PROGRESS REPORT 2021

CROP PRODUCTION

AGRONOMY

ALL INDIA CO-ORDINATED RICE IMPROVEMENT PROGRAMME (AICRIP)

ICAR- INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRA NAGAR, HYDERABAD – 500030
website: http://www.icar-iirr.org
email: director.iirr@icar.gov.in

4. AGRONOMY

CONTENTS

Annexure I to V

4. AGRONOMY

SUMMARY

AICRP Crop production experiments were conducted by Agronomists, Soil scientists and Physiologists at different locations during *rabi* 2020-21-20 and *kharif* 2021 for understanding the response of rice crop to management practices, resource conservation and climatic variations for developing efficient crop and resource management technologies that maximize the productivity and ensure high profitability to double the farmers income on a sustainable basis are compiled in this report.

A total of 245 were experiments conducted at 45 (35 funded and 10 voluntary centers) locations consisting of evaluation of promising cultivars (132 cultures) belonging to 18 groups *Viz.*, early hill (irrigated), Upland Hill (UH), early (TP and DS), IME, IM, Late, RSL, CSTVT, AL& SATVT, Aerobic. Biofortified, NIL (HT- herbicide - resistant mutant and Nitrogen and Phosphorous use efficiency) AVT-1 BT trials in the transplanted situation, for their response to integrated nutrient management at 50 and 100% Recommended dose of fertilizer (RDF). In addition, six trials on cultural management, four trials each on weed management and three in rice based cropping systems and climate resilient agriculture. Most of the trials were collaborative trials with Soil science (2), Entomology (2), and Pathology (2) while all nutrient management trials were in collaboration with Plant Breeding to develop cost effective cultivars and technologies in rice and rice based cropping systems.

4.1. NUTRIENT MANAGEMENT TRAILS (NMT)

The development of high- yielding and improved varieties and hybrids is one of the major components of rice production technology. In rice growing regions, nutrient management is also the most important yield limiting factor for production. Adaptation of cultivars with high Nutrient use efficiency in two different planting situations and nutrient management is a potential strategy for optimizing nutrient requirements, lowering cost of cultivation and reducing the environmental pollution. Optimization of nutrient use not only enhances grain yield through better nutrient use efficiency but also reduces the cost of cultivation. In order to find out the production potential of promising cultivars and their response to varying levels of nutrients and to identify the optimum dose, the effect on late planted rice situations and efficient N and P cultivars, Nutrient management trials (NMTs)were constituted and conducted during *kharif* 2021. A total of 132 AVT-2 entries belonging to 18 categories were evaluated at different locations under two levels of nutrient application, i.e., 50 and 100 % of the recommended dose of nutrients along with standard and local cultivars to identify stable and efficient genotypes.

4.1 Nutrient response trials on selected AVT-2 rice cultures under high and low input management

4.1(a) NMT AVT-2 EH (Irrigated)

Cultures Viz., IET 28200 and IET 28206 were evaluated with Shalimar Rice 3, Vivekdhan 86, VL Dhan 86 and local check at three locations **(Almora, Khudwani and Malan)** indicated the superiority of 100% RFD over 50% and also exhibited higher nutrient recovery at all the locations. Popular varieties like Vivek Dhan-86 and tested culture IET 28200 were found to be promising based on grain yield efficiency index.

4.1(b) NMT AVT-2 UH

One IET culture Viz., IET 28230 was evaluated at two locations (**Almora and Malan**) indicated the application of 100% RFD gave significantly higher yield in Almora (2.59 t/ha) and Malan (3.14 t/ha). Nutrient response (kg grain / kg N) was higher also at 100% RDF. Among the cultures, IET 28230 was found to be promising in terms of higher grain yield efficiency index and grain yield (2.82 t/ha at Almora and 3.31 t/ha at Malan).

4.1(c) NMT – AVT 2 Early (Direct seeded)

The trial conducted at seven locations ***Viz.*****, Chiplima (80:40:40), Hazaribagh (60:30:20), Jagdalpur (100:60:40), Ranchi (60:30:30), Sabour (100:40:20), Vadagaon (100:50:50)** and **Varanasi (100:50:50).** under two recommended doses of fertiliser (50% and 100% RDF) with 2 AVT-2 entries Viz., IET 28241 and 28248 compared with standard, popular and local varieties. None of the IET cultures found promising over popular varieties and local checks emphasises the need for focused breeding efforts. The application of 100% NPK recorded higher grain yield and also exhibited higher nutrient recovery.

4.1(d) NMT AVT-2 E (Transplanted)

Promising AVT-2 cultures (ten) of early duration were evaluated (IET 26790, IET 28329, IET 28354, IET 28343, IET 28358, IET 28332, IET 28356, IET 28115, IET 28366 and IET 26898) for their response to nutrients on grain yield at fifteen locations Viz., **Viz. Coimbatore, Dhangain , Faizabad, Ghahraghat, Hazaribagh, Jagdalpur , Karjat, Mandya, Maruteru, Nagaina, Ranchi, Rewa Sabour , Vadgaon and Varanasi** under two different doses of fertilisers (50% and 100% RDF) application. The results indicated that recommended input of nutrients (100% RDF) was found to be promising with 12% higher grain yield and also exhibited higher nutrient efficiency. IET 28329 and IET 28358 recorded higher grain yields of 4.70 and 4.67 t/ha, respectively were found to be promising entries as compared to standard and local checks

4.1(e) NMT AVT -2 IME (Transplanted)

AVT-2 entries (IET 28396, IET 28032 (R) and IET 280 33 (R) of medium early duration group were evaluated for their response to nutrients and grain yield at sixteen locations

Viz., **Aduthurai, ARI-Rajendranagar, Chinsurah, Dhangain, Faizabad ,Gangavathi, Ghaghraghat, Karjat, Kota, Mandya, Maruteru, Nagina, Navsari, Nawagam, Puducherry and Varanasi** under two different levels of nutrient input (50% and 100% RDF). Application of 100% RDF recorded higher grain yields and also exhibited higher nutrient recovery at all the locations. IET 28396 (4.70 t/ha) and IET 28302 (4.36 t/ha) performed better and recorded higher mean grain yield across the locations as compared to other test entries and cultures.

4.1(f) NMT AVT-2 IM

Two AVT-2 entries (IET 28130(H) and IET 27686) of medium duration were tested for their response to nutrients on grain yield at seventeen different locations Viz., **Chinsurah, Coimbatore, Dhangain, Faizabad, Jagdalpur, Karjat, Kaul, Kota, Maruteru, Nagina, Nawagam, Pantnagar, Puducherry, Pusa, Titabar, Varanasi and** Kaul under two different levels of nutrient input (50% and 100% RDF). Mean over the locations IET 28160(H) found promising over IET 27686 based on overall mean grain yield across the locations. Application of 100% RDF of the location was found significantly superior to 50% RDF application at all the locations.

4.1(g) NMT AVT-2 Late

Four AVT-2 Late entries (IET 28501, IET 28538, IET 28544 and IET 29209 were evaluated for its response to graded levels of nutrients on grain yield and yield attributes at seven locations i.e. **Aduthurai, Chinsurah, Chiplima ,Dhangain, Karjat, Mandya** and **Maruteru** under two levels of RDF (50% and 100% RDF). 100% RDF was found to be promising with 19 % increased grain yield and also exhibited higher nutrient recovery efficiency. IET cultures were found to be promising in terms of higher grain yield at most of the locations (IET 28501, IET 28538 and IET 29209) and recorded better yields at 100% RDF of respective locations.

4.1(h) NMT AVT-2 RSL

Seven AVT-2 cultures (IET 29026, IET 27538, IET 29031, IET 29032, IET 26744, IET 28281 and IET 27547) of rainfed shallow land were evaluated for their response to levels nutrients on grain yield at **Chinsurah, Dhangain , Faizabad , Ghaghraghat ,** and **Pusa** under two levels of RDF (50% and 100% RDF). The results indicated that 100% RDF was found to be promising and also exhibited higher nutrient recovery efficiency. Among the IET cultures, IET 27538 followed by IET 28281 and IET 27547 (4.43 to 5.01 t/ha) were found promising in terms of higher mean grain yield and nutrient response.

4.1(i) NMT AVT-2 CSTVT

Saline tolerant two cultures Viz., IET 27847 (H) and IET 27051 were evaluated in comparison with standard varieties (CSR 10, Jaya, GNR-5 and GNR-19) at **Navsari, Panvel, Nagina** and **Canning town** under two recommended level of input (50 and 100% RDF). In this trial also, 100% RDF was found to be promising and also exhibited higher nutrient

recovery. AVT-2 entry IET 27051 was found to be promising in terms of grain yield and better nutrient response.

4.1(j) NMT AVT-2 AL ISTVT

Saline tolerant cultures Viz., IET 28608, IET 28608, IET 27823 and IET 27807 were tested for their response to different levels of nutrients on grain yield at three different locations i.e. **Lucknow, Navsari** and **Pusa. The results indicated that** 100% RDF was found to be promising with 31% higher yield and also exhibited higher nutrient efficiency, while IET 28606 (3.33 t/ha) followed by IET 28608 (3.24 t/ha) were promising cultures and recorded higher mean grain yield over other test entries.

4.1(k) NMT AVT 2 Aerobic

Two AVT-2 entries (IET 25653 and IET26178) were evaluated for their response to two fertilizer levels on grain yield at seven locations *Viz.*, **Hazaribagh, Jagdalpur, Kota , Ludhiana , Nawagam, Raipur and Vadgaon.** The application of 100% RDF was found to be promising (37% higher grain yield) and also exhibited a higher nutrient response. Aerobic culture, IET 26178 was found to be promising with higher grain yield (4.16 t/ha) across the locations and found suitable across the locations

4.1 (l) NMT AVT-2 Biofortified

AVT-2 Biofortified cultures Viz., IET 28714 and IET 27984 were evaluated for their response to different levels of nutrients (50% and 100% RDF) on grain yield from six locations Viz., **Kaul, Kota, Nagina, Pusa, Raipur and Warangal.** Application of 100% RDF recorded significantly a higher grain yields at **all the locations** with higher nutrient response and IET 28714 and IET 27984 were found to be promising and recorded higher mean grain yields across the locations.

4.1(m) NMT AVT 2 MS

Five entries (IET 28757, IET 28746 and IET 28730) of medium slender group were evaluated for their response to two levels of nutrients (50% and 100% RDF) on grain yield at nine i.e., **ARI-Rajendranagar, Dhangain , Faizabad , Karjat, Kaul, Mandya, Maruteru, Nagina** and **Raipur**. In this trial, the application of 100% RDF was found to be promising (33% higher yield) and also exhibited higher nutrient response. Entries like IET 28730 and IET 2746 were found to be promising with better yields over other test entries and checks at 100% of RDF application at respective locations.

4.1n(i) NMT – NIL - IVT LNT

The trial was conducted at seven locations (**Gangavathi**, **ICAR-IIRR, Karjat, Mandya, Ranchi, Vadgaon and Ludhiana**) to identify the promising cultures for low N application and a total of 35 advanced cultures tested. Trial revealed that IET 29583, IET

29584, IET 29577, IET 30261, IET 28084, IET 30275 and IET 29564 were the high yielding and high nitrogen use efficient cultivars and promising over other cultures across the locations. Most of the cultures were promising at higher dose of N application.

4.1n(ii) NMT – IVT NIL – LPT

The trial was conducted at seven locations (**Gangavathi, Karjat, Mandya, IIRR, Raipur, Vadagaon and Varanasi**) with 4 main plots of phosphorus levels (P_1- No Phosphorus (Control) (N and K Constant), P_2: 50 %of recommended P dose (N and K is constant), P_3: 100 % of recommended dose of P and P_4: 150% of recommended P dose (N and K constant) and Subplots consist of 36 advanced cultures and six checksMean over the location (seven location) all the cultures were 'P' responsive except at **Gangavathi** where in soil 'P' level is very high. Among the cultures, across the locations the culture IET 30232 (5.29 t/ha) followed by IET 30230(5.27 t/ha), IET 30247 (5.25 t/ha) and IET 30242 (5.21 t/ha) found promising gave better yields over cultures.

4.1n(ii) NMT – AVT NIL – LPT

The trial was conducted at eight locations (**Gangavathi, Karjat, Mandya, ICAR-IIRR, Ranchi,Raipur, Vadagaon and Varanasi**) with 4 main plots of phosphorus levels (P_1- No Phosphorus (Control) (N and K Constant), P_2: 50 %of recommended P dose (N and K is constant), P_3: 100 % of recommended dose of P (N and K Constant) and P_4: 150% of recommended P dose (N and K constant) with six advanced cultures and six checks . Mean over the location (seven location) all the cultures were 'P' responsive except at **Gangavathi** where in soil 'P' level is very high. Among the cultures, across the locations the culture IET 28821 (5.49 t/ha) followed by IET 27641(5.27 t/ha), IET 28816 (4.87 t/ha) and IET 28066 (4.64 t/ha) found promising and gave better yields over other cultures and on par with checks.

4.1(o) NMT AVT 1 NIL - HT (Herbicide Tolerant Genotypes)

The herbicide tolerance in elite genotypes for their efficacy was taken up at **ICAR-NRRI, Hazaribagh, Ranchi, Titabar and Varanasi**. The results indicated the superiority of the Bispyribac-sodium followed by Imazethapyr found promising herbicides. The genotypes G1 (CR 4333-181-1-2-1), G2 (CR 4333-35-2-2-1), G4 (CR 4332-184-2-2-1) and G5 (CR 4332-37-2-1-1) with no or low phytotoxicity to Imazethapyr have contributed to higher crop growth and grain yield with standard pre- and post-emergence applications of Bispyribac-sodium and Imazethapyr.

4.1 (p) NMT AVT 1 NIL - BAS HT (Herbicide Tolerant Genotypes)

The trial was conducted at **Kaul**, **Ludhiana, Nagina** and **Pantnagar** with 10 genotypes. The results of study of HT genotypes (Basmati) showed that at all the locations, irrespective of genotypes tested, weed-free check has resulted in significantly higher crop growth, yield attributes and grain yield. The herbicide treatment of standard pre and post-emergence application of Pendimethalin and Bispyribacsodium resulted in a higher yield, yield

attributes and growth parameters. Among the tested genotypes, 1815 and 1823 were superior across the locations. The genotypes 1815 and 1823 with no or low phytotoxicity to Imazethapyr have contributed to higher crop growth and grain yield with standard pre and post-emergence applications of Pendimethalin, Bispyribacsodium. The trends of the results were similar to earlier kharif 2020 season.

4.1 (q) NMT – AVT 2 BT

Ten BT cultures (1901 to 1912) were evaluated for their response to nutrient application in terms of grain yield and yield attributes at four locations i.e., **Kaul, Ludhiana, Nagina** and **Pantnagar under** two different nutrient levels (50% and 100% RFD). In this trial application of 100% RFD was found promising and most of the IET cultures (IET 1902 and 1907) were superior to local checks. (*yet to receive codes from IARI*)

4.2 CULTURAL MANAGEMENT TRIAL (CMT)

4.2.1. Development of package of practices for mechanized transplanting

The trial was conducted at 5 locations (**Chiplima, Ludhiana, Rajendranagar, Warangal and Aduthurai**). Split plot design was adopted with 5 main plots of crop establishments {M_1: Normal Planting Time Mechanical Transplanting (15 days seedlings and recommended spacing); M_2: Delayed Planting time (15 days late) Mechanical Transplanting (15 days seedlings and recommended spacing); M_3: Manual transplanting – Normal time (25 days old seedlings); M_4: Manual transplanting-Delayed sowing time (25 days old seedlings) and 3 subplots consists of local latest released rice varieties}.

Mechanical transplanting (15 days' seedlings and recommended spacing) at normal planting time resulted in significantly the highest grain yield in all the locations

4.2.1a. Developing suitable package of practices for dry DSR

The trial was conducted at 14 locations (**Gangavathi, Khudwani, Kota, Ludhiana, Mandya, Nagina, Nawagam, Pantnagar, Pusa, Raipur, Ranchi and Varanasi**). Split plot design was adopted with 6 main plots of sowing methods (S_1: Broadcasting of seeds and S_2: Manual line sowing of seeds (20-25 cm row spacing sown in solid row), S3: Mechanized line sowing of seeds (Dribbler, Happy seeder of any Drum seeder, spacing as per the equipment specifications), S_4: Raised bed sowing, S_5: Any improved system in that particular location and S_6: Semi-dry system (sowing in dry soil and wet after one month of sowing). Four subplots consist of W_1: Manual weeding (3 times); W_2: Pre + post-emergence herbicide; W_3: Pre-emergence herbicide + manual weeding (two times) and S_4: Mechanical weeding (2-3 times start from 15 DAS at 15-20 days' interval).

Improved system of that particular region found to be best in terms of grain yield in most of the locations. Similarly, pre-emergence + manual weeding twice was effective in controlling weeds and resulted in the highest grain yield.

4.2.1b. Developing suitable package of practices for wet DSR

The trial was conducted at 14 locations (**Aduthurai, Chatha, Chiplima, Coimbatore, Karjat, Kota, Moncompu, Navsari, Nawagam, Puducherry, Pusa, Rewa, Titabar, Tuljapur, Khudwani, Vadagaon, Varanasi** and **Warangal**). RBD design was adopted with seven treatments consist of S_1: manual broadcasting of seeds; S_2: Drum seeding + post-emergence herbicide; S_3: Broadcasting + Post-emergence herbicide; S_4: Drum seeding + mechanical weeding; S_5: Drum seeding + post-emergence + mechanical weeding; S_6: Drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application; S_7: Local wet-DSR.

Local wet direct seeded practices found to be best management practices to get higher grain yield across all the locations.

4.2.3(a)Yield maximization of rice in different zones (new trial initiated in *kharif* 2020)

The trial consisted of 8 treatments and laid out in RBD design with 3 replications. Treatments are T_1: RDF as per site-specific nutrient management; T_2: T_1 + FYM @ 10t/ha; T_3: 125% of T_1; T_4: 150% of T_1; T_5: T_1 + sampoorna (KAU) @ 10g/l (250 l/ha) micronutrient spray (55-60 DAT); T_6: T_1 + Eco-Agra spray 3 times @1 litre in 300 litre of water (25, 40 and 55 DAP); T_7: Farmers fertilizer dose and T_8: Optional (location specific). The trial was conducted at **Chinsurah, Gangavathi, Khudwani, Kota, Malan, Mandya, Pantnagar, Pattambi, Raipur, Ranchi, Titabar** and **Ghaghraghat**. The trial was conducted in in two locations (**Chinsura** and **Karaikal**) in *rabi* 2020-21.

RDF + FYM 10 t/ha found to be the best treatment to increase the grain yield across all the locations.

4.2.4 Enhancing productivity of organic rice cultivation (new trial initiated in *kharif* 2020)

The trial consists of 7 treatments laid out in RBD design with 3 replications. Treatments are T_1: Absolute control (No NPK); T_2: 100% RDN; T_3: 100% N (FYM); T_4: 150% N (FYM); T_5: 50% N (FYM) + 50% N (Green Leaf Manure); T_6: 50% N (FYM) + 50% N (Vermicompost); T_7: 50% N (FYM) + 50% N (Neem / Castor / any cake) and two optional treatments i.e. T_8: 75% RDN 50% each through FYM + Vermicompost; FYM as basal and VC 20 days after transplanting + Panchgavya + Jeevamrit + Ghanjeevamrit and T_9: Best state organic practice. The trial was conducted in *rabi* 2020-21 in two locations (Chinsura and Karaikal).

Apart from 100% RDN through inorganic source, state organic management practices resulted the highest grain yield in all the locations.

4.2.5. Water management for enhancing water use efficiency in different rice establishment methods

To evaluate the suitable and promising irrigation management practices in different crop establishment methods a trial was formulated and conducted at 3 locations (**Chatha**, **Mandya and Nawagam**). Split plot design was adopted with 3 main plots of irrigation management {I_1: Flooding throughout crop growth (3 + / - 2 cm), I_2: Saturation maintenance up to PI and (3 + / - 2 cm) after PI and I_3: Alternate wetting and drying (irrigation at 5 -7 days interval with 5 cm/ha of water (5 cm irrigation at 3 DADPW) up to PI and (3 + / - 2 cm) after PI} and 3 subplots of crop establishment methods {M_1: Mechanical Transplanting method on puddled soil (crop management methods same as for puddled transplanted rice), M_2: Direct

wet seeding on puddled soil (Use of Drum seeder/ dibbling of sprouted seed at 25 x 25 cm) fb crop management practices as per direct wet seeded rice, M_3: Direct dry seeding (Mechanical) 25 cm row spacing and replicated four times. The trial was conducted at 2 locations (Karaikal and Puducherry) in *rabi* 2020-21.

Alternate wetting and drying was the best treatment to enhance the productivity of rice in all locations. Similarly, mechanical transplanting in puddle soil was the best treatment to enhance the productivity of rice crop.

4.2.6. Nano-fertilizers for increasing nutrient use efficiency, yield and economic returns in transplanted rice (New trial)

The trial consisted of seven treatments were T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K) T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stagesT_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI) T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI) T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI) T_6: Control (no application of fertilizer)T7: Optional (Any method/product recommended by University/state dept. for Nano-Nitrogen Products). The trial was conducted in RBD and replicated thrice. The trial was conducted in **15 locations** (Gangavathi, ICAR-IIRR, Jagdalpur, Jagtial, Khudwani, Mandya, Maruteru, Moncompu, Pantnagar, Pattambi, Puducherry, Pusa, Rajendranagar, Warangal and Nellore).

Apart from RDN through urea, 75% of RDN + two foliar spray of nano-urea @ 2% at tilering and panicle initiation stages enhanced the grain yield of rice in all the locations.

4.3. WEED MANAGEMENT TRIALS

4.3.1 Long term trial on weed dynamics in mono or double cropped rice system under different establishment methods

Weeds continue to be a ubiquitous and recurrent threat for rice production due to its ability to shift in response to management practices and environmental conditions.Further long term efficacy and sustainability issues are also the driving forces behind the reconsideration of herbicide dependent weed management.Based on these background issues, the long term trial was initiated in kharif 2019 with the objective of assessing the weed dynamics in different establishment methods and continued during kharif season 2021 at18 locations viz., **Aduthurai, Chatha, Chinsurah, Chiplima, Gangavathi, Ghaghraghat, Jagdalpur, Malan, Moncompu, Nagina, Pantnagar, Pattambi, Pusa, Puducherry, ARI-Rajendranagar, Rewa, Titabarand Varanasi** in replicated split plot design.The treatments consisted of 3 main plots M1 – Mechanised planting/transplanting, M2 – Puddled direct seeding, M3 – Unpuddled dry direct seeding; and four sub plots T1 – Weed free, T2 – Weedy check, T3 – Mechanical weed control using weeder and T4 – Chemical weed control of pre and post emergence herbicide application. The data on crop growth parameters, yield attributes, grain yield, weed parameters (species and group wise weed flora, weed population and weed dry biomass) recorded by the locations are summarized after statistical analyses.The grain yield loss due to

weeds ranged from 14.68% at Rewa to 75.24% at Jagdalpur, depending on the weed intensity and weed flora distribution during the critical period of crop growth.The mean grain yield across the locations varied from 2.39 t/ha at **Chatha** (Variety Basmati370 to 5.41 t/ha at **Puducherry** with VGD1).The crop establishment methods did not show significant difference in grain yields at four out of 18 locations and proved the potentiality of direct seeding system in these regions. At 14 locations, mechanical transplanting system was found superior where the soil type, water availability, other climatic factors were in favor of transplanting over direct seeding.Majority of the locations confirmed that the system of establishment does not influence the trend of group wise weed flora, and no considerable shift in weed species in particular and weed flora in general was recorded in the 2 nd year of the study. At majority of the locations, the weed flora was dominated in the order of grasses, broad leaf weeds and sedges irrespective of the system of establishment. The results of the crop growth parameters, yield attributes and straw yield showed similar trend as that of grain yield. At majority of the test locations, direct seeding system recorded higher weed population (group wise and total) compared to mechanical transplanting; dry direct seeding system recorded higher weed population (group wise and total) compared to wet direct seeded system.Mechanical transplanting has lowest weed biomass and un-puddled direct seeding has highest weed biomass, andamong weed control treatments, chemical weed control treatments recorded lowest.Unlike 2020, in 2021 chemical weed control under the mechanical transplanting / puddled or un-puddled direct seeding systems was found promising and recorded lower weed population and weed dry biomass; higher crop growth, yield attributes and grain yield.

Influence of Establishment methods on pest incidence-*Across the nine locations reported, the incidence of pests was relatively high in machine transplanting, normal transplanting and direct seeding methods as compared to SRI, aerobic rice and semi dry rice methods.*At four locations, the disease incidence was reported. The disease incidence showed that Bacterial leaf blight and Leaf Blast was more in transplanted rice, whereas brown spot incidence was more in unpuddled direct sown rice.

4.3.2. Evaluation of advanced cultures for weed competitiveness under aerobic system

The major constraint in the success of aerobic rice is high weed infestation. Weed control in aerobic rice gets difficult because of shifts in weed flora and herbicide resistance development in weeds. Weed-competitive rice cultivars (with high yield ability) can be an important strategy for reducing cost of weed management in ecofriendly mode. Some of the promising elite cultures were evaluated for their weed competitiveness and identified cultures will be useful in breeding programs in developing weed competitive cultivars.the trial was conducted at six locations viz., Gaghraghat**, Ludhiana, Mandya, Pusa, Rewa and Varanasi.** the mean grain yields ranged from 2.61 t/ha at Mandya to 4.33 t/ha at Ludhiana. The mean grain yield loss due to weeds ranged from **31.63%** at Varanasi to 90.10% at Mandya. At four out of six locations, the yield loss due to weeds was above 50%, which shows the severity of weed problem under aerobic system of cultivation. The dominant weed species are *Echinochloacolona, Echinochloacrusgalli, Cynodondactylon, Digetariasanguinalis, Dinebraretroflexa, Eleusineindica, Leptochloachinensis among grasses; Cyperusiria, Cyperusdifformis, Cyperus procerus, Cyperusrotundus, Fimbristylismiliaceae among sedges; and Ammaniabaccifera,*

*Cyanotisaxillaris, Caesuliaaxillaris, Eclipta alba, Ecliptaprostrata, Ludwigiaparviflora, Sphenocleazeylanica, Spilanthusacmella*among broad leaf weeds.At all the locations, chemical weed control was proved as economic, timely and efficient option along with a good weed competitive cultivar. Among the elite cultures tested at all the locations, independent and interaction effects were significant except Rewa and Varanasi.Among the test genotypes,IET26168 was significantly superior and recorded significantly low group wise and total weed population and weed dry biomass, which in turn contributed tobetter crop growth, yield attributes and grain yield. Followed by IET 26194. These two elite genotypes exhibited superior performance across six locations and useful in breeding program for developing weed competitive varieties.

4.3.3 Sustainable Weed Management in Aerobic rice system

With the objectives of developing sustainable economic and eco-friendly weed control package for the cropping period and evaluating the feasibility of non-chemical weed control options in aerobic rice system, the trial was continued in kharif 2021. The main treatments comprised of 10 weed control practices viz., T-1 mulching with crop residue; T-2 mulching with crop residue followed by one post emergence herbicide application for 2ndflesh of weeds; T-3 mechanical weeding twice or thrice depending on weed intensity; T-4 mechanical weeding followed by post emergence herbicide application; T-5 chemical weed control;T-6 pre emergence herbicide application fb one mechanical weeding; T-7 intercropping with cowpea/horse gram/seabania; T-8 raised bed system of cultivation; T-9 weed free and T-10 weedy check in replicated Randomized Block Design. the trial was conducted at six locations viz., **Chatha**, **Coimbatore**, **ICAR-IIRR, Navsari, Parbhani** and **Ranchi** and the data of crop and weed parameters were analysed, and results revealed that, the mean grain yields ranged from 4.22 t/ha at **Coimbatore** to 2.37 t/ha at **Parbhani**. The mean grain yield loss due to weeds varied from 72.70% at **Chatha** to 37.55% at **Navsari** depending on the intensity of weed problem and cause of yield loss. The treatments of chemical weed control, mechanical weeding followed by post-emergence herbicide application, mulching followed by post-emergence herbicide application were comparable for crop growth parameters, yield attributes and grain yield. The total weed population was higher at maximum tillering and panicle initiation stages. The group-wise dominance of weed population was Grasses>Broad Leaf Weeds>Sedges at four locations and Broad Leaf Weeds>Grasses>Sedges at two locations. The major weed flora recorded over the locations included grass weed species viz., *Echinochloacolona, Echinochloacrusgalli,Dactylacteniumaegyptium,Cynodondactylon,Panicum spp., ,Dinebra spp*. *Digitariasanguinalis* and *Brachiariaerusiformis*; among sedges, *Cyperusiria, Cyperusrotundus, Cyperusdifformis, Fimbristylis spp*.; among BLW, S*olanumnigrum* and *Physalis minima, Ecliptaprostrata,Alternantheraechinata, Commelinabenghalensis, Eclipta alba, Rotaladensiflora, Celosia argentia, Alternantheraechinata, Abutilon indicum, Crozophorarotlerri, Partheniumhisterophorous*. The weed index, weed population and dry weed biomass were significantly low in the treatments of chemical weed control, need based mechanical weeding, mulching followed by post-emergence herbicide application, which in turn resulted in the higher weed control efficiency.

4.3.4 Integrated Pest Management–(Collaborative trial with Entomology and Pathology)

IPM special trial was conducted with an aim to manage pests (including insects, diseases and weeds) in a holistic way in farmers' fields involving them in a participatory way and allowing them to select IPM practices from a basket of options available,at 16 locationsviz. **ARI-Rajendranagar,Coimbatore,Chinsurah, Jagdalpur,Karjat, Kaul. Ludhiana, Malan, Mandya, Navsari, Nawagam, Pusa, Puducherry, Sakoli, Titabarand Vadagaon**in*Kharif*2021 with the objective of managing all pests i.e., weeds, insects, diseases in a holistic way in farmer's fields involving them in a participatory mode. Across the locations, weeds, insect pests, and disease incidence was significantly low in IPM plots. In IPM implemented plots, adoption of the package of biotic stress management resulted in higher grain yields by 37.97% in Zone I comprising Hilly areas,where IPM implementation has to further penetrate into farmers practices; to 8.54 and 8.9% in Zone VII (Southern areas) and Zone II (Northern areas) where Farmer practice was comparable to IPM (farmers are adopting improved rice production technologies). In IPM adopted fields, the mean weed population reduction over the zones ranged from 41.02% in Zone III (Eastern areas) to 100 % in Zone II at active vegetative stage; and at panicle initiation stage, it's range is from 33.55% in zone III to 69.79% in Zone I.The dry weed biomass reported by 12 locations showed that, both at Active Vegetative and Panicle Initiation stages was significantly reduced by 5.67% in Zone I to 64.84% in Zone VI (Western areas); 25.29% in Zone III to 55.28% in ZoneVI (Western areas).

4.4. RESOURCE CONSERVATION TECHNOLOGIES (RCTs) IN RBCS

4.4.1 Conversation Agriculture/system base management practices in rice and rice based cropping systems (crop diversification) to utilise the resources and enhancing the profitability and productivity

Conservation Agriculture (CA) systems are developed for the intensive rice-based cropping systems needs to evaluated in different rice-based cropping systems. To address this issue of soil structure, productivity of the trial on conservation agriculture system management practices in rice and rice-based cropping system were conducted at 4 location Viz. **Vadagaon, Titabar, Ghaghraghat** and **Karjat**. Main plot treatments comprise of three crop establishment methods (M1 – Transplanting, M2 – Wet seeding (line sowing under puddle condition) and M3: Aerobic rice – Dry rice cultivation). The sub plot treatment consists of 3 different residue/straw management (S1 – No residue, S2 – 15 cm height of rice straw retention and S3 – 30 cm height of rice straw retention). Among the crop establishment methods, the transplanting method gave better yields at most of the locations Viz., **Vadgaon (5.62 t/ha), Titabar (4.42 t/ha), Ghagraghat (5.93 t/ha)** and **Karjat** (4.33 t/ha) due to reduced weed competition. The REY of system productivity was higher at all four locations due to rice-residue incorporation in **Vadagaon, Karjat, Titabar and ARI-Rajendranagar** (9.25 t/ha, 8.59 t/ha, 6.03 t/ha and 7.59 t/ha).

4.4.2 Evaluation of promising cultivars for late planting and management for higher productivity and mitigate the effect of climate change

The trial to evaluate promising cultivars for late transplanting was conducted at **Aduthurai, Chatha, Jagadalpur, Mandya** and **Titabar** under direct sowing in puddle condition (M_1) and normal transplanting (M_2).

The results showed that, there is no significant reduction in grain yield due to delay in planting at most of the locations except at **Jagdalpur** (42% reduction). The grain yield reduction ranged from 6.5 to 21% due to the delay of planting at all other locations. The results indicated that, AD 16028 and ADT 53 at **Aduthurai,** Pusa Basmati 1728 and Jammu Basmati 118 at **Chatha**, AD 17152, AD 08219 and AD 16028 at **Jagdalpur**, CTH 1 and KMP 175 at **Mandya**, Gitesh and Bina 11 at **Titabar** were found promising with better yields under late planting situation

4.4.3 Assessing the performance and yielding ability of kharif sorghum hybrids in Rice-Sorghum sequence cropping system

In rice fallows, sorghum cultivation was found to be high yield potential with reduced inputs and labour. New promising Sorghum hybrids having high yield potential were tested in rice fallows wherein rice cultivated as Transplanted, Wet DSR and Dry DSR method in *Kharif* 2021. The trial was conducted at **Ragolu** and **Mandya** during 2021. Transplanting method gave higher yields at **Ragolu** (6.40 t/ha). Sorghum hybrids in rice-fallows were found to be promising (1.64 to 5 t/ha). CSH25 performed better than IIMRH cultures.

NUTRIENT MANAGEMENT TRIALS

Agronomy - 4

4.1 Nutrient Management trials

The development of high- yielding and improved varieties and hybrids is one of the major components of rice production technology. In rice growing regions, nutrient management is also the most important yield limiting factor for production. Adaptation of cultivars with high Nutrient use efficiency in two different planting situations and nutrient management is a potential strategy for optimizing nutrient requirements, lowering cost of cultivation and reducing the environmental pollution. Optimization of nutrient use not only enhances grain yield through better nutrient use efficiency but also reduces the cost of cultivation. In order to find out the production potential of promising cultivars and their response to varying levels of nutrients and to identify the optimum dose, the effect on late planted rice situations and efficient N and P cultivars, Nutrient management trials (NMTs)were constituted and conducted during *kharif* 2021. A total of 132 AVT-2 entries belonging to 18 categories were evaluated at different locations under two levels of nutrient application, i.e., 50 and 100 % of the recommended dose of nutrients along with standard and local cultivars to identify stable and efficient genotypes.

1. NMT 1 (a) Early hill EH (Irrigated)

Cultivar IET 28200 & IET 28206 were evaluated with Shalimar Rice 3, Vivekdhan 86, VL Dhan 86 and local check at three locations **(Almora, Khudwani and Malan)** under two recommended doses of fertilizer (50% and 100% RFD). The data received from three locations was summarized and presented in **Table 4.1(a)**.

Different doses of fertilizer exhibited varying differences in grain yield and yield attributes at all the three locations. Application of 100% RFD recorded higher yield at **Almora, Khudwani and Malan** (5.83, 2.99 and 5.99 t/ha) and was found significantly superior to 50% RFD at Almora and Malan however at Khudwani the yield difference was not significant. Interaction effects of N doses and varieties was non-significant at Almora and Malan except Khudwani. Averaged across the locations, Nutrient response (kg grain / kg N) was higher at 100% RFD compared to 50% RFD.

The grain yield of the locations with different varieties ranged from 4.62 to 6.58 t/ha in Almora, 1.99 to 4.48 t/ha in Khudwani, 3.45 to 7.05 t/ha in Malan. Grain yield of varieties differed significantly at Almora and Malan with different doses of RFD. Among the varieties tested, local check Vivekdhan 86 (5.61 t/ha) at Almora and (6.67 t/ha) at Malan, Shalimar Rice 4 (4.37 t/ha) at Khudwani were found promising over other varieties. Among the cultures, IET 28200 (6.58 t/ha at Almora and 6.37 t/ha at Khudwani) was found promising. Mean over the three locations, Vivek dhan 86 was found promising over other tested varieties.

In this trial, nutrient management with 100% RFD was found to be promising and also exhibited higher nutrient recovery at all the locations. Popular variety like Vivek Dhan-86 and tested culture IET 28200 were found to be promising based on grain yield efficiency index.

2. NMT 1 (b) Upland hill EH (Irrigated)

Cultivar IET 28230 was evaluated in comparison with local checks at two locations (Almora and Malan) under two fertilizer doses (50% RFD & 100% RFD) under upland hill conditions. The data received from two locations was summarized and presented in **Table 4.1.(b).**

The application of 100% RFD gave significantly higher grain yield at Almora (2.59 t/ha) and Malan (3.14 t/ha). Interaction effect of varieties and fertilizer levels are non-significant at both the centers. Nutrient response (kg grain/kg fertilizer) was higher at 100% RDF as compared to 50% RDF at two locations.

The grain yield of the locations ranged from 1.94 to 3.03 t/ha at Almora and 2.02 to 3.82 at Malan. Among the cultivars tested IET 28230 (2.82 t/ha at Almora and 3.31 t/ha at Malan) was found to be promising. Mean over the locations IET 28230 and Sukardhan1 were found to be promising over other cultivars.

In this trial, integrated agronomic management with 100% RFD was found to be promising and also exhibited higher nutrient recovery. Among the cultures, IET 28230 and Sukardhan 1 were found to be promising in terms of higher grain yield efficiency index.

Grain yield differences among the tested genotypes were significant at all the locations except **Jagadalpur** and **Sabour**. All other test centers, IET cultures didn't yield significantly higher over checks.

In conclusion, 100% of RDF was found promising across the locations with 2% higher grain yield (3.52 t/ha), some of the IET cultures gave significantly higher grain yield over checks.

Table-4.1(a): Summary of data on grain yield and ancillary character of selected NMT- early hill (irrigated) cultures grown under transplanted conditions at low and optimum graded levels of recommended nutrient(NPK) doses, kharif 2021.

Fertilizer-levels	Varieties	ALMORA						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle Weight (g)	Test Wt(g)	Days for 50% flowering	Nutrient res. (kg grain/kg Nutrient) (Base level 50% RDF)
F1 - 50% RFD	V1	5.74	*5*	317	3.43	26.1	98.7	
	V2	5.32	*7*	314	3.36	25.7	98.3	
	V3	4.62	*10*	303	2.86	24.4	86.7	
	V4	5.41	*6*	315	3.37	28.7	98.3	
	V5	5.30	*8*	306	3.09	28.9	87.3	
	V6	-		-	-	-	-	
F2 - 100% RFD	V1	6.58	*1*	323	3.68	26.2	99.3	8.40
	V2	5.99	*2*	327	3.65	27.5	98.7	6.70
	V3	5.05	*9*	309	3.2	25.3	87.7	4.30
	V4	5.80	*3*	323	4.17	28.8	98.0	3.90
	V5	5.75	*4*	315	3.38	28.7	88.3	4.50
	V6	-		-	-	-	-	
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
Means of F levels:								
F1		5.28	*2*	311	3.22	26.76	94	
F2		5.83	*1*	319	3.62	27.32	94	5.56
C.D.(0.05)		0.18		NS	NS	NS	NS	
C.V.(%)		2.11		4.80	13.86	6.41	1.85	
Mean of varieties:								
V1		6.16	*1*	320	3.56	26.18	99	8.40
V2		5.66	*2*	321	3.51	26.60	99	6.70
V3		4.84	*5*	306	3.03	24.87	87	4.30
V4		5.61	*3*	319	3.77	28.75	98	3.90
V5		5.53	*4*	310	3.24	28.80	88	4.50
V6		-		-	-	-	-	
C.D.(0.05)		0.39		NS	0.37	0.84	1.32	
C.V.(%)		5.71		3.59	8.93	2.55	1.15	
Expt. Mean		**5.56**		**315**	**3.42**	**27.04**	**94**	
Soil type		-						
pH		6.80						
Fertilizer levels (kg/ha)								
F1		50:30:20						
F2		100:60:40						
Varieties								
V1		IET 28200						
V2		IET 28206						
V3		Shalimar Rice-3						
V4		Vivekdhan-86						
V5		VL Dhan-85						
V6		Local Check --						
Available NPK in Soil		310:12.48:242						

Table-4.1(a): (Contd.)

Fertilizer-levels	Varieties	KHUDWANI						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle Weight (g)	Test Wt(g)	Days for 50% flowering	Nutrient res. (kg grain/kg Nutrient) (Base level 50% RDF)
F1 - 50% RFD	V1	2.17	*7*	228	2.63	23.7	95.3	
	V2	1.99	*10*	255	2.42	24.1	95.0	
	V3	2.22	*5*	217	2.63	24.7	100.7	
	V4	-		-	-	-	-	
	V5	3.19	*4*	300	3.19	27.4	81.0	
	V6	4.26	*2*	339	3.36	28.7	80.0	
F2 - 100% RFD	V1	2.02	*9*	287	2.71	24.9	97.7	-1.43
	V2	2.05	*8*	295	2.49	24.1	98.0	0.57
	V3	2.18	*6*	263	2.71	25.4	102.0	-0.38
	V4	-		-	-	-	-	
	V5	4.21	*3*	365	3.27	28.2	84.0	9.71
	V6	4.48	*1*	401	3.44	29.3	85.0	2.10
Interaction								
F at same V		0.40		NS	NS	NS	NS	
V at same F		0.48		NS	NS	NS	NS	
Means of F levels:								
F1		2.77	*2*	268	2.85	25.72	90	
F2		2.99	*1*	322	2.92	26.39	93	2.11
C.D.(0.05)		NS		9.20	NS	0.22	0.29	
C.V.(%)		8.68		1.98	4.01	0.55	0.20	
Mean of varieties:								
V1		2.10	*4*	257	2.67	24.30	97	-1.43
V2		2.02	*5*	275	2.46	24.10	97	0.57
V3		2.20	*3*	240	2.67	25.05	101	-0.38
V4		-		-	-	-	-	-
V5		3.70	*2*	333	3.23	27.80	83	9.71
V6		4.37	*1*	370	3.40	29.03	83	2.10
C.D.(0.05)		0.29		28.71	0.20	0.61	1.49	
C.V.(%)		8.13		7.95	5.55	1.90	1.33	
Expt. Mean		**2.88**		**295**	**2.89**	**26.06**	**92**	
Soil type		Silty clay loam						
pH		6.90						
Fertilizer levels (kg/ha)								
F1		60:30:15						
F2		120:60:30						
Varieties								
V1		IET 28200						
V2		IET 28206						
V3		Shalimar Rice-3						
V4		-						
V5		VL Dhan-85						
V6		Local Check: Shalimar Rice-4						
Available NPK in Soil		-						

Table-4.1(a): (Contd.)

Fertilizer-levels	Varieties	MALAN							Over All Mean	*Rank*
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle Weight (g)	Test Wt(g)	Days for 50% flowering	Nutrient res. (kg grain/kg Nutrient) (Base level 50% RDF)		
F1 - 50% RFD	V1	5.41	*6*	200	2.72	29.95	91		4.44	*8*
	V2	4.95	*7*	178	2.68	30.57	86		4.09	*10*
	V3	3.45	*10*	170	2.41	29.20	72		3.43	*12*
	V4	6.49	*2*	248	2.71	31.64	84		5.95	*2*
	V5	-		-	-	-	-		4.25	*9*
	V6	4.91	*8*	223	2.45	32.93	85		4.59	*7*
F2 - 100% RFD	V1	6.37	*3*	257	3.00	31.27	91	11.29	4.99	*4*
	V2	6.19	*4*	245	3.23	31.23	87	14.59	4.74	*6*
	V3	4.61	*9*	230	3.06	29.33	74	13.65	3.95	*11*
	V4	7.05	*1*	257	3.18	32.20	85	6.59	6.43	*1*
	V5	-		-	-	-	-	-	4.98	*5*
	V6	5.73	*5*	204	2.52	33.33	87	9.65	5.11	*3*
Interaction										
F at same V		NS		7.11	0.11	NS	NS			
V at same F		NS		10.01	0.10	NS	NS			
Means of F levels:										
F1		5.04	*2*	204	2.59	30.86	85		4.36	*2*
F2		5.99	*1*	239	3.00	31.47	86	11.15	4.94	*1*
C.D.(0.05)		0.17		9.92	0.02	NS	NS			
C.V.(%)		1.94		2.86	0.46	1.46	1.15			
Mean of varieties:										
V1		5.89	*2*	228	2.86	30.61	91.00	11.29	4.72	*3*
V2		5.57	*3*	211	2.96	30.90	87.00	14.59	4.42	*5*
V3		4.03	*5*	200	2.74	29.27	74.00	13.65	3.69	*6*
V4		6.77	*1*	253	2.95	31.92	84.67	6.59	6.19	*1*
V5		-		-	-	-	-	-	4.61	*4*
V6		5.32	*4*	214	2.49	33.13	87.00	9.65	4.85	*2*
C.D.(0.05)		0.33		5.02	0.08	0.84	1.40			
C.V.(%)		4.93		1.86	2.36	2.20	1.36			
Expt. Mean		**5.57**		**223**	**2.87**	**30.67**	**84**			
Soil type		Silty Clay Loam								
pH		5.70								
Fertilizer levels (kg/ha)										
F1		45:20:20								
F2		90:40:40								
Varieties										
V1		IET 28200								
V2		IET 28206								
V3		Shalimar Rice-3								
V4		Vivekdhan-86								
V5		-								
V6		Local Check : HPR 1068								
Available NPK in Soil		298:45:226								

Table-4.1(b): Summary of data on grain yield and ancillary character of selected NMT- upland hill (irrigated) cultures grown under transplanted conditions at low and optimum graded levels of recommended nutrient(NPK) doses, kharif 2021.

Fertilizer-levels	Varieties	ALMORA						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle Weight (g)	Test Wt(g)	Days for 50% flowering	Nutrient res. (kg grain/kg Nutrient) (Base level 50% RDF)
F1 - 50% RFD	V1	2.60	*3*	310	2.24	22.9	93.3	
	V2	2.08	*9*	301	2.07	24.8	92.0	
	V3	2.44	*5*	306	2.13	22.8	90.3	
	V4	2.09	*8*	302	2.09	27.3	80.3	
	V5	1.94	*10*	300	2.05	26.4	80.7	
F2 - 100% RFD	V1	3.03	*1*	322	2.34	24.9	92.7	7.82
	V2	2.43	*6*	314	2.24	25.4	91.7	6.36
	V3	2.72	*2*	323	2.32	23.3	89.7	5.09
	V4	2.54	*4*	314	2.31	28.8	80.7	8.18
	V5	2.21	*7*	302	2.16	25.9	80.7	4.91
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
Means of Flevels:								
F1		2.23	*2*	304	2.12	24.84	87	
F2		2.59	*1*	315	2.27	25.66	87	6.47
C.D.(0.05)		0.11		NS	NS	NS	NS	
C.V.(%)		2.96		4.93	26.80	2.54	3.84	
Mean of varieties:								
V1		2.82	*1*	316	2.29	23.90	93	7.82
V2		2.26	*4*	308	2.16	25.12	92	6.36
V3		2.58	*2*	315	2.23	23.06	90	5.09
V4		2.32	*3*	308	2.20	28.06	81	8.18
V5		2.08	*5*	301	2.11	26.14	81	4.91
C.D.(0.05)		0.27		NS	NS	1.91	1.71	
C.V.(%)		9.20		3.78	13.98	6.17	1.60	
Expt. Mean		**2.41**		**309**	**2.20**	**25.25**	**87**	
Soil type		-						
pH		5.80						
Fertilizer levels (kg/ha)								
F1		30:15:10						
F2		60:30:20						
Varieties								
V1		IET 28230						
V2		Bhalum 1 (NE)						
V3		Sukardhan 1						
V4		Vivek Dhan 154(N)						
V5		Local check (Vivek Dhan 156)						
Available NPK in Soil		258:14:178						

Table-4.1(b): (Contd.)

Fertilizer-levels	Varieties	MALAN							Over All Mean	*Rank*
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle Weight (g)	Test Wt(g)	Days for 50% flowering	Nutrient res. (kg grain/kg Nutrient) (Base level 50% RDF)		
F1 - 50% RFD	V1	2.79	*6*	234	2.22	28.3	90.3		2.70	*5*
	V2	2.27	*9*	177	2.13	28.5	94.0		2.18	*9*
	V3	3.05	*4*	236	2.35	26.5	90.3		2.75	*4*
	V4	2.02	*10*	198	2.26	24.7	74.0		2.06	*10*
	V5	2.96	*5*	236	2.48	26.3	89.0		2.45	*8*
F2 - 100% RFD	V1	3.82	*1*	256	2.82	28.6	91.0	12.12	3.43	*1*
	V2	2.50	*8*	201	2.32	29.2	95.0	2.71	2.47	*7*
	V3	3.41	*3*	260	2.40	27.1	86.0	4.24	3.07	*2*
	V4	2.52	*7*	202	2.41	25.6	78.7	5.88	2.53	*6*
	V5	3.46	*2*	271	2.53	27.9	89.7	5.88	2.84	*3*
Interaction										
F at same V		NS		8.64	0.16	NS	2.97			
V at same F		NS		7.86	0.20	NS	3.31			
Means of Flevels:										
F1		2.62	*2*	216	2.29	26.84	85		2.42	*2*
F2		3.14	*1*	238	2.50	27.69	86	6.16	2.86	*1*
C.D.(0.05)		0.22		1.79	0.17	0.55	NS			
C.V.(%)		4.94		0.50	4.62	1.28	1.81			
Mean of varieties:										
V1		3.31	*1*	245	2.52	28.44	91	12.12	3.06	*1*
V2		2.39	*4*	189	2.23	28.82	95	2.71	2.32	*4*
V3		3.23	*2*	248	2.38	26.80	86	4.24	2.91	*2*
V4		2.27	*5*	200	2.34	25.17	79	5.88	2.29	*5*
V5		3.21	*3*	254	2.51	27.10	90	5.88	2.64	*3*
C.D.(0.05)		0.24		6.11	0.11	1.10	2.10			
C.V.(%)		6.69		2.20	3.83	3.28	1.96			
Expt. Mean		**2.88**		**227**	**2.39**	**27.26**	**88**			
Soil type		Silty Clay Loam								
pH		5.60								
Fertilizer levels (kg/ha)										
F1		45:20:20								
F2		90:40:40								
Varieties										
V1		IET 28230								
V2		Bhalum 1 (NE)								
V3		Sukardhan 1								
V4		Vivek Dhan 154(N)								
V5		Local check (HPR-2656)								
Available NPK in Soil		315:46.1:236								

4.1(c) NMT – AVT 2 Early (Direct seeded)

Two AVT-2 entries Viz., IET 28241 and 28248 were evaluated for its response to low and optimum level of nutrients application on grain yield in comparison to standard varieties i.e. Sahbhagidhan, Vandana, Govind, NDR-97, Varalu and local checks at seven locations **Viz., Chiplima (80:40:40), Hazaribagh (60:30:20), Jagdalpur (100:60:40), Ranchi (60:30:30), Sabour (100:40:20), Vadagaon (100:50:50)** and **Varanasi (100:50:50).** The experiments were conducted in a split plot design at all the locations**.** The main plot treatments were two levels of fertilizer input (50% and 100% RDF) and varieties assigned to sub plots. The data received from these locations are summarized and presented in **Table 4.1(c)**.

Application of different doses of RDF (50% and 100%) exhibited significant influence on grain yield at **all locations except at Jagdalpur and Sabour**. Grain yield increased with increasing level of input from 50% to 100% RFD at these locations. Application of 100% NPK recorded significantly higher yield at **Chiplima** (4.73 t/ha), **Ranchi** (3.83 t/ha), **Vadgaon** (4.80 t/ha) and **Varanasi** (2.38 t/ha), nutrient response (kg grain / kg nutrient) was higher at 100 % RDF and ranged from 3.66 at **Sabour** to 16.43 (**Vadgaon**).

4.1(d) NMT – AVT 2 Early (Transplanted)

Ten AVT-2 entries (IET 26790, IET 28329, IET 28354, IET 28343, IET 28358, IET 28332, IET 28356, IET 28115, IET 28366 and IET 26898) were evaluated for their response to 50% and 100% level of nutrients on grain yield in comparison to standard varieties i.e. Sahbhagidhan, CO 51and PR 124 as well as local checks at fifteen **Viz. Coimbatore (150;50:50), Dhangain (80:40:20), Faizabad (80:40:40), Ghahraghat (120:60:40), Hazaribagh (120:60:40), Jagdalpur (120:60:40), Karjat (100:50:50), Mandya (100:50:50), Maruteru (90:60:60), Nagaina (120:60:40), Ranchi (80:40:30), Rewa (100:60:40), Sabour (100:40:20), Vadgaon (100:50:50) and Varanasi (100:50:50).** The experiments were conducted in a split plot design at all the locations**.** The treatments were two levels of fertilizer input (50% and 100% RDF) as main plot and varieties assigned to sub plots. However, at **Hazaribagh** the entries tested at 100% RDF. The data received from these locations are summarized and presented in **Table 4.1(d)**.

Different doses of RDF (50% and 100%) exhibited significant differences on grain yield at most of the locations except **Jagdalpur** and **Mandya**. Grain yield increased with increasing level of input from 50 to 100% RFD at all the locations. Application of 100% NPK recorded significantly higher yield at **Coimbatore** (5.83 t/ha), **Dhangain** (4.33 t/ha), **Faizabad** (4.06 t/ha), **Karjat** (4.05 t/h), **Jagdalpur** (5.28 t/ha), **Karjat** (4.23 t/ha), **Mandya** (4.38 t/ha), **Maruteru** (5.36 t/ha), **Nagina** (4.27 t/ha), **Ranchi** (4.66 t/ha), **Rewa** (5.37 t/ha), **Sabour** (5.00 t/ha), **Vadagaon** (5.11 t/ha) and **Varanasi** (4.59 t/ha). Nutrient response (kg grain / kg nutrient) was higher at application of 100 % RDF at **Coimbatore** (11.47), **Dhangain** (19.16),

Karjat (9.96), **Nagina** (15.76), **Vadgaon**(16.78), **Varanasi** (11.92) followed by **Ghaghraghat** (6.56), **Maruteru** (8.23 t/ha), **Ranchi** (5.40), **Rewa** (7.86), **Sabour** (4.53) and **Mandya** (2.94) compared to 50% NPK.

Grain yield differences among the tested genotypes were significant at all the locations except at **Dhangain**. All the test entries found significantly superior over checks in all the centres except **Rewa**. Significant higher mean maximum yield was recorded by IET 28366 (5.89 t/ha) followed by IET 28343 (5.73 t/ha) at **Coimbatore;** IET 28332 at **Dhangain** (4.45 t/ha); IET 28343 at **Faizabad** (4.37 t/ha); at **Ghagharaghat** (4.42 t/ha); IET 28358 at **Hazaribagh** (6.17 t/ha), IET 28329 at **Jagdalpur** (8.09 t/ha) and **Maruteru** (6.01 t/ha); IET 26898 (4.33 t/ha) at **Karjat** and IET 26790 (4.90 t/ha) at **Mandya** and **Nagina** (3.67 t/ha) and **Sabour** (5.52 t/ha); IET 28354 (5.32 t/ha) at **Ranchi;** IET 28332 (4.70 t/ha) at **Vadgaon** and IET 26790 (4.75 t/ha) followed by IET 28329 (4.72 t/ha) at **Varanasi** found promising. Mean over the locations, the performance of IET 28329 (4.70 t/ha) followed by IET 28358 (4.67 t/ha) were promising over Sahbhagidhan (3.97 t/ha). Interaction effects of nutrient levels x cultivars on grain yield was non-significant at most of the locations.

In this trial, recommended input of nutrients (100% RDF) was found to be promising with 12% higher grain yield and also exhibited higher nutrient efficiency. IET 28329 and IET 28358 recorded higher grain yield of 4.70 and 4.67 t/ha, respectively were found to be promising entries as compared to standard and local checks.

Table 4.1(c): Summary of data on grain yield and ancillary characters of selected NMT Early (Direct Seeded) cultures grown under direct sowing at graded levels of recommended fertilizer doses, kharif 2021.

F-levels	Varieties	CHIPLIMA						HAZARIBAGH					
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering
F1: Low input (50% NPK)	V1	3.89	8	204	20.70	69		-	-	-	-	-	
	V2	4.15	6	207	21.03	75		-	-	-	-	-	
	V3	4.92	2	224	22.60	81		-	-	-	-	-	
	V4	-	-	-	-	-		-	-	-	-	-	
	V5	-	-	-	-	-		-	-	-	-	-	
	V6	4.67	4	214	21.50	78		-	-	-	-	-	
F2: Medium input (100% NPK)	V1	4.15	6	213	20.53	73	3.25	2.32	3	317	9.57	25.58	74
	V2	4.33	5	222	21.37	80	2.25	2.48	2	217	14.10	25.50	80
	V3	5.65	1	234	23.13	88	9.13	2.73	1	385	8.24	23.22	82
	V4	-	-	-	-	-		1.15	5	200	7.14	23.70	61
	V5	-	-	-	-	-		1.67	4	289	10.36	18.64	87
	V6	4.78	3	225	21.60	82	1.38	-	-	-	-	-	
Interaction													
F at same V		0.06		NS	NS	NS							
V at same F		0.06		NS	NS	NS							
F1		4.41	2	212	21.46	76		-	-	-	-	-	
F2		4.73	1	224	21.66	81	4.00	2.07	1	282	9.88	23.33	77
C.D.(0.05)		0.05		6.22	NS	1.29		0.72		NS	NS	1.40	2.44
C.V.(%)		0.59		1.63	0.91	0.94		18.47		30.46	27.10	3.19	1.69
Mean of varieties:													
V1		4.02	4	209	20.62	71	3.25	2.32	3	317	9.57	25.58	74
V2		4.24	3	215	21.20	78	2.25	2.48	2	217	14.10	25.50	80
V3		5.29	1	229	22.87	84	9.13	2.73	1	385	8.24	23.22	82
V4		-	-	-	-	-		1.15	5	200	7.14	23.70	61
V5		-	-	-	-	-		1.67	4	289	10.36	18.64	87
V6		4.73	2	220	21.55	80	1.38						
C.D.(0.05)		0.04		4.31	NS	NS							
C.V. (%)		0.72		1.57	1.04	1.21							
Expt. Mean		**4.57**		**218**	**21.56**	**78**		**2.07**		**282**	**9.88**	**23.33**	**77**
Soil type		-						-					
pH				-				-					
F - levels (kg/ha)													
F1		40:20:20						-					
F2		80:40:40						-					
Recommended N:P:K (kg/ha)		80:40:40						-					
Varieties													
V1		IET 28241						IET 28241					
V2		IET 28248						IET 28248					
V3		Sahbhagidhan (NC)						Sahbhagidhan (NC)					
V4		-						Vandana					
V5		-						Varalu					
V6		Local Check : Mandakini (110 Days)						-					
Available N:P:K of soil (kg/ha)		118:40:116						-					

Table-4.1(c) (Contd…)

F-levels	Varieties	JAGDALPUR						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle Weight (g)**	**Test weight (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input (50% NPK)	V1	1.83	6	204	12.61	30.99	66	
	V2	2.80	1	204	2.64	31.61	71	
	V3	2.30	3	206	2.90	27.34	69	
	V4	-	-	-	-	-	-	
	V5	-	-	-	-	-	-	
	V6	2.13	5	152	2.92	26.26	84	
F2: Medium input (100% NPK)	V1	1.83	6	276	2.50	28.34	66	0.00
	V2	1.57	8	254	2.80	28.24	71	-12.30
	V3	2.60	2	238	2.60	24.89	69	3.00
	V4	-	-	-	-	-	-	
	V5	-	-	-	-	-	-	
	V6	2.27	4	215	2.62	24.75	84	1.40
Interaction								
F at same V		0.75		81.15	NS	4.99	0.00	
V at same F		1.01		74.07	NS	4.33	0.00	
F1		2.27	1	192	5.27	29.05	73	
F2		2.07	2	246	2.63	26.56	73	-1.98
C.D.(0.05)		NS		29.51	NS	0.37	NS	
C.V.(%)		26.11		7.68	152.28	0.76	0.00	
Mean of varieties:								
V1		1.83	4	240	7.56	29.67	66	0.00
V2		2.19	3	229	2.72	29.93	71	-12.30
V3		2.45	1	222	2.75	26.12	69	
V4		-	-	-	-	-		
V5		-	-	-	-	-		
V6		2.20	2	184	2.77	25.51	84	1.40
C.D.(0.05)		NS		57.38	NS	NS	NS	
C.V. (%)		19.36		20.86	160.40	10.09	0.00	
Expt. Mean		**2.17**		**219**	**3.95**	**27.80**	**73**	
Soil type		-						
pH		6.32						
F - levels (kg/ha)								
F1		50:30:20						
F2		100:60:40						
Recommended N:P:K (kg/ha)		100:60:40						
Varieties								
V1		IET 28241						
V2		IET 28248						
V3		Sahbhagidhan (NC)						
V4		-						
V5		-						
V6		Local Check- Samleswari (120 Day)						
Available N:P:K of soil (kg/ha)		238:17:278						

Table-4.1(c) (Contd…)

F-levels	Varieties	RANCHI					
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Test weight (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input (50% NPK)	V1	3.96	3	207	24.24	86	
	V2	3.24	7	170	23.80	78	
	V3	3.65	5	191	24.00	82	
	V4	-	-	-	-	-	
	V5	-	-	-	-	-	
	V6	3.17	8	165	23.75	70	
F2: Medium input (100% NPK)	V1	4.40	1	231	24.85	89	8.00
	V2	3.76	4	196	24.29	81	9.45
	V3	4.04	2	211	24.60	87	7.09
	V4	-	-	-	-	-	
	V5	-	-	-	-	-	
	V6	3.52	6	184	24.25	74	6.36
Interaction							
F at same V		NS		31.45	0.54	1.57	
V at same F		NS		29.95	0.59	1.68	
F1		3.51	2	183	23.95	79	
F2		3.93	1	205	24.50	83	7.73
C.D.(0.05)		0.37		15.73	0.44	1.24	
C.V.(%)		5.66		4.61	1.04	0.87	
Mean of varieties:							
V1		4.18	1	219	24.55	88	8.00
V2		3.50	3	183	24.05	79	9.45
V3		3.85	2	201	24.30	84	7.09
V4		-	-	-	-	-	
V5		-	-	-	-	-	
V6		3.35	4	174	24.00	72	6.36
C.D.(0.05)		0.38		22.24	NS	NS	
C.V. (%)		8.21		9.11	1.26	1.09	
Expt. Mean		**3.72**		**194**	**24.22**	**80.83**	
Soil type		Sandy Loam					
pH		5.05					
F - levels (kg/ha)							
F1		30:15:10					
F2		60:30:20					
Recommended N:P:K (kg/ha)		60:30:20					
Varieties							
V1		IET 28241					
V2		IET 28248					
V3		Sahbhagidhan (NC)					
V4							
V5							
V6		Local Check- BVD 111					
Available N:P:K of soil (kg/ha)		210:15:157					

Table-4.1(c) (Contd…)

F-levels	Varieties	SABOUR					
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle Weight (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input (50% NPK)	V1	4.38	5	210	3.18	83	
	V2	4.21	8	244	3.60	82	
	V3	4.24	6	246	3.00	85	
	V4	-	-	-	-	-	
	V5	-	-	-	-	-	
	V6	4.24	6	242	3.22	85	
F2: Medium input (100% NPK)	V1	4.56	3	216	3.23	83	2.25
	V2	4.45	4	254	3.72	82	3.00
	V3	4.57	2	255	3.08	85	4.13
	V4	-	-	-	-	-	
	V5	-	-	-	-	-	
	V6	4.66	1	251	3.33	85	5.25
Interaction							
F at same V		NS		21.73	0.31	0.81	
V at same F		NS		32.39	0.50	0.76	
F1		4.27	2	235	3.25	84	
F2		4.56	1	244	3.34	84	3.66
C.D.(0.05)		NS		NS	NS	NS	
C.V.(%)		10.04		8.08	9.30	0.24	
Mean of varieties:							
V1		4.47	1	213	3.21	83	2.25
V2		4.33	4	249	3.66	82	3.00
V3		4.41	3	251	3.04	85	4.13
V4		-	-	-	-	-	
V5		-	-	-	-	-	
V6		4.45	2	246	3.28	85	5.25
C.D.(0.05)		NS		15.36	NS	NS	
C.V. (%)		4.36		5.10	5.32	0.55	
Expt. Mean		**4.41**		**240**	**3.30**	**84**	
Soil type		-					
pH			-				
F - levels (kg/ha)							
F1		50:20:10					
F2		100:40:20					
Recommended N:P:K (kg/ha)		100:40:20					
Varieties							
V1		IET 28241					
V2		IET 28248					
V3		Sahbhagidhan (NC)					
V4							
V5							
V6		Local Check- Sabour Harshit					
Available N:P:K of soil (kg/ha)		-					

Table-4.1(c) (Contd…)

F-levels	Varieties	VADGAON						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle Weight (g)**	**Test weight (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input (50% NPK)	V1	3.47	5	203	3.13	25.00	79	
	V2	3.35	6	196	3.01	23.40	78	
	V3	3.20	7	187	2.88	21.41	79	
	V4	-	-	-	-	-	-	
	V5	-	-	-	-	-	-	
	V6	2.92	8	171	2.63	14.85	78	
F2: Medium input (100% NPK)	V1	5.30	1	310	4.77	25.60	78	18.30
	V2	5.06	2	296	4.55	24.17	78	17.10
	V3	4.63	3	270	4.16	22.05	78	14.30
	V4	-	-	-	-	-	-	
	V5	-	-	-	-	-	-	
	V6	4.52	4	259	3.98	14.83	79	16.00
Interaction								
F at same V		NS		10.75	0.17	0.57	2.46	
V at same F		NS		11.30	0.18	0.52	2.61	
F1		3.24	2	189	2.91	21.17	79	
F2		4.88	1	284	4.37	21.66	78	16.43
C.D.(0.05)		0.32		8.11	0.13	0.23	NS	
C.V.(%)		4.54		1.95	1.97	0.62	1.38	
Mean of varieties:								
V1		4.39	1	257	3.95	25.30	79	18.30
V2		4.21	2	246	3.78	23.79	78	17.10
V3		3.92	3	229	3.52	21.73	79	14.30
V4		-	-	-	-	-	-	
V5		-	-	-	-	-	-	
V6		3.72	4	215	3.31	14.84	79	16.00
C.D.(0.05)		0.15		NS	0.12	NS	NS	
C.V. (%)		3.02		2.56	2.57	1.48	1.77	
Expt. Mean		**4.06**		**237**	**3.64**	**21.41**	**78**	
Soil type		-						
pH		7.78						
F - levels (kg/ha)								
F1		50:25:25						
F2		100:50:50						
Recommended N:P:K (kg/ha)		100:50:50						
Varieties								
V1		IET 28241						
V2		IET 28248						
V3		Sahbhagidhan (NC)						
V4								
V5								
V6		Local Check- Phule Radha						
Available N:P:K of soil (kg/ha)		152:19:205						

Table-4.1(c) (Contd…)

F-levels	Varieties	VARANASI						Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
F1: Low input (50% NPK)	V1	1.27	8	265	0.92	70		3.13	8
	V2	2.04	4	250	1.73	70		3.30	6
	V3	1.64	7	188	1.09	82		3.33	5
	V4	-	-	-	-	-			
	V5	-	-	-	-	-			
	V6	1.73	6	233	1.34	78		3.14	7
F2: Medium input (100% NPK)	V1	1.87	5	285	0.87	69	6.00	3.49	4
	V2	3.10	1	257	1.43	72	10.60	3.54	3
	V3	2.08	3	299	1.51	80	4.40	3.76	1
	V4	-	-	-	-	-		1.15	10
	V5	-	-	-	-	-		1.67	9
	V6	2.47	2	269	1.66	79	7.40	3.70	2
Interaction									
F at same V		0.25		16.76	0.28	4.06			
V at same F		0.22		14.60	0.25	4.69			
F1		1.67	2	234	1.27	75		3.23	2
F2		2.38	1	277	1.37	75	7.10	3.52	1
C.D.(0.05)		0.06		1.90	0.06	NS			
C.V.(%)		1.72		0.42	2.43	3.00			
Mean of varieties:									
V1		1.57	4	275	0.90	70	6.00	3.25	4
V2		2.57	1	253	1.58	71	10.60	3.36	3
V3		1.86	3	244	1.30	81	4.40	3.50	1
V4		-	-	-	-	-		1.15	6
V5		-	-	-	-	-		1.67	5
V6		2.10	2	251	1.50	79	7.40	3.42	2
C.D.(0.05)		0.18		11.85	NS	NS			
C.V. (%)		7.04		3.69	12.14	3.05			
Expt. Mean		**2.03**		**256**	**1.32**	**75**		3.29	
Soil type		Sandy loam							
pH		7.20							
F - levels (kg/ha)									
F1		50:25:25							
F2		100:50:50							
Recommended N:P:K (kg/ha)		100:50:50							
Varieties									
V1		IET 28241							
V2		IET 28248							
V3		Sahbhagidhan (NC)							
V4									
V5									
V6		Local Check- HUR-1309							
Available N:P:K of soil (kg/ha)		-							

Table 4.1(d): Summary of data on grain yield and ancillary characters of selected NMT Early (TP) cultures grown under transplanted conditions at low and optimum recommended fertilizer doses, kharif 2021.

F-levels	Varieties	COIMBATORE					
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: Low input (50% NPK)	V1	3.59	23	206	2.02	24.10	
	V2	4.87	14	248	2.00	22.17	
	V3	4.71	16	239	2.23	21.23	
	V4	4.89	13	282	1.79	23.43	
	V5	4.41	20	220	2.49	22.83	
	V6	3.84	22	208	2.22	21.80	
	V7	4.92	12	277	1.87	23.33	
	V8	3.24	24	206	2.28	23.70	
	V9	4.95	11	296	2.56	22.20	
	V10	4.59	18	227	2.27	23.47	
	V11	4.84	15	250	1.51	18.03	
	V12	3.94	21	212	1.98	24.10	
	V13						
	V14						
	V15						
	V16						
	V17						
	V18						
F2: Optimum input (100% NPK)	V1	4.71	16	284	2.49	24.60	8.96
	V2	6.36	5	350	2.56	22.90	11.92
	V3	6.19	6	338	2.42	21.73	11.84
	V4	6.57	2	374	2.85	23.50	13.44
	V5	5.62	8	323	2.62	23.37	9.68
	V6	5.11	10	306	2.75	22.30	10.16
	V7	6.51	3	369	2.49	23.53	12.72
	V8	4.42	19	266	2.48	23.77	9.44
	V9	6.82	1	378	3.18	22.73	14.96
	V10	5.91	7	329	2.47	23.67	10.56
	V11	6.45	4	357	2.38	18.43	12.88
	V12	5.32	9	312	2.68	24.27	11.04
	V13						
	V14						
	V15						
	V16						
	V17						
	V18						
Interaction							
F at same V		0.18		13.3	0.36	NS	
V at same F		0.19		14.47	0.35	NS	
F1		4.40	2	239	2.10	22.53	
F2		5.83	1	332	2.61	22.90	11.47
C.D.(0.05)		0.1		8.82	0.08	0.35	
C.V.(%)		1.84		3.04	3.46	1.53	

Table-4.1.1(d) (Contd…)

N-levels	Varieties	COIMBATORE					
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle Weight (g)**	**Test weight (g)**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
Mean of varieties:							
	V1	4.15	11	245	2.26	24.35	8.96
	V2	5.62	5	299	2.28	22.54	11.92
	V3	5.45	6	289	2.33	21.48	11.84
	V4	5.73	2	328	2.32	23.47	13.44
	V5	5.02	8	272	2.56	23.10	9.68
	V6	4.48	10	257	2.49	22.05	10.16
	V7	5.72	3	323	2.18	23.43	12.72
	V8	3.83	12	236	2.38	23.74	9.44
	V9	5.89	1	337	2.87	22.47	14.96
	V10	5.25	7	278	2.37	23.57	10.56
	V11	5.65	4	304	1.95	18.23	12.88
	V12	4.63	9	262	2.33	24.19	11.04
	V13	-	-	-	-	-	-
	V14	-	-	-	-	-	-
	V15	-	-	-	-	-	-
	V16	-	-	-	-	-	-
	V17	-	-	-	-	-	-
	V18	-	-	-	-	-	-
C.D.(0.05)		0.13		9.4	0.26	0.7	
C.V. (%)		2.18		2.85	9.39	2.66	
Expt. Mean		**5.12**		**286**	**2.36**	**22.72**	
Soil type		Clay					
pH		8.18					
N - levels (kg/ha)							
F1		75:25:25					
F2		150:50:50					
Recommended N:P:K (kg/ha)		150:50:50					
Varieties							
	V1	IET 26790					
	V2	IET 28329					
	V3	IET 28354					
	V4	IET 28343					
	V5	IET 28358					
	V6	IET 28332					
	V7	IET 28356					
	V8	IET 28115					
	V9	IET 28366					
	V10	IET 26898					
	V11	CO-51 (NC)					
	V12	PR 124 (N)					
	V13	-					
	V14	-					
	V15	-					
	V16	-					
	V17	-					
	V18	-					
Available N:P:K of soil (kg/ha)		212:22:434					

Table-4.1.1(d) (Contd…)

F-levels	Varieties	DHANGAIN						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: Low input (50% NPK)	V1	3.51	13	355	4.95	25.47	78	
	V2	3.09	19	348	4.78	28.00	79	
	V3	2.77	22	325	3.94	20.67	74	
	V4	3.19	16	349	4.65	26.13	78	
	V5	2.61	24	330	4.21	23.47	81	
	V6	3.68	12	363	5.42	25.87	78	
	V7	3.17	17	345	4.58	24.80	76	
	V8	3.08	20	331	4.18	24.27	73	
	V9	3.16	18	343	4.12	22.27	80	
	V10	2.97	21	328	4.06	25.07	73	
	V11	2.36	26	316	2.58	18.13	78	
	V12	2.60	25	313	3.89	26.93	70	
	V13	-	-	-	-	-	-	
	V14	-	-	-	-	-	-	
	V15	-	-	-	-	-	-	
	V16	-	-	-	-	-	-	
	V17	-	-	-	-	-	-	
	V18	2.66	23	290	3.61	27.33	86	
F2: Medium input (100% NPK)	V1	4.87	2	371	5.43	27.47	79	19.43
	V2	4.79	3	372	5.51	30.80	80	24.29
	V3	4.06	10	340	4.33	22.00	76	18.43
	V4	4.65	4	365	5.15	27.47	79	20.86
	V5	4.51	6	356	4.42	25.60	83	27.14
	V6	5.22	1	385	5.91	26.93	79	22.00
	V7	4.63	5	364	5.12	25.87	78	20.86
	V8	4.25	8	349	4.36	26.00	74	16.71
	V9	4.51	6	360	4.85	23.07	82	19.29
	V10	4.08	9	344	4.34	26.80	74	15.86
	V11	3.33	15	325	3.28	19.20	79	13.86
	V12	3.93	11	340	4.13	27.87	71	19.00
	V13	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-
	V15	-	-	-	-	-	-	-
	V16	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-
	V18	3.46	14	327	4.08	28.00	88	11.43
Interaction								
F at same V		0.40		NS	NS	NS	NS	
V at same F		0.45		NS	NS	NS	NS	
F1		2.99	2	334	4.23	24.49	77	
F2		4.33	1	354	4.69	25.93	79	19.16
C.D.(0.05)		0.30		NS	0.13	0.58	0.38	
C.V.(%)		8.51		7.48	3.09	2.38	0.50	

Table-4.1.1(d) (Contd…)

N-levels	Varieties	DHANGAIN						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle Weight (g)**	**Test weight (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
Mean of varieties:								
	V1	4.19	2	363	5.19	26.47	78	19.43
	V2	3.94	3	360	5.15	29.40	80	24.29
	V3	3.42	10	333	4.14	21.34	75	18.43
	V4	3.92	4	357	4.90	26.80	79	20.86
	V5	3.56	8	343	4.32	24.54	82	27.14
	V6	4.45	1	374	5.67	26.40	79	22.00
	V7	3.90	5	355	4.85	25.34	77	20.86
	V8	3.67	7	340	4.27	25.14	73	16.71
	V9	3.84	6	352	4.49	22.67	81	19.29
	V10	3.53	9	336	4.20	25.94	74	15.86
	V11	2.85	13	321	2.93	18.67	79	13.86
	V12	3.27	11	326	4.01	27.40	71	19.00
	V13	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-
	V15	-	-	-	-	-	-	-
	V16	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-
	V18	3.06	12	309	3.85	27.67	87	11.43
C.D.(0.05)		0.28		17.87	0.61	1.04	0.6	
C.V. (%)		6.66		4.5	11.78	3.58	0.67	
Expt. Mean		**3.66**		**344**	**4.46**	**25.21**	**78**	
Soil type		Clay loam						
pH		6.60						
N - levels (kg/ha)								
F1		40:20:10						
F2		80:40:20						
Recommended N:P:K (kg/ha)		80:40:20						
Varieties								
V1		IET 26790						
V2		IET 28329						
V3		IET 28354						
V4		IET 28343						
V5		IET 28358						
V6		IET 28332						
V7		IET 28356						
V8		IET 28115						
V9		IET 28366						
V10		IET 26898						
V11		CO-51 (NC)						
V12		PR 124 (N)						
V13		-						
V14		-						
V15		-						
V16		-						
V17		-						
V18		Local Check R.Bhagwati - 110 Days						
Available N:P:K of soil (kg/ha)		252:42:189						

Table-4.1.1(d) (Contd…)

F-levels	Varieties	FAIZABAD						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: Low input (50% NPK)	V1	3.50	16	201	3.43	24.83	73	
	V2	3.20	19	200	2.27	27.13	76	
	V3	3.40	17	178	2.80	27.63	75	
	V4	4.23	8	202	2.53	23.47	71	
	V5	3.85	12	204	3.22	25.70	73	
	V6	4.07	11	209	2.25	26.70	71	
	V7	3.09	21	223	2.63	26.17	74	
	V8	3.70	15	164	3.20	25.53	80	
	V9	2.92	26	188	2.64	26.80	68	
	V10	2.67	27	190	2.63	23.53	76	
	V11	2.93	25	234	3.20	22.93	74	
	V12	3.09	21	195	3.15	25.47	77	
	V13	-	-	-	-	-	-	
	V14	-	-	-	-	-	-	
	V15	2.97	24	202	2.62	23.70	76	
	V16	-	-	-	-	-	-	
	V17	-	-	-	-	-	-	
	V18	2.15	28	223	2.51	22.77	69	
F2: Medium input (100% NPK)	V1	4.23	8	216	3.87	25.23	79	9.13
	V2	4.50	3	263	2.60	28.13	79	16.25
	V3	4.33	7	234	3.13	28.73	79	11.63
	V4	4.50	3	244	2.97	24.70	77	3.37
	V5	4.57	2	230	3.45	26.97	78	9.00
	V6	4.50	3	233	2.39	28.03	79	5.38
	V7	4.13	10	254	3.03	27.90	81	13.00
	V8	4.67	1	242	3.83	26.97	85	12.13
	V9	3.19	20	244	3.11	27.83	77	3.38
	V10	3.28	18	243	3.20	24.53	82	7.63
	V11	4.44	6	274	3.74	24.77	78	18.88
	V12	3.80	13	224	3.37	26.07	83	8.88
	V13	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-
	V15	3.73	14	241	2.93	24.30	82	9.50
	V16	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-
	V18	3.01	23	231	2.84	24.30	74	10.75
Interaction								
F at same V		0.29		13.46	NS	NS	1.7	
V at same F		0.32		15.06	NS	NS	1.75	
F1		3.27	2	201	2.79	25.17	74	
F2		4.06	1	241	3.18	26.32	79	9.92
C.D.(0.05)		0.2		9.82	0.08	NS	0.81	
C.V.(%)		5.83		4.73	2.86	5.69	1.13	

Table-4.1.1(d) (Contd…)

N-levels	Varieties	FAIZABAD						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
Mean of varieties:								
	V1	3.87	5	209	3.65	25.03	76	9.13
	V2	3.85	7	232	2.44	27.63	78	16.25
	V3	3.87	5	206	2.97	28.18	77	11.63
	V4	4.37	1	223	2.75	24.09	74	3.37
	V5	4.21	3	217	3.34	26.34	76	9.00
	V6	4.29	2	221	2.32	27.37	75	5.38
	V7	3.61	9	239	2.83	27.04	77	13.00
	V8	4.19	4	203	3.52	26.25	83	12.13
	V9	3.06	12	216	2.88	27.32	73	3.38
	V10	2.98	13	217	2.92	24.03	79	7.63
	V11	3.69	8	254	3.47	23.85	76	18.88
	V12	3.45	10	210	3.26	25.77	80	8.88
	V13							
	V14							
	V15	3.35	11	222	2.78	24.00	79	9.50
	V16							
	V17							
	V18	2.58	14	227	2.68	23.54	72	10.75
C.D.(0.05)		0.21		9.52	0.19	0.68	1.2	
C.V. (%)		4.86		3.73	5.38	2.3	1.36	
Expt. Mean		**3.67**		**221**	**2.98**	**25.74**	**77**	
Soil type		Sandy loam						
pH		7.40						
N - levels (kg/ha)								
F1		40:20:20						
F2		80:40:40						
Recommended N:P:K (kg/ha)		80:40:40						
Varieties								
V1		IET 26790						
V2		IET 28329						
V3		IET 28354						
V4		IET 28343						
V5		IET 28358						
V6		IET 28332						
V7		IET 28356						
V8		IET 28115						
V9		IET 28366						
V10		IET 26898						
V11		CO-51 (NC)						
V12		PR 124 (N)						
V13		-						
V14		-						
V15		Sahbhagidhan (NC)						
V16		-						
V17		-						
V18		Local Check NDR 97						
Available N:P:K of soil (kg/ha)		200:24:234						

Table-4.1.1(d) (Contd…)

F-levels	Varieties	GHAGHRAGHAT						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: Low input (50% NPK)	V1	3.73	15	203	3.21	24.73	74	
	V2	3.27	19	207	2.20	26.43	77	
	V3	3.47	17	207	2.80	27.27	77	
	V4	4.10	10	209	2.41	24.30	72	
	V5	4.13	9	208	3.18	25.77	74	
	V6	3.90	12	212	2.29	27.13	72	
	V7	3.03	20	206	2.69	25.97	72	
	V8	3.90	12	184	3.07	25.80	81	
	V9	2.90	27	190	2.69	26.27	72	
	V10	3.01	21	174	2.63	24.20	78	
	V11	2.97	25	222	3.10	23.33	73	
	V12	2.99	24	196	3.15	25.17	74	
	V13	-	-	-	-	-	-	
	V14	-	-	-	-	-	-	
	V15	2.93	26	199	2.71	24.33	72	
	V16	-	-	-	-	-	-	
	V17	-	-	-	-	-	-	
	V18	2.31	28	211	2.51	22.77	68	
F2: Medium input (100% NPK)	V1	4.20	8	216	3.90	25.53	78	4.27
	V2	4.60	4	264	2.60	28.53	78	12.09
	V3	4.23	7	243	3.05	28.53	77	6.91
	V4	4.73	1	253	2.99	25.30	79	5.73
	V5	4.30	6	237	3.44	27.00	79	1.55
	V6	4.70	2	230	2.53	27.37	79	7.27
	V7	4.10	10	257	3.00	27.03	77	9.73
	V8	4.67	3	252	3.83	26.97	85	7.00
	V9	3.01	21	246	3.15	27.63	77	1.00
	V10	3.40	18	249	3.20	25.13	81	3.55
	V11	4.37	5	274	3.60	24.87	78	12.73
	V12	3.84	14	233	3.22	25.37	81	7.73
	V13	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-
	V15	3.60	16	245	2.90	24.40	81	6.09
	V16	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-
	V18	3.00	23	229	2.84	24.17	72	6.27
Interaction								
F at same V		0.26		11.67	0.23	NS	2.3	
V at same F		0.25		16.04	0.22	NS	2.31	
F1		3.33	2	202	2.76	25.25	74	
F2		4.05	1	245	3.16	26.27	79	6.56
C.D.(0.05)		0.04		14.69	0.06	0.28	0.81	
C.V.(%)		1.19		7.01	2.14	1.16	1.13	

Table-4.1.1(d) (Contd…)

N-levels	Varieties	GHAGHRAGHAT						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle Weight (g)**	**Test weight (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
Mean of varieties:								
	V1	3.97	5	210	3.56	25.13	76	4.27
	V2	3.94	6	236	2.40	27.48	78	12.09
	V3	3.85	7	225	2.93	27.90	77	6.91
	V4	4.42	1	231	2.70	24.80	76	5.73
	V5	4.22	4	222	3.31	26.39	77	1.55
	V6	4.30	2	221	2.41	27.25	76	7.27
	V7	3.57	9	232	2.85	26.50	74	9.73
	V8	4.29	3	218	3.45	26.39	83	7.00
	V9	2.96	13	218	2.92	26.95	74	1.00
	V10	3.21	12	211	2.92	24.67	79	3.55
	V11	3.67	8	248	3.35	24.10	75	12.73
	V12	3.42	10	215	3.19	25.27	78	7.73
	V13	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-
	V15	3.27	11	222	2.81	24.37	77	6.09
	V16	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-
	V18	2.66	14	220	2.68	23.47	70	6.27
C.D.(0.05)		0.18		8.25	0.16	0.7	1.63	
C.V. (%)		4.25		3.2	4.73	2.36	1.85	
Expt. Mean		**3.69**		**223**	**2.96**	**25.76**	**76**	
Soil type		Sandy loam						
pH		7.40						
N - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 26790						
V2		IET 28329						
V3		IET 28354						
V4		IET 28343						
V5		IET 28358						
V6		IET 28332						
V7		IET 28356						
V8		IET 28115						
V9		IET 28366						
V10		IET 26898						
V11		CO-51 (NC)						
V12		PR 124 (N)						
V13		-						
V14		-						
V15		Sahbhagidhan (NC)						
V16		-						
V17		-						
V18		Local Check NDR 97						
Available N:P:K of soil (kg/ha)		200:25:235						

Table-4.1.1(d) (Contd…)

F-levels	Varieties	HAZARIBAGH						JAGDALPUR					
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: Low input (50% NPK)	V1	-	-	-	-	-		5.60	14	201	2.67	28.24	
	V2	-	-	-	-	-		8.00	3	214	2.83	33.15	
	V3	-	-	-	-	-		7.83	5	240	2.76	34.10	
	V4	-	-	-	-	-		2.93	21	320	2.30	24.67	
	V5	-	-	-	-	-		4.03	18	291	2.63	25.97	
	V6	-	-	-	-	-		1.10	26	320	2.10	24.83	
	V7	-	-	-	-	-		2.87	22	279	2.28	21.57	
	V8	-	-	-	-	-		6.67	8	231	2.84	33.09	
	V9	-	-	-	-	-		6.50	10	253	2.56	28.18	
	V10	-	-	-	-	-		7.60	6	222	2.76	36.41	
	V11	-	-	-	-	-		4.14	16	309	1.98	26.70	
	V12	-	-	-	-	-		6.59	9	314	2.80	32.70	
	V13	-	-	-	-	-		-	-	-	-	-	
	V14	-	-	-	-	-		-	-	-	-	-	
	V15	-	-	-	-	-		-	-	-	-	-	
	V16	-		-	-	-	-	-	-	-	-	-	
	V17	-		-	-	-	-	-	-	-	-	-	
	V18	-		-	-	-	-	3.63	19	304	2.44	20.77	
F2: Medium input (100% NPK)	V1	5.00	8	166	23.81	27.31	92	3.07	20	241	2.74	102.9	-23.00
	V2	4.17	10	152	23.18	27.78	89	8.17	2	258	2.74	32.56	1.55
	V3	5.33	4	174	23.26	21.42	87	4.53	15	232	2.72	29.37	-30.00
	V4	5.75	2	178	24.56	26.21	88	2.30	24	327	2.18	23.13	-5.73
	V5	6.17	1	205	23.87	22.93	90	8.00	3	273	2.62	26.21	36.09
	V6	5.22	6	148	25.16	24.50	86	1.66	25	298	2.25	15.37	5.09
	V7	4.82	9	205	21.77	26.02	90	2.74	23	285	2.36	17.90	-1.18
	V8	5.42	3	177	31.96	25.56	86	6.20	11	261	2.78	40.44	-4.27
	V9	1.25	12	151	18.34	21.79	90	7.43	7	280	2.25	30.69	8.45
	V10	5.05	7	181	25.52	27.29	91	8.53	1	218	2.72	38.90	8.45
	V11	3.98	11	141	24.87	27.90	88	5.87	13	283	1.97	25.50	15.73
	V12	5.25	5	166	22.15	18.97	91	5.95	12	269	2.84	31.73	-5.82
	V13	-	-	-	-	-		-	-	-	-	-	-
	V14	-	-	-	-	-		-	-	-	-	-	-
	V15	-	-	-	-	-		-	-	-	-	-	-
	V16	-	-	-	-	-		-	-	-	-	-	-
	V17	-	-	-	-	-		-	-	-	-	-	-
	V18	-	-	-	-	-		4.14	16	279	2.45	30.03	4.64
Interaction													
F at same V								1.57		NS	NS	NS	
V at same F								1.67		NS	NS	NS	
F1								5.19	2	269	2.53	28.49	
F2		4.78	1	170	24.04	24.81	89	5.28	1	270	2.51	34.21	0.77
C.D.(0.05)		1.93		NS	3.96	1.08	4.88	NS		NS	NS	NS	
C.V.(%)		23.79		20.39	9.72	2.56	3.24	18.38		2.81	14.49	76.4	

Table-4.1.1(d) (Contd…)

N-levels	Varieties	HAZARIBAGH						JAGDALPUR					
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Grain Yield (t/ha)	Rank	Panicle/ m² (No.)	Panicle Weight (g)	Test weight (g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
Mean of varieties:													
	V1	5.00	8	166	23.81	27.31	92	4.34	9	221	2.71	65.58	-23.00
	V2	4.17	10	152	23.18	27.78	89	8.09	1	236	2.79	32.86	1.55
	V3	5.33	4	174	23.26	21.42	87	6.18	6	236	2.74	31.74	-30.00
	V4	5.75	2	178	24.56	26.21	88	2.62	12	324	2.24	23.90	-5.73
	V5	6.17	1	205	23.87	22.93	90	6.02	7	282	2.63	26.09	36.09
	V6	5.22	6	148	25.16	24.50	86	1.38	13	309	2.18	20.10	5.09
	V7	4.82	9	205	21.77	26.02	90	2.81	11	282	2.32	19.74	-1.18
	V8	5.42	3	177	31.96	25.56	86	6.44	4	246	2.81	36.77	-4.27
	V9	1.25	12	151	18.34	21.79	90	6.97	3	266	2.41	29.44	8.45
	V10	5.05	7	181	25.52	27.29	91	8.07	2	220	2.74	37.66	8.45
	V11	3.98	11	141	24.87	27.90	88	5.01	8	296	1.98	26.10	15.73
	V12	5.25	5	166	22.15	18.97	91	6.27	5	291	2.82	32.22	-5.82
	V13	-	-	-	-	-	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-	-	-	-	-	-
	V15	-	-	-	-	-	-	-	-	-	-	-	-
	V16	-	-	-	-	-	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-	-	-	-	-	-
	V18	-	-	-	-	-	-	3.89	10	292	2.45	25.40	4.64
C.D.(0.05)								1.11		49.33	0.43	NS	
C.V. (%)								18.34		15.86	14.74	81.58	
Expt. Mean		**4.78**		**170**	**24.04**	**24.81**	**89**	**5.23**		**269**	**2.52**	**31.35**	
Soil type		-						Vertisol					
pH		-						6.40					
N - levels (kg/ha)													
F1		60:30:20						60:30:20					
F2		120:60:40						120:60:40					
Recommended N:P:K (kg/ha)		120:60:40						120:60:40					
Varieties													
	V1	IET 26790						IET 26790					
	V2	IET 28329						IET 28329					
	V3	IET 28354						IET 28354					
	V4	IET 28343						IET 28343					
	V5	IET 28358						IET 28358					
	V6	IET 28332						IET 28332					
	V7	IET 28356						IET 28356					
	V8	IET 28115						IET 28115					
	V9	IET 28366						IET 28366					
	V10	IET 26898						IET 26898					
	V11	CO-51 (NC)						CO-51 (NC)					
	V12	PR 124 (N)						PR 124 (N)					
	V13	-						-					
	V14	-						-					
	V15	-						-					
	V16	-						-					
	V17	-						-					
	V18	-						Local Check MTU 1010					
Available N:P:K of soil (kg/ha)		-						242:14:302					

Table-4.1.1(d) (Contd…)

N-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1	V1	3.48	17	241	2.22	28.11	90	
	V2	3.49	16	253	2.46	27.24	92	
	V3	3.30	21	224	1.85	22.88	93	
	V4	3.46	18	232	2.18	26.20	90	
	V5	2.98	22	209	1.79	21.94	92	
	V6	3.42	19	229	2.08	24.91	90	
	V7	2.28	26	187	1.42	20.95	90	
	V8	2.83	24	205	1.69	24.40	92	
	V9	3.79	12	270	2.62	22.60	90	
	V10	3.82	11	282	2.87	26.61	89	
	V11	2.67	25	196	1.53	24.09	92	
	V12	2.91	23	206	1.73	18.54	89	
	V13	-	-	-	-	-	-	
	V14	-	-	-	-	-	-	
	V15	-	-	-	-	-	-	
	V16	-	-	-	-	-	-	
	V17	-	-	-	-	-	-	
	V18	3.56	15	254	2.60	24.97	90	
F2	V1	4.57	5	282	3.17	29.18	89	10.90
	V2	4.62	4	283	3.18	28.49	93	11.30
	V3	4.23	8	276	2.47	25.04	89	9.30
	V4	4.47	6	282	3.04	27.52	90	10.10
	V5	4.11	9	276	2.47	25.01	94	11.30
	V6	4.24	7	280	2.86	26.73	90	8.20
	V7	3.36	20	235	1.93	23.83	88	10.80
	V8	3.57	13	268	2.30	25.25	92	7.40
	V9	4.70	2	286	3.20	23.95	92	9.10
	V10	4.83	1	293	3.34	28.41	90	10.10
	V11	3.57	13	237	1.98	26.92	93	9.00
	V12	4.00	10	268	2.37	19.98	89	10.90
	V13	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-
	V15	-	-	-	-	-	-	-
	V16	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-
	V18	4.67	3	283	3.20	27.73	89	11.10
Interaction								
F at same V		NS		NS	NS	NS	1.45	
V at same F		NS		NS	NS	NS	1.5	
F1		3.23	2	230	2.08	24.11	91	
F2		4.23	1	273	2.73	26.00	91	9.96
C.D.(0.05)		0.4		27.14	0.28	1.67	NS	
C.V.(%)		10.91		11.08	12.15	6.83	0.78	

Table-4.1.1(d) (Contd…)

N-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
Mean of varieties:								
	V1	4.03	5	261	2.70	28.65	90	10.90
	V2	4.06	4	268	2.82	27.87	93	11.30
	V3	3.77	8	250	2.16	23.96	91	9.30
	V4	3.97	6	257	2.61	26.86	90	10.10
	V5	3.55	9	243	2.13	23.48	93	11.30
	V6	3.83	7	255	2.47	25.82	90	8.20
	V7	2.82	13	211	1.68	22.39	89	10.80
	V8	3.20	11	237	2.00	24.83	92	7.40
	V9	4.25	2	278	2.91	23.28	91	9.10
	V10	4.33	1	287	3.11	27.51	90	10.10
	V11	3.12	12	216	1.76	25.51	93	9.00
	V12	3.46	10	237	2.05	19.26	89	10.90
	V13	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-
	V15	-	-	-	-	-	-	-
	V16	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-
	V18	4.12	3	268	2.90	26.35	89	11.10
C.D.(0.05)		0.56		25.46	0.38	1.77	1.03	
C.V. (%)		12.96		8.77	13.54	6.13	0.98	
Expt. Mean		**3.73**		**251**	**2.41**	**25.06**	**91**	
Soil type		-						
pH		-						
N - levels (kg/ha)								
F1		50:25:25						
F2		100:50:50						
Recommended N:P:K (kg/ha)		100:50:50						
Varieties								
	V1	IET 26790						
	V2	IET 28329						
	V3	IET 28354						
	V4	IET 28343						
	V5	IET 28358						
	V6	IET 28332						
	V7	IET 28356						
	V8	IET 28115						
	V9	IET 28366						
	V10	IET 26898						
	V11	CO-51 (NC)						
	V12	PR 124 (N)						
	V13	-						
	V14	-						
	V15	-						
	V16	-						
	V17	-						
	V18	Local Check KJT-7						
Available N:P:K of soil (kg/ha)		-						

Table-4.1.1(d) (Contd…)

N-levels	Varieties	MANDYA						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1	V1	4.80	3	259	2.73	29.7	90	
	V2	3.86	19	334	2.65	28.1	91	
	V3	4.69	5	274	3.07	22.7	90	
	V4	3.55	24	303	3.61	26.9	90	
	V5	4.23	12	274	3.04	25.8	90	
	V6	4.14	14	277	3.08	25.7	90	
	V7	3.83	20	312	2.18	27.7	90	
	V8	4.51	7	338	3.63	27.6	89	
	V9	3.66	22	323	2.54	22.1	90	
	V10	4.30	11	317	3.18	27.3	89	
	V11	3.91	17	273	2.63	19.3	89	
	V12	3.57	23	274	2.37	29.7	90	
	V13	-	-	-	-	-	-	
	V14	-	-	-	-	-	-	
	V15	-	-	-	-	-	-	
	V16	-	-	-	-	-	-	
	V17	-	-	-	-	-	-	
	V18	-	-	-	-	-	-	
F2	V1	4.99	1	271	3.44	30.5	90	1.90
	V2	4.14	14	343	3.26	27.3	91	2.80
	V3	4.81	2	291	3.13	24.2	89	1.20
	V4	4.73	4	310	3.26	27.4	90	11.80
	V5	4.45	10	288	3.68	25.9	91	2.20
	V6	4.48	9	312	3.15	25.6	90	3.40
	V7	3.92	16	327	2.75	28.0	90	0.90
	V8	4.65	6	340	3.67	29.2	89	1.40
	V9	3.80	21	325	3.12	21.4	90	1.40
	V10	4.49	8	327	3.59	28.1	89	1.90
	V11	4.23	12	317	2.72	19.6	89	3.20
	V12	3.89	18	278	3.51	29.4	91	3.20
	V13	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-
	V15	-	-	-	-	-	-	-
	V16	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-
	V18	-	-	-	-	-	-	-
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		4.09	2	296	2.89	26.04	90	
F2		4.38	1	311	3.27	26.38	90	2.94
C.D.(0.05)		NS		NS	NS	NS	NS	
C.V.(%)		7.77		7.58	26.08	9.27	0.79	

Table-4.1.1(d) (Contd…)

N-levels	Varieties	MANDYA						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle Weight (g)**	**Test weight (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
Mean of varieties:								
	V1	4.90	1	265	3.09	30.05	90	1.90
	V2	4.00	9	338	2.96	27.71	91	2.80
	V3	4.75	2	283	3.10	23.46	90	1.20
	V4	4.14	7	306	3.44	27.14	90	11.80
	V5	4.34	5	281	3.36	25.85	91	2.20
	V6	4.31	6	294	3.12	25.63	90	3.40
	V7	3.88	10	319	2.47	27.83	90	0.90
	V8	4.58	3	339	3.65	28.42	89	1.40
	V9	3.73	11	324	2.83	21.72	90	1.40
	V10	4.40	4	322	3.39	27.69	89	1.90
	V11	4.07	8	295	2.68	19.47	89	3.20
	V12	3.73	11	276	2.94	29.57	91	3.20
	V13	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-
	V15	-	-	-	-	-	-	-
	V16	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-
	V18	-	-	-	-	-	-	-
C.D.(0.05)		0.44		38.3	0.5	1.15	1.25	
C.V. (%)		8.98		10.93	14.16	3.81	1.21	
Expt. Mean		**4.23**		**303**	**3.08**	**26.21**	**90**	
Soil type		Red Sandy loam						
pH		8.48						
N - levels (kg/ha)								
F1		50:25:25						
F2		100:50:50						
Recommended N:P:K (kg/ha)		100:50:50						
Varieties								
	V1	IET 26790						
	V2	IET 28329						
	V3	IET 28354						
	V4	IET 28343						
	V5	IET 28358						
	V6	IET 28332						
	V7	IET 28356						
	V8	IET 28115						
	V9	IET 28366						
	V10	IET 26898						
	V11	CO-51 (NC)						
	V12	PR 124 (N)						
	V13	-						
	V14	-						
	V15	-						
	V16	-						
	V17	-						
	V18	-						
Available N:P:K of soil (kg/ha)		285:113:244						

Table-4.1.1(d) (Contd…)

N-levels	Varieties	MARUTERU				NAGINA						
		Grain Yield (t/ha)	Rank	Panicle/ m^2 (No.)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/ m^2 (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1	V1	4.87	15	249		2.76	10	258	3.41	26.47	79	
	V2	5.58	5	229		2.56	14	239	3.37	26.30	80	
	V3	4.63	16	234		2.57	13	239	3.32	26.37	81	
	V4	4.04	20	229		-	-	-	-	-	-	
	V5	5.51	7	260		2.71	11	244	3.4	26.42	81	
	V6	4.08	19	229		-	-	-	-	-	-	
	V7	5.35	9	251		-	-	-	-	-	-	
	V8	4.45	18	247		2.50	15	238	3.39	26.31	82	
	V9	3.70	22	229		2.65	12	241	3.4	26.39	83	
	V10	3.07	24	240		2.48	16	236	3.38	26.40	81	
	V11	3.55	23	235		-	-	-	-	-	-	
	V12	5.13	13	249		2.34	17	223	3.3	26.38	84	
	V13	-	-	-		2.30	18	222	3.27	26.33	78	
	V14	-	-	-		-	-	-	-	-	-	
	V15	-	-	-		-	-	-	-	-	-	
	V16	-	-	-		-	-	-	-	-	-	
	V17	-	-	-		-	-	-	-	-	-	
	V18	-	-	-		-	-	-	-	-	-	
F2	V1	5.58	5	285	6.76	4.58	1	333	3.6	26.57	80	16.55
	V2	6.43	1	305	8.10	4.33	5	316	3.36	26.40	81	16.09
	V3	5.23	12	249	5.71	4.38	4	317	3.48	26.39	82	16.45
	V4	5.26	10	272	11.62	-	-	-	-	-	-	-
	V5	6.08	2	228	5.43	4.51	2	325	3.2	26.46	82	16.36
	V6	4.97	14	252	8.48	-	-	-	-	-	-	-
	V7	5.91	3	237	5.33	-	-	-	-	-	-	-
	V8	5.42	8	272	9.24	4.30	6	310	3.52	26.41	82	16.36
	V9	5.25	11	281	14.76	4.46	3	320	2.95	26.42	84	16.45
	V10	3.95	21	263	8.38	4.29	7	310	2.98	26.40	82	16.45
	V11	4.56	17	249	9.62	-	-	-	-	-	-	-
	V12	5.69	4	236	5.33	3.88	8	297	2.98	26.38	85	14.00
	V13	-	-	-	-	3.74	9	293	2.98	26.33	80	13.09
	V14	-	-	-	-	-	-	-	-	-	-	-
	V15	-	-	-	-	-	-	-	-	-	-	-
	V16	-	-	-	-	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-	-	-	-	-
	V18	-	-	-	-	-	-	-	-	-	-	-
Interaction												
F at same V		NS		NS		0.14		NS	0.07	0.04	NS	
V at same F		NS		NS		0.15		NS	0.08	0.03	NS	
F1		4.50	2	240		2.54	2	238	3.36	26.37	81	
F2		5.36	1	261	8.23	4.27	1	313	3.23	26.42	82	15.76
C.D.(0.05)		0.72		20.33		0.08		7.04	0.05	0	NS	
C.V.(%)		14.46		8.01		1.94		2.18	1.3	0.01	1.37	

Table-4.1.1(d) (Contd…)

N-levels	Varieties	MARUTERU				NAGINA						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
Mean of varieties:												
	V1	5.23	5	267	6.76	3.67	1	296	3.51	26.52	79.34	16.55
	V2	6.01	1	267	8.10	3.45	5	278	3.37	26.35	80.67	16.09
	V3	4.93	7	241	5.71	3.48	4	278	3.40	26.38	81.17	16.45
	V4	4.65	8	251	11.62							
	V5	5.80	2	244	5.43	3.61	2	285	3.30	26.44	81.50	16.36
	V6	4.53	9	241	8.48							
	V7	5.63	3	244	5.33							
	V8	4.94	6	260	9.24	3.40	6	274	3.46	26.36	81.67	16.36
	V9	4.48	10	255	14.76	3.56	3	281	3.18	26.41	83.17	16.45
	V10	3.51	12	252	8.38	3.39	7	273	3.18	26.40	81.50	16.45
	V11	4.06	11	242	9.62							
	V12	5.41	4	243	5.33	3.11	8	260	3.14	26.38	84.50	14.00
	V13	-	-	-	-	3.02	9	258	3.13	26.33	79.00	13.09
	V14	-	-	-	-							
	V15	-	-	-	-							
	V16	-	-	-	-							
	V17	-	-	-	-							
	V18	-	-	-	-							
C.D.(0.05)		0.7		32.09		0.1		15.04	0.05	0.02	1.06	
C.V. (%)		12.29		11.1		2.49		4.68	1.35	0.08	1.12	
Expt. Mean		**4.93**		**250**		**3.41**		**276**	**3.29**	**26.40**	**81.39**	
Soil type		-				-						
pH		-				7.70						
N - levels (kg/ha)												
F1		45:30:30				60:30:20						
F2		90:60:60				120:60:40						
Recommended N:P:K (kg/ha)		90:60:60				120:60:40						
Varieties												
	V1	IET 26790				IET 26790						
	V2	IET 28329				IET 28329						
	V3	IET 28354				IET 28354						
	V4	IET 28343				-						
	V5	IET 28358				IET 28358						
	V6	IET 28332				-						
	V7	IET 28356				-						
	V8	IET 28115				IET 28115						
	V9	IET 28366				NC- IET 28366						
	V10	IET 26898				IET 26898						
	V11	CO-51 (NC)										
	V12	PR 124 (N)				PR 124						
	V13	-				Narendra 97						
	V14	-				-						
	V15	-				-						
	V16	-				-						
	V17	-				-						
	V18	-				-						
Available N:P:K of soil (kg/ha)		-				21:18:209						

Table-4.1.1(d) (Contd…)

N-levels	Varieties	RANCHI						REWA						
		Grain Yield (t/ha)	Rank	Panicle/ m^2 (No.)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m^2 (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1	V1	4.73	10	271	23.19	93		4.63	24	264	3.05	24.53	81	
	V2	4.42	17	255	23.17	96		4.30	35	268	3.11	24.60	79	
	V3	5.26	3	279	24.20	92		4.50	28	264	3.14	24.97	82	
	V4	4.33	20	247	24.10	96		4.77	22	267	3.11	25.03	82	
	V5	4.49	14	238	23.97	88		4.50	28	269	3.16	25.07	83	
	V6	3.47	26	199	23.55	96		4.40	32	268	3.17	25.87	80	
	V7	4.46	16	241	24.00	95		4.80	21	272	3.04	26.10	83	
	V8	4.53	12	268	24.35	96		4.50	28	263	3.16	26.23	80	
	V9	4.40	18	247	24.30	89		4.43	31	262	3.07	25.13	82	
	V10	4.03	21	231	24.06	88		4.60	25	270	3.14	25.20	81	
	V11	3.91	23	228	24.01	94		4.20	36	274	3.07	25.63	79	
	V12	4.67	11	265	24.26	93		4.70	23	274	3.17	24.90	82	
	V13	-	-	-	-	-		4.57	27	271	3.18	25.63	79	
	V14	-	-	-	-	-		4.60	25	273	3.19	24.90	83	
	V15	3.70	25	199	23.97	83		4.87	20	275	3.14	25.67	81	
	V16	-	-	-	-	-		4.40	32	267	3.17	25.07	82	
	V17	-	-	-	-	-		4.40	32	273	3.16	25.73	83	
	V18	3.15	28	178	23.90	72		5.27	13	281	3.18	25.27	78	
F2	V1	5.33	2	303	25.56	98	8.00	5.17	15	270	3.30	27.00	78	5.40
	V2	5.07	6	279	23.88	92	8.67	5.17	15	271	3.50	25.50	77	8.70
	V3	5.37	1	296	24.95	100	1.47	5.60	2	267	3.43	27.50	80	11.00
	V4	5.01	7	291	24.80	98	9.07	5.37	5	269	3.43	28.13	80	6.00
	V5	4.75	9	256	24.73	92	3.47	5.20	14	270	3.53	26.50	78	7.00
	V6	3.85	24	231	24.22	99	5.07	5.60	2	270	3.43	27.67	80	12.00
	V7	4.50	13	256	24.68	98	0.53	5.37	5	274	3.20	28.03	81	5.70
	V8	4.80	8	266	24.92	99	3.60	5.37	5	266	3.53	28.83	79	8.70
	V9	5.10	5	274	24.78	93	9.33	5.30	11	265	3.57	27.47	78	8.70
	V10	4.35	19	264	25.06	92	4.27	5.10	18	271	3.33	26.93	80	5.00
	V11	4.47	15	253	24.89	98	7.47	5.47	4	276	3.27	26.87	80	12.70
	V12	5.16	4	300	24.96	97	6.53	5.13	17	276	3.30	27.83	81	4.30
	V13	-	-	-	-	-	-	5.37	5	273	3.70	27.03	80	8.00
	V14	-	-	-	-	-	-	5.37	5	275	3.37	27.57	81	7.70
	V15	4.03	21	233	24.70	86	4.40	5.10	18	277	3.57	28.13	78	2.30
	V16	-	-	-	-	-	-	5.37	5	270	3.57	26.73	80	9.70
	V17	-	-	-	-	-	-	5.30	11	276	3.60	27.00	80	9.00
	V18	3.43	27	192	24.55	76	3.73	6.23	1	283	3.90	25.83	82	9.60
Interaction														
F at same V		NS		NS	NS	0.91		0.31		NS	0.19	0.78	1.91	
V at same F		NS		NS	NS	0.96		0.3		NS	0.19	0.84	1.95	
F1		4.25	2	239	23.93	91		4.58	2	270	3.13	25.31	81	
F2		4.66	1	264	24.76	94	5.40	5.37	1	272	3.47	27.25	80	7.86
C.D.(0.05)		0.19		23.4	0.39	0.51		0.07		0.48	0.07	0.47	0.78	
C.V.(%)		4.53		9.91	1.73	0.59		1.72		0.21	2.66	2.17	1.18	

Table-4.1.1(d) (Contd…)

N-levels	Varieties	RANCHI Grain Yield (t/ha)	Rank	Panicle/ m² (No.)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/ kg Nutri.)	REWA Grain Yield (t/ha)	Rank	Panicle/ m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/ kg Nutri.)
Mean of varieties:														
	V1	5.03	2	287	24.38	95.50	8.00	4.90	11	267	3.18	25.77	79	5.40
	V2	4.75	5	267	23.53	94.00	8.67	4.74	18	270	3.31	25.05	78	8.70
	V3	5.32	1	288	24.58	95.67	1.47	5.05	4	265	3.29	26.24	81	11.00
	V4	4.67	6	269	24.45	96.84	9.07	5.07	3	268	3.27	26.58	81	6.00
	V5	4.62	8	247	24.35	90.17	3.47	4.85	14	269	3.35	25.79	81	7.00
	V6	3.66	13	215	23.89	97.50	5.07	5.00	5	269	3.30	26.77	80	12.00
	V7	4.48	9	249	24.34	96.34	0.53	5.09	2	273	3.12	27.07	82	5.70
	V8	4.67	7	267	24.64	97.17	3.60	4.94	9	265	3.35	27.53	80	8.70
	V9	4.75	4	261	24.54	91.17	9.33	4.87	13	264	3.32	26.30	80	8.70
	V10	4.19	10	247	24.56	89.84	4.27	4.85	14	271	3.24	26.07	80	5.00
	V11	4.19	10	240	24.45	96.17	7.47	4.84	17	275	3.17	26.25	80	12.70
	V12	4.92	3	283	24.61	95.00	6.53	4.92	10	275	3.24	26.37	82	4.30
	V13	-	-	-	-	-	-	4.97	8	272	3.44	26.33	80	8.00
	V14	-	-	-	-	-	-	4.99	6	274	3.28	26.24	82	7.70
	V15	3.87	12	216	24.34	84.50	4.40	4.99	6	276	3.36	26.90	80	2.30
	V16	-	-	-	-	-	-	4.89	12	269	3.37	25.90	81	9.70
	V17	-	-	-	-	-	-	4.85	14	274	3.38	26.37	81	9.00
	V18	3.29	14	185	24.23	73.67	3.73	5.75	1	282	3.54	25.55	80	9.60
	C.D.(0.05)	0.47		25.35	0.61	0.64		0.22		1.62	0.13	0.55	1.35	
	C.V. (%)	9.09		8.73	2.16	0.6		3.83		0.52	3.5	1.84	1.47	
	Expt. Mean	**4.46**		**251**	**24.35**	**92.39**		**4.97**		**271**	**3.30**	**26.28**	**80**	
	Soil type	Clay Loam						Clay						
	pH	6.20						-						
N - levels (kg/ha)														
	F1	40:20:15						50:30:20						
	F2	80:40:30						100:60:40						
	Recommended N:P:K (kg/ha)	80:40:30						100:60:40						
Varieties														
	V1	IET 26790						IET 26790						
	V2	IET 28329						IET 28329						
	V3	IET 28354						IET 28354						
	V4	IET 28343						IET 28343						
	V5	IET 28358						IET 28358						
	V6	IET 28332						IET 28332						
	V7	IET 28356						IET 28356						
	V8	IET 28115						IET 28115						
	V9	IET 28366						IET 28366						
	V10	IET 26898						IET 26898						
	V11	CO-51 (NC)						CO-51 (NC)						
	V12	PR 124 (N)						PR 124 (N)						
	V13	-						Narendra 97(E)						
	V14	-						Luit (NE)						
	V15	Sahbhagidhan (NC)						Sahbhagidhan (C&W)						
	V16	-						MTU 1153 (S)						
	V17	-						US 314 (Hybrid)						
	V18	Local Check BVD 111						Local Check						
	Available N:P:K of soil (kg/ha)	-						-						

Table-4.1.1(d) (Contd…)

N-levels	Varieties	SABOUR					
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1	V1	5.48	3	277	3.80	83	
	V2	4.74	16	249	3.23	85	
	V3	4.43	21	179	3.28	85	
	V4	4.28	22	243	3.49	85	
	V5	5.21	9	274	3.34	84	
	V6	4.84	14	239	3.09	84	
	V7	4.22	25	199	2.86	85	
	V8	5.27	8	244	3.43	81	
	V9	5.28	7	272	3.40	84	
	V10	3.71	28	269	3.61	85	
	V11	4.19	27	239	2.65	83	
	V12	4.85	13	255	3.75	85	
	V13	-	-	-	-	-	
	V14	-	-	-	-	-	
	V15	4.24	23	246	3.00	85	
	V16	-	-	-	-	-	
	V17	-	-	-	-	-	
	V18	4.24	23	242	3.22	85	
F2	V1	5.55	2	285	3.85	83	0.87
	V2	5.20	10	255	3.42	85	5.75
	V3	5.09	12	186	3.38	85	8.25
	V4	4.78	15	249	3.57	85	6.25
	V5	5.60	1	283	3.47	85	4.88
	V6	5.17	11	247	3.15	85	4.13
	V7	4.46	19	208	3.11	85	3.00
	V8	5.45	5	250	3.45	81	2.25
	V9	5.48	3	280	3.43	84	2.50
	V10	4.21	26	278	3.67	85	6.25
	V11	4.46	19	249	2.86	83	3.37
	V12	5.37	6	261	3.79	85	6.50
	V13	-	-	-	-	-	-
	V14	-	-	-	-	-	-
	V15	4.57	18	255	3.08	85	4.13
	V16	-	-	-	-	-	-
	V17	-	-	-	-	-	-
	V18	4.66	17	251	3.33	85	5.25
Interaction							
F at same V		NS		NS	NS	NS	
V at same F		NS		NS	NS	NS	
F1		4.64	2	245	3.30	84	
F2		5.00	1	253	3.40	84	4.53
C.D.(0.05)		0.15		NS	0.1	NS	
C.V.(%)		3.39		5.7	3.17	0.67	

Table-4.1.1(d) (Contd…)

N-levels	Varieties	SABOUR					
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle Weight (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
Mean of varieties:							
	V1	5.52	1	281	3.83	83	0.87
	V2	4.97	7	252	3.33	85	5.75
	V3	4.76	8	183	3.33	85	8.25
	V4	4.53	9	246	3.53	85	6.25
	V5	5.41	2	278	3.41	84	4.88
	V6	5.01	6	243	3.12	85	4.13
	V7	4.34	12	203	2.99	85	3.00
	V8	5.36	4	247	3.44	81	2.25
	V9	5.38	3	276	3.42	84	2.50
	V10	3.96	14	274	3.64	85	6.25
	V11	4.33	13	244	2.76	83	3.37
	V12	5.11	5	258	3.77	85	6.50
	V13	-	-	-	-	-	-
	V14	-	-	-	-	-	-
	V15	4.41	11	251	3.04	85	4.13
	V16	-	-	-	-	-	-
	V17	-	-	-	-	-	-
	V18	4.45	10	246	3.28	85	5.25
C.D.(0.05)		0.39		18.41	0.21	0.47	
C.V. (%)		6.96		6.41	5.35	0.48	
Expt. Mean		**4.82**		**249**	**3.35**	**84**	
Soil type		-					
pH		7.70					
N - levels (kg/ha)							
F1		50:20:10					
F2		100:40:20					
Recommended N:P:K (kg/ha)		100:40:20					
Varieties							
V1		IET 26790					
V2		IET 28329					
V3		IET 28354					
V4		IET 28343					
V5		IET 28358					
V6		IET 28332					
V7		IET 28356					
V8		IET 28115					
V9		IET 28366					
V10		IET 26898					
V11		CO-51 (NC)					
V12		PR 124 (N)					
V13		-					
V14		-					
V15		Sahbhagidhan (C&W)					
V16		-					
V17		-					
V18		Local Check Sabour Harshit					
Available N:P:K of soil (kg/ha)		160:27:197					

Table-4.1.1(d) (Contd…)

N-levels	Varieties	VADGAON						
		Grain Yield (t/ha)	Rank	Panicle/m^2 (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1	V1	3.38	21	198	3.04	18.90	80	
	V2	3.38	21	197	3.04	23.33	78	
	V3	3.69	16	216	3.32	19.13	79	
	V4	3.19	24	186	2.87	20.80	80	
	V5	3.21	23	188	2.89	19.07	78	
	V6	3.80	14	222	3.42	23.20	80	
	V7	3.72	15	217	3.35	25.13	79	
	V8	3.51	19	205	3.16	19.00	79	
	V9	3.58	17	209	3.22	19.60	79	
	V10	3.39	20	199	3.05	21.07	80	
	V11	3.12	26	183	2.80	17.77	78	
	V12	3.56	18	208	3.20	26.03	80	
	V13	-	-	-	-	-	-	
	V14	-	-	-	-	-	-	
	V15	-	-	-	-	-	-	
	V16	-	-	-	-	-	-	
	V17	-	-	-	-	-	-	
	V18	3.13	25	183	2.81	14.85	79	
F2	V1	5.15	7	302	4.64	19.22	82	17.70
	V2	5.10	9	298	4.59	23.72	80	17.20
	V3	5.33	3	312	4.80	19.45	81	16.40
	V4	4.86	10	284	4.37	21.14	82	16.70
	V5	4.85	11	284	4.36	19.36	80	16.40
	V6	5.49	2	321	4.94	23.58	82	16.90
	V7	5.67	1	332	5.10	25.54	80	19.50
	V8	5.30	4	310	4.77	19.31	81	17.90
	V9	5.17	6	302	4.65	19.93	81	15.90
	V10	5.18	5	303	4.66	21.41	82	17.90
	V11	4.71	12	275	4.24	18.06	80	15.90
	V12	5.14	8	301	4.63	26.46	82	15.80
	V13	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-
	V15	-	-	-	-	-	-	-
	V16	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-
	V18	4.52	13	264	4.06	15.13	81	13.90
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		3.44	2	201	3.09	20.61	79	
F2		5.11	1	299	4.60	20.95	81	16.78
C.D.(0.05)		0.26		14.01	0.21	0.18	0.99	
C.V.(%)		6.19		5.75	5.71	0.89	1.27	

Table-4.1.1(d) (Contd…)

N-levels	Varieties	VADGAON						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
Mean of varieties:								
	V1	4.27	8	250	3.84	19.06	81	17.70
	V2	4.24	9	248	3.82	23.53	79	17.20
	V3	4.51	3	264	4.06	19.29	80	16.40
	V4	4.03	11	235	3.62	20.97	81	16.70
	V5	4.03	10	236	3.63	19.22	79	16.40
	V6	4.65	2	272	4.18	23.39	81	16.90
	V7	4.70	1	275	4.23	25.34	80	19.50
	V8	4.41	4	258	3.97	19.16	80	17.90
	V9	4.38	5	256	3.94	19.77	80	15.90
	V10	4.29	7	251	3.86	21.24	81	17.90
	V11	3.92	12	229	3.52	17.92	79	15.90
	V12	4.35	6	255	3.92	26.25	81	15.80
	V13	-	-	-	-	-	-	-
	V14	-	-	-	-	-	-	-
	V15	-	-	-	-	-	-	-
	V16	-	-	-	-	-	-	-
	V17	-	-	-	-	-	-	-
	V18	3.83	13	224	3.44	14.99	80	13.90
C.D.(0.05)		0.18		10.89	0.17	0.61	1.22	
C.V. (%)		3.73		3.77	3.8	2.54	1.32	
Expt. Mean		**4.27**		**250**	**3.85**	**20.78**	**80**	
Soil type		-						
pH		7.90						
N - levels (kg/ha)								
F1		50:25:25						
F2		100:50:50						
Recommended N:P:K (kg/ha)		100:50:50						
Varieties								
V1		IET 26790						
V2		IET 28329						
V3		IET 28354						
V4		IET 28343						
V5		IET 28358						
V6		IET 28332						
V7		IET 28356						
V8		IET 28115						
V9		IET 28366						
V10		IET 26898						
V11		CO-51 (NC)						
V12		PR 124 (N)						
V13		-						
V14		-						
V15		-						
V16		-						
V17		-						
V18		Local Check Phule Radha						
Available N:P:K of soil (kg/ha)		160:19:219						

Table-4.1.1(d) (Contd…)

N-levels	Varieties	VARANASI						Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
F1	V1	4.08	13	248	2.85	80.67		4.15	23
	V2	4.07	14	241	2.73	84.33		4.20	22
	V3	3.83	18	235	2.91	83.33		4.22	20
	V4	3.25	24	196	2.67	81.33		3.86	29
	V5	3.92	15	230	2.43	83		3.99	26
	V6	3.87	17	208	2.47	82		3.74	31
	V7	2.47	27	223	1.81	81		3.71	32
	V8	3.77	20	199	2.73	82		4.03	25
	V9	1.4	30	206	1.03	82.33		3.81	30
	V10	4.1	12	198	3.24	82.33		3.88	28
	V11	2.6	26	222	1.79	78.67		3.49	34
	V12	3.9	16	188	3.09	89		3.92	27
	V13	2.43	28	207	1.13	75.33		3.10	36
	V14							4.60	13
	V15	3.53	23	221	2.67	82.67		3.71	33
	V16							4.40	17
	V17							4.40	17
	V18	3.8	19	207	1.37	83.33		3.39	35
F2	V1	5.42	1	263	2.71	82	13.40	4.83	9
	V2	5.37	2	276	2.53	84.67	13.00	5.20	5
	V3	5.31	6	241	2.65	82	14.80	4.93	6
	V4	4.65	10	243	2.39	80	14.00	4.83	8
	V5	5.32	5	267	3.03	82	14.00	5.20	4
	V6	4.83	9	244	2.75	81.33	9.60	4.65	12
	V7	3.73	21	242	1.71	81.67	12.60	4.56	14
	V8	5.37	2	238	3.27	83.33	16.00	4.92	7
	V9	2.04	29	196	1.17	82.67	6.40	4.50	16
	V10	5.34	4	209	3.48	82.67	12.40	4.80	10
	V11	3.6	22	245	1.96	80	10.00	4.54	15
	V12	5.2	7	203	3.46	88	13.00	4.77	11
	V13	3.17	25	197	1.2	75.33	7.40	4.09	24
	V14	-	-	-	-	-		5.37	1
	V15	4.61	11	234	2.7	83.33	10.80	4.27	19
	V16	-	-	-	-	-		5.37	1
	V17	-	-	-	-	-		5.30	3
	V18	4.94	8	197	1.73	84	11.40	4.21	21
Interaction									
F at same V		0.31		13.54	0.34	1.32			
V at same F		0.35		13.2	0.34	1.37			
F1		3.40	2	215	2.33	82		3.85	2
F2		4.59	1	233	2.45	82	11.92	4.75	1
C.D.(0.05)		0.23		2.25	0.11	NS			
C.V.(%)		6.43		1.11	5.24	0.9			

Table-4.1.1(d) (Contd…)

N-levels	Varieties	VARANASI						Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
Mean of varieties:									
	V1	4.75	1	255	2.78	81	13.40	4.52	8
	V2	4.72	2	258	2.63	85	13.00	4.70	4
	V3	4.57	5	238	2.78	83	14.80	4.61	6
	V4	3.95	11	219	2.53	81	14.00	4.41	9
	V5	4.62	4	248	2.73	83	14.00	4.67	5
	V6	4.35	9	226	2.61	82	9.60	4.25	12
	V7	3.10	12	232	1.76	81	12.60	4.17	13
	V8	4.57	5	218	3.00	83	16.00	4.52	7
	V9	1.72	15	201	1.10	83	6.40	4.07	14
	V10	4.72	3	204	3.36	83	12.40	4.38	11
	V11	3.10	12	233	1.88	79	10.00	4.03	15
	V12	4.55	7	195	3.28	89	13.00	4.39	10
	V13	2.80	14	202	1.17	75	7.40	3.60	18
	V14	-	-	-	-	-	-	4.99	1
	V15	4.07	10	227	2.69	83	10.80	3.99	16
	V16	-	-	-	-	-	-	4.89	2
	V17	-	-	-	-	-	-	4.85	3
	V18	4.37	8	202	1.55	84	11.40	3.80	17
	C.D.(0.05)	0.22		9.58	0.24	0.93			
	C.V. (%)	4.8		3.7	8.71	0.98			
	Expt. Mean	**4.00**		**224**	**2.39**	**82**		4.36	
	Soil type	-							
	pH	7.20							
	N - levels (kg/ha)								
	F1	50:25:25							
	F2	100:50:50							
	Recommended N:P:K (kg/ha)	100:50:50							
	Varieties								
	V1	IET – 26790							
	V2	IET – 28329							
	V3	IET - 28354							
	V4	IET - 28343							
	V5	IET - 28358							
	V6	IET - 28332							
	V7	IET - 28356							
	V8	IET - 28115							
	V9	IET – 28366							
	V10	IET – 26898							
	V11	Co – 51 (NC)							
	V12	PR – 124 (N)							
	V13	Narendra – 97 (E)							
	V14								
	V15	Sahbhagi dhan							
	V16	-							
	V17	-							
	V18	Local Check HUR - 1309							
	Available N:P:K of soil (kg/ha)	160:19:219							

4.1(e) NMT – AVT 2 IME

AVT-2 IME cultures (IET 28396, IET 28032 and IET 28033) were evaluated at sixteen locations *viz.,* **Aduthurai (150:60:60), ARI-Rajendranagar (120:60:40), Chinsurah (70:35:35), Dhangain (120:60:40), Faizabad (120:60:40), Gangavathi (150:75:75), Ghaghraghat (120:60:60), Karjat (100:50:50), Kota (120:60:40), Mandya (100:50:50), Maruteru (90:60:60), Nagina (120:60:40), Navsari (100:30:0), Nawagam (100:25:0), Puducherry (120:40:40) and Varanasi (120:60:40)** in comparison to high yielding standard checks (IR 64 Sub-1, PR 113, Lalat, Karjat 7, MTU 1010, HC-US 312 and local check) under two recommended dose of fertiliser (50% and 100% RDF). The details and data received from these locations are summarized and presented in **Table 4.1(e)**.

Application of different nutrient levels significantly influenced the grain yield at all the locations except at **Varanasi, Gangavathi, Mandya and Navsari.** Application of 100% RDF recorded significantly higher grain yield at **Aduthurai** (3.10 t/ha), **ARI Rajendrangar** (5.78 t/ha), **Chinsurah** (4.20 t/ha), **Dhangain** (3.12 t/ha), **Faizabad** (3.95 t/ha), **Ghaghraghat** (3.89 t/ha), **Karjat** (4.03 t/ha), **Kota** (4.08 t/ha), **Maruteru** (4.71 t/ha), **Nagina** (4.40 t/ha), **Nawagam** (5.39 t/ha) and **Puducherry** (6.94 t/ha) with mean grain yield increase of 16% over 50% of RDF application. Nutrient response (kg grain/kg nutrient) was found to be higher with the application of 100% RDF at **Chinsurah** (16.73), **Nagina** (16.49), **ARI Rajendrangar** (16.32) as compared to other locations.

Grain yield differences among the tested varieties were found to be significant at all the locations. Highest grain yield was recorded by IET 28396 at **Aduthurai** (4.39 t/ha), **Kota** (6.36 t/ha), **Nagina** (3.91 t/ha), **Puduchery** (7.22 t/ha), **Varanasi** (6.20 t/ha). While, IET 28032 recorded higher grain yield at **Chinsurah** (3.88 t/ha), **Faizabad** (4.27 t/ha) and **Ghaghraghat** (4.22 t/ha). Mean over the locations performance of IET 28396 (4.70 t/ha) followed by IET 28032 (4.36 t/ha) were promising in terms of higher yields. Interaction effects among RDF x varieties was found to be non-significant at all the locations except at **Aduthurai**, **Faizabad**, **Gangavathi, Ghaghraghat, Maruteru** and **Varanasi** where in 100% RDF gave better yields of cultures.

In this trial, mean over the locations, nutrient management with 100% RDF application recorded better yield over 50% RDF at all the locations with 16% higher grain yield. IET 28396 (4.70 t/ha) and IET 28302 (4.36 t/ha) performed better and recorded higher mean grain yield across the locations as compared to other test entries and cultures.

4.1(f) NMT – AVT 2 IM

Two AVT-2 entries (IET 28130(H) and IET 27686) of medium duration were evaluated for their response to nutrients on grain yield at seventeen different locations Viz., **Chinsurah (80:40:40), Coimbatore (150:50:50), Dhangain (120:60:40), Faizabad (120:60:60), Jagdalpur (120:60:40), Karjat (100:50:50), Kaul (150:60:60), Kota (120:60:40)Maruteru (90:60:60), Nagina (120:60:40),Nawagam (100:25:0), Pantnagar (120:60:40), Puducherry (120:40:40), Pusa (120:60:40), Titabar (40:20:20)** and **Varanasi (120:60:40)**

Kaul (150:60:60) under two different levels of nutrient input (50% and 100% RDF). The details and data received from these locations are summarized and presented in Table 4.1 (f).

Application of different nutrient levels (50 and 100% RDF) significantly influenced the grain yield at all the locations except **Marutteru, Nawagam** and **Titabar** yield improvement was to the tune of 12% with 100% RDF compared to 50% RDF (4.04 t/ha). Higher nutrient response was recorded with 100% RDF at **Chinsurah** (21.53), **Nagina** (20.68), **Pusa** (23.00), indicated lower nutrient available status and higher nutrient requirement at these locations.

Grain yield differences among the tested cultures were found to be significant at all the locations. Among the tested entries higher grain yield was recorded by IET 28160(H) (4.88 t/ha) at **Chinsurah**, (5.59 t/ha) at **Dhangain**, (4.05 t/ha) at **Jagdalpur**, (3.93 t/ha) at **Karjat**, (4.97 t/ha) at **Kota**, (3.92 t/ha) at **Maruteru** (4.32 t/ha) at **Pantnagar**, (7.38 t/ha) at **Puduchery** and **Varanasi** (6.67 t/ha) while IET 27686 was promising with higher grain yield of 5.95 t/ha at **Faizabad**, 3.46 t/ha **Nagina.** Interaction effects between nutrient levels and varieties was found to be significant at all the locations except at **Nawagam** and **Titabar** only where significant interaction was noted with application of 100% RDF with IET cultures over 50% RDF indicating higher nutrient response of the cultures.

In this trial, mean over the locations IET 28160(H) found promising over IET 27686 on the basis of overall mean grain yield across the locations. Application of 100% RDF of the location found significantly superior to 50% RDF application at all the locations.

Table 4.1(e): Summary of data on grain yield and ancillary characters of selected AVT -2 IME cultures grown under transplanted conditions at low and optimum level of recommended fertilizer doses, kharif 2021.

F-levels	Varieties	ADUTHURAI					ARI Rajendranagar							CHINSURAH					
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: low input (50% NPK)	V1	4.32	*2*	312	3.81		4.17	*11*	300	2.87	27.5	87		2.83	*12*	245	2.65	100	
	V2	3.78	*7*	302	3.74		4.00	*12*	296	2.72	26.9	85		3.45	*7*	229	3.01	97	
	V3	3.63	*16*	305	3.53		3.50	*16*	248	2.24	26.8	85		3.31	*10*	280	2.72	98	
	V4	3.64	*15*	304	3.42		3.97	*14*	269	2.55	26.2	94		3.30	*11*	265	2.69	92	
	V5	3.67	*13*	311	2.72		4.20	*10*	305	3.08	23.9	97		2.20	*14*	191	2.31	95	
	V6	3.69	*12*	290	2.63		3.70	*15*	296	2.60	27.8	88		3.37	*9*	253	2.82	98	
	V7	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	
	V8	3.81	*6*	301	2.75		4.00	*12*	281	2.57	21.3	86		2.76	*13*	269	2.34	90	
	V9	-	-	-	-		-	-	-	-	-	-		-	-	-	-	-	
	V10	3.65	*14*	310	2.68		4.30	*9*	322	3.22	22.4	87		-	-	-	-	-	
F2: Optimum input (100% NPK)	V1	4.45	*1*	323	3.92	0.96	5.77	*4*	367	3.96	27.9	91	14.55	4.53	*1*	336	2.88	100	24.29
	V2	3.83	*5*	313	3.18	0.37	5.60	*6*	362	3.65	27.5	92	14.55	4.30	*3*	292	3.19	97	12.14
	V3	3.71	*10*	316	3.61	0.59	5.53	*7*	358	3.39	27.5	93	18.45	4.26	*4*	317	3.14	98	13.57
	V4	3.70	*11*	313	3.54	0.44	5.83	*3*	369	3.96	26.6	97	16.91	4.45	*2*	281	2.76	92	16.43
	V5	3.84	*4*	322	2.82	1.26	5.73	*5*	364	3.77	24.8	100	13.91	3.42	*8*	207	2.55	95	17.43
	V6	3.92	*3*	307	2.75	1.70	5.30	*8*	359	3.32	28.5	96	14.55	4.26	*4*	336	3.07	98	12.71
	V7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V8	3.77	*8*	305	2.84	-0.30	6.07	*2*	391	4.32	21.8	90	18.82	4.20	*6*	316	2.86	90	20.57
	V9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V10	3.77	*8*	315	2.74	0.89	6.37	*1*	397	4.46	23.5	90	18.82	-	-	-	-	-	-
Interaction																			
N at same V		0.07		NS	0.25		NS		NS	NS	NS	1.06		NS		NS	NS	NS	
V at same N		0.07		NS	0.27		NS		NS	NS	NS	1.14		NS		NS	NS	NS	
Means of F levels:																			
F1		3.77	*2*	304	3.16		3.98	*2*	290	2.73	25.4	89		3.03	*2*	248	2.65	96	
F2		3.87	*1*	314	3.18	0.74	5.78	*1*	371	3.85	26.0	94	16.32	4.20	*1*	298	2.92	96	16.73
C.D.(0.05)		0.03		8.79	NS		0.42		66.68	0.31	0.30	0.72		0.14		41.81	0.25	NS	
C.V.(%)		0.58		2.29	4.86		6.92		16.25	7.65	0.93	0.63		2.96		11.55	6.83	0.16	

Table 4.1(e): Cntd..

F-levels	Varieties	ADUTHURAI					ARI Rajendranagar							CHINSURAH					
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/ m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.)	Grain Yield (t/ha)	Rank	Panicle/ m² (No.)	Panicle Weight (g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.)
V1		4.39	*1*	318	3.87	0.96	4.97	*3*	334	3.42	27.7	89	14.55	3.68	*5*	291	2.77	100	24.29
V2		3.81	*2*	308	3.46	0.37	4.80	*6*	329	3.19	27.2	89	14.55	3.88	*1*	261	3.10	97	12.14
V3		3.67	*7*	310	3.57	0.59	4.52	*7*	303	2.82	27.2	89	18.45	3.79	*4*	299	2.93	98	13.57
V4		3.67	*7*	309	3.48	0.44	4.90	*5*	319	3.26	26.4	96	16.91	3.88	*1*	273	2.73	92	16.43
V5		3.76	*5*	317	2.77	1.26	4.97	*4*	335	3.43	24.4	99	13.91	2.81	*7*	199	2.43	95	17.43
V6		3.81	*2*	299	2.69	1.70	4.50	*8*	328	2.96	28.2	92	14.55	3.82	*3*	295	2.95	98	12.71
V7		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
V8		3.79	*4*	303	2.80	-0.30	5.04	*2*	336	3.45	21.5	88	18.82	3.48	*6*	293	2.60	90	20.57
V9		-	-	-	-	-	-	-	-	-	-	-	-						
V10		3.71	*6*	313	2.71	0.89	5.34	*1*	360	3.84	23.0	89	18.82						
C.D.(0.05)		0.05		10.52	0.17		0.34		29.66	0.44	0.40	0.75		0.46		32.44	0.35	1.02	
C.V.(%)		1.15		2.88	4.64		5.97		7.59	11.23	1.33	0.70		10.74		9.98	10.50	0.90	
Expt. Mean		**3.82**		**309**	**3.17**		**4.88**		**330**	**3.29**	**25.7**	**91**		**3.62**		**273**	**2.79**	**96**	
Soil type		Clay Loam					Clay Loam							Clay loam					
pH		-					-							7.60					
F - levels (kg/ha)																			
F1		75:30:30					60:30:30							35:17.5:17.5					
F2		150:60:60					120:60:40							70:35:35					
Recommended N:P:K (kg/ha)		150:60:60					120:60:40							70:35:35					
Varieties																			
V1		IET 28396					IET 28396							IET 28396					
V2		IET 28032 ®					IET 28032 ®							IET 28032 ®					
V3		IET 28033 (R)					IET 28033 (R)							IET 28033 (R)					
V4		Gondhra Bidhan-3					Gondhra Bidhan-3							Gondhra Bidhan-3					
V5		PR 113					PR 113							PR 113					
V6		Lalat					Lalat							Lalat					
V7		-					-							-					
V8		MTU 1010					MTU 1010							MTU 1010					
V9		-					-							-					
V10		Local Check ADT 53					Local Check							-					
Available N:P:K of soil (kg/ha)		-					-							104:96:510					

Table 4.1(e): Cntd..

F-levels	Varieties	DHANGAIN							FAIZABAD						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: low input (50% NPK)	V1	3.38	*6*	331	5.14	21.0	83		3.90	*7*	225	3.76	23.5	88	
	V2	2.86	*13*	325	4.32	26.0	77		4.23	*4*	275	2.74	18.3	87	
	V3	2.65	*15*	323	3.70	27.3	79		2.93	*15*	221	2.51	24.2	84	
	V4	3.51	*4*	336	6.03	20.3	82		3.72	*9*	192	2.26	27.7	87	
	V5	3.32	*7*	336	5.61	30.0	88		3.60	*11*	243	2.90	24.5	87	
	V6	2.80	*14*	321	4.53	24.3	89		3.23	*14*	231	2.55	23.4	86	
	V7	-	-	-	-	-	-		-	-	-	-	-	-	
	V8	2.93	*12*	321	4.05	23.0	76		2.47	*16*	263	2.90	20.4	83	
	V9	0.00	*17*	0	0.00	0.0	0		-	-	-	-	-	-	
	V10	2.47	*16*	315	3.30	24.7	84		3.65	*10*	272	3.67	24.8	86	
F2: Optimum input (100% NPK)	V1	4.02	*3*	335	5.54	22.7	84	5.82	4.25	*3*	273	4.03	24.5	94	2.92
	V2	3.20	*8*	332	4.52	27.3	79	3.09	4.31	*1*	305	3.03	20.0	99	0.67
	V3	2.97	*10*	326	3.87	29.0	80	2.91	3.27	*13*	302	3.07	25.3	96	2.83
	V4	4.36	*1*	351	7.03	22.3	83	7.73	4.08	*5*	287	2.45	28.9	93	3.00
	V5	4.07	*2*	342	5.94	32.0	89	6.82	3.86	*8*	255	2.97	26.0	97	2.17
	V6	3.40	*5*	338	4.89	26.7	90	5.45	4.07	*6*	295	2.98	25.7	88	7.00
	V7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V8	3.15	*9*	332	4.31	25.0	77	2.00	3.51	*12*	273	3.17	21.3	87	8.67
	V9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V10	2.94	*11*	322	3.52	25.3	85	4.27	4.27	*2*	304	3.08	26.9	91	5.17
Interaction															
N at same V		NS		NS	NS	NS	NS		0.22		15.95	0.28	NS	1.70	
V at same N		NS		NS	NS	NS	NS		0.26		21.00	0.32	NS	1.82	
Means of F levels:															
F1		2.66	*2*	290	4.08	21.9	73		3.47	*2*	240	2.91	23.4	86	
F2		3.51	*1*	335	4.95	26.3	83	7.78	3.95	*1*	287	3.10	24.8	93	4.05
C.D.(0.05)		0.16		5.59	NS	0.65	0.18		0.20		18.93	NS	NS	1.12	
C.V.(%)		3.97		1.36	8.40	2.05	0.17		4.27		5.78	6.05	5.03	1.01	

Table 4.1(e): Cntd..

F-levels	Varieties	DHANGAIN							FAIZABAD						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
Mean of varieties:															
	V1	3.70	*2*	333	5.34	21.8	83	5.82	4.08	*2*	249	3.90	24.0	91	2.92
	V2	3.03	*6*	329	4.42	26.7	78	3.09	4.27	*1*	290	2.89	19.1	93	0.67
	V3	2.81	*7*	325	3.79	28.2	79	2.91	3.10	*7*	262	2.79	24.7	90	2.83
	V4	3.94	*1*	343	6.53	21.3	82	7.73	3.90	*4*	240	2.36	28.3	90	3.00
	V5	3.70	*3*	339	5.78	31.0	89	6.82	3.73	*5*	249	2.94	25.3	92	2.17
	V6	3.10	*4*	329	4.71	25.5	89	5.45	3.65	*6*	263	2.77	24.6	87	7.00
	V7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V8	3.04	*5*	326	4.18	24.0	76	2.00	2.99	*8*	268	3.04	20.9	85	8.67
	V9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V10	2.71	*8*	319	3.41	25.0	84	4.27	3.96	*3*	288	3.38	25.9	89	5.17
C.D.(0.05)		0.26		16.18	0.83	1.41	0.30		0.16		11.28	0.20	0.78	1.20	
C.V.(%)		6.85		4.14	14.80	4.70	0.31		3.58		3.62	5.62	2.74	1.14	
Expt. Mean		**3.25**		**330**	**4.77**	**25.4**	**83**		**3.71**		**264**	**3.00**	**24.1**	**90**	
Soil type		Clay loam							Sandy loam						
pH		6.60							7.60						
F - levels (kg/ha)															
F1		60:30:20							60:30:30						
F2		120:60:40							120:60:60						
Recommended N:P:K (kg/ha)		120:60:40							120:60:60						
Varieties															
V1		IET 28396							IET 28396						
V2		IET 28032 ®							IET 28032 ®						
V3		IET 28033 (R)							IET 28033 (R)						
V4		Gondhra Bidhan-3							Gondhra Bidhan-3						
V5		PR 113							PR 113						
V6		Lalat							Lalat						
V7		Karjat 7							Karjat 7						
V8		MTU 1010							MTU 1010						
V9		IR64 sub1 (RP)							IR64 sub1 (RP)						
V10		Local Check - R.Bhagwati 110 Days							Local Check - NDR 2064 120Days						
Available N:P:K of soil (kg/ha)		252:42:189							200:24:234						

Table 4.1(e): Cntd..

F-levels	Varieties	GANGAVATHI						GHAGHRAGHAT						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: low input (50% NPK)	V1	4.20	*10*	297	2.51	23.0		3.81	*7*	228	3.33	24.5	89	
	V2	3.80	*14*	354	2.08	26.3		4.16	*4*	266	2.67	18.9	85	
	V3	3.87	*13*	386	2.35	26.2		3.08	*15*	226	2.66	24.5	82	
	V4	6.66	*2*	256	4.05	20.6		3.69	*9*	194	2.30	26.9	86	
	V5	4.52	*6*	186	3.51	26.5		3.65	*10*	243	2.98	24.8	87	
	V6	4.35	*9*	196	3.31	26.5		3.18	*13*	231	2.57	23.8	86	
	V7	2.47	*20*	275	1.72	21.6		-	-	-	-	-	-	
	V8	5.42	*4*	339	2.70	23.5		2.58	*16*	251	2.50	20.9	82	
	V9	4.05	*11*	305	2.40	20.2		-	-	-	-	-	-	
	V10	5.44	*3*	325	2.39	14.8		3.54	*12*	266	3.46	26.3	86	
F2: Optimum input (100% NPK)	V1	3.76	*16*	240	2.83	22.9	-2.93	4.26	*3*	250	3.80	25.1	92	3.75
	V2	3.80	*14*	342	1.46	26.4	0.00	4.27	*2*	293	3.18	21.8	101	0.92
	V3	3.94	*12*	294	1.83	26.0	0.47	3.09	*14*	304	3.05	25.1	97	0.08
	V4	6.89	*1*	229	3.94	19.6	1.53	3.89	*6*	290	2.49	26.9	94	1.67
	V5	3.52	*18*	195	3.84	26.6	-6.67	3.79	*8*	263	2.90	25.7	99	1.17
	V6	4.66	*5*	220	3.29	25.7	2.07	3.97	*5*	286	2.86	25.5	86	6.58
	V7	2.65	*19*	275	1.58	19.8	1.20	-	-	-	-	-	-	-
	V8	4.51	*7*	284	2.31	23.3	-6.07	3.59	*11*	265	3.06	22.1	88	8.42
	V9	3.59	*17*	274	2.39	20.4	-3.07	-	-	-	-	-	-	-
	V10	4.50	*8*	298	2.81	15.0	-6.27	4.28	*1*	299	2.96	26.4	92	6.17
Interaction														
N at same V		0.34		18.25	0.29	NS		0.23		15.73	0.23	1.13	1.34	
V at same N		0.34		20.47	0.29	NS		0.22		16.35	0.29	1.26	1.48	
Means of F levels:														
F1		4.48	*1*	292	2.70	22.9		3.46	*2*	238	2.81	23.8	85	
F2		4.18	*2*	265	2.63	22.6	-1.97	3.89	*1*	281	3.04	24.8	94	3.59
C.D.(0.05)		0.15		13.99	NS	NS		0.08		9.12	NS	0.87	1.00	
C.V.(%)		3.07		4.52	4.45	2.29		1.73		2.83	6.97	2.89	0.90	

Table 4.1(e): Cntd..

F-levels	Varieties	GANGAVATHI						GHAGHRAGHAT						
		Grain Yield (t/ha)	**Rank**	**Panicle/m^2 (No.)**	**Panicle Weight (g)**	**Test wt(g)**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**	**Grain Yield (t/ha)**	**Rank**	**Panicle/m^2 (No.)**	**Panicle Weight (g)**	**Test wt(g)**	**Days for 50% Flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
Mean of varieties:														
	V1	3.98	*6*	269	2.67	22.9	-2.93	4.04	*2*	239	3.57	24.8	90	3.75
	V2	3.80	*9*	348	1.77	26.4	0.00	4.22	*1*	279	2.93	20.4	93	0.92
	V3	3.91	*7*	340	2.09	26.1	0.47	3.09	*7*	265	2.86	24.8	90	0.08
	V4	6.78	*1*	243	4.00	20.1	1.53	3.79	*4*	242	2.40	26.9	90	1.67
	V5	4.02	*5*	191	3.68	26.5	-6.67	3.72	*5*	253	2.94	25.2	93	1.17
	V6	4.51	*4*	208	3.30	26.1	2.07	3.58	*6*	259	2.72	24.7	86	6.58
	V7	2.56	*10*	275	1.65	20.7	1.20	-	-	-	-	-	-	-
	V8	4.97	*3*	312	2.51	23.4	-6.07	3.09	*7*	258	2.78	21.5	85	8.42
	V9	3.82	*8*	290	2.40	20.3	-3.07	-	-	-	-	-	-	-
	V10	4.97	*2*	312	2.60	14.9	-6.27	3.91	*3*	282	3.21	26.4	89	6.17
C.D.(0.05)		0.24		12.90	0.20	0.89		0.16		11.12	0.16	0.80	0.95	
C.V.(%)		4.75		3.97	6.49	3.35		3.69		3.62	4.76	2.78	0.90	
Expt. Mean		**4.33**		**278**	**2.67**	**22.7**		**3.68**		**260**	**2.92**	**24.3**	**90**	
Soil type		Black clay						Sandy Loam						
pH		8.20						7.60						
F - levels (kg/ha)														
F1		75:37.5:37.5						60:30:30						
F2		150:75:75						120:60:60						
Recommended N:P:K (kg/ha)		150:75:75						120:60:60						
Varieties														
V1		IET 28396						IET 28396						
V2		IET 28032 ®						IET 28032 ®						
V3		IET 28033 (R)						IET 28033 (R)						
V4		Gondhra Bidhan-3						Gondhra Bidhan-3						
V5		PR 113						PR 113						
V6		Lalat						Lalat						
V7		Karjat 7						-						
V8		MTU 1010						MTU 1010						
V9		IR64 sub1 (RP)						-						
V10		Local Check GNV 05-01 135Days						Local Check - NDR 359 125 Days						
Available N:P:K of soil (kg/ha)		-						200:24:234						

Table 4.1(e): Cntd..

F-levels	Varieties	KARJAT							KOTA						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: low input (50% NPK)	V1	2.77	*14*	178	3.15	23.93	89		6.09	*4*	310	4.25	22.6	91	
	V2	2.16	*16*	169	2.36	22.03	84		4.59	*12*	311	3.36	26.9	83	
	V3	2.74	*15*	170	2.90	22.41	84		4.80	*10*	299	3.34	26.9	83	
	V4	3.74	*8*	195	4.12	26.85	87		5.50	*7*	289	4.50	21.0	90	
	V5	3.94	*5*	205	4.14	27.94	91		5.33	*8*	289	4.15	28.3	96	
	V6	3.09	*11*	180	3.49	24.95	85		4.14	*14*	296	3.08	25.5	81	
	V7	3.24	*10*	190	3.67	25.75	87		-	-	-	-	-	-	
	V8	2.96	*13*	179	3.23	24.94	84		-	-	-	-	-	-	
	V9	-	-	-	-	-	-		-	-	-	-	-	-	
	V10	-	-	-	-	-	-		4.33	*13*	304	3.10	27.8	84	
F2: Optimum input (100% NPK)	V1	3.87	*7*	246	3.40	25.23	86	11.00	6.62	*2*	327	4.53	23.0	91	4.82
	V2	3.00	*12*	228	2.97	24.37	86	8.40	5.55	*6*	339	3.83	27.8	84	8.73
	V3	3.59	*9*	237	3.24	24.77	85	8.50	5.71	*5*	313	3.69	27.5	84	8.27
	V4	4.71	*2*	259	4.93	28.09	85	9.70	6.72	*1*	306	5.04	21.2	89	11.09
	V5	4.95	*1*	260	5.09	29.09	90	10.10	6.48	*3*	311	4.70	28.9	94	10.45
	V6	3.99	*4*	255	4.07	26.45	85	9.00	4.73	*11*	324	3.35	25.7	83	5.36
	V7	4.26	*3*	256	4.29	27.08	89	10.20	-	-	-	-	-	-	-
	V8	3.88	*6*	250	4.03	26.43	82	9.20	-	-	-	-	-	-	-
	V9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V10	-	-	-	-	-	-	-	5.03	*9*	319	3.38	27.9	85	6.36
Interaction															
N at same V		NS		NS	NS	NS	1.41		NS		NS	NS	NS	NS	
V at same N		NS		NS	NS	NS	1.53		NS		NS	NS	NS	NS	
Means of F levels:															
F1		3.08	*2*	183	3.38	24.85	86		4.97	*2*	300	3.68	25.58	87	
F2		4.03	*1*	249	4.00	26.44	86	9.51	5.83	*1*	320	4.07	26.01	87	7.87
C.D.(0.05)		0.33		15.98	0.34	1.40	NS		0.39		13.32	0.32	0.34	NS	
C.V.(%)		7.43		5.96	7.34	4.39	0.93		5.39		3.24	6.14	0.99	1.28	

Table 4.1(e): Cntd..

F-levels	Varieties	KARJAT							KOTA						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
Mean of varieties:															
	V1	3.32	*6*	212	3.28	24.58	87	11.00	6.36	*1*	319	4.39	22.79	91	4.82
	V2	2.58	*8*	199	2.67	23.20	85	8.40	5.07	*5*	325	3.60	27.35	83	8.73
	V3	3.17	*7*	203	3.07	23.59	85	8.50	5.26	*4*	306	3.52	27.23	84	8.27
	V4	4.23	*2*	227	4.53	27.47	86	9.70	6.11	*2*	298	4.77	21.10	90	11.09
	V5	4.45	*1*	233	4.62	28.52	91	10.10	5.91	*3*	300	4.43	28.62	95	10.45
	V6	3.54	*4*	218	3.78	25.70	85	9.00	4.44	*7*	310	3.22	25.62	82	5.36
	V7	3.75	*3*	223	3.98	26.42	88	10.20	-	-	-	-	-	-	-
	V8	3.42	*5*	214	3.63	25.69	83	9.20	-	-	-	-	-	-	-
	V9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V10	-	-	-	-	-	-	-	4.68	*6*	312	3.24	27.85	85	6.36
C.D.(0.05)		0.59		21.73	0.36	1.52	1.00		0.33		14.78	0.22	0.68	0.77	
C.V.(%)		13.94		8.51	8.33	5.01	0.98		5.20		4.00	4.68	2.21	0.74	
Expt. Mean		**3.56**		**216**	**3.69**	**25.64**	**86**		**5.40**		**310**	**3.88**	**25.79**	**87**	
Soil type		-							Clay loam						
pH		-							7.44						
F - levels (kg/ha)															
F1		50:25:25							60:30:20						
F2		100:50:50							120:60:40						
Recommended N:P:K (kg/ha)		100:50:50							120:60:40						
Varieties															
V1		IET 28396							IET 28396						
V2		IET 28032 ®							IET 28032 ®						
V3		IET 28033 (R)							IET 28033 (R)						
V4		Gondhra Bidhan-3							Gondhra Bidhan-3						
V5		PR 113							PR 113						
V6		Lalat							Lalat						
V7		Karjat 7							-						
V8		MTU 1010							-						
V9		-							-						
V10		-							Local Check - Ratna						
Available N:P:K of soil (kg/ha)		-							189:30:425						

Table 4.1(e): Cntd..

F-levels	Varieties	MANDYA						MARUTERU				NAGINA						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: low input (50% NPK)	V1	5.59	*7*	310	4.01	26.3		3.18	*14*	199		2.98	*8*	223	3.36	26.3	93	
	V2	4.80	*12*	318	3.40	27.3		3.41	*11*	230		2.86	*10*	233	3.36	26.3	94	
	V3	4.81	*11*	340	3.25	27.6		4.74	*5*	242		2.92	*9*	230	3.47	26.4	94	
	V4	6.25	*3*	269	4.96	23.5		3.32	*13*	225		2.36	*12*	207	3.29	26.3	92	
	V5	4.96	*10*	261	4.54	34.6		3.70	*9*	248		2.47	*11*	212	3.47	26.3	95	
	V6	4.65	*14*	317	3.80	26.6		3.36	*12*	202		2.24	*14*	204	3.33	26.9	93	
	V7	-	-	-	-	-		-	-	-		-	-	-	-	-	-	
	V8	4.79	*13*	326	3.21	25.3		4.29	*6*	216		2.28	*13*	206	3.37	25.8	93	
	V9	-	-	-	-	-		-	-	-		-	-	-	-	-	-	
	V10	-	-	-	-	-		-	-	-		-	-	-	-	-	-	
F2: Optimum input (100% NPK)	V1	6.13	*4*	312	4.05	26.6	5.40	4.17	*7*	218	9.43	4.84	*1*	322	3.36	26.4	93	16.91
	V2	5.62	*6*	320	3.46	27.6	8.20	5.51	*2*	241	20.00	4.62	*3*	312	3.39	26.4	94	16.00
	V3	5.33	*9*	342	3.26	28.3	5.20	5.23	*3*	247	4.67	4.75	*2*	313	3.48	26.4	95	16.64
	V4	7.42	*1*	272	5.19	23.0	11.70	3.77	*8*	193	4.29	4.18	*5*	244	3.34	26.4	93	16.55
	V5	5.37	*8*	290	4.50	36.8	4.10	5.70	*1*	250	19.05	4.32	*4*	265	3.52	26.3	96	16.82
	V6	6.26	*2*	334	4.17	27.4	16.10	3.63	*10*	226	2.57	4.07	*6*	239	3.38	25.9	94	16.64
	V7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V8	6.00	*5*	333	3.93	25.4	12.10	4.93	*4*	245	6.10	4.03	*7*	238	3.39	25.8	93	15.91
	V9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Interaction																		
N at same V		NS		NS	NS	NS		0.92		NS		NS		16.03	0.02	0.04	NS	
V at same N		NS		NS	NS	NS		0.91		NS		NS		15.33	0.02	0.04	NS	
Means of F levels:																		
F1		5.12	*2*	306	3.88	27.31		3.71	*2*	223		2.59	*2*	216	3.38	26.31	93	
F2		6.02	*1*	315	4.08	27.87	8.97	4.71	*1*	231	9.44	4.40	*1*	276	3.41	26.22	94	16.49
C.D.(0.05)		NS		NS	NS	NS		0.43		NS		0.19		4.92	0.01	0.03	NS	
C.V.(%)		12.31		22.12	12.66	9.03		7.66		5.64		4.07		1.51	0.32	0.07	1.90	

Table 4.1(e): Cntd..

F-levels	Varieties	MANDYA						MARUTERU				NAGINA						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Nutri. res. (kg grain/kg Nutri.)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Nutri. res. (kg grain/kg Nutri.)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.)
Mean of varieties:																		
	V1	5.86	*2*	311	4.03	26.44	5.40	3.68	*5*	209	9.43	3.91	*1*	272	3.36	26.34	93	16.91
	V2	5.21	*5*	319	3.43	27.45	8.20	4.46	*4*	236	20.00	3.74	*3*	272	3.38	26.35	94	16.00
	V3	5.07	*7*	341	3.26	27.96	5.20	4.99	*1*	245	4.67	3.84	*2*	272	3.48	26.40	94	16.64
	V4	6.84	*1*	270	5.08	23.23	11.70	3.55	*6*	209	4.29	3.27	*5*	226	3.32	26.33	93	16.55
	V5	5.17	*6*	275	4.52	35.72	4.10	4.70	*2*	249	19.05	3.40	*4*	238	3.50	26.29	96	16.82
	V6	5.46	*3*	325	3.99	27.02	16.10	3.50	*7*	214	2.57	3.16	*6*	222	3.36	26.40	93	16.64
	V7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V8	5.40	*4*	329	3.57	25.33	12.10	4.61	*3*	231	6.10	3.16	*6*	222	3.38	25.77	93	15.91
	V9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C.D.(0.05)		0.56		35.30	0.43	1.44		0.65		20.23		0.24		11.33	0.01	0.03	1.01	
C.V.(%)		8.37		9.55	9.10	4.38		12.9		7.47		5.65		3.86	0.34	0.08	0.91	
Expt. Mean		**5.57**		**310**	**3.98**	**27.59**		**4.21**		**227**		**3.49**		**246**	**3.39**	**26.27**	**94**	
Soil type		Red Sandy loam						Clay loam				Clay						
pH		8.31						-				7.85						
F - levels (kg/ha)																		
F1		50:25:25						45:30:30				60:30:20						
F2		100:50:50						90:60:60				120:60:40						
Recommended N:P:K (kg/ha)		100:50:50						90:60:60				120:60:40						
Varieties																		
V1		IET 28396						IET 28396				IET 28396						
V2		IET 28032 ®						IET 28032 ®				IET 28032 ®						
V3		IET 28033 (R)						IET 28033 (R)				IET 28033 (R)						
V4		Gondhra Bidhan-3						Gondhra Bidhan-3				Gondhra Bidhan-3						
V5		PR 113						PR 113				PR 113						
V6		Lalat						Lalat				Lalat						
V7		-						-				-						
V8		MTU 1010						MTU 1010				MTU 1010						
V9		-						-				-						
V10		-						-				-						
Available N:P:K of soil (kg/ha)		263:103:214						-				21:18:209						

Table 4.1(e): Cntd..

F-levels	Varieties	NAVSARI							NAWAGAM						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: low input (50% NPK)	V1	4.86	*5*	131	3.01	25.07	89		4.31	*15*	266	2.74	20.8	93.7	
	V2	4.19	*14*	158	2.38	28.71	91		5.18	*10*	207	2.84	28.7	90.3	
	V3	4.34	*9*	170	2.47	28.62	90		4.72	*12*	247	2.56	27.0	87.0	
	V4	4.41	*8*	108	5.07	22.31	91		5.56	*3*	261	4.08	23.5	89.7	
	V5	4.28	*11*	142	4.53	33.90	92		4.94	*11*	166	3.98	30.9	95.0	
	V6	4.18	*16*	119	2.71	26.98	91		4.65	*13*	211	3.85	26.4	96.3	
	V7	4.19	*14*	163	2.36	24.52	77		-	-	-	-	-	-	
	V8	3.85	*20*	141	2.77	24.72	78		3.95	*16*	214	2.99	24.2	87.7	
	V9	3.89	*17*	120	3.39	25.01	90		-	-	-	-	-	-	
	V10	5.00	*4*	161	4.55	32.23	90		5.23	*7*	201	4.15	14.5	97.0	
F2: Optimum input (100% NPK)	V1	5.17	*3*	131	3.27	22.94	89	4.77	5.21	*9*	193	3.66	23.6	95.7	14.40
	V2	4.26	*12*	166	2.62	25.95	92	1.08	5.33	*6*	257	3.28	25.6	92.0	2.40
	V3	4.21	*13*	156	2.31	26.51	92	-2.00	5.39	*5*	283	3.79	26.2	90.3	10.72
	V4	5.60	*1*	161	4.69	21.76	92	18.31	6.32	*1*	245	4.58	20.7	94.0	12.16
	V5	4.70	*6*	166	4.10	30.47	91	6.46	5.74	*2*	189	4.35	30.9	96.0	12.80
	V6	3.88	*18*	144	3.03	26.66	92	-4.62	5.23	*7*	240	3.46	27.2	97.0	9.28
	V7	4.29	*10*	149	2.32	23.53	77	1.54	-	-	-	-	-	-	-
	V8	4.48	*7*	148	2.66	24.39	80	9.69	4.41	*14*	272	3.07	24.3	88.3	7.36
	V9	3.86	*19*	175	3.41	25.28	91	-0.46	-	-	-	-	-	-	-
	V10	5.26	*2*	142	4.38	32.62	89	4.00	5.46	*4*	243	4.39	15.6	98.0	3.68
Interaction															
N at same V		NS		13.39	NS	NS	NS		NS		43.23	NS	NS	NS	
V at same N		NS		15.18	NS	NS	NS		NS		54.80	NS	NS	NS	
Means of F levels:															
F1		4.32	*2*	141	3.32	27.21	88		4.82	*2*	222	3.40	24.47	92	
F2		4.57	*1*	154	3.28	26.01	89	3.88	5.39	*1*	240	3.82	24.27	94	9.10
C.D.(0.05)		NS		10.63	NS	NS	NS		0.52		NS	0.33	NS	NS	
C.V.(%)		8.38		6.48	4.44	4.53	1.41		8.27		16.51	7.47	14.51	2.02	

Table 4.1(e): Cntd..

F-levels	Varieties	NAVSARI							NAWAGAM						
		Grain Yield (t/ha)	Rank	Panicle/m^2 (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m^2 (No.)	Panicle Weight (g)	Test wt(g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
Mean of varieties:															
V1		5.02	*2*	131	3.14	24.01	89	4.77	4.76	*7*	230	3.20	22.20	95	14.40
V2		4.23	*7*	162	2.50	27.33	91	1.08	5.26	*4*	232	3.06	27.14	91	2.40
V3		4.28	*5*	163	2.39	27.57	91	-2.00	5.06	*5*	265	3.18	26.60	89	10.72
V4		5.01	*3*	135	4.88	22.04	91	18.31	5.94	*1*	253	4.33	22.10	92	12.16
V5		4.49	*4*	154	4.32	32.19	92	6.46	5.34	*3*	177	4.17	30.90	96	12.80
V6		4.03	*9*	132	2.87	26.82	92	-4.62	4.94	*6*	225	3.66	26.77	97	9.28
V7		4.24	*6*	156	2.34	24.03	77	1.54	-	-	-	-	-	-	-
V8		4.17	*8*	145	2.72	24.56	79	9.69	4.18	*8*	243	3.03	24.24	88	7.36
V9		3.88	*10*	147	3.40	25.15	91	-0.46	-	-	-	-	-	-	-
V10		5.13	*1*	152	4.47	32.43	89	4.00	5.35	*2*	222	4.27	15.04	98	3.68
C.D.(0.05)		0.48		9.47	0.53	1.61	2.37		0.63		30.57	0.52	2.91	1.29	
C.V.(%)		9.34		5.50	13.73	5.19	2.31		10.4		11.20	12.27	10.10	1.17	
Expt. Mean		**4.45**		**148**	**3.30**	**26.61**	**88**		**5.10**		**231**	**3.61**	**24.37**	**93**	
Soil type		Clay							Clay loam						
pH		7.89							8.10						
F - levels (kg/ha)															
F1		50:15:0							50:12.5						
F2		100:30:0							100:25:0						
Recommended N:P:K (kg/ha)		100:30:0							100:25:0						
Varieties															
V1		IET 28396							IET 28396						
V2		IET 28032 ®							IET 28032 ®						
V3		IET 28033 (R)							IET 28033 (R)						
V4		Gondhra Bidhan-3							Gondhra Bidhan-3						
V5		PR 113							PR 113						
V6		Lalat							Lalat						
V7		Karjat 7							-						
V8		MTU 1010							MTU 1010						
V9		IR64 sub1 (RP)							-						
V10		Local Check - GNR 3							Local Check -GAR 13 125 Days						
Available N:P:K of soil (kg/ha)		285:24:0							-						

Table 4.1(e): Cntd..

F-levels	Varieties	PUDUCHERRY						VARANASI						Over all Mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
F1: low input (50% NPK)	V1	6.95	*5*	319	3.05	25.7		5.53	*7*	242	3.09	83		4.30	11
	V2	6.65	*10*	269	3.42	26.5		4.19	*15*	245	2.25	82		4.02	13
	V3	6.87	*7*	309	3.52	29.1		4.77	*13*	249	2.29	82		3.98	14
	V4	6.22	*15*	253	5.89	23.0		5.60	*6*	212	3.37	89		4.47	9
	V5	6.70	*8*	310	3.75	31.1		5.27	*8*	230	2.89	95		4.17	12
	V6	6.36	*14*	265	3.31	25.9		4.90	*10*	191	2.85	84		3.87	15
	V7	-	-	-	-	-		-	-	-	-	-		3.30	19
	V8	6.50	*12*	294	3.20	24.1		4.04	*16*	242	2.30	78		3.78	16
	V9	-	-	-	-	-		-	-	-	-	-		2.65	20
	V10	6.10	*16*	246	2.22	20.1		4.83	*12*	253	2.33	97		4.41	10
F2: Optimum input (100% NPK)	V1	7.48	*1*	347	3.07	26.2	5.30	6.87	*1*	266	3.36	85	11.17	5.09	2
	V2	7.05	*4*	299	3.50	27.2	4.00	4.85	*11*	243	2.56	84	5.50	4.69	5
	V3	7.33	*2*	330	3.68	29.0	4.60	4.93	*9*	281	2.50	86	1.33	4.58	7
	V4	6.52	*11*	280	6.65	23.2	3.00	6.60	*2*	225	3.55	87	8.33	5.32	1
	V5	7.12	*3*	324	3.91	31.0	4.20	6.43	*3*	237	3.01	94	9.67	4.94	3
	V6	6.67	*9*	300	3.61	26.2	3.10	6.20	*4*	226	3.75	86	10.83	4.64	6
	V7	-	-	-	-	-	-	-	-	-	-	-	-	3.73	17
	V8	6.89	*6*	312	3.43	24.0	3.90	4.40	*14*	276	2.14	75	3.00	4.52	8
	V9	-	-	-	-	-	-	-	-	-	-	-	-	3.73	18
	V10	6.42	*13*	272	2.50	21.6	3.20	5.87	*5*	268	2.67	96	8.67	4.92	4
Interaction															
N at same V		NS		NS	NS	0.49		0.38		14.34	0.24	1.12			
V at same N		NS		NS	NS	0.62		0.37		13.54	0.27	1.19			
Means of F levels:															
F1		6.54	*2*	283	3.55	25.66		4.89	*2*	233	2.67	86		4.06	2
F2		6.94	*1*	308	3.79	26.03	3.91	5.77	*1*	253	2.94	87	7.31	4.82	1
C.D.(0.05)		0.05		1.82	0.05	NS		0.16		2.35	0.19	NS			
C.V.(%)		0.55		0.50	1.01	1.63		2.36		0.78	5.44	0.67			

Table 4.1(e): Cntd..

F-levels	Varieties	PUDUCHERRY						VARANASI						Over all Mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Test wt(g)	Nutri. res. (kg grain/kg Nutri.)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle Weight (g)	Days for 50% Flowering	Nutri. res. (kg grain/kg Nutri.)		
Mean of varieties:															
	V1	7.22	*1*	333	3.06	25.92	5.30	6.20	*1*	254	3.23	84	11.17	4.70	2
	V2	6.85	*4*	284	3.46	26.82	4.00	4.52	*7*	244	2.41	83	5.50	4.36	5
	V3	7.10	*2*	319	3.60	29.06	4.60	4.85	*6*	265	2.40	84	1.33	4.28	6
	V4	6.37	*7*	267	6.27	23.08	3.00	6.10	*2*	218	3.46	88	8.33	4.89	1
	V5	6.91	*3*	317	3.83	31.03	4.20	5.85	*3*	233	2.95	95	9.67	4.56	4
	V6	6.52	*6*	283	3.46	26.01	3.10	5.55	*4*	208	3.30	85	10.83	4.25	7
	V7	-	-	-	-	-	-	-	-	-	-	-	-	3.52	10
	V8	6.70	*5*	303	3.32	24.04	3.90	4.22	*8*	259	2.22	77	3.00	4.15	8
	V9	-	-	-	-	-	-	-	-	-	-	-	-	3.85	
	V10	6.26	*8*	259	2.36	20.81	3.20	5.35	*5*	260	2.50	97	8.67	4.67	3
C.D.(0.05)		0.18		7.80	0.24	0.35		0.27		10.14	0.17	0.80			
C.V.(%)		2.24		2.23	5.59	1.14		4.25		3.53	5.01	0.78			
Expt. Mean		**6.74**		**296**	**3.67**	**25.85**		**5.33**		**243**	**2.81**	**86**		4.45	
	Soil type	Clay loam						Sandy loam							
	pH	6.98						7.31							
F - levels (kg/ha)															
	F1	60:20:20						60:30:30							
	F2	120:40:40						120:60:60							
	Recommended N:P:K (kg/ha)	120:40:40						120:60:60							
Varieties															
	V1	IET 28396						IET 28396							
	V2	IET 28032 ®						IET 28032 ®							
	V3	IET 28033 (R)						IET 28033 (R)							
	V4	Gondhra Bidhan-3						Gondhra Bidhan-3							
	V5	PR 113						PR 113							
	V6	Lalat						Lalat							
	V7	-						-							
	V8	MTU 1010						MTU 1010							
	V9	-						-							
	V10	Local Check ADT 37						Local Check HUR 4-3							
	Available N:P:K of soil (kg/ha)	123:29:111						241:18:189							

Table 4.1(e): Cntd..

F-levels	Varieties	KANPUR			
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Days for 50% Flowering**
F2: Optimum input (100% NPK)	V1	3.40	*5*	305	89
	V2	4.00	*3*	315	92
	V3	3.80	*4*	320	90
	V4	4.10	*2*	310	88
	V5	2.80	*7*	315	94
	V6	4.15	*1*	302	95
	V7				
	V8	3.10	*6*	301	90
	V9				
	V10				
C.D.(0.05)		1.81		84	24
C.V.(%)		20.36		18	18
Expt.Mean		**3.62**		**310**	**91**
Soil type		Sandy Loam			
pH		8.40			
F - levels (kg/ha)					
F2		120:60:40			
Recommended N:P:K (kg/ha)		120:60:40			
Varieties					
V1		IET 28396			
V2		IET 28032 ®			
V3		IET 28033 (R)			
V4		Gondhra Bidhan-3			
V5		PR 113			
V6		Lalat			
V7		-			
V8		MTU 1010			
V9		-			
V10		-			
Available N:P:K of soil (kg/ha)		-			

Table 4.1 (f): Summary of data on grain yield and ancillary characters of selected Irrigated Medium (Transplanted) cultures grown under transplanted conditions at graded levels of recommended fertilizer doses, kharif 2021.

F-levels	Varieties	CHINSURAH					
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)
F1: Low input 50% NPK	V1	3.85	5	273	3.29	97	
	V2	3.02	8	274	3.12	111	
	V3	-	-	-	-	-	
	V4	3.27	7	272	2.71	94	
	V5	-	-	-	-	-	
	V6	3.67	6	302	3.08	96	
	V7	-	-	-	-	-	
	V8	-	-	-	-	-	
	V9	-	-	-	-	-	
	V10	-	-	-	-	-	
F2: Optimum input 100% NPK	V1	5.90	1	321	4.26	97	25.63
	V2	5.16	3	316	3.87	112	26.75
	V3	-	-	-	-	-	
	V4	4.40	4	280	3.19	95	14.13
	V5	-	-	-	-	-	
	V6	5.24	2	272	3.67	96	19.63
	V7	-	-	-	-	-	
	V8	-	-	-	-	-	
	V9	-	-	-	-	-	
	V10	-	-	-	-	-	
Interaction							
F at same V		0.73		NS	NS	NS	
V at same F		1.17		NS	NS	NS	
F1		3.45	2	280	3.05	100	
F2		5.18	1	297	3.75	100	21.53
C.D.(0.05)		1.28		NS	0.22	NS	
C.V.(%)		16.93		4.05	3.71	0.82	
Mean of varieties:							
V1		4.88	1	297	3.78	97	25.63
V2		4.09	3	295	3.50	111	26.75
V3		-	-	-	-	-	
V4		3.84	4	276	2.95	95	14.13
V5		-	-	-	-	-	
V6		4.46	2	287	3.38	96	19.63
V7		-	-	-	-	-	
V8		-	-	-	-	-	
V9		-	-	-	-	-	
V10		-	-	-	-	-	
C.D.(0.05)		NS		34.82	0.32	0.47	
C.V. (%)		9.47		9.59	7.43	0.37	
Expt. Mean		**4.31**		**289**	**3.40**	**100**	
Soil type		Clay Loam					
pH		7.60					
F - levels (kg/ha)							
F1		40:20:20					
F2		80:40:40					
Recommended N:P:K (kg/ha)		80:40:40					
Varieties							
V1		IET 28160 (H)					
V2		IET 27686					
V3		-					
V4		PR121					
V5		-					
V6		Karma Mahsuri					
V7		-					
V8		-					
V9		-					
V10		-					
Available N:P:K of soil (kg/ha)		104:96:510					

Table-4.1(f) (Contd…)

F-levels	Varieties	DHANGAIN					
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)
F1: Low input 50% NPK	V1	4.83	6	367	22.00	94	
	V2	4.24	11	333	25.00	118	
	V3	4.63	9	365	25.67	96	
	V4	3.66	15	321	17.00	97	
	V5	-		-	-	-	
	V6	3.86	14	320	26.00	119	
	V7	4.18	13	326	17.00	100	
	V8	-		-	-	-	
	V9	4.42	10	347	25.33	116	
	V10	3.09	16	319	14.00	108	
F2: Optimum input 100% NPK	V1	6.34	1	384	22.67	95	13.73
	V2	5.18	4	342	27.33	119	8.55
	V3	5.85	2	375	27.67	97	11.09
	V4	4.82	7	333	18.67	98	10.55
	V5	-		-	-	-	
	V6	4.80	8	328	27.67	120	8.55
	V7	4.99	5	337	18.33	101	7.36
	V8	-		-	-	-	
	V9	5.70	3	350	26.33	117	11.64
	V10	4.22	12	326	14.67	109	10.27
Interaction							
F at same V		NS		NS	NS	NS	
V at same F		NS		NS	NS	NS	
F1		4.11	2	337	21.50	106	
F2		5.24	1	347	22.92	107	10.22
C.D.(0.05)		0.39		7.35	0.95	0.18	
C.V.(%)		6.69		1.73	3.44	0.14	
Mean of varieties:							
V1		5.59	1	375	22.34	94	13.73
V2		4.71	4	338	26.17	119	8.55
V3		5.24	2	370	26.67	97	11.09
V4		4.24	7	327	17.84	98	10.55
V5		-		-	-	-	
V6		4.33	6	324	26.84	119	8.55
V7		4.59	5	331	17.67	100	7.36
V8		-		-	-	-	
V9		5.06	3	349	25.83	117	11.64
V10		3.66	8	323	14.34	108	10.27
C.D.(0.05)		0.38		8.04	1.36	0.53	
C.V. (%)		6.8		1.99	5.16	0.42	
Expt. Mean		**4.68**		**342**	**22.21**	**106**	
Soil type		Clay loam					
pH		6.80					
F - levels (kg/ha)							
F1		60:30:20					
F2		120:60:40					
Recommended N:P:K (kg/ha)		120:60:40					
Varieties							
V1		IET 28160 (H)					
V2		IET 27686					
V3		NC- NDR 359					
V4		PR121					
V5		-					
V6		Karma Mahsuri					
V7		Akshaydhan					
V8		-					
V9		Hybrid check Arise 6444					
V10		Local check Sabour Sree 135 Days					
Available N:P:K of soil (kg/ha)		252:42:189					

Table-4.1(f) (Contd…)

F-levels	Varieties	FAIZABAD						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input 50% NPK	V1	4.57	7	195	3.07	22.87	108	
	V2	5.40	2	201	3.87	26.07	104	
	V3	4.47	9	214	3.63	20.03	102	
	V4	4.13	10	217	2.36	26.87	105	
	V5	-		-	-	-	-	
	V6	3.50	12	200	3.57	18.87	101	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	4.50	8	211	3.15	22.83	104	
F2: Optimum input 100% NPK	V1	5.40	2	226	3.67	24.73	111	6.92
	V2	6.50	1	234	4.33	27.67	107	9.17
	V3	5.28	4	244	4.07	22.13	107	6.75
	V4	4.97	6	242	2.77	27.60	109	7.00
	V5	-		-	-	-	-	
	V6	4.10	11	233	3.83	20.10	106	5.00
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	5.23	5	242	3.55	24.10	108	6.08
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		4.43	2	206	3.28	22.9	104	
F2		5.25	1	237	3.70	24.4	108	6.82
C.D.(0.05)		0.49		21.12	NS	0.39	1.26	
C.V.(%)		7.00		6.65	10.1	1.16	0.83	
Mean of varieties:								
V1		4.99	2	210	3.37	23.8	110	6.92
V2		5.95	1	218	4.10	26.9	106	9.17
V3		4.88	3	229	3.85	21.1	105	6.75
V4		4.55	5	229	2.57	27.2	107	7.00
V5		-		-	-	-	-	
V6		3.80	6	216	3.70	19.5	104	5.00
V7		-		-	-	-	-	
V8		-		-	-	-	-	
V9		-		-	-	-	-	
V10		4.87	4	227	3.35	23.5	106	6.08
C.D.(0.05)		0.27		10.47	0.13	0.73	1.71	
C.V. (%)		4.69		3.92	3.04	2.55	1.34	
Expt. Mean		**4.84**		**221**	**3.49**	**23.66**	**106**	
Soil type		-						
pH		-						
F - levels (kg/ha)								
F1		60:30:30						
F2		120:60:60						
Recommended N:P:K (kg/ha)		120:60:60:25						
Varieties								
V1		IET 28160 (H)						
V2		IET 27686						
V3		NC- NDR 359						
V4		PR121						
V5		-						
V6		Karma Mahsuri						
V7		-						
V8		-						
V9		-						
V10		Local check - Sarjoo 52						
Available N:P:K of soil (kg/ha)		-						

Table-4.1(f) (Contd…)

F-levels	Varieties	JAGDALPUR						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)
F1: Low input 50% NPK	V1	4.83	1	235	2.58	22.50	112	
	V2	4.77	2	226	3.38	20.24	114	
	V3	-		-	-	-	-	
	V4	3.80	3	225	2.93	26.76	110	
	V5	-		-	-	-	-	
	V6	3.17	6	284	2.13	16.16	106	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	3.30	4	246	2.23	21.80	102	
F2: Optimum input 100% NPK	V1	3.27	5	201	3.52	23.38	112	-14.18
	V2	2.47	9	262	3.11	20.78	114	-20.91
	V3	-		-	-	-	-	
	V4	2.47	9	232	2.20	26.59	110	-12.09
	V5	-		-	-	-	-	
	V6	2.50	8	235	2.02	17.20	106	-6.09
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	2.97	7	236	2.57	22.43	102	-3.00
Interaction								
F at same V		0.80		7.87	0.70	NS	NS	
V at same F		0.73		8.43	0.70	NS	NS	
F1		3.97	1	243	2.65	21.5	109	
F2		2.74	2	233	2.68	22.1	109	-11.25
C.D.(0.05)		0.22		5.89	NS	NS	NS	
C.V.(%)		4.11		1.57	9.21	12.07	0.00	
Mean of varieties:								
V1		4.05	1	218	3.05	22.9	112	-14.18
V2		3.62	2	244	3.25	20.5	114	-20.91
V3		-		-	-	-	-	
V4		3.14	3	228	2.57	26.7	110	-12.09
V5		-		-	-	-	-	
V6		2.84	5	259	2.08	16.7	106	-6.09
V7		-		-	-	-	-	
V8		-		-	-	-	-	
V9		-		-	-	-	-	
V10		3.14	3	241	2.40	22.1	102	-3.00
C.D.(0.05)		0.56		5.56	0.50	1.79	0.00	
C.V. (%)		13.73		1.91	15.17	6.71	0.00	
Expt. Mean		**3.36**		**238**	**2.67**	**21.78**	**109**	
Soil type		-						
pH		-						
F - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 28160 (H)						
V2		IET 27686						
V3		NC- NDR 359						
V4		PR121						
V5		CR Dhan 300						
V6		Karma Mahsuri						
V7		Akshaydhan						
V8		Jaya						
V9		Hybrid check						
V10		Local check						
Available N:P:K of soil (kg/ha)		222:12:295						

Table-4.1(f) (Contd…)

F-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)
F1: Low input 50% NPK	V1	3.32	6	245	3.27	20.89	90.0	
	V2	2.84	10	171	1.81	18.12	93.0	
	V3	-		-	-	-	-	
	V4	3.06	8	216	2.12	19.46	93.3	
	V5	-		-	-	-	-	
	V6	2.95	9	196	1.87	18.50	93.0	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	3.20	7	231	2.25	19.53	94.0	
F2: Optimum input 100% NPK	V1	4.54	1	263	3.51	22.09	93.0	12.20
	V2	4.07	5	188	2.11	19.36	93.0	12.30
	V3	-		-	-	-	-	
	V4	4.37	3	229	3.03	20.44	93.0	13.10
	V5	-		-	-	-	-	
	V6	4.19	4	212	2.41	20.10	93.3	12.40
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	4.48	2	246	3.34	20.46	96.0	12.80
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		3.07	2	212	2.26	19.30	93	
F2		4.33	1	228	2.88	20.49	94	12.56
C.D.(0.05)		0.29		15.16	NS	0.75	NS	
C.V.(%)		5.04		4.39	15.35	2.39	1.22	
Mean of varieties:								
V1		3.93	1	254	3.39	21.49	92	12.20
V2		3.46	5	179	1.96	18.74	93	12.30
V3		-		-	-	-	-	
V4		3.72	3	223	2.58	19.95	93	13.10
V5		-		-	-	-	-	
V6		3.57	4	204	2.14	19.30	93	12.40
V7		-		-	-	-	-	
V8		-		-	-	-	-	
V9		-		-	-	-	-	
V10		3.84	2	239	2.80	20.00	95	12.80
C.D.(0.05)		0.20		15.41	0.40	1.14	1.32	
C.V. (%)		4.49		5.73	12.59	4.69	1.16	
Expt. Mean		**3.70**		**220**	**2.57**	**19.90**	**93**	
Soil type		-						
pH		-						
F - levels (kg/ha)								
F1		50:25:25						
F2		100:50:50						
Recommended N:P:K (kg/ha)		100:50:50						
Varieties								
V1		IET 28160 (H)						
V2		IET 27686						
V3		NC- NDR 359						
V4		PR121						
V5		CR Dhan 300						
V6		Karma Mahsuri						
V7		Akshaydhan						
V8		Jaya						
V9		Hybrid check						
V10		Local check - KJT - 9						
Available N:P:K of soil (kg/ha)		-						

Table-4.1(f) (Contd…)

F-levels	Varieties	KAUL					
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)**
F1: Low input 50% NPK	V1	5.47	6	212	2.93	25.8	
	V2	3.77	8	204	2.13	27.9	
	V3	-		-	-	-	
	V4	6.40	5	251	2.73	25.3	
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	6.77	4	245	3.07	22.8	
F2: Optimum input 100% NPK	V1	7.43	3	278	3.13	25.5	14.52
	V2	5.20	7	276	2.47	27.9	10.59
	V3	-		-	-	-	
	V4	7.83	2	303	2.93	25.6	10.59
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	8.37	1	295	3.30	22.9	11.85
Interaction							
F at same V		NS		NS	NS	NS	
V at same F		NS		NS	NS	NS	
F1		5.60	2	228	2.72	25.44	
F2		7.21	1	288	2.96	25.46	11.89
C.D.(0.05)		1.06		15.89	NS	NS	
C.V.(%)		9.44		3.51	8.01	8.68	
Mean of varieties:							
V1		6.45	3	245	3.03	25.67	14.52
V2		4.49	4	240	2.30	27.87	10.59
V3		-		-	-	-	
V4		7.12	2	277	2.83	25.42	10.59
V5		-		-	-	-	
V6		-		-	-	-	
V7		-		-	-	-	
V8		-		-	-	-	
V9		-		-	-	-	
V10		7.57	1	270	3.19	22.84	11.85
C.D.(0.05)		0.65		20.84	0.16	2.06	
C.V. (%)		8.02		6.42	4.36	6.43	
Expt. Mean		**6.41**		**258**	**2.84**		
Soil type		Clay Loam					
pH		8.00					
F - levels (kg/ha)							
F1		75:30:30					
F2		150:60:60					
Recommended N:P:K (kg/ha)		150:60:60					
Varieties							
V1		IET 28160 (H)					
V2		IET 27686					
V3		-					
V4		PR121					
V5		-					
V6		-					
V7		-					
V8		-					
V9		-					
V10		Local check - HKR 127					
Available N:P:K of soil (kg/ha)		160:16:320					

Table-4.1(f) (Contd…)

F-levels	Varieties	KOTA						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)**
F1: Low input 50% NPK	V1	4.67	8	274	4.06	20.8	100	
	V2	4.56	10	294	3.95	18.2	113	
	V3	4.46	11	274	3.71	28.0	101	
	V4	3.87	12	282	3.34	25.9	102	
	V5	-		-	-	-	-	
	V6	4.74	7	295	3.56	16.0	98	
	V7	-		-	-	-	-	
	V8	4.60	9	299	3.38	25.9	99	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
F2: Optimum input 100% NPK	V1	5.26	2	295	4.32	21.2	102	5.36
	V2	5.01	5	310	4.18	19.2	114	4.09
	V3	5.37	1	301	4.15	28.4	100	8.27
	V4	4.93	6	307	3.82	26.8	101	9.64
	V5	-		-	-	-	-	
	V6	5.16	3	315	3.75	16.8	99	3.82
	V7	-		-	-	-	-	
	V8	5.08	4	319	3.62	26.8	100	4.36
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		4.48	2	286	3.67	22.47	102	
F2		5.14	1	308	3.97	23.18	103	5.92
C.D.(0.05)		0.29		19.41	0.26	0.63	NS	
C.V.(%)		4.20		4.56	4.81	1.92	0.71	
Mean of varieties:								
V1		4.97	1	285	4.19	21.04	101	5.36
V2		4.79	5	302	4.07	18.67	114	4.09
V3		4.92	3	288	3.93	28.18	100	8.27
V4		4.40	6	294	3.58	26.34	101	9.64
V5		-		-	-	-	-	
V6		4.95	2	305	3.66	16.40	98	3.82
V7		-		-	-	-	-	
V8		4.84	4	309	3.50	26.34	100	4.36
V9		-		-	-	-	-	
V10		-		-	-	-	-	
C.D.(0.05)		0.36		11.88	0.24	0.88	1.16	
C.V. (%)		6.16		3.32	5.30	3.22	0.94	
Expt. Mean		**4.81**		**297**	**3.82**		**102**	
Soil type		Clay Loam						
pH		7.47						
F - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 28160 (H)						
V2		IET 27686						
V3		NC- NDR 359						
V4		PR121						
V5		CR Dhan 300						
V6		Karma Mahsuri						
V7		Akshaydhan						
V8		Jaya						
V9		Hybrid check						
V10		Local check						
Available N:P:K of soil (kg/ha)		207:37:563						

Table-4.1(f) (Contd…)

F-levels	Varieties	MARUTERU				
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)**
F1: Low input 50% NPK	V1	3.57	2	224	4.09	
	V2	2.85	5	237	3.94	
	V3	-		-	-	
	V4	2.77	6	227	3.95	
	V5	-		-	-	
	V6	2.62	7	237	4.00	
	V7	-		-	-	
	V8	-		-	-	
	V9	-		-	-	
	V10	-		-	-	
F2: Optimum input 100% NPK	V1	4.27	1	239	5.07	6.67
	V2	3.39	3	209	4.71	5.14
	V3	-		-	-	
	V4	3.31	4	240	4.17	5.14
	V5	-		-	-	
	V6	2.43	8	234	4.31	-1.81
	V7	-		-	-	
	V8	-		-	-	
	V9	-		-	-	
	V10	-		-	-	
Interaction						
F at same V		NS		NS	NS	
V at same F		NS		NS	NS	
F1		2.95	2	231	4.00	
F2		3.35	1	231	4.57	3.79
C.D.(0.05)		NS		NS	NS	
C.V.(%)		17.37		8.17	26.82	
Mean of varieties:						
V1		3.92	1	232	4.58	6.67
V2		3.12	2	223	4.33	5.14
V3		-		-	-	
V4		3.04	3	234	4.06	5.14
V5		-		-	-	
V6		2.53	4	235	4.16	-1.81
V7		-		-	-	
V8		-		-	-	
V9		-		-	-	
V10		-		-	-	
C.D.(0.05)		0.83		43.42	NS	
C.V. (%)		20.93		14.95	22.69	
Expt. Mean		**3.15**		**231**	**4.28**	
Soil type		-				
pH		-				
F - levels (kg/ha)						
F1		45:30:30				
F2		90:60:60				
Recommended N:P:K (kg/ha)		90:60:60				
Varieties						
V1		IET 28160 (H)				
V2		IET 27686				
V3		-				
V4		PR121				
V5		-				
V6		Karma Mahsuri				
V7		-				
V8		-				
V9		-				
V10		-				
Available N:P:K of soil (kg/ha)		-				

Table-4.1(f) (Contd…)

F-levels	Varieties	NAGINA						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)**
F1: Low input 50% NPK	V1	2.20	6	223	2.66	23.7	85	
	V2	2.23	5	222	2.63	23.8	83	
	V3	-		-	-	-	-	
	V4	2.04	7	206	2.49	23.5	82	
	V5	-		-	-	-	-	
	V6	2.01	8	199	2.50	23.5	84	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
F2: Optimum input 100% NPK	V1	4.66	2	315	2.74	23.8	85	22.36
	V2	4.68	1	311	2.65	23.9	84	22.27
	V3							
	V4	4.16	3	270	2.52	23.6	83	19.27
	V5	-		-	-	-	-	
	V6	4.08	4	255	2.52	23.7	85	18.82
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
Interaction								
F at same V		0.18		NS	0.03	NS	NS	
V at same F		0.18		NS	0.04	NS	NS	
F1		2.12	2	212	2.57	23.63	84	
F2		4.40	1	288	2.61	23.75	84	20.68
C.D.(0.05)		0.13		9.67	0.03	0.04	NS	
C.V.(%)		2.29		2.20	0.60	0.09	0.73	
Mean of varieties:								
V1		3.43	2	269	2.70	23.76	85	22.36
V2		3.46	1	266	2.64	23.83	83	22.27
V3		-		-	-	-	-	
V4		3.10	3	238	2.51	23.58	83	19.27
V5		-		-	-	-	-	
V6		3.05	4	227	2.51	23.60	85	18.82
V7		-		-	-	-	-	
V8		-		-	-	-	-	
V9		-		-	-	-	-	
V10		-		-	-	-	-	
C.D.(0.05)		0.12		16.36	0.02	0.05	0.70	
C.V. (%)		3.04		5.20	0.71	0.17	0.66	
Expt. Mean		**3.26**		**250**	**2.59**	**23.69**	**84**	
Soil type		-						
pH		7.70						
F - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 28160 (H)						
V2		IET 27686						
V3		-						
V4		PR121						
V5		-						
V6		Karma Mahsuri						
V7		-						
V8		-						
V9		-						
V10		-						
Available N:P:K of soil (kg/ha)		21:18:209						

Table-4.1(f) (Contd…)

F-levels	Varieties	NAWAGAM						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)**
F1: Low input 50% NPK	V1	4.42	8	249	4.08	20.5	120	
	V2	4.51	7	308	3.70	14.0	117	
	V3	-		-	-	-	-	
	V4	3.12	10	322	3.28	22.0	103	
	V5	-		-	-	-	-	
	V6	5.07	3	309	3.72	16.5	105	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	4.75	6	261	3.98	16.8	109	
F2: Optimum input 100% NPK	V1	5.01	5	312	3.90	21.4	122	9.44
	V2	5.24	2	345	4.34	16.0	118	11.68
	V3	-		-	-	-	-	
	V4	3.76	9	354	2.84	20.4	102	10.24
	V5	-		-	-	-	-	
	V6	5.47	1	363	3.76	16.1	108	6.40
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	5.03	4	335	3.61	17.5	108	4.48
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		4.37	2	290	3.75	17.95	111	
F2		4.90	1	342	3.69	18.27	112	8.45
C.D.(0.05)		NS		43.5	NS	NS	NS	
C.V.(%)		9.31		8.77	13.3	12.22	1.89	
Mean of varieties:								
V1		4.72	4	280	3.99	20.94	121	9.44
V2		4.88	3	327	4.02	15.00	118	11.68
V3		-		-	-	-	-	
V4		3.44	5	338	3.06	21.20	103	10.24
V5		-		-	-	-	-	
V6		5.27	1	336	3.74	16.27	107	6.40
V7		-		-	-	-	-	
V8		-		-	-	-	-	
V9		-		-	-	-	-	
V10		4.89	2	298	3.80	17.14	108	4.48
C.D.(0.05)		0.45		28.87	0.58	1.7	2.4	
C.V. (%)		7.94		7.47	12.8	7.69	1.77	
Expt. Mean		**4.64**		**316**	**3.72**	**18.11**	**111**	
Soil type		-						
pH		8.10						
F - levels (kg/ha)								
F1		50:12.5:0						
F2		100:25:0						
Recommended N:P:K (kg/ha)		100:25:0						
Varieties								
V1		IET 28160 (H)						
V2		IET 27686						
V3		-						
V4		PR121						
V5		-						
V6		Karma Mahsuri						
V7		-						
V8		-						
V9		-						
V10		Local check- GAR 13						
Available N:P:K of soil (kg/ha)		-						

Table-4.1(f) (Contd…)

F-levels	Varieties	PANTNAGAR						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)**
F1: Low input 50% NPK	V1	4.14	4	210	2.22	26.3	93	
	V2							
	V3	3.75	7	197	2.18	25.4	89	
	V4	3.20	8	172	2.26	25.5	94	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	3.96	5	202	2.20	29.1	87	
F2: Optimum input 100% NPK	V1	4.50	2	227	2.20	26.8	92	3.27
	V2	-		-	-	-	-	
	V3	4.63	1	234	2.14	26.5	93	8.00
	V4	3.92	6	202	2.20	25.9	94	6.55
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	4.33	3	227	2.14	29.3	92	3.36
Interaction								
F at same V		NS		8.19	NS	NS	2.49	
V at same F		NS		8.26	NS	NS	2.32	
F1		3.76	2	195	2.22	26.56	91	
F2		4.35	1	223	2.17	27.13	93	5.30
C.D.(0.05)		0.39		5.35	NS	NS	1.08	
C.V.(%)		5.44		1.46	2.43	2.11	0.67	
Mean of varieties:								
V1		4.32	1	219	2.21	26.55	93	3.27
V2								
V3		4.19	2	216	2.16	25.94	91	8.00
V4		3.56	4	187	2.23	25.72	94	6.55
V5		-		-	-	-	-	
V6		-		-	-	-	-	
V7		-		-	-	-	-	
V8		-		-	-	-	-	
V9		-		-	-	-	-	
V10		4.15	3	214	2.17	29.17	89	3.36
C.D.(0.05)		0.30		5.79	NS	0.48	1.76	
C.V. (%)		5.90		2.20	2.19	3.86	1.53	
Expt. Mean		**4.05**		**209**	**2.19**	**26.84**	**92**	
Soil type		Silt Loam						
pH		7.50						
F - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 28160 (H)						
V2		-						
V3		NC- NDR 359						
V4		PR121						
V5		-						
V6		-						
V7		-						
V8		-						
V9		-						
V10		Local check -PD 24						
Available N:P:K of soil (kg/ha)		230:22:221						

Table-4.1(f) (Contd…)

F-levels	Varieties	PUDUCHERRY					
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)
F1: Low input 50% NPK	V1	7.16	5	330	3.67	24.1	
	V2	7.02	6	311	4.61	20.2	
	V3	-		-	-	-	
	V4	6.83	7	289	3.21	26.5	
	V5	-		-	-	-	
	V6	6.80	8	273	3.35	19.2	
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	5.71	10	238	2.64	17.9	
F2: Optimum input 100% NPK	V1	7.62	1	351	3.96	24.3	4.60
	V2	7.52	2	329	4.81	21.9	5.00
	V3	-		-	-	-	
	V4	7.36	3	321	3.63	27.2	5.30
	V5	-		-	-	-	
	V6	7.18	4	306	3.76	19.5	3.80
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	6.23	9	260	2.82	18.8	5.20
Interaction							
F at same V		NS		NS	NS	0.61	
V at same F		NS		NS	NS	0.57	
F1		6.70	2	288	3.50	21.59	
F2		7.18	1	314	3.80	22.32	4.78
C.D.(0.05)		0.22		20.75	0.06	0.17	
C.V.(%)		2.00		4.39	1.13	0.49	
Mean of varieties:							
V1		7.39	1	341	3.82	24.21	4.60
V2		7.27	2	320	4.71	21.04	5.00
V3		-		-	-	-	
V4		7.10	3	305	3.42	26.85	5.30
V5		-		-	-	-	
V6		6.99	4	290	3.56	19.30	3.80
V7		-		-	-	-	
V8		-		-	-	-	
V9		-		-	-	-	
V10		5.97	5	249	2.73	18.37	5.20
C.D.(0.05)		0.16		14.07	0.20	0.43	
C.V. (%)		1.88		3.82	4.43	1.62	
Expt. Mean		**6.94**		**301**	**3.65**	**21.95**	
Soil type		Clay loam					
pH		6.98					
F - levels (kg/ha)							
F1		60:20:20					
F2		120:40:40					
Recommended N:P:K (kg/ha)		120:40:40					
Varieties							
V1		IET 28160 (H)					
V2		IET 27686					
V3		NC- NDR 359					
V4		PR121					
V5		CR Dhan 300					
V6		Karma Mahsuri					
V7		Akshaydhan					
V8		Jaya					
V9		Hybrid check					
V10		Local check- W.Ponni					
Available N:P:K of soil (kg/ha)		123:29:111					

Table-4.1(f) (Contd…)

F-levels	Varieties	PUSA						
		Grain Yield (t/ha)	Rank	Panicle/ m^2 (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)
F1: Low input 50% NPK	V1	2.75	9	198	2.45	21.90	97	
	V2	2.16	10	160	2.45	21.53	95	
	V3	-		-	-	-	-	
	V4	2.79	7	202	2.51	21.50	94	
	V5	-		-	-	-	-	
	V6	2.84	6	201	2.66	20.33	96	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	2.76	8	187	2.23	20.47	94	
F2: Optimum input 100% NPK	V1	5.24	3	278	2.89	22.20	98	22.64
	V2	4.89	5	242	2.85	21.80	96	24.82
	V3	-		-	-	-	-	
	V4	5.25	2	262	2.97	21.70	96	22.36
	V5	-		-	-	-	-	
	V6	5.41	1	271	3.16	21.50	98	23.36
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	5.16	4	269	2.94	21.63	94	21.82
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		2.66	2	189	2.46	21.15	95	
F2		5.19	1	264	2.96	21.77	96	23.00
C.D.(0.05)		0.67		23.22	0.21	NS	NS	
C.V.(%)		10.84		6.51	4.87	2.96	0.83	
Mean of varieties:								
V1		4.00	3	238	2.67	22.05	98	22.64
V2		3.53	5	201	2.65	21.67	96	24.82
V3		-		-	-	-	-	
V4		4.02	2	232	2.74	21.60	95	22.36
V5		-		-	-	-	-	
V6		4.13	1	236	2.91	20.92	97	23.36
V7		-		-	-	-	-	
V8		-		-	-	-	-	
V9		-		-	-	-	-	
V10		3.96	4	228	2.59	21.05	94	21.82
C.D.(0.05)		0.23		16.55	0.17	0.47	1.91	
C.V. (%)		4.78		5.96	5.07	1.79	1.63	
Expt. Mean		**3.93**		**227**	**2.71**	**21.46**	**96**	
Soil type		Sandy loam						
pH		8.21						
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 28160 (H)						
V2		IET 27686						
V3		NC- NDR 359						
V4		PR121						
V5		CR Dhan 300						
V6		Karma Mahsuri						
V7		Akshaydhan						
V8		Jaya						
V9		Hybrid check						
V10		Local check - Rajendra Bhagwati 125 Days						
Available N:P:K of soil (kg/ha)		237:13:141						

Table-4.1(f) (Contd…)

F-levels	Varieties	TITABAR						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)**
F1: Low input 50% NPK	V1	3.67	14	235	4.53	22.9	94	
	V2	3.63	15	210	3.89	21.4	98	
	V3	4.40	7	227	3.22	22.4	93	
	V4	3.49	17	290	3.50	22.2	96	
	V5	3.53	16	281	5.28	22.4	97	
	V6	2.52	20	282	4.10	22.8	100	
	V7	3.92	10	208	4.24	21.1	91	
	V8	3.17	19	230	4.17	24.2	87	
	V9	4.50	5	305	5.07	22.6	92	
	V10	4.67	4	231	4.35	25.0	102	
F2: Optimum input 100% NPK	V1	4.47	6	254	5.37	23.2	97	20.00
	V2	3.88	11	227	5.13	23.1	102	6.25
	V3	5.42	1	266	3.46	30.1	92	25.50
	V4	3.80	13	299	3.67	22.9	96	7.75
	V5	4.07	9	292	5.99	24.1	98	13.50
	V6	3.20	18	293	4.37	23.4	100	17.00
	V7	3.83	12	230	4.44	21.3	92	-2.25
	V8	4.08	8	259	4.40	25.1	88	22.75
	V9	4.97	3	324	5.17	25.2	92	11.75
	V10	5.07	2	241	4.72	25.0	105	10.00
Interaction								
F at same V		NS		NS	0.47	1.41	NS	
V at same F		NS		NS	0.47	1.40	NS	
F1		3.75	2	250	4.24	22.70	95	
F2		4.28	1	268	4.67	24.35	96	13.23
C.D.(0.05)		NS		18.29	0.19	0.53	1.00	
C.V.(%)		18.16		6.35	3.76	2.04	0.95	
Mean of varieties:								
V1		4.07	4	245	4.95	23.07	96	20.00
V2		3.76	7	219	4.51	22.24	100	6.25
V3		4.91	1	247	3.34	26.25	92	25.50
V4		3.65	8	295	3.59	22.57	96	7.75
V5		3.80	6	287	5.64	23.27	98	13.50
V6		2.86	10	288	4.24	23.13	100	17.00
V7		3.88	5	219	4.34	21.20	91	-2.25
V8		3.63	9	245	4.29	24.65	87	22.75
V9		4.74	3	315	5.12	23.89	92	11.75
V10		4.87	2	236	4.54	25.00	103	10.00
C.D.(0.05)		0.74		27.02	0.33	0.99	1.82	
C.V. (%)		15.72		8.93	6.41	3.62	1.64	
Expt. Mean		**4.01**		**259**	**4.45**	**23.52**	**95**	
Soil type		Clay Loam						
pH		5.40						
F - levels (kg/ha)								
F1		20:10:10						
F2		40:20:20						
Recommended N:P:K (kg/ha)		40:20:20						
Varieties								
V1		IET 28160 (H)						
V2		IET 27686						
V3		NC- NDR 359						
V4		PR121						
V5		CR Dhan 300						
V6		Karma Mahsuri						
V7		Akshaydhan						
V8		Jaya						
V9		Hybrid check						
V10		Local Check - Numali (130 Days)						
Available N:P:K of soil (kg/ha)		-						

Table-4.1(f) (Contd…)

F-levels	Varieties	VARANASI						Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/ m² (No.)	Panicle wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)		
F1: Low input 50% NPK	V1	6.20	2	290	3.56	95		4.38	11
	V2	4.83	9	246	2.26	113		3.99	16
	V3	-		-	-	-		4.34	12
	V4	5.07	8	279	2.88	102		3.83	18
	V5	-		-	-	-		3.53	20
	V6	5.43	5	293	2.83	104		3.78	19
	V7	-		-	-	-		4.05	15
	V8	-		-	-	-		3.89	17
	V9	-		-	-	-		4.46	9
	V10	4.17	10	230	2.33	101		4.26	13
F2: Optimum input 100% NPK	V1	7.14	1	226	3.83	96	7.83	5.40	1
	V2	5.27	6	228	3.80	112	3.67	4.89	5
	V3	-		-	-	-		5.31	3
	V4	5.57	4	277	3.11	99	4.17	4.73	6
	V5	-		-	-	-		4.07	14
	V6	5.87	3	321	2.86	101	3.67	4.59	7
	V7	-		-	-	-		4.41	10
	V8	-		-	-	-		4.58	8
	V9	-		-	-	-		5.34	2
	V10	5.23	7	301	2.54	101	8.83	5.12	4
Interaction									
F at same V		0.18		15.32	0.67	NS			
V at same F		0.22		14.92	0.65	NS			
F1		5.14	2	267	2.77	103		4.04	2
F2		5.82	1	270	3.23	102	5.63	4.97	1
C.D.(0.05)		0.16		NS	0.29	NS			
C.V.(%)		5.40		1.77	6.21	2.06			
Mean of varieties:									
V1		6.67	1	258	3.70	96	7.83	4.89	2
V2		5.05	4	237	3.03	113	3.67	4.44	5
V3		-		-	-	-		4.83	3
V4		5.32	3	278	3.00	101	4.17	4.28	6
V5		-		-	-	-		3.80	10
V6		5.65	2	307	2.85	103	3.67	4.19	9
V7		-		-	-	-		4.23	8
V8		-		-	-	-		4.23	7
V9		-		-	-	-		4.90	1
V10		4.70	5	265	2.44	101	8.83	4.69	4
C.D.(0.05)		0.13		10.84	0.48	2.09			
C.V. (%)		4.08		3.29	12.99	1.67			
Expt. Mean		**5.48**		**269**	**3.00**	**102**		4.50	
Soil type		-							
pH		-							
F - levels (kg/ha)									
F1		60:30:30							
F2		120:60:60							
Recommended N:P:K (kg/ha)		120:60:60							
Varieties									
V1		IET 28160 (H)							
V2		IET 27686							
V3		-							
V4		PR121							
V5		-							
V6		Karma Mahsuri							
V7		-							
V8		-							
V9		-							
V10		Local check -HUR 4-3							
Available N:P:K of soil		-							

NMT 1(g) Late

Four AVT-2 Late entries (IET 28501, IET 28538, IET 28544 and IET 29209 were evaluated for its response to graded levels nutrients on grain yield and yield attributes at seven locations i.e. **Aduthurai (150:60:60), Chinsurah (80:40:40), Chiplima (80:40:40), Dhangain (120:60:40), Karjat (150:50:50), Mandya (100:50:50)** and **Maruteru** (90:60:60) under two levels of RDF (50% and 100% RDF). The details and data received from these locations are summarized and presented in Table 4.1.1 (g).

Application of nutrients significantly influenced the grain yield at all locations exept Mandya and the maximum grain yield was recorded at all the locations with 100% RDF. Application of 100% RDF had higher grain yields at **Aduthurai** (4.21 t/ha), **Chinsurah** (5.09 t/ha), **Chiplima** (5.13 t/ha), **Dhangain** (6.18 t/ha), **Karjat** (4.33 t/ha) and **Maruteru** (4.71 t/ha). Higher nutrient response (kg grain/kg nutrient) was with 100% RDF over 50% RDF at **Chinsurah**(14.84), **Dhangain** (15.64), **Karjat** (13.03) and **Maruteru** (6.17 kg grain /kg nutrient).

Grain yield differences among the tested varieties were found to be significant at all the locations. Significantly higher mean maximum grain yield was recorded by IET 28501 (4.57 t/ha) followed by other IET cultures (4.11 to 4.39 t/ha) and found significant over local checks at **Aduthurai**. Higher grain yield was with IET 28501 (5.14 t/ha) followed by IET 28538 (5.02 t/ha). Interaction effects among RDF x varieties was found to be significant at all the location except **Chinsurah**. Mean over the locations the performance of IET 29209 (6.73 t/ha) followed by IET 28501 (6.70 t/ha) were promising over other cultures at 100% RDF application.

In this trial, 100% RDF was found to be promising with 19 % increased grain yield and also exhibited higher nutrient recovery efficiency. IET cultures were found to be promising in terms of higher grain yield at most of the locations (IET 28501, IET 28538 and IET 29209) and recorded better yields at 100% RDF of respective locations.

Table 4.1 (g): Summary of data on grain yield and ancillary characters of selected late cultures grown under transplanted conditions at graded levels of recommended fertilizer doses, kharif 2021.

F-levels	Varieties	ADUTHURAI				
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt(g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
	V1	4.51	2	335	4.15	
	V2	4.35	4	346	4.73	
	V3	4.25	6	357	4.52	
	V4	4.04	8	345	3.95	
F1	V5	-		-	-	
	V6	3.82	14	364	3.84	
	V7	3.94	11	360	3.78	
	V8	-		-	-	
	V9	3.85	13	353	3.71	
	V1	4.63	1	342	4.15	0.89
	V2	4.42	3	363	4.10	0.52
	V3	4.34	5	361	4.55	0.67
	V4	4.18	7	353	4.03	1.04
F2	V5	-		-	-	
	V6	3.95	10	381	3.94	0.96
	V7	4.03	9	360	3.84	0.67
	V8	-		-	-	
	V9	3.92	12	372	3.74	0.52
Interaction						
F at same V		NS		8.50	0.25	
V at same F		NS		14.97	0.29	
F1		4.11	2	351	4.10	
F2		4.21	1	362	4.05	0.75
C.D.(0.05)		0.04		NS	NS	
C.V.(%)		0.73		3.50	4.11	
Mean of varieties:						
V1		4.57	1	339	4.15	0.89
V2		4.39	2	354	4.42	0.52
V3		4.30	3	359	4.54	0.67
V4		4.11	4	349	3.99	1.04
V5		-		-	-	
V6		3.89	6	372	3.89	0.96
V7		3.99	5	360	3.81	0.67
V8		-		-	-	
V9		3.89	6	363	3.73	0.52
C.D.(0.05)		0.03		6.01	0.17	
C.V. (%)		0.65		1.41	3.60	
Expt. Mean		**4.16**		**357**	**4.07**	
Soil type		Clay				
pH		7.20				
N - levels (kg/ha)						
F1		75:30:30				
F2		150:60:60				
Recommended N:P:K (kg/ha)		150:60:60				
Varieties						
V1		IET 28501				
V2		IET 28538				
V3		IET 28544				
V4		IET 29209				
V5		-				
V6		NDR 8002				
V7		Pushyami				
V8		-				
V9		Local check _ ADT 46				
Available N:P:K of soil (kg/ha)		29:73:132				

Table-4.1(g) (Contd…)

F-levels	Varieties	CHINSURAH					
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt(g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
	V1	5.15	4	264	2.93	108	
	V2	5.18	3	313	3.16	111	
	V3	3.24	13	299	2.93	110	
	V4	3.90	10	258	3.12	109	
F1	V5	3.35	12	256	3.35	112	
	V6	3.37	11	258	3.08	96	
	V7	3.11	14	225	3.08	110	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V1	5.98	1	318	3.19	108	10.38
	V2	4.98	7	316	3.22	111	-2.50
	V3	5.01	6	272	2.71	111	22.13
	V4	5.35	2	304	3.20	110	18.13
F2	V5	5.03	5	315	3.21	112	21.00
	V6	4.92	8	289	3.19	97	19.38
	V7	4.34	9	328	3.44	111	15.38
	V8	-		-	-	-	
	V9	-		-	-	-	
Interaction							
F at same V		0.73		21.14	NS	NS	
V at same F		0.94		26.59	NS	NS	
F1		3.90	2	268	3.09	108	
F2		5.09	1	306	3.17	109	14.84
C.D.(0.05)		0.84		23.01	0.04	0.20	
C.V.(%)		14.02		6.04	1.00	0.14	
Mean of varieties:							
V1		5.57	1	291	3.06	108	10.38
V2		5.08	2	315	3.19	111	-2.50
V3		4.13	6	285	2.82	110	22.13
V4		4.63	3	281	3.16	110	18.13
V5		4.19	4	286	3.28	112	21.00
V6		4.15	5	274	3.14	97	19.38
V7		3.73	7	277	3.26	111	15.38
V8		-		-	-	-	
V9		-		-	-	-	
C.D.(0.05)		0.51		14.95	NS	0.58	
C.V. (%)		9.59		4.37	8.78	0.45	
Expt. Mean		**4.49**		**287**	**3.13**	**108**	
Soil type		Clay Loam					
pH		7.85					
N - levels (kg/ha)							
F1		40:20:20					
F2		80:40:40					
Recommended N:P:K (kg/ha)		80:40:40					
Varieties							
V1		IET 28501					
V2		IET 28538					
V3		IET 28544					
V4		IET 29209					
V5		Swarna					
V6		NDR 8002					
V7		Pushyami					
V8		-					
V9		-					
Available N:P:K of soil (kg/ha)		530:119:364					

Table-4.1(g) (Contd…)

F-levels	Varieties	CHIPLIMA					
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Test wt(g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
	V1	4.90	8	257	20.5	95	
	V2	5.12	7	282	21.0	111	
	V3	4.56	11	241	20.5	100	
	V4	4.20	16	217	20.8	91	
F1	V5	5.49	4	247	20.8	102	
	V6	4.23	15	220	20.2	96	
	V7	5.62	3	260	21.0	97	
	V8	-		-	-	-	
	V9	4.37	14	254	20.8	108	
	V1	5.22	6	300	20.7	101	4.00
	V2	5.33	5	305	21.0	117	2.63
	V3	4.87	9	288	20.7	105	3.88
	V4	4.45	13	255	20.9	96	3.13
F2	V5	5.89	2	273	21.0	106	5.00
	V6	4.46	12	237	20.7	101	2.87
	V7	5.94	1	280	21.3	102	4.00
	V8	-		-	-	-	
	V9	4.84	10	277	20.9	112	5.88
Interaction							
F at same V		NS		NS	NS	NS	
V at same F		NS		NS	NS	NS	
F1		4.81	2	247	20.69	100	
F2		5.13	1	277	20.90	105	3.92
C.D.(0.05)		0.07		3.60	NS	1.29	
C.V.(%)		1.13		1.10	1.00	1.02	
Mean of varieties:							
V1		5.06	4	279	20.59	98	4.00
V2		5.23	3	294	21.00	114	2.63
V3		4.72	5	265	20.60	103	3.88
V4		4.33	8	236	20.84	94	3.13
V5		5.69	2	260	20.90	104	5.00
V6		4.35	7	229	20.45	99	2.87
V7		5.78	1	270	21.17	99	4.00
V8		-		-	-	-	
V9		4.61	6	266	20.84	110	5.88
C.D.(0.05)		0.16		12.07	0.24	1.05	
C.V. (%)		2.72		3.89	0.97	0.86	
Expt. Mean		**4.97**		**262**	**21**	**103**	
Soil type		Sandy loam					
pH		-					
N - levels (kg/ha)							
F1		40:20:20					
F2		80:40:40					
Recommended N:P:K (kg/ha)		80:40:40					
Varieties							
V1		IET 28501					
V2		IET 28538					
V3		IET 28544					
V4		IET 29209					
V5		Swarna					
V6		NDR 8002					
V7		Pushyami					
V8		-					
V9		Local check - Pratikshya					
Available N:P:K of soil (kg/ha)		118.75:40.008:116.928					

Table-4.1(g) (Contd…)

F-levels	Varieties	DHANGAIN						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt(g)**	**Test wt(g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
	V1	4.62	11	274	7.54	15.3	103	
	V2	4.30	16	256	5.82	19.0	124	
	V3	4.55	13	269	6.93	23.7	111	
	V4	4.90	10	286	7.98	14.0	112	
F1	V5	4.22	17	255	5.55	23.0	102	
	V6	4.50	14	264	6.82	30.3	106	
	V7	4.36	15	262	6.03	19.3	106	
	V8	4.13	18	242	4.68	24.7	117	
	V9	4.59	12	268	7.04	21.7	109	
	V1	6.70	2	288	8.29	17.0	105	18.91
	V2	5.80	7	264	6.10	19.7	125	13.64
	V3	6.43	4	280	7.32	25.0	112	17.09
	V4	6.73	1	290	8.49	14.7	113	16.64
F2	V5	5.74	8	264	5.99	23.3	104	13.82
	V6	6.32	5	276	6.83	31.0	107	16.55
	V7	5.85	6	274	6.51	21.7	108	13.55
	V8	5.54	9	249	4.72	25.7	118	12.82
	V9	6.54	3	284	7.91	22.3	110	17.73
Interaction								
F at same V		NS		NS	NS	NS	0.51	
V at same F		NS		NS	NS	NS	0.53	
F1		4.46	2	264	6.49	21.22	110	
F2		6.18	1	274	6.91	22.26	111	15.64
C.D.(0.05)		0.11		5.28	0.36	0.69	0.28	
C.V.(%)		1.72		1.68	4.55	2.73	0.21	
Mean of varieties:								
V1		5.66	2	281	7.92	16.17	104	18.91
V2		5.05	7	260	5.96	19.34	125	13.64
V3		5.49	4	274	7.13	24.34	111	17.09
V4		5.82	1	288	8.24	14.34	112	16.64
V5		4.98	8	259	5.77	23.17	103	13.82
V6		5.41	5	270	6.83	30.67	106	16.55
V7		5.11	6	268	6.27	20.50	107	13.55
V8		4.84	9	245	4.70	25.17	117	12.82
V9		5.57	3	276	7.48	22.00	109	17.73
C.D.(0.05)		0.27		20.96	0.95	1.55	0.36	
C.V. (%)		4.32		6.67	12.18	6.13	0.28	
Expt. Mean		**5.32**		**269**	**6.70**	**22**	**111**	
Soil type		Clay Loam						
pH		6.60						
N - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 28501						
V2		IET 28538						
V3		IET 28544						
V4		IET 29209						
V5		Swarna						
V6		NDR 8002						
V7		Pushyami						
V8		PA 6444						
V9		Local check						
Available N:P:K of soil (kg/ha)		252:42:189						

Table-4.1(g) (Contd…)

F-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt(g)**	**Test wt(g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	3.47	9	221	2.59	25.0	100	
	V2	3.05	11	207	2.35	18.9	109	
	V3	2.56	13	200	1.84	20.0	102	
	V4	2.36	14	188	1.58	16.8	101	
	V5	-		-	-	-	-	
	V6	2.83	12	205	2.03	27.4	100	
	V7	3.51	8	228	2.92	21.5	103	
	V8	-		-	-	-	-	
	V9	3.44	10	217	2.52	19.1	95	
F2	V1	4.60	2	262	3.33	26.8	102	11.30
	V2	4.38	3	261	3.22	20.8	111	13.30
	V3	4.12	6	238	2.34	21.4	103	15.60
	V4	3.97	7	231	2.18	18.1	101	16.10
	V5	-		-	-	-	-	
	V6	4.35	4	246	3.03	28.4	102	15.20
	V7	4.61	1	286	4.40	22.1	103	11.00
	V8	-		-	-	-	-	
	V9	4.31	5	262	3.32	20.2	97	8.70
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		3.03	2	209	2.26	21.25	102	
F2		4.33	1	255	3.12	22.52	103	13.03
C.D.(0.05)		0.47		21.90	0.85	0.97	0.89	
C.V.(%)		9.55		7.10	23.70	3.35	0.66	
Mean of varieties:								
V1		4.04	2	242	2.96	25.92	101	11.30
V2		3.72	4	234	2.79	19.81	110	13.30
V3		3.34	6	219	2.09	20.72	103	15.60
V4		3.17	7	210	1.88	17.42	101	16.10
V5		-		-	-	-	-	
V6		3.59	5	225	2.53	27.90	101	15.20
V7		4.06	1	257	3.66	21.80	103	11.00
V8		-		-	-	-	-	
V9		3.88	3	240	2.92	19.65	96	8.70
C.D.(0.05)		0.36		15.78	0.47	1.29	1.24	
C.V. (%)		8.21		5.70	14.63	4.94	1.02	
Expt. Mean		**3.68**		**232**	**2.69**	**22**	**102**	
Soil type		-						
pH		-						
N - levels (kg/ha)								
F1		50:25:25						
F2		100:50:50						
Recommended N:P:K (kg/ha)		100:50:50						
Varieties								
V1		IET 28501						
V2		IET 28538						
V3		IET 28544						
V4		IET 29209						
V5		-						
V6		NDR 8002						
V7		Pushyami						
V8		-						
V9		Local check - KJT 9						
Available N:P:K of soil (kg/ha)		-						

Table-4.1(g) (Contd…)

F-levels	Varieties	MANDYA						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt(g)**	**Test wt(g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	6.13	7	319	4.77	15.5	102	
	V2	6.25	6	322	5.07	23.9	115	
	V3	6.00	8	327	4.92	26.6	101	
	V4	5.93	9	328	4.54	15.4	107	
	V5	-		-	-	-	-	
	V6	4.17	14	310	3.96	35.3	99	
	V7	5.85	10	312	6.04	25.2	102	
	V8	-		-	-	-	-	
	V9	4.75	12	344	3.60	32.5	107	
F2	V1	6.53	4	329	5.34	15.3	102	4.00
	V2	6.77	1	363	5.49	24.8	115	5.20
	V3	6.61	3	320	4.59	27.8	101	6.10
	V4	6.35	5	313	4.33	16.3	107	4.20
	V5	-		-	-	-	-	
	V6	4.58	13	328	4.23	34.3	100	4.10
	V7	6.65	2	338	5.02	25.1	102	8.00
	V8	-		-	-	-	-	
	V9	5.12	11	353	4.92	31.7	107	3.70
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		5.58	2	323	4.70	24.91	105	
F2		6.09	1	335	4.85	25.04	105	5.04
C.D.(0.05)		NS		NS	NS	NS	NS	
C.V.(%)		15.77		12.72	26.20	4.83	0.53	
Mean of varieties:								
V1		6.33	2	324	5.06	15.39	102	4.00
V2		6.51	1	342	5.28	24.36	115	5.20
V3		6.31	3	324	4.76	27.21	101	6.10
V4		6.14	5	320	4.44	15.84	107	4.20
V5		-		-	-	-	-	
V6		4.38	7	319	4.10	34.81	99	4.10
V7		6.25	4	325	5.53	25.13	102	8.00
V8		-		-	-	-	-	
V9		4.94	6	348	4.26	32.12	107	3.70
C.D.(0.05)		1.1		37.31	0.90	1.26	0.47	
C.V. (%)		15.88		9.52	15.83	4.23	0.38	
Expt. Mean		**5.84**		**329**	**4.77**	**25.0**	**105**	
Soil type		Red Sandy Loam						
pH		7.64						
N - levels (kg/ha)								
F1		50:25:25						
F2		100:50:50						
Recommended N:P:K (kg/ha)		100:50:50						
Varieties								
V1		IET 28501						
V2		IET 28538						
V3		IET 28544						
V4		IET 29209						
V5		-						
V6		NDR 8002						
V7		Pushyami						
V8		-						
V9		Local check - Jaya						
Available N:P:K of soil (kg/ha)		295:128:223						

Table-4.1(g) (Contd…)

F-levels	Varieties	MARUTERU					Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt(g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
	V1	4.37	8	209	4.55		4.74	9
	V2	4.87	5	221	5.01		4.73	11
	V3	2.81	12	172	3.07		4.00	17
	V4	4.50	7	210	4.70		4.26	14
F1	V5	-		-	-		4.35	13
	V6	3.53	10	197	4.11		3.78	18
	V7	4.26	9	184	4.13		4.38	12
	V8	-		-	-		4.13	16
	V9	-		-	-		4.20	15
	V1	5.13	2	249	4.97	7.24	5.54	2
	V2	5.52	1	247	5.34	6.19	5.31	4
	V3	3.17	11	209	4.40	3.43	4.94	8
	V4	4.94	3	227	5.13	4.19	5.14	6
F2	V5	-		-	-		5.55	1
	V6	4.55	6	218	4.62	9.71	4.73	10
	V7	4.92	4	210	4.68	6.29	5.19	5
	V8	-		-	-		5.54	3
	V9	-		-	-		4.95	7
Interaction								
F at same V		NS		NS	NS			
V at same F		NS		NS	NS			
F1		4.06	2	199	4.26		4.28	2
F2		4.71	1	227	4.86	6.17	5.10	1
C.D.(0.05)		0.46		NS	NS			
C.V.(%)		7.28		9.17	18.98			
Mean of varieties:								
V1		4.75	2	229	4.76	7.24	5.14	1
V2		5.20	1	234	5.18	6.19	5.02	2
V3		2.99	6	190	3.74	3.43	4.47	8
V4		4.72	3	218	4.92	4.19	4.70	6
V5		-		-	-		4.95	3
V6		4.04	5	208	4.37	9.71	4.26	9
V7		4.59	4	197	4.41	6.29	4.79	5
V8		-		-	-		4.84	4
V9		-		-	-		4.57	7
C.D.(0.05)		0.76		27.92	0.67			
C.V. (%)		14.35		10.90	12.18			
Expt. Mean		**4.38**		**213**	**4.56**		4.69	
Soil type		Clay Loam						
pH		-						
N - levels (kg/ha)								
F1		45:30:30						
F2		90:60:60						
Recommended N:P:K (kg/ha)		90:60:60						
Varieties								
V1		IET 28501						
V2		IET 28538						
V3		IET 28544						
V4		IET 29209						
V5		-						
V6		NDR 8002						
V7		Pushyami						
V8		-						
V9		-						
Available N:P:K of soil		-						

4.1(h) NMT – AVT 2 RSL

Seven AVT-2cultures (IET 29026, IET 27538, IET 29031, IET 29032, IET 26744, IET 28281 and IET 27547) of rain fed shallow land were evaluated for its response to levels nutrients on grain yield at **Chinsurah (80:40:40), Dhangain (120:60:40), Faizabad (80:40:40), Ghaghraghat (120:60:40)** and **Pusa (120:60:40)** under two levels of RDF (50% and 100% RDF). The details and data received are summarized and presented in Table 4.1(h).

RDF doses of nutrient application significantly influenced the grain yield at all the locations and the mean maximum increase in grain yield was recorded with 100% RDF (5.22 t/ha) with higher nutrient response ranging from 6.25 to 26.88 kg grain/kg nutrient over 50% RDF.

Grain yield differences among the tested varieties were significant at **Dhangain, Faizabad, Ghaghraghat** and **Pusa** where in IET 27538 (7.32 t/ha) followed by IET 27547 (6.75 t/ha) recorded significantly higher grain yield over check varieties at **Dhangain**. IET 26744 (3.94 t/ha) followed by IET 27538 (3.84 t/ha) at **Faizabad**, IET 26744 (4.31 t/ha) followed by IET 29032 (4.16 t/ha) at Ghaghraghat found promising with better yields. Over the locations, grain yield of IET 27538 (5.01 t/ha) followed by IET 27547 (4.61 t/ha) and IET 28281 (4.41 t/ha) were found promising. Interaction effect s between cultures and nutrient levels were non-significant at all locations except Ghaghraghat. All the cultivars were found to be promising and significant at 100% RDF over 50% RDF and found responsive.

In this trial, 100% RDF was found to be promising and also exhibited higher nutrient recovery efficiency. Among the IET cultures, IET 27538 followed by IET 28281 and IET 27547 (4.43 to 5.01 t/ha) were found promising in terms of higher mean grain yield and nutrient response.

Table 4.1.1(h): Summary of data on grain yield and ancillary characters of selected NMT RSL cultures grown under transplanted conditions at graded levels of recommended fertilizer doses, kharif 2021.

F-levels	Varieties	CHINSURAH						DHANGAIN						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Days to 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)
F1: Low input (50% NPK)	V1	2.76	16	228	2.72	121		3.48	20	257	7.01	23.67	129	
	V2	3.61	10	280	2.66	121		6.41	5	311	4.35	22.33	119	
	V3	3.22	11	300	2.63	120		2.79	22	253	6.69	24.33	131	
	V4	2.95	13	280	2.86	118		3.18	21	269	7.22	24.33	130	
	V5	2.91	14	284	2.77	116		4.48	16	333	4.22	21.33	113	
	V6	2.60	17	299	3.10	110		5.31	11	322	4.28	17.67	119	
	V7	3.00	12	264	3.13	123		6.1	8	278	4.24	24.33	113	
	V8	2.31	18	270	2.86	127		5.6	9	317	3.99	21.33	108	
	V9	-	-	-	-	-		5.1	13	330	4.02	20	126	
	V10	-	-	-	-	-		4.35	17	334	4.73	24	122	
	V11	-	-	-	-	-		5.04	14	330	2.87	18.67	105	
	V12	2.77	15	302	3.14	112		-	-	-	-	-	-	
F2: Optimum input (100% NPK)	V1	4.63	8	288	3.10	121	23.38	4.81	15	331	7.23	25	130	12.09
	V2	4.92	6	352	3.33	123	16.38	8.22	1	386	6.52	23.67	120	16.45
	V3	5.40	2	366	3.28	120	27.25	3.85	19	280	8.11	25.33	132	9.64
	V4	4.89	7	344	3.07	118	24.25	4.02	18	339	8.25	22	131	7.64
	V5	5.28	3	322	3.28	116	29.63	5.53	10	362	4.26	21.67	114	9.55
	V6	5.45	1	339	3.07	110	35.63	6.59	4	347	4.29	19.67	121	11.64
	V7	5.14	5	319	3.13	123	26.75	7.39	2	380	5.51	24	114	11.73
	V8	4.55	9	325	3.13	127	28.00	6.97	3	370	4.12	22	109	12.45
	V9	-	-	-	-	-	-	6.19	7	368	4.35	21	127	9.91
	V10	-	-	-	-	-	-	5.24	12	379	5.06	23.67	123	8.09
	V11	-	-	-	-	-	-	6.28	6	355	3.88	20.67	106	11.27
	V12	5.22	4	326	3.64	112	30.63	-	-	-	-	-	-	
Interation														
F at same V		NS		NS	0.21	NS		NS		26.59	0.69	1.24	NS	
V at same F		NS		NS	0.26	NS		NS		29.28	0.69	1.72	NS	
F1		2.90	2	279	2.87	119		4.71	2	303	4.87	22.00	119	
F2		5.05	1	331	3.23	119	26.88	5.92	1	354	5.60	22.61	121	10.95
C.D.(0.05)		0.56		12.39	0.22	NS		0.28		18.76	0.28	NS	0.13	
C.V.(%)		12.11		3.47	6.10	1.41		5.00		5.39	5.04	6.78	0.1	

Table 4.1.1(h): (Cntd..)

F-levels	Varieties	CHINSURAH						DHANGAIN						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Days to 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)
Mean of varieties:														
	V1	3.70	8	258	2.91	121	23.38	4.15	9	294	7.12	24.34	130	12.09
	V2	4.27	2	316	3.00	122	16.38	7.32	1	349	5.44	23.00	119	16.45
	V3	4.31	1	333	2.96	120	27.25	3.32	11	266	7.40	24.83	132	9.64
	V4	3.92	7	312	2.97	118	24.25	3.60	10	304	7.74	23.17	130	7.64
	V5	4.10	3	303	3.03	116	29.63	5.01	7	347	4.24	21.50	113	9.55
	V6	4.03	5	319	3.09	110	35.63	5.95	4	335	4.29	18.67	120	11.64
	V7	4.07	4	292	3.13	123	26.75	6.75	2	329	4.88	24.17	113	11.73
	V8	3.43	9	298	3.00	127	28.00	6.29	3	344	4.06	21.67	108	12.45
	V9	-	-	-	-	-	-	5.65	6	349	4.19	20.50	126	9.91
	V10	-	-	-	-	-	-	4.80	8	356	4.90	23.84	123	8.09
	V11	-	-	-	-	-	-	5.66	5	343	3.38	19.67	106	11.27
	V12	4.00	6	314	3.39	112	30.63	-	-	-	-	-	-	-
	C.D.(0.05)	NS		23.99	0.15	2.96		0.35		18.8	0.49	0.88	0.78	
	C.V. (%)	14.77		6.74	4.13	2.14		5.6		4.9	8.01	3.38	0.56	
	Expt. Mean	**3.98**		**305**	**3.05**	**119**		**5.32**		**329**	**5.24**	**22.30**	**120**	
	Soil type	-						Clay Loam						
	pH	-						6.60						
N - levels (kg/ha)														
	F1	40:20:20						60:30:20						
	F2	80:40:40						120:60:40						
	Recommended N:P:K (kg/ha)	80:40:40						120:60:40						
Varieties														
	V1	IET-29026						IET-29026						
	V2	IET-27538						IET-27538						
	V3	IET-29031						IET-29031						
	V4	IET-29032						IET-29032						
	V5	IET-26744						IET-26744						
	V6	IET-28281						IET-28281						
	V7	IET-27547						IET-27547						
	V8	Swarna sub-1						Swarna sub-1						
	V9	-						Dhanrasi						
	V10	-						Pooja						
	V11	-						Savithri						
	V12	Local Check - Suala						-						
	Available N:P:K of soil (kg/ha)	156:15:184						252:42:189						

Table 4.1.1(h): (Cntd..)

F-levels	Varieties	FAIZABAD							GHAGRAGHAT						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)
F1: Low input (50% NPK)	V1								3.29	12	205	2.24	23.7	113	
	V2	3.60	4	211	2.03	20.0	118		3.22	14	210	2.22	24.7	116	
	V3	-	-	-	-	-			3.24	13	204	2.01	22.2	114	
	V4	-	-	-	-	-			3.11	16	209	2.11	23.6	118	
	V5	3.57	6	208	2.87	21.0	118		3.37	11	209	2.12	23.3	116	
	V6								3.13	15	196	1.97	24.8	115	
	V7	3.20	8	210	1.93	21.6	117		2.92	17	190	2.04	24.4	119	
	V8	3.27	7	207	2.30	20.2	116		3.54	10	234	2.25	20.0	120	
	V9	-	-	-	-	-			-	-	-	-	-	-	
	V10	-	-	-	-	-			-	-	-	-	-	-	
	V11	-	-	-	-	-			-	-	-	-	-	-	
	V12	2.73	10	217	1.77	15.4	113		2.79	18	214	1.94	15.0	112	
F2: Optimum input (100% NPK)	V1	-	-	-	-	-	-	-	4.24	7	242	2.45	24.9	117	8.64
	V2	4.07	2	231	2.17	20.9	122	5.88	4.66	3	284	3.18	25.5	119	13.09
	V3	-	-	-	-	-	-	-	4.13	8	248	2.24	23.2	120	8.09
	V4	-	-	-	-	-	-	-	5.20	2	299	2.84	24.2	122	19.00
	V5	4.30	1	232	3.30	22.1	122	9.13	5.25	1	237	2.55	24.7	122	17.09
	V6								4.65	4	244	2.21	25.6	119	13.82
	V7	3.60	4	228	2.60	22.9	121	5.00	4.29	6	255	3.09	24.9	120	12.45
	V8	3.70	3	243	2.87	84.9	122	5.38	4.46	5	272	3.21	20.9	124	8.36
	V9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V12	3.20	8	243	2.70	16.4	114	5.88	4.07	9	263	2.27	16.0	117	11.64
Interation															
F at same V		NS		5.59	0.25	NS	1.09		0.25		16.48	0.18	NS	NS	
V at same F		NS		10.01	0.37	NS	1.25		0.24		17.76	0.17	NS	NS	
F1		3.27	2	210	2.18	19.64	116		3.18	2	208	2.10	22.41	116	
F2		3.77	1	236	2.73	33.43	120	6.25	4.55	1	261	2.67	23.32	120	12.46
C.D.(0.05)		0.10		11.33	0.39	NS	0.99		0.05		11.02	0.05	0.07	2.68	
C.V.(%)		1.79		3.23	10.01	128	0.53		1.16		4.02	1.73	0.27	1.94	

Table 4.1.1(h): (Cntd..)

F-levels	Varieties	FAIZABAD							GHAGRAGHAT						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)
Mean of varieties:															
V1									3.77	6	224	2.35	24.29	115	8.64
V2		3.84	2	221	2.10	20.45	120	5.88	3.94	4	247	2.70	25.10	118	13.09
V3		-	-	-	-	-	-	-	3.69	7	226	2.13	22.72	117	8.09
V4		-	-	-	-	-	-	-	4.16	2	254	2.48	23.87	120	19.00
V5		3.94	1	220	3.09	21.52	120	9.13	4.31	1	223	2.34	24.02	119	17.09
V6		-	-	-	-	-	-	-	3.89	5	220	2.09	25.20	117	13.82
V7		3.40	4	219	2.27	22.25	119	5.00	3.61	8	223	2.57	24.65	119	12.45
V8		3.49	3	225	2.59	52.55	119	5.38	4.00	3	253	2.73	20.45	122	8.36
V9		-	-	-	-	-	-	-	-	-	-	-	-	-	-
V10		-	-	-	-	-	-	-	-	-	-	-	-	-	-
V11		-	-	-	-	-	-	-	-	-	-	-	-	-	-
V12		-	-	-	-	-	-	-	3.43	9	239	2.11	15.50	114	11.64
C.D.(0.05)		0.22		3.95	0.18	NS	0.77		0.18		11.65	0.13	0.59	1.39	
C.V. (%)		5.21		1.45	5.93	131.47	0.53		3.93		4.26	4.49	2.21	1.01	
Expt. Mean		**3.66**		**221**	**2.51**	**29.19**	**120**		**3.86**		**234**	**2.39**	**22.87**	**118**	
Soil type		Sandy loam							Sandy loam						
pH		7.60							7.60						
N - levels (kg/ha)															
F1		40:20:20							60:30:20						
F2		80:40:40							120:60:40						
Recommended N:P:K (kg/ha)		80:40:40							120:60:40						
Varieties															
V1		-							IET-29026						
V2		IET-27538							IET-27538						
V3		-							IET-29031						
V4		-							IET-29032						
V5		IET-26744							IET-26744						
V6		-							IET-28281						
V7		IET-27547							IET-27547						
V8		Swarna sub-1							Swarna sub-1						
V9		-							-						
V10		-							-						
V11		-							-						
V12		Local Check - Sambha Mahsuri							Local Check - Sambha Mahsuri						
Available N:P:K of soil (kg/ha)		200:24:234							200:25:234						

Table 4.1.1(h): (Cntd..)

F-levels	Varieties	PUSA						Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Days to 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 100% RDF)		
F1: Low input (50% NPK)	V1	3.83	11	214	2.56	112		3.39	20
	V2	3.43	13	191	2.52	111		4.17	15
	V3	2.50	16	144	1.96	116		2.94	23
	V4	4.15	9	233	2.87	112		3.39	20
	V5	2.63	15	152	2.04	112		3.35	22
	V6	3.67	12	206	2.80	114		3.58	19
	V7	3.98	10	222	2.91	114		3.85	17
	V8	3.28	14	180	2.38	118		3.68	18
	V9	-	-	-	-	-		5.10	8
	V10	-	-	-	-	-		4.35	14
	V11	-	-	-	-	-		3.89	16
	V12	-	-	-	-	-		2.78	24
F2: Optimum input (100% NPK)	V1	5.90	3	324	3.07	113	18.82	4.73	11
	V2	5.64	5	304	2.95	113	20.09	5.86	2
	V3	4.33	8	254	2.42	116	16.64	4.43	13
	V4	6.05	2	344	3.37	113	17.27	4.89	9
	V5	4.49	7	256	2.53	114	16.91	5.14	7
	V6	5.88	4	312	3.12	115	20.09	5.23	5
	V7	6.27	1	356	3.43	115	20.82	5.36	3
	V8	4.70	6	286	2.90	120	12.91	5.17	6
	V9	-	-	-	-	-	-	6.19	1
	V10	-	-	-	-	-	-	5.24	4
	V11	-	-	-	-	-	-	4.74	10
	V12	-	-	-	-	-	-	4.65	12
Interation									
F at same V		NS		NS	NS	NS			
V at same F		NS		NS	NS	NS			
F1		3.43	2	193	2.51	114		3.60	2
F2		5.41	1	304	2.97	115	17.94	5.23	1
C.D.(0.05)		0.42		9.69	0.16	1.36			
C.V.(%)		8.17		3.35	4.87	1.02			

Table 4.1.1(h): (Cntd..)

F-levels	Varieties	PUSA						Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Days to 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
Mean of varieties:									
V1		4.87	3	269	2.82	112	18.82	4.06	10
V2		4.54	5	247	2.74	112	20.09	5.01	3
V3		3.42	8	199	2.19	116	16.64	3.68	12
V4		5.10	2	288	3.12	113	17.27	4.14	9
V5		3.56	7	204	2.29	113	16.91	4.24	8
V6		4.78	4	259	2.96	114	20.09	4.41	7
V7		5.13	1	289	3.17	115	20.82	4.61	5
V8		3.99	6	233	2.64	119	12.91	4.43	6
V9		-	-	-	-	-	-	5.65	2
V10		-	-	-	-	-	-	4.80	4
V11		-	-	-	-	-	-	5.66	1
V12		-	-	-	-	-	-	3.71	11
C.D.(0.05)		0.38		23.42	0.07	2.41			
C.V. (%)		7.33		8.12	2.26	1.8			
Expt. Mean		**4.42**		**248**	**2.74**	**114**		4.39	
Soil type		Sandy loam							
pH		8.25							
N - levels (kg/ha)									
F1		60:30:20							
F2		120:60:40							
Recommended N:P:K (kg/ha)		120:60:40							
Varieties									
V1		IET-29026							
V2		IET-27538							
V3		IET-29031							
V4		IET-29032							
V5		IET-26744							
V6		IET-28281							
V7		IET-27547							
V8		Swarna sub-1							
V9		-							
V10		-							
V11		-							
V12		Local Check - Rajendra Mahsuri							
Available N:P:K of soil (kg/ha)		238:13:139							

4.1(i) NMT CSTVT

Two cultures Viz., IET 27847 (H) and IET 27051 were evaluated in comparison with standard varieties (CSR 10, Jaya, GNR-5 and GNR-19) at **Navsari (120:30:0), Panvel (100:50:50), Nagina (120:60:40)** and **Canning town** under two recommended level of input (50 and 100% RDF). The data is summarized and presented in Table 4.1(i). However, varieties evaluated at single dose at **Canning town**.

Different levels of RDF did not exhibit significant differences in grain yield and yield attributes at both locations, **Navsari** and **Panvel but** significant at **Nagina**. Application of 100% RDF recorded higher yield of 5.55 t/ha at **Panvel** but the yield increase was not significant and was comparable to followed by 50 % RDF which recorded yield of 4.45 t/ha at **Panvel**. Nutrient response (kg grain / kg Nutrients) was higher at 100% RDF (15.88) at **Nagina**.

Average yield of varieties ranged from 2.60 to 4.67 t/ha. IET 27051 (6.75 t/ha) followed by Panvel-1 (5.42 t/ha) was found to be promising over other test entries. Nutrient response (kg grain/kg nutrient) was higher with Jaya (17.18) followed by IET 27051 (16.27) and CSR 10 (15.10). Interaction effects of N levels and varieties were found to be non-significant at all the locations.

In this trial, 100% RDF was found to be promising and also exhibited higher nutrient recovery. AVT-2 entry IET 27051 was found to be promising in terms of grain yield and better nutrient response.

4.1(j) NMT – AVT 2 AL and ISTVT

Saline tolerant cultures Viz., IET 28608, IET 28608, IET 27823 and IET 27807 were evaluated for its response to different levels of nutrients on grain yield at three different locations i.e. **Lucknow (150:60:40), Navsari (120:30:0)** and **Pusa (120:60:40)**. The details and data received from these locations are summarized and presented in Table 4.1(j).

Different RDF doses significantly influenced the grain yield at both locations (**Lucknow** and **Pusa**) except **Navsari.** Maximum increase in grain yield was observed with 100% RDF (4.84 and 3.96 t/ha) respectively at **Pusa** and **Lucknow** over 50% RDF application. Application of 100% RDF recorded higher grain yields of 31% and higher nutrient response (kg grain / kg nutrient) was recorded at **Pusa** (18.71) and **Lucknow** (4.07).

Grain yield differences among the tested cultures were found to be significant at all the locations and IET 27823 recorded higher yield at **Lucknow**. Higher nutrient response was noted with IET 28606 at **Navsari** (7.52). Interaction effects among RFD x varieties on grain yield was found to be non-significant at all locations **Pusa**. Mean over the locations, IET 28606 was found promising with higher grain yield (3.33 t/ha) followed by IET 28608 (3.24 t/ha) as compared to other cultures.

In this trial, 100% RDF was found to be promising with 31% higher yield and also exhibited higher nutrient efficiency, IET 28606 (3.33 t/ha) followed by IET 28608 (3.24 t/ha) were found to be promising entries and recorded higher mean grain yield over other test entries.

4.1(k) NMT – AVT 2 Aerobic

Aerobic rice cultivation is a system where rice is grown under aerated conditions without standing water as against the usual transplanted rice which is grown under unaerated flooded conditions. Rice is grown on dry but irrigated soil same as other irrigated dry (ID) crops such as wheat and barley. The crop is provided with irrigation water depending upon the season, evapotranspiration and specific needs of the crop. It is characterized by the presence of air in the soil medium and its limited water requirement as compared to the irrigated rice.

Two AVT-2 entries (IET 25653 and IET26178) were evaluated for their response to two fertilizer levels on grain yield at seven locations Viz. **Hazaribagh (80:40:30), Jagdalpur (120:60:40), Kota (120:60:40), Ludhiana (150:30:30), Nawagam (80:25:0), Raipur (100:60:40) and Vadgaon (100:50:50).** The data received from four locations are summarized and presented in Table 4.1(i).

Different doses of RDF exhibited significant differences in grain yield at **Hazaribagh, Kota, Nawagam, Raipur** and **Vadgaon**. Application of 100% RDF recorded higher yield at **Hazaribagh** (6.82 t/ha), **Kota** (4.64 t/ha), **Nawagam** (3.65 t/ha), **Raipur** (3.20 t/ha) and **Vadgaon** (5.65 t/ha). Nitrogen response (kg grain / kg N) was higher at 100 % RDF over 50% RDF at **Hazaribagh** (58.77), **Nawagam** (12.69) and **Vadgaon** (16.20).

Grain yield of cultures differed significantly at all locations except at **Hazaribagh**, **Jagdalpur** and **Vadgaon**. Among the entries tested, IET 26178 recorded higher yield at **Kota** (4.99 t/ha), **Ludhiana** (5.66 t/ha), **Nawagam** (4.17 t/ha) and **Vadgaon** (4.96 t/ha), while IET 25653 recorded higher yield at **Raipur** (3.74 t/ha) over other entries. Average over the locations, the performance of IET 26178 (4.16 t/ha) was found to be promising culture over other entries. Interaction effects of N doses and varieties was found to be non-significant at all the locations except **Raipur** where, 100% RDF with IET 25653 realised higher grain yield (4.06 t/ha).

Summarized over the locations, application of 100% RDF was found to be promising (37% higher grain yield) and also exhibited higher nutrient response. IET 26178 was found to be promising with higher grain yield (4.16 t/ha) across the locations and found suitable across the locations.

Table 4.1(i): Summary of data on grain yield and ancillary characters of selected NMT CSTVT cultures grown under transplanted conditions at graded levels of recommended fertilizer doses, kharif 2021.

F-levels	Varieties	NAVSARI						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: Low input (50% NPK)	V1	2.03	11	276	3.60	24.9	109	
	V2	2.14	7	327	3.83	24.6	120	
	V3	2.17	5	267	2.97	24.3	92	
	V4	2.20	4	247	3.47	23.3	100	
	V5	3.08	1	273	3.77	24.6	106	
	V6	2.01	12	273	3.53	25.2	102	
F2: Optimum input (100% NPK)	V1	2.16	6	311	3.77	24.6	110	1.73
	V2	2.08	10	307	4.07	25.3	122	-0.80
	V3	2.28	3	307	2.90	24.6	94	1.47
	V4	2.09	9	289	3.53	25.2	100	-1.47
	V5	2.72	2	280	3.80	24.8	106	-4.80
	V6	2.10	8	289	3.40	25.2	105	1.20
Interation								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		2.27	1	277	3.53	24.50	105	
F2		2.24	2	297	3.58	24.95	106	-0.44
C.D.(0.05)		NS		NS	NS	NS	NS	
C.V.(%)		9.18		14.83	9.85	1.35	2.05	
Mean of varieties:								
V1		2.10	5	293	3.69	24.74	110	1.73
V2		2.11	4	317	3.95	24.95	121	-0.80
V3		2.23	2	287	2.94	24.44	93	1.47
V4		2.15	3	268	3.50	24.27	100	-1.47
V5		2.90	1	277	3.79	24.73	106	-4.80
V6		2.06	6	281	3.47	25.22	104	1.20
C.D.(0.05)		0.24		21.9	0.25	NS	2.25	
C.V. (%)		8.76		6.34	5.9	2.55	1.77	
Expt. Mean		**2.26**		**287**	**3.55**	**24.72**	**106**	
Soil type		Clay						
pH		8.62						
F - levels (kg/ha)								
F1		60:15:0						
F2		120:30:0						
Recommended N:P:K (kg/ha)		120:30:0						
Varieties								
V1		IET 27847 (H)						
V2		IET 27051						
V3		CSR-10						
V4		Jaya						
V5		Hybrid Check - GNR 5						
V6		Local Check - GNR 19						
Available N:P:K of soil (kg/ha)		280:46:1267						

Table 4.1(i): (Cntd…)

F-levels	Varieties	PANVEL						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input (50% NPK)	V1	4.43	7	269	1.98	20.8	121	
	V2	6.37	2	359	2.02	21.3	100	
	V3	3.49	9	267	2.53	25.0	91	
	V4	3.29	10	244	2.92	20.0	115	
	V5							
	V6	4.69	6	317	2.75	26.2	95	
F2: Optimum input (100% NPK)	V1	5.73	4	378	2.07	20.9	120	13.00
	V2	7.12	1	403	2.14	21.1	100	7.50
	V3	5.00	5	325	2.73	25.0	91	15.10
	V4	3.75	8	274	3.00	20.5	113	4.60
	V5							
	V6	6.14	3	357	2.95	26.2	95	14.50
Interation								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		4.45	2	291	2.44	22.67	104	
F2		5.55	1	347	2.58	22.74	104	10.94
C.D.(0.05)		NS		42.03	NS	NS	NS	
C.V.(%)		15.32		8.37	3.53	1.4	1.09	
Mean of varieties:								
V1		5.08	3	324	2.03	20.88	121	13.00
V2		6.75	1	381	2.08	21.19	100	7.50
V3		4.25	4	296	2.63	24.99	91	15.10
V4		3.52	5	259	2.96	20.27	114	4.60
V5								
V6		5.42	2	337	2.85	26.20	95	14.50
C.D.(0.05)		0.58		32.98	0.1	0.57	1.49	
C.V. (%)		9.41		8.44	3.18	2.05	1.17	
Expt. Mean		**5.00**		**319**	**2.51**	**22.70**	**104**	
Soil type		Clay Loam						
pH		7.80						
F - levels (kg/ha)								
F1		50:25:25						
F2		100:50:50						
Recommended N:P:K (kg/ha)		100:50:50						
Varieties								
V1		IET 27847 (H)						
V2		IET 27051						
V3		CSR-10						
V4		Jaya						
V5		-						
V6		Local Check - Panvel 1						
Available N:P:K of soil (kg/ha)		290:38:1250						

Table 4.1(i): (Cntd…)

F-levels	Varieties	NAGINA							Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
F1: Low input (50% NPK)	V1	3.15	4	246	2.96	24.4	100		3.20	8
	V2	3.01	5	259	2.92	24.5	99		3.84	4
	V3								2.83	10
	V4	2.31	6	214	2.81	33.9	101		2.60	12
	V5								3.08	9
	V6								3.35	6
F2: Optimum input (100% NPK)	V1	4.71	2	344	3.26	25.6	102	14.18	4.20	2
	V2	4.8	1	345	3.25	25.6	101	16.27	4.67	1
	V3								3.64	5
	V4	4.2	3	303	3.19	34.7	103	17.18	3.35	7
	V5								2.72	11
	V6								4.12	3
Interation										
F at same V		NS		NS	0.02	0.05	NS			
V at same F		NS		NS	0.03	0.07	NS			
F1		2.82	2	240	2.90	27.61	100		3.18	2
F2		4.57	1	331	3.23	28.65	102	15.88	4.12	1
C.D.(0.05)		0.58		16.75	0.03	0.07	0.48			
C.V.(%)		7.78		2.9	0.47	0.12	0.23			
Mean of varieties:										
V1		3.93	1	295	3.11	25.03	101	14.18	3.70	3
V2		3.91	2	302	3.09	25.08	100	16.27	4.25	1
V3									3.24	4
V4		3.26	3	258	3.00	34.29	102	17.18	2.97	5
V5									2.90	6
V6									3.74	2
C.D.(0.05)		0.37		14.01	0.01	0.03	1.31			
C.V. (%)		7.54		3.69	0.36	0.09	0.98			
Expt. Mean		**3.70**		**285**	**3.07**	**28.13**	**101**		3.65	
Soil type		-								
pH		-								
F - levels (kg/ha)										
F1		60:30:20								
F2		120:60:40								
Recommended N:P:K (kg/ha)		120:60:40								
Varieties										
V1		IET 27847 (H)								
V2		IET 27051								
V3		-								
V4		Jaya								
V5		-								
V6		-								
Available N:P:K of soil (kg/ha)		290:38:1250								

Table 4.1(i): (Cntd…)

F-levels	Varieties	CANNING TOWN		
		Grain Yield (t/ha)	**Panicle/m² (No.)**	**Rank**
F2: Optimum input (100% NPK)	V1	4.89	378	1
	V2	4.42	403	3
	V3	4.88	325	2
	V4	4.41	274	4
	V5			
	V6	3.44	357	5
C.D.(0.05)		NS	120	
C.V.(%)		28.06	26	
Expt. Mean		**4.41**	**347**	
Soil type		-		
pH		-		
F - levels (kg/ha)				
F1		-		
F2		-		
Recommended N:P:K (kg/ha)		-		
Varieties				
V1		IET 27847 (H)		
V2		IET 27051		
V3		CSR-10		
V4		Jaya		
V5		-		
V6		Local Check - Canning 7		
Available N:P:K of soil (kg/ha)		-		

Table 4.1(j): Summary of data on grain yield and ancillary characters of selected NMT AL&ISTVT cultures grown under transplanted conditions at graded levels of recommended fertilizer doses, kharif 2021.

F-levels	Varieties	LUCKNOW						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: Low input (50% NPK)	V1	3.77	6	399	1.33	22.1	78	
	V2	3.43	9	366	1.40	19.9	88	
	V3	3.83	5	418	1.20	19.3	101	
	V4	3.10	11	359	1.60	19.9	87	
	V5							
	V6							
	V7	3.03	12	348	1.57	22.1	85	
	V8							
	V9	3.57	8	380	1.67	21.8	84	
F2: Optimum input (100% NPK)	V1	4.23	3	470	1.60	23.4	76	3.68
	V2	4.37	1	532	1.53	22.9	87	7.52
	V3	4.27	2	502	1.67	22.2	101	3.52
	V4	3.97	4	451	1.70	23.8	87	6.96
	V5							
	V6							
	V7	3.17	10	389	1.77	24.1	85	1.12
	V8							
	V9	3.77	6	418	1.87	20.5	85	1.60
Interation								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		3.46	2	378	1.46	20.86	87	
F2		3.96	1	460	1.69	22.82	87	4.07
C.D.(0.05)		0.38		32.7	NS	NS	NS	
C.V.(%)		7.19		5.44	17.98	24.4	0.77	
Mean of varieties:								
V1		4.00	2	434	1.47	22.77	77	3.68
V2		3.90	3	449	1.47	21.40	88	7.52
V3		4.05	1	460	1.44	20.75	101	3.52
V4		3.54	5	405	1.65	21.85	87	6.96
V5								
V6								
V7		3.10	6	368	1.67	23.10	85	1.12
V8								
V9		3.67	4	399	1.77	21.18	85	1.60
C.D.(0.05)		NS		92.3	NS	NS	1.6	
C.V. (%)		19.53		18.3	16.5	12.8	1.5	
Expt. Mean		**3.71**		**419**	**1.58**	**21.84**	**87**	
Soil type		-						
pH		8.90						
F - levels (kg/ha)								
F1		75:30:20						
F2		150:60:40						
Recommended N:P:K (kg/ha)		150:60:40						
Varieties								
V1		IET 28606						
V2		IET 28608						
V3		IET 27823						
V4		IET 27807						
V5		-						
V6		-						
V7		FL 478						
V8		-						
V9		Local check - CSR 56						
Available N:P:K of soil (kg/ha)		120:26:326						

Table 4.1(j): (Cntd…)

F-levels	Varieties	NAVSARI						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input (50% NPK)	V1	2.16	12	229	3.11	24.9	94	
	V2	1.77	18	231	3.30	25.1	99	
	V3	2.05	14	236	3.12	24.6	117	
	V4	2.25	8	245	3.26	25.1	96	
	V5	2.49	4	282	3.47	24.4	104	
	V6	1.91	16	238	2.80	25.1	96	
	V7	2.44	6	262	3.08	24.2	90	
	V8	2.72	2	287	3.01	25.1	115	
	V9	2.17	11	262	3.44	25.3	99	
F2: Optimum input (100% NPK)	V1	2.21	9	260	3.37	25.1	91	0.67
	V2	1.99	15	296	3.50	24.6	98	2.93
	V3	2.19	10	249	3.26	25.0	118	1.87
	V4	2.31	7	256	3.37	24.6	97	0.80
	V5	2.87	1	280	3.69	25.1	104	5.07
	V6	1.89	17	235	3.01	25.3	96	-0.27
	V7	2.14	13	287	3.13	24.9	92	-4.00
	V8	2.55	3	289	3.12	25.3	113	-2.27
	V9	2.47	5	244	3.72	25.1	97	4.00
Interation								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		2.22	2	252	3.18	24.87	101	
F2		2.29	1	266	3.35	24.99	101	0.98
C.D.(0.05)		NS		NS	NS	NS	NS	
C.V.(%)		14.9		14.2	5.77	2.23	2.84	
Mean of varieties:								
V1		2.19	6	245	3.24	24.97	92	0.67
V2		1.88	9	263	3.40	24.84	98	2.93
V3		2.12	7	242	3.19	24.79	118	1.87
V4		2.28	5	250	3.32	24.85	97	0.80
V5		2.68	1	281	3.58	24.74	104	5.07
V6		1.90	8	237	2.91	25.20	96	-0.27
V7		2.29	4	275	3.11	24.57	91	-4.00
V8		2.64	2	288	3.07	25.22	114	-2.27
V9		2.32	3	253	3.58	25.20	98	4.00
C.D.(0.05)		0.23		31	0.17	NS	2.00	
C.V. (%)		8.63		10	4.36	2.81	1.70	
Expt. Mean		**2.25**		**259**	**3.26**	**24.93**	**101**	
Soil type		Clay						
pH		8.73						
F - levels (kg/ha)								
F1		60:15:0						
F2		120:30:0						
Recommended N:P:K (kg/ha)		120:30:0						
Varieties								
V1		IET 28606						
V2		IET 28608						
V3		IET 27823						
V4		IET 27807						
V5		CSR 36						
V6		CSR 10						
V7		FL 478						
V8		CSR 23						
V9		Local check - GNR 5						
Available N:P:K of soil (kg/ha)		268:49:1348						

Table 4.1(j): (Cntd…)

F-levels	Varieties	PUSA						Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
F1: Low input (50% NPK)	V1	2.77	10	199	2.88	22.3		2.90	7
	V2	2.95	8	207	2.93	22.7		2.72	13
	V3	2.31	12	166	2.25	22.3		2.73	11
	V4	2.75	11	196	2.38	22.5		2.70	14
	V5							2.49	16
	V6							1.91	17
	V7	2.98	7	211	3.08	22.6		2.82	10
	V8							2.72	12
	V9	2.93	9	213	3.12	21.8		2.89	8
F2: Optimum input (100% NPK)	V1	4.81	4	251	3.28	22.7	18.55	3.75	3
	V2	4.95	3	256	3.33	22.9	18.18	3.77	2
	V3	4.20	6	221	2.94	22.6	17.18	3.55	5
	V4	4.48	5	237	3.00	22.6	15.73	3.59	4
	V5							2.87	9
	V6							1.89	18
	V7	5.34	1	275	3.40	23.2	21.45	3.55	6
	V8							2.55	15
	V9	5.26	2	278	3.48	22.3	21.18	3.83	1
Interation									
F at same V		0.25		NS	NS	NS			
V at same F		0.27		NS	NS	NS			
F1		2.78	2	199	2.77	22.38		2.82	2
F2		4.84	1	253	3.24	22.73	18.71	3.70	1
C.D.(0.05)		0.17		13.62	0.25	NS			
C.V.(%)		3.12		4.20	5.85	1.44			
Mean of varieties:									
V1		3.79	4	225	3.08	22.52	18.55	3.33	2
V2		3.95	3	231	3.13	22.83	18.18	3.24	3
V3		3.26	6	194	2.60	22.45	17.18	3.14	6
V4		3.62	5	216	2.69	22.55	15.73	3.14	5
V5								2.68	7
V6								1.90	9
V7		4.16	1	243	3.24	22.92	21.45	3.18	4
V8								2.64	8
V9		4.10	2	246	3.30	22.07	21.18	3.36	1
C.D.(0.05)		0.18		9.92	0.16	0.32			
C.V. (%)		3.92		3.65	4.47	1.19			
Expt. Mean		**3.81**		**226**	**3.01**	**22.55**		3.26	
Soil type		Sandy loam							
pH		8.21							
F - levels (kg/ha)									
F1		60;30:20							
F2		120:60:40							
Recommended N:P:K (kg/ha)		120:60:40							
Varieties									
V1		IET 28606							
V2		IET 28608							
V3		IET 27823							
V4		IET 27807							
V5		-							
V6		-							
V7		FL 478							
V8		-							
V9		Local check - Rajendra Sweta							
Available N:P:K of soil (kg/ha)		235:13:140							

Table 4.1(k): Summary of data on grain yield and ancillary characters of selected NMT Aerobic cultures at graded levels of recommended fertilizer doses, kharif 2021.

F-levels	Varieties	JAGDALPUR						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1	V1	-	-	-	-	-	-	
	V2	2.76	7	193	2.81	27.49	77	
	V3	3.55	4	209	3.52	30.97	78	
	V4	3.73	2	218	2.51	25.66	80	
	V5	-	-	-	-	-	-	
	V6	-	-	-	-	-	-	
	V7	-	-	-	-	-	-	
	V8	3.58	3	149	2.91	22.35	85	
F2	V1	-	-	-	-	-	-	
	V2	2.63	8	204	2.90	26.68	69	-1.18
	V3	3.78	1	264	3.29	30.09	78	2.09
	V4	3.19	5	258	2.83	25.96	80	-4.91
	V5	-	-	-	-	-	-	
	V6	-	-	-	-	-	-	
	V7	-	-	-	-	-	-	
	V8	3.18	6	241	2.95	22.74	85	-3.64
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		3.79	NS	NS	0.73	
				4.24	NS	NS	0.73	
F1		3.41	1	192	2.94	26.62	80	
F2		3.20	2	242	2.99	26.37	78	-1.91
C.D.(0.05)		NS		2.88	NS	NS	0.29	
C.V.(%)		15.9		2.98	27.69	6.24	0.82	
Mean of varieties:								
V1		-	-	-	-	-	-	-
V2		2.70	4	199	2.86	27.09	73	-1.18
V3		3.67	1	236	3.41	30.53	78	2.09
V4		3.46	2	238	2.67	25.81	80	-4.91
V5		-	-	-	-	-	-	-
V6		-	-	-	-	-	-	-
V7		-	-	-	-	-	-	-
V8		3.38	3	195	2.93	22.55	85	-3.64
C.D.(0.05)		0.31		2.68	0.42	1.34	0.52	
C.V. (%)		19.9		2.64	30.28	10.86	1.40	
Expt. Mean		**3.30**		**217**	**2.97**	**26.49**	**79**	
Soil type		Alfisol						
pH		6.20						
N - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		-						
V2		IET 28631						
V3		IET 28645						
V4		IET 27951						
V5		-						
V6		-						
V7		-						
V8		Local Check - Samleswari 120 Days						
Available N:P:K of soil (kg/ha)		225:14:298						

Table 4.1(k): (Contd.)

F-levels	Varieties	KAUL					
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	-		-	-	-	
	V2	4.33	7	172	2.70	26.9	
	V3	4.53	6	145	3.30	28.7	
	V4	4.83	5	205	2.60	24.4	
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	4.23	8	180	2.63	25.2	
F2	V1	-		-	-	-	
	V2	5.70	2	213	3.00	27.2	10.15
	V3	5.40	4	172	3.60	28.8	6.44
	V4	6.33	1	238	2.83	24.6	11.11
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	5.50	3	205	2.77	25.0	9.41
Interaction							
F at same V		0.36		13.55	0.14	NS	
V at same F		0.46		14.26	0.14	NS	
F1		4.48	2	175	2.81	26.29	
F2		5.73	1	207	3.05	26.40	9.28
C.D.(0.05)		0.38		7.89	0.01	NS	
C.V.(%)		16.85		9.28	1.10	21.62	
Mean of varieties:							
V1							
V2		5.02	2	193	2.85	27.04	10.15
V3		4.97	3	158	3.45	28.75	6.44
V4		5.58	1	222	2.72	24.52	11.11
V5							
V6							
V7							
V8		4.87	4	193	2.70	25.09	9.41
C.D.(0.05)		0.26		9.58	0.10	1.42	
C.V. (%)		10.75		10.74	7.47	11.53	
Expt. Mean		**5.11**		**191**	**2.93**	**26.35**	
Soil type		Clay loam					
pH		8.00					
N - levels (kg/ha)							
F1		75:30:30					
F2		150:60:60					
Recommended N:P:K (kg/ha)		150:60:60					
Varieties							
V1		-					
V2		IET 28631					
V3		IET 28645					
V4		IET 27951					
V5		-					
V6		-					
V7		-					
V8		Local Check - HKR 47 135 Days					
Available N:P:K of soil (kg/ha)		160:16:320					

Table 4.1(k): (Contd.)

F-levels	Varieties	KOTA						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	-	-	-	-	-	-	
	V2	4.38	5	27.7	319	3.17	87	
	V3	4.37	6	28.8	276	3.70	83	
	V4	4.73	4	23.2	321	3.32	84	
	V5	2.83	12	22.8	241	2.88	88	
	V6	-	-	-	-	-	-	
	V7	3.28	10	24.8	312	2.34	85	
	V8	3.27	11	24.3	244	2.57	92	
F2	V1	-	-	-	-	-	-	
	V2	5.34	2	28.5	337	3.52	86	8.73
	V3	4.97	3	29.1	295	4.11	83	5.45
	V4	5.40	1	24.2	349	3.65	82	6.09
	V5	3.47	9	23.0	262	3.37	88	5.82
	V6	-	-	-	-	-	-	
	V7	3.82	8	25.0	336	2.77	86	4.91
	V8	3.83	7	25.7	280	3.05	91	5.09
Interaction								
F at same V		0.36		0.68	15.05	0.21	NS	
V at same F		0.40		0.69	18.60	0.24	NS	
F1		3.81	2	25	285.23	3.00	87	
F2		4.47	1	26	309.61	3.41	86	6.02
C.D.(0.05)		0.27		0.31	NS	0.18	NS	
C.V.(%)		9.87		1.82	7.70	8.42	2.38	
Mean of varieties:								
V1		-	-	-	-	-	-	-
V2		4.86	2	28	327.67	3.35	87	8.73
V3		4.67	3	29	285.34	3.91	83	5.45
V4		5.07	1	24	334.84	3.49	83	6.09
V5		3.15	6	23	251.34	3.13	88	5.82
V6		-	-	-	-	-	-	-
V7		3.55	4	25	323.67	2.56	86	4.91
V8		3.55	4	25	261.67	2.81	91	5.09
C.D.(0.05)		0.26		0.48	10.64	0.15	0.96	
C.V. (%)		8.85		2.67	5.11	6.54	1.60	
Expt. Mean		**4.14**		**26**	**297.42**	**3.20**	**86**	
Soil type		Clay loam						
pH		7.40						
N - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		-						
V2		IET 28631						
V3		IET 28645						
V4		IET 27951						
V5		CR Dhan 202						
V6		-						
V7		MAS 946-1						
V8		Local Check - Karjat-7 (125 Days)						
Available N:P:K of soil (kg/ha)		169:34:413						

Table 4.1(k): (Contd.)

F-levels	Varieties	LUDHIANA						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	-	-	-	-	-	-	
	V2	4.87	8	481	3.65	25.0	90	
	V3	4.94	7	489	3.14	22.9	83	
	V4	5.06	5	449	3.14	26.1	86	
	V5	-	-	-	-	-	-	
	V6	-	-	-	-	-	-	
	V7	-	-	-	-	-	-	
	V8	5.58	2	493	3.26	23.6	89	
F2	V1	-	-	-	-	-	-	-
	V2	4.95	6	574	3.70	25.0	90	0.76
	V3	5.13	4	500	3.45	22.9	86	1.81
	V4	5.31	3	535	3.21	26.0	87	2.38
	V5	-	-	-	-	-	-	-
	V6	-	-	-	-	-	-	-
	V7	-	-	-	-	-	-	-
	V8	5.84	1	543	3.50	23.5	90	2.48
Interaction								
F at same V		NS		26.2	NS	NS	NS	
V at same F		NS		28.1	NS	NS	NS	
F1		5.11	2	478	3.30	24.38	87	
F2		5.31	1	538	3.47	24.34	88	1.86
C.D.(0.05)		NS		16.7	NS	NS	NS	
C.V.(%)		12.6		7.37	4.85	4.87	2.78	
Mean of varieties:								
V1		-	-	-	-	-	-	-
V2		4.91	4	528	3.68	24.97	90	0.76
V3		5.04	3	495	3.30	22.89	85	1.81
V4		5.19	2	492	3.18	26.07	87	2.38
V5		-	-	-	-	-	-	-
V6		-	-	-	-	-	-	-
V7		-	-	-	-	-	-	-
V8		5.71	1	518	3.38	23.52	90	2.48
C.D.(0.05)		0.23		18.54	0.15	0.42	0.89	
C.V. (%)		9.65		7.82	9.37	3.71	2.18	
Expt. Mean		**5.21**		**508**	**3.38**	**24.36**	**88**	
Soil type		sandy Loam						
pH		7.40						
N - levels (kg/ha)								
F1		75:15:15						
F2		150:30:30						
Recommended N:P:K (kg/ha)		150:30:30						
Varieties								
V1		-						
V2		IET 28631						
V3		IET 28645						
V4		IET 27951						
V5		-						
V6		-						
V7		-						
V8		Local Check - PR 126 (120 Days)						
Available N:P:K of soil (kg/ha)		267:24:267						

Table 4.1(k): (Contd.)

F-levels	Varieties	NAWAGAM						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	3.65	10	160	2.61	25.1	82	
	V2	4.63	4	217	3.52	20.4	81	
	V3	4.34	6	198	5.07	25.5	76	
	V4	4.29	7	189	3.10	22.9	78	
	V5	-	-	-	-	-	-	
	V6	-	-	-	-	-	-	
	V7	-	-	-	-	-	-	
	V8	4.17	8	198	3.67	16.7	75	
F2	V1	4.09	9	214	2.93	26.1	83	8.38
	V2	5.51	2	205	4.03	21.3	81	16.76
	V3	5.54	1	239	6.52	25.9	77	22.86
	V4	4.43	5	218	3.26	23.1	78	2.67
	V5	-	-	-	-	-	-	
	V6	-	-	-	-	-	-	
	V7	-	-	-	-	-	-	
	V8	4.76	3	224	4.30	17.8	76	11.24
Interaction								
F at same V		0.42		16.25	0.58	NS	NS	
V at same F		0.42		18.49	0.56	NS	NS	
F1		4.22	2	192	3.59	22.12	78	
F2		4.87	1	220	4.21	22.84	79	12.38
C.D.(0.05)		0.19		13.05	0.17	NS	NS	
C.V.(%)		7.33		11.40	7.89	9.95	1.64	
Mean of varieties:								
V1		3.87	5	187	2.77	25.60	82	8.38
V2		5.07	1	211	3.78	20.84	81	16.76
V3		4.94	2	218	5.80	25.70	76	22.86
V4		4.36	4	203	3.18	23.00	78	2.67
V5		-	-	-	-	-	-	
V6		-	-	-	-	-	-	
V7		-	-	-	-	-	-	
V8		4.47	3	211	3.99	17.27	76	11.24
C.D.(0.05)		0.30		11.49	0.41	1.40	1.40	
C.V. (%)		11.18		9.56	17.92	10.6	3.04	
Expt. Mean		**4.54**		**206**	**3.90**	**22.48**	**79**	
Soil type		Clay loam						
pH		8.01						
N - levels (kg/ha)								
F1		40:12.5:0						
F2		80:25:0						
Recommended N:P:K (kg/ha)		80:25:0						
Varieties								
V1		IET 27937						
V2		IET 28631						
V3		IET 28645						
V4		IET 27951						
V5		-						
V6		-						
V7		-						
V8		Local Check - Mahisagar (115 Days)						
Available N:P:K of soil (kg/ha)		-						

Table 4.1(k): (Contd.)

F-levels	Varieties	PANTNAGAR						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	-	-	-	-	-	-	
	V2	3.20	8	215	1.67	24.8	92	
	V3	3.84	5	232	1.90	27.1	81	
	V4	3.38	6	216	1.93	22.0	93	
	V5	-	-	-	-	-	-	
	V6	-	-	-	-	-	-	
	V7	-	-	-	-	-	-	
	V8	3.26	7	201	1.97	28.4	96	
F2	V1	-	-	-	-	-	-	-
	V2	4.30	3	263	2.05	25.9	91	10.00
	V3	4.63	2	277	2.02	27.9	85	7.18
	V4	4.78	1	299	1.89	22.5	89	12.73
	V5	-	-	-	-	-	-	-
	V6	-	-	-	-	-	-	-
	V7	-	-	-	-	-	-	-
	V8	4.03	4	249	1.88	27.7	95	7.00
Interaction								
F at same V		0.10		9.82	0.07	NS	1.77	
V at same F		0.10		9.47	0.07	NS	1.82	
F1		3.42	2	216	1.87	25.57	91	
F2		4.44	1	272	1.96	26.00	90	9.23
C.D.(0.05)		0.04		2.17	0.02	NS	NS	
C.V.(%)		2.22		2.00	2.79	5.71	2.23	
Mean of varieties:								
V1		-	-	-	-	-	-	-
V2		3.75	3	239	1.86	25.36	92	10.00
V3		4.24	1	255	1.96	27.51	83	7.18
V4		4.08	2	258	1.91	22.25	91	12.73
V5		-	-	-	-	-	-	-
V6		-	-	-	-	-	-	-
V7		-	-	-	-	-	-	-
V8		3.65	4	225	1.93	28.01	95	7.00
C.D.(0.05)		0.07		6.94	0.05	0.84	1.25	
C.V. (%)		4.03		6.10	5.82	7.01	2.97	
Expt. Mean		**3.93**		**244**	**1.91**	**25.78**	**90**	
Soil type		Silt Loam						
pH		7.50						
N - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		-						
V2		IET 28631						
V3		IET 28645						
V4		IET 27951						
V5		-						
V6		-						
V7		-						
V8		Local Check - PD 24 (135 Days)						
Available N:P:K of soil (kg/ha)		231:22:218						

Table 4.1(k): (Contd.)

F-levels	Varieties	RAIPUR						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	3.05	8	172	2.42	27.6	80	
	V2	2.83	11	191	2.27	26.4	81	
	V3	3.77	4	198	2.92	26.8	81	
	V4	2.91	9	193	2.25	24.5	81	
	V5	-	-	-	-	-	-	
	V6	2.78	12	200	2.19	24.7	75	
	V7	-	-	-	-	-	-	
	V8	2.87	10	205	2.14	19.1	85	
F2	V1	3.97	2	202	2.65	27.8	81	9.20
	V2	3.87	3	215	2.52	26.7	82	10.40
	V3	4.28	1	226	3.29	27.1	81	5.10
	V4	3.75	5	228	2.43	25.0	81	8.40
	V5	-	-	-	-	-	-	-
	V6	3.72	6	219	2.39	25.1	76	9.40
	V7	-	-	-	-	-	-	-
	V8	3.59	7	231	2.31	19.3	87	7.20
Interaction								
F at same V		0.33		12.48	0.14	NS	0.63	
V at same F		0.33		13.36	0.15	NS	0.74	
F1		3.04	2	193	2.37	24.83	81	
F2		3.86	1	220	2.60	25.15	81	8.28
C.D.(0.05)		0.14		7.92	0.09	NS	NS	
C.V.(%)		5.91		5.75	5.65	2.51	1.06	
Mean of varieties:								
V1		3.51	2	187	2.54	27.65	81	9.20
V2		3.35	3	203	2.40	26.56	81	10.40
V3		4.03	1	212	3.11	26.93	81	5.10
V4		3.33	4	211	2.34	24.73	81	8.40
V5		-	-	-	-	-	-	-
V6		3.25	5	209	2.29	24.87	76	9.40
V7		-	-	-	-	-	-	-
V8		3.23	6	218	2.23	19.20	86	7.20
C.D.(0.05)		0.23		8.83	0.10	0.62	0.44	
C.V. (%)		9.65		6.10	5.78	3.54	0.78	
Expt. Mean		**3.45**		**207**	**2.48**	**24.99**	**81**	
Soil type		Vertisols						
pH		7.06						
N - levels (kg/ha)								
F1		50:30:20						
F2		100:60:40						
Recommended N:P:K (kg/ha)		100:60:40						
Varieties								
V1		IET 27937						
V2		IET 28631						
V3		IET 28645						
V4		IET 27951						
V5		-						
V6		AAUDR-1						
V7		-						
V8		Local Check-Indira aerobic -1 (115 Days)						
Available N:P:K of soil (kg/ha)		209:22:368						

Table 4.1(k): (Contd.)

F-levels	Varieties	VADGAON						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	-	-	-	-	-	-	
	V2	3.97	6	232	3.57	20.5	96	
	V3	4.05	5	237	3.64	20.5	97	
	V4	3.82	7	223	3.44	20.1	95	
	V5	-	-	-	-	-	-	
	V6	-	-	-	-	-	-	
	V7	-	-	-	-	-	-	
	V8	3.75	8	219	3.37	21.7	96	
F2	V1	-	-	-	-	-	-	-
	V2	5.46	2	320	4.91	21.0	98	14.90
	V3	5.50	1	322	4.95	21.1	99	14.50
	V4	5.35	3	313	4.82	20.6	96	15.30
	V5	-	-	-	-	-	-	-
	V6	-	-	-	-	-	-	-
	V7	-	-	-	-	-	-	-
	V8	5.16	4	302	4.64	22.1	98	14.10
Interaction								
F at same V		0.09		5.29	0.08	NS	1.25	
V at same F		0.08		5.04	0.08	NS	1.48	
F1		3.90	2	228	3.51	20.71	96	
F2		5.37	1	314	4.83	21.22	98	14.70
C.D.(0.05)		0.01		0.06	0.06	0.06	0.06	
C.V.(%)		0.32		2.88	2.88	2.88	2.88	
Mean of varieties:								
V1		-	-	-	-	-	-	-
V2		4.72	2	276	4.24	20.75	97	14.90
V3		4.78	1	279	4.30	20.83	98	14.50
V4		4.59	3	268	4.13	20.37	96	15.30
V5		-	-	-	-	-	-	-
V6		-	-	-	-	-	-	-
V7		-	-	-	-	-	-	-
V8		4.46	4	260	4.01	21.90	97	14.10
C.D.(0.05)		0.06		3.74	0.06	0.27	0.89	
C.V. (%)		2.88		2.96	2.92	2.73	1.96	
Expt. Mean		**4.63**		**271**	**4.17**	**20.96**	**97**	
Soil type		-						
pH		7.80						
N - levels (kg/ha)								
F1		50:25:25						
F2		100:50:50						
Recommended N:P:K (kg/ha)		100:50:50						
Varieties								
V1		-						
V2		IET 28631						
V3		IET 28645						
V4		IET 27951						
V5		-						
V6		-						
V7		-						
V8		Local Check - Phule Samruddhi						
Available N:P:K of soil (kg/ha)		168:18:236						

Table 4.1(k): (Contd.)

F-levels	Varieties	VARANASI						Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
F1	V1	-	-	-	-	-		3.35	13
	V2	2.72	4	419	1.80	82		3.74	9
	V3	2.53	5	477	1.27	83		3.99	6
	V4	2.24	8	375	0.97	84		3.89	7
	V5	-	-	-	-	-		2.83	15
	V6	-	-	-	-	-		2.78	16
	V7	-	-	-	-	-		3.28	14
	V8	2.30	7	348	1.58	93		3.67	11
F2	V1	-	-	-	-	-	-	4.03	5
	V2	3.77	1	405	2.19	80	10.50	4.61	2
	V3	3.71	2	333	2.19	81	11.80	4.77	1
	V4	2.40	6	439	1.04	83	1.60	4.55	3
	V5	-	-	-	-	-	-	3.47	12
	V6	-	-	-	-	-	-	3.72	10
	V7	-	-	-	-	-	-	3.82	8
	V8	2.94	3	401	1.85	91	6.40	4.31	4
Interaction									
F at same V		0.20		8.37	0.30	1.18			
V at same F		0.20		8.56	0.28	1.59			
F1		2.45	2	405	1.41	86		3.76	2
F2		3.21	1	395	1.82	84	7.58	4.49	1
C.D.(0.05)		0.07		NS	0.04	NS			
C.V.(%)		5.82		2.31	5.22	3.86			
Mean of varieties:									
V1		-	-	-	-	-	-	3.69	5
V2		3.25	1	412	2.00	81	10.50	4.18	3
V3		3.12	2	405	1.73	82	11.80	4.38	1
V4		2.32	4	407	1.01	84	1.60	4.22	2
V5		-	-	-	-	-	-	3.15	8
V6		-	-	-	-	-	-	3.25	7
V7		-	-	-	-	-	-	3.55	6
V8		2.62	3	374	1.72	92	6.40	3.99	4
C.D.(0.05)		0.14		5.92	0.21	0.83			
C.V. (%)		10.8		3.17	28.00	2.10			
Expt. Mean		**2.83**		**400**	**1.61**	**85**		4.13	
Soil type		-							
pH		-							
N - levels (kg/ha)									
F1		60:30:30							
F2		120:60:60							
Recommended N:P:K (kg/ha)		120:60:60							
Varieties									
V1		-							
V2		IET 28631							
V3		IET 28645							
V4		IET 27951							
V5		-							
V6		-							
V7		-							
V8		Local Check - HUR- 3022							
Available N:P:K of soil (kg/ha)		-							

NMT 1(l) AVT-2 Biofortified

AVT-2 Biofortified cultures Viz., IET 28714 and IET 27984 were evaluated for their response to different levels of nutrients (50% and 100% RDF) on grain yield from six locations Viz., **Kaul (150:60:60), Kota (120:60:40), Nagina (120:60:40), Pusa (120:60:40), Raipur (150:60:40) and Warangal (120:60:60).** The details and data received from these locations are summarized and presented in Table 4.1(l).

Application of different nutrient levels registered significantly higher grain yield at all locations except at **Warangal**. Application of 100% RDF recorded significantly higher grain yields at **Kaul** (6.07 t/ha), **Kota** (5.00 t/ha), **Pusa** (5.21 t/ha), **Raipur** (4.54 t/ha) and **Nagina** (3.89 t/ha). Higher nutrient response was recorded with 100% RDF over 50% RDF at **Pusa** (14.84), **Nagina** (12.73) and **Kaul** (11.10) indicating higher nutrient application for better yields. The percentage mean grain yield increase was 23% with 100% RFD over 50% of the RFD application.

Grain yield differences among the tested cultures were found to be significant at all the locations. Highest grain yield was recorded by IET 28714 (5.75 t/ha) at **Kaul** and found promising over other test entries. Mean over the locations, IET 28714 (4.74 t/ha) followed by IET 27984 (4.66 t/ha) performed better and were found superior over local check – BPT 5204 (4.47 t/ha). Interaction effects among RDF x varieties was found to be non-significant at all the locations except at **Nagina** where significant interaction was noted.

In this trial, mean over the locations nutrient management with 100% had higher grain yield. IET 28714 and IET 27984 were found to be promising and recorded higher mean grain yield across the locations.

Table 4.1.1(I): Summary of data on grain yield and ancillary characters of selected NMT Biofortifed cultures grown under transplanted conditions at graded levels of recommended fertilizer doses, kharif 2021.

F-levels	Varieties	KAUL					
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1	V1	5.07	5	229	2.43	23.8	
	V2	4.43	9	228	2.07	24.8	
	V3	3.50	10	264	1.43	15.7	
	V4	4.80	7	265	1.90	27.6	
	V5	5.03	6	269	2.03	24.6	
F2	V1	6.43	2	320	2.57	24.1	10.07
	V2	6.13	4	305	2.27	24.7	12.59
	V3	4.67	8	362	1.57	15.8	8.67
	V4	6.43	2	371	2.03	27.5	12.07
	V5	6.70	1	351	2.23	24.6	12.37
Interaction							
F at same V		NS		NS	NS	NS	
V at same F		NS		NS	NS	NS	
F1		4.57	2	251	1.97	23.29	
F2		6.07	1	342	2.13	23.32	11.16
C.D.(0.05)		0.35		21.03	NS	NS	
C.V.(%)		4.18		4.52	6.71	8.49	
Mean of varieties:							
V1		5.75	2	274	2.50	23.92	10.07
V2		5.28	4	267	2.17	24.75	12.59
V3		4.09	5	313	1.50	15.74	8.67
V4		5.62	3	318	1.97	27.55	12.07
V5		5.87	1	310	2.13	24.57	12.37
C.D.(0.05)		0.57		19.02	0.15	2.19	
C.V. (%)		8.74		5.24	5.88	7.67	
Expt. Mean		**5.32**		**296**	**2.05**	**23.31**	
Soil type		Clay loam					
pH		8.00					
N - levels (kg/ha)							
F1		75:30:30					
F2		150:60:60					
Recommended N:P:K (kg/ha)		150:60:60					
Varieties							
V1		IET 28714					
V2		IET 27984					
V3		BPT 5204					
V4		IR 64					
V5		Local Check - HKR 47					
Available N:P:K of soil (kg/ha)		160:16:320					

Table 4.1.1(I): (Contd.)

F-levels	Varieties	KOTA						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	4.70	5	299	3.64	21.7	108	
	V2	4.41	7	305	3.24	24.5	98	
	V3	3.53	10	292	2.67	13.6	114	
	V4	3.56	9	266	3.17	25.1	92	
	V5	4.55	6	281	4.06	24.3	97	
F2	V1	5.40	2	316	4.03	22.5	109	6.36
	V2	5.41	1	321	3.74	25.1	98	9.09
	V3	4.40	8	311	3.14	14.8	115	7.91
	V4	4.80	4	290	3.60	25.3	91	11.27
	V5	4.97	3	297	4.49	25.4	98	3.82
Interaction								
F at same V		NS		NS	NS	NS	1.00	
V at same F		NS		NS	NS	NS	1.21	
F1		4.15	2	288	3.36	21.84	102	
F2		5.00	1	307	3.80	22.62	102	7.69
C.D.(0.05)		0.42		13.97	0.44	0.44	NS	
C.V.(%)		5.83		2.99	7.74	1.25	0.65	
Mean of varieties:								
V1		5.05	1	308	3.84	22.11	108	6.36
V2		4.91	2	313	3.49	24.79	98	9.09
V3		3.97	5	302	2.91	14.19	114	7.91
V4		4.18	4	278	3.39	25.18	92	11.27
V5		4.76	3	289	4.28	24.87	98	3.82
C.D.(0.05)		0.37		12.08	0.27	0.43	0.71	
C.V. (%)		6.62		3.31	6.16	1.57	0.57	
Expt. Mean		**4.57**		**298**	**3.58**	**22.23**	**102**	
Soil type		Clay loam						
pH		7.47						
N - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 28714						
V2		IET 27984						
V3		BPT 5204						
V4		IR 64						
V5		Local Check - PR 113 (130 Days)						
Available N:P:K of soil (kg/ha)		207:37:564						

Table 4.1.1(I): (Contd.)

F-levels	Varieties	PUSA						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	3.22	10	173	1.44	22.6	100	
	V2	3.37	9	182	1.50	22.7	103	
	V3	3.82	7	206	1.69	23.2	104	
	V4	3.93	6	210	1.78	23.2	104	
	V5	3.57	8	197	1.66	21.7	98	
F2	V1	4.75	5	223	1.85	22.9	102	13.91
	V2	5.18	3	243	1.91	23.1	105	16.45
	V3	5.36	2	255	2.23	23.3	106	14.00
	V4	5.60	1	265	2.27	23.4	106	15.18
	V5	5.18	3	245	2.15	22.2	100	14.64
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		3.58	2	194	1.61	22.67	102	
F2		5.21	1	246	2.08	23.01	104	14.84
C.D.(0.05)		0.48		23.43	0.10	0.16	1.25	
C.V.(%)		7.00		6.78	3.36	0.45	0.77	
Mean of varieties:								
V1		3.99	5	198	1.65	22.77	101	13.91
V2		4.28	4	212	1.71	22.90	104	16.45
V3		4.59	2	231	1.96	23.25	105	14.00
V4		4.77	1	238	2.03	23.30	105	15.18
V5		4.38	3	221	1.91	21.98	99	14.64
C.D.(0.05)		0.27		14.78	0.10	0.20	1.41	
C.V. (%)		4.93		5.49	4.26	0.73	1.12	
Expt. Mean		**4.40**		**220**	**1.85**	**22.84**	**103**	
Soil type		Sandy Loam						
pH		8.22						
N - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 28714						
V2		IET 27984						
V3		BPT 5204						
V4		IR 64						
V5		Local Check - Rajendra Nilam (130 Days)						
Available N:P:K of soil (kg/ha)		240:13:140						

Table 4.1.1(I): (Contd.)

F-levels	Varieties	RAIPUR						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
	V1	4.35	3	259	2.85	27.6	98	
	V2	3.79	8	233	2.83	27.2	96	
F1	V3	4.02	7	224	2.81	15.3	104	
	V4	4.12	6	231	2.46	26.3	90	
	V5							
	V1	5.10	1	280	3.06	28.2	98	7.50
	V2	4.28	4	242	3.01	27.6	96	4.90
F2	V3	4.23	5	241	3.02	15.4	104	2.10
	V4	4.56	2	249	2.86	26.6	90	4.40
	V5							
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		4.07	2	237	2.74	24.11	97	
F2		4.54	1	253	2.99	24.43	97	4.72
C.D.(0.05)		0.38		16.03	0.17	NS	NS	
C.V.(%)		5.07		3.73	3.46	2.80	0.56	
Mean of varieties:								
V1		4.73	1	270	2.96	27.89	98	7.50
V2		4.04	4	238	2.92	27.42	96	4.90
V3		4.13	3	233	2.92	15.32	104	2.10
V4		4.34	2	240	2.66	26.45	90	4.40
V5								
C.D.(0.05)		0.25		14.11	0.19	0.67	0.53	
C.V. (%)		4.56		4.58	5.40	2.20	0.44	
Expt. Mean		**4.31**		**245**	**2.86**	**24.27**	**97**	
Soil type		Vertisols						
pH		7.11						
N - levels (kg/ha)								
F1		50:30:20						
F2		100:60:40						
Recommended N:P:K (kg/ha)		100:60:40						
Varieties								
V1		IET 28714						
V2		IET 27984						
V3		BPT 5204						
V4		IR 64						
V5		-						
Available N:P:K of soil (kg/ha)		220:18:286						

Table 4.1.1(I): (Contd.)

F-levels	Varieties	WARANGAL					
		Grain Yield (t/ha)	**Rank**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1	V1	5.00	9	3.44	23.1	106	
	V2	5.60	6	3.44	27.5	112	
	V3	5.53	7	3.57	14.2	115	
	V4	4.67	10	2.32	28.5	95	
	V5	6.63	2	5.96	21.4	104	
F2	V1	5.67	5	3.78	23.3	107	6.09
	V2	6.00	3	4.04	28.0	113	3.64
	V3	6.00	3	3.95	14.3	115	4.27
	V4	5.40	8	2.69	28.5	96	6.64
	V5	7.03	1	6.16	21.8	105	3.64
Interaction							
F at same V		NS		NS	NS	NS	
V at same F		NS		NS	NS	NS	
F1		5.49	2	3.75	22.91	107	
F2		6.02	1	4.12	23.17	107	4.85
C.D.(0.05)		NS		NS	NS	NS	
C.V.(%)		7.80		9.65	1.04	0.90	
Mean of varieties:							
V1		5.34	4	3.61	23.16	107	6.09
V2		5.80	2	3.74	27.72	113	3.64
V3		5.77	3	3.76	14.25	115	4.27
V4		5.04	5	2.51	28.49	96	6.64
V5		6.83	1	6.06	21.60	105	3.64
C.D.(0.05)		0.93		0.88	0.69	0.68	
C.V. (%)		13.16		18.25	2.44	0.52	
Expt. Mean		**5.75**		**3.94**	**23.04**	**107**	
Soil type		Clay Loam					
pH		7.30					
N - levels (kg/ha)							
F1		60:30:20					
F2		120:60:40					
Recommended N:P:K (kg/ha)		120:60:40					
Varieties							
V1		IET 28714					
V2		IET 27984					
V3		BPT 5204					
V4		IR 64					
V5		Local Check - WGL 739 (135 Days)					
Available N:P:K of soil (kg/ha)		160:60:340					

Table 4.1.1(I): (Contd.)

F-levels	Varieties	NAGINA							Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
	V1	2.68	6	216	3.54	25.3	89		4.17	7
	V2	2.83	5	232	3.65	27.8	90		4.07	8
F1	V3	2.09	8	196	3.20	21.9	103		3.75	10
	V4	2.36	7	210	3.43	25.6	92		3.91	9
	V5								4.95	5
	V1	4.50	1	319	3.72	25.6	90	16.55	5.31	2
	V2	4.45	2	320	3.77	27.9	90	14.73	5.24	3
F2	V3	3.23	4	260	3.50	24.2	103	10.36	4.65	6
	V4	3.38	3	266	3.51	25.9	92	9.27	5.03	4
	V5							0.00	5.97	1
Interaction										
F at same V		0.16		17	0.02	0.06	NS			
V at same F		0.19		28	0.03	0.08	NS			
F1		2.49	2	214	3.46	25.15	93		4.06	2
F2		3.89	1	291	3.63	25.89	94	12.73	5.12	1
C.D.(0.05)		0.17		31	0.03	0.08	NS			
C.V.(%)		3.07		7	0.55	0.17	1			
Mean of varieties:										
V1		3.59	2	268	3.63	25.46	90	16.55	4.74	2
V2		3.64	1	276	3.71	27.83	90	14.73	4.66	3
V3		2.66	4	228	3.35	23.06	103	10.36	4.20	5
V4		2.87	3	238	3.47	25.74	92	9.27	4.47	4
V5									5.46	1
C.D.(0.05)		0.11		12	0.02	0.04	1			
C.V. (%)		2.81		4	0.36	0.13	1			
Expt. Mean		**3.19**		**252**	**3.54**	**25.52**	**94**		4.59	
Soil type		Vertisols								
pH		7.11								
N - levels (kg/ha)										
F1		60:30:20								
F2		120:60:40								
Recommended N:P:K (kg/ha)		120:60:40								
Varieties										
V1		IET 28714								
V2		IET 27984								
V3		BPT 5204								
V4		IR 64								
V5		-								
Available N:P:K of soil (kg/ha)		21:18:209								

4.1(m) NMT – AVT 2 MS

Five entries (IET 28757, IET 28746 and IET 28730) of medium slender group were evaluated for their response to two levels of nutrients (50% and 100% RDF) on grain yield at nine different locations i.e., **ARI-Rajendranagar (120:60:40), Dhangain (120:60:40), Faizabad (120:60:40), Karjat (100:50:50), Kaul (150:60:60), Mandya (100:50:50), Maruteru (90:60:60), Nagina (120:60:40)** and **Raipur (120:60:40)**. The details and data received from these locations are summarized and presented in Table 4.1 (m).

RDF doses significantly influenced the grain yield at seven locations (**except Mandya and Maruteru)** and the significant increase in grain yield was observed with 100% RDF at all the locations. Application of 100% RDF recorded higher grain yield at **ARI-Rajendranagar** (6.59 t/ha), **Dhangain** (6.19 t/ha), **Faizabad** (4.64t/ha), **Karjat** (3.90 t/ha), **Kaul** (6.47 t/ha), **Nagina** (4.38 t/ha) and **Raipur** (5.61 t/ha). Average over the locations, higher mean grain yield of 5.52 t/ha was recorded with 100% RDF with 33% higher yield over 50% of RFD. Higher nutrient response was (kg grain/kg nutrient) recorded with 100% RDF at **ARI-Rajendranaar** (24.29), **Nagina** (17.62) and **Karjat** (12.53) over other centres.

Grain yield differences among the tested varieties were found to be significant at all the locations EXCEPT Maruteru and Nagina.. Significantly higher mean maximum grain yield was recorded by IET 28757 at **Dhangain** (6.30 t/ha), **Maruteru** (4.44 t/ha), **Raipur** (5.98 t/ha) and **Nagina** (3.71 t/ha) while IET 27830 at **Karjat** (3.73 t/ha), **Kaul** (6.59 t/ha) and **Raipur** (6.66 t/ha). The interaction effect between fertilizer levels and varieties was found to be non-significant at all the locations except at **Faizabad and Nagina** only. Mean over the locations, cultivar IET 28730 (5.03 t/ha) followed by IET 28746 (4.82 t/ha) were found to be promising at 100% RDF application and recorded better yields over other test entries.

In this trial, application of 100% RDF was found to be promising (33% higher yield) and also exhibited higher nutrient response. Entries like IET 28730 and IET 2746 were found to be promising with better yields over other test entries and checks at 100% of RDF application at respective locations.

Table 4.1(m): Summary of data on grain yield and ancillary characters of selected NMT MS cultures grown under transplanted conditions at graded level of fertilizer doses, kharif 2021.

F-levels	Varieties	ARI-RAJENDRANAGAR						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: Low input (50% NPK)	V1	3.70	13	260	2.49	23.6	102	
	V2	4.07	9	315	2.43	17.4	99	
	V3	3.73	12	268	2.52	21.5	88	
	V4	4.67	8	317	2.63	20.7	100	
	V5	4.03	10	307	2.65	19.1	102	
	V6	-	-	-	-	-	-	
	V7	3.20	14	216	2.16	18.3	100	
	V8	4.00	11	287	2.62	27.2	90	
F2: Optimum input (100% NPK)	V1	7.43	2	377	3.34	24.1	105	33.91
	V2	6.97	3	373	3.03	18.4	106	26.36
	V3	5.83	6	334	2.91	22.6	91	19.09
	V4	7.67	1	470	3.50	21.3	103	27.27
	V5	5.60	7	331	2.90	19.2	110	14.27
	V6	-	-	-	-	-	-	-
	V7	5.87	5	349	2.94	19.1	103	24.27
	V8	6.73	4	369	2.98	27.5	93	24.82
Interaction								
F at same V		NS		53.73	NS	0.34	2.15	
V at same F		NS		58.07	NS	0.6	2.08	
F1		3.91	2	281	2.50	21.13	97	
F2		6.59	1	372	3.09	21.73	101	24.29
C.D.(0.05)		0.78		38.22	0.45	NS	0.74	
C.V.(%)		11.23		8.81	12.06	2.34	0.56	
Mean of varieties:								
V1		5.57	2	319	2.92	23.87	104	33.91
V2		5.52	3	344	2.73	17.89	103	26.36
V3		4.78	6	301	2.72	22.07	89	19.09
V4		6.17	1	394	3.07	20.99	101	27.27
V5		4.82	5	319	2.78	19.14	106	14.27
V6		-	-	-	-	-	-	-
V7		4.54	7	283	2.55	18.72	102	24.27
V8		5.37	4	328	2.80	27.35	92	24.82
C.D.(0.05)		0.65		37.99	0.29	0.24	1.52	
C.V. (%)		10.47		9.76	8.71	0.94	1.29	
Expt. Mean		**5.25**		**327**	**2.79**	**21.43**	**99**	
Soil type		Clay loam						
pH		-						
F - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recmnd N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 28757						
V2		IET 28746						
V3		IET 28730						
V4		WGL 14 (NC 1)						
V5		BPT 5204 (NC 2)						
V6		-						
V7		Karjat-6 (W)						
V8		Local Check - JGL24423						
Avalb NPK of soil (kg/ha)		188:100:433						

Table 4.1(m): (Contd.)

F-levels	Varieties	DHANGAIN						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input (50% NPK)	V1	5.57	7	343	5.83	19.0	116	
	V2	4.56	11	330	5.53	14.0	102	
	V3	4.97	8	325	5.34	16.3	86	
	V4	4.63	10	323	4.77	15.3	103	
	V5	4.24	13	304	3.45	14.3	106	
	V6	4.45	12	322	4.27	14.7	106	
	V7	-	-	-	-	-	-	
	V8	3.10	14	288	3.23	12.7	110	
F2: Optimum input (100% NPK)	V1	7.02	1	353	6.37	21.0	117	13.18
	V2	6.47	2	335	6.35	14.3	103	17.36
	V3	6.47	2	331	6.17	17.0	87	13.64
	V4	6.45	4	327	5.30	16.0	104	16.55
	V5	5.84	6	316	3.97	15.0	106	14.55
	V6	6.45	4	325	5.21	15.0	106	18.18
	V7	-	-	-	-	-	-	-
	V8	4.65	9	312	3.97	13.7	111	14.09
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		4.50	2	319	4.63	15.19	104	
F2		6.19	1	328	5.33	16.00	105	15.36
C.D.(0.05)		0.27		NS	0.42	0.2	0.74	
C.V.(%)		3.78		6.41	6.32	0.99	0.53	
Mean of varieties:								
V1		6.30	1	348	6.10	20.00	116	13.18
V2		5.52	4	332	5.94	14.17	103	17.36
V3		5.72	2	328	5.76	16.67	86	13.64
V4		5.54	3	325	5.04	15.67	104	16.55
V5		5.04	6	310	3.71	14.67	106	14.55
V6		5.45	5	323	4.74	14.84	106	18.18
V7		-	-	-	-	-	-	-
V8		3.88	7	300	3.60	13.17	110	14.09
C.D.(0.05)		0.31		NS	0.88	1.18	0.47	
C.V. (%)		4.9		7.54	14.79	6.37	0.38	
Expt. Mean		**5.35**		**324**	**4.98**	**15.60**	**104**	
Soil type		Clay loam						
pH		6.60						
F - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 28757						
V2		IET 28746						
V3		IET 28730						
V4		WGL 14 (NC 1)						
V5		BPT 5204 (NC 2)						
V6		Improved Samba Mahsuri (N, E & C)						
V7		-						
V8		Local Check - R.Sweta (140 Days)						
Available N:P:K of soil (kg/ha)		252:42:189						

Table 4.1(m): (Contd.)

F-levels	Varieties	FAIZABAD						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input (50% NPK)	V1	2.70	12	221	2.74	15.4	107	
	V2	4.43	6	212	3.36	14.1	111	
	V3	4.40	7	237	3.40	18.3	111	
	V4	4.93	4	223	3.10	17.3	108	
	V5	3.50	9	252	2.42	15.2	113	
	V6	3.43	10	210	2.64	17.3	109	
	V7	-	-	-	-	-	-	
	V8	-	-	-	-	-	-	
F2: Optimum input (100% NPK)	V1	3.33	11	266	3.03	17.3	113	5.25
	V2	5.18	2	268	3.70	15.5	115	6.25
	V3	4.90	5	274	4.07	20.2	116	4.17
	V4	5.30	1	276	3.63	18.9	114	3.08
	V5	4.00	8	289	2.90	16.5	116	4.17
	V6	5.13	3	242	2.80	18.5	113	14.17
	V7	-	-	-	-	-	-	-
	V8							
Interaction								
F at same V		0.41		NS	NS	NS	NS	
V at same F		0.37		NS	NS	NS	NS	
F1		3.90	2	226	2.94	16.26	110	
F2		4.64	1	269	3.36	17.81	115	6.18
C.D.(0.05)		0.04		8.15	NS	1.09	1.91	
C.V.(%)		0.59		2.29	9.55	4.45	1.19	
Mean of varieties:								
V1		3.02	6	244	2.89	16.35	110	5.25
V2		4.81	2	240	3.53	14.82	113	6.25
V3		4.65	3	256	3.74	19.25	113	4.17
V4		5.12	1	250	3.37	18.07	111	3.08
V5		3.75	5	271	2.66	15.85	115	4.17
V6		4.28	4	226	2.72	17.89	111	14.17
V7		-	-	-	-	-	-	-
V8		-	-	-	-	-	-	-
C.D.(0.05)		0.29		10.14	0.29	0.54	1.74	
C.V. (%)		5.62		3.4	7.54	2.65	1.28	
Expt. Mean		**4.27**		**247**	**3.15**	**17.04**	**112**	
Soil type		Sandy Loam						
pH		7.60						
F - levels (kg/ha)								
F1		60:30:30						
F2		120:60:60						
Recommended N:P:K (kg/ha)		120:60:60						
Varieties								
V1		IET 28757						
V2		IET 28746						
V3		IET 28730						
V4		WGL 14 (NC 1)						
V5		BPT 5204 (NC 2)						
V6		Improved Samba Mahsuri (N, E & C)						
V7		-						
V8		-						
Available N:P:K of soil (kg/ha)		200:24:234						

Table 4.1(m): (Contd.)

F-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: Low input (50% NPK)	V1	2.42	12	177	1.89	21.7	104	
	V2	3.07	8	187	2.11	24.6	98	
	V3	3.24	7	217	2.27	26.2	88	
	V4	2.86	11	174	1.92	22.4	106	
	V5	-	-	-	-	-	-	
	V6	2.95	10	185	1.99	22.9	101	
	V7	2.99	9	182	2.05	24.4	106	
	V8	-	-	-	-	-	-	
F2: Optimum input (100% NPK)	V1	3.49	6	213	2.04	23.9	106	10.70
	V2	4.13	2	240	2.45	27.1	99	10.60
	V3	4.21	1	253	2.55	27.4	88	9.70
	V4	3.79	5	218	2.11	24.9	105	9.30
	V5	-	-	-	-	-	-	-
	V6	3.83	4	234	2.21	25.4	102	8.80
	V7	3.96	3	237	2.35	26.2	107	9.70
	V8	-	-	-	-	-	-	-
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		2.92	2	187	2.04	23.7	101	
F2		3.90	1	233	2.29	25.8	101	9.80
C.D.(0.05)		0.22		20.8	0.18	1.68	NS	
C.V.(%)		4.51		6.91	5.91	4.74	0.92	
Mean of varieties:								
V1		2.96	6	195	1.97	22.8	105	10.70
V2		3.60	2	214	2.28	25.8	98	10.60
V3		3.73	1	235	2.41	26.8	88	9.70
V4		3.33	5	196	2.02	23.7	106	9.30
V5		-	-	-	-	-	-	-
V6		3.39	4	210	2.10	24.1	102	8.80
V7		3.48	3	209	2.20	25.3	106	9.70
V8		-	-	-	-	-	-	-
C.D.(0.05)		0.36		30.16	0.19	1.87	1.19	
C.V. (%)		8.88		11.94	7.38	6.27	0.98	
Expt. Mean		**3.41**		**210**	**2.16**	**24.7**	**101**	
Soil type		-						
pH		-						
F - levels (kg/ha)								
F1		50:25:25						
F2		100:50:50						
Recommended N:P:K (kg/ha)		100:50:50						
Varieties								
V1		IET 28757						
V2		IET 28746						
V3		IET 28730						
V4		WGL 14 (NC 1)						
V5		-						
V6		Improved Samba Mahsuri (N, E & C)						
V7		Karjat-6 (W)						
V8		-						
Available N:P:K of soil (kg/ha)		-						

Table 4.1(m): (Contd.)

F-levels	Varieties	KAUL						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input (50% NPK)	V1	3.07	10	216	1.57	14.7	126	
	V2	5.37	6	296	2.00	16.0	110	
	V3	5.87	5	234	2.80	19.2	98	
	V4	4.70	8	281	1.90	16.5	115	
	V5	-	-	-	-	-	-	
	V6	4.90	7	291	1.87	14.6	121	
	V7	-	-	-	-	-	-	
	V8	-	-	-	-	-	-	
F2: Optimum input (100% NPK)	V1	4.57	9	309	1.70	14.6	126	11.11
	V2	7.40	1	396	2.13	16.6	110	15.04
	V3	7.30	2	302	2.97	20.0	98	10.59
	V4	6.70	3	366	2.03	16.4	115	14.81
	V5	-	-	-	-	-	-	-
	V6	6.40	4	360	2.03	14.6	121	11.11
	V7	-	-	-	-	-	-	-
	V8							
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		4.78	2	264	2.03	16.2	114	
F2		6.47	1	347	2.17	16.4	114	12.53
C.D.(0.05)		0.48		11.38	NS	NS	NS	
C.V.(%)		5.4		2.37	5.29	8.71	0	
Mean of varieties:								
V1		3.82	5	263	1.64	14.7	126	11.11
V2		6.39	2	346	2.07	16.3	110	15.04
V3		6.59	1	268	2.89	19.6	98	10.59
V4		5.70	3	324	1.97	16.4	115	14.81
V5		-	-	-	-	-	-	-
V6		5.65	4	326	1.95	14.6	121	11.11
V7		-	-	-	-	-	-	-
V8		-	-	-	-	-	-	-
C.D.(0.05)		0.45		22.26	0.15	1.64	0	
C.V. (%)		6.55		5.96	5.75	8.19	0	
Expt. Mean		**5.63**		**305**	**2.10**	**16.3**	**114**	
Soil type		Clay loam						
pH		8.00						
F - levels (kg/ha)								
F1		75:30:30						
F2		150:60:60						
Recommended N:P:K (kg/ha)		150:60:60						
Varieties								
V1		IET 28757						
V2		IET 28746						
V3		IET 28730						
V4		WGL 14 (NC 1)						
V5		-						
V6		Improved Samba Mahsuri (N, E & C)						
V7		-						
V8		-						
Available N:P:K of soil (kg/ha)		160:16:320						

Table 4.1(m): (Contd.)

F-levels	Varieties	MANDYA						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: Low input (50% NPK)	V1	5.25	5	283	4.48	27.6	97	
	V2	5.11	8	330	3.82	19.8	90	
	V3	6.21	3	313	4.77	19.9	83	
	V4	3.93	12	328	3.43	20.8	96	
	V5	-	-	-	-	-	-	
	V6	4.85	10	349	2.77	16.9	92	
	V7	-	-	-	-	-	-	
	V8	4.76	11	318	2.78	17.8	93	
F2: Optimum input (100% NPK)	V1	6.42	2	321	4.94	27.5	96	11.70
	V2	5.84	4	338	4.55	18.8	91	7.30
	V3	7.10	1	335	5.02	20.0	83	8.90
	V4	5.21	7	345	3.78	21.3	96	12.80
	V5	-	-	-	-	-	-	-
	V6	5.04	9	363	2.55	16.9	90	1.90
	V7	-	-	-	-	-	-	-
	V8	5.25	5	327	2.84	17.9	93	4.90
Interaction								
F at same V		NS		NS	NS	NS	NS	
V at same F		NS		NS	NS	NS	NS	
F1		5.02	2	320	3.68	20.5	92	
F2		5.81	1	338	3.95	20.4	92	7.92
C.D.(0.05)		NS		NS	NS	NS	NS	
C.V.(%)		24.06		13	7.04	2.38	1.42	
Mean of varieties:								
V1		5.84	2	302	4.71	27.5	96	11.70
V2		5.48	3	334	4.19	19.3	90	7.30
V3		6.66	1	324	4.90	20.0	83	8.90
V4		4.57	6	336	3.61	21.0	96	12.80
V5		-	-	-	-	-	-	-
V6		4.95	5	356	2.66	16.9	91	1.90
V7		-	-	-	-	-	-	-
V8		5.01	4	323	2.81	17.9	93	4.90
C.D.(0.05)		0.78		37.39	0.55	1.46	1.24	
C.V. (%)		11.96		9.43	11.91	5.94	1.12	
Expt. Mean		**5.41**		**329**	**3.81**	**20.4**	**92**	
Soil type		Red sandy loam						
pH		7.22						
F - levels (kg/ha)								
F1		50:25:25						
F2		100:50:50						
Recommended N:P:K (kg/ha)		100:50:50						
Varieties								
V1		IET 28757						
V2		IET 28746						
V3		IET 28730						
V4		WGL 14 (NC 1)						
V5		-						
V6		Improved Samba Mahsuri (N, E & C)						
V7		-						
V8		Local Check - MSN 99						
Available N:P:K of soil (kg/ha)		245:114:254						

Table 4.1(m): (Contd.)

F-levels	Varieties	MARUTERU				
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input (50% NPK)	V1	3.95	3	216	4.25	
	V2	3.41	7	193	3.36	
	V3	3.67	6	218	3.70	
	V4	3.24	8	200	3.61	
	V5	-	-	-	-	
	V6	-	-	-	-	
	V7	-	-	-	-	
	V8	-	-	-	-	
F2: Optimum input (100% NPK)	V1	4.93	1	266	4.97	9.33
	V2	3.85	5	247	4.43	4.19
	V3	4.82	2	241	3.84	10.95
	V4	3.94	4	221	3.89	6.67
	V5	-	-	-	-	-
	V6	-	-	-	-	-
	V7	-	-	-	-	-
	V8	-	-	-	-	-
Interaction						
F at same V		NS		NS	NS	
V at same F		NS		NS	NS	
F1		3.57	2	207	3.73	
F2		4.39	1	244	4.28	7.79
C.D.(0.05)		NS		NS	NS	
C.V.(%)		18.18		17.60	7.86	
Mean of varieties:						
V1		4.44	1	241	4.61	9.33
V2		3.63	3	220	3.90	4.19
V3		4.25	2	230	3.77	10.95
V4		3.59	4	210	3.75	6.67
V5		-	-	-	-	-
V6		-	-	-	-	-
V7		-	-	-	-	-
V8		-	-	-	-	-
C.D.(0.05)		NS		16.33	NS	
C.V. (%)		16.55		5.76	21.13	
Expt. Mean		**3.98**		**225**	**4.01**	
Soil type		-				
pH		-				
F - levels (kg/ha)						
F1		45:30:30				
F2		90:60:60				
Recommended N:P:K (kg/ha)		90:60:60				
Varieties						
V1		IET 28757				
V2		IET 28746				
V3		IET 28730				
V4		WGL 14 (NC 1)				
V5		-				
V6		-				
V7		-				
V8		-				
Available N:P:K of soil (kg/ha)		-				

Table 4.1(m): (Contd.)

F-levels	Varieties	NAGINA						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days 50% flowering**	**Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)**
F1: Low input (50% NPK)	V1	2.66	6	218	2.54	24.3	100	
	V2	2.43	8	215	2.48	24.9	101	
	V3	2.56	7	226	2.65	24.9	104	
	V4	2.25	10	200	2.20	21.9	101	
	V5	-	-	-	-	-	-	
	V6	2.29	9	205	2.13	22.5	100	
	V7	-	-	-	-	-	-	
	V8	-	-	-	-	-	-	
F2: Optimum input (100% NPK)	V1	4.74	1	317	2.72	23.6	100	18.91
	V2	4.61	3	305	2.63	24.2	101	19.82
	V3	4.70	2	309	2.77	25.9	104	19.45
	V4	3.96	4	266	2.50	22.2	102	15.55
	V5	-	-	-	-	-	-	-
	V6	3.87	5	271	2.16	23.2	101	14.36
	V7	-	-	-	-	-	-	-
	V8	-	-	-	-	-	-	-
Interaction								
F at same V		0.25		17.73	0.03	0.63	1.06	
V at same F		0.27		16.01	0.04	0.72	1.81	
F1		2.44	2	213	2.40	23.7	101	
F2		4.38	1	294	2.56	23.8	102	17.62
C.D.(0.05)		0.19		2.77	0.04	NS	NS	
C.V.(%)		3.52		0.70	1.11	1.51	1.26	
Mean of varieties:								
V1		3.70	1	268	2.63	24.0	100	18.91
V2		3.52	3	260	2.56	24.6	101	19.82
V3		3.63	2	268	2.71	25.4	104	19.45
V4		3.11	4	233	2.35	22.1	102	15.55
V5		-	-	-	-	-	-	-
V6		3.08	5	238	2.15	22.9	101	14.36
V7		-	-	-	-	-	-	-
V8		-	-	-	-	-	-	-
C.D.(0.05)		NS		12.54	NS	NS	NS	
C.V. (%)		4.29		4.04	0.70	1.54	0.60	
Expt. Mean		**3.41**		**253**	**2.48**	**23.8**	**101**	
Soil type		-						
pH		7.70						
F - levels (kg/ha)								
F1		60:30:20						
F2		120:60:40						
Recommended N:P:K (kg/ha)		120:60:40						
Varieties								
V1		IET 28757						
V2		IET 28746						
V3		IET 28730						
V4		WGL 14 (NC 1)						
V5		-						
V6		Improved Samba Mahsuri (N, E & C)						
V7		-						
V8		-						
Available N:P:K of soil (kg/ha)		21:18:209						

Table 4.1(m): (Contd.)

F-levels	Varieties	RAIPUR							Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
F1: Low input (50% NPK)	V1	5.74	3	193	4.33	19.2	96		3.90	14
	V2	4.45	11	183	3.99	14.1	97		4.10	11
	V3	5.07	8	185	3.46	16.2	98		4.41	9
	V4	4.71	10	183	3.63	16.5	95		3.99	12
	V5	-	-	-	-	-	-		3.92	13
	V6	4.25	12	224	3.09	15.1	98		3.87	15
	V7	-	-	-	-	-	-		3.10	16
	V8	5.73	4	224	4.46	25.2	98		4.40	10
F2: Optimum input (100% NPK)	V1	6.21	1	215	4.74	20.2	96	4.27	5.35	5
	V2	5.48	6	212	4.41	14.2	97	9.36	5.55	3
	V3	5.43	7	195	4.93	16.5	99	3.27	5.64	2
	V4	5.54	5	218	4.11	16.7	95	7.55	5.40	4
	V5	-	-	-	-	-	-	-	5.15	6
	V6	5.02	9	243	3.49	15.3	99	7.00	5.11	7
	V7	-	-	-	-	-	-	-	4.92	8
	V8	5.97	2	236	4.72	25.4	98	2.18	5.65	1
Interaction										
F at same V		NS		NS	NS	NS	NS			
V at same F		NS		NS	NS	NS	NS			
F1		4.99	2	199	3.83	17.7	97		4.00	2
F2		5.61	1	220	4.40	18.1	97	5.61	5.33	1
C.D.(0.05)		0.42		13.42	0.52	NS	NS			
C.V.(%)		5.50		4.47	8.80	1.87	0.62			
Mean of varieties:										
V1		5.98	1	204	4.54	19.7	96	4.27	4.62	5
V2		4.97	5	197	4.20	14.2	97	9.36	4.82	3
V3		5.25	3	190	4.20	16.3	99	3.27	5.03	1
V4		5.13	4	200	3.87	16.6	95	7.55	4.69	4
V5		-	-	-	-	-	-	-	4.54	6
V6		4.64	6	234	3.29	15.2	99	7.00	4.49	7
V7		-	-	-	-	-	-	-	4.01	8
V8		5.85	2	230	4.59	25.3	98	2.18	5.02	2
C.D.(0.05)		0.34		16.19	0.42	0.53	0.57			
C.V. (%)		5.28		6.43	8.53	2.48	0.49			
Expt. Mean		**5.30**		**209**	**4.11**	**17.9**	**97**		4.67	
Soil type		Vertisols								
pH		7.11								
F - levels (kg/ha)										
F1		60:30:20								
F2		120:60:40								
Recommended N:P:K (kg/ha)		120:60:40								
Varieties										
V1		IET 28757								
V2		IET 28746								
V3		IET 28730								
V4		WGL 14 (NC 1)								
V5		-								
V6		Improved Samba Mahsuri (N, E & C)								
V7		-								
V8		Local Check - Arise 6444 (135 Days)								
Available N:P:K of soil (kg/ha)		220:18:286								

4.1n(i) NMT – NIL - IVT LNT

Evaluation of identified cultures and cultivars for enhancing nitrogen use efficiency in irrigated rice

The productivity of rice is very low due to imbalanced and excessive use of nitrogen fertilizers by the farmers. It has been reported that the apparent recovery efficiency of applied nitrogen is approximately about 30-33% whereas, the remaining amount of N is either lost through surface runoff, leaching, volatilization or denitrification and further adds to increased cost of production and environmental degradation. The use of efficient and economical rates of nitrogen fertilizer is important for enhancing crop productivity and maintaining environmental sustainability. To achieve this, it is imperative to identify high nitrogen efficient cultivars which can minimize the losses. Large numbers of rice cultivars have been released in India so far, but the question is that whether these cultivars are capable of utilizing the nitrogen efficiently and there by enhance NUE. Inter varietal differences for nitrogen use efficiency has been reported by many researchers. Therefore, there is a need to identify the cultivars which can efficiently utilize the N and to develop a sustainable nitrogen rate recommendation for these cultivars which can further give enhanced yield and resource use efficiency. Hence the present trial is constituted to evaluate the identified cultures (NIL's) and cultivars with the following objective: 1) To study the comparative performance of elite lines and cultivars under different levels of nitrogen. The trial was conducted at seven locations (**Gangavathi**, **ICAR-IIRR, Karjat, Mandya, Ranchi, Vadgaon and Ludhiana**). Split plot design was adopted with 4 main plots of nitrogen levels (N_1- No nitrogen, N_2: 50 %of recommended N dose (P and K is constant), N_3: 100 % of recommended dose of N (P and K constant) and N_4: 150% of recommended dose of N. Subplots consists of 35 advanced cultures along with seven checks. The results were summarized and presented in **Table 4.1n(i)** and the salient findings are as followed.

Interaction effect of nitrogen level and advanced cultures on grain yield was found significant at **ICAR-IIRR** and **Karjat**. However, the objective is to find out suitable and efficient cultivars under low recommended N application.

In **Gangavathi**, the cultures were evaluated at two levels of Nitrogen i.e. 50% and 100% of RDN however, there is no significant difference on grain yield. Among the cultures, the grain yield of IET 30261, IET 30272, IET 29567, IET 29584, IET 30274, IET 30271, IET 29576, IET 29577, IET 29581, IET 28084, IET 29573, IET 30258 and IET 30267 were promising interms of grain yield (3.65 t/ha to 4.35 t/ha) which were comparable to variety Swarna (4.42 t/ha).

All cultures were tested at four graded levels of N (0, 50, 100, 150% RDN) at **ICAR-IIRR**. Interaction effect of cultures vs N fertilizer was significant and 100% RDN and found significant (4.98 t/ha) over 50% (4.81 t/ha) and no Nitrogen application (2.75 t/ha). Among the cultures, IET 29583 (6.37 t/ha) followed by IET 29577 (5.52 t/ha), IET 29576 (5.44 t/ha),

IET 29564 (5.37 t/ha) and IET 29573 (5.30 t/ha) found promising and significantly superior to checks.

In clay loam soils of **Karjat,** all cultures performed better under 50% and 100% of RDN over no 'N' application. Among the cultures, IET 29584 at 100% RDN resulted the highest grain yield (5.12 t/ha) followed by IET 30268 (5.10 t/ha), IET 29583 (4.69 t/ha). Among nitrogen levels 100% RDN resulted significantly highest grain yield (4.18 t/ha) and significantly superior over 50% REN (4.04 t/ha). Among advanced cultures IET 30268 (4.78 t/ha) resulted the highest grain yield followed by IET 29584 (4.72 t/ha) and IET 29583 (4.69 t/ha) found promising across the N levels.

At **Mandya,** interaction effect of nitrogen level and advanced cultures on grain yield was non-significant. Among nitrogen levels (100% RDN and no 'N' application) resulted non-significant results due to high soil 'N' levels at this location. Among advanced cultures IET 30255 (7.02 t/ha) resulted the higher grain yield followed by IET 30261 (7.00 t/ha) at 100% of RDN. Mean over 'N' levels, the highest agronomic efficiency of N was recorded in IET 29568 (17.30) followed by IET 29572 (11.80) and IET 30256 (11.00) and found superior over checks tested.

At **Ranchi**, three levels of 'N' (0,50,100% RDN) was applied for evaluation of cultures and their response. Interaction effect of 'N' levels vs cultures was non-significant. Application of 100% RDN (4.11 t/ha) was significantly higher over 50% (3.71 t/ha) and no N application (1.67 t/ha). Mean over the 'N' levels, the culture IET 29577 (3.62 t/ha) followed by IET 29568 (3.46 t/ha), IET 29581 (3.39 t/ha), IET 30262 (3.35 t/ha), IET 29577 (3.34 t/ha) and IET 29584 (3.33 t/ha) were found promising and found better than checks.

At **Vadagaon**, the cultures were evaluated at three levels of N application (0, 50 and 100% of RDN). Interaction effect was significant and most of the cultures recorded significantly higher grain yield at maximum RDN (100% RDN). Application of 100% RDN gave significantly maximum grain of 5.01 t/ha over 50% RDN (3.99 t/ha) and no 'N' application (3.11 t/ha). Among the cultures, IET 30268 (4.57 t/ha) followed by IET 28084 (4.54 t/ha), IET 29584 & IET 30270 (4.48 t/ha) and IET 30266 (4.40 t/ha) found promising with higher yields.

At **Ludhiana**, the total bio-mass is reported and cultures tested at three levels of N application (0, 50, 100% RDN). The interaction effect was significant and most of the cultures recorded significantly higher grain yield at 100% of RDN. Application of 100% RDN gave significantly higher Biomass of (9.44 t/ha) over 50% RDN (7.71 t/ha). Among the cultures, IET 30273 (13.05 t/ha) followed by IET 30261 (11.38 t/ha) which were comparable with MTU 1121 (RP) (11.05 t/ha) in terms of Biomass yield.

Trial results compiled for six locations to identify N efficient cultivars revealed that IET 29583, IET 29584, IET 29577, IET 30261, IET 28084, IET 30275 and IET 29564 are the high yielding and high nitrogen use efficient cultivars and promising over other cultures across the locations.

Table 4.1(n(i)): Summary of data on grain yield and ancillary characters of selected NIL LNT IVT cultures grown under transplanted conditions at graded levels of recommended N fertilizer doses, kharif 2021.

N-levels	Varieties	GANGAVATHI					
		Grain Yield (t/ha)	*Rank*	Panicle/m^2 (No.)	Panicle wt (g)	Test wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 50% RDN)
N1: No nitrogen (Control) (P and K is constant)	V1	-		-	-	-	
	V2	-		-	-	-	
	V3	-		-	-	-	
	V4	-		-	-	-	
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	-		-	-	-	
	V11	-		-	-	-	
	V12	-		-	-	-	
	V13	-		-	-	-	
	V14	-		-	-	-	
	V15	-		-	-	-	
	V16	-		-	-	-	
	V17	-		-	-	-	
	V18	-		-	-	-	
	V19	-		-	-	-	
	V20	-		-	-	-	
	V21	-		-	-	-	
	V22	-		-	-	-	
	V23	-		-	-	-	
	V24	-		-	-	-	
	V25	-		-	-	-	
	V26	-		-	-	-	
	V27	-		-	-	-	
	V28	-		-	-	-	
	V29	-		-	-	-	
	V30	-		-	-	-	
	V31	-		-	-	-	
	V32	-		-	-	-	
	V33	-		-	-	-	
	V34	-		-	-	-	
	V35	-		-	-	-	
	V36	-		-	-	-	
	V37	-		-	-	-	
	V38	-		-	-	-	
	V39	-		-	-	-	
	V40	-		-	-	-	
	V41	-		-	-	-	
	V42	-		-	-	-	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	GANGAVATHI					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 50% RDN)
N2: 50% of recommended N dose (P and K is constant)	V1	4.16	*9*	311.36	1.6	21.66	
	V2	3.58	*30*	208.5	3.15	21.54	
	V3	4.01	*14*	238	2.03	19.51	
	V4	3.88	*16*	219.5	3.6	17.14	
	V5	3.28	*43*	201.55	2.22	19.47	
	V6	4.07	*12*	301.63	2.72	21.42	
	V7	-		-	-	-	
	V8	4.55	*3*	314.14	2.39	25.74	
	V9	3.5	*34*	243.25	2.61	17.34	
	V10	3.73	*24*	273.83	1.81	21.64	
	V11	-		-	-	-	
	V12	3.1	*50*	251.5	2.08	16.04	
	V13	3.27	*46*	237.69	2.6	16.5	
	V14	2.75	*65*	290.51	1.53	16.67	
	V15	3.08	*52*	201.55	2.76	22.01	
	V16	3.3	*40*	299.5	1.8	21.61	
	V17	2.63	*69*	345	1.64	15.91	
	V18	2.69	*67*	225.5	1.03	20.21	
	V19	3.73	*24*	210	3.3	22.24	
	V20	3.1	*50*	189.04	2.03	23.11	
	V21	3.28	*43*	244.64	1.53	27.27	
	V22	4.13	*10*	229.4	2.82	19.51	
	V23	3.63	*28*	229.35	2	19.35	
	V24	3.45	*36*	261.32	1.61	18.93	
	V25	1.98	*77*	236.27	1.11	15.04	
	V26	-		-	-	-	
	V27	2.86	*61*	261.32	1.32	18.57	
	V28	3.69	*26*	289.12	2.09	20.19	
	V29	3.65	*27*	297.46	3.01	20.83	
	V30	4.01	*14*	323.87	2.09	18.47	
	V31	3.3	*40*	322.7	2.31	18.85	
	V32	2.6	*70*	250.2	1.79	19.13	
	V33	3.12	*49*	350	1.95	20.99	
	V34	3.08	*52*	225.18	1.79	22.12	
	V35	4.11	*11*	240.28	2.73	18.64	
	V36	4.07	*12*	244.64	3.19	19.92	
	V37	3.27	*46*	290.51	2.88	20.8	
	V38	3.55	*33*	272	1.59	24.7	
	V39	2.43	*73*	304.43	2.04	20.12	
	V40	3.57	*31*	305.76	1.43	14.84	
	V41	4.42	*6*	273.68	1.88	19.64	
	V42	4.51	*4*	287.73	1.99	19.08	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	GANGAVATHI					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 50% RDN)
N3: 100% of recommended N dose	V1	4.25	*8*	259.93	1.67	21.34	1.20
	V2	3.78	*20*	264.5	3.79	20.83	2.67
	V3	3.85	*17*	282.5	2.39	18.77	-2.13
	V4	3.81	*19*	226.57	2.79	17.51	-0.93
	V5	2.88	*60*	220	2.61	19.36	-5.33
	V6	3.32	*39*	243.5	3.28	21.07	-10.00
	V7	-		-	-	-	
	V8	3.77	*21*	300.5	2.75	25.78	-10.40
	V9	3.77	*21*	301.5	2.5	17.36	3.60
	V10	3.83	*18*	326.5	1.85	21.1	1.33
	V11	-		-	-	-	
	V12	2.73	*66*	233.52	3.17	15.68	-4.93
	V13	2.84	*62*	219	2.34	15.63	-5.73
	V14	2.78	*64*	318.31	1.86	17.37	0.40
	V15	2.16	*76*	151.51	3.17	22.21	-12.27
	V16	3.62	*29*	323.87	2.69	22.81	4.27
	V17	2.9	*59*	276.61	1.97	13.6	3.60
	V18	3.16	*48*	224	3.17	19.64	6.27
	V19	3.57	*31*	210	3.79	22.02	-2.13
	V20	2.3	*74*	201.5	2.82	24.62	-10.67
	V21	3.42	*37*	259.93	2.08	22.63	1.87
	V22	4.56	*1*	205.72	3.04	18.36	5.73
	V23	4.56	*1*	322.5	3	19.65	12.40
	V24	2.53	*71*	264.22	1.66	17.67	-12.27
	V25	1.93	*78*	256	1.76	14.21	-0.67
	V26	-		-	-	-	
	V27	2.93	*57*	249	1.25	18.55	0.93
	V28	3.36	*38*	259.93	2.29	17.38	-4.40
	V29	2.97	*56*	308.5	3.81	22.4	-9.07
	V30	3.28	*43*	276.35	2.72	21.81	-9.73
	V31	2.98	*54*	292	2.26	18.38	-4.27
	V32	2.98	*54*	193	1.94	20.6	5.07
	V33	2.93	*57*	233.52	2.06	19.06	-2.53
	V34	2.82	*63*	227.96	2.4	20.76	-3.47
	V35	3.76	*23*	207.11	2.02	17.84	-4.67
	V36	4.43	*5*	252	2.46	23.9	4.80
	V37	2.68	*68*	239.5	2.96	20.3	-7.87
	V38	2.5	*72*	243	2.93	23.7	-14.00
	V39	2.2	*75*	211	3.72	19.84	-3.07
	V40	3.29	*42*	272.5	1.23	14.65	-3.73
	V41	3.5	*34*	194.5	2.32	18.05	-12.27
	V42	4.32	*7*	254.37	2.9	19.01	-2.53

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	GANGAVATHI					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 50% RDN)
N4: 150% of recommended N dose	V1	-		-	-	-	
	V2	-		-	-	-	
	V3	-		-	-	-	
	V4	-		-	-	-	
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	-		-	-	-	
	V11	-		-	-	-	
	V12	-		-	-	-	
	V13	-		-	-	-	
	V14	-		-	-	-	
	V15	-		-	-	-	
	V16	-		-	-	-	
	V17	-		-	-	-	
	V18	-		-	-	-	
	V19	-		-	-	-	
	V20	-		-	-	-	
	V21	-		-	-	-	
	V22	-		-	-	-	
	V23	-		-	-	-	
	V24	-		-	-	-	
	V25	-		-	-	-	
	V26	-		-	-	-	
	V27	-		-	-	-	
	V28	-		-	-	-	
	V29	-		-	-	-	
	V30	-		-	-	-	
	V31	-		-	-	-	
	V32	-		-	-	-	
	V33	-		-	-	-	
	V34	-		-	-	-	
	V35	-		-	-	-	
	V36	-		-	-	-	
	V37	-		-	-	-	
	V38	-		-	-	-	
	V39	-		-	-	-	
	V40	-		-	-	-	
	V41	-		-	-	-	
	V42	-		-	-	-	
Interaction							
N at same V		NS		45.85	NS	NS	
V at same N		NS		47.17	NS	NS	
F1							
F2		3.46	*1*	264	2.16	19.92	
F3		3.26	*2*	251	2.55	19.63	-2.69
F4							-
C.D.(0.05)		NS		NS	NS	NS	
C.V.(%)		26.51		4.8	10.69	1.2	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	GANGAVATHI					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 50% RDN)
Mean of varieties:							
V1	29567	4.21	*4*	286	1.64	21.50	1.20
V2	29573	3.68	*13*	237	3.47	21.19	2.67
V3	29576	3.93	*9*	260	2.21	19.14	-2.13
V4	29577	3.85	*10*	223	3.20	17.33	-0.93
V5	29564	3.08	*23*	211	2.42	19.42	-5.33
V6	28084	3.70	*12*	273	3.00	21.25	-10.00
V7	29579	-		-	-	-	
V8	29584	4.16	*5*	307	2.57	25.76	-10.40
V9	29583	3.64	*16*	272	2.56	17.35	3.60
V10	29581	3.78	*11*	300	1.83	21.37	1.33
V11	29574	-		-	-	-	
V12	29568	2.92	*31*	243	2.63	15.86	-4.93
V13	29578	3.06	*24*	228	2.47	16.07	-5.73
V14	29572	2.77	*34*	304	1.70	17.02	0.40
V15	30255	2.62	*37*	177	2.97	22.11	-12.27
V16	30256	3.46	*18*	312	2.25	22.21	4.27
V17	RP Bio 226	2.77	*34*	311	1.81	14.76	3.60
V18	30257	2.93	*30*	225	2.10	19.93	6.27
V19	30258	3.65	*14*	210	3.55	22.13	-2.13
V20	30259	2.70	*36*	195	2.43	23.87	-10.67
V21	30260	3.35	*20*	252	1.81	24.95	1.87
V22	30261	4.35	*2*	218	2.93	18.94	5.73
V23	MTU 1121 (RP)	4.10	*6*	276	2.50	19.50	12.40
V24	30262	2.99	*27*	263	1.64	18.30	-12.27
V25	30263	1.96	*39*	246	1.44	14.63	-0.67
V26	Rasi (Check)	-		-	-	-	
V27	30264	2.90	*32*	255	1.29	18.56	0.93
V28	30265	3.53	*17*	275	2.19	18.79	-4.40
V29	30266	3.31	*21*	303	3.41	21.62	-9.07
V30	30267	3.65	*15*	300	2.41	20.14	-9.73
V31	30268	3.14	*22*	307	2.29	18.62	-4.27
V32	30269	2.79	*33*	222	1.87	19.87	5.07
V33	Varadhan (Check)	3.03	*25*	292	2.01	20.03	-2.53
V34	30270	2.95	*29*	227	2.10	21.44	-3.47
V35	30271	3.94	*8*	224	2.38	18.24	-4.67
V36	30272	4.25	*3*	248	2.83	21.91	4.80
V37	30273	2.98	*28*	265	2.92	20.55	-7.87
V38	TellaHamsa (Check)	3.03	*26*	258	2.26	24.20	-14.00
V39	30274	2.32	*38*	258	2.88	19.98	-3.07
V40	BPT 5204 (Sensitive Check)	3.43	*19*	289	1.33	14.75	-3.73
V41	30275	3.96	*7*	234	2.10	18.85	-12.27
V42	Swarna	4.42	*1*	271	2.45	19.05	-2.53
	C.D.(0.05)	0.79		32.42	0.7	1.71	
	C.V.(%)	16.8		8.98	21.27	6.18	
	Expt. Mean	**3.36**		**258**	**2.35**	**19.77**	
	Soil type	Black clay					
	pH	8.2					
	N - levels (kg/ha)						
	F1	-					
	F2	75					
	F3	150					
	F4	-					
	Recommended NPK (kg/ha)	150:75:75					
	Available NPK (kg/ha)	-					

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	ICAR-IIRR							
		Grain Yield (t/ha)	*Rank*	Panicle/m ^{2} (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Grains/ panicle	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N1: No nitrogen (Control) (P and K is constant)	V1	3.16	*119*	336	16	18	98	108	
	V2	3.6	*103*	368	30.5	20.7	89.5	100.5	
	V3	3.94	*97*	336	32	15.5	106	162.5	
	V4	4.03	*95*	256	33	17.2	105.5	152.5	
	V5	3.54	*106*	304	31	18.65	108.5	161	
	V6	3.19	*118*	288	29	17.25	86	146.5	
	V7	4.2	*88*	352	30.5	18.6	90.5	181.5	
	V8	4.15	*92*	368	24.5	24.95	93.5	136.5	
	V9	3.45	*110*	464	41.5	16.95	98	222	
	V10	3.47	*109*	416	25	21.05	85	152	
	V11	2.6	*131*	416	23.5	15.75	104.5	96.5	
	V12	2.49	*140*	416	21	17.75	107.5	148	
	V13	2.04	*158*	336	25.5	16.95	96.5	186.5	
	V14	2.53	*134*	288	17.5	17.05	91.5	202	
	V15	2.5	*138*	288	35	20.8	88.5	163	
	V16	2.3	*151*	256	18.5	21.15	108.5	128.5	
	V17	2.53	*134*	288	14.5	13.85	114	172.5	
	V18	2.78	*122*	336	27.5	18.1	112.5	160.5	
	V19	2.29	*153*	336	38	19.75	105	118.5	
	V20	2.4	*147*	320	31.5	21.65	89	123.5	
	V21	1.7	*160*	304	24.5	15.05	101.5	98.5	
	V22	2.37	*148*	400	30.5	14.8	106	122.5	
	V23	4.01	*96*	288	41	19.95	97	136.5	
	V24	2.37	*148*	304	19	21.15	104.5	117.5	
	V25	2.16	*155*	320	17	14.15	106.5	178	
	V26	-		-	-	-	-	-	
	V27	1.95	*159*	480	24	15.75	106	161.5	
	V28	2.12	*157*	384	30.5	15.75	113	207.5	
	V29	2.31	*150*	368	16.5	16.9	95.5	94	
	V30	2.43	*145*	336	15.5	16.55	87	97	
	V31	2.13	*156*	352	24.5	19.45	91	148.5	
	V32	2.42	*146*	256	28.5	20.1	93	159.5	
	V33	2.26	*154*	272	17	18.95	94.5	130	
	V34	2.75	*125*	320	25	19.35	94	131	
	V35	2.44	*144*	320	16.5	25.9	83.5	129	
	V36	2.8	*121*	400	21.5	18.35	108	137	
	V37	2.59	*132*	368	18.5	19.6	87.5	148	
	V38	2.45	*143*	368	20	22.1	76.5	113	
	V39	2.46	*142*	288	18.5	18.65	99	111.5	
	V40	-		-	-	-	-	-	
	V41	2.78	*122*	272	17	16.8	107.5	94	
	V42	2.3	*151*	272	16	15.6	110.5	110	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	ICAR-IIRR							
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Grains/ panicle	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N2: 50% of recommended N dose (P and K is constant)	V1	3.82	*100*	416	19.3	18.4	94.67	103	11.00
	V2	6.07	*30*	448	32.2	22.83	84.33	198.67	41.17
	V3	5.83	*34*	455.11	34.07	18.67	104.33	182.67	31.50
	V4	6.23	*25*	387.56	35.4	17.9	102.33	151.33	36.67
	V5	6.07	*30*	465.78	34.1	18.77	105	171.33	42.17
	V6	5.3	*56*	572.44	32.83	17.67	83.67	169.33	35.17
	V7	6.14	*28*	579.56	32.47	20.27	84.33	210.33	32.33
	V8	5.15	*59*	453.33	27.4	30.93	95.33	107.33	16.67
	V9	7.3	*4*	519.11	45.5	16	101.33	246.33	64.17
	V10	4.84	*60*	430.22	25.5	21.5	84	130	22.83
	V11	5.47	*46*	568.89	25.9	17.7	106.33	124.67	47.83
	V12	5.43	*47*	419.56	24.93	18.33	103	165	49.00
	V13	6.08	*29*	615.11	27.67	17.13	94.33	220	67.33
	V14	3.33	*115*	512	24.57	17.53	87.33	211.33	13.33
	V15	5.7	*38*	487.11	38	21.3	85.33	171.33	53.33
	V16	3.51	*108*	394.67	18.8	21.43	106	100	20.17
	V17	4.43	*80*	533.33	19.97	12.93	114	178.33	31.67
	V18	3.42	*113*	421.33	26.43	20	112.33	155.33	10.67
	V19	4.44	*79*	437.33	41.1	21.5	104	180	35.83
	V20	5.5	*45*	480	34.2	22.77	84.67	134.67	51.67
	V21	3.67	*102*	416	25.4	14.53	99.67	83.33	32.83
	V22	6.24	*23*	490.67	29.97	17.97	104.33	139	64.50
	V23	6.38	*15*	544	41.27	20.8	99.33	157	39.50
	V24	4.47	*76*	506.67	21.57	22.17	92.33	114.67	35.00
	V25	4.4	*82*	442.67	20.17	14.53	105	167	37.33
	V26	-		-	-	-	-	-	
	V27	4.63	*72*	476.44	25.33	16.5	105.33	152.33	44.67
	V28	6.51	*11*	597.33	31.73	16.23	108.33	248	73.17
	V29	3.34	*114*	517.33	18.43	17.6	96	91.33	17.17
	V30	4.2	*88*	485.33	19.57	17.8	86	101.33	29.50
	V31	3.44	*112*	453.33	23.5	20.6	91	167.33	21.83
	V32	3.92	*98*	576	31.27	21.03	93.33	126.67	25.00
	V33	4.22	*86*	469.33	18.4	18.5	92.33	162	32.67
	V34	5.58	*43*	554.67	26.33	19	96	140.33	47.17
	V35	2.78	*122*	474.67	17.83	26.27	82.33	101.33	5.67
	V36	2.75	*125*	373.33	24.1	19.4	107	106.33	-0.83
	V37	5.3	*56*	634.67	22.47	21.43	83.67	141	45.17
	V38	4.35	*83*	480	19	23.23	73.33	106.33	31.67
	V39	3.29	*116*	476.44	21.53	19.07	96	111.33	13.83
	V40	-		-	-	-	-	-	
	V41	3.45	*110*	405.33	26.77	18.4	105	149	11.17
	V42	5.43	*47*	348.44	26.93	18.03	115.67	131.67	52.17

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	ICAR-IIRR							
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Grains/ panicle	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N3: 100% of recommended N dose	V1	4.47	*76*	352	17.9	18.4	92.33	106.67	10.92
	V2	6.24	*23*	384	30.77	22.97	84	208	22.00
	V3	6.55	*10*	401.78	32.13	18.83	103	186.33	21.75
	V4	6.29	*21*	376.89	35.93	20.13	101.33	159	18.83
	V5	6.5	*12*	341.33	32.77	19.37	107	181	24.67
	V6	5.34	*53*	440.89	31.5	18.07	85.33	166	17.92
	V7	5.51	*44*	412.44	31.43	19.2	83.67	222	10.92
	V8	4.11	*94*	359.11	26.1	26.77	94.67	121	-0.33
	V9	8.35	*1*	376.89	42.33	17.43	101.67	262.33	40.83
	V10	4.56	*73*	337.78	23.4	18.5	82.67	143.67	9.08
	V11	5.79	*36*	337.78	24.17	20	108	132	26.58
	V12	5.41	*50*	352	22.83	15.5	103	169.67	24.33
	V13	6.32	*19*	401.78	26.3	17.1	94	238.67	35.67
	V14	2.73	*127*	369.78	20.57	18.23	87.33	226	1.67
	V15	5.64	*40*	309.33	34.4	21.47	84.33	159	26.17
	V16	2.5	*138*	433.78	18.5	18.73	105.67	108.33	1.67
	V17	4.75	*64*	419.56	18.73	14.17	113.67	164.33	18.50
	V18	3.58	*104*	362.67	24.5	21.07	111.33	167	6.67
	V19	4.19	*90*	352	41.8	21.4	102.33	170.67	15.83
	V20	6.36	*16*	444.44	33.27	22.47	85	147	33.00
	V21	4.74	*66*	401.78	24.83	17.53	98	96.33	25.33
	V22	7.18	*5*	398.22	27.87	16.57	102.33	139.33	40.08
	V23	4.69	*70*	437.33	38.23	20.73	100	157	5.67
	V24	4.52	*75*	419.56	20.2	21.03	91.67	127.33	17.92
	V25	4.75	*64*	394.67	20.53	13.83	105.33	167.67	21.58
	V26	-		-	-	-	-	-	
	V27	4.55	*74*	362.67	23.7	15.5	106	163.33	21.67
	V28	3.28	*117*	416	31.67	15.9	106.33	215.33	9.67
	V29	6.28	*22*	334.22	18.73	17.67	95.33	95.33	33.08
	V30	5.34	*53*	330.67	19.53	16.63	87	102.67	24.25
	V31	4.45	*78*	348.44	21.63	21.07	90.67	163.67	19.33
	V32	5.61	*42*	369.78	30.3	21.8	90.67	136.33	26.58
	V33	5.76	*37*	369.78	18.4	19.03	90.67	154	29.17
	V34	6.16	*27*	320	25.1	19.13	97	135	28.42
	V35	2.57	*133*	359.11	17.2	26.4	81.67	106.33	1.08
	V36	2.52	*136*	401.78	23.4	21.77	106.67	107.67	-2.33
	V37	5.68	*39*	416	21.47	19.53	86	149	25.75
	V38	4.14	*93*	391.11	18.37	22.17	72.33	138	14.08
	V39	2.51	*137*	391.11	21.43	21.23	94	123.33	0.42
	V40	-		-	-	-	-	-	
	V41	3.56	*105*	376.89	25.17	19.07	103	135	6.50
	V42	5.82	*35*	394.67	21.67	18.77	113	132	29.33

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	ICAR-IIRR							
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Grains/ panicle	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N4: 150% of recommended N dose	V1	5.37	*52*	373.33	18.33	17.2	94.33	90.33	12.28
	V2	6.56	*7*	384	32.17	24.1	86.67	221.67	16.44
	V3	6.63	*6*	423.11	35	19	103	179.33	14.94
	V4	6.43	*14*	416	36.4	17.87	102	168	13.33
	V5	6.5	*12*	366.22	34.6	18.99	111.33	165.33	16.44
	V6	5.32	*55*	391.11	32.6	19.06	85.33	168.33	11.83
	V7	5.42	*49*	327.11	34.23	20.78	81.33	236.67	6.78
	V8	4.26	*85*	437.33	27.33	29	95.67	103	0.61
	V9	4.67	*71*	309.33	47.15	15.31	101.67	274.33	6.78
	V10	4.7	*69*	401.78	25.47	20.88	83.67	129.67	6.83
	V11	5.99	*32*	423.11	26.5	18.33	110	129.67	18.83
	V12	5.27	*58*	391.11	25.22	17.07	103.67	179.67	15.44
	V13	6.31	*20*	426.67	28.75	16.08	91.67	236	23.72
	V14	2.67	*130*	369.78	23.1	17.63	83	203.67	0.78
	V15	3.87	*99*	437.33	38.4	22.85	83.67	161.33	7.61
	V16	2.86	*120*	444.44	18.9	21.28	106	92.33	3.11
	V17	4.78	*62*	444.44	16.83	11.99	109	188.67	12.50
	V18	3.72	*101*	305.78	27.13	20.99	110	154.33	5.22
	V19	4.43	*80*	426.67	43.37	22.79	100	181.33	11.89
	V20	6.56	*7*	423.11	34.4	25.29	83	128.67	23.11
	V21	4.32	*84*	359.11	25.67	14.1	98	63	14.56
	V22	7.75	*2*	401.78	31.03	18.07	100.33	140	29.89
	V23	5.63	*41*	394.67	44.37	20.13	100.33	167.33	9.00
	V24	4.78	*62*	316.44	18.73	20.73	86.67	104.67	13.39
	V25	4.73	*67*	330.67	20.33	12.72	105.33	171	14.28
	V26	-		-	-	-	-	-	-
	V27	4.83	*61*	337.78	26.57	16.34	105.67	160.67	16.00
	V28	7.5	*3*	348.44	31.33	14.78	106	252.67	29.89
	V29	6.19	*26*	348.44	18.53	16.53	95	83.33	21.56
	V30	5.38	*51*	366.22	18.71	18.3	87.67	90	16.39
	V31	4.18	*91*	412.44	25.23	22.01	91.67	178.33	11.39
	V32	6.56	*7*	391.11	30.73	21.24	90	126.67	23.00
	V33	4.73	*67*	391.11	19.37	18.5	93	158.33	13.72
	V34	6.35	*17*	352	27.6	17.92	101.67	118.67	20.00
	V35	2.7	*128*	366.22	16.13	28.9	81.33	97.67	1.44
	V36	2.47	*141*	423.11	24.91	25.13	114	105	-1.83
	V37	5.93	*33*	416	22.6	20.74	86.67	137	18.56
	V38	4.21	*87*	401.78	18.6	24.15	73.33	103.33	9.78
	V39	2.69	*129*	373.33	20.6	21.08	97	104	1.28
	V40	-		-	-	-	-	-	-
	V41	3.53	*107*	348.44	27.9	19	105.33	159	4.17
	V42	6.33	*18*	394.67	27.57	18.27	117.67	119	22.39
Interaction									
N at same V		0.56		85.41	2.3	1.12	3.29	16.04	
V at same N		0.57		89.9	2.29	1.14	3.26	16.09	
F1		2.75	*4*	336	24.68	18.41	99	141	
F2		4.81	*3*	483	27.30	19.42	97	150	34.34
F3		4.98	*2*	380	25.97	19.38	96	155	18.61
F4		5.08	*1*	385	27.56	19.63	97	151	12.93
C.D.(0.05)		0.13		39.39	0.32	0.32	0.36	3.53	
C.V.(%)		9.29		31.49	3.8	5.3	1.18	7.49	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	ICAR-IIRR							
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Grains/ panicle	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
Mean of varieties:									
V1	29567	3.82	*26*	368	17.88	18.00	95	102	11.40
V2	29573	5.30	*5*	400	31.41	22.65	86	182	26.54
V3	29576	5.44	*3*	398	33.30	18.00	104	178	22.73
V4	29577	5.52	*2*	340	35.18	18.28	103	158	22.94
V5	29564	5.37	*4*	370	33.12	18.95	108	170	27.76
V6	28084	4.61	*14*	434	31.48	18.01	85	163	21.64
V7	29579	5.28	*6*	448	32.16	19.71	85	213	16.68
V8	29584	4.47	*17*	393	26.33	27.91	95	117	5.65
V9	29583	6.37	*1*	453	44.12	16.42	101	251	37.26
V10	29581	4.29	*19*	395	24.84	20.48	84	139	12.92
V11	29574	4.62	*12*	441	25.02	17.95	107	121	31.08
V12	29568	4.44	*18*	396	23.50	17.16	104	166	29.59
V13	29578	4.81	*10*	451	27.06	16.82	94	220	42.24
V14	29572	2.86	*36*	390	21.44	17.61	87	211	5.26
V15	30255	4.61	*13*	361	36.45	21.61	85	164	29.04
V16	30256	2.77	*37*	361	18.68	20.65	107	107	8.31
V17	RP Bio 226	3.90	*25*	414	17.51	13.24	113	176	20.89
V18	30257	3.26	*35*	373	26.39	20.04	112	159	7.52
V19	30258	3.64	*31*	375	41.07	21.36	103	163	21.19
V20	30259	4.75	*11*	415	33.34	23.05	85	133	35.93
V21	30260	3.37	*32*	374	25.10	15.30	99	85	24.24
V22	30261	5.26	*7*	430	29.84	16.85	103	135	44.82
V23	MTU 1121 (RP)	5.03	*8*	423	41.22	20.40	99	154	18.06
V24	30262	3.79	*27*	410	19.88	21.27	94	116	22.10
V25	30263	3.77	*28*	386	19.51	13.81	106	171	24.40
V26	Rasi (Check)	-		-	-	-	-	-	
V27	30264	3.71	*29*	440	24.90	16.02	106	159	27.44
V28	30265	3.97	*24*	466	31.31	15.67	108	231	37.57
V29	30266	3.98	*23*	407	18.05	17.18	95	91	23.94
V30	30267	3.99	*21*	384	18.33	17.32	87	98	23.38
V31	30268	3.34	*33*	385	23.72	20.78	91	164	17.52
V32	30269	3.98	*22*	401	30.20	21.04	92	137	24.86
V33	Varadhan (Check)	4.08	*20*	370	18.29	18.75	93	151	25.19
V34	30270	4.83	*9*	398	26.01	18.85	97	131	31.86
V35	30271	2.60	*40*	385	16.92	26.87	82	109	2.73
V36	30272	2.69	*39*	392	23.48	21.16	109	114	-1.67
V37	30273	4.52	*15*	473	21.26	20.33	86	144	29.82
V38	TellaHamsa (Check)	3.65	*30*	413	18.99	22.91	74	115	18.51
V39	30274	2.75	*38*	385	20.52	20.01	97	113	5.18
V40	BPT 5204 (Sensitive Check)	-		-	-	-	-	-	
V41	30275	3.26	*34*	351	24.21	18.32	105	134	7.28
V42	Swarna	4.52	*16*	338	23.04	17.67	114	123	34.63
	C.D.(0.05)	0.28		42.7	1.15	0.56	1.64	8.02	
	C.V.(%)	8		13.48	5.45	3.65	2.12	6.72	
	Expt. Mean	**4.18**		**400**	**26.38**	**19.21**	**97**	**149**	
	Soil type	-							
	pH								
	N - levels (kg/ha)								
	F1	0							
	F2	60							
	F3	120							
	F4	180							
	Recommended NPK (kg/ha)	120:60:40							
	Available NPK (kg/ha)	-							

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N1: No nitrogen (Control) (P and K is constant)	V1	3.02	*104*	231	3.23	23.14	92.33	
	V2	2	*117*	210.33	2.17	23.18	92.33	
	V3	2.98	*109*	241	2.46	22.89	101.67	
	V4	3.21	*97*	192.33	3.35	21.16	91	
	V5	3.33	*89*	218	3.35	24.58	99	
	V6	3.89	*58*	244	3.57	28.16	92.67	
	V7	-		-	-	-	-	
	V8	3.98	*51*	254.33	3.78	23.28	91.33	
	V9	4	*48*	266.67	3.8	23.05	97	
	V10	3.33	*89*	244	3.36	23.19	84.67	
	V11	-		-	-	-	-	
	V12	3.03	*103*	231	3.19	22.82	101.33	
	V13	3.96	*53*	254.33	3.78	22.3	87	
	V14	3.02	*104*	243.67	3.25	22.04	87	
	V15	4.41	*25*	218	3.66	26.95	98.33	
	V16	3.65	*72*	237.33	3.48	24.8	85.67	
	V17	3.3	*92*	211	3.36	23.5	100.67	
	V18	2.99	*108*	211.33	2.62	22.94	90	
	V19	4.26	*30*	245.33	4.22	23.47	98.67	
	V20	3.23	*95*	272.07	3.23	23.73	92	
	V21	3.23	*95*	224	3.27	23.74	89	
	V22	3.46	*82*	282.33	3.5	22.41	99.33	
	V23	2.76	*114*	203.87	2.19	21.43	101.67	
	V24	3.02	*104*	251.33	3.27	26.04	101	
	V25	3.12	*101*	246.67	3.07	25.32	100.33	
	V26	-		-	-	-	-	
	V27	2.76	*114*	256.33	2.67	23.03	99.33	
	V28	4.03	*45*	234.33	4.12	26.26	109	
	V29	3.94	*54*	206.33	3.85	22.62	90.67	
	V30	3.41	*85*	225	3.48	23.4	82.67	
	V31	4.31	*28*	255.67	4.36	26.37	92.33	
	V32	3.09	*102*	221.33	3	22.55	94.67	
	V33	2.77	*113*	242	2.65	22.27	99	
	V34	4	*48*	237.67	4.04	25.42	91.67	
	V35	3.2	*99*	223.33	3.17	27.27	95.33	
	V36	2.92	*110*	249.67	2.92	22.43	108.67	
	V37	3.84	*62*	220	3.76	22.71	82	
	V38	3.02	*104*	192	3.03	24.03	94.67	
	V39	2.85	*111*	234.2	2.98	23.07	93	
	V40	3.43	*83*	207.67	3.47	26.63	107.67	
	V41	3.61	*74*	203	3.65	26.55	100.33	
	V42	3.92	*56*	239.07	4.01	27.13	99	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	*Rank*	Panicle/m^2 (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N2: 50% of recommended N dose (P and K is constant)	V1	3.8	*65*	283.33	3.51	23.97	92.33	15.60
	V2	2.67	*116*	248.33	2.36	23.97	92	13.40
	V3	3.77	*69*	275.4	2.84	23.1	102	15.80
	V4	3.93	*55*	234.67	3.94	22.96	92	14.40
	V5	4.15	*39*	271.67	4.1	25.16	100.33	16.40
	V6	4.34	*26*	268.33	4.17	28.6	94.67	9.00
	V7	-		-	-	-	-	
	V8	5.06	*3*	294.67	4.58	23.74	90.67	21.60
	V9	5	*6*	298.87	4.46	23.35	98.67	20.00
	V10	4.22	*37*	290	4.25	23.77	84.67	17.80
	V11	-		-	-	-	-	
	V12	3.13	*100*	265.33	3.4	23.07	102	2.00
	V13	4.82	*12*	271.33	4.37	22.86	89.67	17.20
	V14	3.89	*58*	265.67	3.69	22.94	86.67	17.40
	V15	4.7	*19*	274.67	4.16	27.32	100	5.80
	V16	4.61	*21*	265	4.63	25.1	86	19.20
	V17	3.38	*87*	235.67	3.42	23.73	101.33	1.60
	V18	3.78	*67*	264.33	3.58	23.21	89.67	15.80
	V19	4.71	*17*	264.33	4.58	23.95	100.33	9.00
	V20	3.28	*93*	309.33	3.25	24.28	93.33	1.00
	V21	4.05	*44*	247.67	4.06	24.36	92.33	16.40
	V22	4	*48*	302.33	4.01	22.83	101	10.80
	V23	3.61	*74*	291.13	3.65	22.16	101	17.00
	V24	3.83	*63*	270.53	3.87	26.48	101.33	16.20
	V25	3.21	*97*	282.67	3.26	25.61	100	1.80
	V26	-		-	-	-	-	
	V27	3.55	*79*	283.33	3.47	23.8	103	15.80
	V28	4.57	*22*	278.33	4.53	26.9	109.33	10.80
	V29	4.74	*16*	238	4.66	22.98	92.67	16.00
	V30	4.23	*35*	270	4.19	24.15	82.67	16.40
	V31	4.92	*7*	293.33	4.85	26.6	92.33	12.20
	V32	3.26	*94*	269.87	3.15	22.77	91.67	3.40
	V33	3.41	*85*	301.2	3.31	22.78	101	12.80
	V34	4.76	*14*	309	4.62	25.72	91.67	15.20
	V35	3.97	*52*	271.53	3.92	27.43	95.67	15.40
	V36	3.78	*67*	280.93	3.68	22.9	108.67	17.20
	V37	4.26	*30*	282.6	4.29	23.05	83.67	8.40
	V38	3.7	*71*	228.33	3.42	24.63	92.67	13.60
	V39	3.52	*81*	294	3.3	23.52	94.33	13.40
	V40	4.13	*40*	243.67	4.03	26.94	109	14.00
	V41	4.25	*33*	254.47	4.1	27.42	101.33	12.80
	V42	4.56	*23*	274	4.25	28.11	100.67	12.80

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N3: 100% of recommended N dose	V1	3.88	*60*	289.67	3.62	24.09	93.67	8.60
	V2	2.81	*112*	257.33	2.41	24.13	92	8.10
	V3	3.81	*64*	291.47	3.01	23.23	101	8.30
	V4	4.01	*47*	244.33	3.98	23	93.33	8.00
	V5	4.23	*35*	292	4.16	25.31	101.67	9.00
	V6	4.45	*24*	288.67	4.42	28.89	94	5.60
	V7	-		-	-	-	-	
	V8	5.12	*1*	301.67	5.03	23.86	90.33	11.40
	V9	5.06	*3*	313.33	5	23.56	97	10.60
	V10	4.26	*30*	294	4.31	23.8	83.33	9.30
	V11	-		-	-	-	-	
	V12	3.56	*77*	270.87	3.6	23.18	101.67	5.30
	V13	4.85	*11*	283.67	4.85	22.92	90.33	8.90
	V14	4.03	*45*	273.67	3.99	23.01	85	10.10
	V15	4.75	*15*	280.5	4.81	27.46	99	3.40
	V16	4.71	*17*	274	4.77	25.2	84.33	10.60
	V17	3.53	*80*	244.4	3.56	23.94	101.33	2.30
	V18	3.87	*61*	284.33	3.68	23.35	89	8.80
	V19	4.91	*8*	280.5	4.92	24.04	101.33	6.50
	V20	3.43	*83*	314	3.49	24.55	91.33	2.00
	V21	4.13	*40*	275.67	4.18	24.6	93.67	9.00
	V22	4.25	*33*	206.67	4.31	22.89	100.33	7.90
	V23	3.8	*65*	292.67	3.84	22.31	101	10.40
	V24	4.12	*42*	284.33	4.02	26.63	100	11.00
	V25	3.37	*88*	296.33	3.41	25.72	100	2.50
	V26	-		-	-	-	-	
	V27	3.62	*73*	292.9	3.63	24	105	8.60
	V28	4.88	*10*	287.8	4.56	26.94	109	8.50
	V29	4.82	*12*	250.6	4.76	23.22	93	8.80
	V30	4.28	*29*	282.6	4.26	24.26	83.67	8.70
	V31	5.1	*2*	315.67	5	26.84	101.67	7.90
	V32	3.32	*91*	292.67	3.18	22.93	91.67	2.30
	V33	3.6	*76*	311.33	3.53	22.98	100	8.30
	V34	5.06	*3*	312	4.93	25.82	93.67	10.60
	V35	4.12	*42*	281.37	3.99	27.55	96	9.20
	V36	3.9	*57*	289.9	3.76	23.01	108	9.80
	V37	4.91	*8*	287.03	4.85	23.16	84.33	10.70
	V38	3.74	*70*	247.67	3.68	24.95	92.67	7.20
	V39	3.56	*77*	309.83	3.61	23.64	95.33	7.10
	V40	4.18	*38*	265.9	4.07	27.02	108.33	7.50
	V41	4.33	*27*	276.07	4.28	27.66	100.33	7.20
	V42	4.65	*20*	285.33	4.39	28.53	100.33	7.30

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N4: 150% of recommended N dose	V1	-		-		-	-	
	V2	-		-		-	-	
	V3	-		-		-	-	
	V4	-		-		-	-	
	V5	-		-		-	-	
	V6	-		-		-	-	
	V7	-		-		-	-	
	V8	-		-		-	-	
	V9	-		-		-	-	
	V10	-		-		-	-	
	V11	-		-		-	-	
	V12	-		-		-	-	
	V13	-		-		-	-	
	V14	-		-		-	-	
	V15	-		-		-	-	
	V16	-		-		-	-	
	V17	-		-		-	-	
	V18	-		-		-	-	
	V19	-		-		-	-	
	V20	-		-		-	-	
	V21	-		-		-	-	
	V22	-		-		-	-	
	V23	-		-		-	-	
	V24	-		-		-	-	
	V25	-		-		-	-	
	V26	-		-		-	-	
	V27	-		-		-	-	
	V28	-		-		-	-	
	V29	-		-		-	-	
	V30	-		-		-	-	
	V31	-		-		-	-	
	V32	-		-		-	-	
	V33	-		-		-	-	
	V34	-		-		-	-	
	V35	-		-		-	-	
	V36	-		-		-	-	
	V37	-		-		-	-	
	V38	-		-		-	-	
	V39	-		-		-	-	
	V40	-		-		-	-	
	V41	-		-		-	-	
	V42	-		-		-	-	
Interaction								
N at same V		0.06		8.32	0.14	0.18	1.94	
V at same N		0.06		8.28	0.14	0.18	1.93	
F1		3.39	*3*	233	3.34	24.00	95	
F2		4.04	*2*	273	3.90	24.52	96	12.96
F3		4.18	*1*	283	4.10	24.67	96	7.88
F4		-		-		-	-	-
C.D.(0.05)		0.02		1.79	0.01	0.04	0.39	
C.V.(%)		2		2.94	1.62	0.66	1.75	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
Mean of varieties:								
V1	29567	3.57	*25*	268	3.45	23.73	93	12.10
V2	29573	2.49	*39*	239	2.31	23.76	92	10.75
V3	29576	3.52	*28*	269	2.77	23.07	102	12.05
V4	29577	3.72	*22*	224	3.76	22.37	92	11.20
V5	29564	3.90	*18*	261	3.87	25.02	100	12.70
V6	28084	4.23	*13*	267	4.05	28.55	94	7.30
V7	29579	-		-	-	-	-	
V8	29584	4.72	*2*	284	4.46	23.63	91	16.50
V9	29583	4.69	*3*	293	4.42	23.32	98	15.30
V10	29581	3.94	*16*	276	3.97	23.59	84	13.55
V11	29574	-		-	-	-	-	
V12	29568	3.24	*36*	256	3.40	23.02	102	3.65
V13	29578	4.54	*7*	270	4.33	22.69	89	13.05
V14	29572	3.65	*24*	261	3.64	22.66	86	13.75
V15	30255	4.62	*5*	258	4.21	27.24	99	4.60
V16	30256	4.32	*12*	259	4.29	25.03	85	14.90
V17	RP Bio 226	3.40	*30*	230	3.45	23.72	101	1.95
V18	30257	3.55	*26*	253	3.29	23.17	90	12.30
V19	30258	4.63	*4*	263	4.57	23.82	100	7.75
V20	30259	3.31	*32*	298	3.32	24.19	92	1.50
V21	30260	3.80	*20*	249	3.84	24.23	92	12.70
V22	30261	3.90	*18*	264	3.94	22.71	100	9.35
V23	MTU 1121 (RP)	3.39	*31*	263	3.23	21.97	101	13.70
V24	30262	3.66	*23*	269	3.72	26.38	101	13.60
V25	30263	3.23	*37*	275	3.25	25.55	100	2.15
V26	Rasi (Check)	-		-	-	-	-	
V27	30264	3.31	*33*	278	3.26	23.61	102	12.20
V28	30265	4.49	*9*	267	4.40	26.70	109	9.65
V29	30266	4.50	*8*	232	4.42	22.94	92	12.40
V30	30267	3.97	*15*	259	3.98	23.94	83	12.55
V31	30268	4.78	*1*	288	4.74	26.60	95	10.05
V32	30269	3.22	*38*	261	3.11	22.75	93	2.85
V33	Varadhan (Check)	3.26	*35*	285	3.16	22.68	100	10.55
V34	30270	4.61	*6*	286	4.53	25.65	92	12.90
V35	30271	3.76	*21*	259	3.69	27.42	96	12.30
V36	30272	3.53	*27*	274	3.45	22.78	108	13.50
V37	30273	4.34	*11*	263	4.30	22.97	83	9.55
V38	TellaHamsa (Check)	3.49	*29*	223	3.38	24.54	93	10.40
V39	30274	3.31	*33*	279	3.30	23.41	94	10.25
V40	BPT 5204 (Sensitive Check)	3.91	*17*	239	3.86	26.86	108	10.75
V41	30275	4.06	*14*	245	4.01	27.21	101	10.00
V42	Swarna	4.38	*10*	266	4.22	27.92	100	10.05
	C.D.(0.05)	0.03		4.8	0.08	0.11	1.12	
	C.V.(%)	0.9		1.98	2.34	0.47	1.27	
	Expt. Mean	**3.87**		**263**	**3.78**	**24.40**	**96**	
	Soil type	-						
	pH	7.1						
	N - levels (kg/ha)							
	F1	0						
	F2	50						
	F3	100						
	F4	-						
	Recommended NPK (kg/ha)							
	Available NPK (kg/ha)	100:50:50						

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	MANDYA						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N1: No nitrogen (Control) (P and K is constant)	V1	5.83	*51*	278	2.38	23.28	91	
	V2	6.47	*25*	268.75	3.67	24.48	91.5	
	V3	5.9	*48*	258.75	3.31	21.87	95.5	
	V4	6.49	*22*	265	3.21	20.48	100.5	
	V5	6.45	*26*	358.75	3.12	21.44	106	
	V6	6.64	*17*	316.25	3.54	23.99	91.5	
	V7	-		-	-	-	-	
	V8	6.49	*22*	289.75	2.35	28.92	92	
	V9	6.51	*21*	311	3.78	20.86	93	
	V10	5.61	*56*	271.25	2.72	22.89	90.5	
	V11	-		-	-	-	-	
	V12	4.45	*75*	313.75	1.9	17.51	105	
	V13	6.14	*40*	322.5	3.28	18.59	90.5	
	V14	5.2	*65*	331.25	1.81	20.06	90.5	
	V15	6.38	*28*	226.25	3.04	27.26	93	
	V16	4.71	*72*	275.75	2.29	25.64	89	
	V17	4.14	*77*	308.75	1.64	13.83	101	
	V18	5.92	*44*	257.5	2.49	22.33	89.5	
	V19	6.25	*37*	225	3.46	22.06	90	
	V20	6.29	*35*	253.75	3.46	27.61	100.5	
	V21	5.01	*67*	238.75	2.48	27.22	105	
	V22	6.32	*32*	225	4.09	22.48	99.5	
	V23	6.12	*42*	226.25	4.44	21.34	101	
	V24	4.47	*74*	268.75	2.08	19.64	101.5	
	V25	4.39	*76*	275	1.96	14.57	97	
	V26	6.32	*32*	287.5	2.17	20.22	103	
	V27	-		-	-	-	-	
	V28	6.05	*43*	296.31	3.84	15.46	105.5	
	V29	6.58	*18*	256	4.15	21.99	89.5	
	V30	5.88	*50*	283.5	2.05	24.19	89	
	V31	4.98	*69*	271.75	3.51	24.53	91.5	
	V32	5.66	*55*	262.5	3.31	22.24	92.5	
	V33	5.37	*60*	293.75	2.23	21.72	91	
	V34	6.32	*32*	285	3.15	19.74	90.5	
	V35	5.75	*53*	281.25	2.17	31.83	90	
	V36	5.61	*56*	297.5	2.17	21.42	104	
	V37	6.27	*36*	247.5	2.81	23.36	92	
	V38	5	*68*	268.75	2.04	27.26	89	
	V39	5.9	*48*	242.5	2.18	25.58	91.5	
	V40	3.95	*78*	317.5	1.79	15.24	107	
	V41	6.45	*26*	311.25	3.89	20.24	105	
	V42	5.18	*66*	291.25	2.38	20.69	110	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	MANDYA						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N2: 50% of recommended N dose (P and K is constant)	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
	V13	-		-	-	-	-	
	V14	-		-	-	-	-	
	V15	-		-	-	-	-	
	V16	-		-	-	-	-	
	V17	-		-	-	-	-	
	V18	-		-	-	-	-	
	V19	-		-	-	-	-	
	V20	-		-	-	-	-	
	V21	-		-	-	-	-	
	V22	-		-	-	-	-	
	V23	-		-	-	-	-	
	V24	-		-	-	-	-	
	V25	-		-	-	-	-	
	V26	-		-	-	-	-	
	V27	-		-	-	-	-	
	V28	-		-	-	-	-	
	V29	-		-	-	-	-	
	V30	-		-	-	-	-	
	V31	-		-	-	-	-	
	V32	-		-	-	-	-	
	V33	-		-	-	-	-	
	V34	-		-	-	-	-	
	V35	-		-	-	-	-	
	V36	-		-	-	-	-	
	V37	-		-	-	-	-	
	V38	-		-	-	-	-	
	V39	-		-	-	-	-	
	V40	-		-	-	-	-	
	V41	-		-	-	-	-	
	V42	-		-	-	-	-	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	MANDYA						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N3: 100% of recommended N dose	V1	5.92	*44*	304.75	2.16	22.73	91	0.90
	V2	6.71	*15*	296.25	3.49	26.75	91.5	2.40
	V3	6.16	*39*	273.75	3.7	20.48	95.5	2.60
	V4	6.93	*7*	267.5	3.67	19.31	100.5	4.40
	V5	6.93	*7*	325	3.1	21.6	106	4.80
	V6	6.86	*13*	336.25	3.22	22.32	91.5	2.20
	V7	-		-	-	-	-	
	V8	6.73	*14*	337.25	2.53	29.52	92	2.40
	V9	6.97	*5*	333	2.87	20.39	92	4.60
	V10	5.26	*62*	290	2.55	23.81	90.5	-3.50
	V11	-		-	-	-	-	
	V12	6.18	*38*	353.75	2.07	18.18	105	17.30
	V13	6.69	*16*	337.5	2.84	18.31	90.5	5.50
	V14	6.38	*28*	283.75	2.05	19.8	90.5	11.80
	V15	7.02	*3*	237.5	3.9	27.25	93	6.40
	V16	5.81	*52*	318.75	2.17	25.09	89	11.00
	V17	5.22	*64*	340	1.82	14.19	101	10.80
	V18	6.38	*28*	302.5	2.18	23.22	89.5	4.60
	V19	6.58	*18*	288.75	3.41	22.88	90	3.30
	V20	6.97	*5*	257.25	2.99	27.21	100.5	6.80
	V21	4.74	*71*	262.75	3.06	26.4	105	-2.70
	V22	7	*4*	228.75	4.1	21.56	99.5	6.80
	V23	7.06	*1*	239	4.58	21.97	101	9.40
	V24	4.96	*70*	287.5	1.89	18.54	101.5	4.90
	V25	4.71	*72*	318.25	2.05	15.46	96	3.20
	V26	7.06	*1*	283.75	3.11	21.11	103	7.40
	V27	-		-	-	-	-	
	V28	6.54	*20*	302.5	3.31	17.04	104.5	4.90
	V29	6.93	*7*	271.5	3.55	22.77	89.5	3.50
	V30	5.92	*44*	288.75	2.29	23.76	89	0.40
	V31	5.33	*61*	268.5	2.61	24.84	91.5	3.50
	V32	5.92	*44*	271.25	2.51	21.59	92.5	2.60
	V33	5.44	*59*	325.5	4.45	25.32	91	0.70
	V34	6.36	*31*	296.5	3.5	20.08	90.5	0.40
	V35	5.7	*54*	292.5	3.08	34.33	90	-0.50
	V36	6.14	*40*	318.75	3.06	21.5	104	5.30
	V37	6.93	*7*	327.5	3.94	23.6	92	6.60
	V38	6.49	*22*	292.25	2.17	26.69	89	14.90
	V39	6.89	*12*	300	2.67	22.98	96	9.90
	V40	5.59	*58*	343.75	4.14	16.71	107	16.40
	V41	6.93	*7*	306.25	3.7	19.72	105	4.80
	V42	5.26	*62*	340	2.51	20.37	109.5	0.80

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	MANDYA						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N4: 150% of recommended N dose	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
	V13	-		-	-	-	-	
	V14	-		-	-	-	-	
	V15	-		-	-	-	-	
	V16	-		-	-	-	-	
	V17	-		-	-	-	-	
	V18	-		-	-	-	-	
	V19	-		-	-	-	-	
	V20	-		-	-	-	-	
	V21	-		-	-	-	-	
	V22	-		-	-	-	-	
	V23	-		-	-	-	-	
	V24	-		-	-	-	-	
	V25	-		-	-	-	-	
	V26	-		-	-	-	-	
	V27	-		-	-	-	-	
	V28	-		-	-	-	-	
	V29	-		-	-	-	-	
	V30	-		-	-	-	-	
	V31	-		-	-	-	-	
	V32	-		-	-	-	-	
	V33	-		-	-	-	-	
	V34	-		-	-	-	-	
	V35	-		-	-	-	-	
	V36	-		-	-	-	-	
	V37	-		-	-	-	-	
	V38	-		-	-	-	-	
	V39	-		-	-	-	-	
	V40	-		-	-	-	-	
	V41	-		-	-	-	-	
	V42	-		-	-	-	-	
Interaction								
N at same V		NS		NS	0.61	NS	NS	
V at same N		NS		NS	3.11	NS	NS	
F1		5.73	*2*	278	2.83	22.16	96	
F2		-		-	-	-	-	
F3		6.25	*1*	299	3.00	22.29	96	5.17
F4		-		-	-	-	-	-
C.D.(0.05)		NS		NS	NS	NS	NS	
C.V.(%)		5.01		36.65	73.51	2.68	2.17	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	MANDYA						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
Mean of varieties:								
V1	29567	5.88	*23*	291	2.27	23.01	91	0.90
V2	29573	6.59	*13*	283	3.58	25.62	92	2.40
V3	29576	6.03	*21*	266	3.51	21.18	96	2.60
V4	29577	6.71	*4*	266	3.44	19.90	101	4.40
V5	29564	6.69	*6*	342	3.11	21.52	106	4.80
V6	28084	6.75	*2*	326	3.38	23.16	92	2.20
V7	29579	-		-	-	-	-	
V8	29584	6.61	*11*	314	2.44	29.22	92	2.40
V9	29583	6.74	*3*	322	3.33	20.63	93	4.60
V10	29581	5.44	*29*	281	2.64	23.35	91	-3.50
V11	29574	-		-	-	-	-	
V12	29568	5.32	*31*	334	1.99	17.85	105	17.30
V13	29578	6.42	*15*	330	3.06	18.45	91	5.50
V14	29572	5.79	*25*	308	1.93	19.93	91	11.80
V15	30255	6.70	*5*	232	3.47	27.26	93	6.40
V16	30256	5.26	*32*	297	2.23	25.37	89	11.00
V17	RP Bio 226	4.68	*38*	324	1.73	14.01	101	10.80
V18	30257	6.15	*20*	280	2.34	22.78	90	4.60
V19	30258	6.42	*15*	257	3.44	22.47	90	3.30
V20	30259	6.63	*10*	256	3.23	27.41	101	6.80
V21	30260	4.88	*35*	251	2.77	26.81	105	-2.70
V22	30261	6.66	*9*	227	4.10	22.02	100	6.80
V23	MTU 1121 (RP)	6.59	*13*	233	4.51	21.66	101	9.40
V24	30262	4.72	*37*	278	1.99	19.09	102	4.90
V25	30263	4.55	*39*	297	2.01	15.02	97	3.20
V26	Rasi (Check)	6.69	*6*	286	2.64	20.67	103	
V27	30264	-		-	-	-	-	#DIV/0!
V28	30265	6.30	*19*	299	3.58	16.25	105	4.90
V29	30266	6.76	*1*	264	3.85	22.38	90	3.50
V30	30267	5.90	*22*	286	2.17	23.98	89	0.40
V31	30268	5.16	*34*	270	3.06	24.69	92	3.50
V32	30269	5.79	*25*	267	2.91	21.92	93	2.60
V33	Varadhan (Check)	5.41	*30*	310	3.34	23.52	91	0.70
V34	30270	6.34	*18*	291	3.33	19.91	91	0.40
V35	30271	5.73	*28*	287	2.63	33.08	90	-0.50
V36	30272	5.88	*23*	308	2.62	21.46	104	5.30
V37	30273	6.60	*12*	288	3.38	23.48	92	6.60
V38	TellaHamsa (Check)	5.75	*27*	281	2.11	26.98	89	14.90
V39	30274	6.40	*17*	271	2.43	24.28	94	9.90
V40	BPT 5204 (Sensitive Check)	4.77	*36*	331	2.97	15.98	107	16.40
V41	30275	6.69	*6*	309	3.80	19.98	105	4.80
V42	Swarna	5.22	*33*	316	2.45	20.53	110	0.80
	C.D.(0.05)	0.98		48.1	0.43	1.69	3.12	
	C.V.(%)	11.7		11.9	10.5	5.42	2.32	
	Expt. Mean	**5.99**		**289**	**2.91**	**22.22**	**96**	
	Soil type	Red sandy loam						
	pH	8.1						
	N - levels (kg/ha)							
	F1	0						
	F2	50						
	F3	100						
	F4	-						
	Recommended NPK (kg/ha)	100;50:50						
	Available NPK (kg/ha)	297:107:26 8						

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	RANCHI				
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	N % in grain	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N1: No nitrogen (Control) (P and K is constant)	V1	1.65	*96*	117.5	1.14	
	V2	1.82	*86*	122	1.16	
	V3	2.05	*79*	140	1.17	
	V4	1.87	*82*	126	1.13	
	V5	2.25	*77*	151	1.18	
	V6	1.5	*105*	103	1.17	
	V7	1.67	*95*	109.5	1.18	
	V8	1.95	*80*	132.5	1.19	
	V9	1.72	*92*	116	1.2	
	V10	1.85	*83*	124	1.17	
	V11	1.81	*88*	121	1.15	
	V12	2.2	*78*	147	1.21	
	V13	1.76	*90*	116	1.14	
	V14	1.58	*100*	106	1.18	
	V15	1.73	*91*	118	1.19	
	V16	1.42	*110*	98	1.17	
	V17	1.51	*104*	102	1.15	
	V18	1.8	*89*	122	1.16	
	V19	1.63	*98*	95.5	1.19	
	V20	1.45	*107*	98	1.21	
	V21	1.71	*93*	115	1.15	
	V22	1.64	*97*	110	1.17	
	V23	1.52	*102*	102	1.19	
	V24	1.83	*84*	118	1.2	
	V25	1.15	*114*	78	1.18	
	V26	1.52	*102*	102	1.17	
	V27	1.43	*109*	97	1.2	
	V28	1.21	*113*	89	1.21	
	V29	1.92	*81*	128	1.18	
	V30	1.47	*106*	95	1.16	
	V31	1.37	*111*	92	1.17	
	V32	1.68	*94*	106	1.19	
	V33	1.45	*107*	108	1.21	
	V34	1.62	*99*	97.5	1.2	
	V35	1.83	*84*	122	1.22	
	V36	1.33	*112*	90	1.19	
	V37	1.56	*101*	105	1.17	
	V38	1.82	*86*	124	1.17	
	V39	-		-	-	
	V40	-		-	-	
	V41	-		-	-	
	V42	-		-	-	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	RANCHI				
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	N % in grain	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N2: 50% of recommended N dose (P and K is constant)	V1	3.65	*60*	197	1.25	40.00
	V2	3.72	*54*	202.5	1.28	38.00
	V3	4.25	*12*	230.5	1.24	44.00
	V4	3.92	*39*	208	1.27	41.00
	V5	3.56	*66*	194	1.28	26.20
	V6	4.01	*23*	220.5	1.24	50.20
	V7	3.5	*70*	191	1.23	36.60
	V8	3.8	*49*	208	1.24	37.00
	V9	3.68	*58*	199	1.27	39.20
	V10	4	*28*	236	1.26	43.00
	V11	3.46	*73*	170	1.25	33.00
	V12	3.83	*45*	186	1.28	32.60
	V13	3.35	*76*	165	1.24	31.80
	V14	3.62	*61*	219	1.28	40.80
	V15	3.78	*51*	214	1.23	41.00
	V16	3.51	*69*	173	1.24	41.80
	V17	3.71	*55*	222	1.24	44.00
	V18	3.48	*71*	172	1.25	33.60
	V19	3.48	*71*	175	1.28	37.00
	V20	3.74	*52*	184	1.29	45.80
	V21	3.62	*61*	215	1.27	38.20
	V22	3.58	*65*	213.5	1.3	38.80
	V23	4.01	*23*	221	1.29	49.80
	V24	3.95	*35*	214	1.27	42.40
	V25	3.68	*58*	201	1.28	50.60
	V26	3.74	*52*	226	1.26	44.40
	V27	3.52	*67*	210.5	1.25	41.80
	V28	3.87	*43*	233.5	1.24	53.20
	V29	3.45	*74*	170	1.28	30.60
	V30	3.71	*55*	223	1.3	44.80
	V31	3.62	*61*	227	1.26	45.00
	V32	3.86	*44*	189	1.28	43.60
	V33	3.52	*67*	192	1.24	41.40
	V34	3.7	*57*	201.5	1.26	41.60
	V35	3.39	*75*	186	1.28	31.20
	V36	4	*28*	217	1.27	53.40
	V37	3.92	*39*	208	1.25	47.20
	V38	3.61	*64*	197	1.26	35.80
	V39	-		-	-	
	V40	-		-	-	
	V41	-		-	-	
	V42	-		-	-	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	RANCHI				
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	N % in grain	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N3: 100% of recommended N dose	V1	4.12	*17*	223	1.32	24.70
	V2	4.01	*23*	217	1.32	21.90
	V3	4.55	*1*	248	1.35	25.00
	V4	4.22	*15*	230	1.35	23.50
	V5	3.97	*33*	217	1.3	17.20
	V6	4.4	*3*	239	1.42	29.00
	V7	3.8	*49*	209	1.32	21.30
	V8	4.24	*14*	237.5	1.3	22.90
	V9	4.03	*22*	220.5	1.28	23.10
	V10	4.32	*6*	236	1.36	24.70
	V11	4.25	*12*	230.5	1.31	24.40
	V12	4.36	*5*	241	1.33	21.60
	V13	4	*28*	219	1.45	22.40
	V14	4.12	*17*	223	1.32	25.40
	V15	4.28	*9*	236.5	1.4	25.50
	V16	3.92	*39*	215.5	1.33	25.00
	V17	4.01	*23*	231	1.32	25.00
	V18	3.95	*35*	219	1.39	21.50
	V19	3.82	*46*	208	1.41	21.90
	V20	4.11	*19*	225.5	1.32	26.60
	V21	3.93	*38*	236	1.38	22.20
	V22	3.82	*46*	218	1.32	21.80
	V23	4.3	*8*	234.5	1.35	27.80
	V24	4.28	*9*	235.5	1.33	24.50
	V25	3.94	*37*	216	1.3	27.90
	V26	4.01	*23*	219	1.31	24.90
	V27	4.38	*4*	240	1.32	29.50
	V28	4.08	*21*	224	1.33	28.70
	V29	4	*28*	219	1.38	20.80
	V30	4.11	*19*	225	1.34	26.40
	V31	3.97	*33*	214	1.4	26.00
	V32	4.22	*15*	232	1.36	25.40
	V33	3.82	*46*	212	1.41	23.70
	V34	3.98	*32*	222	1.45	23.60
	V35	4.5	*2*	247	1.36	26.70
	V36	4.28	*9*	235	1.38	29.50
	V37	4.31	*7*	236	1.4	27.50
	V38	3.9	*42*	215.5	1.33	20.80
	V39	-		-	-	
	V40	-		-	-	
	V41	-		-	-	
	V42	-		-	-	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	RANCHI				
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	N % in grain	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N4: 150% of recommended N dose	V1	-		-	-	
	V2	-		-	-	
	V3	-		-	-	
	V4	-		-	-	
	V5	-		-	-	
	V6	-		-	-	
	V7	-		-	-	
	V8	-		-	-	
	V9	-		-	-	
	V10	-		-	-	
	V11	-		-	-	
	V12	-		-	-	
	V13	-		-	-	
	V14	-		-	-	
	V15	-		-	-	
	V16	-		-	-	
	V17	-		-	-	
	V18	-		-	-	
	V19	-		-	-	
	V20	-		-	-	
	V21	-		-	-	
	V22	-		-	-	
	V23	-		-	-	
	V24	-		-	-	
	V25	-		-	-	
	V26	-		-	-	
	V27	-		-	-	
	V28	-		-	-	
	V29	-		-	-	
	V30	-		-	-	
	V31	-		-	-	
	V32	-		-	-	
	V33	-		-	-	
	V34	-		-	-	
	V35	-		-	-	
	V36	-		-	-	
	V37	-		-	-	
	V38	-		-	-	
	V39	-		-	-	
	V40	-		-	-	
	V41	-		-	-	
	V42	-		-	-	
Interaction						
N at same V		NS		NS	NS	
V at same N		NS		NS	NS	
F1		1.67	*3*	112	1.18	
F2		3.71	*2*	203	1.26	40.80
F3		4.11	*1*	226	1.35	24.48
F4		-		-	-	-
C.D.(0.05)		0.08		14.56	0.04	
C.V.(%)		3.48		11.57	4.96	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	RANCHI				
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	N % in grain	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
Mean of varieties:						
V1	29567	3.14	*18*	179	1.24	32.35
V2	29573	3.18	*15*	181	1.25	29.95
V3	29576	3.62	*1*	206	1.25	34.50
V4	29577	3.34	*5*	188	1.25	32.25
V5	29564	3.26	*11*	187	1.25	21.70
V6	28084	3.30	*7*	188	1.28	39.60
V7	29579	2.99	*33*	170	1.24	28.95
V8	29584	3.33	*6*	193	1.24	29.95
V9	29583	3.14	*17*	179	1.25	31.15
V10	29581	3.39	*3*	199	1.26	33.85
V11	29574	3.17	*16*	174	1.24	28.70
V12	29568	3.46	*2*	191	1.27	27.10
V13	29578	3.04	*31*	167	1.28	27.10
V14	29572	3.11	*22*	183	1.26	33.10
V15	30255	3.26	*9*	190	1.27	33.25
V16	30256	2.95	*36*	162	1.25	33.40
V17	RP Bio 226	3.08	*28*	185	1.24	34.50
V18	30257	3.08	*28*	171	1.27	27.55
V19	30258	2.98	*35*	160	1.29	29.45
V20	30259	3.10	*23*	169	1.27	36.20
V21	30260	3.09	*27*	189	1.27	30.20
V22	30261	3.01	*32*	181	1.26	30.30
V23	MTU 1121 (RP)	3.28	*8*	186	1.28	38.80
V24	30262	3.35	*4*	189	1.27	33.45
V25	30263	2.92	*38*	165	1.25	39.25
V26	Rasi (Check)	3.09	*26*	182	1.25	34.65
V27	30264	3.11	*20*	183	1.26	35.65
V28	30265	3.05	*30*	182	1.26	40.95
V29	30266	3.12	*19*	172	1.28	25.70
V30	30267	3.10	*25*	181	1.27	35.60
V31	30268	2.99	*34*	178	1.28	35.50
V32	30269	3.25	*12*	176	1.28	34.50
V33	Varadhan (Check)	2.93	*37*	171	1.29	32.55
V34	30270	3.10	*23*	174	1.30	32.60
V35	30271	3.24	*13*	185	1.29	28.95
V36	30272	3.20	*14*	181	1.28	41.45
V37	30273	3.26	*9*	183	1.27	37.35
V38	TellaHamsa (Check)	3.11	*20*	179	1.25	28.30
V39	30274	-		-	-	
V40	BPT 5204	-		-	-	
V41	30275	-		-	-	
V42	Swarna	-		-	-	
C.D.(0.05)		NS		NS	NS	
C.V.(%)		13.17		11.3	7.56	
Expt. Mean		**3.16**		**180**	**1.26**	
Soil type		-				
pH		-				
N - levels (kg/ha)						
F1		0				
F2		50				
F3		100				
F4		-				
Recommended NPK (kg/ha)		100				
Available NPK (kg/ha)		-				

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	VADGAON						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)		
N1: No nitrogen (Control) (P and K is constant)	V1	3.18	*96*	172.19	2.72	22.36		3.37	*139*
	V2	2.95	*105*	159.83	2.52	22.4		3.37	*139*
	V3	3.15	*97*	170.77	2.7	21.57		3.60	*123*
	V4	3.22	*91*	174.44	2.75	21.36		3.76	*111*
	V5	3.39	*84*	183.85	2.9	22.78		3.79	*108*
	V6	3.5	*78*	189.56	2.99	23.27		3.74	*112*
	V7	-		-	-	-		2.94	*157*
	V8	3.45	*80*	186.84	2.95	22		4.00	*93*
	V9	3.41	*81*	184.88	2.92	21.73		3.82	*107*
	V10	2.88	*109*	156	2.46	21.94		3.43	*135*
	V11	-		-	-	-		2.21	*166*
	V12	2.91	*107*	157.46	2.49	21.52		3.02	*152*
	V13	3.29	*88*	178.07	2.81	21.28		3.44	*133*
	V14	2.65	*117*	143.68	2.27	21.36		3.00	*153*
	V15	3.21	*94*	173.73	2.74	23.42		3.65	*118*
	V16	3.14	*99*	170.34	2.69	23.39		3.04	*150*
	V17	2.73	*116*	147.81	2.33	22.22		2.84	*159*
	V18	3.04	*102*	164.92	2.6	21.67		3.31	*142*
	V19	3.21	*94*	174.17	2.75	22.32		3.53	*128*
	V20	2.76	*113*	149.53	2.36	22.79		3.23	*146*
	V21	3.15	*97*	170.87	2.7	22.84		2.96	*155*
	V22	3.12	*100*	168.88	2.67	21.25		3.38	*138*
	V23	3.03	*103*	164.31	2.59	20.71		3.49	*130*
	V24	3.22	*91*	174.41	2.75	22.71		2.98	*154*
	V25	2.9	*108*	156.97	2.48	21.93		2.74	*160*
	V26	-		-	-	-		3.92	*99*
	V27	2.77	*112*	152.13	2.36	22.2		2.23	*165*
	V28	3.28	*89*	180.2	2.8	22.89		3.34	*141*
	V29	3.39	*84*	186.65	2.9	21.49		3.63	*120*
	V30	3.03	*103*	166.76	2.59	22.44		3.24	*145*
	V31	3.52	*75*	193.8	3.01	24.84		3.26	*144*
	V32	2.74	*114*	150.82	2.34	21.21		3.12	*149*
	V33	2.87	*111*	157.58	2.45	21.26		2.94	*156*
	V34	3.41	*81*	187.66	2.92	23.88		3.62	*122*
	V35	3.09	*101*	169.83	2.64	23.41		3.26	*143*
	V36	2.94	*106*	161.85	2.52	21.29		3.12	*148*
	V37	3.32	*86*	182.47	2.84	21.43		3.52	*129*
	V38	2.88	*109*	158.61	2.47	23.09		3.03	*151*
	V39	2.74	*114*	150.83	2.34	21.87		3.49	*131*
	V40	3.22	*91*	176.89	2.75	23.47		3.53	*125*
	V41	3.31	*87*	182	2.83	24.02		4.04	*91*
	V42	3.27	*90*	179.73	2.79	24.24		3.67	*117*

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	VADGAON						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)		
N2: 50% of recommended N dose (P and K is constant)	V1	4.07	*57*	228.55	3.56	22.82	17.80	3.90	*102*
	V2	3.78	*66*	212.15	3.31	22.86	16.60	3.96	*96*
	V3	4.04	*58*	226.66	3.54	22.01	17.80	4.38	*67*
	V4	4.13	*52*	231.53	3.61	21.79	18.20	4.42	*64*
	V5	4.35	*44*	244.02	3.81	23.24	19.20	4.28	*76*
	V6	4.49	*35*	251.61	3.92	23.74	19.80	4.44	*62*
	V7	-		-	-	-		4.82	*38*
	V8	4.42	*38*	243.13	3.87	22.45	19.40	4.60	*54*
	V9	4.37	*42*	240.59	3.83	22.17	19.20	4.77	*41*
	V10	3.69	*71*	203	3.23	22.39	16.20	4.10	*87*
	V11	-		-	-	-		4.47	*61*
	V12	3.73	*68*	204.9	3.26	21.96	16.40	3.84	*105*
	V13	4.21	*49*	231.72	3.69	21.71	18.40	4.35	*69*
	V14	3.4	*83*	186.96	2.97	21.79	15.00	3.40	*136*
	V15	4.11	*56*	226.07	3.6	23.89	18.00	4.27	*77*
	V16	4.03	*60*	221.66	3.53	23.87	17.80	3.79	*108*
	V17	3.5	*78*	192.34	3.06	22.68	15.40	3.53	*126*
	V18	3.9	*63*	214.61	3.41	22.12	17.20	3.45	*132*
	V19	4.12	*54*	226.64	3.61	22.77	18.20	4.10	*87*
	V20	3.54	*74*	194.58	3.1	23.25	15.60	3.83	*106*
	V21	4.04	*58*	222.35	3.54	23.31	17.80	3.73	*114*
	V22	4	*61*	219.75	3.5	21.69	17.60	4.39	*66*
	V23	3.89	*64*	213.82	3.4	21.13	17.20	4.30	*74*
	V24	4.13	*52*	226.96	3.61	23.17	18.20	3.97	*95*
	V25	3.71	*69*	204.26	3.25	22.38	16.20	3.40	*137*
	V26	-		-	-	-		3.74	*113*
	V27	3.55	*73*	198.89	3.1	22.65	15.60	3.62	*121*
	V28	4.2	*50*	235.59	3.67	23.35	18.40	4.57	*57*
	V29	4.35	*44*	244.03	3.81	21.92	19.20	3.91	*101*
	V30	3.89	*64*	218.02	3.4	22.9	17.20	4.01	*92*
	V31	4.52	*34*	253.37	3.95	25.34	20.00	3.96	*97*
	V32	3.51	*77*	197.18	3.07	21.64	15.40	3.43	*134*
	V33	3.67	*72*	206.02	3.21	21.69	16.00	3.59	*124*
	V34	4.37	*42*	245.35	3.83	24.37	19.20	4.30	*75*
	V35	3.96	*62*	222.04	3.46	23.89	17.40	3.64	*119*
	V36	3.77	*67*	211.61	3.3	21.73	16.60	3.67	*116*
	V37	4.25	*47*	238.56	3.72	21.87	18.60	4.20	*84*
	V38	3.7	*70*	207.37	3.23	23.56	16.40	3.78	*110*
	V39	3.52	*75*	197.2	3.08	22.31	15.60	3.19	*147*
	V40	4.12	*54*	231.26	3.61	23.95	18.00	3.94	*98*
	V41	4.24	*48*	237.94	3.71	24.51	18.60	4.09	*89*
	V42	4.19	*51*	234.97	3.67	24.74	18.40	4.67	*48*

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	VADGAON						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)		
N3: 100% of recommended N dose	V1	5.13	*18*	285.15	4.46	23.61	19.50	4.63	*52*
	V2	4.76	*27*	266.48	4.14	23.64	18.10	4.72	*45*
	V3	5.08	*20*	284.71	4.42	22.77	19.30	5.00	*29*
	V4	5.19	*13*	290.83	4.52	22.54	19.70	5.08	*25*
	V5	5.47	*6*	306.52	4.76	24.04	20.80	5.00	*31*
	V6	5.64	*2*	316.05	4.91	24.56	21.40	5.00	*28*
	V7	-		-	-	-	#VALUE!	4.66	*50*
	V8	5.56	*3*	311.51	4.84	23.38	21.10	4.92	*34*
	V9	5.5	*4*	308.25	4.79	23.09	20.90	5.61	*16*
	V10	4.64	*32*	260.1	4.04	23.32	17.60	4.48	*60*
	V11	-		-	-	-	#VALUE!	5.02	*27*
	V12	4.69	*29*	263	4.08	22.71	17.80	4.49	*59*
	V13	5.3	*10*	297.42	4.61	22.46	20.10	5.00	*29*
	V14	4.28	*46*	239.97	3.72	22.55	16.30	4.05	*90*
	V15	5.17	*17*	290.16	4.5	24.72	19.60	4.84	*36*
	V16	5.07	*21*	284.5	4.41	24.69	19.30	4.27	*78*
	V17	4.4	*41*	246.87	3.83	23.46	16.70	4.14	*86*
	V18	4.91	*24*	275.46	4.27	22.88	18.70	4.31	*73*
	V19	5.19	*13*	290.9	4.51	23.56	19.80	4.71	*46*
	V20	4.45	*37*	249.74	3.87	24.06	16.90	4.60	*53*
	V21	5.09	*19*	285.39	4.43	24.11	19.40	4.34	*70*
	V22	5.03	*22*	282.06	4.37	22.44	19.10	5.31	*22*
	V23	4.89	*25*	274.44	4.26	21.86	18.60	4.88	*35*
	V24	5.19	*13*	291.3	4.52	23.97	19.70	4.27	*80*
	V25	4.67	*30*	262.17	4.07	23.15	17.70	3.90	*103*
	V26	-		-	-	-		5.54	*17*
	V27	4.46	*36*	249.83	3.88	23.52	16.90	3.99	*94*
	V28	5.28	*11*	295.93	4.6	24.24	20.00	4.57	*56*
	V29	5.47	*6*	306.52	4.76	22.76	20.80	5.08	*24*
	V30	4.89	*25*	273.85	4.25	23.77	18.60	4.64	*51*
	V31	5.68	*1*	318.26	4.94	26.31	21.60	4.59	*55*
	V32	4.42	*38*	247.68	3.85	22.47	16.80	4.41	*65*
	V33	4.62	*33*	258.79	4.02	22.52	17.50	4.36	*68*
	V34	5.5	*4*	308.19	4.79	25.3	20.90	4.98	*32*
	V35	4.98	*23*	278.91	4.33	24.8	18.90	4.27	*79*
	V36	4.75	*28*	265.8	4.13	22.55	18.10	4.34	*71*
	V37	5.35	*8*	299.65	4.66	22.7	20.30	4.98	*33*
	V38	4.65	*31*	260.48	4.05	24.45	17.70	4.24	*82*
	V39	4.42	*38*	247.7	3.85	23.16	16.80	3.92	*100*
	V40	5.19	*13*	290.49	4.51	24.86	19.70	4.56	*58*
	V41	5.34	*9*	298.88	4.64	25.44	20.30	4.73	*42*
	V42	5.27	*12*	295.15	4.59	25.68	20.00	5.06	*26*

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	VADGAON						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)		
N4: 150% of recommended N dose	V1	-		-	-	-		5.37	*20*
	V2	-		-	-	-		6.56	*4*
	V3	-		-	-	-		6.63	*3*
	V4	-		-	-	-		6.43	*8*
	V5	-		-	-	-		6.50	*7*
	V6	-		-	-	-		5.32	*21*
	V7	-		-	-	-		5.42	*18*
	V8	-		-	-	-		4.26	*81*
	V9	-		-	-	-		4.67	*49*
	V10	-		-	-	-		4.70	*47*
	V11	-		-	-	-		5.99	*13*
	V12	-		-	-	-		5.27	*23*
	V13	-		-	-	-		6.31	*11*
	V14	-		-	-	-		2.67	*163*
	V15	-		-	-	-		3.87	*104*
	V16	-		-	-	-		2.86	*158*
	V17	-		-	-	-		4.78	*39*
	V18	-		-	-	-		3.72	*115*
	V19	-		-	-	-		4.43	*63*
	V20	-		-	-	-		6.56	*4*
	V21	-		-	-	-		4.32	*72*
	V22	-		-	-	-		7.75	*1*
	V23	-		-	-	-		5.63	*15*
	V24	-		-	-	-		4.78	*39*
	V25	-		-	-	-		4.73	*43*
	V26	-		-	-	-			
	V27	-		-	-	-		4.83	*37*
	V28	-		-	-	-		7.50	*2*
	V29	-		-	-	-		6.19	*12*
	V30	-		-	-	-		5.38	*19*
	V31	-		-	-	-		4.18	*85*
	V32	-		-	-	-		6.56	*4*
	V33	-		-	-	-		4.73	*43*
	V34	-		-	-	-		6.35	*9*
	V35	-		-	-	-		2.70	*161*
	V36	-		-	-	-		2.47	*164*
	V37	-		-	-	-		5.93	*14*
	V38	-		-	-	-		4.21	*83*
	V39	-		-	-	-		2.69	*162*
	V40	-		-	-	-			
	V41	-		-	-	-		3.53	*126*
	V42	-		-	-	-		6.33	*10*
Interaction									
N at same V		0.03		3.29	0.05	NS			
V at same N		0.92		3.25	0.06	NS			
F1		3.11	*3*	170	2.66	22.36		3.33	*4*
F2		3.99	*2*	222	3.49	22.81	17.53	4.00	*3*
F3		5.01	*1*	281	4.36	23.64	19.05	4.63	*2*
F4		-		-	-	-	-	5.08	*1*
C.D.(0.05)		0.01		0.33	0.05	0.09			
C.V.(%)		0.58		0.64	6.63	1.72			

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	VADGAON						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)		
Mean of varieties:									
V1	29567	4.13	*18*	229	3.58	22.93	18.65	4.12	*21*
V2	29573	3.83	*27*	213	3.32	22.97	17.35	4.18	*19*
V3	29576	4.09	*20*	227	3.55	22.12	18.55	4.44	*10*
V4	29577	4.18	*13*	232	3.63	21.90	18.95	4.55	*5*
V5	29564	4.40	*6*	245	3.82	23.35	20.00	4.45	*9*
V6	28084	4.54	*2*	252	3.94	23.86	20.60	4.52	*7*
V7	29579	-		-	-	-		4.14	*20*
V8	29584	4.48	*3*	247	3.89	22.61	20.25	4.63	*3*
V9	29583	4.43	*4*	245	3.85	22.33	20.05	4.83	*2*
V10	29581	3.74	*32*	206	3.24	22.55	16.90	4.09	*22*
V11	29574	-		-	-	-		3.90	*27*
V12	29568	3.78	*29*	208	3.28	22.06	17.10	3.86	*30*
V13	29578	4.27	*10*	236	3.70	21.82	19.25	4.36	*13*
V14	29572	3.44	*39*	190	2.99	21.90	15.65	3.60	*39*
V15	30255	4.16	*17*	230	3.61	24.01	18.80	4.33	*16*
V16	30256	4.08	*21*	226	3.54	23.98	18.55	3.81	*32*
V17	RP Bio 226	3.54	*38*	196	3.07	22.79	16.05	3.56	*40*
V18	30257	3.95	*24*	218	3.43	22.22	17.95	3.82	*31*
V19	30258	4.17	*16*	231	3.62	22.88	19.00	4.25	*18*
V20	30259	3.58	*35*	198	3.11	23.37	16.25	4.01	*25*
V21	30260	4.09	*19*	226	3.56	23.42	18.60	3.76	*36*
V22	30261	4.05	*22*	224	3.51	21.79	18.35	4.54	*6*
V23	MTU 1121 (RP)	3.94	*25*	218	3.42	21.23	17.90	4.39	*11*
V24	30262	4.18	*13*	231	3.63	23.28	18.95	3.78	*34*
V25	30263	3.76	*30*	208	3.27	22.49	16.95	3.37	*41*
V26	Rasi (Check)	-		-	-	-		4.89	*1*
V27	30264	3.59	*34*	200	3.11	22.79	16.25	3.32	*42*
V28	30265	4.25	*11*	237	3.69	23.49	19.20	4.27	*17*
V29	30266	4.40	*6*	246	3.82	22.06	20.00	4.34	*14*
V30	30267	3.94	*25*	220	3.41	23.04	17.90	4.09	*23*
V31	30268	4.57	*1*	255	3.97	25.50	20.80	4.00	*26*
V32	30269	3.56	*37*	199	3.09	21.77	16.10	3.77	*35*
V33	Varadhan (Check)	3.72	*33*	207	3.23	21.82	16.75	3.74	*37*
V34	30270	4.43	*4*	247	3.85	24.52	20.05	4.38	*12*
V35	30271	4.01	*23*	224	3.48	24.03	18.15	3.88	*29*
V36	30272	3.82	*28*	213	3.32	21.86	17.35	3.90	*28*
V37	30273	4.31	*8*	240	3.74	22.00	19.45	4.33	*15*
V38	TellaHamsa (Check)	3.74	*31*	209	3.25	23.70	17.05	3.79	*33*
V39	30274	3.56	*36*	199	3.09	22.45	16.20	3.67	*38*
V40	BPT 5204 (Sensitive Check)	4.18	*15*	233	3.62	24.09	18.85	4.07	*24*
V41	30275	4.30	*9*	240	3.73	24.66	19.45	4.45	*8*
V42	Swarna	4.24	*12*	237	3.68	24.89	19.20	4.55	*4*
	C.D.(0.05)	0.06		1.9	0.03	0.12			
	C.V.(%)	0.06		0.92	0.93	0.57			
	Expt. Mean	**4.04**		**224**	**3.50**	**22.94**		4.10	
	Soil type	Clay loam							
	pH	-							
	N - levels (kg/ha)								
	F1	0							
	F2	50							
	F3	100							
	F4	-							
	Recommended NPK (kg/ha)	100;50:50							
	Available NPK (kg/ha)	215:17.2:224							

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	LUDHIANA				
		Biological Yield (t/ha)	*Rank*	Tillers/m² (No.)	Panicle wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N1: No nitrogen (Control) (P and K is constant)	V1	3.88	*101*	303.33	60.93	
	V2	2.19	*110*	205	63.3	
	V3	6.89	*62*	126.33	64.03	
	V4	5.94	*78*	155.33	60.13	
	V5	2.95	*108*	159.67	63.7	
	V6	8.13	*45*	210.33	68.9	
	V7	-		-	-	
	V8	7.26	*58*	204.33	58.53	
	V9	6.76	*65*	169	59.1	
	V10	6.22	*73*	178.33	69.13	
	V11	-		-	-	
	V12	2.97	*107*	251.67	49.03	
	V13	4.53	*95*	172.33	59.77	
	V14	5.83	*80*	244	63.2	
	V15	7.74	*52*	193.67	60.8	
	V16	8.36	*39*	211.67	60.27	
	V17	4.2	*99*	202	50.13	
	V18	2.32	*109*	237.33	65.77	
	V19	7.8	*49*	234	79.8	
	V20	6.3	*71*	149	53.1	
	V21	4.25	*98*	117.67	57.93	
	V22	4.83	*92*	164.67	54.7	
	V23	8.38	*38*	178.67	56.67	
	V24	6.18	*75*	191.33	60.73	
	V25	4.16	*100*	312	46.13	
	V26	-		-	-	
	V27	4.49	*97*	188	48.83	
	V28	-		-	-	
	V29	6.11	*77*	211.67	56.3	
	V30	3.55	*105*	168	56.57	
	V31	-		-	-	
	V32	4.79	*93*	176.67	66.83	
	V33	5.31	*88*	210.67	53.7	
	V34	10.79	*16*	214.33	53.03	
	V35	5.59	*81*	200	64.13	
	V36	3.6	*104*	204.67	49.8	
	V37	10.18	*22*	184.67	68	
	V38	5.53	*85*	148.33	67.8	
	V39	4.57	*94*	153	49.07	
	V40	3.55	*105*	216.67	47.53	
	V41	6.83	*63*	237	57	
	V42	3.62	*103*	173.67	45.73	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	LUDHIANA				
		Biological Yield (t/ha)	*Rank*	Tillers/m² (No.)	Panicle wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N2: 50% of recommended N dose (P and K is constant)	V1	4.53	*95*	298.67	65.2	8.67
	V2	9.47	*25*	219.33	65.97	97.07
	V3	8.84	*31*	130.67	63.8	26.00
	V4	8.82	*33*	185.67	64.83	38.40
	V5	7.5	*54*	158.67	61.67	60.67
	V6	11.4	*10*	236	65.57	43.60
	V7	-		-	-	
	V8	9.75	*24*	223	63.37	33.20
	V9	7.82	*47*	194	60.57	14.13
	V10	9.06	*29*	165.67	71.47	37.87
	V11	-		-	-	
	V12	6.54	*67*	290.67	48.57	47.60
	V13	7.45	*55*	169.67	65.17	38.93
	V14	8.26	*41*	235	65.2	32.40
	V15	7.11	*60*	218.33	60.53	-8.40
	V16	7.58	*53*	220.33	61.37	-10.40
	V17	6.15	*76*	206.33	48.67	26.00
	V18	1.93	*111*	242.33	67.3	-5.20
	V19	7.04	*61*	218	73.43	-10.13
	V20	6.46	*68*	143	56.1	2.13
	V21	5.13	*90*	168.67	69.63	11.73
	V22	12.09	*8*	191	69.33	96.80
	V23	10.77	*18*	227	63.5	31.87
	V24	7.32	*56*	182.67	56.57	15.20
	V25	5.57	*83*	212.67	45.03	18.80
	V26	-		-	-	
	V27	8.77	*34*	172.67	52.6	57.07
	V28	-		-	-	
	V29	8.75	*35*	220.67	64.07	35.20
	V30	7.8	*49*	217	62.87	56.67
	V31	-		-	-	
	V32	11.07	*13*	183	70.73	83.73
	V33	6.22	*73*	243.33	57.57	12.13
	V34	10.44	*20*	262.33	67.93	-4.67
	V35	8.19	*43*	188.33	68.77	34.67
	V36	5.53	*85*	191	56.43	25.73
	V37	13.63	*4*	206.67	67.63	46.00
	V38	6.43	*69*	167.67	68.8	12.00
	V39	5.26	*89*	176.33	51.33	9.20
	V40	5.57	*83*	254	52	26.93
	V41	7.28	*57*	223	62	6.00
	V42	3.68	*102*	206.67	48.93	0.80

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	LUDHIANA				
		Biological Yield (t/ha)	*Rank*	Tillers/m² (No.)	Panicle wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N3: 100% of recommended N dose	V1	4.85	*91*	271.33	68.9	6.47
	V2	10.75	*19*	210.67	66.67	57.07
	V3	8.41	*37*	169	63.97	10.13
	V4	10.81	*15*	208	66.47	32.47
	V5	13.35	*5*	213	68.77	69.33
	V6	12.72	*7*	238	65.43	30.60
	V7			-	-	#VALUE!
	V8	9.21	*26*	254.67	66.93	13.00
	V9	9.12	*28*	182	62.13	15.73
	V10	7.95	*46*	204.33	71.03	11.53
	V11	-		-	-	
	V12	8.17	*44*	331.67	59.57	34.67
	V13	9.88	*23*	185.67	66.87	35.67
	V14	11.22	*12*	232.67	65.7	35.93
	V15	8.99	*30*	228	62.3	8.33
	V16	8.36	*39*	244	67.93	0.00
	V17	6.41	*70*	250	50.9	14.73
	V18	6.8	*64*	238	67.77	29.87
	V19	11.72	*9*	217.67	72.53	26.13
	V20	10.34	*21*	156.33	57.77	26.93
	V21	13.17	*6*	203.33	67.9	59.47
	V22	17.22	*1*	224.33	70.57	82.60
	V23	14	*3*	223.33	62.7	37.47
	V24	5.53	*85*	184.33	60.23	-4.33
	V25	6.26	*72*	260.67	52.8	14.00
	V26	-		-	-	
	V27	11.03	*14*	238	61.37	43.60
	V28	-		-	-	
	V29	9.19	*27*	245.67	63	20.53
	V30	8.84	*31*	207.67	66.67	35.27
	V31	-		-	-	
	V32	11.29	*11*	233	71.7	43.33
	V33	7.76	*51*	245	67.03	16.33
	V34	10.79	*16*	262	65.87	0.00
	V35	8.23	*42*	203.67	68.37	17.60
	V36	5.59	*81*	211.67	58.03	13.27
	V37	15.34	*2*	237.67	71.87	34.40
	V38	6.59	*66*	154	73.9	7.07
	V39	7.15	*59*	211	50.17	17.20
	V40	5.85	*79*	254	49.7	15.33
	V41	8.52	*36*	250.67	62.57	11.27
	V42	7.82	*47*	244	58.77	28.00

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	LUDHIANA				
		Biological Yield (t/ha)	*Rank*	Tillers/m² (No.)	Panicle wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
N4: 150% of recommended N dose	V1	-		-	-	
	V2	-		-	-	
	V3	-		-	-	
	V4	-		-	-	
	V5	-		-	-	
	V6	-		-	-	
	V7	-		-	-	
	V8	-		-	-	
	V9	-		-	-	
	V10	-		-	-	
	V11	-		-	-	
	V12	-		-	-	
	V13	-		-	-	
	V14	-		-	-	
	V15	-		-	-	
	V16	-		-	-	
	V17	-		-	-	
	V18	-		-	-	
	V19	-		-	-	
	V20	-		-	-	
	V21	-		-	-	
	V22	-		-	-	
	V23	-		-	-	
	V24	-		-	-	
	V25	-		-	-	
	V26	-		-	-	
	V27	-		-	-	
	V28	-		-	-	
	V29	-		-	-	
	V30	-		-	-	
	V31	-		-	-	
	V32	-		-	-	
	V33	-		-	-	
	V34	-		-	-	
	V35	-		-	-	
	V36	-		-	-	
	V37	-		-	-	
	V38	-		-	-	
	V39	-		-	-	
	V40	-		-	-	
	V41	-		-	-	
	V42	-		-	-	
Interaction						
N at same V		0.55		25.75	1.76	
V at same N		7.84		25.44	1.73	
F1		5.58	*3*	196	58.65	
F2		7.71	*2*	207	61.74	28.34
F3		9.44	*1*	225	64.19	25.70
F4		-		-	-	-
C.D.(0.05)		0.1		2.34	0.11	
C.V.(%)		5.64		4.69	0.78	

Table 4.1(n(i)): (Contd.)

N-levels	Varieties	LUDHIANA				
		Biological Yield (t/ha)	*Rank*	Tillers/m² (No.)	Panicle wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)
Mean of varieties:						
V1	29567	4.42	*36*	291	65.01	7.57
V2	29573	7.47	*22*	212	65.31	77.07
V3	29576	8.05	*13*	142	63.93	18.07
V4	29577	8.52	*9*	183	63.81	35.43
V5	29564	7.93	*16*	177	64.71	65.00
V6	28084	10.75	*4*	228	66.63	37.10
V7	29579	-		-	-	
V8	29584	8.74	*8*	227	62.94	23.10
V9	29583	7.90	*17*	182	60.60	14.93
V10	29581	7.74	*18*	183	70.54	24.70
V11	29574	-		-	-	
V12	29568	5.89	*29*	291	52.39	41.13
V13	29578	7.29	*24*	176	63.94	37.30
V14	29572	8.44	*10*	237	64.70	34.17
V15	30255	7.95	*15*	213	61.21	-0.03
V16	30256	8.10	*11*	225	63.19	-5.20
V17	RP Bio 226	5.59	*31*	219	49.90	20.37
V18	30257	3.68	*37*	239	66.95	12.33
V19	30258	8.85	*7*	223	75.25	8.00
V20	30259	7.70	*19*	149	55.66	14.53
V21	30260	7.52	*21*	163	65.15	35.60
V22	30261	11.38	*2*	193	64.87	89.70
V23	MTU 1121 (RP)	11.05	*3*	210	60.96	34.67
V24	30262	6.34	*27*	186	59.18	5.43
V25	30263	5.33	*32*	262	47.99	16.40
V26	Rasi (Check)	-		-	-	
V27	30264	8.10	*12*	200	54.27	50.33
V28	30265	-		-	-	
V29	30266	8.02	*14*	226	61.12	27.87
V30	30267	6.73	*25*	198	62.04	45.97
V31	30268	-		-	-	
V32	30269	9.05	*6*	198	69.75	63.53
V33	Varadhan (Check)	6.43	*26*	233	59.43	14.23
V34	30270	10.67	*5*	246	62.28	-2.33
V35	30271	7.34	*23*	197	67.09	26.13
V36	30272	4.91	*35*	202	54.75	19.50
V37	30273	13.05	*1*	210	69.17	40.20
V38	TellaHamsa (Check)	6.18	*28*	157	70.17	9.53
V39	30274	5.66	*30*	180	50.19	13.20
V40	BPT 5204 (Sensitive Check)	4.99	*34*	242	49.74	21.13
V41	30275	7.54	*20*	237	60.52	8.63
V42	Swarna	5.04	*33*	208	51.14	14.40
	C.D.(0.05)	0.95		14.87	1.01	
	C.V.(%)	0.94		7.68	1.78	
	Expt. Mean	**7.58**		**209**	**61.53**	
	Soil type	Sandy loam				
	pH	7.4				
	N - levels (kg/ha)					
	F1	0				
	F2	75				
	F3	150				
	F4	225				
	Recommended NPK (kg/ha)	150;50:50				
	Available NPK (kg/ha)	225:24.8:233				

4.1n(ii) NMT – AVT NIL – LPT

Evaluation of identified cultures and cultivars for low phosphorus tolerance in irrigated rice

Phosphorus is an important nutrient for rice production but the use efficiency of this nutrient is very low (20-30%) and its deficiency has been identified as one of the major constraint limiting production of rice in many Indian soils. Enhancing phosphorus use efficiency (PUE) in rice would offer an affordable option for improving yields and economic returns with reduced inputs. Further, research studies have revealed that genotypic differences for PUE exist. There is a need to identify the cultivars which are adopted to low P situations and have higher P use efficiency. Hence, the present trial is constituted to evaluate the identified cultures and cultivars with the following objectives: 1) To study the comparative performance of elite lines and cultivars in different levels of Phosphorus and 2) To identify the elite lines for tolerance to low soil P conditions. The trial was conducted at eight locations (**Gangavathi, Karjat, Mandya, ICAR-IIRR, Ranchi,Raipur, Vadagaon and Varanasi**). Split plot design was adopted with 4 main plots of phosphorus levels (P_1- No Phosphorus (Control) (N and K Constant), P_2: 50 %of recommended P dose (N and K is constant), P_3: 100 % of recommended dose of P (N and K Constant) and P_4: 150% of recommended P dose (N and K constant). Subplots consist of six advanced cultures and six checks. The results were summarized and presented in **Table 4.1n(ii)** and the salient findings are as followed.

Interaction effect of phosphorus level and advanced cultures on grain yield was found significant only at **Gangavathi,** and **ICAR-IIRR**.

At clay loam soils of **Gangavathi,** there is no significant difference between levels of P applied and cultures due to high soil "P" content. Among the cultures tested IET 28066 (R) (5.06 t/ha) followed by IET 28816 (4.77 t/ha) were found promising. The soil "P" level is high at this location.

The cultures and P levels interaction effect was non-significant at **Karjat** and most of the cultures gave significantly higher grain yield at 100% of RDP (recommended dose of P) application. Mean over the cultures P @ 100% RDP application gave significantly higher grain yield (4.26 t/ha) over 50% RDP (3.73 t/ha). Among the cultures tested, IET 28066 (4.01 t/ha) followed by IET 28818 (3.56 t/ha) and IET 28816 (3.51 t/ha) were found promising with better yields and promising over checks.

At **Mandya**, the cultures tested at two doses of P application viz., 0 and 100% RDP. Application of 100% RDP recorded higher grain yield of 6.16 t/ha and all cultures gave better yields at 100% RDP. Among the cultures, IET 27641 (8.04 t/ha) followed by IET 28821 (R) (7.42 t/ha) and IET 28818 (7.34 t/ha) were found promising and gave better yields over checks.

In clay loam soils of **IIRR**, the cultures tested at 50, 100 and 150% of RDP application. Interaction effect was significant, however application of 150% of RDP gave significantly higher grain yield of (5.80 t/ha) and comparable with 100% RDP (5.79 t/ha) while significant

over 50% of RDP (4.80 t/ha). Among the cultures, IET 27641 (7.10 t/ha) followed by IET 28818 (6.06 t/ha) and IET 28816 (5.72 t/ha) were promising and found superior over other cultures.

At **Raipur**, cultures were tested in two level of P application (50 and 100% of RDP). Application of 100% RDP gave significantly higher grain yield (4.18 t/ha) over 50% RDP (3.81 t/ha). Among the cultures, IET 28816 (4.86 t/ha) followed by IET 28818 (4.74 t/ha) and IET 28821 (R) (4.20 t/ha) gave significantly higher yields over other cultures.

At **Ranchi**, three levels of RDP i.e., 0,50 and 100% of RDP is utilized for evaluation of "P" efficient cultivars. Most of the cultures gave significantly higher grain yield at 100% of RDP (60 kg P/ha). Application of 100% RDP gave significantly higher grain yield of 4.89 t/ha followed by 50% RDP (4.74 t/ha). Among the cultures, the promising entries were IET 27641 (5.00 t/ha) followed by IET 28818 (4.75 t/ha) with better yields.

At **Vadagaon**, cultures evaluated at three levels of "P" application viz., 0,50 and 100% RDP. Interaction effect of cultures vs "P" fertilization was significant. The application of 100% RDP gave significantly higher grain yield (4.20 t/ha) over 50% (3.88 t/ha) and No "P" application (3.58 t/ha) and most of the cultures were promising at 50 and 100% RDP application.

Mean over the "P" levels, the cultures IET 28816 (4.44 t/ha) followed by IET 27641 (4.19 t/ha) and IET 28818 (3.92 t/ha) were promising with better yields. All the cultures gave significantly higher yields at 100% RDP application.

At **Varanasi,** interaction effect of phosphorus level and advanced cultures on grain yield was found to be significant. Among the levels of 'P' application (0,50,100% RDP) 100% RDP application gave significantly higher grain yield of 5.73 t/ha over 50% (5.01 t/ha) and No 'P' application (4.40 t/ha). Among the cultures, IET 28821 (R) (6.24 t/ha) followed by IET 28818 (6.05 t/ha) and IET 27641 (5.60 t/ha) found promising with better yields.

Mean over the location (seven location) all the cultures were 'P' responsive except at **Gangavathi** where in soil 'P' level is very high. Among the cultures, across the locations the culture IET 28821 (5.49 t/ha) followed by IET 27641(5.27 t/ha), IET 28816 (4.87 t/ha) and IET 28066 (4.64 t/ha) found promising and gave better yields over other cultures and on par with checks.

Table 4.1(n(ii)): Summary of data on grain yield and ancillary characters of selected AVT NIL LPT cultures grown under transplanted conditions at graded levels of recommended N fertilizer doses, kharif 2021.

P-levels	Varieties	GANGAVATHI						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	4.64	*8*	253	2.68	13.2	110	
	V2	3.94	*19*	280	1.97	14.5	109	
	V3	4.5	*10*	269	2.11	21.5	103	
	V4	4.68	*7*	252	2.76	19.5	105	
	V5	4.42	*12*	252	2.03	18.8	103	
	V6	4.42	*12*	242	2.74	19.9	116	
	V7	4.9	*4*	211	3.14	19.3	103	
	V8	5.69	*1*	194	3.17	19.6	91	
	V9	3.88	*20*	241	2.22	14.3	103	
	V10	4.46	*11*	251	2.15	16.3	103	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
P2: 50% of recommended P dose (N and K is constant)	V1	4.9	*4*	242	2.4	16.6	111	6.93
	V2	4.11	*17*	211	1.87	14.8	109	4.53
	V3	4.26	*15*	204	2.24	21.5	103	-6.40
	V4	4.64	*8*	238	2.06	20.1	105	-1.07
	V5	4.38	*14*	194	2.61	18.5	103	-1.07
	V6	4.97	*3*	222	3.15	20.0	116	14.67
	V7	5.21	*2*	196	3.66	19.4	103	8.27
	V8	4.84	*6*	200	3.56	18.7	91	-22.67
	V9	4.01	*18*	318	2.09	13.8	103	3.47
	V10	4.13	*16*	233	1.9	16.8	103	-8.80
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
P3: 100% of recommended P dose	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
P4: 150% of recommended P dose	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
Interaction								
N at same V		0.38		19.11	0.29	1.23	NS	
V at same N		0.36		19.9	0.28	1.31	NS	

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	GANGAVATHI						
		Grain Yield (t/ha)	***Rank***	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days for 50% Flowering**	**Phosphorous res. (kg grain/kg P) (Base level 0% RDP)**
	F1	4.55	*1*	245	2.50	17.7	105	
	F2	4.55	*2*	226	2.55	18.0	105	-0.21
	F3	-		-	-	-	-	
	F4	-		-	-	-	-	
	C.D.(0.05)	NS		10.5	NS	NS	NS	
	C.V.(%)	0.7		4.02	2.8	3.86	0.49	
	Mean of varieties:							
	V1	4.77	*3*	247	2.54	14.9	110.67	6.93
	V2	4.03	*9*	246	1.92	14.7	109.00	4.53
	V3	4.38	*7*	237	2.18	21.5	103.00	-6.40
	V4	4.66	*5*	245	2.41	19.8	105.00	-1.07
	V5	4.40	*6*	223	2.32	18.6	103.00	-1.07
	V6	4.70	*4*	232	2.95	20.0	116.00	14.67
	V7	5.06	*2*	204	3.40	19.3	103.00	8.27
	V8	5.27	*1*	197	3.37	19.2	91.00	-22.67
	V9	3.95	*10*	279	2.16	14.0	103.00	3.47
	V10	4.30	*8*	242	2.03	16.6	103.00	-8.80
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
	C.D.(0.05)	0.27		13.52	0.21	0.87	1.25	
	C.V.(%)	5.07		4.92	6.99	4.18	1.03	
	Expt. Mean	**4.55**		**235**	**2.53**	**17.85**	**105**	
	Soil type	Black Clay						
	pH	8.2						
	P - levels (kg/ha)							
	P1 (0%)	0						
	P2 (50%)	37.5						
	P3 (100%)	-						
	P4 (150%)	-						
	Recommended NPK (kg/ha)	150:75:75						
	Varieties							
	V1	28816						
	V2	BPT 5204 (Sensitive Check)						
	V3	28818						
	V4	MTU 1121 (RP)						
	V5	27641						
	V6	Swarna (Positive Check)						
	V7	28066 (R)						
	V8	MTU 1010 (RP)						
	V9	28065 (R)						
	V10	Improved Samba Mahsuri (Negative Check)						
	V11	-						
	V12	-						
	Availabe NPK of soil (kg/ha)	-						

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	3.03	*26*	143	1.47	17.2	106	
	V2	2.97	*30*	131	1.31	16.3	109	
	V3	3.03	*26*	147	1.36	21.6	98	
	V4	3.37	*23*	208	1.77	21.5	104	
	V5	3.01	*28*	130	1.35	17.6	97	
	V6	3.26	*24*	164	1.57	19.6	105	
	V7	3.41	*21*	189	1.60	21.4	96	
	V8	3.22	*25*	164	1.59	18.6	90	
	V9	3.00	*29*	136	1.31	19.0	105	
	V10	3.56	*17*	219	2.02	21.4	104	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
P2: 50% of recommended P dose (N and K is constant)	V1	3.48	*18*	219	1.72	21.7	105	18.00
	V2	3.38	*22*	176	1.44	19.2	109	16.40
	V3	3.58	*16*	228	1.94	24.9	99	22.00
	V4	4.03	*9*	265	2.49	23.4	104	26.40
	V5	3.47	*19*	188	1.36	19.9	97	18.40
	V6	3.88	*14*	234	2.00	22.0	105	24.80
	V7	4.04	*8*	248	2.21	22.5	97	25.20
	V8	3.76	*15*	223	1.85	22.0	91	21.60
	V9	3.46	*20*	194	1.59	21.9	105	18.40
	V10	4.23	*6*	265	2.40	23.0	104	26.80
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
P3: 100% of recommended P dose	V1	4.03	*9*	221	1.81	22.59	105	20.00
	V2	3.92	*13*	175	1.61	21.19	108	19.00
	V3	4.07	*7*	221	2.04	24.91	99	20.80
	V4	4.56	*3*	267	2.54	24.66	105	23.80
	V5	4.00	*12*	198	1.46	21.44	98	19.80
	V6	4.40	*4*	237	2.05	24.53	105	22.80
	V7	4.58	*2*	253	2.32	24.45	98	23.40
	V8	4.30	*5*	229	1.96	21.67	92	21.60
	V9	4.01	*11*	203	1.62	23.48	106	20.20
	V10	4.77	*1*	266	2.71	24.95	103	24.20
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
P4: 150% of recommended P dose	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
Interaction								
N at same V		NS		NS	NS	NS	NS	
V at same N		NS		NS	NS	NS	NS	

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	***Rank***	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days for 50% Flowering**	**Phosphorous res. (kg grain/kg P) (Base level 0% RDP)**
	F1	3.19	*3*	163	1.54	19.4	101	
	F2	3.73	*2*	224	1.90	22.0	102	21.80
	F3	4.26	*1*	227	2.01	23	102	21.56
	F4	-		-	-	-	-	
	C.D.(0.05)	0.18		5.20	0.18	1.20	NS	
	C.V.(%)	10.5		5.54	21.19	12.06	0.70	
Mean of varieties:								
	V1	3.51	*7*	194	1.67	20.5	105.33	19.00
	V2	3.42	*10*	160	1.45	18.9	108.67	17.70
	V3	3.56	*6*	199	1.78	23.8	98.67	21.40
	V4	3.99	*3*	247	2.27	23.2	104.00	25.10
	V5	3.49	*8*	172	1.39	19.6	97.33	19.10
	V6	3.85	*4*	212	1.87	22.0	105.00	23.80
	V7	4.01	*2*	230	2.04	22.8	97.00	24.30
	V8	3.76	*5*	205	1.80	20.7	90.78	21.60
	V9	3.49	*9*	178	1.51	21.5	105.22	19.30
	V10	4.19	*1*	250	2.38	23.1	103.78	25.50
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
	C.D.(0.05)	0.29		10.80	0.42	1.57	0.77	
	C.V.(%)	8.13		5.60	24.57	7.69	0.80	
	Expt. Mean	**3.73**		**205**	**1.82**	**21.62**	**102**	
	Soil type	-						
	pH	8.2						
P - levels (kg/ha)								
	P1 (0%)	0						
	P2 (50%)	25						
	P3 (100%)	50						
	P4 (150%)	-						
	Recommended NPK (kg/ha)	100:50:50						
Varieties								
	V1	28816						
	V2	BPT 5204 (Sensitive Check)						
	V3	28818						
	V4	MTU 1121 (RP)						
	V5	27641						
	V6	Swarna (Positive Check)						
	V7	28066 (R)						
	V8	MTU 1010 (RP)						
	V9	28065 (R)						
	V10	Improved Samba Mahsuri (Negative Check)						
	V11	-						
	V12	-						
	Availabe NPK of soil (kg/ha)	-						

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	MANDYA						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	6.54	*10*	321	4.00	21.65	104	
	V2	4.74	*18*	359	2.41	15.38	104	
	V3	7.27	*6*	311	4.55	21.77	97	
	V4	6.85	*9*	303	4.12	20.91	101	
	V5	7.96	*2*	352	3.14	25.35	101	
	V6	5.15	*14*	355	2.90	21.41	104	
	V7	4.43	*19*	323	2.31	20.18	97	
	V8	4.84	*17*	353	2.03	24.46	89	
	V9	3.75	*22*	329	2.05	14.43	94	
	V10	4.29	*20*	357	1.91	15.36	96	
	V11	-		-	-	-	-	
	V12	7.56	*3*	340	4.96	25.97	94	
P2: 50% of recommended P dose (N and K is constant)	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
P3: 100% of recommended P dose	V1	7.24	*7*	325	4.04	21.44	104	14.00
	V2	5.08	*16*	348	2.50	15.35	104	6.80
	V3	7.41	*4*	293	4.32	21.64	97	2.80
	V4	7.12	*8*	285	3.69	21.69	101	5.40
	V5	8.11	*1*	343	3.64	25.45	101	3.00
	V6	5.85	*11*	312	2.85	22.45	104	14.00
	V7	5.28	*13*	358	2.76	23.05	96	17.00
	V8	5.11	*15*	349	2.30	27.26	89	5.40
	V9	3.90	*21*	342	2.11	14.09	93	3.00
	V10	5.33	*12*	333	2.27	16.24	95	20.80
	V11	-		-	-	-	-	
	V12	7.28	*5*	299	3.68	22.27	94	-5.60
P4: 150% of recommended P dose	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
Interaction								
N at same V		NS		NS	0.43	1.93	NS	
V at same N		NS		NS	0.42	1.88	NS	

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	MANDYA						
		Grain Yield (t/ha)	***Rank***	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days for 50% Flowering**	**Phosphorous res. (kg grain/kg P) (Base level 0% RDP)**
	F1	5.76	*2*	337	3.13	20.6	98	
	F2	-		-	-	-	-	
	F3	6.16	*1*	326	3.11	21	98	7.87
	F4	-		-	-	-	-	
	C.D.(0.05)	NS		9.58	NS	NS	NS	
	C.V.(%)	10.25		2.73	3.44	2.18	0.45	
Mean of varieties:								
	V1	6.89	*5*	323	4.02	21.5	104.00	14.00
	V2	4.91	*8*	353	2.46	15.4	104.17	6.80
	V3	7.34	*3*	302	4.44	21.7	97.00	2.80
	V4	6.99	*4*	294	3.91	21.3	101.00	5.40
	V5	8.04	*1*	348	3.39	25.4	101.00	3.00
	V6	5.50	*6*	333	2.88	21.9	104.00	14.00
	V7	4.86	*9*	341	2.54	21.6	96.67	17.00
	V8	4.98	*7*	351	2.17	25.9	89.00	5.40
	V9	3.83	*11*	335	2.08	14.3	93.67	3.00
	V10	4.81	*10*	345	2.09	15.8	95.67	20.80
	V11	-		-	-	-	-	
	V12	7.42	*2*	320	4.32	24.1	94.00	-5.60
	C.D.(0.05)	1.01		NS	0.30	1.36	1.40	
	C.V.(%)	14.51		10.64	8.30	5.61	1.22	
	Expt. Mean	**5.96**		**331**	**3.12**	**20.81**	**98**	
	Soil type	Red Sandy Loam						
	pH	7.6						
P - levels (kg/ha)								
	P1 (0%)	0						
	P2 (50%)	-						
	P3 (100%)	50						
	P4 (150%)	-						
	Recommended NPK (kg/ha)	100:50:50						
Varieties								
	V1	28816						
	V2	BPT 5204 (Sensitive Check)						
	V3	28818						
	V4	MTU 1121 (RP)						
	V5	27641						
	V6	Swarna (Positive Check)						
	V7	28066 (R)						
	V8	MTU 1010 (RP)						
	V9	28065 (R)						
	V10	Improved Samba Mahsuri (Negative Check)						
	V11	-						
	V12	28821 (R)						
	Availabe NPK of soil (kg/ha)	281:98:281						

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	IIRR					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	-		-	-	-	
	V2	-		-	-	-	
	V3	-		-	-	-	
	V4	-		-	-	-	
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	-		-	-	-	
	V11	-		-	-	-	
	V12	-		-	-	-	
P2: 50% of recommended P dose (N and K is constant)	V1	4.96	*20*	284	36.5	18.7	
	V2	4.78	*21*	363	29.5	15.2	
	V3	5.56	*17*	348	28.7	18.6	
	V4	5.80	*16*	338	26.9	21.9	
	V5	6.94	*3*	359	22.2	25.8	
	V6	4.31	*26*	348	20.8	22.1	
	V7	4.57	*22*	320	29.2	21.2	
	V8	2.83	*30*	324	23.6	21.6	
	V9	4.57	*22*	331	23.1	16.2	
	V10	3.71	*27*	284	24.9	18.8	
	V11	-		-	-	-	
	V12	-		-	-	-	
P3: 100% of recommended P dose	V1	5.90	*15*	313	36.9	16.9	47.00
	V2	6.75	*4*	299	28.1	15.4	98.50
	V3	6.38	*5*	302	48.7	19.2	41.00
	V4	6.18	*12*	295	36.8	22.4	19.00
	V5	7.18	*1*	284	25.2	20.5	12.00
	V6	4.37	*25*	288	25.6	20.2	3.00
	V7	6.27	*8*	309	31.2	21.4	85.00
	V8	3.37	*29*	288	24.5	22.2	27.00
	V9	6.19	*11*	277	21.7	18.6	81.00
	V10	5.29	*18*	320	20.9	18.9	79.00
	V11	-		-	-	-	
	V12	-		-	-	-	
P4: 150% of recommended P dose	V1	6.31	*7*	238	36.1	15.5	33.75
	V2	6.20	*10*	299	27.5	13.6	35.50
	V3	6.25	*9*	224	47.4	18.7	17.25
	V4	6.17	*13*	256	36.0	22.4	9.25
	V5	7.17	*2*	249	22.3	20.9	5.75
	V6	4.50	*24*	242	25.5	19.1	4.75
	V7	6.32	*6*	224	27.1	22.9	43.75
	V8	3.61	*28*	267	21.5	20.8	19.50
	V9	6.14	*14*	238	18.8	16.4	39.25
	V10	5.28	*19*	270	22.3	18.7	39.25
	V11	-		-	-	-	
	V12	-		-	-	-	
Interaction							
N at same V		0.74		NS	2.92	1.38	
V at same N		0.71		NS	2.80	1.32	

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	IIRR					
		Grain Yield (t/ha)	***Rank***	**Panicle/m^2 (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Phosphorous res. (kg grain/kg P) (Base level 50% RDP)**
	F1	-		-	-	-	
	F2	4.80	*3*	330	26.54	20.0	
	F3	5.79	*2*	298	29.96	19.6	49.25
	F4	5.80	*1*	251	28.44	18.91	24.80
	C.D.(0.05)	0.17		27.53	0.66	0.20	
	C.V.(%)	6.96		20.51	5.12	2.21	
	Mean of varieties:						
	V1	5.72	*5*	279	36.50	17.1	40.38
	V2	5.91	*4*	320	28.37	14.8	67.00
	V3	6.06	*2*	292	41.60	18.8	29.13
	V4	6.05	*3*	296	33.23	22.2	14.13
	V5	7.10	*1*	297	23.24	22.4	8.87
	V6	4.39	*9*	293	23.95	20.5	3.88
	V7	5.72	*6*	284	29.16	21.8	64.38
	V8	3.27	*10*	293	23.20	21.5	23.25
	V9	5.63	*7*	282	21.18	17.1	60.13
	V10	4.76	*8*	292	22.70	18.8	59.13
	V11						
	V12						
	C.D.(0.05)	0.43		NS	1.69	0.80	
	C.V.(%)	8.26		11.63	6.32	4.34	
	Expt. Mean	**5.46**		**293**	**28.31**	**19.50**	
	Soil type	Clay Loam					
	pH	8.5, 7.4,7.1, 7.3					
	P - levels (kg/ha)						
	P1 (0%)	0					
	P2 (50%)	20					
	P3 (100%)	40					
	P4 (150%)	60					
	Recommended NPK (kg/ha)	120:40:40					
	Varieties						
	V1	28816					
	V2	BPT 5204 (Sensitive Check)					
	V3	28818					
	V4	MTU 1121 (RP)					
	V5	27641					
	V6	Swarna (Positive Check)					
	V7	28066 (R)					
	V8	MTU 1010 (RP)					
	V9	28065 (R)					
	V10	Improved Samba Mahsuri (Negative Check)					
	V11	-					
	V12	-					
	Availabe NPK of soil (kg/ha)	-					

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	RAIPUR						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
P2: 50% of recommended P dose (N and K is constant)	V1	4.36	*10*	171	3.17	19.2	113	
	V2	3.26	*19*	266	2.34	15.0	113	
	V3	4.63	*5*	194	3.85	20.5	106	
	V4	4.41	*7*	218	3.46	21.4	107	
	V5	4.21	*12*	194	2.80	25.3	103	
	V6	4.32	*11*	204	2.44	20.0	116	
	V7	3.56	*17*	230	2.23	19.4	101	
	V8	2.97	*23*	209	2.25	24.0	89	
	V9	2.87	*24*	224	2.29	14.7	113	
	V10	3.02	*22*	216	2.23	14.4	113	
	V11	4.00	*14*	224	3.22	18.8	71	
	V12	4.11	*13*	225	3.36	27.3	70	
P3: 100% of recommended P dose	V1	5.35	*1*	212	3.68	19.8	113	33.00
	V2	3.73	*16*	280	2.42	15.1	114	15.67
	V3	4.84	*2*	205	4.02	21.1	105	7.00
	V4	4.71	*4*	230	3.54	21.7	106	10.00
	V5	4.41	*7*	209	3.14	25.4	103	6.67
	V6	4.56	*6*	224	2.92	20.5	116	8.00
	V7	3.82	*15*	241	2.34	20.2	100	8.67
	V8	3.29	*18*	227	2.29	24.4	90	10.67
	V9	3.04	*21*	245	2.42	14.9	112	5.67
	V10	3.22	*20*	239	2.48	14.6	113	6.67
	V11	4.39	*9*	238	3.33	19.2	69	13.00
	V12	4.82	*3*	245	3.59	27.6	70	23.67
P4: 150% of recommended P dose	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
Interaction								
N at same V		NS		NS	NS	NS	NS	
V at same N		NS		NS	NS	NS	NS	

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	RAIPUR						
		Grain Yield (t/ha)	***Rank***	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days for 50% Flowering**	**Phosphorous res. (kg grain/kg P) (Base level 50% RDP)**
F1		-		-	-	-	-	
F2		3.81	*2*	215	2.80	20.0		
F3		4.18	*1*	233	3.01	20.4	101	12.39
F4		-		-	-	-	-	
C.D.(0.05)		0.24		16.31	0.16	NS	0.12	
C.V.(%)		5.88		7.19	5.51	2.09	0.12	
Mean of varieties:								
	V1	4.86	*1*	191	3.43	19.5	113.00	33.00
	V2	3.50	*9*	273	2.38	15.1	113.17	15.67
	V3	4.74	*2*	199	3.94	20.8	105.50	7.00
	V4	4.56	*3*	224	3.50	21.6	106.67	10.00
	V5	4.31	*6*	202	2.97	25.4	103.00	6.67
	V6	4.44	*5*	214	2.68	20.2	116.00	8.00
	V7	3.69	*8*	235	2.29	19.8	100.67	8.67
	V8	3.13	*10*	218	2.27	24.2	89.17	10.67
	V9	2.96	*12*	235	2.36	14.8	112.17	5.67
	V10	3.12	*11*	228	2.36	14.5	113.00	6.67
	V11	4.20	*7*	231	3.28	19.0	70.17	13.00
	V12	4.47	*4*	235	3.48	27.5	70.00	23.67
C.D.(0.05)		0.35		17.74	0.24	0.66	0.88	
C.V.(%)		7.64		6.86	7.20	2.83	0.75	
Expt. Mean		**4.00**		**224**	**2.91**	**20.19**	**101**	
Soil type		Vertisols						
pH		7.1						
P - levels (kg/ha)								
P1 (0%)		-						
P2 (50%)		30						
P3 (100%)		60						
P4 (150%)		-						
Recommended NPK (kg/ha)		100:60:40						
Varieties								
	V1	28816						
	V2	BPT 5204 (Sensitive Check)						
	V3	28818						
	V4	MTU 1121 (RP)						
	V5	27641						
	V6	Swarna (Positive Check)						
	V7	28066 (R)						
	V8	MTU 1010 (RP)						
	V9	28065 (R)						
	V10	Improved Samba Mahsuri (Negative Check)						
	V11	Rasi (Positive Check)						
	V12	28821 (R)						
Availabe NPK of soil (kg/ha)		183:18:349						

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	RANCHI							
		Grain Yield (t/ha)	*Rank*	Panicle/m^2 (No.)	Test wt (g)	No grains/panicle	P % in grain	P% in straw	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	4.32	*26*	255	24.3	89	0.21	0.05	
	V2	4.64	*17*	275	25.2	96	0.23	0.06	
	V3	4.43	*23*	258	24.2	90	0.21	0.05	
	V4	5.02	*9*	294	24.8	102	0.23	0.06	
	V5	4.80	*16*	279	24.3	98	0.22	0.06	
	V6	5.10	*6*	295	24.8	104	0.22	0.06	
	V7	4.53	*21*	264	24.3	93	0.22	0.06	
	V8	4.12	*28*	238	23.3	84	0.21	0.05	
	V9	3.96	*30*	229	23.2	81	0.21	0.05	
	V10	4.35	*24*	252	24.3	89	0.21	0.06	
	V11	-		-	-	-	-	-	
	V12	-		-	-	-	-	-	
P2: 50% of recommended P dose (N and K is constant)	V1	4.84	*14*	275	24.3	99	0.23	0.06	17.33
	V2	4.60	*18*	285	25.3	101	0.29	0.06	-1.33
	V3	4.81	*15*	278	24.2	97	0.24	0.06	12.67
	V4	5.14	*5*	298	25.2	106	0.24	0.06	4.00
	V5	5.04	*7*	290	24.4	102	0.23	0.06	8.00
	V6	5.22	*3*	300	24.8	108	0.23	0.06	4.00
	V7	4.87	*11*	276	24.3	97	0.24	0.06	11.33
	V8	4.34	*25*	248	24.7	89	0.24	0.06	7.33
	V9	4.02	*29*	230	23.5	82	0.23	0.06	2.00
	V10	4.52	*22*	258	24.4	92	0.24	0.06	5.67
	V11	-		-	-	-	-	-	
	V12	-		-	-	-	-	-	
P3: 100% of recommended P dose	V1	4.87	*11*	280	24.4	99	0.24	0.06	9.17
	V2	5.02	*9*	293	25.3	103	0.24	0.06	6.33
	V3	4.85	*13*	278	24.2	98	0.25	0.07	7.00
	V4	5.32	*1*	311	25.3	110	0.25	0.06	5.00
	V5	5.17	*4*	295	24.4	105	0.24	0.07	6.17
	V6	5.24	*2*	303	24.9	107	0.25	0.07	2.33
	V7	5.03	*8*	288	24.4	104	0.24	0.07	8.33
	V8	4.58	*20*	262	23.8	93	0.25	0.06	7.67
	V9	4.18	*27*	242	24.8	84	0.25	0.06	3.67
	V10	4.59	*19*	265	24.5	94	0.25	0.07	4.00
	V11	-		-	-	-	-	-	
	V12	-		-	-	-	-	-	
P4: 150% of recommended P dose	V1	-		-	-	-	-	-	
	V2	-		-	-	-	-	-	
	V3	-		-	-	-	-	-	
	V4	-		-	-	-	-	-	
	V5	-		-	-	-	-	-	
	V6	-		-	-	-	-	-	
	V7	-		-	-	-	-	-	
	V8	-		-	-	-	-	-	
	V9	-		-	-	-	-	-	
	V10	-		-	-	-	-	-	
	V11	-		-	-	-	-	-	
	V12	-		-	-	-	-	-	
Interaction									
N at same V		NS		NS	NS	NS	0.02	NS	
V at same N		NS		NS	NS	NS	0.02	NS	

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	RANCHI							
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Test wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
F1		4.53	*3*	264	24.25	92.6	0.2	0.1	
F2		4.74	*2*	274	24.51	97.4	0.2	0.1	7.10
F3		4.89	*1*	282	24.59	100	0	0	5.97
F4									
C.D.(0.05)		0.11		6.16	NS	2.74	0.01	0.00	
C.V.(%)		5.21		4.92	3.01	6.19	4.97	4.36	
Mean of varieties:									
	V1	4.68	*7*	270	24.31	95.9	0.2	0.1	13.25
	V2	4.75	*5*	284	25.24	99.6	0.3	0.1	2.50
	V3	4.70	*6*	271	24.21	95.3	0.2	0.1	9.83
	V4	5.16	*2*	301	25.09	105.9	0.2	0.1	4.50
	V5	5.00	*3*	288	24.35	101.9	0.2	0.1	7.08
	V6	5.19	*1*	299	24.81	106.6	0.2	0.1	3.17
	V7	4.81	*4*	276	24.31	98.3	0.2	0.1	9.83
	V8	4.35	*9*	249	23.92	88.8	0.2	0.1	7.50
	V9	4.05	*10*	234	23.83	82.2	0.2	0.1	2.83
	V10	4.49	*8*	258	24.41	91.9	0.2	0.1	4.83
	V11	-		-	-	-	-	-	
	V12	-		-	-	-	-	-	
C.D.(0.05)		0.41		23.97	0.46	5.18	0.01	0.00	
C.V.(%)		9.29		9.31	2.00	5.68	5.02	7.65	
Expt. Mean		**4.72**		**273**	**24.45**	**96.64**	**0.23**	**0.06**	
Soil type		-							
pH		7.7							
P - levels (kg/ha)									
P1 (0%)		0							
P2 (50%)		30							
P3 (100%)		60							
P4 (150%)		-							
Recommended NPK (kg/ha)		120:60:40							
Varieties									
V1		28816							
V2		BPT 5204 (Sensitive Check)							
V3		28818							
V4		MTU 1121 (RP)							
V5		27641							
V6		Swarna (Positive Check)							
V7		28066 (R)							
V8		MTU 1010 (RP)							
V9		28065 (R)							
V10		Improved Samba Mahsuri (Negative Check)							
V11		-							
V12		-							
Availabe NPK of soil (kg/ha)		225:34:160							

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	VADAGAON					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	4.09	*12*	225	3.50	17.5	
	V2	4.17	*9*	229	3.56	17.8	
	V3	3.61	*26*	199	3.09	21.0	
	V4	3.30	*34*	181	2.82	16.9	
	V5	3.86	*18*	212	3.30	19.0	
	V6	3.18	*36*	175	2.72	17.9	
	V7	3.24	*35*	178	2.77	19.5	
	V8	3.63	*25*	200	3.11	13.0	
	V9	3.44	*32*	189	2.94	17.1	
	V10	3.38	*33*	186	2.89	23.4	
	V11	3.53	*29*	194	3.02	20.9	
	V12	3.55	*28*	195	3.03	21.4	
P2: 50% of recommended P dose (N and K is constant)	V1	4.43	*5*	244	3.88	17.7	13.60
	V2	4.51	*4*	248	3.95	18.0	13.60
	V3	3.91	*16*	215	3.42	21.2	12.00
	V4	3.57	*27*	196	3.12	17.1	10.80
	V5	4.18	*8*	230	3.66	19.2	12.80
	V6	3.45	*31*	190	3.01	18.1	10.80
	V7	3.51	*30*	193	3.07	19.7	10.80
	V8	3.93	*15*	216	3.44	13.2	12.00
	V9	3.72	*23*	205	3.25	17.2	11.20
	V10	3.66	*24*	201	3.20	23.6	11.20
	V11	3.82	*20*	210	3.34	21.2	11.60
	V12	3.84	*19*	211	3.36	21.6	11.60
P3: 100% of recommended P dose	V1	4.80	*2*	278	4.29	18.6	14.20
	V2	4.89	*1*	283	4.37	18.9	14.40
	V3	4.24	*7*	246	3.79	22.3	12.60
	V4	3.87	*17*	224	3.46	18.0	11.40
	V5	4.53	*3*	263	4.04	20.2	13.40
	V6	3.73	*22*	216	3.33	19.0	11.00
	V7	3.80	*21*	220	3.40	20.7	11.20
	V8	4.26	*6*	247	3.81	13.8	12.60
	V9	4.03	*13*	234	3.60	18.1	11.80
	V10	3.96	*14*	230	3.54	24.9	11.60
	V11	4.14	*11*	240	3.70	22.3	12.20
	V12	4.16	*10*	241	3.72	22.7	12.20
P4: 150% of recommended P dose	V1	-		-	-	-	
	V2	-		-	-	-	
	V3	-		-	-	-	
	V4	-		-	-	-	
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	-		-	-	-	
	V11	-		-	-	-	
	V12	-		-	-	-	
Interaction							
N at same V		0.04		1.96	0.03	NS	
V at same N		0.08		4.14	0.10	NS	

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	VADAGAON					
		Grain Yield (t/ha)	***Rank***	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Phosphorous res. (kg grain/kg P) (Base level 0% RDP)**
F1		3.58	*3*	197	3.06	18.8	
F2		3.88	*2*	213	3.39	19.0	11.83
F3		4.20	*1*	244	3.75	20	12.38
F4		-		-	-	-	
C.D.(0.05)		0.10		5.27	0.13	0.01	
C.V.(%)		5.95		5.78	9.08	0.08	
Mean of varieties:							
V1		4.44	*2*	249	3.89	17.9	13.90
V2		4.52	*1*	254	3.96	18.2	14.00
V3		3.92	*5*	220	3.43	21.5	12.30
V4		3.58	*10*	201	3.13	17.3	11.10
V5		4.19	*3*	235	3.67	19.5	13.10
V6		3.45	*12*	194	3.02	18.3	10.90
V7		3.52	*11*	197	3.08	20.0	11.00
V8		3.94	*4*	221	3.45	13.3	12.30
V9		3.73	*8*	209	3.26	17.5	11.50
V10		3.67	*9*	206	3.21	24.0	11.40
V11		3.83	*7*	215	3.35	21.5	11.90
V12		3.85	*6*	216	3.37	21.9	11.90
C.D.(0.05)		0.02		1.13	0.02	0.45	
C.V.(%)		0.56		0.56	0.55	2.48	
Expt. Mean		**3.89**		**218**	**3.40**	**19.24**	
Soil type		-					
pH		7.8					
P - levels (kg/ha)							
P1 (0%)		0					
P2 (50%)		25.0					
P3 (100%)		50					
P4 (150%)		-					
Recommended NPK (kg/ha)		100:50:50					
Varieties							
V1		28816					
V2		BPT 5204 (Sensitive Check)					
V3		28818					
V4		MTU 1121 (RP)					
V5		27641					
V6		Swarna (Positive Check)					
V7		28066 (R)					
V8		MTU 1010 (RP)					
V9		28065 (R)					
V10		Improved Samba Mahsuri (Negative Check)					
V11		Rasi (Positive Check)					
V12		28821 (R)					
Availabe NPK of soil (kg/ha)		212:17:250					

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	VARANASI						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m^2 (No.)	Panicle wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)		
P1: 0% of recommended P dose (N and K is constant)	V1	3.43	*31*	236	1.76	106		4.34	*31*
	V2	3.67	*28*	223	1.89	106		4.02	*38*
	V3	5.20	*15*	190	2.73	101		4.67	*24*
	V4	5.03	*19*	172	2.61	102		4.71	*22*
	V5	5.10	*18*	203	2.31	101		4.86	*18*
	V6	5.20	*15*	243	1.84	102		4.39	*30*
	V7	5.13	*17*	226	2.25	101		4.27	*34*
	V8	3.50	*30*	208	1.98	74		4.17	*36*
	V9	3.23	*32*	238	1.51	103		3.54	*45*
	V10	3.10	*33*	174	1.61	103		3.86	*42*
	V11	-		-	-	-		3.53	*46*
	V12	5.80	*8*	210	2.71	103		5.64	*10*
P2: 50% of recommended P dose (N and K is constant)	V1	4.10	*25*	244	1.75	105	22.33	4.44	*29*
	V2	4.00	*26*	233	1.90	105	11.00	4.09	*37*
	V3	5.53	*10*	200	2.81	100	11.00	4.61	*25*
	V4	5.50	*11*	198	2.90	103	15.67	4.73	*21*
	V5	5.40	*13*	226	2.72	101	10.00	4.80	*19*
	V6	6.73	*3*	268	1.71	103	51.00	4.70	*23*
	V7	5.33	*14*	231	2.47	100	6.67	4.44	*28*
	V8	4.77	*21*	257	2.07	73	42.33	3.92	*39*
	V9	3.60	*29*	283	1.59	102	12.33	3.75	*43*
	V10	3.90	*27*	224	1.82	103	26.67	3.88	*41*
	V11	-		-	-	-		3.91	*40*
	V12	6.30	*5*	215	2.75	101	16.67	4.75	*20*
P3: 100% of recommended P dose	V1	4.70	*22*	292	1.94	107	21.17	5.27	*14*
	V2	4.63	*23*	299	2.05	105	16.00	4.86	*17*
	V3	7.43	*1*	254	3.26	99	37.17	5.60	*11*
	V4	5.63	*9*	205	2.97	103	10.00	5.34	*12*
	V5	6.30	*5*	260	2.59	102	20.00	5.67	*9*
	V6	7.23	*2*	306	2.24	104	33.83	5.05	*15*
	V7	6.00	*7*	265	2.27	101	14.50	4.97	*16*
	V8	5.43	*12*	265	2.46	74	32.17	4.33	*32*
	V9	4.80	*20*	310	1.74	101	26.17	4.31	*33*
	V10	4.20	*24*	292	1.81	103	18.33	4.48	*27*
	V11	-		-	-	-		4.27	*35*
	V12	6.63	*4*	238	3.22	101	13.83	5.72	*8*
P4: 150% of recommended P dose	V1	-		-	-	-		6.31	*3*
	V2	-		-	-	-		6.20	*5*
	V3	-		-	-	-		6.25	*4*
	V4	-		-	-	-		6.17	*6*
	V5	-		-	-	-		7.17	*1*
	V6	-		-	-	-		4.50	*26*
	V7	-		-	-	-		6.32	*2*
	V8	-		-	-	-		3.61	*44*
	V9	-		-	-	-		6.14	*7*
	V10	-		-	-	-		5.28	*13*
	V11	-		-	-	-			
	V12	-		-	-	-			
Interaction									
N at same V		0.47		13.77	NS	1.42			
V at same N		0.46		13.14	NS	1.37			

Table 4.1(n(ii)): (Contd.)

P-levels	Varieties	VARANASI						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)		
	F1	4.40	*3*	211	2.11	100.2		4.33	*4*
	F2	5.01	*2*	234	2.23	99.6	20.52	4.36	*3*
	F3	5.73	*1*	271	2.41	100	22.11	5.03	*2*
	F4	-		-	-	-		5.80	*1*
	C.D.(0.05)	0.16		0.74	0.05	NS			
	C.V.(%)	7.30		0.71	5.17	0.95			
	Mean of varieties:								
	V1	4.08	*9*	257	1.82	105.9	21.75	4.87	*5*
	V2	4.10	*8*	251	1.95	105.3	13.50	4.39	*8*
	V3	6.05	*3*	214	2.93	99.8	24.08	5.09	*3*
	V4	5.39	*6*	192	2.83	102.7	12.83	5.05	*4*
	V5	5.60	*4*	230	2.54	101.3	15.00	5.27	*2*
	V6	6.39	*1*	272	1.93	103.3	42.42	4.74	*6*
	V7	5.49	*5*	241	2.33	100.8	10.58	4.64	*7*
	V8	4.57	*7*	243	2.17	73.6	37.25	4.16	*9*
	V9	3.88	*10*	277	1.61	102.0	19.25	3.94	*12*
	V10	3.73	*11*	230	1.75	103.0	22.50	4.13	*10*
	V11	-		-	-	-		4.01	*11*
	V12	6.24	*2*	221	2.89	101.9	15.25	5.49	*1*
	C.D.(0.05)	0.27		7.95	0.22	0.82			
	C.V.(%)	5.66		3.53	10.59	0.87			
	Expt. Mean	**5.05**		**239**	**2.25**	**99.96**		4.67	
	Soil type	-							
	pH	-							
	P - levels (kg/ha)								
	P1 (0%)	0							
	P2 (50%)	30							
	P3 (100%)	60							
	P4 (150%)	-							
	Recommended NPK (kg/ha)	120:60:60							
	Varieties								
	V1	28816							
	V2	BPT 5204 (Sensitive Check)							
	V3	28818							
	V4	MTU 1121 (RP)							
	V5	27641							
	V6	Swarna (Positive Check)							
	V7	28066 (R)							
	V8	MTU 1010 (RP)							
	V9	28065 (R)							
	V10	Improved Samba Mahsuri (Negative Check)							
	V11	-							
	V12	28821 (R)							
	Availabe NPK of soil (kg/ha)	194:17:218							

4.1n(iii) NMT – IVT NIL – LPT

Evaluation of identified cultures and cultivars for low phosphorus tolerance in irrigated rice

Phosphorus is an important nutrient for rice production but the use efficiency of this nutrient is very low (20-30%) and phosphorus deficiency has been identified as one of the major constraint limiting production of rice. Enhancing phosphorus use efficiency (PUE) in rice would offer an affordable option for improving yields and economic returns with reduced inputs. Further, research studies have revealed that genotypic differences for PUE exist. There is a need to identify the cultivars which are adopted to low P situations and have higher P use efficiency. Hence the present trial is constituted to evaluate the identified cultures and cultivars with the following objectives: 1) To study the comparative performance of elite lines and cultivars in different levels of Phosphorus and 2) To identify the elite lines for tolerance to low soil P conditions. The trial was conducted at seven locations (**Gangavathi, Karjat, Mandya, IIRR, Raipur, Vadagaon and Varanasi**). Split plot design was adopted with 4 main plots of phosphorus levels (P_1- No Phosphorus (Control) (N and K Constant), P_2: 50 %of recommended P dose (N and K is constant), P_3: 100 % of recommended dose of P and P_4: 150% of recommended P dose (N and K constant). Subplots consist of 36 advanced cultures and six checks. The results were summarized and presented in **Table 4.1n(iii)** and the salient findings are as followed.

Interaction effect of phosphorus level and advanced cultures on grain yield was found significant only at **Karjat, Vadagaon** and **Varanasi**.

At clay loam soils of **Gangavathi,** there is no significant difference between levels of P applied and cultures. Among the cultures tested IET 29549 (5.09 t/ha) followed by IET 30240 (5.06 t/ha) found promising. The soil "P" level is high at this location.

The cultures and P levels interaction effect was significant at **Karjat** and most of the cultures gave significantly higher grain yield at 100% of RDP (recommended dose of P) application. Mean over the cultures P @ 100%RDP application gave significantly higher grain yield (4.49 t/ha) over 50% RDP (4.31 t/ha). Among the cultures tested, IET 29552 (4.63 t/ha) followed by IET 29558 (4.50 t/ha) were found promising with better yields and promising over checks.

At **Mandya**, the cultures tested at two doses of P application viz., 0 and 100% RDP. Application of 100% RDP increased the grain yield significantly (6.54 t/ha) and all cultures gave better yields at 100% RDP. Among the cultures, IET 30242 (8.12 t/ha) followed by IET 30231 (7.78 t/ha) and IET 30235 (7.52 t/ha) were found promising and gave better yields.

In clay loam soils of **IIRR**, the cultures tested at 50, 100 and 150% of RDP application. Interaction effect was non-significant, however application of 150% of RDP gave significantly higher grain yield of (5.25 t/ha) followed by 100% RDP (5.17 t/ha) over 50% of RDP (3.86 t/ha). Among the cultures, IET 30235 (6.80 t/ha) followed by IET 30238 (5.67 t/ha) and IET 30243 (5.59 t/ha) were promising and found superior over other cultures.

At **Raipur**, cultures were tested in two level of P application (50 and 100% of RDP). Application of 100% RDP gave significantly higher grain yield (3.95 t/ha) over 50% RDP (3.53 t/ha). Among the cultures, IET 30231 (5.00 t/ha) followed by IET 30234 (4.86 t/ha) and IET 30248 (4.85 t/ha) gave significantly higher yields over other cultures.

At **Vadagaon**, cultures evaluated at three levels of "P" application viz., 0,50 and 100% RDP. Interaction effect of cultures vs "P" fertilization was significant. The application of 100% RDP gave significantly higher grain yield (4.80 t/ha) over 50% (4.43 t/ha) and No "P" application (4.09 t/ha).

Mean over the "P" levels, the cultures IET 30231 (5.00 t/ha) followed by IET 30234 (4.86 t/ha) and IET 30248 (4.85 t/ha) were promising with better yields. All the cultures gave significantly higher yields at 100% RDP application.

At **Varanasi,** interaction effect of phosphorus level and advanced cultures on grain yield was found to be significant. Among the levels of 'P' application (0,50,100% RDP) 100% RDP application gave significantly higher grain yield of 5.37 t/ha over 50% and No 'P' application. Among the cultures, IET 30323 (7.39 t/ha) followed by IET 30248 (7.33 t/ha) and IET 30250 (7.25 t/ha) found promising with better yields.

Mean over the location (seven location) all the cultures were 'P' responsive except at **Gangavathi** where in soil 'P' level is very high.

Among the cultures, across the locations the culture IET 30232 (5.29 t/ha) followed by IET 30230(5.27 t/ha), IET 30247 (5.25 t/ha) and IET 30242 (5.21 t/ha) found promising gave better yields over cultures.

Table 4.1(n(iii)): Summary of data on grain yield and ancillary characters of selected IVT NIL LPT cultures grown under transplanted conditions at graded levels of recommended N fertilizer doses, kharif 2021.

P-levels	Varieties	GANGAVATHI						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	4.02	*34*	309	2.08	21.6	92	
	V2	5.24	*1*	279	2.43	20.9	92	
	V3	4.02	*34*	239	2.65	23.4	44	
	V4	3.89	*45*	267	2.36	22.9	96	
	V5	3.92	*42*	284	2.02	21.2	90	
	V6	4.58	*12*	297	3.62	20.3	90	
	V7	3.40	*73*	279	1.86	22.2	100	
	V8	3.64	*59*	272	2.64	20.1	102	
	V9	4.24	*23*	242	2.37	21.7	94	
	V10	4.20	*26*	245	3.02	18.5	100	
	V11	4.27	*22*	211	3.35	20.7	102	
	V12	4.24	*23*	234	2.54	21.1	100	
	V13	4.33	*18*	235	2.16	20.8	55	
	V14	4.28	*20*	258	2.05	22.6	94	
	V15	4.13	*29*	200	2.89	20.5	98	
	V16	3.97	*39*	250	2.13	20.7	100	
	V17	3.62	*60*	232	2.09	23.4	55	
	V18	3.95	*40*	298	2.13	22.9	87	
	V19	-		-	-	-	-	
	V20	5.07	*4*	259	3.15	21.1	107	
	V21	4.03	*31*	288	1.55	22.6	107	
	V22	5.11	*3*	349	3.87	21.9	92	
	V23	3.24	*75*	295	1.72	18.6	54	
	V24	5.02	*6*	342	2.47	20.7	109	
	V25	3.95	*40*	391	2.20	21.4	100	
	V26	4.56	*13*	289	1.72	19.7	107	
	V27	3.57	*64*	307	2.35	22.2	98	
	V28	2.96	*78*	292	2.25	14.4	100	
	V29	3.61	*61*	276	2.21	16.2	92	
	V30	4.03	*31*	317	1.98	16.8	96	
	V31	4.55	*14*	291	2.33	20.4	102	
	V32	-		-	-	-	-	
	V33	4.02	*34*	265	2.61	23.8	109	
	V34	3.88	*46*	317	2.02	16.6	100	
	V35	3.99	*38*	296	2.46	16.9	94	
	V36	3.79	*51*	355	1.89	14.5	98	
	V37	3.80	*49*	363	2.65	18.5	98	
	V38	4.15	*28*	269	1.99	19.4	107	
	V39	3.92	*42*	325	1.38	18.3	104	
	V40	4.55	*14*	286	1.89	19.9	107	
	V41	3.65	*58*	221	1.97	20.4	87	
	V42	4.65	*9*	242	2.56	19.7	94	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	GANGAVATHI						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P2: 50% of recommended P dose (N and K is constant)	V1	3.81	*48*	311	1.84	21.4	92	-5.60
	V2	4.82	*7*	289	2.48	20.5	96	-11.20
	V3	4.16	*27*	306	2.82	23.6	87	3.73
	V4	3.60	*62*	225	2.81	23.0	102	-7.73
	V5	3.60	*62*	286	2.36	20.8	90	-8.53
	V6	4.21	*25*	285	3.13	23.0	90	-9.87
	V7	3.44	*70*	289	2.15	23.0	100	1.07
	V8	3.35	*74*	204	3.10	19.9	102	-7.73
	V9	4.61	*11*	214	3.63	20.2	94	9.87
	V10	4.05	*30*	224	3.29	18.4	100	-4.00
	V11	4.28	*20*	248	3.15	18.2	102	0.27
	V12	4.01	*37*	373	2.60	19.8	100	-6.13
	V13	3.91	*44*	220	2.10	21.2	109	-11.20
	V14	2.83	*79*	232	1.83	23.1	94	-38.67
	V15	4.33	*18*	323	3.44	21.1	98	5.33
	V16	4.03	*31*	316	1.82	20.8	100	1.60
	V17	3.50	*69*	213	2.25	22.6	55	-3.20
	V18	3.41	*72*	265	2.29	23.2	87	-14.40
	V19	-		-	-	-	-	
	V20	5.05	*5*	348	2.39	20.1	107	-0.53
	V21	2.97	*77*	232	2.26	21.7	107	-28.27
	V22	4.64	*10*	370	2.80	22.6	92	-12.53
	V23	3.43	*71*	285	2.00	21.5	107	5.07
	V24	5.15	*2*	313	2.59	20.4	109	3.47
	V25	3.73	*55*	347	2.41	20.3	100	-5.87
	V26	4.78	*8*	268	2.14	19.3	107	5.87
	V27	2.26	*80*	313	2.08	17.7	98	-34.93
	V28	3.55	*65*	364	2.33	15.5	100	15.73
	V29	3.77	*52*	331	2.44	16.9	92	4.27
	V30	3.67	*57*	314	2.43	17.2	96	-9.60
	V31	3.54	*66*	273	2.59	25.9	102	-26.93
	V32	-		-	-	-	-	
	V33	3.77	*52*	308	2.71	23.4	109	-6.67
	V34	3.75	*54*	287	2.34	16.6	100	-3.47
	V35	3.51	*68*	337	2.30	16.5	94	-12.80
	V36	3.02	*76*	293	1.98	13.6	98	-20.53
	V37	3.70	*56*	320	2.06	17.7	98	-2.67
	V38	4.42	*17*	266	2.47	20.0	107	7.20
	V39	3.86	*47*	335	1.77	20.4	104	-1.60
	V40	3.52	*67*	280	2.85	20.2	107	-27.47
	V41	3.80	*49*	334	2.34	18.2	87	4.00
	V42	4.47	*16*	332	2.57	21.9	94	-4.80

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	GANGAVATHI						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P3: 100% of recommended P dose	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
	V13	-		-	-	-	-	
	V14	-		-	-	-	-	
	V15	-		-	-	-	-	
	V16	-		-	-	-	-	
	V17	-		-	-	-	-	
	V18	-		-	-	-	-	
	V19	-		-	-	-	-	
	V20	-		-	-	-	-	
	V21	-		-	-	-	-	
	V22	-		-	-	-	-	
	V23	-		-	-	-	-	
	V24	-		-	-	-	-	
	V25	-		-	-	-	-	
	V26	-		-	-	-	-	
	V27	-		-	-	-	-	
	V28	-		-	-	-	-	
	V29	-		-	-	-	-	
	V30	-		-	-	-	-	
	V31	-		-	-	-	-	
	V32	-		-	-	-	-	
	V33	-		-	-	-	-	
	V34	-		-	-	-	-	
	V35	-		-	-	-	-	
	V36	-		-	-	-	-	
	V37	-		-	-	-	-	
	V38	-		-	-	-	-	
	V39	-		-	-	-	-	
	V40	-		-	-	-	-	
	V41	-		-	-	-	-	
	V42	-		-	-	-	-	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	GANGAVATHI						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P4: 150% of recommended P dose	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
	V13	-		-	-	-	-	
	V14	-		-	-	-	-	
	V15	-		-	-	-	-	
	V16	-		-	-	-	-	
	V17	-		-	-	-	-	
	V18	-		-	-	-	-	
	V19	-		-	-	-	-	
	V20	-		-	-	-	-	
	V21	-		-	-	-	-	
	V22	-		-	-	-	-	
	V23	-		-	-	-	-	
	V24	-		-	-	-	-	
	V25	-		-	-	-	-	
	V26	-		-	-	-	-	
	V27	-		-	-	-	-	
	V28	-		-	-	-	-	
	V29	-		-	-	-	-	
	V30	-		-	-	-	-	
	V31	-		-	-	-	-	
	V32	-		-	-	-	-	
	V33	-		-	-	-	-	
	V34	-		-	-	-	-	
	V35	-		-	-	-	-	
	V36	-		-	-	-	-	
	V37	-		-	-	-	-	
	V38	-		-	-	-	-	
	V39	-		-	-	-	-	
	V40	-		-	-	-	-	
	V41	-		-	-	-	-	
	V42	-		-	-	-	-	
Interaction								
N at same V		NS		45.6	NS	NS	NS	
V at same N		NS		47.7	NS	NS	NS	
F1		4.10	*1*	282	2.34	20.2	94	
F2		3.86	*2*	292	2.47	20.3	98	-6.49
F3		-		-	-	-	-	
F4		-		-	-	-	-	
C.D.(0.05)		NS		NS	NS	NS	NS	
C.V.(%)		4.37		5.51	3.33	2.93	27.4	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	GANGAVATHI						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
Mean of varieties:								
	V1	3.92	*19*	310	1.96	21.5	92.00	-5.60
	V2	5.03	*3*	284	2.46	20.7	93.75	-11.20
	V3	4.09	*15*	273	2.74	23.5	65.25	3.73
	V4	3.75	*28*	246	2.59	22.9	99.00	-7.73
	V5	3.76	*25*	285	2.19	21.0	90.00	-8.53
	V6	4.40	*8*	291	3.38	21.7	90.00	-9.87
	V7	3.42	*36*	284	2.01	22.6	100.00	1.07
	V8	3.50	*35*	238	2.87	20.0	102.00	-7.73
	V9	4.43	*7*	228	3.00	20.9	94.00	9.87
	V10	4.13	*12*	234	3.16	18.4	100.00	-4.00
	V11	4.28	*10*	229	3.25	19.4	102.00	0.27
	V12	4.13	*12*	303	2.57	20.4	100.00	-6.13
	V13	4.12	*14*	227	2.13	21.0	81.75	-11.20
	V14	3.56	*33*	245	1.94	22.8	94.00	-38.67
	V15	4.23	*11*	261	3.17	20.8	98.00	5.33
	V16	4.00	*18*	283	1.98	20.8	100.00	1.60
	V17	3.56	*32*	222	2.17	23.0	54.50	-3.20
	V18	3.68	*31*	281	2.21	23.0	87.00	-14.40
	V19	-		-	-	-	-	
	V20	5.06	*2*	303	2.77	20.6	107.00	-0.53
	V21	3.50	*34*	260	1.91	22.1	107.00	-28.27
	V22	4.88	*4*	359	3.34	22.3	92.00	-12.53
	V23	3.34	*38*	290	1.86	20.0	80.25	5.07
	V24	5.09	*1*	327	2.53	20.6	109.00	3.47
	V25	3.84	*23*	369	2.31	20.8	100.00	-5.87
	V26	4.67	*5*	279	1.93	19.5	107.00	5.87
	V27	2.92	*40*	310	2.22	19.9	98.00	-34.93
	V28	3.26	*39*	328	2.29	15.0	100.00	15.73
	V29	3.69	*30*	303	2.33	16.5	92.00	4.27
	V30	3.85	*22*	316	2.21	17.0	96.00	-9.60
	V31	4.05	*16*	282	2.46	23.2	102.00	-26.93
	V32	-		-	-	-	-	
	V33	3.90	*20*	286	2.66	23.6	109.00	-6.67
	V34	3.82	*24*	302	2.18	16.6	100.00	-3.47
	V35	3.75	*26*	316	2.38	16.7	94.00	-12.80
	V36	3.41	*37*	324	1.94	14.0	98.00	-20.53
	V37	3.75	*26*	341	2.36	18.1	98.00	-2.67
	V38	4.29	*9*	267	2.23	19.7	107.00	7.20
	V39	3.89	*21*	330	1.58	19.4	104.00	-1.60
	V40	4.04	*17*	283	2.37	20.1	107.00	-27.47
	V41	3.73	*29*	277	2.16	19.3	87.00	4.00
	V42	4.56	*6*	287	2.57	20.8	94.00	-4.80

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	GANGAVATHI						
		Grain Yield (t/ha)	***Rank***	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**No of grains/panicle**	**Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)**
C.D.(0.05)		0.79		32.3	1.0	2.4	24.5	
C.V.(%)		15.0		8.4	30.4	8.8	19.2	
Expt. Mean		**3.98**		**287**	**2.41**	**20.26**	**96**	
Soil type		-						
pH		8.2						
P - levels (kg/ha)								
P1 (0%)		0						
P2 (50%)		37.5						
P3 (100%)		-						
P4 (150%)		-						
Recmnd NPK (kg/ha)		150:75:75						
Varieties								
	V1	29547						
	V2	29549						
	V3	29554						
	V4	29546						
	V5	30230						
	V6	29560						
	V7	29558						
	V8	30231						
	V9	30232						
	V10	30233						
	V11	30234						
	V12	30235						
	V13	30236						
	V14	30237						
	V15	30238						
	V16	30239						
	V17	29552						
	V18	29548						
	V19	**Rasi (Positive Check)**						
	V20	30240						
	V21	30241						
	V22	30242						
	V23	30243						
	V24	**Swarna (Positive Check)**						
	V25	30244						
	V26	30245						
	V27	30246						
	V28	29555						
	V29	29563						
	V30	**Improved Samba Mahsuri (Negative Check)**						
	V31	30247						
	V32	29562						
	V33	30248						
	V34	30249						
	V35	30250						
	V36	30251						
	V37	30252						
	V38	30253						
	V39	**BPT 5204 (Sensitive Check)**						
	V40	30254						
	V41	**IR 64 (RP)**						
	V42	**MTU 1121 (RP)**						
Avail NPK of soil (kg/ha)		-						

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	3.70	*88*	195	3.39	21.7	90	
	V2	3.48	*99*	210	3.54	18.7	103	
	V3	3.57	*94*	204	3.07	16.1	91	
	V4	3.78	*85*	174	3.35	20.5	97	
	V5	-		-	-	-	-	
	V6	3.74	*86*	225	3.25	19.3	91	
	V7	3.89	*79*	189	3.31	18.1	98	
	V8	3.47	*101*	170	3.24	19.8	91	
	V9	3.40	*104*	215	3.22	18.3	95	
	V10	3.56	*95*	170	3.29	19.8	91	
	V11	3.24	*115*	187	3.11	17.5	100	
	V12	3.69	*89*	182	3.36	20.2	90	
	V13	3.43	*102*	182	3.42	19.0	106	
	V14	3.28	*112*	212	3.25	20.2	104	
	V15	3.66	*91*	225	3.25	17.5	91	
	V16	3.43	*102*	222	3.09	18.8	106	
	V17	4.10	*66*	188	3.65	16.8	107	
	V18	4.03	*73*	181	3.57	16.1	109	
	V19	-		-	-	-	-	
	V20	3.37	*106*	204	3.34	17.2	91	
	V21	4.37	*45*	190	3.93	18.5	108	
	V22	3.38	*105*	189	3.10	21.1	105	
	V23	4.11	*64*	188	3.79	17.3	91	
	V24	4.11	*64*	190	4.03	16.4	104	
	V25	4.04	*72*	187	3.65	16.8	107	
	V26	3.65	*92*	166	3.33	16.5	102	
	V27	3.24	*115*	206	3.29	17.3	100	
	V28	3.52	*98*	194	3.15	17.6	105	
	V29	3.48	*99*	177	3.36	18.1	107	
	V30	3.73	*87*	204	3.07	17.7	108	
	V31	3.35	*108*	180	3.38	18.0	104	
	V32	-		-	-	-	-	
	V33	3.35	*108*	210	3.04	16.3	105	
	V34	3.54	*96*	205	3.16	17.0	107	
	V35	3.69	*89*	200	3.24	15.8	95	
	V36	3.26	*114*	200	3.34	15.7	96	
	V37	3.54	*96*	194	3.11	17.7	105	
	V38	3.35	*108*	207	3.55	17.1	108	
	V39	3.29	*111*	215	3.14	19.8	103	
	V40	3.18	*117*	198	3.05	18.5	102	
	V41	3.37	*106*	219	3.24	20.6	100	
	V42	3.28	*112*	218	3.07	17.6	90	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P2: 50% of recommended P dose (N and K is constant)	V1	4.31	*51*	281	4.08	24.0	90	24.40
	V2	3.95	*76*	282	3.78	20.4	103	18.80
	V3	4.62	*19*	264	4.45	19.0	90	42.00
	V4	4.32	*50*	282	4.03	23.2	94	21.60
	V5	-		-	-	-	-	
	V6	4.60	*23*	281	4.37	21.8	90	34.40
	V7	4.78	*8*	265	3.54	20.5	98	35.60
	V8	4.80	*7*	268	3.68	22.3	92	53.20
	V9	4.39	*43*	278	3.88	20.7	91	39.60
	V10	4.07	*70*	235	3.48	21.3	91	20.40
	V11	4.16	*61*	256	3.78	19.0	100	36.80
	V12	4.06	*71*	265	3.83	20.5	87	14.80
	V13	4.59	*24*	261	4.36	20.5	105	46.40
	V14	4.68	*13*	263	4.41	22.4	104	56.00
	V15	4.30	*52*	265	4.46	19.7	91	25.60
	V16	4.08	*69*	260	3.89	21.0	106	26.00
	V17	4.87	*2*	276	3.93	18.9	105	30.80
	V18	4.67	*14*	240	4.42	18.3	107	25.60
	V19	-		-	-	-	-	
	V20	3.93	*77*	263	3.55	20.0	90	22.40
	V21	4.44	*40*	282	4.31	21.6	106	2.80
	V22	3.89	*79*	244	4.64	23.3	102	20.40
	V23	4.50	*38*	260	4.33	18.9	90	15.60
	V24	4.30	*52*	247	3.62	19.5	101	7.60
	V25	4.39	*43*	235	4.21	19.9	105	14.00
	V26	4.28	*57*	250	3.47	19.6	103	25.20
	V27	3.64	*93*	256	3.47	20.4	105	16.00
	V28	4.61	*21*	263	4.39	19.3	103	43.60
	V29	4.56	*29*	275	3.62	20.4	107	43.20
	V30	4.35	*46*	248	3.28	20.5	106	24.80
	V31	4.10	*66*	283	3.79	20.4	103	30.00
	V32	-		-	-	-	-	
	V33	4.28	*57*	236	4.03	19.6	104	37.20
	V34	3.86	*82*	289	3.94	20.2	106	12.80
	V35	3.84	*83*	250	3.65	19.0	92	6.00
	V36	4.34	*48*	262	3.56	19.0	95	43.20
	V37	4.33	*49*	261	4.04	21.0	104	31.60
	V38	4.57	*28*	268	4.69	19.4	106	48.80
	V39	4.52	*34*	268	3.30	20.6	104	49.20
	V40	3.91	*78*	217	3.75	21.1	103	29.20
	V41	4.13	*63*	253	3.92	20.5	97	30.40
	V42	4.20	*60*	255	4.50	18.8	91	36.80

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P3: 100% of recommended P dose	V1	4.53	*32*	267	4.61	26.4	93	16.60
	V2	4.02	*74*	295	4.07	23.3	105	10.80
	V3	4.76	*9*	276	4.64	20.8	93	23.80
	V4	4.74	*10*	280	4.28	25.2	99	19.20
	V5	-		-	-	-	-	
	V6	4.62	*19*	294	4.46	24.9	95	17.60
	V7	4.84	*4*	289	3.82	23.1	101	19.00
	V8	4.81	*5*	282	4.08	24.3	95	26.80
	V9	4.59	*24*	270	4.28	24.0	97	23.80
	V10	4.52	*34*	274	3.75	22.7	95	19.20
	V11	4.30	*52*	264	3.98	20.5	102	21.20
	V12	4.51	*36*	272	4.46	23.2	99	16.40
	V13	4.64	*16*	254	4.58	22.0	108	24.20
	V14	4.81	*5*	282	4.99	24.6	106	30.60
	V15	4.42	*41*	274	4.63	22.7	95	15.20
	V16	4.10	*66*	289	4.29	23.0	107	13.40
	V17	4.91	*1*	271	4.04	22.0	109	16.20
	V18	4.74	*10*	286	4.58	20.0	108	14.20
	V19							
	V20	4.29	*55*	294	3.83	21.7	92	18.40
	V21	4.63	*17*	297	4.47	23.1	107	5.20
	V22	4.14	*62*	281	4.86	25.6	107	15.20
	V23	4.67	*14*	245	4.45	21.8	93	11.20
	V24	4.58	*27*	276	3.84	23.1	107	9.40
	V25	4.53	*32*	286	4.54	20.8	108	9.80
	V26	4.56	*29*	285	3.63	22.7	105	18.20
	V27	3.81	*84*	281	3.66	22.7	106	11.40
	V28	4.61	*21*	267	4.47	22.5	107	21.80
	V29	4.63	*17*	297	3.94	23.1	108	23.00
	V30	4.41	*42*	285	3.85	22.7	106	13.60
	V31	4.29	*55*	286	4.00	23.0	105	18.80
	V32	-		-	-	-	-	
	V33	4.71	*12*	285	4.68	23.2	104	27.20
	V34	3.88	*81*	297	4.17	21.6	108	6.80
	V35	4.28	*57*	284	4.15	20.4	98	11.80
	V36	4.35	*46*	281	3.92	22.4	97	21.80
	V37	4.51	*36*	254	4.76	22.7	106	19.40
	V38	4.86	*3*	258	5.01	20.9	108	30.20
	V39	4.54	*31*	258	3.69	23.6	105	25.00
	V40	4.01	*75*	283	3.87	22.3	105	16.60
	V41	4.48	*39*	294	4.45	24.4	100	22.20
	V42	4.59	*24*	251	4.83	21.4	93	26.20

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P4: 150% of recommended P dose	V1	-		-	-	-	-	
	V2	-		-	-	-	-	
	V3	-		-	-	-	-	
	V4	-		-	-	-	-	
	V5	-		-	-	-	-	
	V6	-		-	-	-	-	
	V7	-		-	-	-	-	
	V8	-		-	-	-	-	
	V9	-		-	-	-	-	
	V10	-		-	-	-	-	
	V11	-		-	-	-	-	
	V12	-		-	-	-	-	
	V13	-		-	-	-	-	
	V14	-		-	-	-	-	
	V15	-		-	-	-	-	
	V16	-		-	-	-	-	
	V17	-		-	-	-	-	
	V18	-		-	-	-	-	
	V19	-		-	-	-	-	
	V20	-		-	-	-	-	
	V21	-		-	-	-	-	
	V22	-		-	-	-	-	
	V23	-		-	-	-	-	
	V24	-		-	-	-	-	
	V25	-		-	-	-	-	
	V26	-		-	-	-	-	
	V27	-		-	-	-	-	
	V28	-		-	-	-	-	
	V29	-		-	-	-	-	
	V30	-		-	-	-	-	
	V31	-		-	-	-	-	
	V32	-		-	-	-	-	
	V33	-		-	-	-	-	
	V34	-		-	-	-	-	
	V35	-		-	-	-	-	
	V36	-		-	-	-	-	
	V37	-		-	-	-	-	
	V38	-		-	-	-	-	
	V39	-		-	-	-	-	
	V40	-		-	-	-	-	
	V41	-		-	-	-	-	
	V42	-		-	-	-	-	
Interaction								
N at same V		0.41		NS	0.44	NS	1.97	
V at same N		0.40		NS	0.44	NS	1.97	
F1		3.58	*3*	197	3.33	18.1	100	
F2		4.31	*2*	261	3.96	20.4	99	29.30
F3		4.49	*1*	278	4.27	23	102	18.24
F4								
C.D.(0.05)		0.05		5.20	0.06	0.74	0.48	
C.V.(%)		5.14		5.54	6.66	15.55	2.04	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
Mean of varieties:								
	V1	4.18	*17*	248	4.03	24.0	90.78	20.50
	V2	3.82	*35*	262	3.80	20.8	103.67	14.80
	V3	4.32	*10*	248	4.05	18.6	91.33	32.90
	V4	4.28	*11*	245	3.89	23.0	96.56	20.40
	V5	-		-	-	-	-	
	V6	4.32	*8*	267	4.03	22.0	92.00	26.00
	V7	4.50	*2*	248	3.56	20.6	99.11	27.30
	V8	4.36	*6*	240	3.67	22.1	92.45	40.00
	V9	4.13	*20*	254	3.79	21.0	94.55	31.70
	V10	4.05	*26*	226	3.51	21.3	92.22	19.80
	V11	3.90	*32*	236	3.62	19.0	100.78	29.00
	V12	4.09	*25*	240	3.88	21.3	91.78	15.60
	V13	4.22	*16*	232	4.12	20.5	106.33	35.30
	V14	4.26	*13*	252	4.22	22.4	104.89	43.30
	V15	4.13	*20*	255	4.11	20.0	92.22	20.40
	V16	3.87	*33*	257	3.76	21.0	106.55	19.70
	V17	4.63	*1*	245	3.87	19.2	107.11	23.50
	V18	4.48	*4*	236	4.19	18.1	108.11	19.90
	V19	-		-	-	-	-	
	V20	3.86	*34*	254	3.57	19.6	91.22	20.40
	V21	4.48	*3*	256	4.24	21.1	107.11	4.00
	V22	3.80	*36*	238	4.20	23.3	104.78	17.80
	V23	4.43	*5*	231	4.19	19.4	91.33	13.40
	V24	4.33	*7*	238	3.83	19.7	104.00	8.50
	V25	4.32	*8*	236	4.13	19.2	106.56	11.90
	V26	4.16	*18*	234	3.48	19.6	103.33	21.70
	V27	3.56	*39*	248	3.47	20.1	103.78	13.70
	V28	4.25	*14*	241	4.00	19.8	104.89	32.70
	V29	4.22	*15*	250	3.64	20.5	107.44	33.10
	V30	4.16	*18*	246	3.40	20.3	106.56	19.20
	V31	3.91	*31*	250	3.72	20.4	104.00	24.40
	V32	-		-	-	-	-	
	V33	4.11	*24*	244	3.92	19.7	104.44	32.20
	V34	3.76	*37*	264	3.76	19.6	107.00	9.80
	V35	3.94	*30*	245	3.68	18.4	95.11	8.90
	V36	3.98	*29*	248	3.61	19.0	96.11	32.50
	V37	4.13	*20*	236	3.97	20.5	105.00	25.50
	V38	4.26	*12*	244	4.42	19.1	107.11	39.50
	V39	4.12	*23*	247	3.38	21.3	104.22	37.10
	V40	3.70	*38*	233	3.56	20.6	103.44	22.90
	V41	3.99	*28*	255	3.87	21.8	99.11	26.30
	V42	4.02	*27*	241	4.13	19.3	91.44	31.50

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	KARJAT						
		Grain Yield (t/ha)	***Rank***	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**No of grains/panicle**	**Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)**
C.D.(0.05)		0.24		10.80	0.25	0.96	1.14	
C.V.(%)		6.19		5.60	7.14	5.07	1.22	
Expt. Mean		**4.13**		**245**	**3.85**	**20.44**	**100**	
Soil type		-						
pH		8.2						
P - levels (kg/ha)								
P1 (0%)		0						
P2 (50%)		25.0						
P3 (100%)		50						
P4 (150%)		-						
Recmnd NPK (kg/ha)		100:50:50						
Varieties								
	V1	29547						
	V2	29549						
	V3	29554						
	V4	29546						
	V5	30230						
	V6	29560						
	V7	29558						
	V8	30231						
	V9	30232						
	V10	30233						
	V11	30234						
	V12	30235						
	V13	30236						
	V14	30237						
	V15	30238						
	V16	30239						
	V17	29552						
	V18	29548						
	V19	**Rasi (Positive Check)**						
	V20	30240						
	V21	30241						
	V22	30242						
	V23	30243						
	V24	**Swarna (Positive Check)**						
	V25	30244						
	V26	30245						
	V27	30246						
	V28	29555						
	V29	29563						
	V30	**Improved Samba Mahsuri (Negative Check)**						
	V31	30247						
	V32	29562						
	V33	30248						
	V34	30249						
	V35	30250						
	V36	30251						
	V37	30252						
	V38	30253						
	V39	**BPT 5204 (Sensitive Check)**						
	V40	30254						
	V41	**IR 64 (RP)**						
	V42	**MTU 1121 (RP)**						
Avlb NPK of soil (kg/ha)		-						

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	MANDYA					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	5.83	*48*	333	1.73	27.14	
	V2	6.54	*30*	343	2.73	20.48	
	V3	4.01	*75*	388	1.86	37.41	
	V4	6.67	*26*	350	2.99	27.65	
	V5	6.88	*21*	380	2.74	21.82	
	V6	6.93	*17*	353	2.66	26.29	
	V7	6.77	*22*	310	2.75	27.53	
	V8	6.72	*23*	345	2.82	29.18	
	V9	6.18	*38*	345	3.17	25.45	
	V10	6.32	*36*	378	3.96	21.06	
	V11	-		-	-	-	
	V12	7.11	*15*	393	3.02	27.17	
	V13	4.23	*74*	300	2.66	19.93	
	V14	4.61	*68*	310	1.75	26.87	
	V15	5.80	*50*	315	3.28	21.66	
	V16	5.75	*51*	325	2.09	23.34	
	V17	4.32	*73*	335	2.71	23.87	
	V18	4.85	*64*	313	1.75	26.84	
	V19	-		-	-	-	
	V20	6.89	*20*	373	2.09	26.23	
	V21	5.96	*43*	343	2.18	20.44	
	V22	7.51	*13*	300	2.32	27.59	
	V23	4.71	*67*	265	3.00	21.88	
	V24	3.01	*78*	318	1.91	25.51	
	V25	6.07	*41*	390	2.08	27.10	
	V26	5.93	*46*	380	2.64	20.42	
	V27	4.39	*70*	358	2.34	18.22	
	V28	5.22	*59*	398	2.37	17.02	
	V29	6.44	*31*	240	3.37	22.37	
	V30	4.93	*63*	345	2.04	14.62	
	V31	6.59	*27*	385	3.28	25.27	
	V32	-		-	-	-	
	V33	5.33	*58*	385	3.68	33.17	
	V34	5.69	*52*	300	3.78	21.49	
	V35	4.38	*71*	383	1.88	14.56	
	V36	5.62	*55*	318	2.80	16.51	
	V37	6.93	*17*	338	3.10	24.22	
	V38	5.59	*56*	233	3.26	21.57	
	V39	3.79	*76*	338	1.90	15.99	
	V40	6.39	*34*	315	3.31	23.90	
	V41	5.09	*61*	370	2.27	27.96	
	V42	6.43	*32*	268	3.36	22.20	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	MANDYA					
		Grain Yield (t/ha)	*Rank*	Panicle/m^2 (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P2: 50% of recommended P dose (N and K is constant)	V1	-		-	-	-	
	V2	-		-	-	-	
	V3	-		-	-	-	
	V4	-		-	-	-	
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	-		-	-	-	
	V11	-		-	-	-	
	V12	-		-	-	-	
	V13	-		-	-	-	
	V14	-		-	-	-	
	V15	-		-	-	-	
	V16	-		-	-	-	
	V17	-		-	-	-	
	V18	-		-	-	-	
	V19	-		-	-	-	
	V20	-		-	-	-	
	V21	-		-	-	-	
	V22	-		-	-	-	
	V23	-		-	-	-	
	V24	-		-	-	-	
	V25	-		-	-	-	
	V26	-		-	-	-	
	V27	-		-	-	-	
	V28	-		-	-	-	
	V29	-		-	-	-	
	V30	-		-	-	-	
	V31	-		-	-	-	
	V32	-		-	-	-	
	V33	-		-	-	-	
	V34	-		-	-	-	
	V35	-		-	-	-	
	V36	-		-	-	-	
	V37	-		-	-	-	
	V38	-		-	-	-	
	V39	-		-	-	-	
	V40	-		-	-	-	
	V41	-		-	-	-	
	V42	-		-	-	-	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	MANDYA					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P3: 100% of recommended P dose	V1	7.00	*16*	373	1.87	28.01	23.40
	V2	6.38	*35*	385	2.59	20.72	-3.20
	V3	4.38	*71*	390	1.92	43.56	7.40
	V4	7.94	*7*	380	3.12	26.42	25.40
	V5	7.43	*14*	396	2.78	21.80	11.00
	V6	8.01	*5*	395	2.75	26.20	21.60
	V7	7.76	*11*	315	2.98	27.49	19.80
	V8	8.84	*1*	378	2.99	28.28	42.40
	V9	6.91	*19*	368	3.24	24.19	14.60
	V10	6.58	*28*	358	3.93	22.08	5.20
	V11	-		-	-	-	
	V12	7.93	*8*	398	3.63	26.65	16.40
	V13	4.85	*64*	370	3.01	19.04	12.40
	V14	6.56	*29*	345	2.00	28.26	39.00
	V15	5.94	*44*	250	3.81	20.08	2.80
	V16	5.83	*48*	338	2.12	23.66	1.60
	V17	5.66	*53*	377	3.01	22.27	26.80
	V18	8.25	*4*	345	2.28	25.29	68.00
	V19	-		-	-	-	
	V20	8.01	*5*	410	2.67	25.94	22.40
	V21	6.69	*24*	335	2.86	21.38	14.60
	V22	8.73	*2*	373	2.61	28.39	24.40
	V23	4.95	*62*	363	3.28	23.17	4.80
	V24	3.57	*77*	423	1.68	22.60	11.20
	V25	6.14	*40*	429	3.41	29.97	1.40
	V26	5.98	*42*	380	2.79	21.34	1.00
	V27	4.72	*66*	353	2.24	16.71	6.60
	V28	5.42	*57*	425	2.67	18.12	4.00
	V29	7.83	*10*	405	3.55	25.18	27.80
	V30	6.41	*33*	374	2.38	14.80	29.60
	V31	8.41	*3*	383	3.49	25.22	36.40
	V32						
	V33	5.88	*47*	350	3.61	31.30	11.00
	V34	6.25	*37*	305	3.68	21.77	11.20
	V35	4.61	*68*	333	1.87	14.01	4.60
	V36	5.94	*44*	338	2.70	16.80	6.40
	V37	7.89	*9*	372	3.66	24.01	19.20
	V38	6.16	*39*	278	3.38	23.14	11.40
	V39	5.22	*59*	380	2.13	15.31	28.60
	V40	7.52	*12*	300	3.47	23.72	22.60
	V41	5.64	*54*	364	2.69	27.64	11.00
	V42	6.69	*24*	283	3.41	21.53	5.20

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	MANDYA					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P4: 150% of recommended P dose	V1	-		-	-	-	
	V2	-		-	-	-	
	V3	-		-	-	-	
	V4	-		-	-	-	
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	-		-	-	-	
	V11	-		-	-	-	
	V12	-		-	-	-	
	V13	-		-	-	-	
	V14	-		-	-	-	
	V15	-		-	-	-	
	V16	-		-	-	-	
	V17	-		-	-	-	
	V18	-		-	-	-	
	V19	-		-	-	-	
	V20	-		-	-	-	
	V21	-		-	-	-	
	V22	-		-	-	-	
	V23	-		-	-	-	
	V24	-		-	-	-	
	V25	-		-	-	-	
	V26	-		-	-	-	
	V27	-		-	-	-	
	V28	-		-	-	-	
	V29	-		-	-	-	
	V30	-		-	-	-	
	V31	-		-	-	-	
	V32	-		-	-	-	
	V33	-		-	-	-	
	V34	-		-	-	-	
	V35	-		-	-	-	
	V36	-		-	-	-	
	V37	-		-	-	-	
	V38	-		-	-	-	
	V39	-		-	-	-	
	V40	-		-	-	-	
	V41	-		-	-	-	
	V42	-		-	-	-	
Interaction							
N at same V		NS		NS	NS	NS	
V at same N		NS		NS	NS	NS	
F1		5.70	*2*	337	2.66	23.6	
F2		-		-	-	-	
F3		6.54	*1*	362	2.88	24	16.67
F4		-		-	-	-	
C.D.(0.05)		NS			NS	NS	
C.V.(%)		10.18			27.46	8.16	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	MANDYA					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
Mean of varieties:							
	V1	6.42	*18*	353	1.80	27.6	23.40
	V2	6.46	*16*	364	2.66	20.6	-3.20
	V3	4.20	*38*	389	1.89	40.5	7.40
	V4	7.31	*8*	365	3.06	27.0	25.40
	V5	7.16	*10*	388	2.76	21.8	11.00
	V6	7.47	*5*	374	2.71	26.2	21.60
	V7	7.27	*9*	313	2.87	27.5	19.80
	V8	7.78	*2*	362	2.91	28.7	42.40
	V9	6.55	*15*	357	3.21	24.8	14.60
	V10	6.45	*17*	368	3.95	21.6	5.20
	V11	-		-	-	-	
	V12	7.52	*3*	395	3.33	26.9	16.40
	V13	4.54	*35*	335	2.84	19.5	12.40
	V14	5.59	*29*	328	1.88	27.6	39.00
	V15	5.87	*24*	283	3.55	20.9	2.80
	V16	5.79	*25*	331	2.11	23.5	1.60
	V17	4.99	*32*	356	2.86	23.1	26.80
	V18	6.55	*14*	329	2.02	26.1	68.00
	V19	-		-	-	-	
	V20	7.45	*6*	391	2.38	26.1	22.40
	V21	6.33	*19*	339	2.52	20.9	14.60
	V22	8.12	*1*	336	2.47	28.0	24.40
	V23	4.83	*33*	314	3.14	22.5	4.80
	V24	3.29	*39*	370	1.80	24.1	11.20
	V25	6.11	*20*	409	2.75	28.5	1.40
	V26	5.96	*22*	380	2.72	20.9	1.00
	V27	4.56	*34*	355	2.29	17.5	6.60
	V28	5.32	*31*	411	2.52	17.6	4.00
	V29	7.14	*11*	323	3.46	23.8	27.80
	V30	5.67	*27*	360	2.21	14.7	29.60
	V31	7.50	*4*	384	3.39	25.2	36.40
	V32	-		-	-	-	
	V33	5.61	*28*	368	3.65	32.2	11.00
	V34	5.97	*21*	303	3.73	21.6	11.20
	V35	4.50	*37*	358	1.88	14.3	4.60
	V36	5.78	*26*	328	2.75	16.7	6.40
	V37	7.41	*7*	355	3.38	24.1	19.20
	V38	5.88	*23*	255	3.32	22.4	11.40
	V39	4.51	*36*	359	2.02	15.7	28.60
	V40	6.96	*12*	308	3.39	23.8	22.60
	V41	5.37	*30*	367	2.48	27.8	11.00
	V42	6.56	*13*	275	3.39	21.9	5.20

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	MANDYA					
		Grain Yield (t/ha)	***Rank***	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)**
C.D.(0.05)		0.93			0.55	1.80	
C.V.(%)		10.81			14.08	5.42	
Expt. Mean		**6.12**		**349**	**2.77**	**23.69**	
Soil type		Red Sandy Loam					
pH		8.0					
P - levels (kg/ha)							
P1 (0%)		0					
P2 (50%)		-					
P3 (100%)		50					
P4 (150%)		-					
Recmd NPK (kg/ha)		100:50:50					
Varieties							
	V1	29547					
	V2	29549					
	V3	29554					
	V4	29546					
	V5	30230					
	V6	29560					
	V7	29558					
	V8	30231					
	V9	30232					
	V10	30233					
	V11	30234					
	V12	30235					
	V13	30236					
	V14	30237					
	V15	30238					
	V16	30239					
	V17	29552					
	V18	29548					
	V19	**Rasi (Positive Check)**					
	V20	30240					
	V21	30241					
	V22	30242					
	V23	30243					
	V24	**Swarna (Positive Check)**					
	V25	30244					
	V26	30245					
	V27	30246					
	V28	29555					
	V29	29563					
	V30	**Improved Samba Mahsuri (Negative Check)**					
	V31	30247					
	V32	29562					
	V33	30248					
	V34	30249					
	V35	30250					
	V36	30251					
	V37	30252					
	V38	30253					
	V39	**BPT 5204 (Sensitive Check)**					
	V40	30254					
	V41	**IR 64 (RP)**					
	V42	**MTU 1121 (RP)**					
Avlb NPK of soil (kg/ha)		292:96:293					

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	IIRR					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	-		-	-	-	
	V2	-		-	-	-	
	V3	-		-	-	-	
	V4	-		-	-	-	
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	-		-	-	-	
	V11	-		-	-	-	
	V12	-		-	-	-	
	V13	-		-	-	-	
	V14	-		-	-	-	
	V15	-		-	-	-	
	V16	-		-	-	-	
	V17	-		-	-	-	
	V18	-		-	-	-	
	V19	-		-	-	-	
	V20	-		-	-	-	
	V21	-		-	-	-	
	V22	-		-	-	-	
	V23	-		-	-	-	
	V24	-		-	-	-	
	V25	-		-	-	-	
	V26	-		-	-	-	
	V27	-		-	-	-	
	V28	-		-	-	-	
	V29	-		-	-	-	
	V30	-		-	-	-	
	V31	-		-	-	-	
	V32	-		-	-	-	
	V33	-		-	-	-	
	V34	-		-	-	-	
	V35	-		-	-	-	
	V36	-		-	-	-	
	V37	-		-	-	-	
	V38	-		-	-	-	
	V39	-		-	-	-	
	V40	-		-	-	-	
	V41	-		-	-	-	
	V42	-		-	-	-	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	IIRR					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
P2: 50% of recommended P dose (N and K is constant)	V1	3.32	*100*	313	1.8	24.6	
	V2	2.21	*115*	309	2.8	20.7	
	V3	2.88	*111*	284	3.3	28.3	
	V4	3.05	*108*	295	2.7	26.2	
	V5	3.96	*85*	345	2.6	21.4	
	V6	3.86	*92*	313	3.2	21.1	
	V7	4.42	*71*	341	3.7	22.3	
	V8	3.11	*107*	398	3.5	22.3	
	V9	4.43	*70*	320	2.5	19.8	
	V10	3.48	*98*	313	4.0	21.6	
	V11	3.13	*106*	320	3.8	20.7	
	V12	5.29	*38*	366	3.0	22.3	
	V13	3.14	*104*	331	3.5	20.6	
	V14	2.35	*112*	377	2.0	21.1	
	V15	4.75	*56*	338	3.8	25.7	
	V16	4.05	*78*	345	2.7	24.8	
	V17	3.92	*89*	341	3.4	23.3	
	V18	1.89	*117*	302	1.9	24.6	
	V19	-		-	-	-	
	V20	4.00	*80*	306	3.5	24.4	
	V21	3.33	*99*	316	2.9	19.6	
	V22	4.11	*77*	309	2.7	21.6	
	V23	4.23	*74*	370	2.1	21.4	
	V24	4.13	*76*	370	2.2	11.0	
	V25	3.16	*103*	331	2.2	21.0	
	V26	2.90	*110*	302	2.8	18.7	
	V27	3.29	*101*	345	1.8	15.6	
	V28	3.14	*104*	363	1.2	16.3	
	V29	3.49	*97*	363	2.4	20.8	
	V30	3.93	*88*	363	2.1	15.3	
	V31	4.02	*79*	316	2.9	21.9	
	V32	-		-	-	-	
	V33	2.28	*114*	366	3.8	21.2	
	V34	2.29	*113*	331	3.5	18.8	
	V35	3.29	*101*	423	2.3	12.2	
	V36	2.06	*116*	409	2.1	19.0	
	V37	3.98	*82*	366	3.0	21.8	
	V38	4.20	*75*	316	3.1	19.1	
	V39	2.91	*109*	338	2.7	15.0	
	V40	-		-	-	-	
	V41	4.89	*49*	359	3.7	18.9	
	V42	4.71	*61*	348	3.6	19.2	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	IIRR					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
P3: 100% of recommended P dose	V1	5.38	*35*	267	1.9	23.9	103.00
	V2	3.82	*93*	324	3.8	22.3	80.50
	V3	5.08	*41*	288	3.4	29.0	110.00
	V4	4.67	*63*	274	2.5	27.8	81.00
	V5	5.57	*29*	341	2.7	25.4	80.50
	V6	4.90	*48*	295	3.1	23.3	52.00
	V7	6.14	*11*	277	3.5	23.2	86.00
	V8	4.87	*50*	292	3.7	22.3	88.00
	V9	6.32	*8*	306	2.6	20.6	94.50
	V10	4.94	*46*	292	4.1	26.4	73.00
	V11	4.64	*64*	274	4.0	26.0	75.50
	V12	7.61	*1*	341	3.0	26.6	116.00
	V13	4.75	*56*	313	3.3	21.7	80.50
	V14	3.90	*90*	270	2.1	18.8	77.50
	V15	6.43	*7*	348	3.9	25.2	84.00
	V16	6.46	*6*	341	2.7	26.1	120.50
	V17	5.35	*36*	288	3.6	25.4	71.50
	V18	3.82	*93*	274	1.9	25.2	96.50
	V19	-		-	-	-	
	V20	5.74	*21*	284	3.5	25.1	87.00
	V21	5.42	*33*	309	2.8	22.1	104.50
	V22	4.78	*52*	345	2.6	22.1	33.50
	V23	6.02	*13*	281	1.9	22.1	89.50
	V24	5.56	*30*	302	2.2	14.2	71.50
	V25	5.62	*26*	284	2.2	21.3	123.00
	V26	4.78	*52*	288	2.9	19.0	94.00
	V27	4.59	*67*	260	2.5	17.3	65.00
	V28	4.77	*54*	331	1.0	17.1	81.50
	V29	4.61	*65*	320	2.6	28.1	56.00
	V30	5.35	*36*	341	2.0	15.7	71.00
	V31	5.83	*16*	256	2.8	24.3	90.50
	V32	-		-	-	-	
	V33	5.41	*34*	295	4.1	21.6	156.50
	V34	3.80	*95*	277	3.6	20.8	75.50
	V35	3.94	*86*	309	2.1	12.9	32.50
	V36	4.61	*65*	309	1.9	17.1	127.50
	V37	3.72	*96*	284	3.1	23.6	-13.00
	V38	5.59	*28*	306	3.2	19.0	69.50
	V39	5.71	*24*	295	2.7	14.5	140.00
	V40	-		-	-	-	
	V41	4.38	*72*	373	3.7	20.9	-25.50
	V42	6.81	*3*	306	3.4	22.3	105.00

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	IIRR					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
P4: 150% of recommended P dose	V1	5.06	*42*	267	1.7	24.1	43.50
	V2	3.99	*81*	270	3.4	21.4	44.50
	V3	4.97	*44*	281	3.5	28.3	52.25
	V4	4.77	*54*	242	2.5	25.8	43.00
	V5	5.73	*23*	345	2.5	21.5	44.25
	V6	5.55	*31*	263	3.2	20.7	42.25
	V7	6.16	*10*	270	3.6	22.4	43.50
	V8	4.80	*51*	284	3.4	21.6	42.25
	V9	5.74	*21*	260	2.4	19.0	32.75
	V10	4.96	*45*	242	3.4	25.4	37.00
	V11	4.70	*62*	284	3.9	24.2	39.25
	V12	7.50	*2*	327	2.7	25.7	55.25
	V13	4.74	*58*	260	3.6	20.7	40.00
	V14	4.26	*73*	267	1.9	19.1	47.75
	V15	5.83	*16*	324	3.1	24.3	27.00
	V16	6.03	*12*	309	2.6	23.7	49.50
	V17	4.98	*43*	288	3.4	23.0	26.50
	V18	3.94	*86*	292	1.9	25.4	51.25
	V19	-		-	-	-	
	V20	5.89	*15*	284	3.2	23.9	47.25
	V21	5.81	*18*	242	2.7	21.2	62.00
	V22	5.16	*39*	331	2.5	21.6	26.25
	V23	6.53	*5*	270	2.0	21.2	57.50
	V24	5.94	*14*	331	2.1	11.2	45.25
	V25	5.76	*20*	288	2.4	21.0	65.00
	V26	5.13	*40*	252	2.7	17.4	55.75
	V27	4.74	*58*	267	2.3	16.4	36.25
	V28	4.94	*46*	238	1.4	15.7	45.00
	V29	4.50	*69*	313	2.5	27.6	25.25
	V30	5.77	*19*	267	1.9	14.6	46.00
	V31	6.25	*9*	263	2.6	23.2	55.75
	V32	-		-	-	-	
	V33	5.62	*26*	299	3.6	21.8	83.50
	V34	3.97	*83*	252	3.6	20.4	42.00
	V35	3.97	*83*	284	2.4	12.0	17.00
	V36	4.53	*68*	277	1.9	18.1	61.75
	V37	3.88	*91*	309	3.0	22.4	-2.50
	V38	5.53	*32*	249	2.8	19.0	33.25
	V39	5.68	*25*	324	2.5	14.2	69.25
	V40	-		-	-	-	
	V41	4.72	*60*	295	3.6	19.2	-4.25
	V42	6.77	*4*	299	3.5	22.6	51.50
Interaction							
N at same V		NS		NS	2.81	1.48	
V at same N		NS		NS	2.77	1.46	
F1		-		-	-	-	
F2		3.53	*3*	340	2.84	20.6	
F3		5.17	*2*	302	2.88	22.1	82.19
F4		5.25	*1*	282	2.76	21.05	43.09
C.D.(0.05)		0.53		NS	0.16	0.23	
C.V.(%)		47.87		40.51	2.42	4.70	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	IIRR					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
Mean of varieties:							
	V1	4.59	*21*	282	1.81	24.2	73.25
	V2	3.34	*38*	301	3.34	21.5	62.50
	V3	4.31	*24*	284	3.43	28.5	81.13
	V4	4.16	*31*	270	2.56	26.6	62.00
	V5	5.09	*12*	344	2.58	22.8	62.38
	V6	4.77	*16*	290	3.16	21.7	47.13
	V7	5.57	*5*	296	3.59	22.6	64.75
	V8	4.26	*27*	325	3.54	22.1	65.13
	V9	5.50	*7*	295	2.53	19.8	63.63
	V10	4.46	*22*	282	3.83	24.5	55.00
	V11	4.16	*32*	293	3.90	23.6	57.38
	V12	6.80	*1*	345	2.91	24.9	85.63
	V13	4.21	*28*	301	3.47	21.0	60.25
	V14	3.50	*36*	305	2.00	19.7	62.63
	V15	5.67	*3*	337	3.58	25.1	55.50
	V16	5.51	*6*	332	2.67	24.9	85.00
	V17	4.75	*18*	306	3.48	23.9	49.00
	V18	3.22	*39*	289	1.89	25.1	73.88
	V19	-		-	-	-	
	V20	5.21	*9*	292	3.39	24.5	67.13
	V21	4.85	*14*	289	2.79	20.9	83.25
	V22	4.68	*19*	328	2.61	21.8	29.88
	V23	5.59	*4*	307	1.97	21.6	73.50
	V24	5.21	*9*	334	2.15	12.1	58.38
	V25	4.85	*15*	301	2.27	21.1	94.00
	V26	4.27	*26*	281	2.78	18.4	74.88
	V27	4.21	*29*	290	2.20	16.4	50.63
	V28	4.28	*25*	311	1.19	16.4	63.25
	V29	4.20	*30*	332	2.46	25.5	40.63
	V30	5.02	*13*	324	1.96	15.2	58.50
	V31	5.37	*8*	279	2.75	23.1	73.13
	V32	-		-	-	-	
	V33	4.44	*23*	320	3.83	21.5	120.00
	V34	3.35	*37*	287	3.57	20.0	58.75
	V35	3.73	*34*	339	2.26	12.4	24.75
	V36	3.73	*35*	332	1.95	18.1	94.63
	V37	3.86	*33*	320	3.05	22.6	-7.75
	V38	5.11	*11*	290	3.06	19.1	51.38
	V39	4.77	*17*	319	2.65	14.6	104.63
	V40	-		-	-	-	
	V41	4.66	*20*	343	3.64	19.6	-14.88
	V42	6.10	*2*	318	3.50	21.4	78.25

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	IIRR					
		Grain Yield (t/ha)	***Rank***	**Panicle/m^2 (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)**
C.D.(0.05)		1.91		37.43	1.62	0.85	
C.V.(%)		43.50		13.15	6.20	4.34	
Expt. Mean		**4.65**		**308**	**2.83**	**21.24**	
Soil type		Clay Loam					
pH		8.5, 7.4,7.1, 7.3					
P - levels (kg/ha)							
P1 (0%)		0					
P2 (50%)		20					
P3 (100%)		40					
P4 (150%)		60					
Recmnd NPK (kg/ha)		120:40:40					
Varieties							
V1		29547					
V2		29549					
V3		29554					
V4		29546					
V5		30230					
V6		29560					
V7		29558					
V8		30231					
V9		30232					
V10		30233					
V11		30234					
V12		30235					
V13		30236					
V14		30237					
V15		30238					
V16		30239					
V17		29552					
V18		29548					
V19		**Rasi (Positive Check)**					
V20		30240					
V21		30241					
V22		30242					
V23		30243					
V24		**Swarna (Positive Check)**					
V25		30244					
V26		30245					
V27		30246					
V28		29555					
V29		29563					
V30		**Improved Samba Mahsuri (Negative Check)**					
V31		30247					
V32		29562					
V33		30248					
V34		30249					
V35		30250					
V36		30251					
V37		30252					
V38		30253					
V39		**BPT 5204 (Sensitive Check)**					
V40		30254					
V41		**IR 64 (RP)**					
V42		**MTU 1121 (RP)**					
Avlb NPK of soil (kg/ha)		292:96:293					

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	RAIPUR				
		Grain Yield (t/ha)	*Rank*	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	-		-	-	
	V2	-		-	-	
	V3	-		-	-	
	V4	-		-	-	
	V5	-		-	-	
	V6	-		-	-	
	V7	-		-	-	
	V8	-		-	-	
	V9	-		-	-	
	V10	-		-	-	
	V11	-		-	-	
	V12	-		-	-	
	V13	-		-	-	
	V14	-		-	-	
	V15	-		-	-	
	V16	-		-	-	
	V17	-		-	-	
	V18	-		-	-	
	V19	-		-	-	
	V20	-		-	-	
	V21	-		-	-	
	V22	-		-	-	
	V23	-		-	-	
	V24	-		-	-	
	V25	-		-	-	
	V26	-		-	-	
	V27	-		-	-	
	V28	-		-	-	
	V29	-		-	-	
	V30	-		-	-	
	V31	-		-	-	
	V32	-		-	-	
	V33	-		-	-	
	V34	-		-	-	
	V35	-		-	-	
	V36	-		-	-	
	V37	-		-	-	
	V38	-		-	-	
	V39	-		-	-	
	V40	-		-	-	
	V41	-		-	-	
	V42	-		-	-	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	RAIPUR				
		Grain Yield (t/ha)	*Rank*	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
P2: 50% of recommended P dose (N and K is constant)	V1	2.45	*80*	2.31	26.73	
	V2	3.55	*52*	2.73	20.90	
	V3	2.47	*78*	2.74	26.13	
	V4	3.57	*47*	3.05	25.23	
	V5	4.11	*24*	2.82	21.70	
	V6	3.62	*43*	2.78	25.20	
	V7	4.36	*15*	3.14	24.80	
	V8	3.93	*30*	3.72	21.20	
	V9	4.42	*9*	5.35	21.17	
	V10	4.22	*20*	3.26	17.83	
	V11	3.84	*38*	3.90	23.33	
	V12	2.80	*74*	3.24	19.73	
	V13	2.78	*75*	2.10	28.27	
	V14	4.00	*28*	4.86	18.73	
	V15	3.51	*54*	3.32	23.10	
	V16	3.15	*69*	3.22	21.97	
	V17	2.47	*78*	2.30	25.43	
	V18	-		-	-	
	V19	4.45	*7*	3.50	23.70	
	V20	3.56	*50*	3.09	19.47	
	V21	3.30	*62*	2.48	28.03	
	V22	4.08	*26*	3.13	22.10	
	V23	3.38	*61*	2.45	18.93	
	V24	3.61	*45*	3.02	20.23	
	V25	3.57	*47*	2.74	18.90	
	V26	3.23	*65*	2.62	17.53	
	V27	3.25	*64*	2.60	16.77	
	V28	3.09	*71*	2.54	21.00	
	V29	2.71	*76*	3.02	24.00	
	V30	3.19	*68*	3.13	19.37	
	V31	-		-	-	
	V32	3.21	*66*	3.18	26.67	
	V33	3.27	*63*	3.60	22.90	
	V34	3.05	*73*	4.01	24.13	
	V35	3.67	*41*	3.19	20.83	
	V36	4.01	*27*	3.85	17.77	
	V37	3.94	*29*	3.89	21.57	
	V38	4.09	*25*	3.97	21.40	
	V39	3.56	*50*	3.75	19.47	
	V40	3.88	*35*	3.30	24.37	
	V41	3.90	*34*	3.47	21.40	
	V42	3.92	*31*	3.72	19.43	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	RAIPUR				
		Grain Yield (t/ha)	*Rank*	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
P3: 100% of recommended P dose	V1	3.20	*67*	2.57	27.03	37.50
	V2	3.91	*33*	2.95	21.40	18.00
	V3	2.65	*77*	2.94	26.97	9.00
	V4	4.40	*12*	3.30	25.37	41.50
	V5	4.33	*17*	3.02	21.90	11.00
	V6	3.85	*37*	2.99	25.97	11.50
	V7	4.64	*3*	3.71	25.07	14.00
	V8	4.24	*19*	4.06	21.60	15.50
	V9	4.97	*1*	5.82	21.63	27.50
	V10	4.41	*10*	3.67	18.20	9.50
	V11	4.37	*13*	4.51	23.80	26.50
	V12	3.12	*70*	3.72	20.23	16.00
	V13	3.44	*57*	2.36	28.63	33.00
	V14	4.30	*18*	5.06	19.13	15.00
	V15	3.62	*43*	3.60	23.57	5.50
	V16	3.51	*54*	4.16	22.43	18.00
	V17	3.08	*72*	2.48	26.23	30.50
	V18	-		-	-	#VALUE!
	V19	4.82	*2*	3.68	24.33	18.50
	V20	3.92	*31*	3.25	19.97	18.00
	V21	3.66	*42*	2.65	28.70	18.00
	V22	4.37	*13*	3.65	22.50	14.50
	V23	3.74	*40*	2.60	19.60	18.00
	V24	4.19	*22*	3.35	20.80	29.00
	V25	3.88	*35*	3.19	19.50	15.50
	V26	3.57	*47*	2.85	18.13	17.00
	V27	3.55	*52*	3.00	17.30	15.00
	V28	3.44	*57*	3.16	21.43	17.50
	V29	3.61	*45*	3.19	24.50	45.00
	V30	3.81	*39*	3.45	20.33	31.00
	V31	-		-	-	#VALUE!
	V32	3.43	*59*	3.54	27.43	11.00
	V33	3.50	*56*	3.92	23.83	11.50
	V34	3.42	*60*	4.28	24.53	18.50
	V35	4.15	*23*	3.57	21.50	24.00
	V36	4.21	*21*	4.39	18.53	10.00
	V37	4.41	*10*	4.20	22.20	23.50
	V38	4.49	*6*	4.31	21.77	20.00
	V39	4.35	*16*	4.11	20.23	39.50
	V40	4.53	*5*	4.03	25.17	32.50
	V41	4.44	*8*	4.11	22.10	27.00
	V42	4.55	*4*	4.05	19.97	31.50

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	RAIPUR				
		Grain Yield (t/ha)	*Rank*	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
P4: 150% of recommended P dose	V1	-		-	-	
	V2	-		-	-	
	V3	-		-	-	
	V4	-		-	-	
	V5	-		-	-	
	V6	-		-	-	
	V7	-		-	-	
	V8	-		-	-	
	V9	-		-	-	
	V10	-		-	-	
	V11	-		-	-	
	V12	-		-	-	
	V13	-		-	-	
	V14	-		-	-	
	V15	-		-	-	
	V16	-		-	-	
	V17	-		-	-	
	V18	-		-	-	
	V19	-		-	-	
	V20	-		-	-	
	V21	-		-	-	
	V22	-		-	-	
	V23	-		-	-	
	V24	-		-	-	
	V25	-		-	-	
	V26	-		-	-	
	V27	-		-	-	
	V28	-		-	-	
	V29	-		-	-	
	V30	-		-	-	
	V31	-		-	-	
	V32	-		-	-	
	V33	-		-	-	
	V34	-		-	-	
	V35	-		-	-	
	V36	-		-	-	
	V37	-		-	-	
	V38	-		-	-	
	V39	-		-	-	
	V40	-		-	-	
	V41	-		-	-	
	V42	-		-	-	
Interaction						
N at same V		NS		NS	NS	
V at same N		NS		NS	NS	
F1		-		-	-	
F2		3.53	*2*	3.23	22.0	
F3		3.95	*1*	3.59	22.6	21.14
F4		-		-	-	
C.D.(0.05)		0.40		0.06	0.17	
C.V.(%)		19.22		3.31	1.38	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	RAIPUR				
		Grain Yield (t/ha)	*Rank*	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 50% RDP)
Mean of varieties:						
	V1	2.83	*38*	2.44	26.9	37.50
	V2	3.73	*22*	2.84	21.2	18.00
	V3	2.56	*40*	2.84	26.6	9.00
	V4	3.99	*16*	3.18	25.3	41.50
	V5	4.22	*8*	2.92	21.8	11.00
	V6	3.74	*21*	2.89	25.6	11.50
	V7	4.50	*3*	3.43	24.9	14.00
	V8	4.09	*15*	3.89	21.4	15.50
	V9	4.70	*1*	5.59	21.4	27.50
	V10	4.32	*4*	3.47	18.0	9.50
	V11	4.11	*14*	4.21	23.6	26.50
	V12	2.96	*37*	3.48	20.0	16.00
	V13	3.11	*36*	2.23	28.5	33.00
	V14	4.15	*12*	4.96	18.9	15.00
	V15	3.57	*24*	3.46	23.3	5.50
	V16	3.33	*31*	3.69	22.2	18.00
	V17	2.78	*39*	2.39	25.8	30.50
	V18	-		-	-	
	V19	4.64	*2*	3.59	24.0	18.50
	V20	3.74	*20*	3.17	19.7	18.00
	V21	3.48	*27*	2.57	28.4	18.00
	V22	4.23	*7*	3.39	22.3	14.50
	V23	3.56	*25*	2.53	19.3	18.00
	V24	3.90	*19*	3.19	20.5	29.00
	V25	3.73	*23*	2.97	19.2	15.50
	V26	3.40	*28*	2.74	17.8	17.00
	V27	3.40	*28*	2.80	17.0	15.00
	V28	3.27	*33*	2.85	21.2	17.50
	V29	3.16	*35*	3.11	24.3	45.00
	V30	3.50	*26*	3.29	19.9	31.00
	V31	-		-	-	
	V32	3.32	*32*	3.36	27.1	11.00
	V33	3.39	*30*	3.76	23.4	11.50
	V34	3.24	*34*	4.15	24.3	18.50
	V35	3.91	*18*	3.38	21.2	24.00
	V36	4.11	*13*	4.12	18.2	10.00
	V37	4.18	*10*	4.05	21.9	23.50
	V38	4.29	*5*	4.14	21.6	20.00
	V39	3.96	*17*	3.93	19.9	39.50
	V40	4.21	*9*	3.67	24.8	32.50
	V41	4.17	*11*	3.79	21.8	27.00
	V42	4.24	*6*	3.89	19.7	31.50

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	RAIPUR				
		Grain Yield (t/ha)	***Rank***	**Panicle wt (g)**	**Test wt (g)**	**Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)**
C.D.(0.05)		0.34		0.40	0.81	
C.V.(%)		8.00		10.49	3.20	
Expt. Mean		**3.74**		**3.41**	**22.31**	
Soil type		Vertisols				
pH		7.1				
P - levels (kg/ha)						
P1 (0%)		-				
P2 (50%)		20				
P3 (100%)		40				
P4 (150%)		-				
RemdNPK (kg/ha)		100:40:40				
Varieties						
V1		29547				
V2		29549				
V3		29554				
V4		29546				
V5		30230				
V6		29560				
V7		29558				
V8		30231				
V9		30232				
V10		30233				
V11		30234				
V12		30235				
V13		30236				
V14		30237				
V15		30238				
V16		30239				
V17		29552				
V18		29548				
V19		**Rasi (Positive Check)**				
V20		30240				
V21		30241				
V22		30242				
V23		30243				
V24		**Swarna (Positive Check)**				
V25		30244				
V26		30245				
V27		30246				
V28		29555				
V29		29563				
V30		**Improved Samba Mahsuri (Negative Check)**				
V31		30247				
V32		29562				
V33		30248				
V34		30249				
V35		30250				
V36		30251				
V37		30252				
V38		30253				
V39		**BPT 5204 (Sensitive Check)**				
V40		30254				
V41		**IR 64 (RP)**				
V42		**MTU 1121 (RP)**				
Avlb NPK of soil (kg/ha)		183:18:349				

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VADAGAON					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P1: 0% of recommended P dose (N and K is constant)	V1	4.36	*66*	253	3.51	21.9	
	V2	4.51	*51*	204	3.21	16.6	
	V3	4.58	*47*	246	3.54	23.0	
	V4	3.88	*111*	220	3.24	19.5	
	V5	4.00	*100*	190	2.96	12.6	
	V6	4.01	*99*	234	3.83	14.0	
	V7	3.66	*122*	208	3.33	11.5	
	V8	4.99	*19*	219	3.21	17.7	
	V9	4.42	*60*	227	3.24	22.4	
	V10	3.71	*120*	200	3.91	18.8	
	V11	4.80	*29*	206	3.41	23.3	
	V12	4.25	*80*	214	3.51	21.5	
	V13	3.98	*104*	226	3.26	19.9	
	V14	3.63	*123*	264	3.14	17.4	
	V15	3.60	*125*	237	3.09	12.4	
	V16	4.60	*45*	219	3.73	24.2	
	V17	3.99	*101*	221	3.85	20.0	
	V18	4.32	*71*	237	3.92	19.2	
	V19	3.80	*113*	242	3.32	16.9	
	V20	4.71	*34*	209	3.42	23.8	
	V21	3.73	*119*	254	3.43	16.6	
	V22	3.99	*101*	259	3.13	19.3	
	V23	4.08	*92*	225	4.26	18.0	
	V24	4.62	*44*	205	3.78	21.7	
	V25	4.41	*62*	240	3.17	19.4	
	V26	4.02	*97*	198	4.11	17.7	
	V27	4.31	*74*	201	3.64	16.4	
	V28	4.10	*88*	226	3.40	15.6	
	V29	3.75	*116*	213	3.11	14.9	
	V30	4.14	*85*	210	3.07	18.4	
	V31	3.78	*114*	219	3.94	19.0	
	V32	3.46	*126*	221	3.41	17.3	
	V33	4.48	*52*	252	3.69	22.4	
	V34	3.90	*109*	202	3.25	18.7	
	V35	3.75	*116*	220	4.03	18.8	
	V36	3.78	*114*	208	3.19	12.0	
	V37	4.57	*48*	248	3.41	16.8	
	V38	3.99	*101*	274	3.49	20.0	
	V39	4.10	*88*	199	3.95	14.1	
	V40	3.82	*112*	207	3.77	13.3	
	V41	3.67	*121*	243	3.44	18.6	
	V42	3.61	*124*	251	3.69	12.4	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VADAGAON					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P2: 50% of recommended P dose (N and K is constant)	V1	4.10	*88*	274	4.33	19.2	-10.40
	V2	4.98	*20*	221	3.61	24.5	18.80
	V3	3.74	*118*	266	3.67	17.9	-33.60
	V4	4.31	*74*	238	3.77	20.2	17.20
	V5	5.00	*18*	206	3.40	22.0	40.00
	V6	5.20	*11*	253	4.27	23.3	47.60
	V7	4.32	*71*	225	3.53	20.3	26.40
	V8	4.77	*32*	237	3.47	19.7	-8.80
	V9	4.22	*82*	246	4.13	18.9	-8.00
	V10	4.11	*87*	216	3.42	17.0	16.00
	V11	3.93	*107*	223	3.87	17.7	-34.80
	V12	4.35	*67*	232	3.89	18.0	4.00
	V13	4.67	*40*	244	3.80	16.6	27.60
	V14	4.44	*56*	286	3.58	16.1	32.40
	V15	4.06	*93*	257	3.56	15.0	18.40
	V16	4.48	*52*	237	3.58	18.8	-4.80
	V17	4.84	*26*	239	4.36	22.7	34.00
	V18	4.60	*45*	257	3.28	21.6	11.20
	V19	4.32	*71*	262	3.77	19.4	20.80
	V20	4.02	*97*	226	4.38	19.2	-27.60
	V21	4.67	*40*	275	4.55	19.3	37.60
	V22	4.78	*31*	280	3.78	22.4	31.60
	V23	5.40	*5*	243	4.17	18.1	52.80
	V24	4.33	*70*	222	3.69	12.8	-11.60
	V25	5.10	*15*	260	3.60	24.3	27.60
	V26	4.96	*22*	214	3.44	23.3	37.60
	V27	3.97	*105*	218	3.81	11.7	-13.60
	V28	4.95	*23*	244	4.08	17.0	34.00
	V29	4.13	*86*	231	3.89	13.6	15.20
	V30	4.20	*84*	227	3.55	19.7	2.40
	V31	4.31	*74*	237	3.92	20.3	21.20
	V32	3.89	*110*	239	4.24	12.6	17.20
	V33	4.88	*24*	273	4.03	17.1	16.00
	V34	4.03	*96*	218	3.78	17.0	5.20
	V35	3.97	*105*	238	3.51	18.6	8.80
	V36	4.72	*33*	225	4.09	22.5	37.60
	V37	3.91	*108*	268	4.18	12.8	-26.40
	V38	4.42	*60*	297	4.72	18.6	17.20
	V39	4.44	*56*	215	3.79	14.3	13.60
	V40	4.34	*69*	224	4.46	14.0	20.80
	V41	4.10	*88*	263	4.34	12.3	17.20
	V42	4.06	*93*	272	3.47	19.1	18.00

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VADAGAON					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P3: 100% of recommended P dose	V1	5.06	*16*	313	4.21	17.4	14.00
	V2	4.81	*27*	252	4.20	16.6	6.00
	V3	4.40	*63*	304	3.84	15.7	-3.60
	V4	4.85	*25*	272	3.96	19.4	19.40
	V5	4.66	*43*	235	4.30	21.2	13.20
	V6	4.98	*20*	289	4.63	22.7	19.40
	V7	4.06	*93*	257	4.18	18.4	8.00
	V8	5.25	*10*	270	3.89	23.9	5.20
	V9	4.47	*54*	281	4.82	14.0	1.00
	V10	4.40	*63*	247	3.96	20.0	13.80
	V11	5.85	*1*	255	4.18	18.7	21.00
	V12	4.69	*37*	265	3.80	13.4	8.80
	V13	5.37	*7*	279	4.08	24.4	27.80
	V14	4.67	*40*	327	5.03	21.2	20.80
	V15	4.55	*50*	293	4.72	20.7	19.00
	V16	4.29	*78*	271	4.52	12.3	-6.20
	V17	5.11	*14*	273	4.30	23.2	22.40
	V18	4.79	*30*	293	3.93	19.1	9.40
	V19	5.42	*4*	300	4.33	23.1	32.40
	V20	5.16	*13*	258	4.16	20.7	9.00
	V21	4.23	*81*	314	4.45	13.2	10.00
	V22	5.06	*16*	320	3.62	20.2	21.40
	V23	4.45	*55*	278	4.69	17.8	7.40
	V24	5.52	*3*	253	3.99	25.1	18.00
	V25	4.37	*65*	297	3.93	17.5	-0.80
	V26	4.21	*83*	244	5.22	13.2	3.80
	V27	5.36	*8*	249	4.19	17.9	21.00
	V28	4.71	*34*	279	4.80	18.9	12.20
	V29	4.70	*36*	264	4.17	14.7	19.00
	V30	4.30	*77*	259	4.06	19.6	3.20
	V31	4.44	*56*	271	3.84	12.7	13.20
	V32	4.81	*27*	273	4.57	15.0	27.00
	V33	5.18	*12*	312	4.27	23.5	14.00
	V34	4.68	*38*	249	4.84	20.4	15.60
	V35	4.35	*67*	272	4.61	19.8	12.00
	V36	5.39	*6*	257	3.78	25.7	32.20
	V37	4.44	*56*	306	4.52	20.2	-2.60
	V38	4.68	*38*	339	3.98	21.3	13.80
	V39	4.26	*79*	246	4.93	18.5	3.20
	V40	4.57	*48*	255	3.90	19.9	15.00
	V41	5.63	*2*	300	3.76	24.5	39.20
	V42	5.28	*9*	311	4.78	17.6	33.40

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VADAGAON					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
P4: 150% of recommended P dose	V1	-		-	-	-	
	V2	-		-	-	-	
	V3	-		-	-	-	
	V4	-		-	-	-	
	V5	-		-	-	-	
	V6	-		-	-	-	
	V7	-		-	-	-	
	V8	-		-	-	-	
	V9	-		-	-	-	
	V10	-		-	-	-	
	V11	-		-	-	-	
	V12	-		-	-	-	
	V13	-		-	-	-	
	V14	-		-	-	-	
	V15	-		-	-	-	
	V16	-		-	-	-	
	V17	-		-	-	-	
	V18	-		-	-	-	
	V19	-		-	-	-	
	V20	-		-	-	-	
	V21	-		-	-	-	
	V22	-		-	-	-	
	V23	-		-	-	-	
	V24	-		-	-	-	
	V25	-		-	-	-	
	V26	-		-	-	-	
	V27	-		-	-	-	
	V28	-		-	-	-	
	V29	-		-	-	-	
	V30	-		-	-	-	
	V31	-		-	-	-	
	V32	-		-	-	-	
	V33	-		-	-	-	
	V34	-		-	-	-	
	V35	-		-	-	-	
	V36	-		-	-	-	
	V37	-		-	-	-	
	V38	-		-	-	-	
	V39	-		-	-	-	
	V40	-		-	-	-	
	V41	-		-	-	-	
	V42	-		-	-	-	
Interaction							
N at same V		0.06		3.23	0.05	0.25	
V at same N		0.09		5.17	0.10	0.29	
F1		4.09	*3*	225	3.50	18.1	
F2		4.43	*2*	244	3.88	18.3	13.49
F3		4.80	*1*	278	4.28	19	14.10
F4		-		-	-	-	
C.D.(0.05)		0.11		5.89	0.13	0.23	
C.V.(%)		10.78		10.57	15.18	5.51	

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VADAGAON					
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)
Mean of varieties:							
	V1	4.51	*19*	280	4.02	19.5	1.80
	V2	4.77	*5*	226	3.67	19.2	12.40
	V3	4.24	*32*	272	3.68	18.9	-18.60
	V4	4.35	*26*	243	3.66	19.7	18.30
	V5	4.55	*16*	210	3.55	18.6	26.60
	V6	4.73	*6*	259	4.24	20.0	33.50
	V7	4.01	*42*	230	3.68	16.7	17.20
	V8	5.00	*1*	242	3.52	20.4	-1.80
	V9	4.37	*24*	252	4.06	18.4	-3.50
	V10	4.07	*38*	221	3.76	18.6	14.90
	V11	4.86	*2*	228	3.82	19.9	-6.90
	V12	4.43	*22*	237	3.73	17.6	6.40
	V13	4.67	*7*	250	3.71	20.3	27.70
	V14	4.25	*30*	292	3.92	18.2	26.60
	V15	4.07	*39*	262	3.79	16.0	18.70
	V16	4.46	*21*	243	3.94	18.4	-5.50
	V17	4.65	*8*	245	4.17	22.0	28.20
	V18	4.57	*15*	263	3.71	20.0	10.30
	V19	4.51	*18*	268	3.81	19.8	26.60
	V20	4.63	*10*	231	3.99	21.2	-9.30
	V21	4.21	*34*	281	4.14	16.4	23.80
	V22	4.61	*13*	287	3.51	20.7	26.50
	V23	4.64	*9*	248	4.37	18.0	30.10
	V24	4.82	*4*	227	3.82	19.9	3.20
	V25	4.63	*12*	265	3.57	20.4	13.40
	V26	4.40	*23*	219	4.26	18.1	20.70
	V27	4.55	*17*	223	3.88	15.3	3.70
	V28	4.59	*14*	250	4.09	17.2	23.10
	V29	4.19	*36*	236	3.72	14.4	17.10
	V30	4.21	*33*	232	3.56	19.2	2.80
	V31	4.18	*37*	242	3.90	17.3	17.20
	V32	4.05	*40*	244	4.07	15.0	22.10
	V33	4.85	*3*	279	4.00	21.0	15.00
	V34	4.20	*35*	223	3.96	18.7	10.40
	V35	4.02	*41*	243	4.05	19.1	10.40
	V36	4.63	*10*	230	3.69	20.1	34.90
	V37	4.31	*28*	274	4.04	16.6	-14.50
	V38	4.36	*25*	303	4.06	19.9	15.50
	V39	4.27	*29*	220	4.22	15.7	8.40
	V40	4.24	*31*	228	4.04	15.7	17.90
	V41	4.47	*20*	269	3.85	18.4	28.20
	V42	4.32	*27*	278	3.98	16.4	25.70

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VADAGAON					
		Grain Yield (t/ha)	***Rank***	**Panicle/m^2 (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)**
C.D.(0.05)		0.03		1.87	0.03	0.14	
C.V.(%)		0.81		0.81	0.81	0.83	
Expt. Mean		**4.44**		**249**	**3.89**	**18.50**	
Soil type		-					
pH		7.7					
P - levels (kg/ha)							
P1 (0%)		0					
P2 (50%)		25.0					
P3 (100%)		50					
P4 (150%)		-					
Recmd NPK (kg/ha)		100:50:50					
Varieties							
	V1	29547					
	V2	29549					
	V3	29554					
	V4	29546					
	V5	30230					
	V6	29560					
	V7	29558					
	V8	30231					
	V9	30232					
	V10	30233					
	V11	30234					
	V12	30235					
	V13	30236					
	V14	30237					
	V15	30238					
	V16	30239					
	V17	29552					
	V18	29548					
	V19	**Rasi (Positive Check)**					
	V20	30240					
	V21	30241					
	V22	30242					
	V23	30243					
	V24	**Swarna (Positive Check)**					
	V25	30244					
	V26	30245					
	V27	30246					
	V28	29555					
	V29	29563					
	V30	**Improved Samba Mahsuri (Negative Check)**					
	V31	30247					
	V32	29562					
	V33	30248					
	V34	30249					
	V35	30250					
	V36	30251					
	V37	30252					
	V38	30253					
	V39	**BPT 5204 (Sensitive Check)**					
	V40	30254					
	V41	**IR 64 (RP)**					
	V42	**MTU 1121 (RP)**					
Avlb NPK of soil (kg/ha)		194:17:218					

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VARANASI						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)		
P1: 0% of recommended P dose (N and K is constant)	V1	6.30	*31*	273	26.0	99		4.84	*62*
	V2	5.37	*61*	356	15.7	87		5.03	*47*
	V3	5.57	*50*	281	14.7	101		4.35	*112*
	V4	4.27	*89*	382	15.1	108		4.50	*102*
	V5	6.92	*15*	286	15.4	105		5.43	*26*
	V6	5.88	*41*	366	15.3	100		5.03	*48*
	V7	4.60	*80*	284	18.4	91		4.46	*105*
	V8	4.40	*86*	414	28.1	105		4.64	*85*
	V9	7.17	*11*	372	20.8	95		5.08	*42*
	V10	3.23	*110*	299	21.1	104		4.20	*123*
	V11	-		-	-	-		4.10	*133*
	V12	6.07	*34*	399	18.6	100		5.07	*44*
	V13	3.47	*105*	335	24.6	107		3.89	*152*
	V14	5.89	*40*	383	14.9	83		4.34	*113*
	V15	4.40	*86*	329	28.3	106		4.32	*115*
	V16	3.61	*99*	306	18.7	104		4.27	*120*
	V17	7.07	*13*	405	12.6	99		4.62	*89*
	V18	5.42	*57*	365	28.5	95		4.51	*99*
	V19	6.15	*33*	361	22.3	107		4.98	*52*
	V20	5.53	*52*	309	24.6	85		5.11	*40*
	V21	5.12	*68*	327	12.9	83		4.64	*86*
	V22	7.50	*4*	427	14.4	102		5.50	*24*
	V23	3.83	*96*	274	27.5	109		3.99	*142*
	V24	-		-	-	-		4.19	*125*
	V25	-		-	-	-		4.62	*90*
	V26	5.51	*54*	353	17.8	82		4.73	*76*
	V27	3.13	*111*	261	31.0	107		3.73	*160*
	V28	2.87	*112*	264	23.5	107		3.73	*159*
	V29	5.53	*52*	397	23.0	85		4.56	*95*
	V30	4.03	*94*	295	17.0	105		4.17	*126*
	V31	5.40	*58*	361	20.6	101		4.73	*74*
	V32	-		-	-	-		3.46	*165*
	V33	6.48	*24*	307	18.6	101		4.73	*77*
	V34	6.70	*18*	328	17.0	102		4.74	*71*
	V35	7.18	*9*	387	28.7	98		4.60	*92*
	V36	5.47	*56*	349	17.5	103		4.38	*109*
	V37	5.82	*44*	306	26.2	88		4.93	*58*
	V38	6.59	*22*	366	13.5	87		4.73	*74*
	V39	5.40	*58*	365	20.9	103		4.10	*135*
	V40	4.50	*84*	312	17.8	89		4.49	*103*
	V41	5.70	*45*	360	17.6	102		4.30	*118*
	V42	4.92	*73*	330	16.0	96		4.58	*94*

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VARANASI						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)		
P2: 50% of recommended P dose (N and K is constant)	V1	6.83	*16*	335	21.11	99	17.67	4.14	*129*
	V2	4.47	*85*	259	20.77	87	-30.00	4.00	*141*
	V3	6.60	*19*	341	14.91	101	34.33	4.08	*137*
	V4	3.47	*105*	236	16.93	107	-26.67	3.72	*161*
	V5	7.27	*8*	365	16.15	106	11.67	4.79	*66*
	V6	6.77	*17*	387	30.02	100	29.67	4.71	*80*
	V7	4.82	*74*	349	18.64	90	7.33	4.36	*111*
	V8	4.78	*76*	352	17.42	105	12.67	4.12	*130*
	V9	7.50	*4*	388	32.21	95	11.00	4.93	*59*
	V10	1.80	*113*	199	22.79	102	-47.67	3.62	*162*
	V11	-		-	-	-		3.87	*155*
	V12	4.13	*92*	326	23.65	99	-64.67	4.11	*132*
	V13	3.50	*103*	256	27.30	105	1.00	3.77	*158*
	V14	5.87	*42*	382	29.29	82	-0.67	4.03	*140*
	V15	3.67	*97*	223	34.16	106	-24.33	4.10	*133*
	V16	3.49	*104*	232	15.11	103	-4.00	3.88	*153*
	V17	5.60	*49*	409	17.79	99	-49.00	4.20	*124*
	V18	5.31	*64*	362	18.73	94	-3.67	3.98	*146*
	V19	5.57	*50*	377	25.89	106	-19.33	4.78	*67*
	V20	5.02	*70*	335	28.24	85	-17.00	4.26	*121*
	V21	5.15	*67*	342	25.78	82	1.00	3.98	*145*
	V22	6.33	*29*	385	23.74	102	-39.00	4.64	*87*
	V23	3.62	*98*	251	42.82	108	-7.00	4.09	*136*
	V24	-		-	-	-		4.30	*117*
	V25	-		-	-	-		3.99	*144*
	V26	5.70	*45*	386	19.47	82	6.33	4.31	*116*
	V27	4.70	*79*	328	39.90	106	52.33	3.52	*164*
	V28	3.31	*108*	282	16.46	106	14.67	3.78	*157*
	V29	4.53	*83*	324	23.93	85	-33.33	3.87	*156*
	V30	4.97	*72*	337	24.42	105	31.33	4.05	*138*
	V31	6.43	*25*	388	18.79	101	34.33	4.48	*104*
	V32	-		-	-	-		3.55	*163*
	V33	7.70	*3*	311	16.63	101	40.67	4.36	*110*
	V34	6.60	*19*	247	16.19	102	-3.33	3.93	*151*
	V35	7.38	*7*	415	29.38	98	6.67	4.28	*119*
	V36	5.50	*55*	322	30.08	102	1.00	3.94	*149*
	V37	4.98	*71*	398	30.22	85	-28.00	4.14	*128*
	V38	5.87	*42*	359	25.84	85	-24.00	4.60	*93*
	V39	5.62	*48*	335	21.61	102	7.33	4.15	*127*
	V40	4.59	*82*	210	18.20	88	3.00	4.05	*139*
	V41	5.90	*38*	360	34.06	101	6.67	4.45	*106*
	V42	5.30	*65*	387	15.51	95	12.67	4.44	*107*

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VARANASI						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)		
P3: 100% of recommended P dose	V1	6.60	*19*	367	21.68	97	5.00	5.30	*33*
	V2	7.12	*12*	386	25.76	85	29.17	5.01	*49*
	V3	4.73	*77*	287	22.88	99	-14.00	4.33	*114*
	V4	1.77	*114*	194	27.35	106	-41.67	4.73	*78*
	V5	6.37	*28*	313	15.26	105	-9.17	5.67	*19*
	V6	6.07	*34*	337	22.36	98	3.17	5.41	*30*
	V7	5.12	*68*	327	24.12	90	8.67	5.43	*27*
	V8	4.38	*88*	250	32.62	103	-0.33	5.40	*31*
	V9	7.50	*4*	356	32.21	94	5.50	5.79	*12*
	V10	3.30	*109*	251	26.52	101	1.17	4.69	*83*
	V11	-		-	-	-		4.79	*65*
	V12	6.43	*25*	418	18.00	99	6.00	5.72	*17*
	V13	4.00	*95*	257	26.56	106	8.83	4.51	*100*
	V14	5.37	*61*	380	22.92	82	-8.67	4.94	*57*
	V15	4.27	*89*	254	32.50	104	-2.17	4.87	*61*
	V16	3.59	*100*	330	16.95	102	-0.33	4.63	*88*
	V17	5.90	*38*	347	24.85	96	-19.50	5.00	*50*
	V18	6.01	*36*	345	30.06	95	9.83	5.52	*23*
	V19	3.57	*101*	349	18.47	104	-43.00	4.60	*91*
	V20	5.32	*63*	350	27.77	84	-3.50	5.41	*29*
	V21	3.55	*102*	278	26.47	82	-26.17	4.70	*82*
	V22	4.73	*77*	374	20.59	101	-46.17	5.30	*32*
	V23	3.42	*107*	330	36.31	106	-6.83	4.54	*96*
	V24	-		-	-	-		4.68	*84*
	V25	-		-	-	-		4.91	*60*
	V26	5.40	*58*	399	24.67	82	-1.83	4.75	*70*
	V27	4.60	*80*	335	27.33	107	24.50	4.44	*108*
	V28	4.21	*91*	339	25.33	107	22.33	4.53	*98*
	V29	5.93	*37*	389	26.28	84	6.67	5.22	*34*
	V30	6.17	*32*	243	23.72	103	35.67	5.08	*43*
	V31	7.73	*2*	367	24.59	102	38.83	6.14	*6*
	V32	-		-	-	-		4.12	*131*
	V33	7.80	*1*	413	18.16	99	22.00	5.41	*28*
	V34	7.00	*14*	381	23.40	99	5.00	4.84	*63*
	V35	7.18	*9*	423	39.64	96	0.00	4.75	*69*
	V36	6.40	*27*	394	17.55	101	15.50	5.15	*38*
	V37	5.68	*47*	340	31.66	85	-2.33	5.11	*41*
	V38	5.27	*66*	338	17.80	85	-22.00	5.18	*36*
	V39	6.32	*30*	373	21.31	101	15.33	5.07	*45*
	V40	4.09	*93*	262	25.37	87	-6.83	4.94	*55*
	V41	6.50	*23*	411	29.80	101	13.33	5.18	*35*
	V42	4.8	*75*	337	21.08	96	-2.00	5.45	*25*

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VARANASI						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)		
P4: 150% of recommended P dose	V1	-		-	-	-		5.06	*46*
	V2	-		-	-	-		3.99	*143*
	V3	-		-	-	-		4.97	*53*
	V4	-		-	-	-		4.77	*68*
	V5	-		-	-	-		5.73	*16*
	V6	-		-	-	-		5.55	*21*
	V7	-		-	-	-		6.16	*5*
	V8	-		-	-	-		4.80	*64*
	V9	-		-	-	-		5.74	*15*
	V10	-		-	-	-		4.96	*54*
	V11	-		-	-	-		4.70	*81*
	V12	-		-	-	-		7.50	*1*
	V13	-		-	-	-		4.74	*72*
	V14	-		-	-	-		4.26	*122*
	V15	-		-	-	-		5.83	*10*
	V16	-		-	-	-		6.03	*7*
	V17	-		-	-	-		4.98	*51*
	V18	-		-	-	-		3.94	*150*
	V19	-		-	-	-			
	V20	-		-	-	-		5.89	*9*
	V21	-		-	-	-		5.81	*11*
	V22	-		-	-	-		5.16	*37*
	V23	-		-	-	-		6.53	*3*
	V24	-		-	-	-		5.94	*8*
	V25	-		-	-	-		5.76	*14*
	V26	-		-	-	-		5.13	*39*
	V27	-		-	-	-		4.74	*72*
	V28	-		-	-	-		4.94	*56*
	V29	-		-	-	-		4.50	*101*
	V30	-		-	-	-		5.77	*13*
	V31	-		-	-	-		6.25	*4*
	V32	-		-	-	-			
	V33	-		-	-	-		5.62	*20*
	V34	-		-	-	-		3.97	*147*
	V35	-		-	-	-		3.97	*147*
	V36	-		-	-	-		4.53	*97*
	V37	-		-	-	-		3.88	*154*
	V38	-		-	-	-		5.53	*22*
	V39	-		-	-	-		5.68	*18*
	V40	-		-	-	-			
	V41	-		-	-	-		4.72	*79*
	V42	-		-	-	-		6.77	*2*
Interaction									
N at same V		0.37		42.27	1.00	1.01			
V at same N		0.37		41.89	2.02	1.01			
F1		5.34	*2*	339	20.12	98.2		4.56	*3*
F2		5.28	*3*	328	23.79	97.6	-2.06	4.16	*4*
F3		5.37	*1*	337	25.00	97	0.53	5.05	*2*
F4		-		-	-	-		5.25	*1*
C.D.(0.05)		0.02		NS	NS	0.19			
C.V.(%)		1.24		7.98	46.88	0.83			

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VARANASI						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Days for 50% Flowering	Phosphorous res. (kg grain/kg P) (Base level 0% RDP)		
Mean of varieties:									
	V1	6.58	*6*	325	22.92	98.1	11.33	4.72	*15*
	V2	5.65	*16*	334	20.75	86.2	-0.42	4.69	*16*
	V3	5.63	*17*	303	17.50	100.2	10.17	4.19	*38*
	V4	3.17	*37*	271	19.80	107.0	-34.17	4.43	*33*
	V5	6.85	*4*	321	15.60	105.6	1.25	5.27	*2*
	V6	6.24	*8*	363	22.56	99.3	16.42	5.09	*5*
	V7	4.85	*27*	320	20.39	90.4	8.00	4.87	*9*
	V8	4.52	*29*	339	26.05	104.3	6.17	4.79	*12*
	V9	7.39	*1*	372	28.39	94.8	8.25	5.29	*1*
	V10	2.78	*38*	250	23.47	102.2	-23.25	4.32	*35*
	V11	-		-	-	-		4.26	*37*
	V12	5.54	*19*	381	20.07	99.6	-29.33	5.07	*6*
	V13	3.66	*33*	283	26.14	106.0	4.92	4.08	*39*
	V14	5.71	*15*	382	22.36	82.3	-4.67	4.43	*32*
	V15	4.11	*32*	269	31.65	105.4	-13.25	4.52	*23*
	V16	3.56	*35*	289	16.93	103.1	-2.17	4.36	*34*
	V17	6.19	*9*	387	18.41	98.3	-34.25	4.51	*24*
	V18	5.58	*18*	357	25.78	94.8	3.08	4.68	*17*
	V19	5.10	*24*	362	22.21	105.9	-31.17	4.75	*13*
	V20	5.29	*23*	331	26.86	84.4	-10.25	5.03	*7*
	V21	4.61	*28*	316	21.73	82.3	-12.58	4.49	*26*
	V22	6.19	*10*	395	19.57	101.6	-42.58	5.21	*4*
	V23	3.62	*34*	285	35.54	107.4	-6.92	4.29	*36*
	V24	-		-	-	-		4.44	*31*
	V25	-		-	-	-		4.58	*21*
	V26	5.54	*20*	379	20.63	82.2	2.25	4.63	*19*
	V27	4.14	*31*	308	32.75	106.7	38.42	3.90	*41*
	V28	3.46	*36*	295	21.75	106.8	18.50	4.06	*40*
	V29	5.33	*22*	370	24.40	84.6	-13.33	4.56	*22*
	V30	5.06	*25*	292	21.72	104.2	33.50	4.50	*25*
	V31	6.52	*7*	372	21.31	101.3	36.58	5.25	*3*
	V32	-		-	-	-		3.69	*42*
	V33	7.33	*2*	344	17.78	100.3	31.33	4.80	*11*
	V34	6.77	*5*	319	18.86	100.9	0.83	4.44	*29*
	V35	7.25	*3*	408	32.56	97.6	3.33	4.44	*30*
	V36	5.79	*13*	355	21.70	102.1	8.25	4.49	*27*
	V37	5.49	*21*	348	29.35	86.0	-15.17	4.73	*14*
	V38	5.91	*12*	354	19.05	85.7	-23.00	4.87	*10*
	V39	5.78	*14*	358	21.26	102.0	11.33	4.47	*28*
	V40	4.39	*30*	261	20.44	88.1	-1.92	4.59	*20*
	V41	6.03	*11*	377	27.14	101.6	10.00	4.63	*18*
	V42	5.01	*26*	351	17.53	95.6	5.33	4.97	*8*

Table 4.1(n(iii)): (Contd.)

P-levels	Varieties	VARANASI						Mean Grain Yield (t/ha)	Rank
		Grain Yield (t/ha)	*Rank*	Panicle/m^2 (No.)	Panicle wt (g)	Test wt (g)	Nitrogen. res. (kg grain/kg N) (Base level 0% RDN)		
C.D.(0.05)		0.22		24.40	0.58	0.59			
C.V.(%)		4.38		7.89	2.72	0.65			
Expt. Mean		**5.33**		**335**	**22.97**	**97.50**		4.63	
Soil type		-							
pH		-							
P - levels (kg/ha)									
P1 (0%)		0							
P2 (50%)		30							
P3 (100%)		60							
P4 (150%)		-							
Recmd NPK (kg/ha)		120:60:60							
Varieties									
V1		29547		1					
V2		29549		2					
V3		29554		3					
V4		29546		4					
V5		30230		5					
V6		29560		6					
V7		29558		7					
V8		30231		8					
V9		30232		9					
V10		30233		10					
V11		30234							
V12		30235		11					
V13		30236		12					
V14		30237		13					
V15		30238		14					
V16		30239		15					
V17		29552		16					
V18		29548		17					
V19		**Rasi (Positive Check)**		18					
V20		30240		19					
V21		30241		20					
V22		30242		21					
V23		30243		22					
V24		**Swarna (Positive Check)**							
V25		30244							
V26		30245		23					
V27		30246		24					
V28		29555		25					
V29		29563		26					
V30		**Improved Samba Mahsuri (-ve check)**		27					
V31		30247		28					
V32		29562							
V33		30248		29					
V34		30249		30					
V35		30250		31					
V36		30251		32					
V37		30252		33					
V38		30253		34					
V39		**BPT 5204 (Sensitive Check)**		35					
V40		30254		36					
V41		**IR 64 (RP)**		37					
V42		**MTU 1121 (RP)**		38					
Avlb NPK of soil (kg/ha)		194:17:218							

4.1(o) NMT – AVT 1 NIL - HT (Herbicide Tolerant Genotypes)

Rice crop suffers more from weed competition, unlike other cereal crops. Efficient cultures will reduce weed competition and enhance productivity with reduced input. The present investigation to study the herbicide tolerance in elite genotypes for their efficacy taken up at **ICAR-NRRI, Hazaribagh, Ranchi, Titabar and Varanasi** during *Kharif* 2021. The trial was conducted in replicated split-plot design with weed control treatments (T1–Imazethapyr 10% SL post-emergence application; T2–Bispyribac-sodium 10% SC post-emergence application; T3–Weed free check) in main plots and genotypes (G1: CR 4333-181-1-2-1; G2: CR 4333-35-2-2-1; G3: Sahabhagidhan; G4: CR 4332-184-2-2-1; G5: CR 4332-37-2-1-1; G6: Naveen; G7: Robin as tolerant check) in sub-plots. The data on crop growth parameters, yield attributes, yield and weed parameters were recorded in the crop season and results are presented in **Tables 4.1(o)**

The mean grain yield at **ICAR-NRRI** was 2.99 t/ha due to poor recurrent parent yields. Irrespective of the genotypes, weedy check has resulted in significantly lower plant growth and yield attributes Viz., no of panicles, panicle weight, test weight, grain yield (1.68 t/ha). Among the weed management treatments, the application of Imazethapyr (10% SL) resulted in the higher grain yield (4.01 t/ha) and significantly superior to weed free check. Out of seven genotypes higher grain yields recorded with G2 (CR 4333-35-2-2-1) followed by G4 (CR 4332-184-2-2-1) which were superior over checks (Naveen and Robin). All the HT genotypes performed superior over recurring parent (Sahabhagidhan, Naveen and Robin).

The results are similar at Hazaribagh where in G2 (CR 4333-35-2-2-1) and G4 (CR 4332-184-2-2-1) were found to be superior (3.57 and 3.38 t/ha) over other entries.

The NIL HT lines tested at **Ranchi** indicated the superiority of G2 (CR 4333-35-2-2-1) recording higher grain yield of 4.25 t/ha followed by G1 (CR 4333-181-1-2-1) with 4.02 t/ha and G5 (CR 4332-37-2-1-1) with 3.61 t/ha. The entries are promising over other cultures.

At **Titabar**, the performance of G5 (CR 4332-37-2-1-1) found promising (3.36 t/ha) while NILs were not found superior over recurrent parent at **Varanasi**.

The results of HT NIL experiment conducted, indicated the superiority of Bispyribacsodium followed by Imazethapyr found promising herbicides. The genotypes G1 (CR 4333-181-1-2-1), G2 (CR 4333-35-2-2-1), G4 (CR 4332-184-2-2-1) and G5 (CR 4332-37-2-1-1) with no or low phytotoxicity to Imazethapyr have contributed to higher crop growth and grain yield with standard pre and post-emergence applications of Bispyribacsodium and Imazethapyr.

Table 4.1(o): Summary of data on grain yield and ancillary characters of selected NIL -HT cultures grown under transplanted conditions at different weed control management, kharif 2021.

Main plot	Sub plot	CUTTACK					HAZARIBHAG				
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)
T1: Imazethapyr	G1	3.67	11	337	2.27	21.3	3.67	10	331.67	2.27	17.63
	G2	4.48	3	355	2.51	21.73	4.2	2	345	2.51	19.73
	G3	0	27	0	0	0	0	27	0	0	0
	G4	4.3	5	351	2.43	22	4.09	5	343.67	2.43	19
	G5	4.08	6	343	2.39	21	3.96	7	337.33	2.39	17.97
	G6	0	27	0	0	0	0	27	0	0	0
	G7	3.5	14	329	2.17	20.9	3.5	12	327.33	2.17	16.93
T2: Bispyribacsodium (National Check)	G1	3.29	16	311	2.17	20.4	3.19	16	313	2.19	18.93
	G2	3.73	9	335	2.4	21.2	3.73	9	331.33	2.4	20.3
	G3	2.86	18	299	2.17	21.3	2.71	19	297	1.94	21.3
	G4	3.58	13	324	2.37	21.4	3.41	14	320	2.37	20.03
	G5	3.42	15	316	2.33	20.7	3.29	15	315.67	2.33	19.37
	G6	2.82	19	300	2.03	20.7	2.83	18	300.33	2.07	20.7
	G7	3.01	17	306	2.17	23	3.02	17	307.33	2.16	18.63
T3: Weed free check (with out weeds)	G1	4.03	7	345	2.37	22.4	4.03	6	342	2.37	18.97
	G2	4.96	1	368	2.6	22.5	4.36	1	362.33	2.6	21.5
	G3	3.69	10	329	2	22	3.45	13	318.67	1.93	16.83
	G4	4.63	2	359	2.5	22.6	4.17	3	355.67	2.5	20.7
	G5	4.44	4	357	2.43	22.4	4.1	4	350.33	2.43	19.73
	G6	3.61	12	321	1.93	22.2	3.61	11	321	2	17.67
	G7	3.83	8	334	2.27	22.5	3.83	8	334	2.27	18.5
T4: Weedy check (No weeding to be done)	G1	1.67	23	216	1.7	19.4	1.67	23	216	1.7	11.83
	G2	1.98	20	243	1.83	19.5	1.98	20	243	1.83	14.63
	G3	1.5	25	206	1.53	19	1.37	26	201	1.43	10.6
	G4	1.83	21	236	1.77	20	1.83	21	236	1.78	13.47
	G5	1.77	22	229	1.8	19.4	1.77	22	229	1.74	12.53
	G6	1.47	26	201	1.53	19.5	1.47	25	206	1.53	11.1
	G7	1.62	24	211	1.6	19.5	1.62	24	211	1.6	11.5

Table 4.1(o): (Contd.)

Main plot	Sub plot	CUTTACK					HAZARIBHAG				
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)
Interactions											
C.D.(0.05)		0.01	0.04	1.05	0.25	1.06	0.11	0.04	2.91	0.26	1.52
C.V.(%)		0.01	0.05	1.14	0.27	1.14	0.11	0.05	3.81	0.28	2.56
Mean of Factor 1											
T1		4.01	2	245	1.68	15.28	2.77	3	240.71	1.68	13.04
T2		3.24	3	313	2.23	21.24	3.17	2	312.1	2.21	19.9
T3		4.17	1	344.71	2.3	22.37	3.94	1	340.57	2.3	19.13
T4		1.69	4	220.29	1.68	19.47	1.67	4	220.29	1.66	12.24
C.D.(0.05)		0.01	0.04	0.76	0.18	0.74	0.06	0.04	3.58	0.19	2.92
C.V.(%)		0.34	4.03	0.36	12.18	5.02	2.74	4.03	1.7	12.73	24.04
Mean of Factor 2											
G1		3.17	4	302.25	2.12	20.88	3.14	4	300.67	2.13	16.84
G2		3.79	1	325.25	2.34	21.23	3.57	1	320.42	2.34	19.04
G3		2.01	6	208.5	1.43	15.58	1.88	7	204.17	1.33	12.18
G4		3.59	2	317.5	2.27	21.5	3.38	2	313.83	2.27	18.3
G5		3.43	3	311.25	2.24	20.88	3.28	3	308.08	2.22	17.4
G6		1.97	7	205.5	1.38	15.6	1.98	6	206.83	1.4	12.37
G7		2.99	5	295	2.05	21.47	2.99	5	294.92	2.05	16.39
C.D.(0.05)		0.01	0.02	0.53	0.13	0.53	0.06	0.02	1.46	0.13	0.76
C.V.(%)		0.22	1.27	0.23	7.87	3.31	2.34	1.27	0.64	7.97	5.8
Exp mean		2.99	103.990(1.88)	280.75	1.97	19.59	2.89	103.990(1.88)	278.42	1.96	16.08

G1	CR 4333-181-1-2-1 (Sahbhagi Dhan NIL)	CR 4333-181-1-2-1 (Sahbhagi Dhan NIL)
G2	CR 4333-35-2-2-1 (Sahbhagi Dhan NIL)	CR 4333-35-2-2-1 (Sahbhagi Dhan NIL)
G3	Sahbhagi Dhan (Recurrent Parent)	Sahbhagi Dhan (Recurrent Parent)
G4	CR 4332-184-2-2-1 (Navven NIL)	CR 4332-184-2-2-1 (Navven NIL)
G5	CR 4332-37-2-1-1 (Navven NIL)	CR 4332-37-2-1-1 (Navven NIL)
G6	Naveen (Recurrent Parent)	Naveen (Recurrent Parent)
G7	Robin (Tolerant Check)	Robin (Tolerant Check)

Table 4.1(o): (Contd.)

Main plot	Sub plot	RANCHI							
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Test wt (g)	Weed population(No/m2)		Weed biomass(g)	
						at 30 DAS	at 60 DAS	at 30 DAS	at 60 DAS
T1: Imazethapyr	G1	4.52	8	237.33	24.2	26.20(5.16)	45.20(6.76)	28.5	81.2
	G2	4.73	4	239.67	24.43	23.80(4.93)	42.17(6.53)	21.7	61.2
	G3	0.04	28	6	24.17	36.60(6.09)	84.07(9.20)	38.2	108.9
	G4	3.85	17	212.33	23.97	34.20(5.89)	58.20(7.66)	30.2	85.5
	G5	3.92	16	215.33	24.02	31.50(5.66)	53.40(7.34)	28.5	81.2
	G6	0.06	27	7	24.18	40.20(6.38)	86.50(9.33)	32.43	92.6
	G7	3.69	19	190.33	23.8	37.20(6.13)	60.00(7.78)	39.2	111.87
T2: Bispyribacsodium (National Check)	G1	4.72	5	249.67	24.24	13.60(3.75)	27.20(5.26)	24.2	53.7
	G2	5.06	2	265	24.61	10.23(3.27)	25.43(5.09)	17.3	39.7
	G3	4.46	11	240.67	24.2	16.50(4.12)	28.33(5.37)	27.2	60.7
	G4	4.21	14	220.67	23.91	20.20(4.55)	32.20(5.72)	30.2	66.3
	G5	4.34	13	225	24.17	18.70(4.38)	30.50(5.57)	27.4	62.9
	G6	4.52	8	232.67	24.22	15.10(3.95)	26.43(5.19)	28.2	65.1
	G7	3.85	17	207	23.85	22.20(4.76)	34.87(5.95)	34.6	74
T3: Weed free check (with out weeds)	G1	5.02	3	262.33	24.18	9.13(3.09)	13.10(3.69)	17.2	39.3
	G2	5.27	1	274.67	24.58	6.57(2.66)	11.70(3.49)	11.4	22.4
	G3	4.66	6	244.33	24.22	11.87(3.51)	15.10(3.95)	20.2	47
	G4	4.62	7	240.33	23.9	16.50(4.12)	17.90(4.29)	22.23	53.8
	G5	4.38	12	228.67	24.18	13.50(3.73)	16.80(4.16)	20.8	46.6
	G6	4.52	8	238	24.2	11.10(3.40)	13.73(3.77)	21.9	49.1
	G7	4.12	15	216	23.82	19.30(4.45)	20.20(4.52)	25.2	65.1
T4: Weedy check (No weeding to be done)	G1	1.82	21	94.33	22.68	177.50(13.34)	192.50(13.89)	65.7	310.8
	G2	1.94	20	101	22.79	170.80(13.09)	185.20(13.62)	61.5	281.4
	G3	1.72	24	89	22.59	180.50(13.45)	200.10(14.16)	68.2	313.3
	G4	1.63	26	84	22.55	186.17(13.66)	207.50(14.42)	70.3	339.5
	G5	1.8	22	82	22.63	172.50(13.15)	187.80(13.72)	64.7	293.5
	G6	1.79	23	90	22.63	183.07(13.55)	188.20(13.74)	72.5	333.7
	G7	1.65	25	78.33	22.52	190.10(13.80)	220.27(14.86)	70.8	342.8

Table 4.1(o): (Contd.)

Main plot	Sub plot	RANCHI							
		Grain Yield (t/ha)	Rank	Panicle/m^2 (No.)	Test wt (g)	Weed population(No/m2)		Weed biomass(g)	
						at 30 DAS	at 60 DAS	at 30 DAS	at 60 DAS
Interactions									
C.D.(0.05)		0.64	0.04	31.23	NS	0.35	0.4	NS	NS
C.V.(%)		0.61	0.05	29.76	NS	0.33	0.39	NS	NS
Mean of Factor 1									
T1		2.97	3	158.29	24.11	32.81(5.75)	61.36(7.80)	31.25	88.92
T2		4.45	2	234.38	24.17	16.65(4.11)	29.28(5.45)	27.01	60.34
T3		4.66	1	243.48	24.15	12.57(3.56)	15.50(3.98)	19.85	46.19
T4		1.76	4	88.38	22.63	180.09(13.43)	197.37(14.06)	67.67	316.43
C.D.(0.05)		0.2	0.04	8.9	0.15	0.11	0.14	1.61	4.56
C.V.(%)		7.68	4.03	6.51	0.82	2.24	2.4	5.86	4.71
Mean of Factor 2									
G1		4.02	2	210.92	23.82	56.61(6.34)	69.50(7.40)	33.9	121.25
G2		4.25	1	220.08	24.1	52.85(5.99)	66.13(7.18)	27.98	101.17
G3		2.72	6	145	23.8	61.37(6.79)	81.90(8.17)	38.45	132.48
G4		3.58	4	189.33	23.58	64.27(7.06)	78.95(8.02)	38.23	136.27
G5		3.61	3	187.75	23.75	59.05(6.73)	72.13(7.70)	35.35	121.05
G6		2.72	6	141.92	23.81	62.37(6.82)	78.72(8.00)	38.76	135.12
G7		3.33	5	172.92	23.5	67.20(7.29)	83.83(8.27)	42.45	148.44
C.D.(0.05)		0.32	0.02	15.62	0.24	0.17	0.2	2.97	13.32
C.V.(%)		11.35	1.27	10.56	1.24	3.17	3.12	9.97	12.75
Exp mean		3.46	103.990(1.88)	181.13	23.77	6.71	7.82	36.45	127.97

G1 CR 4333-181-1-2-1 (Sahbhagi Dhan NIL)
G2 CR 4333-35-2-2-1 (Sahbhagi Dhan NIL)
G3 Sahbhagi Dhan (Recurrent Parent)
G4 CR 4332-184-2-2-1 (Navven NIL)
G5 CR 4332-37-2-1-1 (Navven NIL)
G6 Naveen (Recurrent Parent)
G7 Robin (Tolerant Check)

NOTE: Plot no T1 G3and T1 G6 were completely wilted after Imazethapyre application. However, 1or 2 plants werw remained in plots having no wilting effect/

Table 4.1(o): (Contd.)

Main plot	Sub plot	TITABAR								
		Grain Yield (t/ha)	Rank	Panicle/m^2 (No.)	Panicle wt (g)	Test wt (g)	Weed population(No/m2)		Weed biomass(g)	
							1 DBHA	30 DBHA	1 DBHA	30 DBHA
T1: Imazethapyr	G1	-	-	-	-	-	-	-	-	-
	G2	-	-	-	-	-	-	-	-	-
	G3	-	-	-	-	-	-	-	-	-
	G4	3.2	8	202.33	2.53	19.07	22.00(4.73)	10.67(3.31)	8.93	6.73
	G5	3.9	3	216.33	3.37	21.53	24.33(4.98)	16.00(4.04)	11.07	8.23
	G6	3.53	5	206.33	3.07	22.1	21.33(4.65)	13.67(3.71)	6.4	4.53
	G7	-	-	-	-	-	-	-	-	-
T2: Bispyribacsodium (National Check)	G1	-	-	-	-	-	-	-	-	-
	G2	-	-	-	-	-	-	-	-	-
	G3	-	-	-	-	-	-	-	-	-
	G4	3	9	191.67	2.67	19.23	22.33(4.76)	14.67(3.88)	7.8	5.9
	G5	3.63	4	200	3.23	21.83	26.33(5.18)	16.67(4.13)	8.93	6.67
	G6	3.47	6	199.67	3	22.73	23.00(4.84)	12.67(3.60)	7.55	5.28
	G7	-	-	-	-	-	-	-	-	-
T3: Weed free check (with out weeds)	G1	-	-	-	-	-	-	-	-	-
	G2	-	-	-	-	-	-	-	-	-
	G3	-	-	-	-	-	-	-	-	-
	G4	3.47	6	228.33	3.2	19.4	24.67(5.01)	15.33(3.95)	8.17	6.67
	G5	4.27	1	243.67	3.7	21.9	23.33(4.87)	14.33(3.83)	7.67	4.67
	G6	3.93	2	238.33	3.37	21.93	26.67(5.19)	14.67(3.83)	9.37	6.57
	G7	-	-	-	-	-	-	-	-	-
T4: Weedy check (No weeding to be done)	G1	-	-	-	-	-	-	-	-	-
	G2	-	-	-	-	-	-	-	-	-
	G3	-	-	-	-	-	-	-	-	-
	G4	2.6	10	176	2.7	19.17	24.33(4.97)	32.00(5.70)	8.43	12.4
	G5	2.6	10	180	3	21.37	27.00(5.24)	34.33(5.90)	9.3	12.9
	G6	1.7	12	168.67	2.8	22.37	24.00(4.93)	32.33(5.72)	8.4	12.07
	G7	-	-	-	-	-	-	-	-	-

Table 4.1(o): (Contd.)

Main plot	Sub plot	TITABAR								
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Weed population(No/m2)		Weed biomass(g)	
							1 DBHA	30 DBHA	1 DBHA	30 DBHA
Interactions										
C.D.(0.05)		NS	0.04	NS	NS	NS	NS	NS	NS	NS
C.V.(%)		NS	0.05	NS	NS	NS	NS	NS	NS	NS
Mean of Factor 1										
T1		3.54	2	208.33	2.99	20.9	22.56(4.78)	13.44(3.69)	8.8	6.5
T2		3.37	3	197.11	2.97	21.27	23.89(4.93)	14.67(3.87)	8.09	5.95
T3		3.89	1	236.78	3.42	21.08	24.89(5.02)	14.78(3.87)	8.4	5.97
T4		2.3	4	174.89	2.83	20.97	25.11(5.05)	32.89(5.77)	8.71	12.46
C.D.(0.05)		0.58	0.04	4.17	0.33	NS	NS	0.64	NS	2.88
C.V.(%)		15.25	4.03	1.77	9.49	1.38	11.77	12.97	26.61	32.31
Mean of Factor 2										
G1		-	-	-	-	-	-	-	-	-
G2		-	-	-	-	-	-	-	-	-
G3		-	-	-	-	-	-	-	-	-
G4		3.07	3	199.58	2.78	19.22	23.33(4.87)	18.17(4.21)	8.33	7.92
G5		3.6	1	210	3.32	21.66	25.25(5.07)	20.33(4.47)	9.24	8.12
G6		3.16	2	203.25	3.06	22.28	23.75(4.90)	18.33(4.22)	7.93	7.11
G7		-	-	-	-	-	-	-	-	-
C.D.(0.05)		0.41	0.02	7.48	0.12	0.41	NS	NS	NS	NS
C.V.(%)		14.45	1.27	4.23	4.7	2.24	7.12	8.8	17.53	19.7
Exp mean		3.28	103.990(1.88)	204.28	3.05	21.05	4.95	4.3	8.5	7.72

G1	-
G2	-
G3	-
G4	CR 4332-184-2-2-1 (Navven NIL)
G5	CR 4332-37-2-1-1 (Navven NIL)
G6	Naveen (Recurrent Parent)
G7	-

Table 4.1(o): (Contd.)

Main plot	Sub plot	VARANASI								Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Weed population(No/m2)		Weed biomass(g)			
						at Active tillering	at Heading	at Active tillering	at Heading		
T1: Imazethapyr	G1	-	-	-	-	-	-	-	-	3.95	6
	G2	-	-	-	-	-	-	-	-	4.47	2
	G3	-	-	-	-	-	-	-	-	0.01	28
	G4	0.19	12	29.33	0.69	15.00(3.92)	10.67(3.34)	9.63	14.35	3.13	19
	G5	0.44	10	88	1.84	81.67(9.06)	75.33(8.71)	66.66	70.33	3.26	17
	G6	0.31	11	72.33	1.88	46.33(6.84)	38.67(6.22)	18.55	23.49	0.78	27
	G7	-	-	-	-	-	-	-	-	3.56	12
T2: Bispyribacsodium (National Check)	G1	-	-	-	-	-	-	-	-	3.73	10
	G2	-	-	-	-	-	-	-	-	4.17	4
	G3	-	-	-	-	-	-	-	-	3.34	14
	G4	2.11	6	156	1.86	37.67(6.17)	28.00(5.33)	18.44	15.29	3.26	16
	G5	2.16	3	294.67	1.73	23.67(4.91)	17.67(4.26)	11.37	14.59	3.37	13
	G6	2.13	4	202	1.47	104.67(10.25)	109.00(10.46)	68.38	72.71	3.15	18
	G7	-	-	-	-	-	-	-	-	3.29	15
T3: Weed free check (with out weeds)	G1	-	-	-	-	-	-	-	-	4.36	3
	G2	-	-	-	-	-	-	-	-	4.86	1
	G3	-	-	-	-	-	-	-	-	3.93	7
	G4	2.13	4	213.33	1.69	50.67(7.15)	35.67(6.00)	28.02	26	3.80	9
	G5	2.63	2	383	1.51	39.33(6.31)	27.33(5.27)	14.53	16.37	3.96	5
	G6	2.73	1	209	1.68	31.33(5.64)	26.33(5.16)	13.38	16.93	3.68	11
	G7	-	-	-	-	-	-	-	-	3.93	8
T4: Weedy check (No weeding to be done)	G1	-	-	-	-	-	-	-	-	1.72	23
	G2	-	-	-	-	-	-	-	-	1.97	20
	G3	-	-	-	-	-	-	-	-	1.53	26
	G4	1.68	8	156	1.13	123.67(11.14)	121.00(11.02)	72.07	78.73	1.91	21
	G5	1.61	9	302	1.46	56.33(7.53)	46.33(6.82)	37.77	27.87	1.91	22
	G6	1.77	7	354	1.36	45.67(6.79)	31.00(5.61)	20.88	17.39	1.64	24
	G7	-	-	-	-	-	-	-	-	1.63	25

Table 4.1(o): (Contd.)

Main plot	Sub plot	VARANASI								Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Weed population(No/m2)		Weed biomass(g)			
						at Active tillering	at Heading	at Active tillering	at Heading		
Interactions											
C.D.(0.05)		NS	0.04	29.31	NS	0.55	0.88	6.56	2.39		
C.V.(%)		NS	0.05	29.33	NS	0.48	0.75	6.97	2.36		
Mean of Factor 1											
T1		0.31	4	63.22	1.47	47.67(6.61)	41.56(6.09)	31.61	36.05	2.72	3
T2		2.13	2	217.56	1.69	55.33(7.11)	51.56(6.68)	32.73	34.2	3.27	2
T3		2.49	1	268.44	1.63	40.44(6.37)	29.78(5.48)	18.64	19.77	3.83	1
T4		1.69	3	270.67	1.32	75.22(8.49)	66.11(7.82)	43.57	41.33	1.82	4
C.D.(0.05)		0.31	0.04	22.55	NS	0.23	0.28	5.96	1.76		
C.V.(%)		16.19	4.03	9.54	25.91	2.74	3.77	16.34	4.64		
Mean of Factor 2											
G1		-	-	-	-	-	-	-	-	3.44	2
G2		-	-	-	-	-	-	-	-	3.87	1
G3		-	-	-	-	-	-	-	-	2.20	7
G4		1.53	3	138.67	1.34	56.75(7.10)	48.83(6.42)	32.04	33.59	3.03	5
G5		1.71	2	266.92	1.63	50.25(6.95)	41.67(6.27)	32.58	32.29	3.13	3
G6		1.73	1	209.33	1.6	57.00(7.38)	51.25(6.86)	30.3	32.63	2.31	6
G7		-	-	-	-	-	-	-	-	3.10	4
C.D.(0.05)		0.18	0.02	14.65	NS	0.27	0.44	NS	NS		
C.V.(%)		12.27	1.27	8.26	22.08	4.41	7.79	11.98	4.2		
Exp mean		1.66	103.990(1.88)	204.97	1.53	7.14	6.52	31.64	32.84	2.86	

4.1 p NMT – AVT 1 NIL - BAS HT (Herbicide Tolerant Genotypes)

Rice crop suffers more from weed competition, unlike other cereal crops. Efficient cultures will reduce weed competition and enhance productivity with reduced input. The present investigation was taken up to study the herbicide tolerance in elite genotypes for their efficacy in Basmati growing areas of the country. The trial was conducted at **Kaul**, **Ludhiana, Nagina** and **Pantnagar** in replicated split-plot design with weed control treatments (T1: Imazethapyr 100g a.i/L ; T2: Imazethapyr 125 g a.i/L; T3: Imazethapyr 200 g a-i/L; T4: Imazethapyr 100g a.i/L fb Imazethapyr 100g a.i/L; T5: Imazethapyr 125g a.i/L fb Imazethapyr 125g a.i/L; T6: Imazethapyr 200 g a.i/L fb Imazethapyr 200g a.i/L; T7: Pendimethalin fb bispyribacsodium; T8: Weed free (2 HW); T9: Weedy check) in main plots and genotypes (1815, 1816, 1819, 1823, 1824 , 1825, Pusa Basmati 1121 and Pusa Basmati 1509) in sub-plots. The data on crop growth parameters, yield attributes, yield and weed parameters were recorded in the crop season and results are presented in **Tables 4.1p.**

The mean grain yield recorded was 3.84 t/ha at **Kaul**, 3.17 t/ha at **Ludhiana** and 3.22 t/ha at **Nagina**. At all the test locations, irrespective of the genotypes, weed-free check has resulted in significantly higher plant growth and yield attributes Viz., no of panicles, panicle weight, test weight, filled grain percentage, grain yield and straw yield. The standard herbicide application of pre-emergence Pendimethalin and post-emergence Bispyribacsodium resulted in significantly higher crop growth, yield attributes and grain yield compared to Imazethapyr application. Among the three weed management treatments, the application of Imazethapyr resulted in lower grain yield and significantly inferior to others herbicide treatments. Among the test genotypes, at **Kaul**, 1815 followed by 1824 and 1816 recorded significantly higher grain yield and comparable. At **Ludhiana**, 1815 followed by 1823 and 1816 were found promising with higher grain yields. At **Nagina**, two genotypes Viz., 1816 and 1815 recorded significantly higher grain yields and superior to other entries. At **Pantnagar**, 1824 was promising with higher grain of 4.33 t/ha followed by 1823 (4.10 t/ha) and 1815 (4.07 t/ha). A similar trend was observed in crop growth, yield attributes and straw yield also. The recurring parents PusaBasmati 1121 & 1509 recorded significantly lower mean yields. (**Tables 4.1p)**

The results of study of HT genotypes (Basmati) showed that at all the locations, irrespective of genotypes tested, weed-free check has resulted in significantly higher crop growth, yield attributes and grain yield. The herbicide treatment of standard pre and post-emergence application of Pendimethalin and Bispyribacsodium resulted in a higher yield, yield attributes and growth parameters. Among the tested genotypes, 1815 and 1823 were superior across the locations. The genotypes 1815and 1823 with no or low phytotoxicity to Imazethapyr have contributed to higher crop growth and grain yield with standard pre and post-emergence applications of Pendimethalin, Bispyribacsodium. The trends of the results were similar to earlier kharif 2020 season.

Table 4.1(p): Summary of data on grain yield and ancillary characters of selected NIL BAS-HT cultures grown under transplanted conditions at graded levels of recommended N fertilizer doses, kharif 2021.

N-levels	Varieties	KAUL						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt(g)	Weed population at 60 DAHA	Weed biomass at 60 DAHA
T1: Imazethapyr 10% SL (X dose)	V1	3.13	10	252	1.41	28.1	2.80(1.82)	20.34
	V2	2.97	19	263	1.25	26.1	2.74(1.80)	17.76
	V3	0	43	0	0.00	0.0	9.02(3.09)	51.28
	V4	2.9	32	202	1.60	30.8	2.85(1.83)	18.18
	V5	3.01	13	210	1.59	31.1	2.80(1.82)	20.04
	V6	0	43	0	0.00	0.0	8.55(3.01)	46.05
T2: Imazethapyr 10% SL (1.25X dose)	V1	3.17	7	240	1.45	28.3	2.75(1.80)	19.9
	V2	2.96	21	255	1.28	26.2	2.69(1.78)	17.38
	V3	0	43	0	0.00	0.0	8.80(3.05)	49.93
	V4	2.9	32	197	1.66	30.9	2.75(1.80)	18.77
	V5	2.91	29	208	1.61	31.1	2.67(1.78)	19.6
	V6	0	43	0	0.00	0.0	8.38(2.98)	45.13
T3: Imazethapyr 10% SL (2X dose)	V1	3.2	3	247	1.40	27.8	2.70(1.79)	19.63
	V2	2.96	21	258	1.24	26.1	2.64(1.77)	17.14
	V3	0	43	0	0.00	0.0	8.67(3.03)	49.16
	V4	2.9	32	200	1.64	30.9	2.73(1.80)	18.51
	V5	3	16	202	1.63	31.0	2.67(1.78)	19.33
	V6	0	43	0	0.00	0.0	8.32(2.97)	44.52
T4: Imazethapyr 10% SL fb Imazethapyr 10% SL (X dose)	V1	3.18	5	250	1.41	28.2	2.75(1.80)	19.56
	V2	2.95	23	260	1.24	26.1	2.68(1.78)	17.08
	V3	0	43	0	0.00	0.0	8.83(3.05)	48.46
	V4	2.92	27	198	1.64	30.9	2.75(1.80)	18.46
	V5	3.01	13	203	1.63	31.0	2.61(1.76)	19.27
	V6	0	43	0	0.00	0.0	8.37(2.98)	44.46
T5: Imazethapyr 10% SL fb Imazethapyr 10% SL (1.25 X dose)	V1	3.17	7	240	1.44	28.3	2.72(1.80)	19.59
	V2	2.93	26	265	1.21	26.0	2.67(1.78)	17.11
	V3	0	43	0	0.00	0.0	8.77(3.04)	48.52
	V4	2.91	29	197	1.63	31.0	2.74(1.80)	18.49
	V5	2.99	17	205	1.64	31.0	2.68(1.78)	19.3
	V6	0	43	0	0.00	0.0	8.35(2.98)	44.5
T6: Imazethapyr 10% SL fb Imazethapyr 10% SL (2 X dose)	V1	3.15	9	248	1.42	28.1	2.70(1.79)	19.35
	V2	2.95	23	273	1.19	26.1	2.65(1.77)	16.91
	V3	0	43	0	0.00	0.0	9.03(3.09)	47.65
	V4	2.91	29	203	1.64	31.2	2.70(1.79)	18.26
	V5	3.01	13	205	1.64	31.1	2.65(1.77)	19.07
	V6	0	43	0	0.00	0.0	8.22(2.95)	43.95
T7: Pendimethalin(PM) 30% EC + Bispyribac-sodium (BS)10% SC	V1	3.18	5	253	1.41	28.1	5.50(2.45)	29.68
	V2	2.97	19	272	1.21	26.1	5.53(2.45)	32.05
	V3	3.3	2	250	1.48	27.1	6.14(2.58)	34.66
	V4	2.92	27	192	1.68	31.1	5.79(2.51)	31.68
	V5	3.02	12	205	1.65	30.9	5.72(2.49)	31.15
	V6	2.84	35	207	1.54	27.2	5.94(2.54)	31.56
T8: Weed free control (2 times Hand weeding)	V1	3.2	3	248	1.40	28.0	0.00(0.71)	0
	V2	2.98	18	265	1.26	26.3	0.00(0.71)	0
	V3	3.31	1	247	1.49	27.1	0.00(0.71)	0
	V4	2.94	25	190	1.69	31.1	0.00(0.71)	0
	V5	3.03	11	203	1.68	31.0	0.00(0.71)	0
	V6	2.84	35	205	1.55	27.4	0.00(0.71)	0
T9: Untreated Control (Weedy check)	V1	0.88	40	85	1.21	25.9	19.80(4.50)	105.91
	V2	0.87	42	95	1.07	26.0	20.40(4.57)	106.49
	V3	0.91	39	105	0.98	27.1	20.16(4.54)	111.11
	V4	0.95	38	70	1.52	30.9	19.90(4.51)	106.65
	V5	0.96	37	68	1.55	31.2	19.49(4.47)	105.43
	V6	0.88	40	65	1.02	27.1	19.83(4.51)	107.21

Table 4.1p (Contd.)

N-levels	Varieties	KAUL						
		Grain Yield (t/ha)	**Rank**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt(g)**	**Weed population at 60 DAHA**	**Weed BIOMASS at 60 DAHA**
Interaction								
N at same V		0.24		29	0.10	3.3	0.12	4.33
V at same N		0.25		28	0.10	3.2	0.11	3.99
Mean of treatments:								
T1		2.00	5	154	0.97	19.4	4.79(2.23)	28.94
T2		1.99	8	150	1.00	19.4	4.67(2.20)	28.45
T3		2.01	3	151	0.99	19.3	4.62(2.19)	28.05
T4		2.01	3	152	0.99	19.4	4.66(2.20)	27.88
T5		2.00	5	151	0.99	19.4	4.66(2.20)	27.92
T6		2.00	5	155	0.98	19.4	4.66(2.19)	27.53
T7		3.04	2	230	1.49	28.4	5.77(2.50)	31.8
T8		3.05	1	226	1.51	28.5	0.00(0.71)	0
T9		0.91	9	81	1.22	28.0	19.93(4.52)	107.13
C.D.(0.05)		0.15		13	0.04	1.3	0.03	0.67
C.V.(%)		10.37		12	5.54	8.1	1.9	2.76
Mean of varieties:								
V1		2.92	1	229	1.39	27.9	4.64(2.05)	28.22
V2		2.73	3	245	1.22	26.1	4.67(2.05)	26.88
V3		0.84	5	67	0.44	9.0	8.82(2.91)	48.97
V4		2.70	4	183	1.63	31.0	4.69(2.06)	27.67
V5		2.77	2	190	1.63	31.0	4.59(2.04)	28.13
V6		0.73	6	53	0.46	9.1	8.44(2.85)	45.27
CD(0.05)		0.08		10	0.03	1.1	0.04	1.44
CV(%)		7.11		11	5.56	9.2	3.19	7.84
Experimental Mean		3.84		161	1.13	22.4	2.33	34.19
Recomd NPK (kg/ha)		150:60:60						
Varieties								
V1		1815						
V2		1816						
V3		1819						
V4		1823						
V5		1824						
V6		1825						
Availabe NPK of soil (kg/ha)		160:16:320						

Table 4.1p (Contd.)

N-levels	Varieties	LUDHIANA									
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt(g)	Days to 50% flowering	Sterlity (%)	Total weed population 1 DBHA	Total weed population 60 DAHA	Total weed biomass 1 DBHA
T1: Imazethapyr 10% SL (X dose)	V1	4.87	12	404	1.76	27.60	101	20.04	47.67(6.93)	23.33(4.88)	55.3
	V2	4.75	19	393	1.73	27.87	110	24.02	46.67(6.87)	26.00(5.15)	60.3
	V3	0.00	43	0	0.00	0.00	0	0.00	39.67(6.32)	32.00(5.69)	162.0
	V4	4.94	7	355	1.91	27.10	76	22.13	42.33(6.54)	23.67(4.91)	59.3
	V5	4.66	25	364	1.89	27.60	76	24.38	43.00(6.55)	25.67(5.11)	59.3
	V6	0.00	43	0	0.00	0.00	0	0.00	43.00(6.57)	34.00(5.87)	137.0
T2: Imazethapyr 10% SL (1.25X dose)	V1	4.90	10	409	1.76	27.43	100	20.46	42.33(6.53)	14.33(3.85)	54.0
	V2	4.80	13	401	1.73	27.50	110	28.78	42.00(6.50)	13.33(3.72)	51.7
	V3	0.00	43	0	0.00	0.00	0	0.00	40.67(6.39)	29.33(5.45)	118.7
	V4	4.72	21	352	1.90	27.00	77	29.32	42.33(6.52)	13.67(3.75)	52.0
	V5	4.78	14	368	1.90	27.37	79	23.83	41.33(6.45)	14.00(3.79)	59.3
	V6	0.00	43	0	0.00	0.00	0	0.00	39.33(6.30)	27.00(5.23)	111.3
T3: Imazethapyr 10% SL (2X dose)	V1	4.37	32	376	1.65	27.30	101	25.41	45.33(6.73)	10.00(3.24)	39.3
	V2	4.27	34	375	1.52	27.33	114	27.37	46.00(6.80)	11.67(3.48)	43.7
	V3	0.00	43	0	0.00	0.00	0	0.00	41.00(6.40)	23.00(4.85)	92.7
	V4	4.59	29	346	1.79	26.90	78	19.22	41.00(6.44)	11.00(3.38)	45.3
	V5	4.31	33	349	1.87	27.13	79	23.17	37.00(6.09)	12.67(3.62)	48.3
	V6	0.00	43	0	0.00	0.00	0	0.00	40.67(6.41)	22.33(4.77)	92.0
T4: Imazethapyr 10% SL fb Imazethapyr 10% SL (X dose)	V1	5.03	1	403	1.76	27.57	100	22.29	38.67(6.25)	9.67(3.19)	37.3
	V2	4.91	9	393	1.74	27.87	108	26.07	45.33(6.76)	9.33(3.12)	38.3
	V3	0.00	43	0	0.00	0.00	0	0.00	43.33(6.61)	24.00(4.95)	117.0
	V4	4.76	18	357	1.91	27.13	78	24.42	45.67(6.78)	10.33(3.29)	42.7
	V5	4.71	22	362	1.87	27.53	77	19.42	42.00(6.50)	9.67(3.18)	39.7
	V6	0.00	43	0	0.00	0.00	0	0.00	51.33(7.18)	24.00(4.94)	90.7
T5: Imazethapyr 10% SL fb Imazethapyr 10% SL (1.25 X dose)	V1	4.97	4	403	1.78	27.50	101	21.45	44.00(6.66)	7.33(2.76)	24.3
	V2	4.97	4	397	1.74	27.80	109	26.91	40.67(6.40)	8.00(2.91)	26.3
	V3	0.00	43	0	0.00	0.00	0	0.00	41.00(6.44)	19.33(4.43)	82.3
	V4	4.63	26	353	1.90	27.13	76	22.77	48.00(6.96)	7.00(2.71)	25.7
	V5	4.74	20	354	1.92	27.30	76	22.88	43.67(6.63)	7.00(2.73)	25.0
	V6	0.00	43	0	0.00	0.00	0	0.00	45.67(6.73)	20.00(4.51)	84.3
T6: Imazethapyr 10% SL fb Imazethapyr 10% SL (2 X dose)	V1	4.38	31	374	1.63	27.43	101	26.54	45.67(6.77)	4.00(2.08)	13.3
	V2	4.16	35	361	1.54	27.53	110	21.77	40.33(6.37)	3.00(1.82)	14.0
	V3	0.00	43	0	0.00	0.00	0	0.00	47.33(6.87)	12.67(3.62)	45.7
	V4	4.47	30	351	1.78	27.33	79	24.26	47.00(6.83)	3.33(1.95)	17.0
	V5	4.02	36	347	1.81	27.20	77	27.35	47.00(6.88)	3.67(2.02)	14.3
	V6	0.00	43	0	0.00	0.00	0	0.00	41.67(6.46)	11.00(3.38)	43.0
T7: Pendimethalin(PM) 30% EC + Bispyribac-sodium (BS)10% SC	V1	4.98	3	400	1.76	27.63	100	21.81	26.67(5.16)	15.00(3.93)	56.0
	V2	4.71	22	403	1.73	27.93	109	24.40	33.00(5.76)	16.00(4.06)	58.7
	V3	4.89	11	435	1.68	27.80	109	34.46	29.00(5.42)	15.33(3.97)	61.3
	V4	4.92	8	358	1.91	27.27	78	25.79	26.67(5.18)	15.67(4.02)	58.7
	V5	4.78	14	373	1.89	27.70	76	23.61	29.00(5.42)	15.67(4.01)	60.7
	V6	4.63	26	363	1.85	27.87	76	26.22	25.67(5.09)	15.00(3.93)	58.0
T8: Weed free control (2 times Hand weeding)	V1	4.78	14	393	1.79	27.53	100	19.08	42.67(6.56)	13.00(3.66)	50.7
	V2	4.78	14	398	1.71	27.87	109	26.92	41.00(6.42)	13.33(3.71)	56.3
	V3	4.96	6	448	1.69	27.87	110	24.66	49.00(7.03)	12.67(3.62)	49.7
	V4	5.03	1	337	1.90	27.50	79	17.81	43.33(6.55)	12.67(3.63)	49.0
	V5	4.67	24	373	1.89	27.57	78	20.24	43.00(6.58)	16.00(4.05)	56.7
	V6	4.62	28	361	1.84	27.83	78	28.39	46.33(6.82)	12.33(3.58)	48.7
T9: Untreated Control (Weedy check)	V1	0.37	38	132	0.75	27.53	96	41.36	53.00(7.28)	46.00(6.82)	185.3
	V2	0.39	37	219	0.63	27.83	108	47.92	46.67(6.86)	50.00(7.10)	190.0
	V3	0.36	40	182	0.60	27.93	108	43.72	45.00(6.74)	51.00(7.17)	197.3
	V4	0.20	42	138	0.76	27.50	76	32.72	41.33(6.46)	48.00(6.95)	187.3
	V5	0.37	38	123	0.76	27.67	72	48.13	43.33(6.62)	46.67(6.85)	171.7
	V6	0.21	41	88	0.78	27.67	75	53.44	43.67(6.62)	51.67(7.22)	185.3

Table 4.1p (Contd.)

N-levels	Varieties	LUDHIANA									
		Grain Yield (t/ha)	***Rank***	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt(g)**	**Days to 50% flowering**	**Sterlity (%)**	**Total weed population 1 DBHA**	**Total weed population 60 DAHA**	**Total weed biomass 1 DBHA**
Interaction											
N at same V		0.35		41	0.12	0.81	2	7.77	NS	0.51	20.35
V at same N		0.34		40	0.12	0.77	2	7.50	NS	0.5	20.44
Mean of treatments:											
T1		3.20	5	253	1.22	18.36	60	15.09	43.72(6.63)	27.44(5.27)	88.89
T2		3.20	5	255	1.21	18.22	61	17.06	41.33(6.45)	18.61(4.30)	74.5
T3		2.92	7	241	1.14	18.11	62	15.86	41.83(6.48)	15.11(3.89)	60.22
T4		3.23	3	252	1.21	18.35	61	15.37	44.39(6.68)	14.50(3.78)	60.94
T5		3.22	4	251	1.22	18.29	60	15.67	43.83(6.64)	11.44(3.34)	44.67
T6		2.84	8	239	1.12	18.25	61	16.65	44.83(6.70)	6.28(2.48)	24.56
T7		4.82	1	389	1.80	27.70	91	26.05	28.33(5.34)	15.44(3.99)	58.89
T8		4.81	2	385	1.80	27.69	92	22.85	44.22(6.66)	13.33(3.71)	51.83
T9		0.32	9	147	0.71	27.69	89	44.55	45.50(6.76)	48.89(7.02)	186.17
C.D.(0.05)		0.17		20	0.05	0.30	1	3.26	0.47	0.25	11.54
C.V.(%)		7.50		11	5.32	1.95	2	21.96	10.18	8.56	22.59
Mean of varieties:											
V1		4.30	1	366	1.63	27.50	100	24.27	42.89(6.54)	15.85(3.82)	57.3
V2		4.19	3	371	1.56	27.73	110	28.24	42.41(6.53)	16.74(3.90)	59.93
V3		1.13	5	118	0.44	9.29	36	11.43	41.78(6.47)	24.37(4.86)	102.96
V4		4.25	2	327	1.75	27.21	78	24.27	41.96(6.48)	16.15(3.84)	59.67
V5		4.11	4	335	1.76	27.45	77	25.89	41.04(6.41)	16.78(3.93)	59.44
V6		1.05	6	90	0.50	9.26	25	12.00	41.93(6.47)	24.15(4.83)	94.48
CD(0.05)		0.12		14	0.04	0.27	1	2.59	NS	0.17	6.78
CV(%)		6.85		9	5.92	2.35	2	22.88	9.24	7.48	17.41
Experimental Mean		3.17		268	1.27	21.41	71	21.02	6.48	4.2	72.3
Recomd NPK (kg/ha)											
Varieties											
V1		1815									
V2		1816									
V3		1819									
V4		1823									
V5		1824									
V6		1825									
Availabe NPK of soil (kg/ha)		264:23:248									

Table 4.1p (Contd.)

N-levels	Varieties	NAGINA								
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt(g)	Total weed population 1 DBHA	Total weed population 15 DAHA	Total weed biomass 1 DBHA	Total weed biomass 15 DAHA
T1: Imazethapyr 10% SL (X dose)	V1	4.96	12	305	2.74	23.73	13.50(3.73)	0.00(0.71)	11.64	0
	V2	4.96	12	301	2.74	23.72	12.18(3.55)	0.00(0.71)	11.42	0
	V3	0.00	43	0	0.00	0.00	11.99(3.53)	0.00(0.71)	9.54	0
	V4	4.79	24	311	2.75	23.54	11.26(3.43)	0.00(0.71)	10.29	0
	V5	4.13	30	295	2.72	23.34	12.74(3.64)	0.00(0.71)	10.36	0
	V6	0.00	43	0	0.00	0.00	12.28(3.57)	0.00(0.71)	10.13	0
T2: Imazethapyr 10% SL (1.25X dose)	V1	5.02	7	295	2.74	23.73	11.37(3.43)	0.00(0.71)	10.97	0
	V2	4.94	16	296	2.72	23.71	13.98(3.80)	0.00(0.71)	9.69	0
	V3	0.00	43	0	0.00	0.00	10.41(3.30)	0.00(0.71)	9.72	0
	V4	4.84	22	309	2.74	23.55	11.10(3.39)	0.00(0.71)	10.52	0
	V5	4.09	32	294	2.72	23.34	12.86(3.65)	0.00(0.71)	10.97	0
	V6	0.00	43	0	0.00	0.00	10.70(3.34)	0.00(0.71)	9.52	0
T3: Imazethapyr 10% SL (2X dose)	V1	5.00	9	316	2.75	23.73	12.60(3.62)	0.00(0.71)	10.18	0
	V2	4.95	14	304	2.73	23.70	10.00(3.24)	0.00(0.71)	11.08	0
	V3	0.00	43	0	0.00	0.00	11.77(3.49)	0.00(0.71)	10.87	0
	V4	4.84	22	238	2.75	23.56	10.29(3.28)	0.00(0.71)	11.10	0
	V5	4.06	34	290	2.72	23.36	12.78(3.63)	0.00(0.71)	11.46	0
	V6	0.00	43	0	0.00	0.00	21.13(4.58)	0.00(0.71)	8.91	0
T4: Imazethapyr 10% SL fb Imazethapyr 10% SL (X dose)	V1	5.05	3	312	2.74	23.72	12.71(3.63)	0.00(0.71)	11.45	0
	V2	4.98	11	309	2.73	23.73	12.06(3.54)	0.00(0.71)	9.88	0
	V3	0.00	43	0	0.00	0.00	12.53(3.61)	0.00(0.71)	10.44	0
	V4	5.02	7	305	2.74	23.56	12.95(3.66)	0.00(0.71)	9.85	0
	V5	4.11	31	295	2.71	23.34	12.84(3.65)	0.00(0.71)	8.87	0
	V6	0.00	43	0	0.00	0.00	9.92(3.22)	0.00(0.71)	10.22	0
T5: Imazethapyr 10% SL fb Imazethapyr 10% SL (1.25 X dose)	V1	5.00	9	312	2.74	23.71	11.97(3.51)	0.00(0.71)	10.30	0
	V2	5.04	5	305	2.74	23.72	13.77(3.77)	0.00(0.71)	9.37	0
	V3	0.00	43	0	0.00	0.00	10.65(3.34)	0.00(0.71)	8.65	0
	V4	5.06	2	306	2.75	23.56	11.27(3.43)	0.00(0.71)	10.01	0
	V5	4.08	33	294	2.71	23.34	11.35(3.43)	0.00(0.71)	9.69	0
	V6	0.00	43	0	0.00	0.00	10.61(3.33)	0.00(0.71)	7.81	0
T6: Imazethapyr 10% SL fb Imazethapyr 10% SL (2 X dose)	V1	5.05	3	310	2.74	23.73	12.93(3.66)	0.00(0.71)	9.07	0
	V2	4.89	19	307	2.73	23.72	11.04(3.40)	0.00(0.71)	10.28	0
	V3	0.00	43	0	0.00	0.00	10.84(3.36)	0.00(0.71)	9.59	0
	V4	4.90	18	310	2.75	23.56	13.91(3.79)	0.00(0.71)	9.64	0
	V5	3.99	35	296	2.71	23.37	11.35(3.43)	0.00(0.71)	9.97	0
	V6	0.00	43	0	0.00	0.00	9.05(3.09)	0.00(0.71)	7.65	0
T7: Pendimethalin(PM) 30% EC + Bispyribac-sodium (BS)10% SC	V1	4.93	17	306	2.74	23.72	13.76(3.78)	6.98(2.73)	8.29	11.45
	V2	4.89	19	309	2.74	23.72	13.36(3.72)	6.29(2.60)	9.36	10.2
	V3	4.78	27	311	2.71	23.84	11.20(3.42)	8.12(2.94)	8.92	10.14
	V4	4.87	21	310	2.75	23.76	12.84(3.65)	7.84(2.89)	8.86	10.45
	V5	3.95	36	296	2.72	23.34	11.25(3.42)	6.76(2.69)	9.54	10.97
	V6	4.74	28	315	2.72	23.80	9.81(3.21)	6.23(2.59)	7.59	9.6
T8: Weed free control (2 times Hand weeding)	V1	5.04	5	301	2.74	23.77	0.00(0.71)	0.20(0.83)	0.00	0
	V2	4.95	14	308	2.73	23.73	0.00(0.71)	0.20(0.83)	0.00	0
	V3	4.79	24	302	2.73	23.72	0.00(0.71)	0.20(0.83)	0.00	0
	V4	5.08	1	313	2.74	23.74	0.00(0.71)	0.20(0.83)	0.00	0
	V5	4.15	29	311	2.74	23.34	0.00(0.71)	0.20(0.83)	0.00	0
	V6	4.79	24	306	2.72	23.73	0.00(0.71)	0.20(0.83)	0.00	0
T9: Untreated Control (Weedy check)	V1	0.45	38	192	2.73	22.08	39.81(6.34)	61.16(7.85)	37.84	70.29
	V2	1.25	37	190	2.72	22.06	55.65(7.49)	63.29(7.99)	41.30	74.55
	V3	0.45	38	190	2.72	23.08	48.82(7.02)	64.63(8.05)	43.42	69.16
	V4	0.44	40	193	2.72	22.96	49.43(7.06)	69.21(8.35)	38.97	76.67
	V5	0.38	41	193	2.70	22.97	45.87(6.81)	63.74(8.01)	39.97	64.25
	V6	0.31	42	183	2.71	22.80	41.36(6.46)	62.29(7.92)	39.01	57.51

Table 4.1p (Contd.)

N-levels	Varieties	NAGINA								
		Grain Yield (t/ha)	***Rank***	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt(g)**	**Total weed population 1 DBHA**	**Total weed population 15 DAHA**	**Total weed biomass 1 DBHA**	**Total weed biomass 15 DAHA**
Interaction										
N at same V		0.28		16.18	0.02	0.16	0.43	NS	2.28	3.56
V at same N		0.26		15.42	0.02	0.16	0.42	NS	2.17	3.3
Mean of treatments:										
T1		3.14	6	202	1.82	15.72	12.32(3.57)	0.00(0.71)	10.56	0
T2		3.15	5	199	1.82	15.72	11.74(3.48)	0.00(0.71)	10.23	0
T3		3.14	6	191	1.83	15.73	13.09(3.64)	0.00(0.71)	10.60	0
T4		3.19	4	203	1.82	15.73	12.17(3.55)	0.00(0.71)	10.12	0
T5		3.2	3	203	1.82	15.72	11.60(3.47)	0.00(0.71)	9.30	0
T6		3.14	6	204	1.82	15.73	11.52(3.45)	0.00(0.71)	9.37	0
T7		4.69	2	308	2.73	23.7	12.04(3.53)	7.04(2.74)	8.76	10.47
T8		4.8	1	307	2.73	23.67	0.00(0.71)	0.20(0.83)	0.00	0
T9		0.55	9	190	2.72	22.66	46.82(6.86)	64.05(8.03)	40.08	68.74
C.D.(0.05)		0.08		5.97	0.01	0.08	0.22	0.1	0.84	0.74
C.V.(%)		3.56		3.79	0.84	0.61	8.77	8.22	9.55	11.87
Mean of varieties:										
V1		4.5	2	294	2.74	23.55	14.29(3.60)	7.59(1.74)	12.19	9.08
V2		4.54	1	292	2.73	23.54	15.78(3.69)	7.75(1.74)	12.48	9.42
V3		1.11	5	89	0.91	7.85	14.24(3.53)	8.11(1.78)	12.35	8.81
V4		4.43	3	288	2.74	23.53	14.78(3.60)	8.58(1.81)	12.14	9.68
V5		3.66	4	285	2.72	23.3	14.56(3.60)	7.86(1.75)	12.31	8.36
V6		1.09	6	89	0.9	7.81	13.87(3.50)	7.64(1.73)	11.21	7.46
CD(0.05)		0.09		5.39	0.01	0.05	NS	NS	NS	1.19
CV(%)		5.39		4.49	0.55	0.55	7.39	8.08	11.43	25.04
Experimental Mean		3.22		223.0	2.12	18.26	3.59	1.76	12.34	8.8
Recomd NPK (kg/ha)										
Varieties										
V1		1815								
V2		1816								
V3		1819								
V4		1823								
V5		1824								
V6		1825								
Availabe NPK of soil (kg/ha)		21:18:209								

Table 4.1p (Contd.)

N-levels	Varieties	PANTNAGAR							
		Grain Yield (t/ha)	*Rank*	Panicle/m² (No.)	Panicle wt (g)	Test wt(g)	Total weed population at1 DBHA	Total weed population at 15 DAHA	Total weed population at 30 DAHA
T1: Imazethapyr 10% SL (X dose)	V1	4.23	18	310	1.49	21.7	76.00(8.70)	26.67(5.19)	12.00(3.39)
	V2	4.06	30	303	1.52	21.8	118.67(10.88)	16.00(4.04)	5.33(2.18)
	V3	0.00	43	0	0.00	0.0	101.33(10.04)	24.00(4.91)	9.33(3.06)
	V4	4.39	15	338	1.42	22.7	98.67(9.92)	26.67(5.19)	13.33(3.66)
	V5	4.60	5	353	1.51	22.5	98.67(9.91)	21.33(4.55)	6.67(2.59)
	V6	0.00	43	0	0.00	0.0	84.00(9.16)	24.00(4.90)	10.67(3.19)
T2: Imazethapyr 10% SL (1.25X dose)	V1	4.21	20	316	1.46	21.5	120.00(10.94)	24.00(4.94)	9.33(2.77)
	V2	4.04	32	309	1.47	20.7	120.00(10.98)	40.00(6.36)	20.00(4.51)
	V3	0.00	43	0	0.00	0.0	113.33(10.66)	29.33(5.44)	14.67(3.73)
	V4	4.31	16	337	1.40	22.8	140.00(11.83)	34.67(5.92)	17.33(4.22)
	V5	4.42	13	355	1.48	22.6	114.67(10.72)	28.00(5.33)	10.67(3.24)
	V6	0.00	43	0	0.00	0.0	112.00(10.58)	29.33(5.44)	14.67(3.89)
T3: Imazethapyr 10% SL (2X dose)	V1	4.19	21	333	1.37	22.3	120.00(10.95)	20.00(4.51)	12.00(3.45)
	V2	4.02	33	301	1.48	20.2	121.33(11.01)	49.33(7.04)	24.00(4.90)
	V3	0.00	43	0	0.00	0.0	120.00(10.97)	37.33(6.05)	20.00(4.40)
	V4	4.24	17	318	1.46	24.0	146.67(12.04)	25.33(5.06)	12.00(3.50)
	V5	4.48	11	366	1.43	22.2	129.33(11.37)	34.67(5.89)	20.00(4.48)
	V6	0.00	43	0	0.00	0.0	165.33(12.71)	40.00(6.35)	21.33(4.64)
T4: Imazethapyr 10% SL fb Imazethapyr 10% SL (X dose)	V1	4.18	22	331	1.35	21.9	133.33(11.56)	29.33(5.45)	14.67(3.89)
	V2	3.99	34	294	1.51	21.0	110.67(10.50)	30.67(5.55)	14.67(3.87)
	V3	0.00	43	0	0.00	0.0	104.00(10.17)	24.00(4.90)	10.67(3.30)
	V4	4.15	24	339	1.34	20.6	108.00(10.32)	34.67(5.89)	20.00(4.38)
	V5	4.54	8	373	1.38	23.1	110.67(10.28)	36.00(6.04)	18.67(4.37)
	V6	0.00	43	0	0.00	0.0	137.33(11.63)	29.33(5.42)	13.33(3.66)
T5: Imazethapyr 10% SL fb Imazethapyr 10% SL (1.25 X dose)	V1	4.17	23	338	1.30	21.2	130.67(11.45)	46.67(6.83)	28.00(5.28)
	V2	3.97	35	293	1.49	20.8	121.33(11.02)	20.00(4.51)	9.33(3.12)
	V3	0.00	43	0	0.00	0.0	160.00(12.66)	42.67(6.56)	28.00(5.28)
	V4	4.09	28	313	1.44	23.0	114.67(10.72)	26.67(5.20)	13.33(3.66)
	V5	4.49	9	371	1.38	22.0	185.33(13.61)	33.33(5.77)	18.67(4.31)
	V6	0.00	43	0	0.00	0.0	121.33(11.02)	26.67(5.21)	12.00(3.50)
T6: Imazethapyr 10% SL fb Imazethapyr 10% SL (2 X dose)	V1	4.13	26	341	1.27	22.1	124.00(11.10)	18.67(4.31)	10.67(3.30)
	V2	3.91	36	295	1.46	21.2	118.67(10.89)	20.00(4.40)	5.33(2.39)
	V3	0.00	43	0	0.00	0.0	121.33(11.03)	13.33(3.57)	4.00(1.91)
	V4	4.05	31	313	1.43	24.2	121.33(11.02)	29.33(5.44)	9.33(3.06)
	V5	4.46	12	363	1.41	23.6	85.33(9.19)	21.33(4.67)	9.33(3.06)
	V6	0.00	43	0	0.00	0.0	90.67(9.42)	22.67(4.78)	5.33(2.39)
T7: Pendimethalin(PM) 30% EC + Bispyribac-sodium (BS)10% SC	V1	4.66	3	387	1.33	21.5	21.33(4.65)	50.67(7.15)	84.00(9.19)
	V2	4.58	6	370	1.40	21.0	46.67(6.85)	57.33(7.60)	80.00(8.97)
	V3	4.09	28	314	1.41	20.6	33.33(5.81)	54.67(7.42)	78.67(8.89)
	V4	4.78	2	388	1.34	23.7	33.33(5.81)	58.67(7.67)	80.00(8.95)
	V5	4.87	1	403	1.31	21.9	28.00(5.33)	57.33(7.60)	81.33(9.04)
	V6	4.15	24	344	1.35	22.2	36.00(6.04)	46.67(6.86)	70.67(8.43)
T8: Weed free control (2 times Hand weeding)	V1	4.55	7	359	1.42	21.0	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V2	4.42	13	362	1.42	20.2	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V3	4.13	26	343	1.35	21.7	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V4	4.49	9	356	1.45	23.5	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V5	4.61	4	378	1.38	23.3	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V6	4.23	18	353	1.36	23.1	0.00(0.71)	0.00(0.71)	0.00(0.71)
T9: Untreated Control (Weedy check)	V1	2.29	40	179	1.60	21.8	125.33(11.19)	184.00(13.52)	214.67(14.64)
	V2	2.12	42	199	1.34	21.3	122.67(11.08)	185.33(13.63)	221.33(14.89)
	V3	2.27	41	203	1.35	21.7	132.00(11.41)	193.33(13.86)	225.33(14.99)
	V4	2.39	39	186	1.61	20.6	124.00(11.13)	170.67(13.07)	198.67(14.10)
	V5	2.47	38	213	1.44	21.5	117.33(10.75)	174.67(13.20)	204.00(14.26)
	V6	2.82	37	240	1.41	19.8	108.00(10.41)	201.33(14.19)	226.67(15.06)

Table 4.1p (Contd.)

N-levels	Varieties	PANTNAGAR							
		Grain Yield (t/ha)	***Rank***	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt(g)**	**Total weed population at1 DBHA**	**Total weed population at 15 DAHA**	**Total weed population at 30 DAHA**
Interaction									
N at same V		0.09		10	0.06	0.9	1.27	1.06	1.19
V at same N		0.10		9	0.06	0.9	1.31	1.08	1.18
Mean of treatments:									
T1		2.88	3	217	0.99	14.8	96.22(9.77)	23.11(4.80)	9.56(3.01)
T2		2.83	4	219	0.97	14.6	120.00(10.95)	30.89(5.57)	14.44(3.73)
T3		2.82	5	220	0.96	14.8	133.78(11.51)	34.44(5.82)	18.22(4.23)
T4		2.81	6	223	0.93	14.4	117.33(10.74)	30.67(5.54)	15.33(3.91)
T5		2.79	7	219	0.94	14.5	138.89(11.75)	32.67(5.68)	18.22(4.19)
T6		2.76	8	219	0.93	15.2	110.22(10.44)	20.89(4.53)	7.33(2.69)
T7		4.52	1	368	1.36	21.8	33.11(5.75)	54.22(7.38)	79.11(8.91)
T8		4.40	2	359	1.40	22.1	0.00(0.71)	0.00(0.71)	0.00(0.71)
T9		2.39	9	203	1.46	21.1	121.56(10.99)	184.89(13.58)	215.11(14.66)
C.D.(0.05)		0.07		4	0.02	0.4	0.83	0.65	0.61
C.V.(%)		3.22		2	2.89	3.0	12.74	15.33	16.99
Mean of varieties:									
V1		4.07	3	322	1.40	21.7	94.52(9.03)	44.44(5.85)	42.81(5.18)
V2		3.90	4	303	1.45	20.9	97.78(9.32)	46.52(5.98)	42.22(5.06)
V3		1.17	6	96	0.46	7.1	98.37(9.27)	46.52(5.94)	43.41(5.14)
V4		4.10	2	321	1.43	22.8	98.52(9.28)	45.19(6.02)	40.44(5.14)
V5		4.33	1	353	1.41	22.5	96.59(9.10)	45.19(5.97)	41.04(5.12)
V6		1.24	5	104	0.46	7.2	94.96(9.07)	46.67(5.98)	41.63(5.05)
CD(0.05)		0.03		3	0.02	0.3	NS	NS	NS
CV(%)		1.84		2	3.39	3.3	8.58	10.99	14.39
Experimental Mean		3.13		250	1.10	17.0	9.18	5.96	5.11
Recomd NPK (kg/ha)									
Varieties									
V1									
V2									
V3									
V4									
V5									
V6									
Availabe NPK of soil (kg/ha)									

Table 4.1p (Contd.)

N-levels	Varieties	PANTNAGAR Contd..					Mean Grain Yield (t/ha)	*Rank*
		Total weed population at 45 DAHA	Total weed biomass at 1 DBHA	Total weed biomass at 15 DAHA	Total weed biomass at 30 DAHA	Total weed biomass at 45 DAHA		
T1: Imazethapyr 10% SL (X dose)	V1	0.00(0.71)	23.05	20.73	9.49	0	4.30	8
	V2	1.33(1.18)	27.73	22.24	12.76	0	4.19	19
	V3	5.33(2.18)	36.41	28.85	12.03	0	0.00	43
	V4	4.00(1.91)	36.55	29.2	9.43	0	4.26	13
	V5	4.00(1.91)	40.19	28.95	11.6	0	4.10	27
	V6	4.00(1.91)	25.08	21.17	12.43	0	0.00	43
T2: Imazethapyr 10% SL (1.25X dose)	V1	14.67(3.71)	60.2	49	9.91	3.09	4.33	7
	V2	5.33(2.12)	50.12	47.39	12.91	4.48	4.19	19
	V3	5.33(2.39)	51.68	43.28	13.71	7.73	0.00	43
	V4	10.67(3.33)	37.88	29.05	14.71	9.71	4.19	17
	V5	2.67(1.44)	45.67	37.35	8.52	0	4.05	32
	V6	1.33(1.18)	36.61	29.44	9.83	1.59	0.00	43
T3: Imazethapyr 10% SL (2X dose)	V1	8.00(2.56)	40.17	36.35	13.29	1.59	4.19	18
	V2	2.67(1.65)	43.56	35.81	10.41	0	4.05	33
	V3	1.33(1.18)	71.23	50.55	11.15	4.24	0.00	43
	V4	9.33(3.06)	50.99	36.97	16.13	6.64	4.14	24
	V5	5.33(2.18)	61.36	40.71	17.4	2.4	3.96	35
	V6	0.00(0.71)	52.37	24.71	11.55	0	0.00	43
T4: Imazethapyr 10% SL fb Imazethapyr 10% SL (X dose)	V1	6.67(2.59)	48.23	41.55	8.8	8.35	4.36	5
	V2	0.00(0.71)	54.92	41.2	7.91	0	4.21	16
	V3	9.33(3.06)	51.2	39.51	11.81	8.03	0.00	43
	V4	10.67(3.33)	49.01	38.36	10.57	9.55	4.21	15
	V5	8.00(2.86)	53.83	45.6	10.31	8.67	4.09	28
	V6	5.33(2.18)	48.29	41.85	7.96	5.65	0.00	43
T5: Imazethapyr 10% SL fb Imazethapyr 10% SL (1.25 X dose)	V1	8.00(2.92)	82.13	59.27	12.83	6.13	4.33	6
	V2	1.33(1.18)	58.49	42.01	11.29	2.51	4.23	14
	V3	2.67(1.65)	70.92	54.77	13.83	4.93	0.00	43
	V4	10.67(3.30)	54.67	42.13	17.25	9.17	4.17	22
	V5	5.33(2.12)	90.13	72.15	12.33	4.8	4.08	31
	V6	1.33(1.18)	58.05	45.77	13.12	0	0.00	43
T6: Imazethapyr 10% SL fb Imazethapyr 10% SL (2 X dose)	V1	1.33(1.18)	57.51	38.12	16.09	2.37	4.18	21
	V2	2.67(1.65)	22.47	19.11	11.32	4.85	3.98	34
	V3	0.00(0.71)	38.39	32.84	10.88	0	0.00	43
	V4	0.00(0.71)	54.55	45.23	24.64	0	4.08	30
	V5	4.00(2.12)	57.92	45.07	16	6.91	3.87	36
	V6	1.33(1.18)	51.53	39.15	13.56	2.43	0.00	43
T7: Pendimethalin(PM) 30% EC + Bispyribac-sodium (BS)10% SC	V1	30.67(5.58)	20.28	19.08	12.68	11.79	4.44	1
	V2	16.00(3.93)	36.37	22.97	11.11	9.84	4.29	10
	V3	25.33(5.08)	25.25	17.29	18.69	9.63	4.27	12
	V4	28.00(5.25)	38.51	26.07	18.63	10.77	4.37	4
	V5	26.67(5.19)	346.99	21	11.52	10.32	4.16	23
	V6	22.67(4.78)	0	0	8.45	10.03	4.09	29
T8: Weed free control (2 times Hand weeding)	V1	0.00(0.71)	0	0	0	0	4.39	2
	V2	0.00(0.71)	0	0	0	0	4.28	11
	V3	0.00(0.71)	0	0	0	0	4.30	9
	V4	0.00(0.71)	0	0	0	0	4.39	3
	V5	0.00(0.71)	0	0	0	0	4.12	26
	V6	0.00(0.71)	0	0	0	0	4.12	25
T9: Untreated Control (Weedy check)	V1	182.67(13.50)	46	32.37	26.33	46.59	1.00	40
	V2	121.33(11.03)	43.59	34.11	26.35	43.52	1.16	37
	V3	157.33(12.55)	44.12	34.08	32.08	46.83	1.00	40
	V4	168.00(12.97)	37.15	29.41	24.67	45.28	1.00	42
	V5	149.33(12.22)	48.13	38.89	33.01	45.95	1.05	39
	V6	189.33(13.76)	31.63	24.92	27.96	46.59	1.06	38

Table 4.1p (Contd.)

N-levels	Varieties	PANTNAGAR Contd..					Mean Grain Yield (t/ha)	*Rank*
		Total weed population at 45 DAHA	Total weed biomass at 1 DBHA	Total weed biomass at 15 DAHA	Total weed biomass at 30 DAHA	Total weed biomass at 45 DAHA		
Interaction								
N at same V		1.12	NS	NS	NS	3.17		
V at same N		1.15	NS	NS	NS	3.17		
Mean of treatments:								
T1		3.11(1.63)	31.5	25.19	11.29	0	2.81	4
T2		6.67(2.36)	47.03	39.25	11.6	4.43	2.79	6
T3		4.44(1.89)	53.28	37.52	13.32	2.48	2.72	7
T4		6.67(2.45)	50.91	41.34	9.56	6.71	2.81	3
T5		4.89(2.06)	69.07	52.68	13.44	4.59	2.80	5
T6		1.56(1.26)	47.06	36.58	15.42	2.76	2.69	8
T7		24.89(4.97)	77.9	17.74	13.51	10.4	4.27	1
T8		0.00(0.71)	0	0	0	0	4.27	2
T9		161.33(12.67)	41.77	32.3	28.4	45.79	1.04	9
C.D.(0.05)		0.72	NS	11.72	5.46	1.75		
C.V.(%)		30.63	162.51	52.81	59.64	28.97		
Mean of varieties:								
V1		28.00(3.72)	41.95	32.94	12.16	8.88	3.95	1
V2		16.74(2.68)	37.47	29.43	11.56	7.24	3.84	3
V3		22.96(3.28)	43.24	33.46	13.8	9.04	1.06	5
V4		26.81(3.84)	39.92	30.71	15.11	10.12	3.87	2
V5		22.81(3.42)	82.69	36.63	13.41	8.78	3.72	4
V6		25.04(3.07)	33.73	25.22	11.65	7.36	1.03	6
CD(0.05)		0.37	NS	6.9	NS	1.06		
CV(%)		20.71	169.87	40.75	40.43	22.9		
Experimental Mean		3.33	46.5	31.4	12.95	8.57	3.34	
Recomd NPK (kg/ha)								
Varieties								
V1								
V2								
V3								
V4								
V5								
V6								
Availabe NPK of soil (kg/ha)								

4.1q NMT – AVT 2 BT

Ten BT cultures (1901 to 1912) were evaluated for its response to nutrient application in terms of grain yield and yield attributes at four locations i.e., **Kaul (90:30:0), Ludhiana (40:30:30), Nagina (120:60:40)** and **Pantnagar (120:60:40)** under two different nutrient levels (50% and 100% RFD). The details and data received from these locations are summarized and presented in Table 4.1(q).

Different RDF doses (50% and 100% RDF) significantly influenced the grain yield at at all three locations (**Kaul, Ludhiana, Nagina** and **Pantnagar)** and the maximum increase in grain yield was observed at most of the locations and higher nutrient response (8 to 22% kg grain/kg Nutrient). Application of 100% RDF recorded significantly higher grain yields at **Kaul** (4.98 t/ha), **Ludhiana** (4.39 t/ha), **Nagina** (4.74 t/ha) and **Pantnagar** (4.50 t/ha). Higher nutrient response was recorded with 100% RDF at **Nagina** (21.70) and **Kaul** (15.77 kg grain /kg Nutrient).

Grain yield differences among the tested cultures were significant at all locations. Significantly higher mean maximum grain yield was recorded by IET cultures at all the locations over local checks. At **Kaul**, 1907 (5.07 t/ha) followed by 1908 (5.07 t/ha); at **Ludhiana** 1902 (4.94 t/ha) followed by 1907 (4.76 t/ha); at **Nagina** 1901 (3.73 t/ha) followed by 1908 (3.62 t/ha) and at Pantnagar 1902 (3.97 t/ha) were found promising and superior to other entries tested. Among the entries tested at all locations, mean grain yield of IET culture 1902 (4.36 t/ha) was higher followed by IET culture 1907 (4.30 t/ha).

In this trial application of 100% RFD was found promising and most of the IET cultures (IET 1902 and 1907) were superior to local checks.

Table 4.1(q): Summary of data on grain yield and ancillary characters of selected NMT BT cultures grown under transplanted conditions at graded level of fertilizer doses, kharif 2021.

F-levels	Varieties	KAUL						LUDHIANA						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
F1: Low input (50% NPK)	V1	3.60	18	168	2.42	25.9		4.35	10	205	3.12	26.0	93	
	V2	4.50	11	187	2.62	27.2		4.80	6	200	3.50	26.4	96	
	V3	3.43	19	262	1.45	29.6		3.17	19	200	1.88	27.7	106	
	V4	4.27	13	224	2.06	26.3		3.76	13	207	3.37	26.2	93	
	V5	4.47	12	235	2.04	31.9		3.73	14	174	2.38	30.7	106	
	V6	3.67	17	239	1.61	26.7		3.11	20	233	2.66	22.7	106	
	V7	4.60	8	214	2.27	27.3		4.57	7	154	3.82	25.5	92	
	V8	4.57	9	187	2.55	26.4		4.50	8	185	3.99	25.5	90	
	V9	3.17	20	337	1.02	24.2		3.31	18	231	2.05	25.9	106	
	V10	-	-	-	-	-		-	-	-	-	-	-	
	V11	4.03	15	329	1.27	28.8		4.43	9	240	2.74	27.1	96	
F2: Optimum input (100% NPK)	V1	5.03	6	216	2.65	26.1	23.83	5.13	1	253	3.36	26.5	91	15.60
	V2	5.40	3	232	2.77	27.2	15.00	5.08	2	224	3.62	26.0	94	5.60
	V3	4.23	14	332	1.57	30.3	13.33	3.60	16	227	2.27	27.8	104	8.60
	V4	5.00	7	257	2.21	26.6	12.17	3.95	12	224	3.70	26.6	92	3.80
	V5	5.33	4	276	2.21	32.1	14.33	4.04	11	191	3.11	31.2	105	6.20
	V6	4.57	9	298	1.75	26.6	15.00	3.46	17	240	2.83	22.0	106	7.00
	V7	5.57	1	261	2.44	27.1	16.17	4.94	4	207	3.98	25.7	93	7.40
	V8	5.57	1	225	2.73	26.5	16.67	4.94	4	205	4.14	25.8	93	8.80
	V9	3.93	16	397	1.11	24.5	12.67	3.64	15	266	2.16	25.9	107	6.60
	V10	-	-	-	-	-	-	-	-	-	-	-	-	-
	V11	5.14	5	392	1.51	28.7	18.50	5.08	2	255	2.89	27.2	103	13.00
Interation														
F at same V		NS		NS	NS	NS		NS		NS	NS	NS	1.70	
V at same F		NS		NS	NS	NS		NS		NS	NS	NS	1.72	
F1		4.03	2	238	1.93	27.44		3.97	2	203	2.95	26.36	98	
F2		4.98	1	289	2.10	27.56	15.77	4.39	1	229	3.21	26.48	99	8.26
C.D.(0.05)		0.21		18.55	NS	NS		0.11		19.88	0.18	NS	NS	
C.V.(%)		4.11		6.34	7.96	1.69		2.44		8.28	5.30	1.01	0.69	

Table 4.1(q): (Contd.)

F-levels	Varieties	KAUL						LUDHIANA						
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)
Mean of varieties:														
V1		4.32	7	192	2.54	26.02	23.83	4.74	4	229	3.24	26.22	92	15.60
V2		4.95	3	209	2.70	27.20	15.00	4.94	1	212	3.56	26.20	95	5.60
V3		3.83	9	297	1.51	29.97	13.33	3.39	9	213	2.08	27.78	105	8.60
V4		4.64	5	241	2.14	26.47	12.17	3.86	7	216	3.54	26.42	93	3.80
V5		4.90	4	256	2.13	32.00	14.33	3.89	6	183	2.75	30.94	105	6.20
V6		4.12	8	269	1.68	26.64	15.00	3.29	10	237	2.75	22.37	106	7.00
V7		5.09	1	237	2.36	27.20	16.17	4.76	2	180	3.90	25.60	93	7.40
V8		5.07	2	206	2.64	26.42	16.67	4.72	5	195	4.07	25.67	92	8.80
V9		3.55	10	367	1.07	24.34	12.67	3.48	8	249	2.11	25.87	107	6.60
V10		-	-	-	-	-	-	-	-	-	-	-	-	-
V11		4.59	6	360	1.39	28.75	18.50	4.76	3	248	2.82	27.17	100	13.00
C.D.(0.05)		0.30		26.09	0.15	2.91		0.34		39.93	0.50	0.59	1.20	
C.V. (%)		5.65		8.49	6.52	9.08		6.87		15.84	13.99	1.91	1.05	
Expt. Mean		**4.50**		**263**	**2.01**	**27.50**		**4.18**		**216**	**3.08**	**26.42**	**99**	
Soil type		Clay loam						Sandy Loam						
pH		8.00						7.40						
F - levels (kg/ha)														
F1		45:15:0						20:15:15						
F2		90:30:0						40:30:30						
Recmd NPK (kg/ha)		90:30:0						40:30:30						
Varieties														
V1		1901						1901						
V2		1902						1902						
V3		1903						1903						
V4		1904						1904						
V5		1905						1905						
V6		1906						1906						
V7		1907						1907						
V8		1908						1908						
V9		1910						1910						
V10		-						-						
V11		Local Check(PB 1121						Local Check (Punjab Basmati -7)						
Avlb NPK of soil (kg/ha)		160:16:320						239:22:222						

Table 4.1(q): (Contd.)

F-levels	Varieties	NAGINA							PANTNAGAR							Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
F1: Low input (50% NPK)	V1	2.43	12	223	2.96	24.1	93		3.32	14	187	1.92	22.6	86		3.43	17
	V2	2.27	19	217	2.96	23.1	95		3.52	10	205	1.92	20.8	85		3.77	12
	V3	2.52	11	207	2.93	23.3	106		2.26	20	177	1.45	22.4	99		2.85	21
	V4	2.30	18	222	2.95	22.8	93		2.41	18	179	1.54	20.9	102		3.19	18
	V5	2.35	15	226	2.96	23.5	106		3.45	11	200	1.90	21.7	85		3.50	16
	V6	2.39	13	209	2.97	24.7	106		2.40	19	180	1.55	21.1	86		2.89	20
	V7	2.38	14	226	2.91	24.2	92		3.34	12	191	1.92	20.9	85		3.72	13
	V8	2.33	16	223	2.87	22.2	91		3.34	12	189	1.97	20.6	85		3.69	15
	V9	2.31	17	212	2.91	22.5	106		3.21	15	192	1.88	22.3	86		3.00	19
	V10	2.25	20	203	2.90	23.2	98		-	-	-	-	-	-		2.25	22
	V11	-	-	-	-	-	-		3.55	9	211	1.88	22.0	105		4.00	10
F2: Optimum input (100% NPK)	V1	5.02	1	299	3.05	24.3	91	23.55	4.07	6	215	2.19	23.1	87	6.82	4.81	5
	V2	4.86	3	305	3.05	23.3	93	23.55	4.42	1	241	2.02	22.7	87	8.18	4.94	1
	V3	4.60	8	293	3.05	22.3	105	18.91	2.44	17	183	1.58	22.6	96	1.64	3.72	14
	V4	4.81	5	301	3.04	22.5	92	22.82	3.92	8	216	2.11	22.3	85	13.73	4.42	7
	V5	4.85	4	310	3.06	23.3	94	22.73	4.27	2	222	2.19	22.5	85	7.45	4.62	6
	V6	4.45	9	316	2.90	23.1	106	18.73	3.16	16	204	1.80	22.3	84	6.91	3.91	11
	V7	4.81	5	308	2.86	23.4	93	22.09	4.16	4	222	2.09	23.1	86	7.45	4.87	3
	V8	4.91	2	302	2.91	24.0	94	23.45	4.15	5	223	2.03	23.9	86	7.36	4.89	2
	V9	4.67	7	326	2.99	23.8	107	21.45	4.05	7	207	2.14	22.7	103	7.64	4.07	9
	V10	4.42	10	315	2.93	23.4	102	19.73	-	-	-	-	-	-	-	4.42	7
	V11	-	-	-	-	-	-	-	4.22	3	226	2.13	22.4	85	6.09	4.81	4
Interaction																	
F at same V		NS		NS	0.02	0.35	1.35		0.22		13.03	0.14	1.15	1.52			
V at same F		NS		NS	0.02	0.34	1.38		0.29		12.76	0.14	1.17	1.47			
F1		2.35	2	217	2.93	23.35	99		3.08	2	191	1.79	21.52	90		3.36	2
F2		4.74	1	307	2.98	23.33	98	21.70	3.89	1	216	2.03	22.76	88	7.33	4.50	1
C.D.(0.05)		0.25		12.30	0.01	NS	0.66		0.26		4.03	0.03	0.54	0.38			
C.V.(%)		6.29		4.22	0.17	0.18	0.60		6.73		1.78	1.48	2.19	0.38			

Table 4.1(q): (Contd.)

F-levels	Varieties	NAGINA							PANTNAGAR							Over all mean	Rank
		Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)	Grain Yield (t/ha)	Rank	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days 50% flowering	Nutri. res. (kg grain/kg Nutri.) (Base level 50% RDF)		
Mean of varieties:																	
	V1	3.73	1	261	3.01	24.22	92	23.55	3.70	6	201	2.06	22.85	86	6.82	4.12	5
	V2	3.57	5	261	3.01	23.17	94	23.55	3.97	1	223	1.97	21.75	86	8.18	4.36	2
	V3	3.56	6	250	2.99	22.77	105	18.91	2.35	10	180	1.52	22.52	97	1.64	3.28	11
	V4	3.56	7	262	3.00	22.66	93	22.82	3.17	8	197	1.83	21.59	94	13.73	3.80	7
	V5	3.60	3	268	3.01	23.38	100	22.73	3.86	3	211	2.05	22.08	85	7.45	4.06	6
	V6	3.42	9	263	2.94	23.87	106	18.73	2.78	9	192	1.68	21.69	85	6.91	3.40	9
	V7	3.60	4	267	2.89	23.79	93	22.09	3.75	4	206	2.01	22.00	85	7.45	4.30	3
	V8	3.62	2	263	2.89	23.13	92	23.45	3.75	5	206	2.00	22.26	86	7.36	4.29	4
	V9	3.49	8	269	2.95	23.15	107	21.45	3.63	7	200	2.01	22.49	95	7.64	3.54	8
	V10	3.34	10	259	2.92	23.30	100	19.73	-	-	-	-	-	-	-	3.34	10
	V11	-	-	-	-	-	-	-	3.89	2	219	2.01	22.19	95	6.09	4.41	1
C.D.(0.05)		0.19		NS	0.02	0.25	0.96		0.16		9.21	0.10	NS	1.08			
C.V. (%)		4.56		4.17	0.49	0.92	0.84		3.84		3.88	4.57	3.16	1.03			
Expt. Mean		**3.55**		**262**	**2.96**	**23.34**	**98**		**3.48**		**204**	**1.91**	**22.14**	**89**		3.93	
Soil type		Sandy Loam							Silt Loam								
pH		7.60							7.50								
F - levels (kg/ha)																	
F1		60:30:20							60:30:20								
F2		120:60:40							120:60:40								
Recmd NPK (kg/ha)		120:60:40							120:60:40								
Varieties																	
V1		1901							1901								
V2		1902							1902								
V3		1903							1903								
V4		1904							1904								
V5		1905							1905								
V6		1906							1906								
V7		1907							1907								
V8		1908							1908								
V9		1910							1910								
V10		1912							-								
V11		-							Local Check (Pant Basmati-1)								
Avalb NPK of soil (kg/ha)		-							231:22:221								

4.1(r) Grain Yield Efficiency Index values (GYEI):

Grain yield is the best measure for evaluation of given genotype in the screening experiments for its efficiency. Further, field screening results can be interpreted using the grain yield efficiency index (GYEI) for identifying efficient, stable, suitable and promising cultures at various levels of nutrient application.

Grain yield efficiency Index (GYEI) was computed for genotype evaluation using the following formula in the present Nitrogen variety evaluation trial.

$$GYEI = \frac{\textbf{(Yield at low nutrient level) (Yield at high nutrient level)}}{\textbf{(Experimental mean yield at low nutrient level) X (Experimental mean yield at high nutrient level)}}$$

Tolerant genotypes have a (GYEI) of 1 or higher and the susceptible ones have a GYEI in the range of 0 to 0.50 and the genotypes between these two limits (0.50 to 1.00) are considered intermediate types. The results of these trials, if utilized meticulously not only aid to develop promising cultivars but also to reduce the cost of cultivation in rice production.

Based on the GYEI values few promising cultivars identified in different groups is furnished below:

Table. 4.1(r): Identification of cultures based on the GYEI values in different groups of cultivars.

AVT-2 EH (Irrigated)			AVT-2 UH (Irrigated)			AVT-2 E-TP			AVT-2 E-DS		
Nutrient-Levels	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**
F2	IET 28200	1.03	**F2**	IET 28230	1.33	**F2**	IET 26790	1.10	**F2**	IET 28241	0.95
	IET 28206	0.90		Bhalum 1	0.77		IET 28329	1.20		IET 28248	1.01
	Shalimar Rice-3	0.63		Sukardhan 1	1.21		IET 28354	1.14		Sahbhagidhan	1.08
	Vivekdhan-86	1.78		Vivek Dhan 154	0.75		IET 28343	1.02		Local Check	1.01
	VL Dhan-85	0.98		Local check	1.00		IET 28358	1.13			
	Local Check	1.09					IET 28332	0.95			
							IET 28356	0.92			
							IET 28115	1.09			
							IET 28366	0.94			
							IET 26898	1.02			
							CO-51 (NC)	0.87			
							PR 124 (N)	1.02			
							Narendra 97(E)	0.69			
							Luit (NE)	1.35			
							Sahbhagidhan (C&W)	0.87			
							MTU 1153 (S)	1.29			
							US 314 (Hybrid)	1.28			
							Local Check	0.78			
	Mean	**1.07**		**Mean**	**1.01**		**Mean**	**1.04**		**Mean**	**1.01**

Table. 4.1(r): Cntd…

AVT-2-IME (TP)			AVT-2 IM (TP)			AVT-2 Late			AVT 2 - RSL		
Nutrient-Level	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**
F2	IET 28396	1.21	**F2**	IET 28160 (H)	1.18	**F2**	IET 28501	1.20	**F2**	IET-29026	0.85
	IET 28032 ®	1.04		IET 27686	0.97		IET 28538	1.15		IET-27538	1.30
	IET 28033 (R)	1.00		NC- NDR 359	1.15		IET 28544	0.90		IET-29031	0.69
	Gondhra Bidhan-3	1.31		PR121	0.90		IET 29209	1.00		IET-29032	0.88
	PR 113	1.14		CR Dhan 300	0.72		Swarna	1.11		IET-26744	0.92
	Lalat	0.99		Karma Mahsuri	0.86		NDR 8002	0.82		IET-28281	1.00
	Karjat 7	0.20		Akshaydhan	0.89		Pushyami	1.04		IET-27547	1.10
	MTU 1010	0.83		Jaya	0.89		PA 6444	1.05		Swarna sub-1	1.01
	IR64 sub1 (RP)	0.16		Hybrid check	1.19		Local check	0.95		Dhanrasi	1.68
	Local Check	1.20		Local check	1.09					Pooja	1.21
										Savithri	0.98
										Local check	0.75
	Mean	**0.91**		**Mean**	**0.98**		**Mean**	**1.03**		**Mean**	**1.03**

Table. 4.1(r): Cntd…

AVT 2 -CSTVT			AL & ISTVT			AVT-2 Aerobic			AVT-2 Biofortified		
Nutrient-Level	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**
F2	IET 27847 (H)	1.03	**F2**	IET 28606	1.04	**F2**	IET 27937	0.80	**F2**	IET 28714	1.07
	IET 27051	1.37		IET 28608	0.98		IET 28631	1.02		IET 27984	1.03
	CSR-10	0.79		IET 27823	0.93		IET 28645	1.13		BPT 5204	0.84
	Jaya	0.66		IET 27807	0.93		IET 27951	1.05		IR 64	0.95
	Hybrid Check	0.64		CSR 36	0.69		CR Dhan 202	0.58		Local Check	1.42
	Local Check - GNR 19	1.05		CSR 10	0.35		AAUDR-1	0.61			
				FL 478	0.96		MAS 946-1	0.74			
				CSR 23	0.67		Local Check	0.94			
				Local check	1.06						
	Mean	**0.92**		**Mean**	**0.85**		**Mean**	**0.86**		**Mean**	**1.06**

Table. 4.1(r): Cntd…

AVT-2 MS			AVT-2 BT		
Nutrient-Level	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**
F2	IET 28757	0.98	**F2**	1901	1.09
	IET 28746	1.07		1902	1.23
	IET 28730	1.17		1903	0.70
	WGL 14 (NC 1)	1.01		1904	0.93
	BPT 5204 (NC 2)	0.95		1905	1.07
	Improved Samba Mahsuri (N, E & C)	0.93		1906	0.75
	Karjat-6 (W)	0.71		1907	1.20
	Local Check	1.16		1908	1.19
				1910	0.81
				1912	0.66
				Local Check	1.28
	Mean	**1.00**		**Mean**	**1.02**

Table. 4.1(r): Cntd…

IVT - LNT									Mean GYEI of N2,N3&N4	Rank
Nutrient-Level	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**	**Nutrient-Level**	**Varieties**	**GYEI**		
N2	29567	0.99	**N3**	29567	1.01	**N4**	29567	1.07	**1.02**	**22**
	29573	1.00		29573	1.03		29573	1.31	**1.11**	**16**
	29576	1.19		29576	1.17		29576	1.41	**1.26**	**6**
	29577	1.25		29577	1.24		29577	1.43	**1.31**	**1**
	29564	1.22		29564	1.23		29564	1.46	**1.30**	**2**
	28084	1.25		28084	1.21		28084	1.18	**1.21**	**10**
	29579	1.06		29579	0.89		29579	0.94	**0.96**	**26**
	29584	1.38		29584	1.28		29584	1.01	**1.22**	**9**
	29583	1.37		29583	1.39		29583	1.05	**1.27**	**5**
	29581	1.05		29581	1.00		29581	0.95	**1.00**	**23**
	29574	0.74		29574	0.72		29574	0.78	**0.75**	**37**
	29568	0.87		29568	0.88		29568	0.94	**0.90**	**28**
	29578	1.12		29578	1.11		29578	1.28	**1.17**	**13**
	29572	0.76		29572	0.79		29572	0.47	**0.67**	**41**
	30255	1.17		30255	1.14		30255	0.83	**1.05**	**18**
	30256	0.87		30256	0.84		30256	0.51	**0.74**	**38**
	RP Bio 226	0.75		RP Bio 226	0.76		RP Bio 226	0.80	**0.77**	**34**
	30257	0.86		30257	0.92		30257	0.73	**0.84**	**30**
	30258	1.08		30258	1.08		30258	0.92	**1.03**	**21**
	30259	0.93		30259	0.96		30259	1.25	**1.05**	**19**
	30260	0.83		30260	0.83		30260	0.76	**0.81**	**33**
	30261	1.11		30261	1.16		30261	1.55	**1.28**	**4**
	MTU 1121 (RP)	1.13		MTU 1121 (RP)	1.10		MTU 1121 (RP)	1.16	**1.13**	**15**
	30262	0.89		30262	0.82		30262	0.84	**0.85**	**29**
	30263	0.70		30263	0.69		30263	0.77	**0.72**	**40**
	Rasi (Check)	1.10		Rasi (Check)	1.41		Rasi (Check)		**1.25**	**7**
	30264	0.61		30264	0.58		30264	0.64	**0.61**	**42**
	30265	1.14		30265	0.99		30265	1.48	**1.20**	**11**
	30266	1.06		30266	1.19		30266	1.33	**1.20**	**12**
	30267	0.98		30267	0.98		30267	1.03	**0.99**	**24**
	30268	0.97		30268	0.97		30268	0.81	**0.92**	**27**
	30269	0.80		30269	0.89		30269	1.21	**0.97**	**25**
	Varadhan (Check)	0.79		Varadhan (Check)	0.83		Varadhan (Check)	0.82	**0.82**	**32**
	30270	1.17		30270	1.17		30270	1.36	**1.23**	**8**
	30271	0.89		30271	0.90		30271	0.52	**0.77**	**35**
	30272	0.86		30272	0.88		30272	0.46	**0.73**	**39**
	30273	1.11		30273	1.13		30273	1.23	**1.16**	**14**
	TellaHamsa (Check)	0.86		TellaHamsa (Check)	0.83		TellaHamsa (Check)	0.76	**0.82**	**31**
	30274	0.84		30274	0.89		30274	0.55	**0.76**	**36**
	BPT 5204 (Sensitive	1.05		BPT 5204 (Sensitive	1.05		BPT 5204 (Sensitive		**1.05**	**20**
	30275	1.24		30275	1.24		30275	0.84	**1.11**	**17**
	Swarna	1.29		Swarna	1.20		Swarna	1.37	**1.29**	**3**
	Mean	**1.01**		**Mean**	**1.01**		**Mean**	**1.00**	**1.00**	

Table. 4.1(r): Cntd…

AVT-1 LPT									Mean GYEl of N2,N3&N4	Rank
Nutrient-Level	**Varieties**	**GYEl**	**Nutrient-Level**	**Varieties**	**GYEl**	**Nutrient-Level**	**Varieties**	**GYEl**		
P2	28816	1.02	**P3**	28816	1.05	**P4**	28816	1.09	**1.05**	**5**
	BPT 5204 (Sensitive Check)	0.87		BPT 5204 (Sensitive Check)	0.90		BPT 5204 (Sensitive Check)	0.99	**0.92**	**8**
	28818	1.14		28818	1.20		28818	1.16	**1.17**	**3**
	MTU 1121 (RP)	1.18		MTU 1121 (RP)	1.15		MTU 1121 (RP)	1.16	**1.16**	**4**
	27641	1.23		27641	1.26		27641	1.39	**1.30**	**2**
	Swarna (Positive Check)	1.09		Swarna (Positive Check)	1.02		Swarna (Positive Check)	0.79	**0.96**	**7**
	28066 (R)	1.00		28066 (R)	0.97		28066 (R)	1.08	**1.02**	**6**
	MTU 1010 (RP)	0.86		MTU 1010 (RP)	0.83		MTU 1010 (RP)	0.60	**0.76**	**10**
	28065 (R)	0.70		28065 (R)	0.70		28065 (R)	0.87	**0.76**	**11**
	Improved Samba Mahsuri (Negative Check)	0.79		Improved Samba Mahsuri (Negative Check)	0.79		Improved Samba Mahsuri (Negative Check)	0.81	**0.80**	**9**
	Rasi (Positive Check)	0.73		Rasi (Positive Check)	0.69		Rasi (Positive Check)		**0.71**	**12**
	28821 (R)	1.42		28821 (R)	1.48		28821 (R)		**1.45**	**1**
	Mean	**1.00**		**Mean**	**1.00**		**Mean**	**0.99**	**1.00**	

Table. 4.1(r): Cntd…

IVT - LPT									Mean GYEI of N2,N3&N4	Rank
Nutrient-Level	Varieties	GYEI	Nutrient-Level	Varieties	GYEI	Nutrient-Level	Varieties	GYEI		
P2	29547	1.06	P3	29547	1.11	P4	29547	1.02	**1.06**	**13**
	29549	1.06		29549	1.09		29549	0.84	**1.00**	**18**
	29554	0.94		29554	0.82		29554	0.90	**0.88**	**35**
	29546	0.88		29546	0.92		29546	0.90	**0.90**	**34**
	30230	1.37		30230	1.34		30230	1.30	**1.33**	**1**
	29560	1.25		29560	1.18		29560	1.16	**1.20**	**7**
	29558	1.03		29558	1.05		29558	1.15	**1.07**	**12**
	30231	1.01		30231	1.09		30231	0.93	**1.01**	**17**
	30232	1.32		30232	1.28		30232	1.22	**1.27**	**3**
	30233	0.80		30233	0.86		30233	0.87	**0.84**	**37**
	30234	0.84		30234	0.85		30234	0.80	**0.83**	**38**
	30235	1.10		30235	1.26		30235	1.59	**1.31**	**2**
	30236	0.77		30236	0.76		30236	0.77	**0.77**	**39**
	30237	0.92		30237	0.93		30237	0.77	**0.87**	**36**
	30238	0.93		30238	0.91		30238	1.05	**0.97**	**21**
	30239	0.87		30239	0.86		30239	1.07	**0.94**	**27**
	29552	1.02		29552	1.00		29552	0.96	**0.99**	**19**
	29548	0.95		29548	1.08		29548	0.74	**0.92**	**29**
	Rasi (Positive Check)	1.25		**Rasi (Positive Check)**	0.99		**Rasi (Positive Check)**		**1.12**	**9**
	30240	1.15		30240	1.20		30240	1.26	**1.20**	**6**
	30241	0.97		30241	0.95		30241	1.13	**1.01**	**16**
	30242	1.34		30242	1.26		30242	1.18	**1.26**	**4**
	30243	0.86		30243	0.79		30243	1.09	**0.91**	**32**
	Swarna (Positive Check)	0.95		**Swarna (Positive Check)**	0.85		**Swarna (Positive Check)**	1.04	**0.95**	**23**
	30244	0.97		30244	0.98		30244	1.11	**1.02**	**14**
	30245	1.08		30245	0.97		30245	1.01	**1.02**	**15**
	30246	0.69		30246	0.72		30246	0.74	**0.72**	**41**
	29555	0.74		29555	0.73		29555	0.77	**0.75**	**40**
	29563	0.93		29563	1.03		29563	0.86	**0.94**	**25**
	Improved Samba Mahsuri (Negative	0.89		**Improved Samba Mahsuri**	0.92		**Improved Samba Mahsuri**	1.00	**0.94**	**26**
	30247	1.12		30247	1.26		30247	1.23	**1.20**	**5**
	29562	0.65		29562	0.62		29562		**0.63**	**42**
	30248	1.09		30248	1.11		30248	1.11	**1.10**	**10**
	30249	0.98		30249	0.99		30249	0.79	**0.92**	**30**
	30250	1.04		30250	0.95		30250	0.76	**0.92**	**31**
	30251	0.91		30251	0.98		30251	0.83	**0.91**	**33**
	30252	1.08		30252	1.09		30252	0.80	**0.99**	**20**
	30253	1.15		30253	1.06		30253	1.09	**1.10**	**11**
	BPT 5204 (Sensitive Check)	0.90		**BPT 5204 (Sensitive Check)**	0.90		**BPT 5204 (Sensitive Check)**	0.97	**0.92**	**28**
	30254	0.96		30254	0.96		30254		**0.96**	**22**
	IR 64 (RP)	1.01		**IR 64 (RP)**	0.96		**IR 64 (RP)**	0.85	**0.94**	**24**
	MTU 1121 (RP)	1.07		**MTU 1121 (RP)**	1.08		**MTU 1121 (RP)**	1.29	**1.15**	**8**
	Mean	**1.00**		**Mean**	**0.99**		**Mean**	**1.00**	**1.00**	

Table. 4.1. (s): Identification of cultures performing better with low level of Nutrients application based on the % yield reduction at 50 % of RDN and 100% of RDN

Group	Group	Entry No	50	100	Diffrence -50	(%) Reduction
EH	**V1**	IET 28200	4.44	4.99	0.55	11.02
	V2	IET 28206	4.09	4.74	0.66	13.84
	V3	Shalimar Rice-3	3.43	3.95	0.52	13.09
	V4	Vivekdhan-86	5.95	6.43	0.48	7.39
	V5	VL Dhan-85	4.25	4.98	0.74	14.76
	V6	Local Check	4.59	5.11	0.52	10.19
UH	**V1**	IET 28230	2.70	3.43	0.73	21.31
	V2	Bhalum 1	2.18	2.47	0.29	11.76
	V3	Sukardhan 1	2.75	3.07	0.32	10.44
	V4	Vivek Dhan 154	2.06	2.53	0.48	18.77
	V5	Local check	2.45	2.84	0.39	13.58
E(TP)	**V1**	IET 26790	4.15	4.83	0.68	13.98
	V2	IET 28329	4.20	5.20	1.00	19.21
	V3	IET 28354	4.22	4.93	0.71	14.48
	V4	IET 28343	3.86	4.83	0.97	20.05
	V5	IET 28358	3.99	5.20	1.22	23.40
	V6	IET 28332	3.74	4.65	0.91	19.51
	V7	IET 28356	3.71	4.56	0.85	18.69
	V8	IET 28115	4.03	4.92	0.89	18.10
	V9	IET 28366	3.81	4.50	0.69	15.38
	V10	IET 26898	3.88	4.80	0.92	19.13
	V11	CO-51 (NC)	3.49	4.54	1.04	23.03
	V12	PR 124 (N)	3.92	4.77	0.85	17.88
	V13	Narendra 97(E)	3.10	4.09	0.99	24.27
	V14	Luit (NE)	4.60	5.37	0.77	14.34
	V15	Sahbhagidhan (C&W)	3.71	4.27	0.57	13.26
	V16	MTU 1153 (S)	4.40	5.37	0.97	18.06
	V17	US 314 (Hybrid)	4.40	5.30	0.90	16.98
	V18	Local Check	3.39	4.21	0.82	19.40
E(DS)	**V1**	IET 28241	3.13	3.49	0.36	10.22
	V2	IET 28248	3.30	3.54	0.24	6.71
	V3	Sahbhagidhan	3.33	3.76	0.43	11.50
	V4	Local Check	3.14	3.70	0.56	15.12

Group	Group	Entry No	50	100	Diffrence -50	(%) Reduction
IME (TP)	**V1**	IET 28396	4.30	5.09	0.78	15.39
	V2	IET 28032 ®	4.02	4.69	0.67	14.37
	V3	IET 28033 (R)	3.98	4.58	0.60	13.05
	V4	Gondhra Bidhan-3	4.47	5.32	0.85	15.98
	V5	PR 113	4.17	4.94	0.77	15.55
	V6	Lalat	3.87	4.64	0.77	16.64
	V7	Karjat 7	1.98	1.87	-0.11	-6.07
	V8	MTU 1010	3.54	4.24	0.70	16.50
	V9	IR64 sub1 (RP)	1.59	1.86	0.27	14.74
	V10	Local Check	4.41	4.92	0.51	10.39

Table. 4.1. (s): Cntd….

Group	Group	Entry No	50	100	Diffrence -50	(%) Reduction
IM (TP)	**V1**	IET 28160 (H)	4.38	5.40	1.03	19.00
	V2	IET 27686	3.99	4.89	0.90	18.45
	V3	NC- NDR 359	4.34	5.31	0.97	18.23
	V4	PR121	3.83	4.73	0.89	18.92
	V5	CR Dhan 300	3.53	4.07	0.54	13.27
	V6	Karma Mahsuri	3.78	4.59	0.80	17.52
	V7	Akshaydhan	4.05	4.41	0.36	8.16
	V8	Jaya	3.89	4.58	0.70	15.17
	V9	Hybrid check	4.46	5.34	0.88	16.40
	V10	Local check	4.26	5.12	0.86	16.76

Group	Group	Entry No	50	100	Diffrence -50	(%) Reduction
Late	**V1**	IET 28501	4.74	5.54	0.81	14.54
	V2	IET 28538	4.73	5.31	0.58	10.97
	V3	IET 28544	4.00	4.94	0.94	19.04
	V4	IET 29209	4.26	5.14	0.88	17.07
	V5	Swarna	4.35	5.55	1.20	21.61
	V6	NDR 8002	3.78	4.73	0.95	20.16
	V7	Pushyami	4.38	5.19	0.81	15.66
	V8	PA 6444	4.13	5.54	1.41	25.45
	V9	Local check	4.20	4.95	0.75	15.08

Group	Group	Entry No	50	100	Diffrence -50	(%) Reduction
RSL	**V1**	IET-29026	3.39	4.73	1.34	28.29
	V2	IET-27538	4.17	5.86	1.69	28.88
	V3	IET-29031	2.94	4.43	1.49	33.65
	V4	IET-29032	3.39	4.89	1.50	30.66
	V5	IET-26744	3.35	5.14	1.79	34.84
	V6	IET-28281	3.58	5.23	1.65	31.56
	V7	IET-27547	3.85	5.36	1.50	28.07
	V8	Swarna sub-1	3.68	5.17	1.49	28.77
	V9	Dhanrasi	5.10	6.19	1.09	17.61
	V10	Pooja	4.35	5.24	0.89	16.98
	V11	Savithri	3.89	4.74	0.86	18.04
	V12	Local check	2.98	4.70	1.72	36.64

Group	Group	Entry No	50	100	Diffrence -50	(%) Reduction
CSTVT	**V1**	IET 27847 (H)	3.20	4.20	1.00	23.73
	V2	IET 27051	3.84	4.67	0.83	17.71
	V3	CSR-10	2.83	3.64	0.81	22.25
	V4	Jaya	2.60	3.35	0.75	22.31
	V5	Hybrid Check	3.08	2.72	-0.36	-13.24
	V6	Local Check - GNR 19	3.35	4.12	0.77	18.69

Group	Group	Entry No	50	100	Diffrence -50	(%) Reduction
AL&ISTVT	**V1**	IET 28606	2.90	3.75	0.85	22.67
	V2	IET 28608	2.72	3.77	1.05	27.94
	V3	IET 27823	2.73	3.55	0.82	23.17
	V4	IET 27807	2.70	3.59	0.89	24.72
	V5	CSR 36	2.49	2.87	0.38	13.24
	V6	CSR 10	1.91	1.89	-0.02	-1.06
	V7	FL 478	2.82	3.55	0.73	20.66
	V8	CSR 23	2.72	2.55	-0.17	-6.67
	V9	Local check	2.89	3.83	0.94	24.61

Table. 4.1. (s): Cntd….

Group	Group	Entry No	50	100	Diffrence -50	(%) Reduction
Aerobic	**V1**	IET 27937	3.35	4.03	0.68	16.87
	V2	IET 28631	3.74	4.61	0.87	18.88
	V3	IET 28645	3.99	4.77	0.78	16.35
	V4	IET 27951	3.89	4.55	0.66	14.53
	V5	CR Dhan 202	2.83	3.47	0.64	18.44
	V6	AAUDR-1	2.78	3.72	0.94	25.27
	V7	MAS 946-1	3.28	3.82	0.54	14.14
	V8	Local Check	3.67	4.31	0.65	14.99

Group	Group	Entry No	50	100	Diffrence -50	(%) Reduction
Biofortified	**V1**	IET 28714	4.17	5.31	1.14	21.44
	V2	IET 27984	4.07	5.24	1.17	22.32
	V3	BPT 5204	3.75	4.65	0.90	19.36
	V4	IR 64	3.91	5.03	1.12	22.31
	V5	Local Check	4.95	5.97	1.03	17.17

Group	Group	Entry No	50	100	Diffrence -50	(%) Reduction
MS	**V1**	IET 28757	3.90	5.35	1.45	27.17
	V2	IET 28746	4.10	5.55	1.45	26.10
	V3	IET 28730	4.41	5.64	1.23	21.75
	V4	WGL 14 (NC 1)	3.99	5.40	1.40	26.03
	V5	BPT 5204 (NC 2)	3.92	5.15	1.22	23.77
	V6	Improved Samba Mahsuri (N, E & C)	3.87	5.11	1.23	24.12
	V7	Karjat-6 (W)	3.10	4.92	1.82	37.03
	V8	Local Check	4.40	5.65	1.25	22.17

Group	Group	Entry No	50	100	Diffrence -50	(%) Reduction
BT	**V1**	1901	3.43	4.81	1.39	28.83
	V2	1902	3.77	4.94	1.17	23.63
	V3	1903	2.85	3.72	0.87	23.47
	V4	1904	3.19	4.42	1.24	27.94
	V5	1905	3.50	4.62	1.12	24.28
	V6	1906	2.89	3.91	1.02	26.02
	V7	1907	3.72	4.87	1.15	23.56
	V8	1908	3.69	4.89	1.21	24.68
	V9	1910	3.00	4.07	1.07	26.34
	V10	1912	2.25	4.42	2.17	49.10
	V11	Local Check	4.00	4.81	0.81	16.83

Table. 4.1. (s): Cntd….

Group	Group	Entry No	0% RDN	50% RDN	100% RDN	150% RDN	0-50% difference	Reduction %	50-100% difference	Reduction %	100-150% difference	Reduction %	Mean Grain Yield difference	Mean Reduction %
IVT LNT	V1	29567	3.37	3.90	4.63	5.37	0.53	13.64	0.73	15.74	0.74	13.81	0.67	14.40
	V2	29573	3.37	3.96	4.72	6.56	0.60	15.04	1.35	28.62	3.19	48.66	1.71	30.77
	V3	29576	3.60	4.38	5.00	6.63	0.78	17.72	1.40	27.92	3.03	45.64	1.73	30.43
	V4	29577	3.76	4.42	5.08	6.43	0.65	14.80	1.31	25.83	2.67	41.46	1.54	27.37
	V5	29564	3.79	4.28	5.00	6.50	0.49	11.44	1.20	24.11	2.71	41.66	1.47	25.74
	V6	28084	3.74	4.44	5.00	5.32	0.70	15.71	1.26	25.14	1.58	29.62	1.18	23.49
	V7	29579	2.94	4.82	4.66	5.42	1.89	39.11	1.72	36.95	2.49	45.85	2.03	40.64
	V8	29584	4.00	4.60	4.92	4.26	0.59	12.88	0.92	18.65	0.26	6.01	0.59	12.51
	V9	29583	3.82	4.77	5.61	4.67	0.95	19.96	1.80	31.98	0.85	18.24	1.20	23.40
	V10	29581	3.43	4.10	4.48	4.70	0.67	16.31	1.05	23.45	1.27	27.06	1.00	22.28
	V11	29574	2.21	4.47	5.02	5.99	2.26	50.62	2.82	56.08	3.79	63.19	2.95	56.63
	V12	29568	3.02	3.84	4.49	5.27	0.83	21.54	1.47	32.80	2.25	42.77	1.52	32.37
	V13	29578	3.44	4.35	5.00	6.31	0.91	20.89	1.56	31.24	2.87	45.52	1.78	32.55
	V14	29572	3.00	3.40	4.05	2.67	0.40	11.83	1.06	26.09	-0.33	-12.21	0.38	8.57
	V15	30255	3.65	4.27	4.84	3.87	0.63	14.69	1.19	24.62	0.22	5.79	0.68	15.03
	V16	30256	3.04	3.79	4.27	2.86	0.75	19.73	1.23	28.74	-0.18	-6.43	0.60	14.01
	V17	RP Bio 226	2.84	3.53	4.14	4.78	0.69	19.49	1.29	31.27	1.94	40.54	1.31	30.43
	V18	30257	3.31	3.45	4.31	3.72	0.15	4.28	1.00	23.26	0.41	11.13	0.52	12.89
	V19	30258	3.53	4.10	4.71	4.43	0.57	13.87	1.18	25.10	0.90	20.36	0.88	19.77
	V20	30259	3.23	3.83	4.60	6.56	0.61	15.81	1.38	29.92	3.33	50.82	1.77	32.19
	V21	30260	2.96	3.73	4.34	4.32	0.77	20.69	1.38	31.82	1.36	31.48	1.17	28.00
	V22	30261	3.38	4.39	5.31	7.75	1.01	22.96	1.92	36.27	4.37	56.36	2.43	38.53
	V23	MTU 1121 (RP)	3.49	4.30	4.88	5.63	0.82	18.96	1.40	28.57	2.14	38.05	1.45	28.53
	V24	30262	2.98	3.97	4.27	4.78	0.98	24.81	1.28	30.11	1.80	37.62	1.36	30.85
	V25	30263	2.74	3.40	3.90	4.73	0.65	19.20	1.15	29.55	1.99	41.99	1.26	30.25
	V26	Rasi (Check)	3.92	3.74	5.54		-0.18	-4.81	1.62	29.18	-3.92		-0.83	12.18
	V27	30264	2.23	3.62	3.99	4.83	1.39	38.50	1.76	44.14	2.60	53.88	1.92	45.51
	V28	30265	3.34	4.57	4.57	7.50	1.23	26.93	1.23	26.96	4.16	55.49	2.21	36.46
	V29	30266	3.63	3.91	5.08	6.19	0.28	7.12	1.45	28.56	2.56	41.39	1.43	25.69
	V30	30267	3.24	4.01	4.64	5.38	0.76	19.06	1.39	30.04	2.14	39.70	1.43	29.60
	V31	30268	3.26	3.96	4.59	4.18	0.70	17.63	1.32	28.85	0.92	21.96	0.98	22.81
	V32	30269	3.12	3.43	4.41	6.56	0.31	9.10	1.29	29.32	3.44	52.47	1.68	30.30
	V33	Varadhan (Check)	2.94	3.59	4.36	4.73	0.64	17.95	1.42	32.50	1.79	37.76	1.28	29.40
	V34	30270	3.62	4.30	4.98	6.35	0.68	15.77	1.36	27.31	2.73	42.99	1.59	28.69
	V35	30271	3.26	3.64	4.27	2.70	0.38	10.43	1.01	23.64	-0.56	-20.81	0.28	4.42
	V36	30272	3.12	3.67	4.34	2.47	0.55	15.08	1.22	28.06	-0.65	-26.32	0.37	5.61
	V37	30273	3.52	4.20	4.98	5.93	0.68	16.29	1.46	29.35	2.41	40.71	1.52	28.78
	V38	TellaHamsa (Check)	3.03	3.78	4.24	4.21	0.75	19.78	1.20	28.39	1.18	27.93	1.04	25.37
	V39	30274	3.49	3.19	3.92	2.69	-0.30	-9.33	0.43	10.94	-0.80	-29.65	-0.22	-9.34
	V40	BPT 5204 (Sensitive Check)	3.53	3.94	4.56		0.41	10.32	1.03	22.56	-3.53		-0.70	16.44
	V41	30275	4.04	4.09	4.73	3.53	0.05	1.28	0.69	14.68	-0.51	-14.38	0.08	0.53
	V42	Swarna	3.67	4.67	5.06	6.33	1.01	21.51	1.40	27.58	2.66	42.06	1.69	30.38

Table. 4.1. (s): Cntd….

Group	Group	Entry No	0% RDP	50% RDP	100% RDP	150% RDP	0-50% difference	Reduction %	50-100% difference	Reduction %	100-150% difference	Reduction %	Mean Grain Yield difference	Mean Reduction %
AVT 1 LPT	**V1**	28816	4.34	4.44	5.27	6.31	0.10	2.18	0.83	15.78	1.04	16.48	0.66	11.48
	V2	BPT 5204 (Sensitive Check)	4.02	4.09	4.86	6.20	0.07	1.71	0.84	17.25	2.18	35.13	1.03	18.03
	V3	28818	4.67	4.61	5.60	6.25	-0.06	-1.34	0.93	16.59	1.58	25.23	0.81	13.49
	V4	MTU 1121 (RP)	4.71	4.73	5.34	6.17	0.02	0.40	0.63	11.85	1.46	23.69	0.70	11.98
	V5	27641	4.86	4.80	5.67	7.17	-0.06	-1.16	0.81	14.34	2.31	32.24	1.02	15.14
	V6	Swarna (Positive Check)	4.39	4.70	5.05	4.50	0.31	6.65	0.67	13.24	0.12	2.56	0.37	7.48
	V7	28066 (R)	4.27	4.44	4.97	6.32	0.17	3.78	0.70	13.99	2.05	32.38	0.97	16.72
	V8	MTU 1010 (RP)	4.17	3.92	4.33	3.61	-0.25	-6.29	0.17	3.87	-0.56	-15.42	-0.21	-5.95
	V9	28065 (R)	3.54	3.75	4.31	6.14	0.21	5.51	0.76	17.73	2.60	42.29	1.19	21.85
	V10	Improved Samba Mahsuri (Negative Check)	3.86	3.88	4.48	5.28	0.02	0.64	0.62	13.91	1.42	26.96	0.69	13.84
	V11	Rasi (Positive Check)	3.53	3.91	4.27		0.38	9.72	0.74	17.23	-3.53		-0.81	13.48
	V12	28821 (R)	5.64	4.75	5.72		-0.89	-18.67	0.09	1.50	-5.64		-2.15	-8.58

Table. 4.1. (s): Cntd….

Group	Group	Entry No	0% RDP	50% RDP	100% RDP	150% RDP	0-50% difference	Reduction %	50-100% difference	Reduction %	100-150% difference	Reduction %	Mean Grain Yield difference	Mean Reduction %
IVT LPT	V1	29547	4.84	4.14	5.30	5.06	-0.71	-17.05	1.16	21.88	-0.23	-4.64	0.07	0.06
	V2	29549	5.03	4.00	5.01	3.99	-1.03	-25.80	-0.02	-0.36	-1.04	-26.02	-0.70	-17.39
	V3	29554	4.35	4.08	4.33	4.97	-0.27	-6.66	-0.02	-0.38	0.62	12.47	0.11	1.81
	V4	29546	4.50	3.72	4.73	4.77	-0.78	-20.91	0.23	4.87	0.27	5.70	-0.09	-3.45
	V5	30230	5.43	4.79	5.67	5.73	-0.64	-13.41	0.24	4.27	0.30	5.24	-0.03	-1.30
	V6	29560	5.03	4.71	5.41	5.55	-0.32	-6.75	0.38	6.98	0.52	9.41	0.19	3.21
	V7	29558	4.46	4.36	5.43	6.16	-0.11	-2.46	0.96	17.74	1.70	27.53	0.85	14.27
	V8	30231	4.64	4.12	5.40	4.80	-0.52	-12.63	0.75	13.97	0.16	3.25	0.13	1.53
	V9	30232	5.08	4.93	5.79	5.74	-0.15	-3.12	0.71	12.28	0.66	11.46	0.41	6.87
	V10	30233	4.20	3.62	4.69	4.96	-0.58	-16.08	0.49	10.39	0.76	15.24	0.22	3.19
	V11	30234	4.10	3.87	4.79	4.70	-0.24	-6.08	0.69	14.34	0.60	12.70	0.35	6.98
	V12	30235	5.07	4.11	5.72	7.50	-0.97	-23.51	0.64	11.25	2.43	32.37	0.70	6.71
	V13	30236	3.89	3.77	4.51	4.74	-0.12	-3.27	0.62	13.76	0.85	17.97	0.45	9.49
	V14	30237	4.34	4.03	4.94	4.26	-0.31	-7.69	0.60	12.10	-0.08	-1.83	0.07	0.86
	V15	30238	4.32	4.10	4.87	5.83	-0.21	-5.23	0.55	11.37	1.51	25.93	0.62	10.69
	V16	30239	4.27	3.88	4.63	6.03	-0.39	-10.10	0.36	7.73	1.76	29.15	0.57	8.93
	V17	29552	4.62	4.20	5.00	4.98	-0.42	-10.00	0.38	7.63	0.36	7.23	0.11	1.62
	V18	29548	4.51	3.98	5.52	3.94	-0.54	-13.53	1.01	18.25	-0.57	-14.57	-0.03	-3.28
	V19	Rasi (Positive Check)	4.98	4.78	4.60		-0.19	-4.08	-0.37	-8.07	-4.98		-1.85	-6.08
	V20	30240	5.11	4.26	5.41	5.89	-0.85	-19.95	0.29	5.41	0.78	13.17	0.07	-0.46
	V21	30241	4.64	3.98	4.70	5.81	-0.67	-16.73	0.05	1.16	1.17	20.10	0.19	1.51
	V22	30242	5.50	4.64	5.30	5.16	-0.86	-18.53	-0.20	-3.70	-0.34	-6.55	-0.46	-9.60
	V23	30243	3.99	4.09	4.54	6.53	0.10	2.43	0.55	12.06	2.54	38.84	1.06	17.77
	V24	Swarna (Positive Check)	4.19	4.30	4.68	5.94	0.11	2.65	0.49	10.55	1.75	29.46	0.79	14.22
	V25	30244	4.62	3.99	4.91	5.76	-0.63	-15.73	0.29	5.92	1.14	19.84	0.27	3.34
	V26	30245	4.73	4.31	4.75	5.13	-0.43	-9.88	0.02	0.34	0.40		0.00	-4.77
	V27	30246	3.73	3.52	4.44	4.74	-0.21	-5.96	0.71	16.00	1.01	21.35	0.50	10.47
	V28	29555	3.73	3.78	4.53	4.94	0.04	1.09	0.79	17.51	1.21	24.41	0.68	14.34
	V29	29563	4.56	3.87	5.22	4.50	-0.70	-18.03	0.66	12.58	-0.06	-1.38	-0.03	-2.28
	V30	Improved Samba Mahsuri (Negative Check)	4.17	4.05	5.08	5.77	-0.12	-2.97	0.90	17.79	1.60	27.69	0.79	14.17
	V31	30247	4.73	4.48	6.14	6.25	-0.25	-5.67	1.41	22.90	1.52	24.26	0.89	13.83
	V32	29562	3.46	3.55	4.12		0.09	2.54	0.66	16.02	-3.46		-0.90	9.28
	V33	30248	4.73	4.36	5.41	5.62	-0.37	-8.45	0.68	12.59	0.89	15.80	0.40	6.65
	V34	30249	4.74	3.93	4.84	3.97	-0.81	-20.66	0.10	1.99	-0.77	-19.45	-0.50	-12.71
	V35	30250	4.60	4.28	4.75	3.97	-0.32	-7.51	0.15	3.23	-0.63	-15.82	-0.27	-6.70
	V36	30251	4.38	3.94	5.15	4.53	-0.44	-11.22	0.77	14.87	0.15	3.22	0.16	2.29
	V37	30252	4.93	4.14	5.11	3.88	-0.79	-19.13	0.18	3.45	-1.05	-27.11	-0.56	-14.26
	V38	30253	4.73	4.60	5.18	5.53	-0.14	-3.03	0.44	8.52	0.80	14.39	0.37	6.63
	V39	BPT 5204 (Sensitive Check)	4.10	4.15	5.07	5.68	0.05	1.24	0.97	19.08	1.58	27.82	0.87	16.05
	V40	30254	4.49	4.05	4.94		-0.44	-10.87	0.46	9.22	-4.49		-1.49	-0.82
	V41	IR 64 (RP)	4.30	4.45	5.18	4.72	0.16	3.53	0.88	17.04	0.42	8.98	0.49	9.85
	V42	MTU 1121 (RP)	4.58	4.44	5.45	6.77	-0.13	-3.03	0.88	16.05	2.19	32.38	0.98	15.13

CULTURAL MANAGEMET TRIALS

4.2. CULTURAL MANAGEMENT TRIALS (CMTs)

4.2.1. Development of package of practices for mechanized transplanting

Mechanical transplanting of rice is the process of transplanting young rice seedlings, which have been grown in a mat nursery, using a paddy transplanter. In conventional manual transplanting practice, 8-12 labourers are required to transplant one acre. The process is also very time consuming and difficult. However, if self-propelled paddy transplanters are used, three people can transplant up to three to four acres in one day. This has great advantages in areas where farm labour is scarce and expensive. Hence the present trial is constituted to enhance the productivity of the mechanized transplanted rice with the following objectives: 1) To enhance the productivity of mechanized transplanted rice and 2) To identify the suitable agronomic management practices to enhance the efficiency of mechanized transplanting. The trial was conducted at 5 locations (**Chiplima, Ludhiana, Rajendranagar, Warangal and Aduthurai**). Split plot design was adopted with 5 main plots of crop establishments {M_1: Normal Planting time Mechanical Transplanting (15 days seedlings and recommended spacing); M_2: Delayed Planting time (15 days late) Mechanical Transplanting (15 days seedlings and recommended spacing); M_3: Manual transplanting – Normal time (25 days old seedlings); M_4: Manual transplanting-Delayed sowing time (25 days old seedlings) and 3 subplots consists of local latest released rice varieties. However, data from Aduthurai center was statistically analysed in RBD. The results were summarized and presented in **Table 4.2.1** and the salient findings are as followed.

Interaction between crop establishment methods and varieties were found to be significant at all locations.

In sandy loam soils of **Chiplima**, mechanical transplanting (15 days' seedlings and recommended spacing) of MTU 1156 variety at normal planting time resulted in significantly the highest grain yield (6.5 t/ha) over all other treatment combinations. Among establishment methods, mechanical transplanting (15 days' seedlings and recommended spacing) at normal planting time resulted in significantly the highest grain yield (6.04 t/ha) over all other establishment methods. Between the two varieties, MTU 1156 resulted the higher grain yield (6.08 t/ha) than Swarna (5.42 t/ha). In sandy loam soils of **Ludhiana**, mechanical transplanting (15 days' seedlings and recommended spacing) of PR 126 in delayed planting time (15 days late) resulted the highest grain yield (7.60 t/ha), however, at par with PR 126 mechanically transplanted at normal time (7.51 t/ha), manual transplanted at normal time (7.58 t/ha) and manual transplanted in delayed condition (7.53 t/ha). Among establishment methods, manual transplanting in normal time resulted the highest grain yield (7.46 t/ha). Similarly, between varieties, PR 126 resulted the higher grain yield (7.56 t/ha) than ITY-2-21 (6.30 t/ha). In clay loam soil of **Rajendranagar**, mechanical transplanting of JGL 24423 variety in delayed condition resulted the highest grain yield (7.09 t/ha), however, at par with grain yield produced by same variety transplanted mechanically in normal time (6.86 t/ha). Establishment methods did not differ significantly. Among varieties, JGL 24423 (6.52 t/ha) performed better than other varieties RNR 15048 (5.72 t/ha), KNM 118 (6.31 t/ha). In clay loam soils of **Warangal**, WGL 739 transplanted mechanically in normal time resulted the highest grain yield (6.80 t/ha), however at par with WGL 915 mechanically transplanted in delayed condition (6.72 t/ha).

Among establishment methods, mechanical transplanting at normal time resulted the highest grain yield (6.76 t/ha). Between two varieties, WGL 739 performed (5.75 t/ha) better than WGL 915 (5.54 t/ha). **Higher CV (> 20) is recorded in this trial**.

At **Aduthurai**, the trial was conducted in RBD design. **CV of the trial was 1.02**, which is practically not possible in field condition. Only 4 crop establishment treatments were taken up. Mechanically transplanting of 15 days' seedlings at normal sowing time resulted the highest grain yield (5.43 t/ha).

Table-4.2.1: Development of package of practices for Mechanized Transplanting, Kharif-2021

Methods of crop establishment	Varieties	CHIPLIMA							
		Grain yield (t/ha)	No. of hills/m²	Tillers/m² (No.)	Test wt (g)	Days for 50% flowering	Dry matter/m2 30 DAT	Dry matter/m2 60 DAT	Dry matter/m2 90 DAT
M1	V1	6.50	63	240	21.27	88	55.73	161.67	273.00
	V2	5.57	62	253	20.87	102	52.60	152.67	252.33
	V3	-	-	-	-	-	-	-	-
M2	V1	6.10	62	230	21.10	86	50.60	156.00	254.67
	V2	5.47	63	241	20.77	101	48.40	146.33	239.67
	V3	-	-	-	-	-	-	-	-
M3	V1	5.97	57	226	20.57	83	48.53	143.67	237.00
	V2	5.37	57	231	20.40	99	43.17	134.33	226.00
	V3	-	-	-	-	-	-	-	-
M4	V1	5.77	56	220	20.60	81	42.93	138.33	225.67
	V2	5.27	59	222	20.13	96	39.53	128.67	218.00
	V3	-	-	-	-	-	-	-	-
Mean of Methods									
M1		6.04	63	247	21.07	95	54.16	157.17	262.66
M2		5.78	63	236	20.94	94	49.50	151.16	247.17
M3		5.67	57	229	20.48	91	45.85	139.00	231.50
M4		5.52	58	221	20.36	89	41.23	133.50	221.84
C.D. (0.05)		0.09	0.48	1.3	0.13	0.82	1.02	3.04	4.6
C.V. (%)		4.29	2.22	1.56	1.77	2.49	6.01	5.85	5.34
Mena of Varieties									
V1		6.08	60	229	20.88	85	49.45	149.92	247.58
V2		5.42	60	237	20.54	100	45.92	140.50	234.00
V3		-	-	-	-	-	-	-	-
CD (0.05)		0.09	0.72	15.72	0.11	0.78	0.92	2.4	4.64
C.V. (%)		4.68	3.64	20.45	1.59	2.56	5.86	5.01	5.83
Interaction									
M and S		0.18	1.44	ns	0.22	1.56	1.84	4.8	9.27
S and M		0.17	1.34	ns	0.22	1.53	1.83	4.9	9.04
Experimental Mean		2.30	24	93	8.29	37	19.07	58.08	96.32
Soil type									
pH									
EC		-							
Variety & Duration		MTU 1156 & Swarna							
Applied NPK kg/ha		150;60:60:25							
Available NPK kg/ha		-							

M1 – Normal planting time Mechanical Transplanting (15 days seedlings)
M2 – Delayed planting time (15 days late) Mechanical transplanting (15 days seedlings)
M3 – Manual transplanting – Normal time (25 days old seedlings)
M4 – Manual transplanting – Delayed sowing time (25 days old seedlings)

Table-4.2.1: Contd.

Methods of crop establishment	Varieties	LUDHIANA									
		Grain yield (t/ha)	No of hills/ m² (15 DAP)	Plant height (cm)	Tillers/ m² (No.)	Panicle/ m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	No of Grains/panicle	Sterility %
M1	V1	7.51	26	96.73	389	383	4.10	22.57	86	176	8.72
	V2	6.79	26	97.93	337	320	4.28	26.73	89	147	19.66
	V3	-	-	-	-	-	-	-	-	-	-
M2	V1	7.60	26	99.40	403	391	4.09	22.47	86	172	9.47
	V2	5.49	24	97.67	344	333	3.74	26.53	91	125	28.83
	V3	-	-	-	-	-	-	-	-	-	-
M3	V1	7.58	32	97.33	365	328	4.18	22.63	85	176	15.18
	V2	7.33	32	99.40	361	330	4.26	26.43	90	163	19.41
	V3	-	-	-	-	-	-	-	-	-	-
M4	V1	7.53	32	98.13	425	394	4.20	22.53	89	170	6.86
	V2	5.61	31	97.27	389	363	4.06	26.37	93	129	23.05
	V3	-	-	-	-	-	-	-	-	-	-
Mean of Methods											
M1		7.15	26	97.33	363	352	4.19	24.65	88	162	14.19
M2		6.54	25	98.54	374	362	3.92	24.50	89	148	19.15
M3		7.46	32	98.36	363	329	4.22	24.53	88	170	17.30
M4		6.57	31	97.70	407	378	4.13	24.45	91	149	14.96
C.D. (0.05)		0.28	0.58	NS	8.42	NS	NS	NS	0.62	5.14	1.31
C.V. (%)		11.49	5.74	4.13	6.26	18.57	7.44	2.33	1.96	9.15	22.32
Mena of Varieties											
V1		7.56	29	97.90	395	374	4.14	22.55	87	173	10.06
V2		6.30	28	98.07	358	337	4.08	26.52	90	141	22.74
V3		-	-	-	-	-	-	-	-	-	-
CD (0.05)		0.39	0.48	1.05	23.1	28.54	0.11	0.21	0.55	6.4	1.21
C.V. (%)		16.98	5.1	3.26	18.59	24.34	8.07	2.61	1.89	12.34	22.43
Interaction											
M and S		0.78	0.96	NS	NS	NS	0.22	NS	1.11	12.8	2.43
S and M		0.73	0.97	NS	NS	NS	0.21	NS	1.1	12.14	2.4
Experimental Mean		2.77	11	39.19	151	142	1.65	9.81	35	63	6.56
Soil type		Sandy loam									
pH		-									
EC		-									
Variety & Duration		PR 126 & ITY-2-21									
Applied NPK kg/ha		105:30:30:10									
Available NPK kg/ha		268;23.8:233									

M1 – Normal planting time Mechanical Transplanting (15 days seedlings)
M2 – Delayed planting time (15 days late) Mechanical transplanting (15 days seedlings)
M3 – Manual transplanting – Normal time (25 days old seedlings)
M4 – Manual transplanting – Delayed sowing time (25 days old seedlings)

Table-4.2.1: Contd.

Methods of crop establishment	Varieties	RAJENDRANAGAR							
		Grain yield (t/ha)	No of hills/m² (15 DAP)	Plant height (cm)	Tillers/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	No of Grains/panicle
M1	V1	5.20	24	121.33	301	4	10.97	103	252
	V2	6.45	25	104.17	366	4	22.37	89	268
	V3	6.86	24	98.77	386	4	23.97	92	224
M2	V1	6.12	25	117.63	341	4	11.87	93	313
	V2	6.44	24	105.07	355	4	21.30	85	231
	V3	7.09	24	105.17	407	5	26.00	88	267
M3	V1	5.54	44	115.87	322	4	11.20	101	279
	V2	6.41	42	94.20	348	4	22.43	89	229
	V3	6.23	43	90.43	348	4	22.67	90	221
M4	V1	6.01	43	112.23	323	3	12.00	93	309
	V2	5.95	44	99.13	322	4	23.47	90	222
	V3	5.90	44	97.00	318	4	24.43	92	217
Mean of Methods									
M1		6.17	24	108.09	351	4	19.10	94	248
M2		6.55	24	109.29	368	4	19.72	89	270
M3		6.06	43	100.17	339	4	18.77	93	243
M4		5.95	44	102.79	321	3	19.97	92	249
C.D. (0.05)		NS	1.05	2.1	NS	0.29	0.48	0.84	NS
C.V. (%)		8.37	5.83	3.73	23.71	13.67	4.63	1.71	17.18
Mena of Varieties									
V1		5.72	34	116.76	322	4	11.51	97	288
V2		6.31	34	100.64	348	4	22.39	88	237
V3		6.52	34	97.84	365	4	24.27	91	232
CD (0.05)		0.21	0.63	1.91	28.27	0.23	0.41	0.78	15.3
C.V. (%)		7.01	3.78	3.66	16.57	11.96	4.3	1.7	12.24
Interaction									
M and S		0.43	1.26	3.81	NS	NS	0.83	1.55	30.61
S and M		0.44	1.38	3.78	NS	NS	0.83	1.53	32.69
Experimental Mean		3.71	20	63.05	207	2	11.63	55	152
Soil type		Clay loam							
pH		-							
EC		-							
Variety & Duration		RNR15048, KNM 118 & JGL 24423							
Applied NPK kg/ha		120:60:40							
Available NPK kg/ha		-							

M1 – Normal planting time Mechanical Transplanting (15 days seedlings)
M2 – Delayed planting time (15 days late) Mechanical transplanting (15 days seedlings)
M3 – Manual transplanting – Normal time (25 days old seedlings)
M4 – Manual transplanting – Delayed sowing time (25 days old seedlings)

Table-4.2.1: Contd.

Methods of crop establishment	Varieties	WARANGAL							Over all Mean	Rank
		Grain yield (t/ha)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	No of Grains/panicle	Sterility %		
M1	V1	6.80	314	304	6.63	21.00	298	3.87	6.50	3
	V2	6.72	235	252	8.78	29.32	299	4.87	6.38	5
	V3	-	-	-	-	-	-	-	6.86	2
M2	V1	6.03	302	295	5.98	21.61	305	7.48	6.46	4
	V2	5.72	227	210	8.45	29.61	256	9.01	5.78	11
	V3	-	-	-	-	-	-	-	7.09	1
M3	V1	5.33	293	282	6.31	21.47	284	4.92	6.11	7
	V2	5.23	254	206	8.41	29.37	286	6.17	6.09	8
	V3	-	-	-	-	-	-	-	6.23	6
M4	V1	4.85	285	281	5.10	21.76	257	7.10	6.04	9
	V2	4.49	218	197	7.91	29.90	230	10.53	5.33	12
	V3	-	-	-	-	-	-	-	5.90	10
Mean of Methods										
M1		6.76	275	278	7.70	25.16	298	4.37	6.53	1
M2		5.88	265	253	7.22	25.61	281	8.24	6.19	2
M3		5.28	273	244	7.36	25.42	285	5.54	6.12	3
M4		4.67	252	239	6.50	25.83	243	8.82	5.68	4
C.D. (0.05)		0.42	NS	NS	NS	NS	NS	0.52	0.26	
C.V. (%)		20.91	14.61	16.27	20.57	5.5	25.81	21.46	11.27	
Mena of Varieties										
V1		5.75	299	291	6.00	21.46	286	5.84	6.28	2
V2		5.54	233	216	8.39	29.55	268	7.64	5.89	3
V3		-	-	-	-	-	-	-	6.52	1
CD (0.05)		0.4	18.86	16.98	0.48	0.4	23.4	2.49		
C.V. (%)		21.44	21.48	20.31	20.28	4.79	25.61	111.73		
Interaction										
M and S		0.8	NS	NS	NS	NS	NS	NS		
S and M		0.79	NS	NS	NS	NS	NS	NS		
Experimental Mean		2.26	106	101	2.88	10.20	110.72	2.70	2.76	
Soil type		Clay loam								
pH		-								
EC		-								
Variety & Duration		WGL 739 & WGL 915								
Applied NPK kg/ha		120:60:40:50								
Available NPK kg/ha		160:50:340								

M1-Normal planting time Mechanical transplanting (15 days seedlings and recommended spacing)
M2-Delayed planting time (15 days late) Mechanical transplanting (15 days seedlings and recommended spacing)
M3-Manual transplanting - Normal time (25 days old seedlings)
M4-Manual transplanting - Delayed sowing time (25 days old seedlings)

Table-4.2.1: Contd.

Methods of crop establishment	ADUTHURAI						
	Grain yield (t/ha)	Plant height (cm)	Tillers/m² (No.)	Productive tillers/m² (No.)	Panicle wt (g)	Test wt (g)	No of Grains/panicle
M1	5.43	94.93	350	329	2.53	17.57	169
M2	4.77	92.33	324	308	2.43	17.30	156
M3	4.39	85.63	296	279	2.26	17.10	139
M4	4.13	82.43	280	256	2.14	17.10	130
Exp. mean	**4.68**	**88.83**	**312**	**293**	**2.34**	**17.27**	**148**
CD(0.05)	0.1	3.19	16.2	11	0.02	0.21	15.66
CV%	1.02	1.8	2.6	1.88	0.37	0.6	5.28
Soil type	**Clay**						
pH	7.2						
EC	0.15						
Variety & Duration	ADT 53						
Applied NPK kg/ha	150:60:60:25						
Available NPK kg/ha	28.5:72.5:132						

M1 – Normal planting time Mechanical Transplanting (15 days seedlings)

M2 – Delayed planting time (15 days late) Mechanical transplanting (15 days seedlings)

M3 – Manual transplanting – Normal time (25 days old seedlings)

M4 – Manual transplanting – Delayed sowing time (25 days old seedlings)

4.2.2.1. Developing suitable package of practices for dry DSR

Imminent water crisis, labour scarcity and climate change threaten the sustainability and profitability of traditional transplanted rice. Direct-seeded rice (DSR) technology has been proposed to reduce water requirement, save labour demand, mitigate greenhouse gas emission and improve environmental sustainability. It involves three principal methods viz., dry seeding, wet seeding, and water seeding, among which dry DSR is gaining momentum due to relatively high grain yield, less water consumption, reduced labour intensity, facilitating to mechanization during crop establishment, and less greenhouse gases emission. The major challenges confronting the development of dry DSR in India are poor crop establishment, weed infestation, lodging susceptibility, yield decline under continuous cropping, and variety breeding; and the strategies which may help in mitigating the constraints to dry DSR. Hence the present trial is constituted to enhance the productivity of the wet DSR with the following objectives 1) To identify suitable and cost effective agronomic management practices to enhance the productivity of dry DSR and 2) To maximize the resource use efficiency. The trial was conducted at 14 locations (**Gangavathi, Khudwani, Kota, Ludhiana, Mandya, Nagina, Nawagam, Pantnagar, Pusa, Raipur, Ranchi and Varanasi**). Split plot design was adopted with 6 main plots of sowing methods (S_1: Broadcasting of seeds and S_2: Manual line sowing of seeds (20-25 cm row spacing sown in solid row), S3: Mechanized line sowing of seeds (Dribbler, Happy seeder of any Drum seeder, spacing as per the equipment specifications), S_4: Raised bed sowing, S_5: Any improved susyem in that particular location and S_6: Semi-dry system (sowing in dry soil and wet after one month of sowing). Four subplots consist of W_1: Manual weeding (3 times); W_2: Pre + post-emergence herbicide; W_3: Pre-emergence herbicide + manual weeding (two times) and S_4: Mechanical weeding (2-3 times start from 15 DAS at 15-20 days' interval). The results were summarized and presented in **Table 4.2.2** and the salient findings are as followed.

Interaction effect of grain yield between sowing time and crop establishment methods were found to be non-significant at all locations except at **Gangavathi** and **Khudwani**. In black clay soils of **Gangavathi**, GNV-10-89 variety resulted the highest grain yield under semi-dry system applied with pre-emergence herbicide and two times manual weeding (5.51 t/ha). Interaction effect on weed population was found to be significant. The lowest total weed population at active tillering stage was recorded in mechanical weeding sown under broadcasting methods (7.61). Similarly, at panicle initiation stage the lowest total weed population was recorded in plots treated with pre-emergence + two times of manual weeding (5.28). Among crop establishment methods, at active tillering stage the lowest total weed biomass was recorded in manual line sowing of seeds (47.26 g/m^2). Similarly, at panicle initiation stage, broadcasting of seeds recorded the lowest weed biomass (79.78 g/m^2). The lowest cost of cultivation was in broadcasting of seeds (Rs.60,433/-). Among weed control methods, the lowest cost of cultivation was recorded in pre + post emergence of herbicide (Rs.46,995/-). Total water input was 947 mm/ha irrespective of different treatments. In silty clay loam soils of **Khudwani**, SR-4 variety under broadcasting methods with 3 manual weedings resulted the highest grain yield (5.63 t/ha) closely followed by and at par with improved system of that particular region with pre-emergence herbicide + 2 manual weedings (5.61 t/ha) and improved system of that particular region with pre + post-emergence herbicide (5.48 t/ha). The experimental mean cost of cultivation was Rs. 59,379/-, which did not differ

much among the treatments. The total water input recorded was 1250 mm/ha. In clay loam soils of **Kota**, 3 main plots treatments were taken up with 4 sub plot treatments. Among crop establishment methods, Pusa Sugandh-5 (P-2511) with manual line sowing resulted in the highest grain yield (5.17 t/ha) followed by mechanical line sowing (4.78 t/ha). Similarly, among weed control methods, three times weeding resulted in the highest grain yield (4.95 t/ha), however at par with plots applied with pre-emergence herbicide + manual weeding twice (4.85 t/ha). In sandy loam soils of Ludhiana, among establishment methods, manual line sowing of Pusa Basmati 1509 resulted the highest grain yield (4.02 t/ha), however, equally effective was semi-dry system (4.02 t/ha). Among weed control measures, pre + post-emergence herbicide application resulted the highest grain yield (4.56 t/ha). In red sandy loam soils of **Mandya**, Improved local system (drum seeding) resulted the highest grain yield (5.18 t/ha), however, at par with semi-dry rice system (5.01 t/ha). Among weed control methods, application of pre + post-emergence of herbicide resulted the highest grain yield (5.23 t/ha). However, cost of cultivation was less in mechanical weeding (Rs. 52720/-) compared to pre + post emergence herbicide application (Rs. 57278/-). In **Nagina**, mechanical line sowing of seeds resulted in the highest grain yield (5.4 t/ha). Similarly, among weed control methods, pre-emergence herbicide application + manual weeding twice resulted in the highest grain yield (4.98 t/ha), however, similar to pre- + post-emergence herbicide treatments (4.85 t/ha). In clay loam soils of **Nawagam**, Mahisagar variety sown in manual line sowing resulted in the highest grain yield (4.17 t/ha) closely followed by improved system of the region (sprouted seed in wet soil) (3.97 t/ha). Among weed control methods, pre + post-emergence application of herbicides gave the highest grain yield (3.84 t/ha), however, other treatments were also found equally effective. In silt loam soils of **Pantnagar**, line sowing of PD-24 resulted the highest grain yield (4.17 t/ha). Among weed control methods, pre-emergence herbicide + manual weeding twice resulted numerically the highest grain yield (4.15 t/ha). In sandy loam soils of **Pusa**, mechanized line sowing of Rajendra Nilam variety resulted the highest grain yield (4.5 t/ha) followed by local improved method (4.4 t/ha). Among weed control methods, manual weeding thrice produced the highest grain yield (4.45 t/ha). In vertisols of **Raipur**, mechanized line sowing of IGKV R1 resulted in the highest grain yield (4.66 t/ha) followed by and at par with local improved system (sowing with inclined plate) (4.55 t/ha). In Ranchi, Naveen variety with local improved method (rice + sesbania) resulted the highest grain yield (4.88 t/ha), however, at par with line sowing (4.68 t/ha) and semi-dry system (4.67 t/ha). Among weed control methods, pre + post-emergence application of herbicides resulted the highest grain yield (4.93 t/ha). In sandy loam soils of Varanasi, raised bed sowing treatment produced the highest grain yield (3.68 t/ha). Among weed control methods, pre + post-emergence application of herbicides produced the highest grain yield (3.68 t/ha).

Table-4.2.2.1: Development of suitable package of practices for higher yield in Dry Direct Seeded Rice system, Kharif-2021.

Methods of crop establishment	Sub plot	GANGAVATHI											
		Grain yield (t/ha)	Straw yield (t/ha)	Plant height (cm)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Weed population (no/m²)		Weed biomass (g/m²)		Cost of cultivation Rs/ha	Total water input /ha
								At active tillering	At panicle initiation	At active tillering	At panicle initiation		
S1	W1	4.96	5.70	84.67	286	3.06	16.93	103.79(10.17)	44.48(6.68)	45.04	30.95	77345	947
	W2	2.11	2.43	86.33	317	3.06	17.83	95.45(9.79)	48.19(6.95)	91.83	93.59	45745	947
	W3	4.72	5.43	83.00	258	2.46	17.39	82.47(9.11)	27.80(5.28)	82.01	31.69	67545	947
	W4	3.93	4.52	87.67	184	2.89	17.08	57.45(7.61)	77.84(8.84)	32.62	162.91	51095	947
S2	W1	5.13	5.89	90.33	296	3.62	17.19	75.99(8.74)	32.43(5.72)	32.06	60.05	78595	947
	W2	2.35	2.71	80.67	203	2.68	17.38	97.30(9.89)	101.01(10.05)	73.76	194.23	46995	947
	W3	5.10	5.87	83.33	260	3.63	16.97	101.01(10.05)	34.29(5.88)	52.45	24.19	68795	947
	W4	3.72	4.28	81.67	242	2.99	17.43	77.84(8.85)	101.93(10.12)	30.77	232.04	52345	947
S3	W1	4.85	5.58	87.33	202	3.52	17.51	121.39(11.04)	67.65(8.25)	56.16	74.41	79845	947
	W2	1.25	1.43	84.00	197	3.51	17.33	141.78(11.93)	106.57(10.34)	159.57	250.29	48245	947
	W3	5.33	6.13	85.00	320	2.99	17.33	120.47(10.98)	50.97(7.13)	97.86	28.35	70045	947
	W4	2.71	3.11	80.67	218	3.18	17.07	106.57(10.34)	99.15(9.98)	66.44	301.82	53595	947
S4	W1	-	-	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-	-	-
S5	W1	-	-	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-	-	-
S6	W1	5.14	5.91	92.67	240	3.48	16.89	120.47(10.99)	57.45(7.59)	42.07	56.25	78595	947
	W2	1.48	1.70	78.00	195	2.62	17.94	181.63(13.49)	84.33(9.20)	131.12	182.92	46995	947
	W3	5.51	6.33	82.33	273	3.10	18.00	95.45(9.76)	62.09(7.88)	58.38	81.45	68795	947
	W4	4.04	4.65	88.33	243	3.68	17.17	101.01(10.02)	80.62(9.00)	33.73	114.81	52345	947
Mean of Methods													
S1		3.93	4.52	85.42	261	2.87	17.31	84.79(9.17)	49.58(6.94)	62.88	79.78	60433	947
S2		4.08	4.69	84.00	250	3.23	17.24	88.03(9.38)	67.42(7.94)	47.26	127.63	61683	947
S3		3.54	4.06	84.25	234	3.30	17.31	122.55(11.07)	81.08(8.93)	95.01	163.72	62933	947
S4		-	-	-	-	-	-	-	-	-	-	-	-
S5		-	-	-	-	-	-	-	-	-	-	-	-
S6		4.04	4.65	85.33	238	3.22	17.50	124.64(11.07)	71.12(8.42)	66.32	108.86	61683	947
C.D. (0.05)		0.35	0.42	NS	19.39	0.24	NS	0.59	0.57	13.75	17.67	0	14.67
C.V. (%)		8.96	9.31	2.86	7.9	7.64	1.94	5.82	7.14	18.19	13.22	0	1.39

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	GANGAVATHI											
		Grain yield (t/ha)	Straw yield (t/ha)	Plant height (cm)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Weed population (no/m²)		Weed biomass (g/m²)		Cost of cultivation Rs/ha	Total water input /ha
								At active tillering	At panicle initiation	At active tillering	At panicle initiation		
Mena of Varieties													
W1		5.02	5.77	88.75	256	3.42	17.13	105.41(10.24)	50.50(7.06)	43.83	55.42	78595	947
W2		1.80	2.07	82.25	228	2.97	17.62	129.04(11.27)	85.02(9.14)	114.07	180.26	46995	947
W3		5.16	5.94	83.42	277	3.04	17.42	99.85(9.98)	43.78(6.54)	72.68	41.42	68795	947
W4		3.60	4.14	84.58	222	3.18	17.19	85.72(9.20)	89.89(9.49)	40.89	202.90	52345	947
CD (0.05)		0.33	0.42	1.75	19.19	0.2	0.33	0.56	0.55	NS	NS	NS	0
C.V. (%)		9.91	11.11	2.45	9.27	7.58	2.26	6.5	8.09	18.22	18.32	0	0
Interaction													
M and S		0.65	0.84	3.49	38.38	0.4	NS	1.11	1.1	NS	NS	NS	0
S and M		0.62	0.79	3.55	36.47	0.39	NS	1.07	1.05	NS	NS	NS	0
Experimental Mean		**3.90**	**4.48**	**84.75**	**246**	**3.15**	**17.34**	**10.17**	**8.06**	**67.87**	**120.00**	**61683**	**947**
Soil type		Black clay											
pH		8.2											
EC		1.2											
Variety & Duration		GNV-10-89											
Applied NPK kg/ha		-											
Available NPK kg/ha		-											

S1: Broadcasting of seeds
S2: Manual line sowing of seeds (20-25 cm row spacing sown in solid row)
S3: Mechanized line sowing of seeds (Dribbler, Happy seeder of any Drum Seeder: Spacing as per the equipment specifications)
S4: Raised bed sowing
S5- Any improved system in that particular location
S6:Semi-Dry system (Sowing in dry soil and Wet after one month of sowing)

W1: Manual weeding (three times)
W2: Pre + post-emergence herbicide
W3: Pre-emergence herbicide + Manual weeding (two times)
W4: Mechanical weeding (2-3 times start from 15 DAS at 15-20 days interval)

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	KHUDWANI																		
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m²		Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Dry mater accumulation (g/m2)			Weed population (no/m²)		Weed biomass (g/m²)		Cost of cultivation Rs/ha	Total water input /ha
				At 10 DAS	At 20 DAS							At 45 DAS	At 75 DAS	At 105 DAS	At active tillering	At panicle initiation	At active tillering	At panicle initiation		
S1	W1	5.63	8.86	173	181	128.80	417	398	3.20	27.86	92	3881.67	5618.67	9265.00	19.60(4.48)	11.48(3.46)	44.10	21.34	59540	1250
	W2	4.84	7.40	104	112	127.07	330	312	3.27	29.24	91	3447.33	5381.00	8454.33	24.87(5.03)	12.02(3.54)	57.27	22.62	58965	1250
	W3	4.47	6.98	103	110	127.87	371	360	3.21	28.65	90	3890.33	5427.67	8487.33	21.12(4.65)	19.62(4.48)	46.43	41.52	58965	1250
	W4	5.50	7.40	43	64	131.93	477	402	3.23	29.87	93	3809.00	5071.33	8432.33	31.91(5.69)	13.43(3.73)	73.03	27.65	58965	1250
S2	W1	5.44	9.29	193	205	128.20	429	405	3.27	27.54	94	3664.33	5155.33	9301.00	20.51(4.58)	14.27(3.84)	46.17	26.52	59540	1250
	W2	4.65	7.15	109	116	126.13	386	368	3.43	27.71	91	3441.67	5411.67	8901.00	26.04(5.15)	9.77(3.20)	59.97	20.19	58965	1250
	W3	4.89	7.94	107	115	126.87	359	349	3.09	27.85	90	2999.00	4567.67	7551.67	22.11(4.75)	20.78(4.61)	53.73	43.98	58965	1250
	W4	4.50	6.42	43	64	128.13	418	391	3.30	29.16	94	3268.00	4827.33	8168.67	33.40(5.82)	13.08(3.68)	77.70	24.62	58965	1250
S3	W1	4.95	7.73	189	202	129.03	425	395	3.50	28.14	90	3893.00	5510.67	9747.33	23.62(4.91)	18.47(4.35)	53.13	38.02	60620	1250
	W2	5.13	7.62	103	110	125.93	367	353	3.13	27.91	93	3120.67	4476.67	8169.33	29.98(5.52)	13.16(3.70)	68.93	27.10	60045	1250
	W3	5.32	8.30	98	99	126.27	401	375	3.49	27.75	91	3266.00	4831.00	7666.00	25.46(5.09)	16.64(4.14)	62.00	31.32	60045	1250
	W4	5.00	7.43	43	64	130.43	384	398	3.32	29.56	91	3060.33	5156.33	8143.67	38.45(6.24)	15.13(3.95)	84.47	28.68	60045	1250
S4	W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S5	W1	5.22	8.56	196	203	129.43	428	408	3.67	28.54	98	3776.67	5911.33	8984.33	16.93(4.16)	10.55(3.32)	41.03	21.72	59540	1250
	W2	5.48	8.39	106	110	126.03	358	332	3.36	28.63	97	3551.67	5839.67	8981.33	23.72(4.92)	9.32(3.13)	53.33	18.91	58965	1250
	W3	5.61	8.80	103	107	126.77	357	347	3.53	28.75	97	3942.67	5599.00	8833.00	20.14(4.54)	10.07(3.25)	49.17	18.95	58965	1250
	W4	5.32	7.78	43	64	130.87	414	400	3.25	29.57	97	3514.33	5220.33	8331.33	21.91(4.73)	12.51(3.61)	64.63	26.49	58965	1250
S6	W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean of Methods																				
S1		5.11	7.66	106	117	128.92	399	368	3.23	28.90	92	3757.08	5374.67	8659.75	24.38(4.96)	14.14(3.80)	55.21	28.28	59108.8	1250
S2		4.87	7.70	113	125	127.33	398	378	3.27	28.06	92	3343.25	4990.50	8480.58	25.51(5.08)	14.47(3.84)	59.39	28.83	59108.8	1250
S3		5.10	7.77	108	119	127.92	394	380	3.36	28.34	91	3335.00	4993.67	8431.58	29.38(5.44)	15.85(4.04)	67.13	31.28	60188.8	1250
S4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S5		5.41	8.38	112	121	128.28	389	372	3.45	28.87	97	3696.34	5642.58	8782.50	20.68(4.59)	10.61(3.33)	52.04	21.52	59108.8	1250
S6		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C.D. (0.05)		0.21	NS	NS	NS	0.3	NS	NS	0.02	0.17	0.82	126.82	NS	188.21	0.11	0.02	4.21	2.31	0	NS
C.V. (%)		4.17	7.74	0	0	0.24	7.02	5.65	0.61	0.6	0.88	3.59	13.22	2.19	2.74	0.75	7.22	8.42	0	0

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	KHUDWANI																		
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m²		Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Dry mater accumulation (g/m2)			Weed population (no/m²)		Weed biomass (g/m²)		Cost of cultivation Rs/ha	Total water input /ha
				At 10 DAS	At 20 DAS							At 45 DAS	At 75 DAS	At 105 DAS	At active tillering	At panicle initiation	At active tillering	At panicle initiation		
Mena of Varieties																				
W1		5.31	8.61	187	198	128.86	425	401	3.41	28.02	93	3803.92	5549.00	9324.42	20.16(4.53)	13.69(3.75)	46.11	26.90	59810	1250
W2		5.02	7.64	105	112	126.29	360	341	3.30	28.37	93	3390.34	5277.25	8626.50	26.15(5.15)	11.07(3.39)	59.88	22.20	59235	1250
W3		5.07	8.00	103	108	126.94	372	358	3.33	28.25	92	3524.50	5106.34	8134.50	22.21(4.76)	16.77(4.12)	52.83	33.94	59235	1250
W4		5.08	7.26	43	64	130.34	423	398	3.28	29.54	94	3412.92	5068.83	8269.00	31.42(5.62)	13.54(3.74)	74.96	26.86	59235	1250
CD (0.05)		0.21	0.52	0	NS	2.2	30.23	21.72	0.1	0.47	NS	191.24	265.61	427.6	0.15	0.07	5.65	3.01	0	NS
C.V. (%)		4.98	7.89	0	0	2.04	9.08	6.88	3.44	1.94	1.48	6.42	6	5.91	4.14	2.48	11.48	13.01	0	0
Interaction																				
M and S		0.43	1.05	NS	NS	NS	NS	NS	0.19	NS	NS	382.48	531.23	NS	0.3	0.13	NS	6.02	NS	NS
S and M		0.41	1.02	NS	NS	NS	NS	NS	0.17	NS	NS	345.72	689.45	NS	0.27	0.12	NS	5.52	NS	NS
Experimental Mean		**5.12**	**7.88**	**110**	**120**	**128.11**	**395**	**375**	**3.33**	**28.55**	**93**	**3532.92**	**5250.35**	**8588.60**	**5.02**	**3.75**	**58.44**	**27.48**	**59378.8**	**1250**
Soil type		Silty clay loam																		
pH		6.9																		
EC		0.45																		
Variety & Duration		SR4																		
Applied NPK kg/ha		-																		
Available NPK kg/ha		208;12.5:228																		

S1: Broadcasting of seeds
S2: Manual line sowing of seeds (20-25 cm row spacing sown in solid row)
S3: Mechanized line sowing of seeds (Dribbler, Happy seeder of any Drum Seeder: Spacing as per the equipment specifications)
S4: Raised bed sowing
S5- Any improved system in that particular location
S6:Semi-Dry system (Sowing in dry soil and Wet after one month of sowing)

W1: Manual weeding (three times)
W2: Pre + post-emergence herbicide
W3: Pre-emergence herbicide + Manual weeding (two times)
W4: Mechanical weeding (2-3 times start from 15 DAS at 15-20 days interval)

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	KOTA									
		Grain yield (t/ha)	Straw yield (t/ha)	Tiller/m² (No.)	Panicle/m² (No.)	Panicle lngth (cm)	Panicle wt (g)	Test wt (g)	Weed population (no/m²)		Weed biomass (g/m²)
									At active tillering	At panicle initiation	At active tillering
S1	W1	4.26	6.12	328	284	26.00	3.43	22.68	8.33(2.96)	8.33(2.97)	8.11
	W2	4.15	5.97	316	276	26.60	3.08	22.56	18.00(4.30)	15.00(3.92)	17.54
	W3	4.36	6.07	327	283	25.97	3.17	22.64	19.67(4.49)	8.67(3.02)	20.68
	W4	3.75	5.53	297	257	25.20	2.81	22.39	45.33(6.77)	41.33(6.47)	44.24
S2	W1	5.45	6.64	359	320	28.87	3.87	23.90	6.67(2.67)	4.67(2.26)	5.96
	W2	5.07	6.26	338	307	28.33	3.65	23.39	19.00(4.41)	14.00(3.80)	19.19
	W3	5.40	6.72	352	314	28.43	3.71	23.82	16.67(4.14)	5.00(2.32)	16.66
	W4	4.77	6.06	323	284	27.40	3.13	22.66	34.00(5.87)	30.33(5.55)	35.68
S3	W1	5.14	6.34	342	306	28.33	3.62	23.69	6.33(2.60)	4.33(2.18)	6.89
	W2	4.79	6.06	329	297	27.73	3.35	23.04	17.00(4.18)	13.33(3.71)	21.39
	W3	4.80	5.88	331	299	27.57	3.43	23.23	15.67(4.02)	6.33(2.60)	17.03
	W4	4.41	5.63	310	275	27.57	3.17	22.99	32.67(5.76)	28.67(5.40)	36.24
S4	W1	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-
S5	W1	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-
S6	W1	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-
Mean of Methods											
S1		4.13	5.92	317	275	25.94	3.12	22.57	22.83(4.63)	18.33(4.09)	22.64
S2		5.17	6.42	343	306	28.26	3.59	23.44	19.08(4.27)	13.50(3.48)	19.37
S3		4.78	5.98	328	294	27.80	3.39	23.24	17.92(4.14)	13.17(3.47)	20.39
S4		-	-	-	-	-	-	-	-	-	-
S5		-	-	-	-	-	-	-	-	-	-
S6		-	-	-	-	-	-	-	-	-	-
C.D. (0.05)		0.23	NS	10.92	9.49	1.09	0.1	0.2	0.22	0.26	NS
C.V. (%)		6.74	5.94	4.57	4.48	5.49	4.04	1.17	6.93	9.61	13.04

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	KOTA									
		Grain yield (t/ha)	Straw yield (t/ha)	Tiller/m² (No.)	Panicle/m² (No.)	Panicle lngth (cm)	Panicle wt (g)	Test wt (g)	Weed population (no/m²)		Weed biomass (g/m²)
									At active tillering	At panicle initiation	At active tillering
Mena of Varieties											
W1		4.95	6.37	343	303	27.73	3.64	23.42	7.11(2.74)	5.78(2.47)	6.99
W2		4.67	6.10	328	293	27.55	3.36	23.00	18.00(4.30)	14.11(3.81)	19.37
W3		4.85	6.22	337	298	27.32	3.44	23.23	17.33(4.21)	6.67(2.65)	18.12
W4		4.31	5.74	310	272	26.72	3.04	22.68	37.33(6.13)	33.44(5.80)	38.72
CD (0.05)		0.19	0.25	15.65	12.7	NS	0.3	NS	0.24	0.29	3.06
C.V. (%)		4.17	4.07	4.79	4.39	2.95	8.92	2.49	5.56	7.86	14.84
Interaction											
M and S		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
S and M		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Experimental Mean		**4.7**	**6.11**	**330**	**292**	**27.33**	**3.37**	**23.08**	**4.35**	**3.68**	**20.8**
Soil type		Clay loam									
pH		7.4									
EC		0.37									
Variety & Duration		Pusa Sugandha-5 (P-2511)									
Applied NPK kg/ha		-									
Available NPK kg/ha		168.99:34.6:413.42									

S1: Broadcasting of seeds

S2: Manual line sowing (20 cm row spacing)

S3: Mechanical line sowing of seeds using Seed drill (22.5 cm row spacing sown in solid row)

W1: Manual weeding (three times)

W2: Pre + post-emergence herbicide

W3: Pre-emergence herbicide + Manual weeding (two times)

W4: Mechanical weeding (2-3 times start from 15 DAS at 15-20 days interval)

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	LUDHIANA												
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m²	Plant height (cm)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Dry mater accumulation (g/m2)	Weed population (no/m²)		Weed biomass (g/m²)	Sterility %
				At 20 DAS						At 105 DAS	At active tillering	At panicle initiation	At panicle initiation	
S1	W1	2.75	4.48	55	90.87	339	1.56	27.12	83	711.00	40.00(6.36)	80.00(8.96)	113.53	29.58
	W2	4.54	7.37	57	92.03	381	2.04	27.32	82	1063.67	12.33(3.57)	18.67(4.37)	32.68	23.72
	W3	3.91	6.53	55	91.30	323	1.92	27.24	82	925.00	19.00(4.40)	56.00(7.47)	53.91	22.32
	W4	2.35	3.96	57	90.67	315	1.40	27.00	82	619.67	48.33(6.99)	129.33(11.37)	130.50	35.16
S2	W1	3.83	6.17	58	90.63	379	1.81	27.15	81	919.67	26.67(5.21)	52.00(7.24)	84.27	24.85
	W2	4.68	7.47	57	90.40	472	2.15	27.30	82	1137.67	12.00(3.52)	14.67(3.87)	29.85	24.47
	W3	4.34	4.29	58	91.67	424	2.08	27.09	81	831.33	18.33(4.33)	43.33(6.60)	38.73	26.88
	W4	3.21	3.59	58	88.87	432	1.81	27.20	82	682.33	37.33(6.14)	90.67(9.55)	80.07	30.15
S3	W1	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-	-	-	-
S4	W1	3.63	4.42	53	91.60	333	1.83	27.31	83	723.67	32.00(5.69)	52.00(7.20)	80.87	21.77
	W2	4.60	3.84	54	92.80	416	2.22	27.28	80	761.33	15.00(3.87)	16.00(4.04)	28.43	23.98
	W3	4.19	4.16	52	90.20	392	2.02	27.32	81	753.33	17.33(4.00)	41.33(6.34)	32.80	25.24
	W4	3.33	4.60	50	89.13	405	1.84	27.33	81	735.00	40.67(6.41)	94.67(9.75)	79.63	24.81
S5	W1	3.52	3.48	51	92.60	341	2.03	27.29	84	719.67	27.67(5.29)	61.33(7.78)	93.57	23.89
	W2	4.23	4.32	49	94.40	379	2.10	27.38	80	777.00	17.33(4.20)	13.33(3.66)	35.07	21.68
	W3	3.85	3.82	51	95.93	365	1.99	27.35	80	747.67	21.33(4.65)	41.33(6.44)	34.67	23.30
	W4	3.13	3.47	50	92.00	381	1.93	27.37	83	623.33	36.33(6.05)	70.67(8.43)	73.67	26.70
S6	W1	3.85	4.07	50	91.40	381	1.93	27.32	81	816.67	25.00(5.03)	40.00(6.30)	76.85	25.60
	W2	4.77	4.51	52	94.93	440	2.20	27.42	81	884.00	13.67(3.75)	13.33(3.54)	21.34	20.65
	W3	4.31	3.96	51	91.47	400	2.14	27.30	81	838.67	14.67(3.89)	37.33(6.14)	25.37	22.29
	W4	3.16	4.40	51	90.47	405	1.89	27.30	82	807.00	37.67(6.17)	90.67(9.52)	68.00	29.48
Mean of Methods														
S1		3.39	5.58	56	91.22	339	1.73	27.17	82	829.84	29.92(5.33)	71.00(8.04)	82.66	27.70
S2		4.02	5.38	58	90.39	427	1.96	27.18	82	892.75	23.58(4.80)	50.17(6.81)	58.23	26.59
S3														
S4		3.94	4.26	52	90.93	387	1.98	27.31	81	743.33	26.25(4.99)	51.00(6.83)	55.43	23.95
S5		3.68	3.77	50	93.73	367	2.01	27.35	82	716.92	25.67(5.05)	46.67(6.58)	59.24	23.89
S6		4.02	4.24	51	92.07	407	2.04	27.34	82	836.58	22.75(4.71)	45.33(6.37)	47.89	24.50
C.D. (0.05)		0.35	0.83	NS	NS	31.96	0.11	NS	NS	87.56	NS	0.87	12.93	2.28
C.V. (%)		9.71	19.08	12.83	5.1	8.81	6.24	3.69	2.44	11.57	14.7	13.36	22.62	9.56

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	LUDHIANA												
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m²	Plant height (cm)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Dry mater accumulation (g/m2)	Weed population (no/m²)		Weed biomass (g/m²)	Sterility %
				At 20 DAS						At 105 DAS	At active tillering	At panicle initiation	At panicle initiation	
Mena of Varieties														
W1		3.52	4.52	53	91.42	355	1.83	27.24	82	778.14	30.27(5.52)	57.07(7.50)	89.82	25.14
W2		4.56	5.50	54	92.91	418	2.14	27.34	81	924.73	14.07(3.78)	15.20(3.90)	29.47	22.90
W3		4.12	4.55	53	92.11	381	2.03	27.26	81	819.20	18.13(4.25)	43.87(6.60)	37.10	24.01
W4		3.04	4.00	53	90.23	388	1.77	27.24	82	693.47	40.07(6.35)	95.20(9.72)	86.37	29.26
CD (0.05)		0.21	0.53	2.65	NS	26.82	0.08	NS	0.84	63.84	0.38	0.61	14.57	2.23
C.V. (%)		7.26	15.31	6.65	3.16	9.34	5.46	4	1.38	10.65	10.11	11.73	32.19	11.81
Interaction														
M and S		NS	1.19	NS	NS	NS	0.18	NS	NS	142.75	NS	NS	NS	NS
S and M		NS	1.2	NS	NS	NS	0.18	NS	NS	140.17	NS	NS	NS	NS
Experimental Mean		**3.81**	**4.65**	**54**	**91.67**	**385**	**1.94**	**27.27**	**82**	**803.88**	**4.98**	**6.93**	**60.69**	**25.33**
Soil type		Sandy loam												
pH		7.5												
EC		-												
Variety & Duration		Pusa Basmati 1509												
Applied NPK kg/ha		-												
Available NPK kg/ha		256;24.2:233												

S1: Broadcasting of seeds
S2: Manual line sowing of seeds (20 cm row spacing sown in solid row)
S3: -
S4: Raised bed sowing - (4 rows on 1 mt wide bed)
S5- Any improved system in that particular location(Raised bed sowing (2 rows on 67.5 wide bed))
S6:Semi-Dry system (Sowing in dry soil and Wet after one month of sowing) - Line sowing in Tar Vattar (Soil mulch DSR) f.b. 1st irrigation at 21 DAS

W1: Manual weeding (three times)
W2: Pre + post-emergence herbicide
W3: Pre-emergence herbicide + Manual weeding (two times)
W4: Mechanical weeding (2-3 times start from 15 DAS at 15-20 days interval)

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	MANDYA															
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m² At 20 DAS	Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle length (cm)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Dry mater accumulation at 105 DAS	Weed population (no/m²) At active tillering	Weed population (no/m²) At panicle initiation	Weed biomass (g/m²) At active tillering	Weed biomass (g/m²) At panicle initiation	Cost of cultivation Rs/ha
S1	W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	4.61	6.71	74	92.53	315	311	22.83	3.67	22.84	80	970.80	6.33(2.60)	8.00(2.90)	6.50	8.81	55860
	W3	4.05	6.62	78	91.90	358	314	23.46	3.96	21.80	80	896.43	10.00(3.18)	20.33(4.56)	9.67	11.85	57276
	W4	3.47	5.77	77	90.07	269	264	21.25	3.76	22.91	80	776.07	11.33(3.43)	27.00(5.20)	12.80	14.40	51209
S2	W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S3	W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	5.18	7.76	48	87.93	335	328	23.89	4.26	23.29	80	1110.03	2.67(1.77)	8.33(2.94)	3.29	7.50	57958
	W3	4.96	7.97	47	88.93	262	255	23.74	4.01	23.63	80	1061.90	4.33(2.20)	9.00(3.07)	6.57	6.96	59767
	W4	4.24	6.89	48	90.20	286	284	23.30	4.17	23.14	80	933.73	12.00(3.51)	17.67(4.23)	9.56	12.12	53482
S4	W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S5	W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	5.82	7.38	54	91.00	335	324	24.37	4.80	22.83	79	1097.70	1.33(1.34)	6.33(2.59)	2.20	3.09	57179
	W3	5.40	6.90	55	92.10	384	378	24.01	4.68	22.29	79	994.37	7.00(2.65)	8.67(2.98)	3.62	6.80	58430
	W4	4.33	6.80	51	91.57	297	290	23.71	4.16	22.66	79	912.43	5.33(2.38)	14.33(3.69)	5.02	10.60	52529
S6	W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	5.30	7.89	47	92.93	283	280	23.53	4.24	22.43	80	1096.17	1.67(1.39)	4.00(2.11)	1.35	4.03	58118
	W3	5.14	7.61	49	88.90	298	298	24.27	4.90	22.64	80	1061.90	6.00(2.53)	10.83(3.29)	4.95	7.13	59667
	W4	4.59	6.83	46	94.57	307	302	22.71	3.88	22.02	80	965.30	13.00(3.67)	19.67(4.41)	7.08	13.12	53661
Mean of Methods																	
S1		4.04	6.37	76	91.50	314	297	22.51	3.80	22.52	80	881.10	9.22(3.07)	18.44(4.22)	9.66	11.69	54782
S2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S3		4.79	7.54	47	89.02	294	289	23.64	4.15	23.35	80	1035.22	6.33(2.49)	11.67(3.41)	6.47	8.86	57069
S4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S5		5.18	7.03	53	91.56	339	330	24.03	4.55	22.59	79	1001.50	4.56(2.12)	9.78(3.09)	3.61	6.83	56046
S6		5.01	7.44	47	92.13	296	293	23.50	4.34	22.36	80	1041.12	6.89(2.53)	11.50(3.27)	4.46	8.09	57149
C.D. (0.05)		0.24	NS	4.96	NS	NS	NS	1	0.25	NS	NS	87.07	NS	NS	3.08	1.77	513.83
C.V. (%)		4.45	12.24	7.67	7.3	9.26	15.46	3.7	5.22	3.75	1.31	7.63	23.57	20.48	44.17	17.28	0.79

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	MANDYA															
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m² At 20 DAS	Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle length (cm)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Dry mater accumulation at 105 DAS	Weed population (no/m²) At active tillering	Weed population (no/m²) At panicle initiation	Weed biomass (g/m²) At active tillering	Weed biomass (g/m²) At panicle initiation	Cost of cultivation Rs/ha
Mena of Varieties																	
W1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W2		5.23	7.44	56	91.10	317	311	23.66	4.24	22.85	80	1068.68	3.00(1.78)	6.67(2.64)	3.34	5.86	57279
W3		4.89	7.28	57	90.46	326	311	23.87	4.39	22.59	80	1003.65	6.83(2.64)	12.21(3.48)	6.20	8.18	58785
W4		4.16	6.57	56	91.60	290	285	22.74	3.99	22.68	80	896.88	10.42(3.25)	19.67(4.38)	8.62	12.56	52720
CD (0.05)		0.35	0.55	3.57	NS	23.97	21.28	0.7	0.33	NS	NS	56.28	0.37	0.46	3.11	3.3	396.61
C.V. (%)		8.54	8.96	7.35	2.96	8.91	8.13	3.44	8.94	3.54	0	6.57	16.69	15.14	59.41	43.04	0.81
Interaction																	
M and S		NS	NS	NS	NS	47.94	42.55	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
S and M		NS	NS	NS	NS	46.5	52.69	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Experimental Mean		**4.76**	**7.09**	**56**	**91.05**	**311**	**302**	**23.42**	**4.21**	**22.71**	**80**	**989.74**	**2.55**	**3.5**	**6.05**	**8.87**	**56261**
Soil type		Red sandy loam															
pH		7.24															
EC		0.81															
Variety & Duration		KMP - 175															
Applied NPK kg/ha		100:50:50:20															
Available NPK kg/ha		255.2:83:247.2															

S1: Broadcasting of seeds
S2: -
S3: Mechanized line sowing of seeds (25 cm row spacing sown in solid row)
S4: -
S5:Any improved system in that particular location (Drum seeding)
S6:Semi-Dry system (Sowing in dry soil and Wet after one month of sowing)

W_1: -
W_2: Pre + post-emergence herbicide (Pendimethalin 30 EC @ 3.33 lit./ha at 3 DAS followed by Penoxsulam 1.02% + Cyholofop-P- butuly 5.1% OD @ 2.5 lit./ha at 20 DAS
W_3: Pre-emergence herbicide (Pendimethalin 30 EC @ 3.33 lit./ha at 3 DAS) + Manual weeding (two times)
W_4: Mechanical weeding (2 - 3 times start from 15 DAS at 15-20 days interval)

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	NAGINA								
		Grain yield (t/ha)	Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Weed population (no/m²)	Weed biomass (g/m²)
									At active tillering	At active tillering
S1	W1	4.33	99.33	290	282	3.57	34.51	103	4.69(2.27)	5.29
	W2	4.49	100.33	289	270	3.58	34.52	103	9.81(3.20)	6.04
	W3	4.60	100.67	299	286	3.59	34.55	105	9.09(3.05)	4.61
	W4	4.24	100.00	285	275	3.56	34.49	102	9.22(3.10)	5.81
S2	W1	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-
S3	W1	5.24	101.33	315	300	3.64	34.52	108	5.41(2.41)	3.84
	W2	5.48	101.33	317	303	3.66	34.54	108	5.35(2.40)	3.28
	W3	5.67	103.00	324	314	3.67	34.57	110	5.57(2.45)	3.17
	W4	5.21	100.67	311	291	3.63	34.52	109	4.26(2.17)	3.34
S4	W1	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-
S5	W1	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-
S6	W1	4.41	102.00	315	296	3.63	34.51	108	6.71(2.68)	3.84
	W2	4.57	102.33	322	304	3.65	31.19	108	5.54(2.43)	4.03
	W3	4.68	103.00	324	317	3.66	35.21	110	4.29(2.18)	3.55
	W4	4.43	100.00	305	295	3.63	34.51	108	5.42(2.39)	4.15
Mean of Methods										
S1		4.42	100.08	291	278	3.58	34.52	103	8.20(2.90)	5.44
S2		-	-	-	-	-	-	-	-	-
S3		5.40	101.58	317	302	3.65	34.54	109	5.15(2.36)	3.41
S4		-	-	-	-	-	-	-	-	-
S5		-	-	-	-	-	-	-	-	-
S6		4.52	101.83	317	303	3.64	33.86	109	5.49(2.42)	3.89
C.D. (0.05)		0.06	0.51	7.78	8.84	NS	NS	0.84	0.22	0.66
C.V. (%)		1.75	0.7	3.48	4.14	0	5.44	1.08	11.67	21.34

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	NAGINA								
		Grain yield (t/ha)	Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Weed population (no/m²)	Weed biomass (g/m²)
									At active tillering	At active tillering
Mena of Varieties										
W1		4.66	100.89	306	293	3.61	34.51	106	5.60(2.45)	4.32
W2		4.85	101.33	309	292	3.63	33.42	106	6.90(2.68)	4.45
W3		4.98	102.22	316	306	3.64	34.78	108	6.31(2.56)	3.78
W4		4.63	100.22	301	287	3.61	34.51	106	6.30(2.55)	4.43
CD (0.05)		0.14	0.97	10.26	10.42	NS	NS	1.15	NS	NS
C.V. (%)		3	0.97	3.36	3.57	0	4.81	1.08	16.99	31.32
Interaction										
M and S		NS	NS	NS	NS	NS	NS	NS	NS	NS
S and M		NS	NS	NS	NS	NS	NS	NS	NS	NS
Experimental Mean		**4.78**	**101.17**	**308**	**294**	**0.00**	**34.30**	**107**	**2.56**	**4.25**
Soil type		-								
pH		-								
EC		-								
Variety & Duration		-								
Applied NPK kg/ha		-								
Available NPK kg/ha		-								

S1: Broadcasting of seeds
S2: Manual line sowing of seeds (20-25 cm row spacing sown in solid row)
S3: Mechanized line sowing of seeds (Dribbler, Happy seeder of any Drum Seeder: Spacing as per the equipment specifications)
S4: Raised bed sowing
S5- Any improved system in that particular location
S6:Semi-Dry system (Sowing in dry soil and Wet after one month of sowing)

W1: Manual weeding (three times)
W2: Pre + post-emergence herbicide
W3: Pre-emergence herbicide + Manual weeding (two times)
W4: Mechanical weeding (2-3 times start from 15 DAS at 15-20 days interval)

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	NAWAGAM											
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m²	Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Weed population (no/m²)		Weed biomass (g/m²)	
				At 10 DAS							At active tillering	At panicle initiation	At active tillering	At panicle initiation
S1	W1	3.52	4.11	40	39.67	224	169	3.05	16.20	69	74.00(8.61)	99.75(10.00)	31.41	30.45
	W2	3.71	4.15	39	39.00	235	187	3.31	16.48	68	51.50(7.09)	63.75(7.92)	22.90	23.75
	W3	3.31	3.97	44	44.33	237	184	3.42	16.60	69	50.25(7.10)	84.25(9.16)	21.20	25.02
	W4	3.04	3.69	42	42.33	233	194	2.96	16.85	67	74.25(8.60)	86.25(9.18)	28.33	25.26
S2	W1	4.31	4.83	40	39.67	249	209	3.94	16.70	71	37.50(6.09)	42.50(6.36)	13.06	11.11
	W2	4.45	4.98	39	39.33	276	232	4.18	17.73	70	35.00(5.82)	47.75(6.68)	15.24	19.53
	W3	4.26	4.78	40	40.33	242	203	4.03	16.64	71	34.25(5.83)	39.75(6.08)	13.83	17.64
	W4	3.65	4.14	40	39.67	236	198	3.93	17.47	70	43.75(6.57)	56.00(7.29)	18.62	18.58
S3	W1	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-	-	-	-
S4	W1	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-	-	-	-
S5	W1	3.68	4.12	40	39.67	241	193	3.94	17.82	71	79.50(8.93)	91.25(9.55)	36.23	37.85
	W2	4.22	4.72	41	41.00	225	180	4.03	17.14	72	57.00(7.52)	65.25(7.96)	21.54	24.59
	W3	4.16	4.66	35	34.67	245	196	3.96	16.27	70	58.50(7.54)	75.50(8.63)	29.67	34.16
	W4	3.81	4.37	35	35.33	195	156	3.85	16.28	71	90.00(9.44)	107.00(10.32)	38.24	41.39
S6	W1	2.79	3.37	38	38.00	220	163	3.34	16.64	69	57.25(7.57)	80.75(8.97)	28.91	36.08
	W2	2.97	3.74	36	36.33	243	180	3.70	17.47	71	44.50(6.64)	67.50(8.14)	13.62	20.67
	W3	3.29	3.85	44	44.00	240	178	3.62	17.53	70	57.50(7.56)	81.50(9.01)	28.24	34.58
	W4	3.15	3.92	44	43.67	218	161	3.87	18.23	70	60.50(7.78)	97.25(9.86)	29.41	38.96
Mean of Methods														
S1		3.40	3.98	41	41.33	232	183	3.18	16.53	68	62.50(7.85)	83.50(9.06)	25.96	26.12
S2		4.17	4.68	40	39.75	251	211	4.02	17.14	71	37.63(6.08)	46.50(6.60)	15.19	16.72
S3		-	-	-	-	-	-	-	-	-	-	-	-	-
S4		-	-	-	-	-	-	-	-	-	-	-	-	-
S5		3.97	4.47	38	37.67	227	181	3.94	16.88	71	71.25(8.36)	84.75(9.12)	31.42	34.50
S6		3.05	3.72	41	40.50	230	170	3.63	17.47	70	54.94(7.39)	81.75(8.99)	25.04	32.57
C.D. (0.05)		0.36	0.38	NS	NS	NS	20.52	0.42	NS	1.44	0.91	1.01	9.25	9.4
C.V. (%)		9.95	9.06	13.82	0	11.05	11.02	11.47	6.44	2.06	15.38	15.03	37.96	34.25

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	NAWAGAM											
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m²	Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Weed population (no/m²)		Weed biomass (g/m²)	
				At 10 DAS							At active tillering	At panicle initiation	At active tillering	At panicle initiation
Mena of Varieties														
W1		3.58	4.11	39	39.25	234	183	3.57	16.84	70	62.06(7.80)	78.56(8.72)	27.40	28.87
W2		3.84	4.40	39	38.92	245	195	3.80	17.20	70	47.00(6.77)	61.06(7.67)	18.32	22.14
W3		3.76	4.32	41	40.83	241	190	3.76	16.76	70	50.13(7.01)	70.25(8.22)	23.24	27.85
W4		3.41	4.03	40	40.25	220	177	3.65	17.21	70	67.13(8.10)	86.63(9.16)	28.65	31.05
CD (0.05)		NS	NS	5.48	NS	NS	NS	NS	NS	NS	0.82	NS	6.99	NS
C.V. (%)		13.01	11.53	16.33	0	9.61	10.18	7.6	7.79	3.45	15.41	19.18	33.99	35.5
Interaction														
M and S		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
S and M		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Experimental Mean		**3.65**	**4.21**	**40**	**0.00**	**235**	**186**	**3.70**	**17.00**	**70**	**7.42**	**8.44**	**24.40**	**27.48**
Soil type		Caly loam												
pH		7.8												
EC		0.23												
Variety & Duration		Mahisagar												
Applied NPK kg/ha		-												
Available NPK kg/ha		0.022:24.19												

S1: Broadcasting of seeds
S2: Manual line sowing of seeds (20-25 cm row spacing sown in solid row)
S3: -
S4: -
S5- Any improved system in that particular location - Sprauted seed on wet soil
S6:Semi-Dry system (Sowing in dry soil and Wet after one month of sowing)

W1: Manual weeding (three times)
W2: Pre + post-emergence herbicide
W3: Pre-emergence herbicide + Manual weeding (two times)
W4: Mechanical weeding (2-3 times start from 15 DAS at 15-20 days interval)

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	PANTNAGAR												
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m²		Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Weed population (no/m²)		Weed biomass (g/m²)	
				At 10 DAS	At 20 DAS							At active tillering	At panicle initiation	At active tillering	At panicle initiation
S1	W1	3.87	4.42	26	48	110.33	149	241	1.84	21.77	91	17.33(4.13)	25.33(5.07)	48.60	37.17
	W2	3.20	3.71	20	32	109.00	129	233	1.57	21.40	91	50.67(7.14)	13.33(3.71)	48.60	38.67
	W3	3.88	4.49	24	36	104.67	181	237	1.84	21.97	91	21.33(4.64)	25.33(5.06)	49.50	41.10
	W4	2.76	3.47	22	34	103.67	154	209	1.54	21.23	91	134.67(11.62)	97.33(9.88)	41.00	33.93
S2	W1	4.58	4.83	28	42	109.33	186	312	1.67	21.77	96	42.67(6.56)	24.00(4.83)	48.93	37.93
	W2	3.90	4.28	34	62	106.67	165	279	1.74	21.60	96	69.33(8.33)	38.67(6.26)	46.30	34.73
	W3	4.56	5.15	30	48	108.00	187	302	1.71	21.97	96	38.67(6.25)	29.33(5.44)	48.93	36.47
	W4	3.63	4.33	31	49	107.33	178	265	1.74	21.47	96	186.67(13.64)	124.00(11.16)	43.57	36.57
S3	W1	3.98	4.20	34	48	107.00	177	289	1.59	21.00	99	24.00(4.92)	36.00(6.00)	48.27	38.60
	W2	3.24	3.56	34	44	107.00	188	259	1.46	20.73	99	28.00(5.27)	34.67(5.84)	47.03	37.37
	W3	4.01	4.35	35	45	105.33	181	291	1.58	21.30	99	41.33(6.44)	32.00(5.67)	49.00	34.10
	W4	3.09	3.53	39	50	103.33	188	248	1.45	20.60	99	140.00(11.84)	113.33(10.66)	47.60	34.60
S4	W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S5	W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S6	W1	4.07	4.24	34	51	109.67	153	276	1.63	20.60	95	29.33(5.46)	10.67(3.33)	47.93	38.63
	W2	3.39	3.78	36	53	109.67	166	265	1.55	20.23	95	29.33(5.33)	13.33(3.71)	48.40	35.33
	W3	4.15	4.50	31	54	109.00	154	285	1.58	20.77	95	41.33(6.46)	13.33(3.68)	49.80	39.20
	W4	3.25	3.47	34	52	109.67	166	259	1.55	20.17	95	113.33(10.67)	93.33(9.68)	49.07	38.00
Mean of Methods															
S1		3.43	4.02	23	37	106.92	153	230	1.70	21.59	91	56.00(6.88)	40.33(5.93)	46.92	37.72
S2		4.17	4.65	31	50	107.83	179	290	1.72	21.70	96	84.33(8.70)	54.00(6.92)	46.93	36.42
S3		3.58	3.91	35	47	105.66	184	272	1.52	20.91	99	58.33(7.12)	54.00(7.05)	47.98	36.17
S4		-	-	-	-	-	-	-	-	-	-	-	-	-	-
S5		-	-	-	-	-	-	-	-	-	-	-	-	-	-
S6		3.72	4.00	34	53	109.50	159	272	1.58	20.44	95	53.33(6.98)	32.67(5.10)	48.80	37.79
C.D. (0.05)		0.17	0.13	5.09	4.46	3	11.79	7.94	0.04	0.16	5.15	0.42	0.65	2.42	2.86
C.V. (%)		4.05	2.75	14.82	8.54	2.51	6.27	2.68	2.02	0.67	4.84	5.62	10.47	4.55	6.94

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	PANTNAGAR												
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m²		Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Weed population (no/m²)		Weed biomass (g/m²)	
				At 10 DAS	At 20 DAS							At active tillering	At panicle initiation	At active tillering	At panicle initiation
Mena of Varieties															
W1		4.12	4.42	31	47	109.08	166	279	1.68	21.28	96	28.33(5.27)	24.00(4.81)	48.43	38.08
W2		3.43	3.83	31	48	108.08	162	259	1.58	20.99	96	44.33(6.52)	25.00(4.88)	47.58	36.52
W3		4.15	4.62	30	46	106.75	176	279	1.68	21.50	96	35.67(5.95)	25.00(4.96)	49.31	37.72
W4		3.18	3.70	31	46	106.00	171	246	1.57	20.87	96	143.67(11.94)	107.00(10.35)	45.31	35.78
CD (0.05)		NS	NS	2.84	NS	NS	NS	NS	NS	NS	0	0.66	0.51	NS	NS
C.V. (%)		2.05	5.34	13.27	7.9	2.65	3.92	3.13	2.86	0.66	0	10.49	9.66	4	7.2
Interaction															
M and S		NS	NS	NS	NS	NS	NS	NS	NS	NS	0	1.31	NS	NS	NS
S and M		NS	NS	NS	NS	NS	NS	NS	NS	NS	2.21	1.18	NS	NS	NS
Experimental Mean		**3.72**	**4.14**	**31**	**47**	**107.48**	**169**	**266**	**1.63**	**21.16**	**96**	**7.42**	**6.25**	**47.66**	**37.02**
Soil type		Silt Loam													
pH		7.7													
EC		1.2													
Variety & Duration		PD-24													
Applied NPK kg/ha		-													
Available NPK kg/ha		230;21.3:220													

S1: Broadcasting of seeds
S2: Manual line sowing of seeds (20-25 cm row spacing sown in solid row)
S3: Mechanized line sowing of seeds (Dribbler, Happy seeder of any Drum Seeder: Spacing as per the equipment specifications)
S4: -
S5- -
S6:Semi-Dry system (Sowing in dry soil and Wet after one month of sowing)

W1: Manual weeding (three times)
W2: Pre + post-emergence herbicide
W3: Pre-emergence herbicide + Manual weeding (two times)
W4: Mechanical weeding (2-3 times start from 15 DAS at 15-20 days interval)

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	PUSA										RAIPUR						
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m²		Plant height (cm)	Tillers/m² (No.)	Test wt (g)	Days for 50% flowering	Dry mater accumulation (g/m2)			Grain yield (t/ha)	Straw yield (t/ha)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Filled grain / panicle	unfilled grain / panicle
				At 10 DAS	At 20 DAS					At 45 DAS	At 75 DAS	At 105 DAS							
S1	W1	4.09	5.29	58	52	115.33	311	22.00	84	225.33	591.67	1001.33	4.46	6.04	332	2.93	30.57	100	30
	W2	4.01	5.20	53	49	110.33	298	21.47	84	194.00	562.00	928.67	4.24	5.88	315	2.75	30.17	95	27
	W3	4.06	5.25	54	51	113.00	305	21.40	84	200.67	577.00	938.33	4.39	5.97	325	2.87	30.17	99	29
	W4	4.07	5.28	53	50	113.33	309	21.90	83	222.67	584.67	981.67	-	-	-	-	-	-	-
S2	W1	4.79	6.26	51	49	119.33	354	22.57	84	241.67	633.33	1038.33	-	-	-	-	-	-	-
	W2	4.19	5.49	51	50	113.67	337	21.60	84	214.00	594.33	964.33	-	-	-	-	-	-	-
	W3	4.26	5.56	52	51	115.33	340	21.73	84	220.67	602.33	970.33	-	-	-	-	-	-	-
	W4	4.76	6.20	52	49	118.33	351	22.30	83	240.00	624.67	1028.33	-	-	-	-	-	-	-
S3	W1	4.27	5.54	54	51	119.67	315	22.60	85	235.33	623.33	992.33	4.71	6.39	160	3.50	30.80	126	30
	W2	3.86	5.06	54	52	115.67	300	21.63	84	199.33	588.33	943.33	4.59	6.20	150	3.23	30.57	123	27
	W3	3.90	5.10	55	53	116.67	310	21.53	83	205.33	595.33	949.33	4.69	6.35	154	3.39	30.80	125	29
	W4	4.27	5.56	56	52	119.00	313	22.20	82	230.67	615.33	985.67	-	-	-	-	-	-	-
S4	W1	-	-	-	-	-	-	-	-	-	-	-	3.51	4.73	74	3.83	30.63	130	32
	W2	-	-	-	-	-	-	-	-	-	-	-	3.30	4.45	67	3.44	29.70	125	28
	W3	-	-	-	-	-	-	-	-	-	-	-	3.39	4.67	72	3.64	30.00	127	32
	W4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S5	W1	4.59	5.99	54	50	124.67	352	22.07	86	237.33	625.33	1014.33	4.62	6.34	142	3.81	30.83	128	32
	W2	4.21	5.47	56	53	121.00	321	21.33	85	206.67	582.00	952.33	4.48	6.14	134	3.28	30.50	125	29
	W3	4.26	5.53	53	50	123.33	324	21.47	84	210.67	590.67	957.33	4.54	6.17	135	3.68	30.80	126	30
	W4	4.54	5.90	52	49	123.67	342	21.70	85	232.00	619.00	1004.33	-	-	-	-	-	-	-
S6	W1	4.50	5.83	56	52	121.33	338	22.40	85	235.00	625.00	995.67	-	-	-	-	-	-	-
	W2	4.26	5.54	55	52	114.00	318	21.50	84	199.67	568.00	937.67	-	-	-	-	-	-	-
	W3	4.33	5.62	54	52	116.33	322	21.60	82	211.00	568.33	944.33	-	-	-	-	-	-	-
	W4	4.44	5.76	55	50	118.67	337	22.17	84	231.67	617.00	996.67	-	-	-	-	-	-	-
Mean of Methods																			
S1		4.06	5.26	55	51	113.00	306	21.69	84	210.67	578.84	962.50	4.36	5.96	324	2.85	30.30	98	29
S2		4.50	5.88	52	50	116.66	346	22.05	84	229.08	613.66	1000.33	-	-	-	-	-	-	-
S3		4.08	5.32	55	52	117.75	309	21.99	84	217.66	605.58	967.66	4.66	6.31	155	3.37	30.72	124	29
S4		-	-	-	-	-	-	-	-	-	-	-	3.40	4.62	71	3.64	30.11	127	30
S5		4.40	5.72	54	51	123.17	335	21.64	85	221.67	604.25	982.08	4.55	6.22	137	3.59	30.71	126	30
S6		4.38	5.69	55	51	117.58	329	21.92	84	219.34	594.58	968.58	-	-	-	-	-	-	-
C.D. (0.05)		0.22	0.29	1.29	1.39	4.18	NS	NS	NS	NS	NS	21.26	0.15	0.22	13.81	0.37	NS	11.48	NS
C.V. (%)		5.4	5.55	2.54	2.9	3.77	11.93	2.39	2.1	6.18	5.26	2.31	3.1	3.37	6.97	9.6	2.19	8.36	13.57

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	PUSA										RAIPUR						
		Grain yield (t/ha)	Straw yield (t/ha)	Plant population no/m²		Plant height (cm)	Tillers/m² (No.)	Test wt (g)	Days for 50% flowering	Dry mater accumulation (g/m2)			Grain yield (t/ha)	Straw yield (t/ha)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Filled grain / panicle	unfilled grain / panicle
				At 10 DAS	At 20 DAS					At 45 DAS	At 75 DAS	At 105 DAS							
Mena of Varieties																			
W1		4.45	5.78	54	51	120.07	334	22.33	85	234.93	619.73	1008.40	4.32	5.88	177	3.52	30.71	121	31
W2		4.11	5.35	54	51	114.93	315	21.51	84	202.73	578.93	945.27	4.15	5.67	166	3.18	30.24	117	28
W3		4.16	5.41	54	51	116.93	320	21.55	83	209.67	586.73	951.93	4.25	5.79	171	3.40	30.44	119	30
W4		4.42	5.74	53	50	118.60	331	22.05	83	231.40	612.13	999.33	-	-	-	-	-	-	-
CD (0.05)		0.11	0.14	1.29	NS	2.5	7.85	0.31	NS	5.73	7.68	19.35	0.13	0.13	7.64	0.21	NS	NS	2.5
C.V. (%)		3.33	3.31	3.21	3.67	2.85	3.24	1.92	3.23	3.5	1.72	2.66	3.54	2.66	5.14	7.24	2.53	7.15	9.77
Interaction																			
M and S		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
S and M		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Experimental Mean		**4.28**	**5.57**	**54**	**51**	**117.63**	**325**	**21.86**	**84**	**219.68**	**599.38**	**976.23**	**4.24**	**5.78**	**172**	**3.36**	**30.46**	**119**	**30**
Soil type		Sandy loam											Vertisols						
pH		8.19											7.06						
EC		-											-						
Variety & Duration		Rajendra Nilam											IGKV R1						
Applied NPK kg/ha		-											-						
Available NPK kg/ha		238;11.8:137											2.9:21.6:368						

S1: Broadcasting of seeds
S2: Manual line sowing of seeds (20-25 cm row spacing sown in solid row)
S3: Mechanized line sowing of seeds (Dribbler, Happy seeder of any Drum Seeder: Spacing as per the equipment specifications)
S4: -
S5- Any improved system in that particular location
S6:Semi-Dry system (Sowing in dry soil and Wet after one month of sowing)

W1: Manual weeding (three times)
W2: Pre + post-emergence herbicide
W3: Pre-emergence herbicide + Manual weeding (two times)
W4: Mechanical weeding (2-3 times start from 15 DAS at 15-20 days interval)

S1: Broadcasting of seeds
S2: -
S3: Mechanized line sowing of seeds (Conentional seed drill)
S4: Raised bed sowing
S5- Any improved system in that particular location (Sowing with inclined plate planter seed drill with less seed rate
S6-

W1: Manual weeding
W2: Pre-emergence herbicide (Oxadiargyl)+ Post emergence herbicide (Bispyribac Na)
W3: Pre emergence herbicide (Oxadiargyl) + hand weeding
W4: -

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	Ranchi							VARANASI							Over all Mean	Rank
		Grain yield (t/ha)	Panicle/m² (No.)	Test wt (g)	Filled grains/Panicle	Dry mater accumulation (g/m2)		Weed population (no/m2)	Grain yield (t/ha)	Panicle/m² (No.)	Panicle wt (g)	Weed population (no/m²)		Weed biomass (g/m²)			
						At 30 DAS	At 60 DAS	At active tillering				At active tillering	At panicle initiation	At active tillering	At panicle initiation		
S1	W1	4.11	227	23.62	91	15.63	40.50	26.30(5.18)	3.11	243	0.69	62.78(7.92)	35.44(5.94)	63.63	82.54	4.10	13
	W2	4.44	255	23.70	100	16.70	42.00	20.60(4.59)	3.36	273	0.83	24.67(4.94)	21.89(4.69)	40.07	38.04	3.98	16
	W3	4.20	232	23.60	93	20.20	47.20	16.30(4.10)	3.17	257	0.78	35.89(5.93)	24.67(4.91)	51.64	52.30	4.09	14
	W4	3.80	220	23.50	84	40.00	61.60	29.20(5.45)	3.02	213	0.65	56.00(7.51)	26.89(5.22)	53.87	94.76	3.63	22
S2	W1	4.72	275	23.87	105	20.20	32.00	21.20(4.66)	3.37	229	1.11	41.11(6.37)	20.11(4.48)	43.73	34.16	4.62	4
	W2	4.97	288	23.91	111	14.73	30.60	13.50(3.74)	3.95	267	1.26	18.00(4.26)	6.67(2.67)	12.64	18.58	4.25	9
	W3	4.75	270	23.86	117	15.30	40.40	15.80(4.03)	3.41	262	1.23	25.89(5.12)	12.78(3.62)	20.06	28.63	4.55	5
	W4	4.27	235	23.67	96	31.67	50.90	27.73(5.31)	3.18	227	0.97	46.00(6.81)	37.78(6.15)	46.06	41.85	3.97	18
S3	W1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.73	2
	W2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.19	10
	W3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.84	1
	W4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.13	11
S4	W1	-	-	-	-	-	-	-	3.29	259	1.35	30.33(5.52)	18.56(4.27)	24.22	22.58	3.48	23
	W2	-	-	-	-	-	-	-	4.01	326	1.63	7.89(2.87)	8.33(2.94)	14.75	14.46	3.97	17
	W3	-	-	-	-	-	-	-	3.92	272	1.35	11.67(3.47)	14.33(3.84)	22.37	21.11	3.83	21
	W4	-	-	-	-	-	-	-	3.48	264	1.35	25.56(5.03)	22.00(4.73)	49.03	46.81	3.41	24
S5	W1	4.82	280	24.00	108	11.00	27.60	13.80(3.78)	3.39	175	0.97	37.22(6.12)	24.44(4.78)	34.96	31.77	4.26	8
	W2	5.32	304	24.26	118	8.80	28.80	12.70(3.63)	3.85	249	1.28	17.00(4.16)	11.78(3.48)	19.84	17.88	4.70	3
	W3	4.96	290	24.10	112	10.60	31.70	10.63(3.33)	3.35	188	1.05	32.22(5.72)	16.89(4.14)	30.08	23.04	4.52	6
	W4	4.40	257	23.81	99	16.50	36.00	18.20(4.32)	3.07	170	0.89	52.33(7.26)	37.22(6.12)	47.70	51.24	4.09	15
S6	W1	4.92	288	24.07	111	12.40	38.40	15.80(4.03)	3.20	189	0.87	55.44(7.46)	27.11(5.23)	60.67	30.42	4.11	12
	W2	4.98	292	24.10	112	17.60	40.10	24.50(5.00)	3.22	288	1.03	32.56(5.61)	13.89(3.78)	14.88	23.18	3.88	19
	W3	4.41	253	23.75	99	20.47	41.27	16.60(4.13)	3.45	196	0.88	41.00(6.41)	18.11(4.29)	19.39	26.77	4.36	7
	W4	4.37	240	23.90	95	23.60	46.77	24.80(5.03)	3.37	176	0.77	64.89(8.08)	40.00(6.32)	87.46	64.19	3.87	20
Mean of Methods																	
S1		4.14	233	23.60	92	23.13	47.82	23.10(4.83)	3.16	247	0.74	44.83(6.58)	27.22(5.19)	52.30	66.91	3.96	5
S2		4.68	267	23.83	107	20.48	38.48	19.56(4.44)	3.48	246	1.14	32.75(5.64)	19.33(4.23)	30.62	30.80	4.35	3
S3		-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.49	1
S4		-	-	-	-	-	-	-	3.68	280	1.42	18.86(4.22)	15.81(3.94)	27.59	26.24	3.67	6
S5		4.88	283	24.04	109	11.72	31.02	13.83(3.77)	3.42	195	1.05	34.69(5.82)	22.58(4.63)	33.14	30.98	4.44	2
S6		4.67	268	23.96	104	18.52	41.64	20.42(4.55)	3.31	212	0.89	48.47(6.89)	24.78(4.90)	45.60	36.14	4.08	4
C.D. (0.05)		0.47	21.05	0.29	4.21	2.39	2.62	0.11	0.18	7.59	0.16	0.86	0.53	25.39	NS		
C.V. (%)		10.3	8.02	1.21	4.09	12.97	6.59	2.53	5.18	3.22	15.21	15.73	12.25	67.31	132.22		

Table-4.2.2.1: Contd.

Methods of crop establishment	Sub plot	Ranchi							VARANASI							Over all Mean	Rank
		Grain yield (t/ha)	Panicle/m² (No.)	Test wt (g)	Filled grains/Panicle	Dry mater accumulation (g/m2)		Weed population (no/m2)	Grain yield (t/ha)	Panicle/m² (No.)	Panicle wt (g)	Weed population (no/m²)		Weed biomass (g/m²)			
						At 30 DAS	At 60 DAS	At active tillering				At active tillering	At panicle initiation	At active tillering	At panicle initiation		
Mena of Varieties																	
W1		4.64	267	23.89	103	14.81	34.62	19.28(4.41)	3.27	219	1.00	45.38(6.68)	25.13(4.94)	45.44	40.29	4.35	2
W2		4.93	285	23.99	110	14.46	35.38	17.83(4.24)	3.68	280	1.21	20.02(4.37)	12.51(3.51)	20.44	22.43	4.19	3
W3		4.58	261	23.83	105	16.64	40.14	14.83(3.90)	3.46	235	1.06	29.33(5.33)	17.36(4.16)	28.71	30.37	4.45	1
W4		4.21	238	23.72	93	27.94	48.82	24.98(5.03)	3.22	210	0.93	48.96(6.94)	32.78(5.71)	56.82	59.77	3.93	4
CD (0.05)		0.35	22.29	NS	3.72	1.51	2.73	0.13	0.07	NS	NS	0.57	0.55	NS	NS		
C.V. (%)		9.03	10.06	1.87	4.28	9.69	8.15	3.6	3.08	4.47	19.01	13.2	16.09	43.87	59.3		
Interaction																	
M and S		NS	NS	NS	7.44	3.02	5.46	0.27	NS	NS	NS	NS	NS	NS	NS		
S and M		NS	NS	NS	7.21	3.18	5.14	0.25	NS	NS	NS	NS	NS	NS	NS		
Experimental Mean		**4.59**	**263**	**23.86**	**103**	**18.46**	**39.74**	**4.39**	**3.41**	**236**	**1.05**	**5.83**	**4.58**	**37.85**	**38.22**	**4.25**	
Soil type		-							Sandy loam								
pH		-							7.2								
EC		-							0.21								
Variety & Duration		Naveen							-								
Applied NPK kg/ha		-							-								
Available NPK kg/ha		226: 38:176							185:32:198								

S1: Broadcasting of seeds
S2: Line sowing 20 cm apart
S3: Mechanized line sowing of seeds (Dribbler, Happy seeder of any Drum Seeder: Spacing as per the equipment specifications)
S4: Raised bed sowing
S5- Rice + Sesbania {sesbania uprooted 25DAS and placed in between rice rows
S6:Semi-Dry system (Sowing in dry soil and Wet after one month of sowing)

W1- 3 Hand Weeding
W2- Pretilachlor@0.75 lit.ai/ha +Bispyribac Sodium@ 25gai/ha
W3 - Pretilachlor@0.75 lit.ai/ha +2 weeding at 30 and 60 DAS
W4- Mechanicle weeding at 15 and 30 DAS

S1: Broadcasting of seeds
S2: Manual line sowing of seeds (20-25 cm row spacing sown in solid row)
S3: Mechanized line sowing of seeds (Dribbler, Happy seeder of any Drum Seeder: Spacing as per the equipment specifications)
S4: Raised bed sowing
S5- Any improved system in that particular location(Dibbling)
S6:Semi-Dry system (Sowing in dry soil and Wet after one month of sowing)- Sowing in dry soil fb wetting

W1: Manual weeding (three times)
W2: Pre + post-emergence herbicide
W3: Pre-emergence herbicide + Manual weeding (two times)
W4: Mechanical weeding (2-3 times start from 15 DAS at 15-20 days interval)

4.2.2.2. Developing suitable package of practices for wet DSR

Direct wet seeding offers the advantage of faster and easier planting, reduced labour and less drudgery, 7-10 days' earlier crop maturity, more efficient water use and higher tolerance to water deficit, less methane emission, and often higher profit in areas with assured water supply. This method of seeding in the past has received relatively less attention than transplanting. Sowing of sprouted rice seed or wet-seeded rice in puddled soil though becoming increasingly important as a method of crop establishment under lowland rice is beset with weed problems, particularly grassy weeds besides other management practices. Weeds emerge at about the same time that the rice seeds germinate, and therefore the yield losses caused by weeds will become greater with the trend towards wet seeding. Effective weed control is one of the key issue and major requirements to ensure a successful wet-seeded rice crop. Furthermore, varieties must be improved for early seeding vigour, weed competitiveness, submergence tolerance to survive untimely rainfall during stand establishment and drought tolerance to survive dry conditions during germination and later growth stages, and for lodging resistance at maturity. Hence the present trial is constituted to enhance the productivity of the wet DSR with the following objectives 1) To identify suitable and cost effective agronomic management practices to enhance the productivity of wet-DSR) To maximize the resource use efficiency. The trial was conducted at 14 locations (**Aduthurai, Chatha, Chiplima, Coimbatore, Karjat, Kota, Moncompu, Navsari, Nawagam, Puducherry, Pusa, Rewa, Titabar, Tuljapur, Khudwani, Vadagaon, Varanasi** and **Warangal**). RBD design was adopted with seven treatments consist of S_1: manual broadcasting of seeds; S_2: Drum seeding + post-emergence herbicide; S_3: Broadcasting + Post-emergence herbicide; S_4: Drum seeding + mechanical weeding; S_5: Drum seeding + post-emergence + mechanical weeding; S_6: Drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application; S_7: Local wet-DSR. The results were summarized and presented in **Table 4.2.2** and the salient findings are as followed.

At **Aduthurai**, Drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application resulted the highest grain yield (5.58 t/ha). In sandy clay loam soils of Chatha, Basmati 370 produced the highest grain yield under mechanized line sowing (Drum seeding) + post-emergence herbicide + mechanical weeding + 4 split N application resulted the highest grain yield (3.48 t/ha). At Chiplima, MTU 1156 resulted the highest grain yield (6.15 t/ha) under drum seeding + post-emergence + mechanical weeding treatment. Similarly, in clay soils of Coimbatore, drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application treatment resulted the highest grain yield (5.49 t/ha). Further, the total water input was 1154 mm/ha. At **Karjat**, KJT-3 variety under drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application treatment produced the highest grain yield (4.26 t/ha), however at par with drum seeding + post-emergence + mechanical weeding (4.20 t/ha) and drum seeding + mechanical weeding (4.17 t/ha). At Kota, Pusa Sugandh-5 (P-2511) variety, apart from manual transplanting, drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application resulted the highest grain yield (5.37 t/ha), however, at par with Drum seeding + post-emergence + mechanical weeding (5.30 t/ha), drum seeding + mechanical weeding (5.00 t/ha) and mechanized line sowing (5.11 t/ha). In clay loam soils of Moncompu, broadcasting of seeds + post-emergence herbicide resulted the highest grain yield (6.52 t/ha) followed by drum seeding + post-emergence + mechanical weeding (6.46

t/ha). In clay soils of Navsari, drum seeding + post-emergence herbicide + mechanical weeding + 4 split N applicationgave the highest grain yield (5.47 t/ha) at par with drum seeding + post-emergence + mechanical weeding (5.16 t/ha) and drum seeding + post-emergence herbicide application (5.11 t/ha). The lowest cost of cultivation was recorded in broadcasting of seeds and manual weeding once (Rs. 36,539/-). The total input was the lowest in drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application treatment (142 cm/ha). In clay loam soils of Nawagam, drum seeding + mechanical weeding resulted the highest grain yield (3.85 t/ha) with cost of cultivation of Rs. 39,398/ha. In clay loam soils of **Puducherry**, DRR Dhan 52 produced the highest grain yield under drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application (7.15 t/ha). In sandy loam soils of Pusa, drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application resulted the highest yield (4.85 t/ha) followed by and at par with manual sowing + pre and post-emergence application of herbicide (4.64 t/ha). Total water input for all treatments was 843 mm/ha. In **Rewa**, drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application resulted the highest grain yield (5.38 t/ha). In clay loam soils of Titabar, drum seeding + post-emergence + mechanical weeding treatment resulted the highest grain yield (3.90 t/ha). The CV of the trial was 23.08. At **Tuljapur**, the highest grain yield was recorded in drum seeding + mechanical weeding (2.10 t/ha). The experimental mean grain yield was 1.82 t/ha, which is very low. In **Vadgaon**, the highest grain yield was recorded in drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application (5.49 t/ha) followed by drum seeding + mechanical weeding (5.37 t/ha). In sandy loam soils of Varanasi, drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application resulted the highest grain yield (4.88 t/ha). followed by drum seeding + post-emergence + mechanical weeding (4.61 t/ha). In Warangal, WGL-962 produced the highest grain yield under drum seeding + post-emergence herbicide + mechanical weeding + 4 split N application treatment (6.08 t/ha), however at par with drum seeding + post-emergence + mechanical weeding (6.03 t/ha).

Trial 4.2.2.2: Developing a suitable package of practices for higher yield in Wet DSR system, Kharif 2021

Treatment	ADUTHURAI				
Crop establishment methods	Grain yield (t/ha)	Plant height (cm)	Tillers/m² (No.)	Panicle wt (g)	Test wt (g)
S1	3.50	83.65	208	2.07	17.13
S2	3.57	85.08	209	2.18	17.50
S3	4.32	89.53	227	2.20	17.40
S4	4.73	93.23	244	2.24	17.53
S5	5.20	95.68	251	2.26	17.45
S6	5.58	102.33	263	2.32	17.63
S7	-	-	-	-	-
Exp. mean	**4.48**	**91.58**	**233**	**2.21**	**17.44**
CD(0.05)	0.18	2.52	10.26	0.04	0.23
CV	2.71	1.82	2.92	1.27	0.89
Soil type	-				
pH	-				
EC					
Variety	-				
Applied NPK kg/ha)					
Available NPK kg/ha	-				

S_1 – Broadcasting + Mannual weeding

S_2 – Drum seeding + Post emergence herbicide

S_3 – Broadcasting + Post emergence herbicide

S_4 – Drum seeding + Mechanical weeding

S_5 – Drum seeding + Post emergence herbicide + Mechanical weeding

S_6 – Drum seeding + Post emergence herbicide + Mechanical weeding + 4 split N application

Trial 4.2.2.2: Contd.

Treatment / Crop establishment methods	CHATHA															
	Grain yield (t/ha)	Plant population/m2		Plant height (cm)	Tillers/m^2 (No.)	Panicle no. /m^2	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Dry matter accumulation (g/m^2)			Weed population (no/m^2)		Weed dry weight (g/m2)	
		At 10 DAS	At 20 DAS							At 45 DAS	At 75 DAS	At 105 DAS	At active tillering	At panicle initiation	At active tillering	At panicle initiation
S1	2.85	72	110	102.67	216	159	1.70	20.03	105	131.33	313.07	433.70	85.33(9.26)	83.00(9.14)	81.33	86.03
S2	3.12	86	124	124.67	225	175	1.81	20.23	106	149.67	315.93	447.77	80.67(9.01)	77.67(8.84)	75.17	81.00
S3	2.84	77	105	103.33	213	156	1.65	19.80	105	126.30	304.80	430.67	79.00(8.92)	78.00(8.86)	74.10	80.53
S4	3.22	88	127	126.67	231	186	1.85	20.43	107	152.10	325.00	450.67	86.00(9.30)	81.67(9.06)	77.57	84.60
S5	3.26	90	126	129.00	234	188	1.87	20.67	107	155.23	326.87	454.90	73.67(8.61)	71.33(8.48)	67.83	78.37
S6	3.48	85	122	146.33	268	204	2.02	20.97	109	169.20	359.27	476.90	74.67(8.67)	72.67(8.55)	65.13	76.27
S7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exp. mean	**3.13**	**83**	**119**	**122.11**	**231**	**178**	**1.82**	**20.36**	**106**	**147.31**	**324.16**	**449.10**	**8.96**	**8.82**	**73.52**	**81.13**
CD(0.05)	0.05	3.69	5.41	5.79	5.1	3.07	0.04	0.12	0.81	4.11	4.91	4.67	0.22	0.11	2.93	4.78
CV	0.82	2.44	2.49	2.61	1.21	0.95	1.35	0.33	0.42	1.53	0.83	0.57	1.38	0.68	2.19	3.24
Soil type	Sandy clay loam															
pH	8.03															
EC	0.21															
Variety	Basmati 370															
Applied NPK kg/ha)	30:20:10															
Available NPK kg/ha	245.15:14.34:146.31															

S_1-Broadcasting of seeds (Flat sowing) + manual weeding (once)
S_2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide
S_3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide
S_4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice
S_5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once
S_6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage
S7 - Optional (local wet direct seeded practices)

Trial 4.2.2.2: Contd.

Treatment / Crop establishment methods	CHIPLIMA								
	Grain yield (t/ha)	Plant population/m2	Plant height (cm)	Tillers/m² (No.)	Test wt (g)	Days to 50% flowering	Dry matter accumulation (g/m²)		
		At 10 DAS					At 45 DAS	At 75 DAS	At 105 DAS
S1	5.18	130	95.90	174	20.00	81	82.78	164.50	265.25
S2	5.75	138	101.83	268	20.28	86	88.93	184.50	276.75
S3	5.35	133	97.08	180	20.05	82	85.30	171.00	275.75
S4	5.88	141	102.70	281	20.53	86	88.28	190.25	283.75
S5	6.15	140	102.93	292	20.60	87	93.78	194.00	296.75
S6	-	-	-	-	-	-	-	-	-
S7	-	-	-	-	-	-	-	-	-
Exp. mean	**5.66**	**136**	**100.09**	**239**	**20.29**	**84**	**87.81**	**180.85**	**279.65**
CD(0.05)	0.15	5.93	2.71	11.98	0.17	1.43	3.99	6.72	12.55
CV	1.71	2.82	1.76	3.25	0.55	1.1	2.95	2.41	2.91
Soil type	-								
pH	-								
EC	-								
Variety	MTU 1156								
Applied NPK kg/ha)	-								
Available NPK kg/ha	-								

S_1-Broadcasting of seeds (Flat sowing) + manual weeding (once)

S_2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide

S_3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide

S_4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice

S_5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once

Trial 4.2.2.2: Contd.

Treatment	COIMBATORE											
Crop establishment methods	Grain yield (t/ha)	Plant population/m2	Plant height (cm)	Tillers/m² (No.)	Panicle no. /m²	Panicle wt (g)	Test wt (g)	Dry matter accumulation (g/m²)	Weed population (no/m²)		Weed dry weight (g/m2)	Total water input mm/ha
		At 20 DAS						At 105 DAS	At active tillering	At panicle initiation	At active tillering	
S1	3.95	69	75.48	329	246	2.98	14.53	765.93	23.15(4.86)	8.43(2.99)	7.08	1154
S2	5.22	55	86.78	302	270	3.38	14.65	843.08	12.48(3.60)	5.45(2.44)	4.13	1154
S3	3.99	66	77.75	330	235	3.04	14.48	764.05	19.58(4.48)	7.63(2.85)	6.63	1154
S4	5.25	55	85.28	319	286	3.49	14.63	871.10	11.93(3.52)	4.73(2.28)	4.00	1154
S5	5.38	56	86.53	334	308	3.56	14.80	917.08	8.33(2.97)	2.90(1.84)	2.60	1154
S6	5.49	58	88.50	379	323	3.65	14.85	942.13	8.15(2.93)	2.80(1.81)	2.48	1154
S7	4.85	61	85.68	293	268	3.22	14.60	833.15	19.15(4.43)	6.98(2.73)	5.70	1154
Exp. mean	**4.88**	**60**	**83.71**	**326**	**277**	**3.33**	**14.65**	**848.07**	**3.83**	**2.42**	**4.66**	**1154**
CD(0.05)	0.15	3.02	3.43	18.4	24.51	0.19	0.57	16.52	0.24	0.13	0.77	0
CV	2.12	3.39	2.75	3.79	5.96	3.86	2.61	1.31	4.22	3.64	11.15	0
Soil type	Clay											
pH	8.36											
EC	0.43											
Variety	CO 52											
Applied NPK kg/ha)	150:50:50											
Available NPK kg/ha	272;27:490											

S_1-Broadcasting of seeds (Flat sowing) + manual weeding (once)

S_2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide

S_3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide

S_4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice

S_5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once

S_6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage

S7 - Optional - Line sowing + Manual weeding twice

Trial 4.2.2.2: Contd.

Treatment	KARJAT																
Crop establishment methods	Grain yield (t/ha)	Straw yield (t/ha)	Plant population/m2		Plant height (cm)	Tillers/m² (No.)	Panicle no. /m²	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Dry matter accumulation (g/m²)			Weed population (no/m²)		Weed dry weight (g/m2)	
			At 10 DAS	At 20 DAS							At 45 DAS	At 75 DAS	At 105 DAS	At active tillering	At panicle initiation	At active tillering	At panicle initiation
S1	3.67	4.77	32	37	89.83	215	194	1.75	20.11	82	203.40	610.27	884.45	49.00(7.01)	41.67(6.49)	14.91	22.19
S2	3.88	5.19	37	43	95.93	235	225	1.82	22.45	83	228.20	726.44	1037.78	35.00(5.94)	32.00(5.69)	11.28	18.69
S3	3.52	4.60	31	37	89.70	211	186	1.73	19.75	82	197.13	560.77	824.66	53.67(7.33)	49.33(7.06)	22.17	26.76
S4	4.17	5.70	36	45	97.53	242	231	1.86	22.71	82	229.23	729.56	1042.22	29.67(5.47)	24.67(5.01)	8.66	17.22
S5	4.20	5.77	34	45	97.60	253	244	1.97	22.84	82	244.44	744.02	1062.89	28.67(5.38)	24.00(4.95)	8.39	16.29
S6	4.26	5.82	34	45	98.13	256	248	1.98	23.26	82	264.03	766.80	1080.00	25.67(5.09)	22.67(4.81)	6.41	14.70
S7	3.74	4.99	30	37	95.60	234	223	1.81	22.49	82	224.10	692.22	988.89	44.67(6.71)	34.00(5.87)	12.46	19.87
Exp. mean	**3.92**	**5.26**	**33**	**41**	**94.90**	**235**	**222**	**1.85**	**21.94**	**82**	**227.22**	**690.01**	**988.70**	**6.13**	**5.7**	**12.04**	**19.39**
CD(0.05)	0.47	0.77	3.45	2.39	6.32	26.81	29.51	0.18	2.43	2.2	41.64	94.43	135.71	1.14	0.4	5.34	3.51
CV	6.79	8.21	5.81	3.27	3.74	6.41	7.49	5.34	6.23	1.5	10.3	7.69	7.71	10.42	3.91	24.94	10.18
Soil type	-																
pH	-																
EC	-																
Variety	KJT - 3																
Applied NPK kg/ha)	-																
Available NPK kg/ha	-																

S_1-Broadcasting of seeds (Flat sowing) + manual weeding (once)

S_2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide

S_3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide

S_4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice

S_5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once

S_6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage

S7 - Optional (local wet direct seeded practices)

Trial 4.2.2.2: Contd.

Treatment / Crop establishment methods	KOTA									
	Grain yield (t/ha)	Straw yield (t/ha)	Tillers/m² (No.)	Panicle no. /m²	Panicle wt (g)	Test wt (g)	Weed population (no/m²)		Weed dry weight (g/m2)	
							At active tillering	At panicle initiation	At active tillering	At panicle initiation
S1	4.43	5.91	287	247	3.18	22.95	11.00(3.38)	16.33(4.10)	10.95	24.12
S2	5.11	6.29	314	278	3.78	23.81	8.67(3.03)	10.67(3.34)	8.63	15.60
S3	4.60	6.20	291	244	3.25	22.89	11.67(3.48)	15.00(3.93)	12.64	23.43
S4	5.00	6.25	309	267	3.90	23.89	7.33(2.79)	9.00(3.07)	7.24	13.09
S5	5.30	6.56	316	283	3.97	23.75	5.67(2.48)	6.67(2.68)	5.51	9.84
S6	5.37	6.58	310	280	4.06	23.92	6.00(2.54)	5.67(2.47)	5.62	7.93
S7	5.44	6.69	322	291	4.12	24.14	4.67(2.26)	5.67(2.47)	4.47	7.59
Exp. mean	**5.04**	**6.35**	**307**	**270**	**3.75**	**23.62**	**2.85**	**3.15**	**7.87**	**14.51**
CD(0.05)	0.39	0.45	22.07	19.01	0.35	0.65	0.41	0.51	2.25	4.65
CV	4.33	3.99	4.04	3.96	5.2	1.56	8.06	9.07	16.1	18
Soil type	-									
pH	7.47									
EC	0.55									
Variety	Pusa Sugandha-5 (P-2511)									
Applied NPK kg/ha)	120:60:40									
Available NPK kg/ha	206.98:37.12:563.6									

S1-Broadcasting of seeds (Flat sowing) + manual weeding (once)

S2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide

S3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide

S4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice

S5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once

S6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage

S7 - Normal transplanting + Post emergence herbicide

Trial 4.2.2.2: Contd.

Treatment / Crop establishment methods	MONCOMPU																
	Grain yield (t/ha)	Straw yield (t/ha)	Plant population/m2		Plant height (cm)	Tillers/m² (No.)	Panicle no. /m²	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Dry matter accumulation (g/m²)			Weed population (no/m²)		Weed dry weight (g/m2)	
			At 10 DAS	At 20 DAS							At 45 DAS	At 75 DAS	At 105 DAS	At active tillering	At panicle initiation	At active tillering	At panicle initiation
S1	6.34	7.12	209	112	152.00	412	409	18.70	21.67	87	4.27	6.27	22.87	0.00(0.71)	16.67(4.12)	0.00	21.60
S2	5.78	6.91	92	69	109.33	379	375	18.77	24.00	89	5.50	7.50	22.63	70.67(8.27)	21.33(4.64)	16.00	96.00
S3	6.52	7.96	269	129	149.67	516	509	19.50	23.67	85	5.90	7.90	20.37	28.00(5.10)	13.67(3.76)	4.40	23.33
S4	5.44	8.09	89	75	114.67	357	357	20.77	25.67	90	6.93	8.93	23.53	121.33(10.44)	45.33(6.76)	30.00	90.13
S5	6.46	8.50	75	69	109.33	351	341	20.17	23.33	91	9.30	11.30	26.27	52.00(7.02)	13.33(3.71)	17.13	11.07
S6	5.65	6.01	88	68	108.00	407	407	19.17	23.67	90	6.10	8.10	24.07	64.00(7.34)	27.33(5.27)	16.40	38.93
S7	5.51	6.56	92	69	109.33	397	393	19.60	23.00	90	6.73	8.73	18.50	82.67(8.92)	59.67(7.75)	24.00	74.53
Exp. mean	**5.96**	**7.31**	**131**	**85**	**121.76**	**403**	**399**	**19.53**	**23.57**	**89**	**6.39**	**8.39**	**22.61**	**6.83**	**5.14**	**17.99**	**50.80**
CD(0.05)	0.71	1.39	30.01	11.5	28.38	28.56	28.58	0.92	1.95	1.33	1.63	1.63	2.52	4.01	0.76	15.64	42.67
CV	6.67	10.71	12.91	7.64	13.1	3.99	4.03	2.64	4.66	0.84	14.31	10.9	6.26	33.04	8.34	47.78	47.21
Soil type	Clay loam																
pH	6.00																
EC	-																
Variety	-																
Applied NPK kg/ha)	-																
Available NPK kg/ha	400:35:220																

S1-Broadcasting of seeds (Flat sowing) + manual weeding (once)

S2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide

S3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide

S4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice

S5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once

S6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage

S7 - Optional (local wet direct seeded practices)

Trial 4.2.2.2: Contd.

Treatment / Crop establishment methods	NAVSARI																			
	Grain yield (t/ha)	Straw yield (t/ha)	Plant population/m2		Plant height (cm)	Tillers/m² (No.)	Panicle no. /m²	Panicle wt (g)	Panicle length (cm)	Test wt (g)	Days to 50% flowering	Dry matter accumulation (g/m²)			Weed population (no/m²)		Weed dry weight (g/m2)		Cost of cultivation Rs/ha	Total water input mm/ha
			At 10 DAS	At 20 DAS								At 45 DAS	At 75 DAS	At 105 DAS	At active tillering	At panicle initiation	At active tillering	At panicle initiation		
S1	4.45	6.85	86	90	99.83	223	261	2.79	19.23	31.97	93	440.00	857.67	996.43	13.00(3.67)	13.00(3.67)	25.03	64.08	36539	428
S2	5.11	7.57	91	95	113.60	267	227	2.73	21.57	32.00	89	431.94	814.37	998.94	11.67(3.48)	11.67(3.48)	21.37	52.17	38399	172
S3	4.61	7.38	96	99	108.13	250	267	2.39	20.3	32.07	92	387.84	793.44	986.33	12.67(3.62)	12.67(3.62)	22.03	54.33	37207	423
S4	4.83	7.41	93	96	115.10	257	245	3.09	21.73	33.83	90	381.50	828.43	967.07	10.00(3.24)	10.00(3.24)	21.43	52.67	37933	187
S5	5.16	7.13	95	99	124.43	269	241	2.49	21.53	30.27	92	429.54	812.32	997.07	9.67(3.19)	9.67(3.19)	20.50	51.60	39857	147
S6	5.47	8.53	98	101	136.07	276	268	2.80	22.03	31.83	90	438.80	849.32	1018.64	10.00(3.23)	10.00(3.23)	20.20	52.68	40907	143
S7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exp. mean	**4.94**	**7.48**	**93**	**97**	**116.19**	**257**	**252**	**2.72**	**21.065**	**32.00**	**91**	**418.27**	**825.93**	**994.08**	**3.41**	**3.41**	**21.76**	**54.59**	**38474**	**250**
CD(0.05)	0.65	1.1	16.82	15.65	18.15	32.64	37.22	0.73	2.9	3.22	2.71	80.07	134.56	115.14	0.35	0.35	2.78	8.17	738.44	28.43
CV	7.21	8.11	9.94	8.91	8.59	6.98	8.14	14.79	7.58	5.53	1.64	10.52	8.96	6.37	5.67	5.67	7.01	8.23	1.06	6.25
Soil type	Clay																			
pH	7.84																			
EC	0.48																			
Variety	-																			
Apld NPK kg/ha)	100:30:0:0																			
Available NPK kg/ha	277:29:648																			

S1-Broadcasting of seeds (Flat sowing) + manual weeding (once)
S2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide
S3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide

S4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice

S5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once
S6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage
S7-

Trial 4.2.2.2: Contd.

Treatment / Crop establishment methods	NAWAGAM											
	Grain yield (t/ha)	Plant height (cm)	Tillers/m² (No.)	Panicle no. /m²	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Weed population (no/m²)		Weed dry weight (g/m2)		Cost of cultivation Rs/ha
								At active tillering	At panicle initiation	At active tillering	At panicle initiation	
S1	2.85	103.50	204	177	3.14	16.90	68	68.75(8.32)	99.75(10.00)	27.35	49.33	39764
S2	3.20	110.50	243	202	3.52	17.83	72	57.25(7.57)	63.50(7.94)	22.43	31.52	40740
S3	2.69	102.95	231	202	3.30	16.70	67	74.00(8.61)	82.25(9.09)	28.55	40.62	38642
S4	3.85	110.05	234	201	4.02	17.35	76	57.50(7.56)	87.75(9.38)	23.05	42.86	39398
S5	3.42	115.05	273	243	3.77	17.65	70	50.25(7.10)	60.50(7.73)	18.30	19.36	42571
S6	3.82	106.60	309	280	4.25	18.13	73	57.00(7.56)	65.25(8.04)	19.98	21.13	42772
S7	-	-	-	-	-	-	-	-	-	-	-	-
Exp. mean	**3.31**	**108.11**	**249**	**218**	**3.67**	**17.43**	**71**	**7.79**	**8.7**	**23.28**	**34.14**	**40648**
CD(0.05)	0.52	5.94	41.09	28.98	0.4	1.23	2.53	0.93	1.44	6.04	10.87	1058.78
CV	10.47	3.65	10.96	8.84	7.23	4.69	2.36	7.91	10.98	17.22	21.12	1.73
Soil type	Clay loam											
pH	7.80											
EC	0.23											
Variety	-											
Applied NPK kg/ha)	100:30:0:0											
Available NPK kg/ha	277:29:648											

S1-Broadcasting of seeds (Flat sowing) + manual weeding (once)
S2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide
S3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide
S4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice
S5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once
S6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage
S7 - Optional (local wet direct seeded practices)

Trial 4.2.2.2: Contd.

Treatment / Crop establishment methods	PUDUCHERRY											
	Grain yield (t/ha)	Straw yield (t/ha)	Plant population/m2	Plant height (cm)	Tillers/m² (No.)	Panicle no. /m²	Panicle wt (g)	Test wt (g)	Weed population (no/m²)		Weed dry weight (g/m2)	
			At 15 DAS						At active tillering	At panicle initiation	At active tillering	At panicle initiation
S1	6.35	9.08	33	124.00	353	313	3.32	24.56	62.96(7.96)	41.20(6.46)	44.04	28.40
S2	6.27	8.97	29	126.33	361	319	3.47	24.73	60.31(7.80)	36.85(6.11)	40.48	26.03
S3	5.91	8.45	31	122.00	348	308	3.25	24.62	66.26(8.17)	44.04(6.67)	47.57	31.52
S4	6.65	9.51	28	128.00	368	329	3.74	25.06	51.71(7.22)	29.83(5.51)	33.30	19.67
S5	6.88	9.84	28	129.00	378	338	3.78	25.27	49.81(7.09)	27.70(5.31)	29.03	16.34
S6	7.15	10.23	29	130.33	383	348	3.84	25.50	43.92(6.66)	23.60(4.91)	25.65	11.94
S7	6.55	9.36	28	127.00	364	325	3.52	24.77	55.58(7.49)	33.11(5.80)	36.46	22.64
Exp. mean	**6.54**	**9.35**	**29**	**126.67**	**365**	**326**	**3.56**	**24.93**	**7.49**	**5.82**	**36.65**	**22.36**
CD(0.05)	0.09	0.14	2.22	2.8	4.27	4.13	0.05	0.97	0.02	0.04	0.99	0.86
CV	0.81	0.84	4.25	1.24	0.66	0.71	0.72	2.19	0.16	0.36	1.53	2.17
Soil type	Clay loam											
pH	7.01											
EC	0.06											
Variety	DRR Dhan 52											
Applied NPK kg/ha)	120:40:40											
Available NPK kg/ha	145.6:25.09:68											

S1-Broadcasting of seeds (Flat sowing) + manual weeding (once)
S2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide
S3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide
S4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice
S5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once
S6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage
S7 - Optional (Sowing of seeds with Drum seeder in wet condition + manual weeding twice)

Trial 4.2.2.2: Contd.

Treatment	PUSA																
Crop establishment methods	Grain yield (t/ha)	Plant population/m2		Plant height (cm)	Tillers/m² (No.)	Panicle no. /m²	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Dry matter accumulation (g/m²)			Weed population (no/m²)		Weed dry weight (g/m2)		Total water input mm/ha
		At 10 DAS	At 20 DAS							At 45 DAS	At 75 DAS	At 105 DAS	At active tillering	At panicle initiation	At active tillering	At panicle initiation	
S1	3.94	53	50	108.25	329	289	2.30	20.45	82	197.00	582.50	752.75	39.50(6.26)	77.50(8.73)	15.75	41.75	843
S2	4.04	52	51	113.25	337	296	2.56	20.97	82	201.00	609.75	805.75	21.00(4.61)	38.25(6.19)	9.23	24.35	843
S3	3.98	53	51	108.75	326	283	2.29	20.68	82	199.25	590.75	760.75	31.00(5.57)	73.75(8.53)	13.80	35.00	843
S4	4.24	52	51	117.00	385	347	2.98	21.21	85	209.75	627.75	927.75	16.75(4.06)	24.50(4.96)	6.80	13.05	843
S5	4.41	53	51	114.25	384	353	2.97	21.28	86	215.25	653.50	945.25	6.00(2.49)	15.25(3.93)	3.60	11.93	843
S6	4.85	52	51	122.00	389	358	3.08	21.53	86	232.00	691.25	1003.00	4.75(2.25)	10.75(3.27)	2.68	7.38	843
S7	4.64	55	51	115.75	366	330	2.89	21.39	85	220.75	669.50	952.75	7.50(2.74)	13.75(3.65)	3.23	7.83	843
Exp. mean	**4.30**	**53**	**51**	**114.18**	**359**	**322**	**2.72**	**21.07**	**84**	**210.71**	**632.14**	**878.29**	**4**	**5.61**	**7.87**	**20.18**	**843**
CD(0.05)	0.44	5.1	3.45	10.24	31.9	30.77	0.17	0.44	2.89	26.39	48.72	110.61	1.05	1.68	2.82	7.47	0
CV	6.96	6.51	4.58	6.03	5.97	6.42	4.19	1.41	2.32	8.42	5.18	8.47	17.66	20.11	24.1	24.89	0
Soil type	Sandy loam																
pH	8.20																
EC	0.48																
Variety	Rajendra Bhagwati																
Applied NPK kg/ha)	120:60:40:25																
Available NPK kg/ha	234;13.0:133																

S1-Broadcasting of seeds (Flat sowing) + manual weeding (once)
S2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide
S3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide
S4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice
S5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once
S6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage
S7 - Optional (Manual line sowing + pre and post emergence of herbicide application)

Trial 4.2.2.2: Contd.

Treatment	REWA										
Crop establishment methods	Grain yield (t/ha)	Straw yield (t/ha)	Tillers/m² (No.)	Panicle no. /m²	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Weed population (no/m²)		Weed dry weight (g/m2)	
								At active tillering	At panicle initiation	At active tillering	At panicle initiation
S1	3.98	4.65	267	3	2.43	24.75	73	26.48(5.19)	6.25(2.59)	9.60	3.95
S2	4.38	4.95	274	3	2.68	25.45	78	25.28(5.08)	6.25(2.60)	9.30	3.80
S3	4.58	5.15	282	3	2.93	24.98	81	26.03(5.15)	6.75(2.69)	10.78	2.58
S4	5.05	5.40	299	3	3.45	26.35	85	10.88(3.37)	5.25(2.39)	3.50	3.33
S5	4.83	5.48	288	3	3.15	25.50	82	24.03(4.94)	5.75(2.50)	11.33	2.73
S6	5.38	5.63	290	3	2.98	24.75	78	11.30(3.43)	7.25(2.78)	4.55	2.38
S7	4.08	4.60	268	2	2.25	26.35	72	24.45(4.99)	4.50(2.23)	7.35	0.00
Exp. mean	**4.61**	**5.12**	**281**	**3**	**2.84**	**25.45**	**78**	**4.59**	**2.54**	**8.06**	**3.13**
CD(0.05)	0.33	0.11	10.05	0.18	0.14	1.19	3.36	0.22	0.22	2.3	0.55
CV	4.82	1.47	2.41	4.21	3.22	3.15	2.9	3.15	5.96	19.18	11.76
Soil type	-										
pH	-										
EC	-										
Variety	-										
Applied NPK kg/ha)	-										
Available NPK kg/ha	-										

S1-Broadcasting of seeds (Flat sowing) + manual weeding (once)
S2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide
S3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide
S4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice
S5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once
S6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage
S7 - Optional (local wet direct seeded practices)

Trial 4.2.2.2: Contd.

Treatment / Crop establishment methods	TITABAR							TULJAPUR								
	Grain yield (t/ha)	Plant population/m2 At 20 DAS	Plant height (cm)	Tillers/m² (No.)	Panicle no. /m²	Panicle wt (g)	Days to 50% flowering	Grain yield (t/ha)	Straw yield (t/ha)	Plant height (cm)	Tillers/m² (No.)	Panicle no. /m²	Panicle length (cm)	Panicle wt (g)	Test wt (g)	Days to 50% flowering
S1	3.60	127	120.13	296	274	3.73	105	1.57	2.63	109.50	185	154	21.98	2.37	22.17	79
S2	3.20	161	131.63	334	308	4.05	105	1.76	2.92	115.75	195	176	22.40	2.58	23.31	82
S3	2.80	160	123.75	330	304	3.90	105	1.49	2.42	110.25	203	176	22.28	2.40	22.28	78
S4	3.78	185	134.88	374	355	4.15	105	2.12	3.59	114.25	206	175	23.66	3.01	23.04	86
S5	3.90	183	137.88	396	372	4.33	105	1.88	3.15	119.00	240	212	22.44	2.82	22.98	80
S6	3.75	199	141.75	425	394	4.68	106	2.10	3.59	111.25	273	244	23.38	3.18	23.38	83
S7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exp. mean	**3.51**	**169**	**131.67**	**359**	**334**	**4.14**	**105**	**1.82**	**3.05**	**113.33**	**217**	**189**	**22.69**	**2.73**	**22.86**	**81**
CD(0.05)	1.22	40.29	11.88	103.46	98.04	0.62	2.01	0.24	0.34	6.46	34.85	25.37	1.37	0.32	1.17	1.92
CV	23.08	15.82	5.99	19.12	19.46	9.94	1.27	10.50	8.86	3.78	10.66	8.91	4	7.71	3.41	1.57
Soil type	Clay Loam							-								
pH	5.24							-								
EC	-							-								
Variety	Numoli							-								
Applied NPK kg/ha)	-							-								
Available NPK kg/ha	-							-								

S1-Broadcasting of seeds (Flat sowing) + manual weeding (once)

S2-Mechanized line sowing of seeds (Drum seeder) + post-emergence herbicide

S3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide

S4- Mechanized line sowing of seeds (Drum seeder) + mechanical weeding twice

S5- Mechanized line sowing of seeds (Drum seeder) + post-emergence herbicide + mechanical weeding once

S6 - Mechanized line sowing of seeds (Drum seeder) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage

S7-

S1-Broadcasting of seeds (Flat sowing) + manual weeding (once)

S2-Mechanized line sowing of seeds (Drum seeder) + post-emergence herbicide

S3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide

S4- Mechanized line sowing of seeds (Drum seeder) + mechanical weeding twice

S5- Mechanized line sowing of seeds (Drum seeder) + post-emergence herbicide + mechanical weeding once

S6 - Mechanized line sowing of seeds (Drum seeder) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage

S7-

Trial 4.2.2.2: Contd.

Treatment	VADGAON											VARANASI				
Crop establishment methods	Grain yield (t/ha)	Plant height (cm)	Tillers/m² (No.)	Panicle no. /m²	Panicle wt (g)	Test wt (g)	Days to 50% flowering	Weed population (no/m²)		Weed dry weight (g/m2)		Grain yield (t/ha)	Panicle no. /m²	Panicle wt (g)	Weed population (no/m²)	Weed dry weight (g/m2)
								At active tillering	At panicle initiation	At active tillering	At panicle initiation				At active tillering	At active tillering
S1	4.14	78.65	203	199	3.84	21.83	98	9.79(3.20)	12.73(3.63)	9.80	19.60	3.42	243	1.30	124.67(11.18)	79.08
S2	5.31	92.40	260	258	4.93	22.25	96	7.96(2.90)	10.34(3.29)	7.98	15.95	4.23	284	1.49	90.33(9.50)	33.19
S3	4.15	79.98	204	199	3.85	22.53	97	10.40(3.29)	13.52(3.74)	10.40	20.83	3.78	262	1.43	107.33(10.37)	48.52
S4	5.32	93.78	261	259	4.94	22.55	96	6.73(2.68)	8.75(3.03)	6.70	13.48	4.08	284	1.45	100.33(10.02)	42.07
S5	5.37	95.63	264	262	4.98	22.58	96	5.82(2.51)	7.16(2.76)	5.50	11.00	4.61	301	1.68	76.00(8.63)	30.48
S6	5.49	97.18	269	268	5.09	22.70	95	3.67(2.04)	4.77(2.29)	3.68	7.35	4.88	310	1.82	51.00(7.07)	27.20
S7	4.28	85.60	210	205	3.97	21.50	97	12.24(3.56)	15.91(4.04)	12.25	24.50	-	-	-	-	-
Exp. mean	**4.87**	**89.03**	**239**	**236**	**4.51**	**22.28**	**96**	**2.88**	**3.25**	**8.04**	**16.10**	**4.17**	**280**	**1.53**	**8.21**	**43.42**
CD(0.05)	0.19	3.81	9.34	9.01	0.18	0.5	2.19	0.08	0.08	0.73	1.44	0.78	53.34	0.21	2.01	27.94
CV	2.57	2.88	2.63	2.57	2.68	1.5	1.53	1.8	1.59	6.12	6	10.29	10.46	7.52	13.75	35.37
Soil type	-											Sandy Loam				
pH	7.90											7.20				
EC	0.18											-				
Variety	-											-				
Applied NPK kg/ha)	######											-				
Available NPK kg/ha	164:16:226											185;32:198				

S1-Broadcasting of seeds (Flat sowing) + manual weeding (once)

S2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide

S3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide

S4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice

S5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once

S6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage

S7 - Optional (local wet direct seeded practices)

S1-Broadcasting + manual weeding (Once)

S2-Drum seeding + Post emergence herbicide

S3-Broadcasting of seeds + post emergence herbicide

S4-Drum seeding + mechanical weeding twice

S5-Drum seeding + post emergence herbicide + mechanical weeding once

S6-Drum seeding + Post emergence herbicide + mechanical weeding once+ 4 splits N application 25% each at basal, active tillering, panicle initiation and heading stage

Trial 4.2.2.2: Contd.

Treatment / Crop establishment methods	WARANGAL													Over all mean	Rank
	Grain yield (t/ha)	Plant population/m2		Plant height (cm)	Tillers/m² (No.)	Panicle no. /m²	Panicle length (cm)	Panicle wt (g)	Test wt (g)	Weed population (no/m²)		Weed dry weight (g/m2)			
		At 10 DAS	At 20 DAS							At active tillering	At panicle initiation	At active tillering	At panicle initiation		
S1	4.28	72	75	102.90	239	213	22.25	4.05	14.04	76.25(8.73)	106.00(10.31)	25.58	39.99	4.03	7
S2	5.45	20	20	107.68	282	258	22.85	4.18	14.06	55.25(7.31)	91.00(9.53)	22.32	27.37	4.43	5
S3	5.18	74	77	106.30	285	253	22.63	4.07	14.05	59.00(7.69)	99.25(9.97)	20.24	30.57	4.14	6
S4	5.58	20	20	110.80	291	259	23.48	4.34	14.07	55.00(7.43)	85.75(9.25)	19.45	27.26	4.66	4
S5	6.03	21	21	111.45	294	263	23.53	4.40	14.45	42.75(6.46)	65.75(8.10)	18.66	24.51	4.85	3
S6	6.08	21	21	114.45	320	307	23.75	4.51	14.58	41.25(6.37)	61.00(7.84)	14.58	20.04	4.92	1
S7	-	-	-	-	-	-	-	-	-	-	-	-	-	4.89	2
Exp. mean	**5.43**	**38**	**39**	**108.93**	**285**	**259**	**23.08**	**4.26**	**14.21**	**7.33**	**9.17**	**20.14**	**28.29**	**4.50**	
CD(0.05)	1.43	2.75	2.9	3.12	26.15	53.18	1.6	0.63	0.59	1.87	1.21	8.42	12.81		
CV	17.44	4.83	4.96	1.9	6.09	13.65	4.59	9.85	2.75	16.91	8.77	27.75	30.05		
Soil type	-														
pH	-														
EC	-														
Variety	WGL-962(Warangal Rice-1)														
Applied NPK kg/ha)	120:60:40:50														
Available NPK kg/ha	160:60:340														

S1-Broadcasting of seeds (Flat sowing) + manual weeding (once)

S2-Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide

S3- Broadcasting of seeds (Flat sowing) + post-emergence herbicide

S4- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + mechanical weeding twice

S5- Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once

S6 - Mechanized line sowing of seeds (Drum seeder, any seeder used in wet condition) + post-emergence herbicide + mechanical weeding once + 4 split N application 25% each at basal, active tillering, panicle initiation and heading stage

S7 - Optional (local wet direct seeded practices)

4.2.3(a)Yield maximization of rice in different zones (new trial initiated in *kharif* 2020)

Rice (*Oryza sativa* L.) is grown in India over a gross area of 44 million hectares (ha). The total production in 2019 was about 107 million ones. However, India would need to produce at least 200 million ones of paddy to meet its ever-growing population requirements, and this figure would have to increase by almost 75% by 2050. Rice occupies a pivotal position concerning food security in India. The future of food security in this region will depend on its ability to improve rice productivity continuously on an ecologically sustainable basis. One of the main reasons for low rice productivity in India is the variation in fertilizer usage between the country's different agro-climatic zones and between states in each region. Low input use in general is a further factor accounting for the plateau or declining trend of grain yields. To evaluate the suitable, promising and best management practices in rice crop, a new trial was formulated with the following objectives 1. To maximize the yield in different zones 2. To compare yield and economics of the best management practices. The trial consisted of 8 treatments and laid out in RBD design with 3 replications. Treatments are T_1: RDF as per site-specific nutrient management; T_2: T_1 + FYM @ 10t/ha; T_3: 125% of T_1; T_4: 150% of T_1; T_5: T_1 + sampoorna (KAU) @ 10g/l (250 l/ha) micronutrient spray (55-60 DAT); T_6: T_1 + Eco-Agra spray 3 times @1 litre in 300 litre of water (25, 40 and 55 DAP); T_7: Farmers fertilizer dose and T_8: Optional (location specific). The trial was conducted at **Chinsurahh, Gangavathi, Khudwani, Kota, Malan, Mandya, Pantnagar, Pattambi, Raipur, Ranchi, Titabar** and **Ghaghraghat**. The results were summarized and presented in **Table 4.2.3(a)** and the salient findings are as followed.

In clay loam soil of **Chinsurahh**, Shatabdi variety at 150% of recommended dose (N-P_2O_5-K_2O 120-40-40 kg/ha) resulted significantly the highest grain yield (5.69 t/ha) compared to those of other treatments except RDF + 10 t FYM/ha (5.60 t/ha), 125% of RDF (5.50 t/ha). In black clay soil of **Gangavathi**, GGV-05-01 variety produced the highest grain yield (6.51 t/ha) under location specific crop management practices, however, at par with RDF + Eco-Agra spray 3 times (6.34 t/ha). The cost of cultivation was the lowest in RDF treatment (Rs.45245/-). The highest gross return was recorded in location specific crop management practices (Rs.99290/-). In silty clay loam soils of **Khudwani**, 125% of RDF resulted the highest grain yield (7.19 t/ha), however, at par with location specific crop management practices (6.79 t/ha). Similarly, N (105.4 kg/ha) and P (26.09 kg/ha) uptake of rice crop was also higher in 125% of RDF treatment. In clay loam soils of **Kota**, Pusa Sugandh-5 (P-2511) at 150% of RDF (N-P_2O_5-K_2O 180-90-60 kg/ha) resulted the highest grain yield (6.23 t/ha), however at par with RDF + FYM 10t/ha (6.21 t/ha), 125% of RDF (6.13 t/ha) RDF + Sampoorna (6.00 t/ha), RDF + Eco-Agra (5.88 t/ha) and RDF + two foliar sprays of NPK 19:19:19 @ 0.5% at tillering and PI stage (6.05 t/ha). The lowest cost of cultivation was recorded in RDF treatment (Rs. 42,372/- per hectare) and the same under 150% of RDF was Rs. 44,542/-, which is Rs.2170/- higher than RDF. The highest gross return was recorded in 150% of RDF (Rs. 1,86,900/-). In silty clay loam soils of **Malan**, HPR 2143 resulted the highest grain yield in RDF + Sampoorna micronutrient spray (6.81 t/ha), however, at par with all other treatments except Farmers' practices (3.75 t/ha) which recorded the lowest grain yield. In red sandy loam soil of **Mandya**, 150% of RDF (N-P_2O_5-K_2O 150-75-30 kg/ha) resulted the highest grain yield (6.11 t/ha), however, all other treatments are also equally effective in producing grain yield. The cost of cultivation was the lowest under RDF treatment (Rs. 55,297/-) and the highest gross return was

in 150% of RDF (Rs. 1,34,451/-). In silty loam soils of **Pantnagar**, PD-24 variety in RDF + FYM @ 10 t/ha resulted the highest grain yield (5.83 t/ha) followed by and at par with 150% of RDF (5.74 t/ha). In laterite soil of **Pattambi**, aiswarya variety in RDF + Sampoorna micronutrient spray resulted the highest grain yield (4.97 t/ha), however, at par with RDF + Eco-Agra spray (4.15 t/ha), Farmers' fertilizer dose (4.17 t/ha) and RDF (4.08 t/ha). In vertisols of **Raipur**, IGKV R1 variety applied with 150% of RDF resulted the highest grain yield (6.15 t/ha) followed by RDF + FYM @ 10 t/ha (6.09 t/ha). In clay loam soils of **Ranchi**, Naveen variety applied with RDF + FYM @ 10 t/ha produced the highest grain yield (6.25 t/ha) followed by and at par with RDF + Sampoorna micronutrient spray (6.17 t/ha). The highest plant N, P and K uptake (124.78, 22.59, 111.33 kg/ha, respectively) was also the highest under RDF + FYM @ 10 t/ha. In clay loam soils of **Titabar**, Ranjit Sub 1 variety recorded the highest grain yield under RDF + Sampoorna micronutrient spray (5.35 t/ha) followed by and at par with RDF + Eco-Agra spray (5.15 t/ha) and RDF (5.15 t/ha). In **Ghaghraghat**, NDR 2065 variety applied with 150% of RDF (N-P_2O_5-K_2O 180-90-60 kg/ha) resulted in the highest grain yield (5.97 t/ha). Farmers' application dose ((N-P_2O_5-K_2O 100-50-0 kg/ha) resulted in the lowest grain yield (2.86 t/ha).

4.2.3(a)(R) Yield maximization of rice in different zones (*rabi* 2020-21)

In clay loam soils of **Chinsurah,** Shatabdi variety grown under Nutrient Expert resulted the highest grain yield (5.50 t/ha), however, at par with 125% of RDF (5.42 t/ha) and 150% of RDF (N-P_2O_5-K_2O 210-105-105) (5.47 t/ha). Similarly, at **Karaikkal**, ADT 46 variety produced the highest grain yield (6.27 t/ha) under location specific management practices (100% NP and 150% K). Similarly, the highest gross return was also observed under the same treatment (Rs. 1,09,293/-).

Table 4.2.3(a): Yield maximization of rice in different Zones, Kharif 2021

Treatment	CHINSURAHH								GANGAVATHI								
	Grain yield (t/ha)	Straw yield (t/ha)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Soil available N	Soil available P	Soil available K	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (t/ha)	Straw yield (Kg/20 m²)	Panicle/m² (No.)	Test wt (g)	Filled grains/panicle	Cost of cultivation Rs/ha	Gross return Rs/ha
T1	4.49	5.54	307	352	19.70	319.50	65.88	212.50	5.14	10.28	5.86	11.72	366	15.48	141	45245	78861
T2	5.60	6.82	339	387	19.83	340.00	69.00	222.08	5.69	11.38	6.49	12.97	351	15.28	171	52745	85218
T3	5.50	6.35	320	369	19.90	358.25	72.13	218.43	5.65	11.30	6.44	12.88	342	15.28	169	46239	84437
T4	5.69	6.30	335	390	19.80	338.50	73.38	221.13	5.20	10.40	5.93	11.85	335	15.19	168	47192	78634
T5	4.32	5.21	300	345	19.53	357.25	72.13	214.30	6.13	12.26	6.99	13.97	309	15.06	154	46370	92380
T6	4.67	5.79	311	352	19.65	353.50	73.13	221.60	6.34	12.69	7.23	14.46	333	15.21	175	49858	96433
T7	2.59	3.10	240	267	19.28	361.75	69.63	209.78	6.11	12.22	6.96	13.93	344	15.11	176	47533	93248
T8	-	-	-	-	-	-	-	-	6.51	13.01	7.42	14.83	342	15.24	137	51770	99290
Exp. mean	**4.69**	**5.59**	**307**	**352**	**19.67**	**346.96**	**70.75**	**217.12**	**5.85**	**11.69**	**6.67**	**13.33**	**340**	**15.23**	**161**	**48369**	**88563**
CD(0.05)	0.36	0.49	35.83	32.45	0.49	36.4	6.83	14.19	0.23	0.46	0.26	0.52	12.29	0.53	16.1	2705.91	8454.71
CV	5.11	5.93	7.84	6.21	1.67	7.06	6.5	4.4	2.7	2.7	2.7	2.66	2.46	2.37	6.79	3.8	6.49
Soil type	Clay loam								Blackclay								
pH	-								-								
EC																	
Variety	Shatabdi								GGV-05-01								
Applied NPK kg/ha	80:40:40								-								
Available NPK kg/ha	164:82.4:518.1								-								

T_1: Fertiliser as per the site-specific nutrient management (RDF)
T_2: T_1 +FYM@10t/ha
T_3: 125 % of T_1
T_4:150 % T_1
T_5: T_1+ Sampoorna (KAU) @ 10 g /l (250 l/ha) micronutrient spray (55-60 DAT)
T_6: T_1+ Eco-Agra spray 3 times @ 1litre in 300 litre of water (25, 40 and 55 DAP)
T_7: Farmers application dose
T_8: Optional (Location specific; mention while sending the data)

T_1: Fertiliser as per the site-specific nutrient management (RDF)
T_2: T_1 +FYM@10t/ha
T_3: 125 % of T_1
T_4:150 % T_1
T_5: T_1+ Sampoorna (KAU) @ 10 g /l (250 l/ha) micronutrient spray (55-60 DAT)
T_6: T_1+ Eco-Agra spray 3 times @ 1litre in 300 litre of water (25, 40 and 55 DAP)
T_7: Farmers application dose
T_8: Optional (Location specific; mention while sending the data)

Table 4.2.3(a): Contd.

Treatment	KHUDWANI														
	Grain yield (t/ha)	Grain yield (Kg/20 m^2)	Straw yield (t/ha)	Straw yield (Kg/20 m^2)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/panicle	Unfilled grains/panicle	N uptake (kg/ha) in plant	P uptake (kg/ha) in plant	K uptake (kg/ha) in plant	Soil available N	Soil available P	Soil available K
T1	5.41	11.88	7.94	15.19	349	289	26.52	105	18	93.44	20.85	118.61	247.00	17.60	251.50
T2	6.25	12.32	7.74	15.73	360	292	25.65	122	13	94.65	23.30	134.40	260.80	21.13	263.57
T3	7.19	14.74	7.69	14.84	326	304	28.77	129	12	105.40	26.09	134.32	269.80	20.43	270.80
T4	5.77	11.83	7.87	14.83	326	284	25.52	117	16	104.75	21.57	125.74	278.67	23.47	284.33
T5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T7	4.59	9.78	6.71	12.90	315	241	26.05	116	18	86.04	16.95	97.79	240.43	16.03	214.27
T8	6.79	13.95	7.99	15.88	331	313	27.91	123	11	101.41	23.47	137.90	237.40	17.33	248.13
Exp. mean	**6.00**	**12.42**	**7.66**	**14.90**	**335**	**287**	**26.74**	**119**	**15**	**97.62**	**22.04**	**124.79**	**255.68**	**19.33**	**255.43**
CD(0.05)	0.64	1.82	0.99	1.58	32.93	36.86	2.8	19.94	2.73	11.09	3	17.72	25.8	1.75	17.31
CV	5.84	8.05	7.11	5.82	5.41	7.06	5.77	9.24	10.28	6.24	7.47	7.8	5.55	4.98	3.72
Soil type	Silty clay loam														
pH	6.80														
EC	0.10														
Variety	-														
Applied NPK kg/ha	-														
Available NPK kg/ha	215;1375:237														

T_1: Fertiliser as per the site-specific nutrient management (RDF)
T_2: T_1 +FYM@10t/ha
T_3: 125 % of T_1
T_4:150 % T_1
T_5: T_1+ Sampoorna (KAU) @ 10 g /l (250 l/ha) micronutrient spray (55-60 DAT)
T_6: T_1+ Eco-Agra spray 3 times @ 1litre in 300 litre of water (25, 40 and 55 DAP)
T_7: Farmers application dose
T_8: Optional (Location specific; mention while sending the data)

Table 4.2.3(a): Contd.

Treatment	KOTA									
	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (t/ha)	Straw yield (Kg/20 m²)	Tillers/m² (No.)	Test wt (g)	Filled grains/panicle	Unfilled grains/panicle	Cost of cultivation Rs/ha	Gross return Rs/ha
T1	5.59	11.18	6.66	13.31	320	24.23	114	17	42372	167625
T2	6.21	12.41	7.18	14.36	338	24.79	128	16	46872	186188
T3	6.13	12.26	7.36	14.73	342	24.64	132	16	43457	183825
T4	6.23	12.46	7.55	15.09	346	24.47	126	19	44542	186900
T5	6.00	12.01	6.99	13.98	326	24.71	123	17	43396	180113
T6	5.88	11.75	6.87	13.74	316	24.53	118	18	50660	176250
T7	5.41	10.81	6.79	13.58	317	24.12	110	19	42485	162188
T8	6.05	12.09	7.09	14.18	324	24.74	125	17	44135	181313
Exp. mean	**5.94**	**11.87**	**7.06**	**14.12**	**329**	**24.53**	**122**	**17**	**44740**	**178050**
CD(0.05)	0.4	0.79	0.48	0.96	21.36	0.44	10.42	2.16	2726.83	11901.71
CV	4.54	4.54	4.66	4.64	4.42	1.21	5.82	8.51	4.14	4.54
Soil type	Clay loam									
pH	-									
EC										
Variety	Pusa Sugandha-5 (P-2511)									
Applied NPK kg/ha	120:60:40									
Available NPK kg/ha	189.34:29.25:425.07									

T_1: Fertiliser as per the site-specific nutrient management (RDF)
T_2: T_1 +FYM@10t/ha
T_3: 125 % of T_1
T_4:150 % T_1
T_5: T_1+ Sampoorna (KAU) @ 10 g /l (250 l/ha) micronutrient spray (55-60 DAT)
T_6: T_1+ Eco-Agra spray 3 times @ 1litre in 300 litre of water (25, 40 and 55 DAP)
T_7: Farmers application dose (160-80 kg NP/ha)
T_8: Optional (T1 + Two foliar sprays of NPK 19:19:19 @ 0.5% at tillering and PI stage)

Table 4.2.3(a): Contd.

Treatment	MALAN									MANDYA										
	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (t/ha)	Straw yield (Kg/20 m²)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Filled grains /panicle	Unfilled grains/ panicle	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (t/ha)	Straw yield (Kg/20 m²)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Filled grains/panicle	Unfilled grains/ panicle	Cost of cultivation Rs/ha	Gross return Rs/ha
T1	5.20	10.39	5.61	11.22	241	241	26.60	135	18	5.32	10.63	7.17	14.34	326	288	24.87	88	17	55297	117476
T2	5.78	11.51	6.33	12.65	254	255	27.23	144	19	5.79	11.58	7.66	15.33	346	319	24.40	98	20	59751	127652
T3	5.83	11.69	6.43	12.86	273	272	27.47	153	22	5.90	11.81	7.93	15.87	354	320	24.55	111	18	56933	130409
T4	5.70	11.35	6.24	12.49	274	275	25.60	154	26	6.11	12.22	7.97	15.93	363	325	24.50	111	24	57862	134451
T5	6.81	13.62	7.55	15.10	279	281	28.70	152	19	5.44	10.88	7.32	14.64	327	304	24.51	103	22	56473	120176
T6	6.63	13.29	7.33	14.67	282	283	29.17	149	19	5.69	11.39	7.36	14.73	347	314	25.44	110	21	58959	125202
T7	3.75	7.50	4.15	8.31	207	208	26.17	117	21	5.95	11.89	7.89	15.77	370	334	25.00	108	19	59923	131138
T8	-	-	-	-	-	-	-	-	-	5.51	11.03	7.34	14.68	340	313	24.36	104	15	56955	121640
Exp. mean	**5.67**	**11.34**	**6.23**	**12.47**	**258**	**259**	**27.28**	**143**	**21**	5.71	11.43	7.58	15.16	347	315	24.70	104	20	57769	126018
CD(0.05)	1.68	1.37	0.79	1.59	10.78	9.29	0.98	5.27	1.16	1.37	2.75	0.56	1.13	43.68	45.01	1.04	18.09	9.99	798.34	26263
CV	20.16	6.8	7.16	7.15	2.35	2.02	2.02	2.07	3.15	13.74	13.75	4.24	4.25	7.2	8.17	2.41	9.93	29.09	0.79	11.9
Soil type	Silty clay loam									Red sandy loam										
pH	-									7.64										
EC										0.67										
Variety	HPR 2143									MTU 1001										
Applied NPK kg/ha	-									100;50:50:20										
Available NPK kg/ha	318;47.2:233									234.8;74.62:235.2										

T_1: Fertiliser as per the site-specific nutrient management (RDF)
T_2: T_1 +FYM@10t/ha
T_3: 125 % of T_1
T_4:150 % T_1
T_5: T_1+ Sampoorna (KAU) @ 10 g /l (250 l/ha) micronutrient spray (55-60 DAT)
T_6: T_1+ Eco-Agra spray 3 times @ 1litre in 300 litre of water (25, 40 and 55 DAP)
T_7: Farmers application dose
T_8: Optional (Location specific; mention while sending the data)

T_1: Fertiliser as per the site-specific nutrient management (RDF)
T_2: T_1 +FYM@10t/ha
T_3: 125 % of T_1
T_4:150 % T_1
T_5: T_1+ Sampoorna (KAU) @ 10 g /l (250 l/ha) micronutrient spray (55-60 DAT)
T_6: T_1+ Eco-Agra spray 3 times @ 1litre in 300 litre of water (25, 40 and 55 DAP)
T_7: Farmers application dose (150:30:75 kg/ha N:P2O5:K2O)
T_8: Optional (T1 + Two spray of 2% 19-19-19 at 30 and 55 DAP)

Table 4.2.3(a): Contd.

Treatment	PANTNAGAR									PATTAMBI								
	Grain yield (t/ha)	Grain yield (Kg/20 m^2)	Straw yield (t/ha)	Straw yield (Kg/20 m^2)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/panicle	Unfilled grains/panicle	Grain yield (t/ha)	Grain yield (Kg/20 m^2)	Straw yield (t/ha)	Straw yield (Kg/20 m^2)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/ panicle	Unfilled grains/ panicle
T1	5.46	13.17	5.81	11.60	239	235	27.40	90	7	4.08	8.15	7.01	14.02	262	262	28.00	60	22
T2	5.83	12.97	6.18	12.37	229	248	27.67	74	8	3.69	7.38	5.21	10.42	288	288	28.75	61	18
T3	5.64	13.00	5.98	11.93	229	231	27.40	86	5	3.63	7.27	6.13	12.27	249	249	28.75	67	22
T4	5.74	12.90	6.05	12.10	245	241	28.97	77	6	3.59	7.19	6.28	12.57	299	299	28.75	64	28
T5	5.57	12.80	5.85	11.70	227	229	27.90	77	5	4.97	9.93	9.24	18.49	287	287	28.75	63	22
T6	5.49	12.53	5.71	11.43	232	239	27.47	83	8	4.15	8.30	7.14	14.28	286	286	28.75	58	24
T7	5.54	12.77	5.89	11.77	230	227	27.23	76	6	4.17	8.35	6.89	13.78	291	294	28.25	65	22
T8	5.55	0.00	5.68	11.37	239	231	27.37	75	9	-	-	-	-	-	-	-	-	-
Exp. mean	**5.60**	**12.88**	**5.89**	**11.78**	**234**	**235**	**27.68**	**80**	**7**	**3.54**	**7.07**	**6.84**	**11.98**	**245**	**246**	**25.00**	**55**	**20**
CD(0.05)	0.11	0.19	0.42	0.83	10.52	12.18	0.42	4.69	2.55	1.09	2.19	1.83	3.66	74.6	74.93	1.55	8.16	11.97
CV	1.14	0.85	4.04	4.01	2.57	2.96	0.86	3.35	21.83	18.23	18.22	17.99	17.98	17.91	17.96	3.66	8.78	36.15
Soil type	Silt loam									Laterite soil								
pH	-									-								
EC	-									-								
Variety	PD-24									Aiswarya								
Applied NPK kg/ha	-									-								
Available NPK kg/ha	231:22.2;222									-								

T_1: Fertiliser as per the site (RDF) - 135 kg N+ 42 kg P+ 46 kg K (SSNM)
T_2: T_1 +FYM@10t/ha
T_3: 125 % of T_1
T_4:150 % T_1
T_5: T_1+ Sampoorna (KAU) @ 10 g /l (250 l/ha) micronutrient spray (55-60 DAT)
T_6: T_1+ Eco-Agra spray 3 times @ 1litre in 300 litre of water (25, 40 and 55 DAP)
T_7: Farmers application dose (180 kg N + 60 kg P+ 40 kg K)
T_8: Optional (150 kg N + 60 kg P + 40 kg K + FYM @ 5t/ha)

T_1: Fertiliser as per the site-specific nutrient management (RDF)
T_2: T_1 +FYM@10t/ha
T_3: 125 % of T_1
T_4:150 % T_1
T_5: T_1+ Sampoorna (KAU) @ 10 g /l (250 l/ha) micronutrient spray (55-60 DAT)
T_6: T_1+ Eco-Agra spray 3 times @ 1litre in 300 litre of water (25, 40 and 55 DAP)
T_7: Farmers application dose
T_8: Optional (Location specific; mention while sending the data)

Table 4.2.3(a): Contd.

Treatment	RAIPUR								RANCHI						
	Grain yield (t/ha)	Plant height (cm)	Panicle length (cm)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Filled grains/ panicle	Unfilled grains/ panicle	Grain yield (t/ha)	Panicle/m² (No.)	Test wt (g)	Filled grains/ panicle	N uptake (kg/ha) in plant	P uptake (kg/ha) in plant	K uptake (kg/ha) in plant
T1	5.41	108.20	22.73	221	4.05	32.48	122	18	5.32	265	24.10	97	100.28	16.76	98.02
T2	6.09	112.88	23.51	271	4.25	32.10	133	20	6.25	316	25.04	114	124.78	22.59	111.33
T3	5.96	112.88	23.43	261	4.19	31.93	131	18	5.41	280	24.75	101	101.45	18.01	99.77
T4	6.15	114.08	23.57	273	4.33	32.55	132	22	6.05	312	24.95	112	114.04	19.45	107.54
T5	5.69	110.70	23.09	238	4.10	32.03	125	19	6.17	307	25.12	116	119.68	20.84	109.17
T6	5.78	111.58	23.14	244	4.19	32.15	128	18	5.28	263	24.67	96	98.82	16.57	100.98
T7	4.84	105.68	22.31	211	3.97	32.05	118	21	3.86	201	24.38	68	71.40	12.16	75.43
T8	5.01	107.33	22.58	218	4.03	32.20	120	18	5.57	282	24.76	101	103.96	18.29	98.76
Exp. mean	**5.62**	**110.42**	**23.05**	**242**	**4.14**	**32.19**	**126**	**19**	**5.49**	**278**	**24.72**	**101**	**104.30**	**18.08**	**100.13**
CD(0.05)	0.46	4.8	0.83	20.82	0.22	1.27	19.48	2.95	0.61	28.96	1.66	7.78	11.96	1.67	12.46
CV	5.58	2.96	2.45	5.85	3.64	2.68	10.51	10.46	7.55	7.08	4.56	5.25	7.79	6.29	8.46
Soil type	Vertisols								Clay loam						
pH	-								-						
EC	-								-						
Variety	IGKV R1								Naveen						
Applied NPK kg/ha									120:60:40						
Available NPK kg/ha	220:18.3:286.3								230:38:158						

T_1: Fertiliser as per the site-specific nutrient management (RDF)

T_2: T_1 +FYM@10t/ha

T_3: 125 % of T_1

T_4:150 % T_1

T_5: T_1+ Sampoorna (KAU) @ 10 g /l (250 l/ha) micronutrient spray (55-60 DAT)

T_6: T_1+ Eco-Agra spray 3 times @ 1litre in 300 litre of water (25, 40 and 55 DAP)

T_7: Farmers application dose (90:57.5: 30 kg NPK/ha)

T_8: Optional (Blanket RDF (100:60:40 kg NPK/ha))

T_1: Fertiliser as per the SSNM(RDF) (120:60:40 Kg NPK/ha)

T_2: T_1 +FYM@10t/ha

T_3: 125 % of T_1

T_4:150 % T_1

T_5: T_1+ Sampoorna (KAU) @ 10 g /l (250 l/ha) micronutrient spray (55-60 DAT)

T_6: T_1+ Eco-Agra spray 3 times @ 1litre in 300 litre of water (25, 40 and 55 DAP)

T_7: Farmers appl. dose (2.5 tFYM/ha + 50 Kg ureas top dressing twice at 20 and 40 DAT)

T_8: Optional (75% RDF +5 t FYM/ ha)

Table 4.2.3(a): Contd.

Treatment	TITABAR					Over all Mean	Rank
	Grain yield (t/ha)	Tillers/ m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/ panicle		
T1	5.15	251	246	21.60	262	5.16	5
T2	5.28	265	261	22.90	285	5.71	1
T3	4.20	219	208	20.78	231	5.58	2
T4	4.25	233	215	22.25	248	5.55	3
T5	5.35	261	254	22.55	270	5.18	4
T6	5.15	253	254	22.75	267	5.07	6
T7	3.45	177	173	18.15	172	4.59	7
T8	-	-	-	-	-	3.83	8
Exp. mean	**4.69**	**237**	**230**	**21.57**	**248**	**5.37**	
CD(0.05)	0.37	10.02	7.8	1.29	10.78		
CV	5.31	2.85	2.28	4.03	2.92		
Soil type	Clay loam						
pH	-						
EC							
Variety	Ranjit sub 1						
Applied NPK kg/ha	-						
Available NPK kg/ha	303:19:190						

T_1: Fertiliser as per the site-specific nutrient management (RDF)

T_2: T_1 +FYM@10t/ha

T_3: 125 % of T_1

T_4:150 % T_1

T_5: T_1+ Sampoorna (KAU) @ 10 g /l (250 l/ha) micronutrient spray (55-60 DAT)

T_6: T_1+ Eco-Agra spray 3 times @ 1litre in 300 litre of water (25, 40 and 55 DAP)

T_7: Farmers application dose (40-20-20 kg N:P2O5:K2O)

T_8: Optional

Table 4.2.3(a): Contd.

Treatment	GHAGHRAGHAT							
	Grain yield (t/ha)	Straw yield (t/ha)	Plant height (cm)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Panicle wt (g)	Test wt (g)	Days to 50% flowering
T1	3.09	6.43	114.00	227	218	2.40	25.53	107
T2	5.37	9.37	131.67	277	270	2.97	26.13	108
T3	4.67	8.54	125.00	255	247	2.76	25.17	106
T4	5.97	9.74	137.00	312	301	3.26	27.13	110
T5	4.30	8.40	124.33	243	233	2.63	25.20	107
T6	3.62	7.81	114.67	240	233	2.60	25.47	108
T7	2.86	6.82	107.67	222	215	2.30	24.87	107
T8	-	-	-	-	-	-	-	-
Exp. mean	4.27	8.16	122.05	254	245	2.70	25.64	108
CD(0.05)	0.26	0.46	6.04	13.53	12.19	0.13	0.5	2.4
CV	3.43	3.19	2.78	3	2.79	2.68	1.09	1.26
Soil type	-							
pH	-							
EC								
Variety	NDR 2065							
Applied NPK kg/ha	120:60:40:25							
Available NPK kg/ha	-							

T1: Fertilizer as per SSNM(RDF@120:60:40kg NPK/ha)
T2:T1+FYM@10t/ha
T3:125% of T1
T4:150% of T1
T5:T1+2- spray of micro nutrient (as per location specific deficiency)
T6:Fertilizer as per nutrient expert (dose time of application)
T7:Farmers application dose(100:50:0kg NPK/ha)

Table 4.2.3(a)(R): Yield maximization of rice in different Zones, Rabi 2020-21.

Treatment	CHINSURAHH								
	Grain yield (t/ha)	Grain yield (Kg/20 m^2)	Straw yield (t/ha)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Soil available N	Soil available P	Soil available K
T1	4.51	4.51	5.49	340	293	19.70	426.00	87.83	283.33
T2	5.32	5.32	6.52	366	319	19.83	453.33	92.00	296.10
T3	5.42	5.42	6.69	392	345	19.90	477.68	96.18	291.23
T4	5.47	5.47	6.66	377	330	19.80	451.33	97.83	294.83
T5	4.32	5.21	5.21	345	300	19.53	476.33	96.18	285.73
T6	5.50	5.29	6.26	361	305	19.65	471.33	97.50	295.48
T7	2.88	2.88	3.46	276	234	19.28	482.33	92.83	279.70
T8	-	-	-	-	-	-	-	-	-
Exp. mean	**4.77**	**4.87**	**5.76**	**351**	**303**	**19.67**	**462.62**	**94.34**	**289.49**
CD(0.05)	0.18	0.33	0.22	23.46	21.74	0.49	33.18	6.28	13.33
CV	2.47	4.51	2.55	4.5	4.82	1.67	4.82	4.48	3.1
Soil type	Clay loam								
pH	-								
EC	-								
Variety	Shatabdi								
Applied NPK kg/ha	140:70:70								
Available NPK kg/ha	-								

T1: Fertiliser as per the site-specific nutrient management (RDF)
T2: T1 +FYM@10t/ha
T3: 125 % of T1
T4:150 % T1
T5: T1+ two sprays of micro nutrient spray (55-60 DAT)
T6: Fertilizer as per the Nutrient Expert
T7: Farmers application dose
T8: Optional (Location specific; mention while sending the data)

Table 4.2.3(a)(R): Contd.

Treatment	KARAIKAL										Overall mean	Rank
	Grain yield (t/ha)	Grain yield (Kg/20 m^2)	Straw yield (t/ha)	Straw yield (Kg/20 m^2)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/panicle	Unfilled grains/ panicle	Gross return Rs/ha		
T1	4.63	9.27	7.65	15.29	484	442	26.27	85	11	84768	4.57	7
T2	5.98	11.97	7.99	15.99	475	451	26.21	88	13	105612	5.65	2
T3	5.64	11.30	7.09	14.17	475	429	26.67	109	14	98798	5.53	3
T4	5.21	10.43	8.61	17.21	469	422	25.93	93	13	95338	5.34	5
T5	5.36	10.73	5.86	11.72	462	422	24.47	91	14	92095	4.84	6
T6	5.42	10.83	7.23	14.45	448	438	25.61	93	12	95728	5.46	4
T7	5.25	10.53	6.87	13.75	475	431	26.03	94	6	92422	4.07	8
T8	6.27	12.57	7.65	15.29	511	475	26.05	90	10	109293	6.27	1
Exp. mean	**5.47**	**10.95**	**7.37**	**14.73**	**475**	**439**	**25.91**	**93**	**12**	**96757**	**5.12**	
CD(0.05)	1.05	2.12	1.72	3.45	95.99	67.69	1.44	12.67	5.74	13680.54		
CV	11.01	11.03	13.35	13.35	11.54	8.81	3.18	7.79	28.12	8.07		
Soil type	-											
pH	-											
EC	-											
Variety	ADT 46											
Applied NPK kg/ha	150:50:50											
Available NPK kg/ha	-											

T1: Fertiliser as per the site-specific nutrient management (RDF); 150:50:50 NPK ha-1
T2: T1 +FYM@10t/ha
T3: 125 % of T1
T4:150% % T1
T5: T1+ two sprays of micronutrient spray (as per the location-specific deficiency): 0.5% ZnSO4 Foliar spray at PI and 15 days later
T6:Fertiliser as per the Nutrient Expert (dose and time of application)
T7: Farmers application dose
T8: Optional (Location specific; mention while sending the data): 100% NP and 150%K of T1

4.2.4 Enhancing productivity of organic rice cultivation (new trial initiated in *kharif* 2020)

Organic farming is rapidly gaining recognition worldwide as a promising means to offer healthier food and to ensure environmental sustainability. Currently, organic produce including organic rice is in huge demand owing to its potential to fetch premium prices in the global market. Even though rice performs well under organic production system, a set of constraints including nitrogen stress at critical growth stages, unavailability of rapidly mineralizable organic amendments, lack of appropriate varieties and intense crop–weed competition pose major challenges to realize the potential yield. Use of diverse organic nutrient sources including the split application of fast mineralizable nutrient-rich manures (vermicompost, poultry manure), green manures and bio-fertilizers can supply optimum nutrients in organic rice system. In parallel, development and deployment of rice varieties having a response to organic nutrient inputs, resistance to diseases/insects and the ability to compete with weeds can help minimize the risk of crop failure. Further, higher emission of greenhouse gases (GHGs) in the organic rice field deserves greater attention because of environmental sustainability. Strategic water management and selection of appropriate organic amendments could help address this issue. However, a substantial research gap still exists demanding a deeper understanding of the organic rice system to register higher yield gains. There is an urgency for the alignment of modern agricultural techniques with organic rice production to improve both the system productivity and the product quality along with effectively avoiding the risks associated with indiscriminate use of chemicals in agriculture. A new trial on organic rice was initiated with the following objectives: 1. To maximize the yield in organic rice through management practices 2. To compare yield and economics of the different organic management practices 3. To assess the soil health, pest dynamics and seed quality parameters in organic rice. The trial consisted of 7 treatments laid out in RBD design with 3 replications. Treatments are T_1: Absolute control (No NPK); T_2: 100% RDN; T_3: 100% N (FYM); T_4: 150% N (FYM); T_5: 50% N (FYM) + 50% N (Green Leaf Manure); T_6: 50% N (FYM) + 50% N (Vermicompost); T_7: 50% N (FYM) + 50% N (Neem / Castor / any cake) and two optional treatments i.e. T_8: 75% RDN 50% each through FYM + Vermicompost; FYM as basal and VC 20 days after transplanting + Panchgavya + Jeevamrit + Ghanjeevamrit and T_9: Best state organic practice. The results were summarized and presented in **Table 4.2.4** and the salient findings are as followed.

In clay loam soils of **Chinsurah**, Sukumar variety performed best at 100% RDN (5.48 t/ha). None of the organic treatments could able to result more than 4 t/ha grain yield. In **Gangavathi** also RNR 15048 at 100% RDN produced the highest grain yield (5.00 t/ha). Except absolute control, cost of cultivation was the lowest under RDN treatment (Rs. 49138/-) and the highest gross return also recorded under same treatment (Rs. 95,323/-). **Interesting to note that T_8 treatment recorded loss of Rs. 7128/- per hectare due to adoption of 75% RDN 50% each through FYM + Vermicompost; FYM as basal and VC 20 days after transplanting + Panchgavya + Jeevamrit + Ghanjeevamrit**. In **Karjat**, KJT-3 variety recorded the highest grain yield under RDN treatment (4.20 t/ha), however, at par with 50% N (FYM) + 50% N (Vermicompost) (3.96 t/ha). Apart from absolute control, the lowest cost of cultivation was recorded in 100% RDN (Rs. 69,152/-). All other organic treatments recorded higher cost of cultivation ranged from Rs. 93,308/- to Rs.1,14,979/-, which indicated that organic rice cultivation need more monetary input than that of inorganic or integrated nutrient

management. In silty clay loam soils of **Khudwani**, 100% of RDN resulted the highest grain yield (7.04 t/ha) followed by and at par with 75% RDN, 50% each through FYM + vermicompost; FYM as basal and VC at 20 days after transplanting + Panchgavya + Jeevamrit + Ghanjeevamrit (6.78 t/ha). Similarly, apart from absolute control, the lowest cost of cultivation was recorded in 100% RDN (Rs. 67,030/-). **The highest gross return was obtained from 100% N (FYM) (Rs.1,45,194/-)**. **At Khudwani the trial was conducted in a nice manner and the data reporting was also very impressive**. In **Parbani**, the experimental mean grain yield was very low (1.78 t/ha). So, the details of the trial were not reported in this progress report. In laterite soils of **Pattambi**, absolute control resulted the highest grain yield (4.21 t/ha) compared to those of other treatments. **The data reported to be justified properly by the centre Agronomist**. In clay loam soils of **Puducherry**, VGD 1 variety produced the highest grain yield (4.87 t/ha) under best state recommended organic practices, followed by 50% N (FYM) + 50% N (vermicompost) with 4.46 t/ha. In vertisols of **Raipur**, CG Devbhog resulted in the highest grain yield under best state organic management practices (50% N through vermicompost + green manuring in situ + PSB + Azotobacter + cow urine spray twice@30%) with yield of 4.83 t/ha. In Titabar also the highest grain yield was recorded under state recommended organic practices (4.30 t/ha).

4.2.4 (R) Enhancing productivity of organic rice cultivation (*rabi* 2020-21)

In **Chinsurah**, Sukumar variety, apart from inorganic treatment (5.21 t/ha), FYM @ 10t/ha + vermicompost 2.5 t/ha + spray of liquid manure produced the highest grain yield (3.51 t/ha). In **Karaikal** also FYM @ 10t/ha + vermicompost 2.5 t/ha + spray of liquid manure like Panchgavya, Jeevamrit, Ghanjeevamrit produced the highest grain yield (3.87 t/ha). Similarly, the highest gross return also recorded under same treatment (Rs.1,52,547/-).

Table 4.2.4: Enhancing productivity of Organic Rice cultivation – permanent trial for 5 years and system-based approach, Kharif-2021.

Treatment	CHINSURAHH				GANGAVATHI							
	Grain yield (t/ha)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (Kg/20 m²)	Panicle/m² (No.)	Test wt (g)	Filled grains/panicle	Cost of cultivation Rs/ha	Gross return Rs/ha
T1	2.33	258	219	20.18	3.50	7.00	8.05	250	12.40	116	42769	68194
T2	5.48	364	319	21.75	5.00	10.00	11.50	339	13.73	148	49138	95323
T3	2.73	249	216	19.63	3.65	7.31	8.41	243	12.62	136	63769	69076
T4	2.58	250	218	20.23	3.55	7.10	8.16	274	12.64	134	72769	69474
T5	3.44	258	215	19.65	3.48	6.95	7.99	264	12.38	153	65269	65275
T6	3.69	290	263	20.23	3.57	7.14	8.21	273	12.66	125	78019	64615
T7	2.75	259	225	19.65	3.92	7.83	9.01	289	12.81	133	83644	72880
T8	2.67	264	227	19.80	3.46	6.92	7.96	269	12.76	133	70037	62909
T9	2.72	247	214	20.95	-	-	-	-	-	-	-	-
T10	-	-	-	-	-	-	-	-	-	-	-	-
Exp. mean	3.15	271	235	20.23	3.35	6.69	7.70	245	11.33	120	58379	63083
CD(0.05)	0.22	33.31	33.72	0.71	0.45	0.9	1.17	26.6	1.14	13.97	13599.49	13155.88
CV	4.78	8.42	9.83	2.4	8.14	8.16	9.16	6.58	6.1	7.06	14.08	12.6
Soil type	Clay Loam				-							
pH	-				-							
EC	-											
Variety	Sukumar				RNR-15048							
Applied NPK kg/ha	80:40:40				-							
Available NPK kg/ha	-				-							

T_1: Absolute Control (No NPK)
T_2: 100% RDN
T_3: 100 % N (FYM)
T_4: 150 % N (FYM)
T_5: 50 % N (FYM) + 50 % N (Green Leaf Manure)
T_6: 50 % N (FYM) + 50 % N (Vermi compost)
T_7: 50 % N (FYM) + 50 % N (Neem / Castor/ any cake)
Optional treatments:
T8: Optional 1- 75% RDN 50% each through FYM + Vermicompost ; FYM as basal and VC 20 days after transplanting + Panchgavya + Jeevamrit + Ghanjeevamrit.
T9: Optional 2 – Best State Organic practice (mention the treatment)

T_1: Absolute Control (No NPK)
T_2: 100% RDN
T_3: 100 % N (FYM)
T_4: 150 % N (FYM)
T_5: 50 % N (FYM) + 50 % N (Green Leaf Manure)
T_6: 50 % N (FYM) + 50 % N (Vermi compost)
T_7: 50 % N (FYM) + 50 % N (Neem / Castor/ any cake)
Optional treatments:
T8: Optional 1- 75% RDN 50% each through FYM + Vermicompost ; FYM as basal and VC 20 days after transplanting + Panchgavya + Jeevamrit + Ghanjeevamrit.
T9: Optional 2 – Best State Organic practice (mention the treatment)

Table 4.2.4: Contd.

Treatment	KARJAT								
	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (Kg/20 m²)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Filled grains/panicle	Unfilled grains/panicle	Cost of cultivation Rs/ha
T1	2.23	4.46	6.00	188	180	20.37	82	23	64129
T2	4.20	8.40	11.18	292	288	23.38	153	5	69152
T3	3.49	6.98	9.32	277	271	22.00	130	14	98029
T4	3.67	7.34	9.82	273	268	22.75	141	9	114979
T5	3.66	7.32	9.77	277	270	22.60	133	13	82350
T6	3.96	7.92	10.58	297	293	23.55	145	6	107564
T7	3.64	7.27	9.71	297	292	23.10	146	8	93308
T8	3.63	7.27	9.67	277	272	22.11	139	12	87350
T9	-	-	-	-	-	-	-	-	-
T10	-	-	-	-	-	-	-	-	-
Exp. mean	3.16	6.33	8.45	242	237	19.98	119	10	79651
CD(0.05)	0.35	0.7	0.94	31.5	31.39	1.58	9.72	4.37	17288.16
CV	6.67	6.67	6.73	7.87	8	4.77	4.96	26.5	13.12
Soil type	-								
pH	-								
EC									
Variety	KJT - 3								
Applied NPK kg/ha	100:50:50								
Available NPK kg/ha	-								

T_1: Absolute Control (No NPK)
T_2: 100% RDN (P and K Constant)
T_3: 100 % N (FYM)
T_4: 150 % N (FYM)
T_5: 50 % N (FYM) + 50 % N (Green Leaf Manure)
T_6: 50 % N (FYM) + 50 % N (Vermi compost)
T_7: 50 % N (FYM) + 50 % N (Neem / Castor/ any cake)
Optional treatments:
T8: Optional 1- 75% RDN 50% each through FYM + Vermicompost ; FYM as basal and VC 20 days after transplanting + Jeevamrit.
T9: -

Table 4.2.4: Contd.

Treatment	KHUDWANI																
	Grain yield (t/ha)	Grain yield (Kg/20 m^2)	Straw yield (t/ha)	Straw yield (Kg/20 m^2)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/panicle	Unfilled grains/panicle	N uptake (kg/ha) in plant	P uptake (kg/ha) in plant	K uptake (kg/ha) in plant	Soil available N	Soil available P	Soil available K	Cost of cultivation Rs/ha	Gross return Rs/ha
T1	4.46	8.92	6.25	12.51	308	236	25.33	106	17	78.02	15.62	91.78	233.33	12.70	228.00	61030	67723
T2	7.04	14.09	7.60	15.19	319	299	29.30	119	12	104.32	24.53	128.24	247.47	15.13	249.33	67030	97850
T3	5.97	11.95	7.68	15.37	325	286	26.53	111	13	96.17	23.03	127.84	266.47	14.67	255.33	81030	145194
T4	5.47	10.94	7.85	15.70	334	272	26.73	104	15	109.92	20.90	115.61	275.33	16.83	267.67	79530	136211
T5	5.56	11.11	7.31	14.62	319	275	25.60	107	15	100.88	19.73	120.32	252.83	16.80	259.00	72410	82455
T6	5.41	10.83	7.38	14.76	321	282	25.77	96	16	84.70	19.25	111.17	270.43	17.53	258.00	181030	81361
T7	5.51	11.01	7.29	14.58	323	241	25.80	91	16	88.31	15.67	108.48	267.40	17.33	251.33	150000	81896
T8	6.78	13.57	7.94	15.88	330	307	28.87	112	11	100.81	23.19	131.13	263.33	16.80	251.67	160000	96729
T9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exp. mean	5.78	11.55	7.41	14.83	322	275	26.74	106	14	95.39	20.24	116.82	259.57	15.97	252.54	106508	98677
CD(0.05)	0.55	1.09	0.54	1.07	12.22	8.82	0.58	9.37	1.52	7.23	2.843376	12.81	14.44	2.57	11.42	35667.5	33247.9
CV	5.39	5.39	4.12	4.12	2.16	1.83	1.24	5.06	6.08	4.33	10.74775	6.26	3.18	9.2	2.58	30.4	16.5
Soil type	Silty clay loam																
pH	-																
EC																	
Variety	-																
Applied NPK kg/ha	120:60:30																
Available NPK kg/ha	223;14.7:245																

T_1: Absolute Control (No NPK)
T_2: 100% RDN
T_3: 100 % N (FYM)
T_4: 150 % N (FYM)
T_5: 50 % N (FYM) + 50 % N (Green Leaf Manure)
T_6: 50 % N (FYM) + 50 % N (Vermi compost)
T_7: 50 % N (FYM) + 50 % N (Neem / Castor/ any cake)
Optional treatments:
T8: Optional 1- 75% RDN 50% each through FYM + Vermicompost ; FYM as basal and VC 20 days after transplanting + Panchgavya + Jeevamrit + Ghanjeevamrit.
T9: Optional 2 – Best State Organic practice (mention the treatment)

Table 4.2.4: Contd.

Treatment	PARBHANI									
	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (t/ha)	Straw yield (Kg/20 m²)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Filled grains/panicle	Unfilled grains/panicle	Gross return Rs/ha
T1	1.18	2.37	1.93	3.87	232	145	21.10	106	12	41405
T2	2.87	5.73	3.69	7.37	280	201	24.80	148	13	100345
T3	1.86	3.72	2.88	5.76	264	207	24.57	129	8	65100
T4	1.93	3.87	2.95	5.91	268	210	25.20	137	7	67725
T5	1.44	2.89	2.46	4.93	245	174	23.05	119	8	50575
T6	1.72	3.45	2.72	5.45	260	186	23.37	127	7	60375
T7	1.68	3.36	2.70	5.40	248	177	23.20	121	8	58800
T8	1.50	3.00	2.52	5.04	236	169	22.90	115	8	52500
T9	1.80	3.60	2.82	5.64	263	205	23.70	127	7	63000
T10	-	-	-	-	-	-	-	-	-	-
Exp. mean	1.78	3.55	2.74	5.49	255	186	23.54	126	9	62203
CD(0.05)	0.01	0.03	0.01	0	0.82	0	0	1	0	493.43
CV	0.48	0.45	0.12	0.04	0.19	0	0	0.46	0	0.46
Soil type	-									
pH	-									
EC	-									
Variety	-									
Applied NPK kg/ha	-									
Available NPK kg/ha	-									

T_1: Absolute Control (No NPK)

T_2: 100% RDN

T_3: 100 % N (FYM)

T_4: 150 % N (FYM)

T_5: 50 % N (FYM) + 50 % N (Green Leaf Manure)

T_6: 50 % N (FYM) + 50 % N (Vermi compost)

T_7: 50 % N (FYM) + 50 % N (Neem / Castor/ any cake)

Optional treatments:

T8: Optional 1- 75% RDN 50% each through FYM + Vermicompost ; FYM as basal and VC 20 days after transplanting + Panchgavya + Jeevamrit + Ghanjeevamrit.

T9: Optional 2 – Best State Organic practice (mention the treatment)

Table 4.2.4: Contd.

Treatment	PATTAMBI							
	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (Kg/20 m²)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Filled grains/panicle	Unfilled grains/panicle
T1	4.21	8.43	15.24	284	284	28.25	65	57
T2	3.84	7.68	14.66	249	249	27.75	59	48
T3	3.06	6.12	11.62	211	211	28.25	52	49
T4	3.17	6.34	11.11	167	167	29.50	59	40
T5	3.96	7.91	12.80	238	238	28.75	57	35
T6	3.60	7.21	14.72	206	211	28.25	54	43
T7	3.18	6.35	11.99	179	179	28.25	53	36
T8	0.00	0.00	0.00	0	0	0.00	0	0
T9	0.00	0.00	0.00	0	0	0.00	0	0
T10	-	-	-	-	-	-	-	-
Exp. mean	2.78	5.56	10.24	170	171	22.11	44	34
CD(0.05)	1.17	2.34	7.22	44.71	43.72	1.76	11.16	12.57
CV	22.01	22.01	36.92	13.73	13.39	4.16	13.25	19.31
Soil type	Laterite soil							
pH	-							
EC	-							
Variety	Aiswarya							
Applied NPK kg/ha	-							
Available NPK kg/ha	-							

T_1: Absolute Control (No NPK)
T_2: 100% RDN
T_3: 100 % N (FYM)
T_4: 150 % N (FYM)
T_5: 50 % N (FYM) + 50 % N (Green Leaf Manure)
T_6: 50 % N (FYM) + 50 % N (Vermi compost)
T_7: 50 % N (FYM) + 50 % N (Neem / Castor/ any cake)
Optional treatments:
T8: Optional 1- 75% RDN 50% each through FYM + Vermicompost ; FYM as basal and VC 20 days after transplanting + Panchgavya + Jeevamrit + Ghanjeevamrit.
T9: Optional 2 – Best State Organic practice (mention the treatment)

Table 4.2.4: Contd.

Treatment	PUDUCHERRY														
	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (t/ha)	Straw yield (Kg/20 m²)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Filled grains/ panicle	Unfilled grains/ panicle	N uptake (kg/ha) in plant	P uptake (kg/ha) in plant	K uptake (kg/ha) in plant	Soil available N	Soil available P	Soil available K
T1	2.63	5.26	4.69	9.38	273	237	9.69	139	29	40.33	14.00	54.33	123.00	11.00	105.00
T2	2.80	5.60	4.90	9.81	295	249	9.76	159	22	49.00	21.33	62.67	123.00	11.00	105.00
T3	3.36	6.73	5.89	11.78	299	258	9.85	170	20	58.33	24.00	70.00	123.00	11.00	105.00
T4	3.92	7.84	7.27	14.53	315	276	9.92	179	14	85.00	34.67	97.67	123.00	11.00	105.00
T5	3.64	7.28	6.22	12.44	307	264	9.91	174	17	65.00	27.67	75.33	123.00	11.00	105.00
T6	4.46	8.92	7.74	15.48	326	290	10.00	190	10	84.33	34.67	89.67	123.00	11.00	105.00
T7	4.20	8.40	7.33	14.66	323	287	9.93	184	12	73.00	32.33	85.00	123.00	11.00	105.00
T8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T9	4.87	9.73	8.48	16.97	339	299	10.01	197	8	91.33	35.33	97.00	123.00	11.00	105.00
T10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exp. mean	3.74	7.47	6.57	13.13	310	270	9.88	174	16	68.29	28.00	78.96	123.00	11.00	105.00
CD(0.05)	0.09	0.17	0.68	1.37	7.29	5.3	0.11	3.78	0.82	6.03	4.19	4.52	0	0	0
CV	1.33	1.31	5.95	5.95	1.34	1.12	0.61	1.24	2.87	5.04	8.55	3.27	0	0	0
Soil type	Clay loam														
pH	6.77														
EC	0.10														
Variety	VGD 1														
Applied NPK kg/ha	120;40:40														
Available NPK kg/ha	123;11.4:105														

T_1: Absolute Control (No NPK)
T_2: 100% RDN
T_3: 100 % N (FYM)
T_4: 150 % N (FYM)
T_5: 50 % N (FYM) + 50 % N (Green Leaf Manure)
T_6: 50 % N (FYM) + 50 % N (Vermi compost)
T_7: 50 % N (FYM) + 50 % N (Neem / Castor/ any cake)
Optional treatments:
T8: Optional 1- 75% RDN 50% each through FYM + Vermicompost ; FYM as basal and VC 20 days after transplanting + Panchgavya + Jeevamrit + Ghanjeevamrit.
T9: Optional 2 – Best State Organic practice (mention the treatment)

Table 4.2.4: Contd.

Treatment	RAIPUR					TITABAR						Over all Mean	Rank
	Grain yield (t/ha)	Panicle/m² (No.)	Test wt (g)	Filled grains/ panicle	Unfilled grains/ panicle	Grain yield (t/ha)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Filled grains/panicle	Unfilled grains/ panicle		
T1	2.65	236	18.50	115	40	2.48	236	213	11.20	81	43	2.85	9
T2	4.49	328	19.08	144	49	4.85	301	293	12.30	157	34	4.51	1
T3	3.54	260	19.05	130	46	3.23	254	248	11.23	123	35	3.43	7
T4	3.79	274	19.15	135	46	3.45	303	293	11.95	130	35	3.50	6
T5	4.53	336	19.43	151	52	3.58	256	249	11.38	137	29	3.70	4
T6	3.42	259	19.30	128	44	3.80	302	300	11.20	121	38	3.74	3
T7	3.55	263	18.90	132	45	4.03	256	249	11.10	130	35	3.61	5
T8	4.63	344	19.40	154	53	-	-	-	-	-	-	3.24	8
T9	4.83	350	19.18	156	54	-	-	-	-	-	-	2.84	10
T10	-	-	-	-	-	4.30	291	283	12.08	157	29	4.30	2
Exp. mean	3.94	295	19.11	138	48	3.30	244	236	10.27	115	31		
CD(0.05)	0.42	35.5	0.84	9.3	11.72	0.59	26.75	39.01	0.75	30.22	13.4		
CV	7.32	8.26	3	4.61	16.86	10.76	6.63	9.98	4.4	15.88	26.31		
Soil type	Vertisols					Clay loam							
pH	-					-							
EC	-												
Variety	CG Devbhog					Keteki Joha							
Applied NPK kg/ha	80:50:30 in T2					-							
Available NPK kg/ha	220;18.3:286.3					-							

T_1: Absolute Control (No NPK)
T_2: 100% RDN (80:50:30 kg NPK/ha)
T_3: 100 % N (FYM) i.e 80 kg N/ha
T_4: 150 % N (FYM)
T_5: 50 % N (FYM) + 50 % N (Green Leaf Manure)
T_6: 50 % N (FYM) + 50 % N (Vermi compost)
T_7: 50 % N (FYM) + 50 % N (Neem cake)
Optional treatments:
T8: Optional 1- 33% N through vermicompost + Green manuring in situ+ PSB+Azotobacter+ cow urine spray twice @ 30%
T9: Optional 2 – 50% N through vermicompost + Green manuring in situ+ PSB+Azotobacter+ cow urine spray twice @ 30%

T_1: Absolute Control (No NPK)
T_2: 100% RDN
T_3: 100 % N (FYM)
T_4: 150 % N (FYM)
T_5: 50 % N (FYM) + 50 % N (Green Leaf Manure)
T_6: 50 % N (FYM) + 50 % N (Vermi compost)
T_7: 50 % N (FYM) + 50 % N (Neem / Castor/ any cake)
Optional treatments:
T8: Optional 1- 75% RDN 50% each through FYM + Vermicompost ; FYM as basal and VC 20 days after transplanting + Panchgavya + Jeevamrit + Ghanjeevamrit.
T9: Optional 2 – Best State Organic practice (mention the treatment)
T10: Optional 3 – Best State Organic practice Enriched Compost (@ 5 t/ha) + Biofertilizer (Azospirillum, PSB and KSB mix @ 4.0 kg/ha as seedling root dip)- State Package

Table 4.2.4(R): Enhancing productivity of Organic Rice cultivation – permanent trial for 5 years and system-based approach, Rabi-2020-21.

Treatment	CHINSURAHH							
	Grain yield (t/ha)	Straw Yield (t/ha)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Soil available N	Soil available P	Sopil available K
T1	3.42	4.21	259	218	20.18	426.00	87.83	283.33
T2	2.75	3.28	259	225	19.65	451.00	87.17	289.10
T3	2.61	3.11	262	229	19.63	477.33	96.83	294.83
T4	3.51	4.31	278	241	20.23	490.67	94.83	292.73
T5	0.00	0.00	0	0	0.00	0.00	0.00	0.00
T6	5.21	6.49	364	325	21.75	452.67	93.83	292.20
T7	0.00	0.00	0	0	0.00	0.00	0.00	0.00
T8	0.00	0.00	0	0	0.00	0.00	0.00	0.00
Exp. mean	**3.50**	**4.28**	**284**	**248**	**20.29**	**459.53**	**92.10**	**290.44**
CD(0.05)	0.3	0.37	46.9	41.1	0.45	33.41	6	7.93
CV	5.5	5.6	10.71	10.78	1.45	4.72	4.23	1.77
Soil type	-							
pH	-							
EC	-							
Variety	Sukumar							
Applied NPK kg/ha	140:70:70							
Available NPK kg/ha	-							

T_1: Organic POP recommendation

T_2: 100 % POP recommendation as organic
T_3: 75 % POP recommendation as organic
T_4: FYM @ 10 t/ha + VC 2.5 t/ha + spray of liquid manure
T_5: Bio-inoculated fortified compost
T_6: Inorganic RDF
Optional treatments:
T_7: Optional – Location specific
T8: Optional – Location specific

Table 4.2.4(R): Contd.

Treatment	KARAIKAL									Over all Mean	Rank
	Grain yield (t/ha)	Grain yield (kg/20 m²)	Straw Yield (t/ha)	Straw Yield (kg/20 m2)	Tillers/m² (No.)	Test wt (g)	Filled grain / panicle	Unfilled grain / panicle	Gross return Rs./ha		
T1	3.69	7.38	7.65	15.29	510	18.37	99	4	144385	3.56	3
T2	3.61	7.20	7.99	15.99	577	18.00	92	5	142045	3.18	4
T3	2.76	5.52	7.09	14.17	530	18.00	90	11	110773	2.69	5
T4	3.87	7.73	8.61	17.21	533	18.43	112	5	152547	3.69	2
T5	3.82	7.62	5.86	11.72	460	18.33	106	4	145128	1.91	6
T6	3.12	6.24	7.23	14.45	513	18.47	100	7	123653	4.17	1
T7	3.55	7.09	6.87	13.75	517	18.30	109	6	137880	1.78	7
T8	2.66	5.31	7.65	15.29	490	18.23	97	7	108277	1.33	8
Exp. mean	**3.39**	**6.76**	**7.37**	**14.73**	**516**	**18.27**	**101**	**6**	**133086**		
CD(0.05)	0.84	1.68	1.72	3.45	66.51	0.48	23.33	5.47	30076.08		
CV	14.18	14.18	13.35	13.35	7.36	1.5	13.23	50.34	12.9		
Soil type	-										
pH	-										
EC	-										
Variety	Sukumar										
Applied NPK kg/ha	140:70:70										
Available NPK kg/ha	-										

T1- Adhoc Organic POP recommendation: 30 kg N by FYM, 30 kg N by vermicompost, 30 kg N by neem cake, Azospirillum (2 kg ha-1) and P solubilising bacteria (2 kg ha-1)

T2: 100 % POP recommendation as organic (FYM @ 5 t ha-1, 45 kg N by FYM, 22.5 kg N by vermicompost, 22.5 kg N by neem cake)

T3: 75 % POP recommendation as organic (FYM @ 5 t ha-1, 33.75 kg N by FYM, 16.88 kg N by vermicompost, 16.88 kg N by neem cake)

T4: FYM @ 10 t/ha + VC 2.5 t/ha + spray of liquid manure like Panchgavya, Jeevamrit, Ghanjeevamrit etc.

T5: Bio-inoculated fortified compost @ 10 t/ha + All bio-fertilizers/biomanure

T6: Inorganic RDF (soil test based application of NPK): 75:50:50 kg NPK/ha

T-7: Optional (Location specific; mention while sending the data): 100 % POP recommendation as organic FYM @ 5 t ha-1, 90 kg N by GLM

T-8: Optional (Location specific; mention while sending the data): 75 % POP recommendation as organic (FYM @ 5 t ha-1, 67 kg N by GLM)

4.2.5. Water management for enhancing water use efficiency in different rice establishment methods

Increasing water scarcity is becoming real threat to rice cultivation. Hence water-saving technology needs to be developed which not only economically beneficial but also maintains soil health. Any approach that would lessen the amount of water use without compromising the rice yield would certainly be a welcome strategy. Introduction of SRI is an alternative practice to solve water crisis, and as a methodology for increasing the productivity of irrigated rice. AWD is also called 'intermittent irrigation' or 'controlled irrigation' which can reduce the water requirement by 30 % in irrigated rice system. To evaluate the suitable and promising irrigation management practices in different crop establishment methods a trial was formulated and conducted at 3 locations (**Chatha**, **Mandya and Nawagam**). Split plot design was adopted with 3 main plots of irrigation management {I_1: Flooding throughout crop growth (3 + / - 2 cm), I_2: Saturation maintenance up to PI and (3 + / - 2 cm) after PI and I_3: Alternate wetting and drying (irrigation at 5 -7 days interval with 5 cm/ha of water (5 cm irrigation at 3 DADPW) up to PI and (3 + / - 2 cm) after PI} and 3 subplots of crop establishment methods {M_1: Mechanical Transplanting method on puddled soil (crop management methods same as for puddled transplanted rice), M_2: Direct wet seeding on puddled soil (Use of Drum seeder/ dibbling of sprouted seed at 25 x 25 cm) fb crop management practices as per direct wet seeded rice, M_3: Direct dry seeding (Mechanical) 25 cm row spacing and replicated four times. The results were summarized and presented in **Table 4.2.5**and the salient findings are as followed.

In sandy clay loam soils of **Chatha**, interaction effect on grain yield was found to be significant. Alternate wetting and drying along with direct wet seeding on puddled soil combination resulted the highest grain yield (3.48 t/ha). In red sandy loam soils of **Mandya**, interaction and main plots effect were found to be non-significant. Among establishment methods mechanical transplanting method resulted the highest grain yield (6.04 t/ha) compared to those of rest methods. Straw yield was found to be significant. Alternate wetting and drying along with direct wet seeding on puddled soil combination resulted the highest grain yield (5.86 t/ha). The lowest cost of cultivation under was recorded in alternate wetting and drying (Rs. 61,173/-). Similarly, the lowest water input was 1251 mm/ha under the same treatment. In **Nawagam**, interaction and main plots effect were found to be non-significant. Mechanical transplanting method on puddled soil (crop management methods same as for puddled transplanted rice) resulted the highest grain yield (4.95 t/ha) followed by direct wet seeding in puddled soil (4.60 t/ha). However, the cost of cultivation was lower in direct dry seeding (mechanical) (Rs. 40,598/ha).

4.2.5. (R) Water management for enhancing water use efficiency in different rice establishment methods

The trial was conducted at 2 locations (**Karaikal and Puducherry**). In sandy clay loam soils of Karaikal, ADT 46 produced the highest grain yield under SRI cultivation with alternate wetting and drying (5.92 t/ha). Main plot and sub plots effect was found to be non-significant. Alternate wetting and drying treatment recorded the lowest cost of cultivation (Rs. 38,334/- per hectare) and total water input (700 mm/ha). Similarly, mechanical transplanting method on puddle soil also recorded the lowest cost of cultivation (Rs. 31,485/- per hectare). Normal transplanting method showed lowest total water input (800 mm/ha). In clay loam soils of

Puducherry, interaction effect on grain yield was found to be non-significant. Alternate wetting and drying treatment resulted in the highest grain yield (6.54 t/ha) and total water input (799 mm/ha). Similarly, mechanical transplanting on puddled soil recorded the highest grain yield (6.64 t/ha) and lowest total water input (966 mm/ha). Direct wet seeding on puddled soil recorded the lowest cost of cultivation (Rs. 53250/- per hectare).

Table 4.2.5: Evaluation of Water management for enhancing Water use efficiency in different rice establishments methods, Kharif-2021.

Treatment		CHATHA							
Main Plot- Irrigation management practices	Crop establishment methods	Grain yield (t/ha)	Straw yield (t/ha)	Plant height (cm)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering
I 1- Flooding throughout crop growth (3 +/- 2cm) after 15 days	M1	2.88	4.35	252.33	220	217	1.44	19.23	118
	M2	3.05	4.56	244.00	228	221	1.46	19.37	117
	M3	2.61	3.74	235.00	215	203	1.43	19.00	116
I 2- Irrigation at Saturation (No flooding)	M1	2.91	4.37	260.67	223	221	1.50	19.43	115
	M2	3.15	4.71	250.67	227	224	1.53	19.60	111
	M3	2.77	4.13	238.67	217	207	1.45	19.23	114
I 3- Alternate wetting and drying	M1	3.22	4.83	263.67	227	225	1.53	20.07	112
	M2	3.48	5.08	253.33	231	228	1.56	20.27	109
	M3	2.81	4.22	241.67	219	209	1.50	19.27	112
Mean of Irrigation									
I1		2.85	4.22	243.78	221	214	1.44	19.20	117
I2		2.94	4.40	250.00	222	217	1.49	19.42	113
I3		3.17	4.71	252.89	225	221	1.53	19.87	111
C.D. (0.05)		0.02	0.03	0.79	1.35	0.81	0.01	0.03	0.32
C.V. (%)		0.62	0.74	0.38	0.72	0.44	0.63	0.16	0.34
Method of Methods									
M1		3.00	4.52	258.89	223	221	1.49	19.58	115
M2		3.23	4.78	249.33	229	224	1.52	19.75	112
M3		2.73	4.03	238.45	217	206	1.46	19.17	114
CD (0.05)		0.03	0.04	3.18	1.99	2.41	0.01	0.06	0.67
C.V. (%)		0.91	0.9	1.24	0.87	1.08	0.51	0.29	0.57
Interaction									
I and M		0.05	0.07	NS	NS	NS	0.01	0.1	1.16
M and I		0.04	0.06	NS	NS	NS	0.01	0.08	0.96
Experimental Mean		**2.99**	**4.44**	**248.89**	**223**	**217**	**1.49**	**19.50**	**114**
Soil type		Sandy clay loam							
pH		8.03							
EC		0.21							
Variety		Basmati 370							
Available NPK kg/ha		245;14.3:146							

M1 - Transplanting
M2 - Dibbling of sprouted seed at 25 x 25 cm
M3 - Direct Dry Seeding (25 cm row spacing)

Table 4.2.5: Contd.

Treatment		MANDYA									
Main Plot- Irrigation management practices	**Crop establishment methods**	**Grain yield (t/ha)**	**Straw yield (t/ha)**	**Plant height (cm)**	**Tillers/m² (No.)**	**Panicle/m² (No.)**	**Panicle wt (g)**	**Test wt (g)**	**Days for 50% flowering**	**Cost of cultivation Rs/ha**	**Total water input (mm/ha)**
I 1- Flooding throughout crop growth (3 +/- 2cm) after 15 days	M1	5.11	7.33	63.13	378	348	2.14	26.00	86	68045	1999
	M2	5.34	8.18	66.25	421	391	2.16	27.08	82	60675	1885
	M3	5.11	7.21	58.50	389	362	2.20	25.80	83	59216	1842
I 2- Irrigation at Saturation (No flooding)	M1	5.49	7.96	65.62	413	385	2.56	27.52	86	67636	1638
	M2	4.96	7.86	68.88	415	386	2.04	25.88	83	59183	1440
	M3	5.15	7.67	59.64	372	344	1.97	27.31	82	58484	1479
I 3- Alternate wetting and drying	M1	5.41	8.62	63.67	438	403	2.08	25.75	87	67577	1335
	M2	5.86	7.62	66.72	412	375	2.41	26.70	82	59183	1152
	M3	4.39	6.37	58.56	422	389	2.05	26.56	82	56758	1266
Mean of Irrigation											
I1		5.19	7.57	62.63	396	367	2.17	26.29	84	62645	1909
I2		5.20	7.83	64.71	400	372	2.19	26.90	84	61768	1519
I3		5.22	7.54	62.98	424	389	2.18	26.34	84	61173	1251
C.D. (0.05)		NS	NS	NS	NS	NS	NS	NS	NS	391.33	51
C.V. (%)		8.04	6.64	5.09	14.5	13.71	8.8	5.42	1.08	0.76	3.91
Method of Methods											
M1		5.34	7.97	64.14	409	379	2.26	26.42	86	67753	1657
M2		5.39	7.89	67.28	416	384	2.20	26.55	83	59680	1492
M3		4.88	7.08	58.90	394	365	2.07	26.56	82	58153	1529
CD (0.05)		0.34	NS	3.61	NS	NS	NS	NS	0.97	661.14	45.19
C.V. (%)		6.38	13.18	5.55	7.21	7.82	7.79	7.21	1.13	1.04	2.82
Interaction											
I and M		0.59	NS	NS	NS	NS	0.3	NS	NS	NS	NS
M and I		0.52	NS	NS	NS	NS	0.26	NS	NS	NS	NS
Experimental Mean		**5.20**	**7.65**	**63.44**	**406**	**376**	**2.18**	**26.51**	**84**	**61862**	**1559**
Soil type		Red Sandy loam									
pH		8.05									
EC		0.81									
Variety		MTU 1001									
Available NPK kg/ha		268.4:94.8:244.8									

M1- Transplanted rice

M2- Direct wet seeding on puddled soil (Use of Drum seeder spourted seed at 25 x 25 cm) fb crop management practices as per direct wet seeded rice

M3- Sprouted rice- Broadcasting of germinated seed in puddled land

Table 4.2.5: Contd.

Treatment		NAWAGAM								Over all Mean	Rank
Main Plot- Irrigation management practices	Crop establishment methods	Grain yield (t/ha)	Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	Cost of cultivation Rs/ha		
I 1- Flooding throughout crop growth (3 +/- 2cm)	M1	5.05	119.50	247	210	4.36	18.83	104	45312	4.35	5
	M2	4.76	105.25	285	242	4.07	16.79	103	41853	4.38	4
	M3	4.37	106.50	278	236	4.06	17.25	98	40259	4.03	8
I 2- Saturation maintenance upto PI and (3 +/- 2 cm) after PI	M1	4.92	119.50	245	216	4.58	18.81	104	45258	4.44	3
	M2	4.41	107.50	300	264	4.32	18.68	102	41618	4.17	6
	M3	4.27	112.50	302	265	4.14	17.72	100	40616	4.06	7
I 3- Alternate wetting and drying	M1	4.88	120.75	232	209	4.58	17.85	105	45457	4.50	2
	M2	4.64	106.00	287	258	4.06	17.78	102	41431	4.66	1
	M3	3.98	105.25	290	261	4.39	17.08	98	40919	3.73	9
Mean of Irrigation											
I1		4.73	110.42	270	229	4.16	17.62	102	42475	4.26	2
I2		4.53	113.17	282	249	4.35	18.40	102	42497	4.22	3
I3		4.50	110.67	270	243	4.34	17.57	101	42602	4.30	1
C.D. (0.05)		NS	NS	NS	NS	NS	NS	NS	NS		
C.V. (%)		8.69	6.25	10.92	10.66	9.1	8.61	1.61	1.86		
Method of Methods											
M1		4.95	119.92	241	212	4.51	18.50	104	45342	4.43	1
M2		4.60	106.25	291	255	4.15	17.75	102	41634	4.41	2
M3		4.21	108.08	290	254	4.20	17.35	98	40598	3.94	3
CD (0.05)		0.27	5.38	22.75	19.78	NS	NS	2.19	483.11		
C.V. (%)		6.74	5.62	9.68	9.6	9.63	6.79	2.51	1.32		
Interaction											
I and M		NS	NS	NS	NS	NS	NS	NS	NS		
M and I		NS	NS	NS	NS	NS	NS	NS	NS		
Experimental Mean		**4.59**	**111.42**	**274**	**240**	**4.28**	**17.87**	**102**	**42525**	**4.26**	
Soil type		-									
pH		7.80									
EC		0.23									
Variety		GAR 13									
Available NPK kg/ha		-									

M1- Mechanical Transplanting method on puddled soil (crop management methods same as for puddled transplanted rice)

M2- Direct wet seeding on puddled soil (Use of Drum seeder/dibbling of spourted seed at 25 x 25 cm) fb crop management practices as per direct wet seeded rice

M3- Direct dry seeding (Mechanical) (25 cm row sowing)

Table 4.2.5(R): Evaluation of Water management for enhancing Water use efficiency in different rice establishments methods, Rabi-2020-21.

Treatment		KARAIKAL								
Main Plot- Irrigation management practices	Crop establishment methods	Grain yield (t/ha)	Straw yield (t/ha)	Plant height (cm)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle wt (g)	Test wt (g)	Cost of cultivation Rs/ha	Total water input (mm/ha)
I 1- Flooding throughout crop growth (3 +/- 2cm) after 15 days	M1	5.08	9.20	117.77	356	306	2.79	25.05	33818	960
	M2	5.47	8.80	110.89	251	242	3.48	25.69	41832	1000
	M3	5.68	10.57	117.31	394	342	2.93	25.11	52888	900
	M4	5.77	11.80	120.51	361	319	3.12	25.38	44798	1020
I 2- Saturation maintenance upto PI and (3 +/- 2 cm) after PI	M1	3.82	9.47	118.41	356	322	2.89	25.09	31818	810
	M2	3.77	8.50	117.15	251	240	3.46	25.54	39832	960
	M3	5.17	8.70	117.38	384	354	2.78	25.62	50888	850
	M4	5.82	10.27	121.50	355	327	3.51	25.56	42798	960
I 3- Alternate wetting and drying	M1	4.50	9.67	118.65	362	318	3.08	25.27	28818	700
	M2	4.08	9.87	119.67	274	265	3.17	25.61	36832	700
	M3	5.33	9.07	118.62	390	352	3.08	25.36	47888	650
	M4	5.92	11.23	120.26	365	335	3.33	24.05	39798	750
Mean of Irrigation										
I1		5.50	10.09	116.62	340	302	3.08	25.31	43334	970
I2		4.64	9.24	118.61	337	311	3.16	25.45	41334	895
I3		4.96	9.96	119.30	348	317	3.16	25.07	38334	700
C.D. (0.05)		NS	NS	NS	NS	NS	NS	NS	0	0
C.V. (%)		12.71	10.62	3.15	10.8	7.24	12.36	2.65	0	0
Method of Methods										
M1		4.47	9.45	118.28	358	315	2.92	25.14	31485	823
M2		4.44	9.06	115.90	259	249	3.37	25.61	39499	887
M3		5.39	9.45	117.77	389	349	2.93	25.36	50555	800
M4		5.84	11.10	120.76	360	327	3.32	25.00	42465	910
CD (0.05)		NS	NS	4.65	NS	NS	NS	NS	NS	NS
C.V. (%)		14.39	10.75	3.97	15.94	15.09	13.05	2.97	0	0
Interaction										
I and M		1.24	1.8	8.06	93.42	80.31	0.7	1.29	0	0
M and I		1.11	1.62	7.14	82.21	70.09	0.63	1.15	0	0
Experimental Mean		5.03	9.76	118.18	342	310	3.13	25.28	41001	855
Soil type		Sandy clay loam								
pH		-								
EC		-								
Variety		ADT 46								
Available NPK kg/ha		185.2:18:212								

M1- Mechanical Transplanting method on puddled soil (crop management methods same as for puddled transplanted rice)

M2- Direct wet seeding on puddled soil (Use of Drum seeder/dibbling of spourted seed at 25 x 25 cm) fb crop management practices as per direct wet seeded rice

M3- Normal Transplanting (20 x 15 cm with flooding water management, transplanting of 3-4 seedlings of 25-30 days old seddlings

M4- Optional - Location specific (**SRI**)

Table 4.2.5(R):

Treatment		PUDUCHERRY									Over all Mean
Main Plot- Irrigation management practices	Crop establishment methods	Grain yield (t/ha)	Straw yield (t/ha)	Plant height (cm)	Tillers/m^2 (No.)	Panicle wt (g)	Weed population (No./m$^{2)}$	Weed dry wt (g/m$^{2)}$	Cost of cultivation Rs/ha	Total water input (mm/ha)	
I 1- Flooding throughout crop growth (3 +/- 2cm) after 15 days	M1	6.47	9.46	120.67	356	3.44	75.50(8.72)	53.87	55125	1099	5.78
	M2	6.10	9.18	114.33	327	3.20	97.97(9.92)	70.10	53250	1099	5.79
	M3	6.35	9.21	118.67	346	3.38	90.05(9.51)	62.13	55750	1099	6.02
	M4	-	-	-	-	-	-	-	-	-	5.77
I 2- Saturation maintenance upto PI and (3 +/- 2 cm) after PI	M1	6.66	9.68	121.67	367	3.69	67.89(8.27)	48.07	55125	999	5.24
	M2	6.17	9.36	116.67	334	3.27	88.07(9.41)	62.27	53250	999	4.97
	M3	6.38	9.51	120.00	354	3.36	79.79(8.96)	55.50	55750	999	5.78
	M4	-	-	-	-	-	-	-	-	-	5.82
I 3- Alternate wetting and drying	M1	6.78	9.98	124.00	378	3.80	59.79(7.76)	42.03	55125	799	5.64
	M2	6.30	9.42	119.00	359	3.49	82.35(9.10)	56.63	53250	799	5.19
	M3	6.55	9.71	121.67	366	3.69	70.70(8.44)	48.73	55750	799	5.94
	M4	-	-	-	-	-	-	-	-	-	
Mean of Irrigation											
I1		6.31	9.28	117.89	343	3.34	87.84(9.38)	62.03	54708	1099	5.91
I2		6.40	9.52	119.45	351	3.44	78.58(8.88)	55.28	54708	999	5.52
I3		6.54	9.70	121.56	368	3.66	70.95(8.43)	49.13	54708	799	5.75
C.D. (0.05)		0.06	NS	1.19	2.8	0.02	0.05	0.73	NS	0	
C.V. (%)		1.09	3.05	1.19	0.94	0.8	0.7	1.57	0	0	
Method of Methods											
M1		6.64	9.71	122.11	367	3.64	67.73(8.25)	47.99	55125	966	5.56
M2		6.19	9.32	116.67	340	3.32	89.46(9.48)	63.00	53250	966	5.32
M3		6.43	9.47	120.11	355	3.48	80.18(8.97)	55.45	55750	966	5.91
M4		-	-	-	-	-	-	-	-	-	
CD (0.05)		0.1	NS	1.26	3.28	0.05	0.08	0.92	0	NS	
C.V. (%)		1.58	3.29	1.02	0.9	1.46	0.91	1.62	0	0	
Interaction											
I and M		NS	NS	NS	5.68	0.09	NS	NS	NS	NS	
M and I		NS	NS	NS	4.89	0.07	NS	NS	NS	NS	
Experimental Mean		6.42	9.50	119.63	354	3.48	8.9	55.48	54708	966	5.73
Soil type		Clay laom									
pH		6.82									
EC		0.16									
Variety		ADT 53									
Available NPK kg/ha		168;24.7:120									

M1-Mechanical Transplanting on puddled soil (Crop management methods same as for puddled transplanted rice)

M2-Direct wet seeding on puddled soil (Use of Drum seeder/dibbling of sprouted seed at 25x25)fb crop management practices as per direct wet seeded rice

M3-Manual Transplanting (20X15 cm with flooding water management, 3-4 seedlings transplanted at 25-30 days old)

4.2.6. Nano-fertilizers for increasing nutrient use efficiency, yield and economic returns in transplanted rice (New trial)

The current NUE needs to be improved substantially by increasing the efficiency of agricultural systems, adopting environmentally sound agronomic practices, and exploring disrupting technologies. Nano-fertilizers possess unique features which enhance plants' performance in terms of ultra- high absorption, increase in production, rise in photosynthesis, and significant expansion in the leaves' surface area. Besides, the controlled release of nutrients contributes in preventing eutrophication and pollution of water resources. Replacement of traditional fertilizer by nano-fertilizer is beneficial as upon application, it releases nutrients into the soil steadily and in a controlled way, thus preventing the water pollution. It would be very helpful if we use nano-fertilizer for specific crops such as rice to minimize the potential negative effects brought about by the extensive use of chemical inputs without compromising production and nutritional benefits. Based on the previous study and present status the trial is constituted with the following objectives 1. To study the efficiency of nano-fertilizer in increasing the growth and yield of rice crop and 2. To find out nutrient use efficiency of nano-fertilizers in rice crop. Seven treatments were T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K) T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stagesT_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI) T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI) T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI) T_6: Control (no application of fertilizer)T7: Optional (Any method/product recommended by University/state dept. for Nano-Nitrogen Products). The trial was conducted in RBD and replicated thrice. The trial was conducted in **15 locations** (**Gangavathi, ICAR-IIRR, Jagdalpur, Jagtial, Khudwani, Mandya, Maruteru, Moncompu, Pantnagar, Pattambi, Puducherry, Pusa, Rajendranagar, Warangal and Nellore**). The results were summarized and presented in **Table 4.2.6** and the salient findings are as followed.

In black clay soils of **Gangavathi**, GNV-10-89 variety, RDN through Urea resulted the highest grain yield (5.00 t/ha). However, at par with 75% RDN + two foliar spray of Nano-Urea (4.75 t/ha). Apart from control treatment, the lowest cost of cultivation was in 50% RDN through urea + two foliar spray of Nano-Urea (Rs. 46,502/-). In clay loam soils of ICAR-IIRR, RNR 15048 variety, RDN through urea resulted the highest grain yield (5.34 t/ha). However, at par with 75% RDN + two foliar spray of Nano-Urea (4.24 t/ha) and 50% RDN + two foliar spray of Nano-Urea (4.40 t/ha). In vertisols of Jagdalpur, 75% RDN + two foliar spray of Nano-Urea treatment resulted the highest grain yield (5.13 t/ha), at par with RDN through urea (5.07 t/ha). In **Jagtial**, 100% RDN+ two foliar spray of nano-urea resulted the highest grain yield (4.42 t/ha), however, at par with 50% RDN + two foliar spray of nano-urea (3.99 t/ha) and 75% RDN + two foliar spray of nano-urea (4.13 t/ha). In silty clay loam soils of Khudwani SR-4 variety produced the highest grain yield (7.59 t/ha) under package and practices followed by local region (University recommendation), however, the cost of cultivation was higher (Rs. 52,523/-) under the same treatment compared to those of other treatments.In red sandy loam soils of Mandya, 75% RDN + two foliar spray of nano-urea resulted higher gran yield (5.26

t/ha) than 5.02 t/ha under RDN through urea. However, cost of cultivation was higher under 75% RDN + two foliar spray of nano-urea (Rs. 67407/-) compared to RDN (Rs. 64533/-). In **Maruteru**, either 50% RDN or 75% RDN with two foliar spray of nano-urea was equally effective in producing grain yield of 3.52 and 3.56 t/ha, respectively compared to 3.65 t/ha in RDN through urea. Similar result were observed in Moncompu also. Either 50% RDN or 75% RDN with two foliar spray of nano-urea was equally effective in producing grain yield of 4.94 and 5.51 t/ha, respectively compared to 5.51 t/ha in RDN through urea. In silt loam soils of **Pantnagar**, RDN through urea resulted the highest grain yield (3.64 t/ha) compared to 50% RDN + 2 foliar spray of nano-urea (2.50 t/ha) and 75% RDN + 2 foliar spray of nano-urea (3.12 t/ha). In laterite soils of **Pattambi**, 50% RDN + 2 foliar spray of nano-urea resulted the highest grain yield (4.32 t/ha). In clay loam soils of Puducherry, 75% RDN + 2 foliar spray of nano-urea resulted the highest grain yield (7.47 t/ha). In sandy loam soils of Pusa, 75% RDN + 2 foliar spray of nano-urea performed better (4.19 t/ha) than RDN through urea (3.93 t/ha). Gross return was also higher under the same treatment (Rs. 86326/-). In Rajendranagar, either 50% RDN (4.54 t/ha) or 75% RDN (5.35 t/ha) with two foliar spray of nano-urea did not perform well compared to 6.13 t/ha under 100% RDN through urea. In sandy clay loam soils of Warangal WGL 962 variety performed well under 50% RDN (6.43 t/ha) and 75% RDN (6.50 t/ha) with two foliar spray of nano-urea compared to 6.17 t/ha in RDN through urea. In sandy clay loam soils of Nellore, 50% RDN or 75% RDN with two foliar spray of nano-urea was equally effective in producing grain yield of 4.68 and 4.89 t/ha, respectively compared to 5.08 t/ha in RDN through urea.

Table 4.2.6: Evaluation of Nano-fertilizers for increasing nutrient use efficiency, yield and economic returns in transplanted rice (New trial), Kharif-2021.

Treatment	GANGAVATHI							ICAR-IIRR				
	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Panicle/ m² (No.)	Test wt (g)	Filled grains/panicle	Cost of cultivation Rs/ha	Gross returns Rs/ha	Grain yield (t/ha)	Straw yield (t/ha)	Panicle/m² (No.)	Test wt (g)	Un-Filled grains/panicle
T1	5.00	10.00	346	17.91	125	47194	74051	5.34	5.22	218	23.78	12
T2	4.54	9.08	323	17.65	118	46502	65613	4.40	3.05	178	20.77	11
T3	4.75	9.50	338	17.92	127	46832	68725	5.24	4.78	184	23.53	13
T4	4.85	9.71	345	17.32	124	51574	71358	-	-	-	-	-
T5	4.69	9.37	352	17.71	143	51880	68416	-	-	-	-	-
T6	3.64	7.28	308	17.23	88	38464	51494	3.50	3.40	131	16.60	20
T7	3.42	6.85	307	17.24	91	47912	48885	-	-	-	-	-
Exp. mean	**4.41**	**8.83**	**331**	**17.57**	**116**	**47194**	**64077**	**4.62**	**4.11**	**178**	**21.17**	**14**
CD(0.05)	0.32	0.64	20.53	0.73	18.01	4403.49	10823.48	1.34	1.99	59.33	0.72	7.51
CV	4.92	4.9	4.17	2.78	10.41	6.28	11.36	14.57	24.25	16.72	1.7	27.02
Soil type	Blackclay							Clay loam				
pH	-							7.30				
EC	-							-				
Variety	GNV-10-89							RNR 15048				
Applied NPK kg/ha	-							120:60:40				
Available NPK kg/ha	-							-				

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)

T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages

T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_6: Control (no application of fertilizer)

T7: Optional - 100%NPK through nano urea at 20,40,60,80 and 100 DAT

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)

T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages

T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T4:-

T5:-

T6:-

T7: Optional (100% of RDN (Urea) + Two foliar spray 2%Urea at active tillering (AT) and panicle initiation (PI) stages)

Table 4.2.6: Contd.

Treatment	JAGDALPUR								JAGTIAL						
	Grain yield (t/ha)	Grain yield (Kg/20 m^2)	Straw yield (t/ha)	Straw yield (Kg/20 m^2)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/panicle	Grain yield (t/ha)	Straw yield (t/ha)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/panicle	Un-filled grains/panicle
T1	5.07	10.13	3.13	6.31	364	283	22.62	180	4.05	5.94	313	250	13.33	1082	278
T2	4.77	9.53	2.93	5.89	368	286	23.20	160	3.99	5.90	269	216	15.33	981	239
T3	5.13	10.27	3.23	6.47	347	263	22.29	158	4.13	6.06	283	212	15.33	952	184
T4	5.00	10.00	3.07	6.13	380	298	22.99	157	4.42	6.55	308	213	18.00	1172	195
T5	4.80	9.60	3.27	6.54	367	282	22.49	199	4.24	6.22	327	238	16.00	1015	197
T6	2.73	5.47	1.77	3.48	319	260	22.48	150	4.00	5.86	289	244	15.33	1176	262
T7	-	-	-	-	-	-	-	-	2.50	3.65	202	165	12.67	648	150
Exp. mean	**4.58**	**9.17**	**2.90**	**5.80**	**357**	**279**	**22.68**	**167**	**3.90**	**5.74**	**284**	**220**	**15.14**	**1004**	**215**
CD(0.05)	0.28	0.56	0.41	0.78	15.58	34.02	1.34	39.54	0.5	0.82	60.87	48.47	2.97	203.9	76.14
CV	3.33	3.33	7.68	7.4	2.4	6.71	3.25	13	7.23	8.01	12.03	12.4	11.01	11.42	19.91
Soil type	Vertisol								-						
pH	-								-						
EC	-								-						
Variety	Sanleswari								-						
Applied NPK kg/ha	100:50:40								-						
Available NPK kg/ha	265:14.78:305								-						

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)

T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages

T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_6: Control (no application of fertilizer)

T7: Optional -

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)

T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages

T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_6: Control (no application of fertilizer)

T7: Optional - (Any method/product recommended by University/state dept. for Nano-Nitrogen Products)

Table 4.2.6: Contd.

Treatment	KHUDWANI														
	Grain yield (t/ha)	Grain yield (Kg/20 m^2)	Straw yield (Kg/20 m^2)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/ panicle	Unfilled grains/ panicle	N uptake (kg/ha) in plant	P uptake (kg/ha) in plant	K uptake (kg/ha) in plant	Soil available N	Soil available P	Soil available K	Cost of cultivation Rs/ha
T1	6.99	13.98	13.98	373	353	28.56	96	13	110.50	20.87	117.86	167.75	9.84	172.50	50273
T2	5.62	11.23	11.23	319	302	27.57	85	10	74.36	15.10	91.99	147.25	10.26	178.75	50108
T3	6.16	12.32	12.32	338	320	28.95	88	11	93.11	17.63	99.57	153.00	9.82	177.25	50393
T4	7.34	14.67	14.67	390	369	27.66	99	14	116.59	22.72	120.85	166.75	9.82	171.25	50633
T5	7.43	14.87	14.87	399	377	28.16	99	15	124.38	23.26	129.48	171.50	9.67	176.50	51764
T6	4.25	8.50	8.50	262	248	27.07	80	9	52.50	8.53	65.04	142.25	8.52	170.50	45750
T7	7.59	15.18	15.18	369	349	29.05	99	13	127.27	23.02	128.71	177.75	10.54	184.00	52523
Exp. mean	**6.48**	**12.96**	**12.96**	**350**	**331**	**28.15**	**92**	**12**	**99.82**	**18.73**	**107.64**	**160.89**	**9.78**	**175.82**	**50206**
CD(0.05)	0.55	1.1	1.1	28.21	36.64	0.89	5.22	0.86	29.45	6.08	25.09	20.58	0.75	8.79	2136.03
CV	5.71	5.7	5.7	5.43	7.45	2.12	3.81	4.75	19.85	21.83	15.68	8.61	5.14	3.36	2.86
Soil type	Silty clay loam														
pH	-														
EC	-														
Variety	SR4														
Applied NPK kg/ha	120:60:30														
Available NPK kg/ha	223;12.8:228														

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)

T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages

T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_6: Control (no application of fertilizer)

T7: Optional - (Any method/product recommended by University/state dept. for Nano-Nitrogen Products)

Table 4.2.6: Contd.

Treatment	MANDYA									MARUTERU				
	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (t/ha)	Straw yield (Kg/20 m²)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Cost of cultivation Rs/ha	Gross returns Rs/ha	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (Kg/20 m²)	Tillers/m² (No.)	Panicle/m² (No.)
T1	5.02	10.05	8.85	17.69	347	336	18.61	64533	115133	3.65	7.29	8.70	323	266
T2	4.48	8.97	8.20	16.40	338	323	18.15	66482	103412	3.52	7.03	8.39	236	195
T3	5.26	10.51	8.83	17.66	352	338	18.03	67407	119643	3.56	7.12	8.59	272	207
T4	5.53	11.06	9.22	18.44	354	342	18.00	67909	125668	4.35	8.69	10.31	323	272
T5	5.81	11.62	9.54	19.08	377	358	18.35	68381	131810	4.02	8.03	9.56	315	265
T6	3.61	7.23	5.30	10.60	259	246	17.46	61206	80702	2.63	5.26	6.31	209	177
T7	-	-	-	-	-	-	-	-	-	3.76	7.52	8.95	315	256
Exp. mean	**4.95**	**9.91**	**8.32**	**16.65**	**338**	**324**	**18.10**	**65986**	**112728**	**3.64**	**7.28**	**8.69**	**285**	**234**
CD(0.05)	0.74	1.49	1.5	3.01	29.33	33.21	1.11	1174.49	16601.1	0.34	0.68	0.88	31.39	25.46
CV	8.26	8.27	9.93	9.93	4.77	5.64	3.37	0.98	8.1	6.29	6.29	6.82	7.42	7.33
Soil type	Red sandy loam									-				
pH	7.80									-				
EC	0.88									-				
Variety	RNR 15048									-				
Applied NPK kg/ha	100:50:50:20									90:60:60				
Available NPK kg/ha	268:88.6:214.2									-				

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)
T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages
T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_6: Control (no application of fertilizer)
T7: Optional -

T_1: Recommended dose of nitrogen (RDN) through urea (rcmnd P and K)
T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages
T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_6: Control (no application of fertilizer)
T7: Optional -Site specific nutrient management

Table 4.2.6: Contd.

Treatment	MONCOMPU							PANTNAGAR							
	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (Kg/20 m²)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Filled grains/panicle	Grain yield (t/ha)	Grain yield (Kg/20 m²)	Straw yield (t/ha)	Tillers/m² (No.)	Panicle/m² (No.)	Test wt (g)	Filled grains/panicle	Un-filled grains/panicle
T1	5.51	11.03	20.19	111	68	28.75	116	3.64	8.48	4.16	285	195	25.70	73	31
T2	4.94	9.88	17.00	82	70	27.75	129	2.50	6.03	2.82	253	165	25.45	92	21
T3	5.51	11.03	20.37	103	65	27.50	157	3.12	7.64	3.61	277	185	25.82	70	21
T4	5.49	10.98	17.67	92	73	27.50	138	3.71	8.58	4.07	293	199	25.75	59	33
T5	6.04	12.08	20.35	95	71	27.50	112	3.93	9.00	4.14	283	203	25.77	72	10
T6	4.75	9.50	15.25	90	57	27.25	101	1.66	4.52	2.00	187	137	24.28	29	13
T7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exp. mean	**5.37**	**10.75**	**18.47**	**95**	**67**	**27.71**	**125**	**3.09**	**7.38**	**3.47**	**263**	**181**	**25.46**	**66**	**21**
CD(0.05)	1.14	2.28	6.19	23.38	18.17	1.51	44.83	0.31	0.32	0.37	27.55	8.24	0.75	5.43	5.14
CV	14.07	14.07	22.25	16.27	17.94	3.62	23.72	5.48	2.42	5.94	5.75	2.5	1.61	4.54	13.18
Soil type	-							Silt Loam							
pH	-							-							
EC	-							-							
Variety	-							PD-18							
Applied NPK kg/ha	-							-							
Available NPK kg/ha	-							231:22.3;221							

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)

T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages

T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_6: Control (no application of fertilizer)

T7: Optional - (Any method/product recommended by University/state dept. for Nano-Nitrogen Products)

T_1: Recommended dose of nitrogen (RDN) through urea (recomnd P and K)

T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages

T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_6: Control (no application of fertilizer)

T7: Optional - (Any method/product recommended by University/state dept. for Nano-Nitrogen Products)

Table 4.2.6: Contd.

Treatment	PATTAMBI								
	Grain yield (t/ha)	Grain yield (Kg/20 m^2)	Straw yield (t/ha)	Straw yield (Kg/20 m^2)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/panicle	Un-filled grains/panicle
T1	3.76	7.53	4.84	9.69	217	217	27.67	59	33
T2	4.32	8.63	5.98	11.97	221	221	27.67	67	32
T3	3.95	7.89	5.26	10.52	210	210	28.00	58	35
T4	3.96	7.92	5.94	11.88	231	231	28.33	63	31
T5	3.85	7.70	5.62	11.23	213	213	28.00	71	30
T6	3.58	7.17	5.06	10.12	215	215	28.00	73	30
T7	-	-	-	-	-	-	-	-	-
Exp. mean	**3.90**	**7.81**	**5.45**	**10.90**	**218**	**218**	**27.95**	**65**	**32**
CD(0.05)	1.47	2.93	2.56	5.12	59.1	59.1	1.62	22.32	14.96
CV	20.65	20.65	25.82	25.82	14.92	14.92	3.18	18.82	25.88
Soil type	Laterite soil								
pH	-								
EC	-								
Variety	Aiswarya								
Applied NPK kg/ha	-								
Available NPK kg/ha	-								

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)

T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages

T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)

T_6: Control (no application of fertilizer)

T7: Optional - (Any method/product recommended by University/state dept. for Nano-Nitrogen Products)

Table 4.2.6: Contd.

Treatment	PUDUCHERRY											
	Grain yield (t/ha)	Straw yield (t/ha)	Straw yield (Kg/20 m^2)	Panicle/m^2 (No.)	Test wt (g)	Unfilled grains/panicle	N uptake (kg/ha) in plant	P uptake (kg/ha) in plant	K uptake (kg/ha) in plant	Soil available N	Soil available P	Soil available K
T1	6.53	9.34	18.68	319	26.07	6	116.33	36.67	104.00	134.00	17.00	126.00
T2	6.40	9.15	18.30	309	26.20	6	112.00	34.00	101.00	134.00	17.00	126.00
T3	7.47	10.69	21.38	386	27.97	3	136.33	45.33	120.00	134.00	17.00	126.00
T4	7.03	10.06	20.11	355	26.87	5	129.67	44.33	115.67	134.00	17.00	126.00
T5	7.36	10.52	21.04	370	27.03	4	144.67	55.00	129.00	134.00	17.00	126.00
T6	5.74	8.20	16.41	293	25.30	7	86.33	29.33	88.67	134.00	17.00	126.00
T7	6.72	9.61	19.22	341	26.17	5	120.67	39.33	108.33	134.00	17.00	126.00
Exp. mean	**6.75**	**9.65**	**19.31**	**339**	**26.52**	**5**	**120.86**	**40.57**	**109.52**	**134.00**	**17.00**	**126.00**
CD(0.05)	1.805037905	2.582119633	0.34	3.98	0.78	0.18	3.33	0.76	3.04	0	0	0
CV	18.18710548	18.19265994	1	0.66	1.65	1.95	1.55	1.05	1.56	0	0	0
Soil type	Clay loam											
pH	6.87											
EC	0.09											
Variety	DRR Dhan 52											
Applied NPK kg/ha	120:40:40											
Available NPK kg/ha	123;13.5:101											

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)
T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages
T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_6: Control (no application of fertilizer)

T7: Optional - RDF + Two foliar spray Urea 1% (AT and PI)

Table 4.2.6: Contd.

Treatment	PUSA													
	Grain yield (t/ha)	Grain yield (Kg/20 m^2)	Straw yield (Kg/20 m^2)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Filled grains/panicle	Unfilled grains/panicle	N uptake (kg/ha) in plant	P uptake (kg/ha) in plant	K uptake (kg/ha) in plant	Soil available N	Soil available P	Soil available K	Gross returns Rs/ha
T1	3.93	8.28	11.01	334	268	70	35	69.10	27.60	123.73	236.75	13.08	132	81052
T2	3.04	6.41	8.55	283	238	67	33	53.03	20.90	95.35	229.75	12.70	129	62761
T3	4.19	8.81	11.80	332	274	72	30	75.68	32.20	131.83	238.25	13.05	131	86326
T4	4.81	10.11	13.31	361	307	83	28	89.83	37.85	149.10	238.50	13.35	135	98997
T5	4.92	10.43	13.89	364	310	85	27	95.83	38.40	160.68	242.00	13.58	136	101535
T6	1.60	3.46	4.72	204	149	52	42	27.13	9.70	48.33	212.50	11.85	117	32953
T7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exp. mean	**3.75**	**7.92**	**10.55**	**313**	**258**	**71**	**32**	**68.43**	**27.78**	**118.17**	**232.96**	**12.94**	**130**	**77271**
CD(0.05)	0.63	1.31	1.75	25.5	30.58	11.21	5.01	13.6	4.73	22.14	6.53	0.44	4.67	12938.77
CV	11.14	10.97	10.98	5.41	7.88	10.42	10.29	13.19	11.29	12.43	1.86	2.27	2.38	11.11
Soil type	Sandy loam													
pH	-													
EC	-													
Variety	Rajendra Bhagwati													
Applied NPK kg/ha	120:60:40													
Available NPK kg/ha	238;13.1:135													

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)
T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages
T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_6: Control (no application of fertilizer)

T7: Optional - (Any method/product recommended by University/state dept. for Nano-Nitrogen Products)

Table 4.2.6: Contd.

Treatment	RAJENDRANAGAR						
	Grain yield (t/ha)	Straw yield (t/ha)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/panicle	Un-filled grains/panicle
T1	6.13	7.89	339	296	22.70	175	11
T2	4.54	6.76	316	272	22.00	153	13
T3	5.35	7.45	345	290	22.57	169	11
T4	6.20	7.30	369	299	22.93	176	9
T5	6.75	8.09	373	311	23.40	181	9
T6	3.93	4.77	276	223	21.37	150	14
T7	6.98	7.95	381	320	24.37	188	7
Exp. mean	**5.70**	**7.17**	**343**	**287**	**22.76**	**170**	**11**
CD(0.05)	0.57	0.65	25.42	39.54	1.52	20.52	2.65
CV	5.67	5.06	4.17	7.74	3.74	6.78	14.1
Soil type	-						
pH	-						
EC	-						
Variety	-						
Applied NPK kg/ha	-						
Available NPK kg/ha	-						

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)
T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages
T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_6: Control (no application of fertilizer)
T7: Optional - 150%N

Table 4.2.6: Contd.

Treatment	WARANGAL									NELLORE					Overall mean	Rank
	Grain yield (t/ha)	Grain yield (Kg/20 m^2)	Straw yield (t/ha)	Straw yield (Kg/20 m^2)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Test wt (g)	Filled grains/ panicle	Un-filled grains/ panicle	Grain yield (t/ha)	Plnat height (cm)	Panicle length (cm)	Test wt (g)	Filled grains/ panicle		
T1	6.17	12.33	4.71	9.43	231	108	13.61	276	22	5.08	77.55	19.95	14.89	127	5.06	4
T2	6.43	12.87	5.47	10.93	208	106	13.44	268	24	4.68	80	20.2	16.32	128	4.54	6
T3	6.50	13.00	5.29	10.57	223	107	13.62	278	30	4.89	79.25	19.5	17.65	108	5.01	5
T4	6.47	12.93	5.03	10.07	249	108	13.89	283	31	4.99	79.95	19.55	16.58	110	5.30	2
T5	6.13	12.27	4.91	9.82	256	109	13.94	303	24	5.02	80.7	20.35	16.48	125	5.36	1
T6	6.23	12.47	4.67	9.35	230	93	13.28	243	35	3.61	73.55	19.25	14.55	124	3.70	7
T7	6.47	12.93	5.60	11.21	199	104	13.47	265	26	4.74	78.6	19.95	14.85	117	5.27	3
Exp. mean	**6.34**	**12.69**	**5.10**	**10.20**	**228**	**105**	**13.61**	**274**	**27**	**4.71**	**78.51**	**19.82**	**15.9**	**120**	**4.81**	
CD(0.05)	0.96	1.91	0.69	1.37	78.93	33.27	0.47	75.55	8.11	0.43	3.08	0.81	1.81	18.64		
CV	8.47	8.47	7.55	7.55	19.47	17.81	1.93	15.52	16.68	6.13	2.64	2.74	7.65	10.47		
Soil type	Sandy clay loam									Sandy clay loam						
pH	-									-						
EC	-									-						
Variety	WGL-962									WGL-962						
Applied NPK kg/ha	120:60:40									120:60:40						
Available NPK kg/ha	180:80:380									180:80:380						

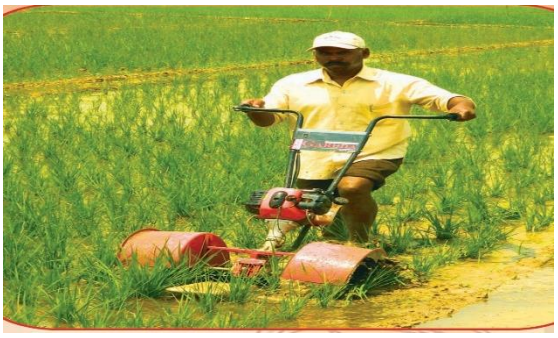
T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)
T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages
T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_6: Control (no application of fertilizer)

T7: Optional - (100% of RDN (Urea) + Two foliar spray 2%Urea at active tillering (AT) and panicle initiation (PI) stages)

T_1: Recommended dose of nitrogen (RDN) through urea (recommended P and K)
T_2: 50% of RDN (Urea) + Two foliar spray Nano-Urea @2% at active tillering and panicle initiation stages
T_3: 75% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_4: 100 % RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_5: 125% of RDN + Two foliar spray Nano-urea @2% (AT and PI)
T_6: Control (no application of fertilizer)

T7: Optional - (100% of RDN (Urea) + Nano

WEED MANAGEMENT TRIALS



WEED MANAGEMENT TRIALS

4.3.1. Long term trial on weed dynamics in mono or double cropped rice system under different establishment methods

Weeds are endemic in crops and a constant problem in crop production because of their dynamic nature. Despite modern control practices aimed at weed elimination, weed continues to be a ubiquitous and recurrent threat for crop production due to its ability to shift in response to management practices and environmental conditions. Because of the diversity and plasticity of weed communities, weed management should include diverse approaches and to be viewed as a continuous process. Further, long term continuous use of selective herbicides in rice may cause a shift in weed flora, from annuals to perennials, which are difficult to control. Other crop management practices, especially nitrogen use (organic / inorganic / integrated nutrient management) is likely to change the crop-weed ecology as well as herbicide activity and herbicide residue in the soil. Long term efficacy and sustainability issues are also the driving forces behind the reconsideration of herbicide dependent weed management. With these aspects in view, a long term trial on fixed plot basis has been continued during *Kharif* season 2021 with the objective of assessing the weed dynamics in different establishment methods over a period of five years, the trial was conducted at 18 locations viz., **Aduthurai, Chatha, Chinsurah, Chiplima, Gangavathi, Ghaghraghat, Jagdalpur, Malan, Moncompu, Nagina, Pantnagar, Pattambi, Pusa, Puducherry, ARI-Rajendranagar, Rewa, Titabar and Varanasi** in replicated split plot design. **Tuljapur** location has not reported weed information. The treatments consisted of 3 main plots M1 – Mechanised planting/transplanting, M2 – Puddled direct seeding, M3 – Unpuddled dry direct seeding and four sub plots T1 – Weed free, T2 – Weedy check, T3 – Mechanical weeding using weeder and T4 – Chemical weed control of pre and post emergence herbicide application. The data on crop growth parameters, yield attributes, grain yield and weed parameters viz., weed population and weed biomass recorded by test locations are summarized after statistical analyses and presented in **Tables 4.3.1.**

The result revealed that the grain yield loss due to weeds ranged from 14.68% at **Rewa** to as severe as 75.24% at **Jagdalpur**, depending on the weed intensity and weed flora distribution during the critical period of crop growth. The mean grain yield across the locations varied from 2.39 t/ha at **Chatha**(Variety Basmati370) to 5.41 t/ha at **Puducherry** with VGD1. Majority of the locations recorded lower average yields of 3-5 t/ha.

The crop establishment methods did not show significant difference in grain yield at four out of 18 locations. At **Chinsurah**, **Jagdalpur**, **ARI-Rajendranagar**, **Pattambi**, direct seeding (both un-puddled and puddled were found equally effective as that of mechanical transplanting at 14 locations viz., **Aduthurai, Chatha, Chiplima, Gangavathi, Ghaghraghat, Malan, Moncompu, Nagina, Pantnagar, Pusa, Puducherry, Rewa, Titabar and Varanasi** reported significantly superior performance of mechanised transplanting over puddled and/or un-puddled direct seeding. At **Chinsurah and ARI-Rajendranagar** only puddled direct seeding was adopted and comparable to mechanical transplanting. Whereas at **Puducherry** puddled direct seeding was adopted and statistically inferior to mechanical transplanting. At

Aduthurai, **Chatha**, **Moncompu**, **Pattambi** and **Puducherry**, weed free critical period/hand weeding twice was not implemented. At other locations, irrespective of the region, soil and climatic condition during the season, weed free treatment was significantly superior among the weed control treatments. At **Chinsurah, Jagdalpur and Rewa**, mechanical weeding using weeder was comparable to weed free critical period treatment/ two hand weedings and recorded on par grain yield. At **Chinsurah** and **Rewa** chemical weed control was comparable to weed free critical period / hand weeding twice treatment. At **Pusa, ARI-Rajendranagar, Rewa** both mechanical weed control and chemical weed control were comparable.

The interactions of weed control treatments and different establishment methods were significant at seven locations viz., **Aduthurai, Chatha, Chiplima, Gangavathi, Malan, Moncompu and Varanasi**, indicating that mechanical transplanting with chemical weed control was promising and high yielding. The results of straw yield was reported by 13 locations viz., **Chiplima, Gangavathi, Jagdalpur, Malan,Moncompu, Pantnagar, Pattambi, Pusa, Puducherry,Rewa, ARI-Rajendranagar and Titabar**. At **Jagdalpur, Moncompu, Pusa, ARI-Rajendranagar** different establishment methods did not show significant difference and comparable. At nine other locations, mechanical transplanting was significantly superior. At five locations viz., **Puducherry**, **Pusa**, **ARI-Rajendranagar**, **Rewa** and **Titabar**, both mechanical weed control and chemical weed control were comparable. The important growth parameters i.e., no. of tillers/m2 at maximum tillering and panicle initiation stages were reported by 15 locations (viz., **Aduthurai**,, **Gaghraghat**, **Chinsurah,Chiplima, Malan, Moncompu, Chatha, Nagina, Pantnagar, Pattambi, Pusa, Puducherry, ARI-Rajendranagar,Rewa and Titabar**) and 12 locations (viz.,Chatha, Chiplima, Jagdalpur,**Malan, Moncompu, Pantnagar, Pattambi, Pusa, Puducherry, ARI-Rajendranagar, Rewa and Titabar**) respectively; total crop dry matter production at maximum tillering stage was reported by 6 locations viz., **Chatha**, **Chiplima**, **Malan**, **Moncompu, Pusa, ARI-Rajendranagar, Rewa**; and total crop dry matter production at panicle initiation stage was reported by five locations viz., **Chatha, Malan, Moncompu, Pattambi, Pusa** and **ARI-Rajendranagar**. These growth parameters followed similar trend as that of grain yield and straw yield. All the 18 locations have reported yield attributes i.e., no. of panicles/m^2, 16 locations reported panicle weight and 15 locations reported test weight. These yield attributes supported the trend exhibited by the treatments regarding grain yield.

The weed flora reported in the test locations included **GRASSES:** *Cynodondactylon, Dactylacteniumaegyptium, Dinebraretroflexa, Digitariasanguinolis, Echinochloacolona, Echinochloacrusgalli, Eleusineindica, Isachnemiliacea, Ischaemumrugosum, Leptochloachinensis, Panicumrepens ,Paspalumdistichum, Paspalumscrobiculatum, Oplisenusbermani;* **SEDGES:** *Cyperusdifformis ,Cyperus erectus, Cyperusiria, Cyperusrotundu, Fimbristylismiliacea;* **BLW:** *Ammaniabaccifera, Caesuliaaxilaris, Cyanotisaxillaris, Cynotiscristata, Eclipta alba, Ludwigiaparviflora, Ludwigiaperennis, Marsileaminuta, Marsileaquadrifolia, Mimosa pudica, Monochoriavaginalis, Physalis minima, Portulacaoleracea, Solanumnigrum, Sphenocleazeylanica, Wedeliachinensi.*

Eleven locations viz., **Chatha, Chinsurah, Gangavathi, Jagdalpur, Malan, Moncompu, Nagina, Pantnagar, Puducherry, Pusa, Rewa and Varanasi** have reported the

group-wise and total weed population at critical crop growth stages. Four locations viz., **Aduthurai, Rewa and Titabar** reported the group-wise weed population at active vegetative stage also. At two locations (**Chiplima** and **Ghaghraghat**), total weed population at three and two crop growth stages respectively was reported. **Pattambi** has reported replication data of weed population with high variations. Weed population showed progressive increase from active vegetative stage to heading stage at **Chiplima, Chinsurah, Pantnagar and Pusa**. At **Nagina** and **ARI-Rajendranagar**, weed population increased from active vegetative stage to panicle initiation stage. At **Jagdalpur, Puducherry and Varanasi,** the group wise and total weed population decreased from active tillering stage to heading stage irrespective of the system of establishment. At **Chatha, Malan**, the group-wise and total weed population increased from active tillering to panicle initiation stage and decreased at heading stage. At **Gangavathi, and Moncompu**, the group-wise and total weed population decreased from active tillering to panicle initiation stage and increased at heading stage.

Among establishment methods, at **Pantnagar**, **Moncompu, ARI-Rajendranagar,** there was no significant differences in the trend of group-wise occurrence of weed flora. At **Aduthurai, Chiplima, Chatha, Chinsurah, Jagdalpur, Malan, Nagina, Puducherry, Pusa, ARI-Rajendranagar, Rewa, Titabar** and **Varanasi**, the total weed population was significantly high in unpuddled direct sown rice. Nine locations viz., **Chatha, Chinsurah, Gangavathi, Jagdalpur, Moncompu, Pantnagar, Pusa** and **ARI-Rajendranagar**, reported species wise weed population. The results showed that the order of dominance was Grasses-Sedges-BLW at **Chatha, Chinsurah, Moncompu, Nagina** (active vegetative stage), **Pantnagar** (active vegetative and heading stages), **Puducherry** (active vegetative stage). At **Aduthurai**, **Malan, Puducherry and Pusa** (panicle initiation and heading stages) and **Titabar**, the weed dominance was in the order of Grasses>BLW>Sedges. The Sedges>Grasses>BLW dominance was recorded at **Varanasi**, **Chatha** and **Gangavathi** (active vegetative stage), **Moncompu** and **Pantnagar** (panicle initiation stage), **Nagina** (panicle initiation stage), **ARI-Rajendranagar** (active vegetative and panicle initiation stages); Sedges>Grasses dominance was recorded at **Ghaghraghat**; while Sedges>BLW>Grasses were the order of dominance at **Gangavathi** (panicle initiation and heading stages), **Pusa** (active vegetative stage). At **chiplima** and **Jagdalpur**(active vegetative stage) sedges and grasses equally infested. At **Jagdalpur** (panicle initiation stage) BLW>Grasses>Sedges was the order of dominance. Over the locations, Grasses-Sedges-BLW, Sedges>Grasses>BLW was the order of dominance irrespective of the system of establishment.

Irrespective of the locations, un-puddled direct seeding system recorded highest weed population and mechanical transplanting system recorded lowest weed population and all the three systems are significantly different from each other. The results from most of the locations confirmed that the system of establishment does not influence the occurrence of group wise weed flora and no considerable shift in weed flora was noticed in the second year study. At all the locations chemical weed control was found superior in reducing total weed population except **Puducherry**, where mechanical weed control was proved significantly superior. At **Chinsurah** and **Gangavathi** (panicle initiation and heading stages), mechanical weed control was comparable to chemical weed control.

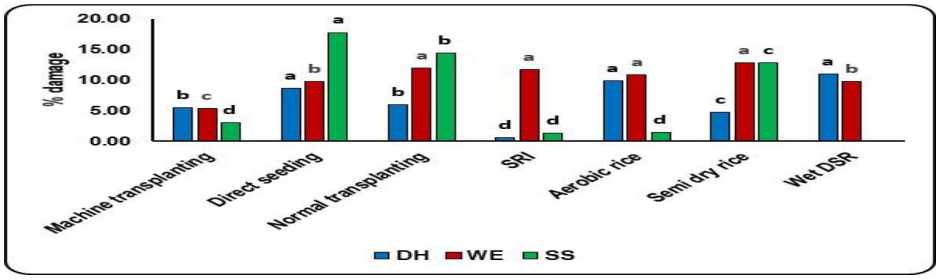
The data on group wise and total dry weed biomass was recorded and reported by 14 locations viz., **Aduthurai, Chinsurah, Chiplima, Ghaghraghat, Gangavatni, Malan, Moncompu, Nagina, Pantnagar, Puducherry, Pusa, ARI-Rajendranagar, Titabar** and **Varanasi**. The establishment systems were not significantly different in weed dry biomass at **Chinsurah, Gangavathi, Moncompu, Nagina;** while the group wise and total weed biomass was lowest under mechanical transplanting system and highest under un-puddled direct seeding system in rest of the locations. Among the weed control treatments, mechanical weed control and chemical weed control were on par at **Chinsurah,Gangavathi** (active vegetative stage). At all the 14 reported locations except Puducherry, the chemical weed control was significantly superior and recorded lowest dry weed biomass. The order of dominace exhibited similar trend as that of weed population.

Rabi Season 2020-21

With the objective of assessing the weed dynamics in different establishment methods over a period of five years and continued during Rabi season 2020-21. The trial was conducted at **Karaikal,** in replicated split plot design with 3 main plot treatments and four sub plot treatments with variety ADT46. The results revealed that the grain yield loss due to weeds was 42.61%. The mean gain yield was 3.53 t/ha. The establishment method of mechanical transplanting was superior over puddled or un-puddled direct seeding. Both dry and wet direct seeding systems were comparable in terms of grain yield, yield attributes, crop growth, weed population and dry biomass (heading stage). The un-puddled dry direct seeding recorded highest group-wise and total weed population. The order of dominance of weed population was BLW-Grasses-Sedges, whereas maximum weed biomass was recorded by grasses followed by BLW. Among the weed control treatments, chemical weed control and mechanical weed control were comparable in all the crop growth and yield parameters (grain yields, yield attributes, weed population, weed biomass etc).

Activity 2- Influence of Establishment methods on pest incidence

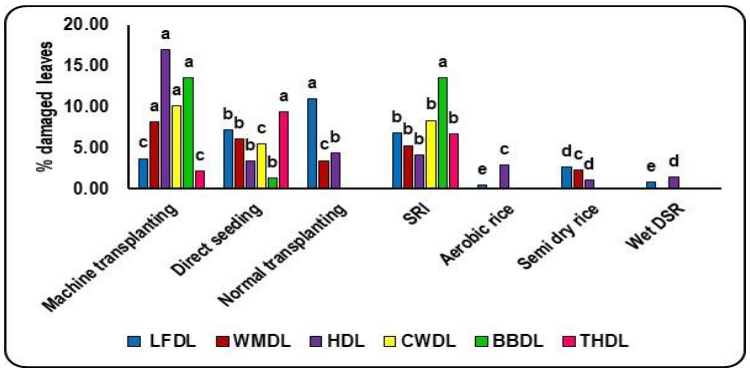
The trial was conducted at nine locations viz., **Aduthurai, Ganagavathi, Jagdalpur, Nawagam, Pantnagar, Pattambi, Pusa, Rajendranagar** and **Titabar**. Standard procedures were adopted to record insect pest incidence in different treatments and results are summarized. Across the locations, incidence of stem borer, gall midge, leaf folder, hispa, whorl maggot, BPH and WBPH was observed in all the crop establishment methods. In general, the incidence of pests was relatively high in machine transplanting, normal transplanting and direct seeding methods as compared to other methods. Incidence of dead hearts was significantly high in wet DSR (10.95%) followed by aerobic rice (9.84%) and direct seeding (8.62%) as compared to other methods (Fig…). White ear incidence was significantly high in semi-dry rice (12.80%) and was at par with normal transplanting method (11.89%), SRI (11.70%) and aerobic rice (10.83%) as compared to machine transplanting (5.34%), direct seeding (9.74%) and wet DSR (9.75%). Gall midge incidence was significantly high in direct seeding (17.72%), followed by normal transplanting (14.37%) and semi dry rice (12.80%) compared to other methods.



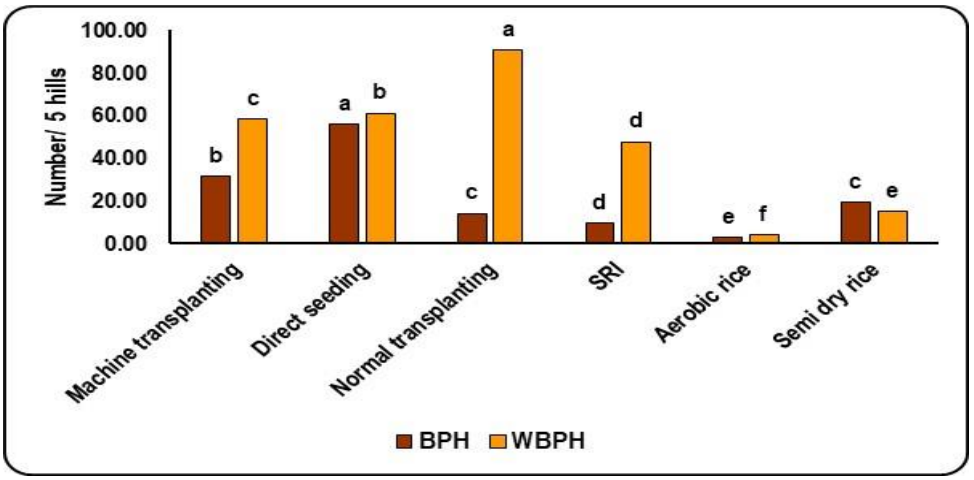
Fig… Incidence of stem borer and gall midge in different crop establishment methods across locations

Among the leaf feeding insects, leaf folder incidence was significantly high in normal transplanting method (10.93% LFDL), whorl maggot and hispa incidence in machine transplanting method (8.10% WMDL & 16.90% HDL) as compared to other methods. Blue beetle and caseworm incidence was significantly high in machine transplanting and SRI methods compared to direct seeding (Fig…).

Among the sucking pests, BPH incidence was found significantly high in direct seeding (55.53/5 hills) while WBPH incidence in normal transplanting method (90.50/5 hills) as compared to other crop establishment methods.



Fig… Incidence of leaf feeding insects in different crop establishment methods across locations



Fig… Incidence of sucking pests in different crop establishment methods across locations

Across the locations, incidence of dead hearts caused by stem borer was significantly high in wet DSR while white ears were high and at par in semi dry rice, normal transplanting, SRI and aerobic rice methods. Gall midge incidence was high in direct seeding while leaf folder damage was high in normal transplanting method. Hispa, whorl maggot, caseworm and blue beetle incidence was high in machine transplanting method. BPH incidence was high in direct seeding while WBPH in normal transplanting method across locations. In general, the incidence of pests was relatively high in machine transplanting, normal transplanting and direct seeding methods as compared to SRI, aerobic rice and semi dry rice methods.

Activity 2- Influence of Establishment methods on disease incidence

This trail was conducted to study the influence of different crop establishment methods and cropping system on rice diseases. It was conducted at 3 locations viz., **ARI-Rajendranagar, Chinsurah and Karjat**. Standard procedures were adopted to record disease incidence in different treatments and results are summarized. In **ARI-Rajendranagar**, puddled direct seeded method was found promising in reducing Neck blast and Sheath rot diseases but in the case of Grain discolouration, manual transplanting showed promising. In **Chinsurah**, manual transplanting (M1) has showed maximum sheath blight disease when compared to puddled direct seeded plants (M2). In **Karjat**, manual transplanting method (M1) showed less sheath rot disease severity as compared to other main plot treatments.

In summary, the trial was conducted at 18 locations viz., **Aduthurai, Chatha, Chinsurah, Chiplima, Ghaghraghat, Jagdalpur, Malan, Moncompu, Nagina, Pantnagar, Pattambi, Pusa, Puducherry, Rewa, ARI-Rajendranagar, Titabar and Varanasi**. The grain yield loss due to weeds ranged from 14.68% at **Rewa** to 75.24% at **Jagdalpur**, depending on the weed intensity and weed flora distribution during the critical period of crop growth.14 locations viz., **Aduthurai, Chatha, Chiplima, Gangavathi, Ghaghraghat, Malan, Moncompu, Nagina, Pantnagar, Pusa, Puducherry, Rewa, Titabar and Varanasi** reported significantly superior performance of mechanised transplanting over puddled and/or un-puddled direct seeding. The mean grain yield across the locations varied from 2.39 t/ha at **Chatha** (Variety Basmati370) to 5.41 t/ha at **Puducherry** with VGD1. The crop establishment methods did not show significant difference in grain yields at four out of 18 locations and proved the potentiality of direct seeding system in these regions. At 14 locations, mechanical transplanting system was found superior where the soil type, water availability, other climatic factors were in favor of transplanting over direct seeding. The results from most of the locations confirmed that the system of establishment does not influence the trend of group wise weed flora and no considerable shift in weed species in particular and weed flora in general was recorded in the 2nd year of the study. At majority of the locations, the weed flora was dominated by groups in the order of grasses, broadleafweeds and sedges irrespective of the system of establishment. The results of the crop growth parameters, yield attributes and straw yield showed similar trend as that of grain yield. At majority of the test locations, the direct seeding system recorded higher weed population (group wise and total)compared to mechanical transplanting; dry direct seeding system recorded higher weed population (group wise and

total) compared to wet direct seeded system. The dry weed biomass (group wise and total) reported by 14 locations indicated that mechanical transplanting has lowest weed biomass and un-puddled direct seeding has highest weed biomass. The dry weed biomass was significantly low with chemical weed control treatments. In *rabi* season 2020-21, at **Karaikal**, the grain yield loss due to weeds was 42.61%. The mean gain yield was 3.53 t/ha. The weed population was dominated by BLW-Grasses-Sedges, whereas maximum weed biomass was recorded by grasses followed by BLW. Chemical weed control and mechanical weed control were comparable for all the crop growth and yield parameters (grain yields, yield attributes, weed population, weed biomass etc).

Unlike 2020 results, in 2021 the weed management by chemical weed control under the mechanical transplanting/puddled or un-puddled direct seeding systems was found promising and recorded lower weed population and weed dry biomass; higher crop growth, yield attributes and grain yield. At the incidence of pests was relatively high in machine transplanting, normal transplanting and direct seeding methods as compared to SRI, aerobic rice and semi dry rice methods. The disease incidence reported by three locations revealed that, puddled direct seeding method was found promising in reducing Neck blast and Sheath rot diseases.

Trial 4.3.1: Summary on yield parameters and grain yield of long term trial on weed dynamics in mono or double cropped rice system under different establishment methods, Kharif 2021.

Main plot	Sub plot Treatments	Grain Yield t/ha						
		Aduthurai	Chatha	Chinsurah	Chiplima	Gangavathi	Ghaghraghat	Jagdalpur
M1	T1	-	-	4.77	5.30	5.58	5.50	4.07
	T2	3.25	1.24	3.74	4.13	4.31	2.60	1.43
	T3	4.76	3.47	4.48	4.87	4.68	4.60	4.53
	T4	5.15	3.23	4.87	5.13	4.73	5.20	2.40
M2	T1	-	-	3.98	5.10	4.69	5.07	4.40
	T2	2.97	1.06	2.72	4.17	3.03	2.02	0.90
	T3	4.37	3.06	3.58	5.00	3.49	3.87	3.17
	T4	4.59	2.85	3.68	4.93	4.01	4.70	2.80
M3	T1	-	-	-	5.07	3.90	4.90	3.90
	T2	2.67	0.93	-	4.13	1.71	1.50	0.73
	T3	3.6	2.97	-	4.73	3.08	3.43	3.10
	T4	3.75	2.74	-	4.93	3.40	4.30	2.77
Mean of Factor-1								
1		4.39	2.64	4.46	4.86	4.83	4.48	3.11
2		3.97	2.33	3.49	4.80	3.80	3.91	2.82
3		3.34	2.21	-	4.72	3.02	3.53	2.62
CD(0.05)		0.18	0.03	NS	0.02	0.10	0.04	NS
Mean of Factor-2								
1		-	-	4.38	5.16	4.72	5.16	4.12
2		2.96	1.08	3.23	4.14	3.02	2.04	1.02
3		4.24	3.17	4.03	4.87	3.75	3.97	3.60
4		4.5	2.94	4.28	5.00	4.05	4.73	2.66
CD(0.05)		0.11	0.03	0.39	0.07	0.22	0.20	0.90
Interaction								
M and T		0.18	0.05	NS	0.12	0.38	NS	NS
T and M		0.19	0.04	NS	0.10	0.34	NS	NS
Experimental Mean		**3.9**	**2.39**	**3.98**	**4.79**	**3.88**	**3.97**	**2.85**
Grain yield loss %		-	-	26.25	19.76	36.01	60.46	75.24
Applied N:P:K:Zn Kg/ha			245.15;14.34;146.31				120:60:40:2	
Avail N:P:K (kg/ha)								
Name of the variety			basmati 370			GGV-05-01	NDR 2065	
Soil type			Sandy clay loam			Black clay		
pH			8.03			8.2		
EC (dsm-1)			0.21					
Organic carbon			0.57					

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Grain Yield t/ha					
		Malan	Moncompu	Nagina	Pantnagar	Pattambi	Puducherry
M1	T1	5.52	-	4.83	5.67	-	-
	T2	2.70	3.81	2.04	3.67	3.66	5.25
	T3	3.62	3.13	4.49	5.11	3.47	5.99
	T4	4.56	6.87	4.72	5.14	3.21	5.64
M2	T1	4.18	-	4.4	4.78	-	-
	T2	2.62	3.32	1.98	2.83	2.73	4.74
	T3	3.48	3.85	4.13	3.89	3.16	5.54
	T4	4.37	4.60	4.35	4.42	3.45	5.32
M3	T1	4.16	-	4.27	4.53	-	-
	T2	2.73	3.29	1.82	2.19	3.46	-
	T3	3.27	4.72	4.06	4.14	3.6	-
	T4	4.08	5.07	4.22	3.94	4.36	-
Mean of Factor-1							
1		4.10	4.60	4.02	4.9	3.45	5.62
2		3.66	3.92	3.71	3.98	3.12	5.2
3		3.56	4.36	3.59	3.7	3.81	-
CD(0.05)		0.12	0.19	0.06	0.22	NS	0.05
Mean of Factor-2							
1		4.62	-	4.5	4.99	-	-
2		2.68	3.48	1.95	2.9	3.28	4.99
3		3.46	3.90	4.23	4.38	3.41	5.76
4		4.34	5.51	4.43	4.5	3.67	5.48
CD(0.05)		0.17	0.52	0.1	0.2	NS	0.21
Interaction							
M and T		0.30	0.90	NS	NS	NS	NS
T and M		0.27	0.74	NS	NS	NS	NS
Experimental Mean		**3.77**	**4.30**	**3.78**	**4.19**	**3.46**	**5.41**
Grain yield loss %		41.99	-	61.44	41.88	-	-
Applied N:P:K:Zn Kg/ha		90;40;40		120:60:40:25	120- 60-40-10Kg/ha		120;40;40
Avail N:P:K (kg/ha)		295;53.1;235		21;18.33;209kg/ha	230-21.1-220 Kg/ha		123;11.4;105
Name of the variety		HPR 1068		Pusa basmati 1509		Aiswarya	VGD 1
Soil type		Silty clay loam	Clay loam		Silt Loam	Laterite soil	Clay loam
pH		5.6	6	7.7	7.7		6.77
EC (dsm-1)				0.18			0.1
Organic carbon		8.1g/kg	2.5		1.17		

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Grain Yield t/ha				
		Pusa	ARI-ARI-Rajendranagar	Rewa	Titabar	Varanasi
M1	T1	4.68	6.09	3.60	4.10	4.21
	T2	2.50	3.07	3.20	1.83	3.31
	T3	4.30	5.07	3.63	3.63	3.73
	T4	4.33	5.64	3.47	4.07	4.11
M2	T1	4.51	5.80	3.47	3.60	4.32
	T2	2.35	2.77	3.00	1.67	2.79
	T3	4.16	5.31	3.30	3.07	3.99
	T4	4.20	5.41	3.57	3.10	4.02
M3	T1	4.34	-	2.77	2.27	3.34
	T2	2.14	-	3.00	1.17	1.35
	T3	3.94	-	2.87	2.07	2.78
	T4	3.98	-	2.70	2.23	3.05
Mean of Factor-1						
1		3.95	4.97	3.47	3.41	3.84
2		3.80	4.82	3.33	2.86	3.78
3		3.60	-	2.67	1.93	2.63
CD(0.05)		0.13	NS	0.01	0.19	0.02
Mean of Factor-2						
1		4.51	5.94	3.28	3.32	3.96
2		2.33	2.92	2.86	1.56	2.48
3		4.13	5.19	3.27	2.92	3.5
4		4.17	5.53	3.24	3.13	3.73
CD(0.05)		0.17	0.43	0.11	0.26	0.09
Interaction						
M and T		NS	NS	NS	NS	0.16
T and M		NS	NS	NS	NS	0.14
Experimental Mean		**3.79**	**4.89**	**3.16**	**2.73**	**3.42**
Grain yield loss %		48.33	50.84	14.68	53.01	**37.37**
Applied N:P:K:Zn Kg/ha		120-60-40-25			60:20:40	
Avail N:P:K (kg/ha)		238-12.9-119				
Name of the variety		Rajendra Saraswati	JGL 24423		Ranjit Sub-1	
Soil type		Sandy Loam	clay loam		Clay Loam	sandyloam
pH		8.24			5.6	
EC (dsm-1)						
Organic carbon		0.42%				

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Straw yield t/ha												
		Chiplima	Gangavathi	Ghaghraghat	Jagdalpur	Malan	Moncompu	Pantnagar	Pattambi	Puducherry	Pusa	ARI-Rajendranagar	Rewa	Titabar
M1	T1	5.97	6.42	8.77	5.70	6.07	-	5.99	-	-	6.11	9.55	5.20	4.90
	T2	4.58	4.96	6.83	2.00	2.97	5.66	4.01	9.95	8.73	3.34	7.05	5.60	3.60
	T3	5.39	5.38	7.53	6.37	3.99	5.44	5.54	7.32	9.84	5.59	9.08	5.77	4.60
	T4	5.69	5.44	8.30	3.37	5.02	8.32	5.44	7.93	9.45	5.67	8.93	5.43	4.83
M2	T1	5.65	5.39	7.87	6.17	4.61		5.44	-	-	5.93	8.40	5.27	4.87
	T2	4.62	3.48	6.23	1.23	2.88	6.55	3.69	4.61	7.94	3.11	5.22	5.50	2.87
	T3	5.54	4.02	6.73	4.43	3.84	5.41	4.29	4.99	9.18	5.48	8.63	5.30	4.87
	T4	5.47	4.61	7.53	3.93	4.80	6.83	5.07	6.09	8.96	5.50	8.67	5.57	4.30
M3	T1	5.62	4.48	7.43	5.47	4.58		4.93	-	-	5.70	-	4.23	3.70
	T2	4.58	1.97	5.47	1.03	3.00	5.00	2.59	4.88	-	2.71	-	4.17	2.63
	T3	5.25	3.55	5.37	4.33	4.12	6.83	4.77	6.85	-	5.18	-	4.60	2.93
	T4	5.47	3.91	6.37	3.83	4.50	7.70	4.59	7.45	-	5.21	-	5.10	3.53
Mean of Factor-1														
1		5.41	5.55	7.86	4.36	4.51	6.47	5.25	8.4	9.34	5.18	8.65	5.50	4.48
2		5.32	4.37	7.09	3.94	4.03	6.26	4.62	5.23	8.69	5.00	7.73	5.41	4.22
3		5.23	3.48	6.16	3.67	4.05	6.51	4.22	6.4	-	4.70	-	4.52	3.20
CD(0.05)		0.03	0.12	0.24	NS	0.07	NS	0.17	1.07	0.57	NS	NS	0.10	0.49
Mean of Factor-2														
1		5.75	5.43	8.02	5.78	5.08	-	5.46	-	-	5.91	8.97	4.90	4.49
2		4.59	3.47	6.18	1.42	2.95	5.74	3.43	6.48	8.34	3.06	6.14	5.09	3.03
3		5.39	4.31	6.54	5.04	3.98	5.89	4.87	6.39	9.51	5.42	8.86	5.22	4.13
4		5.54	4.65	7.40	3.71	4.77	7.62	5.03	7.16	9.2	5.46	8.80	5.37	4.22
CD(0.05)		0.09	0.26	0.19	1.26	0.23	1.51	0.27	NS	0.36	0.22	0.90	0.23	0.42
Interaction														
M and T		0.15	0.44	0.32	NS	0.40	NS	0.47	NS	NS	NS	NS	0.40	NS
T and M		0.13	0.39	0.32	NS	0.35	NS	0.42	NS	NS	NS	NS	0.35	NS
Experimental Mean		5.32	4.47	7.04	3.99	4.20	6.42	4.7	6.67	9.02	4.96	8.19	5.14	3.97

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)

M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	No of Tillers/m² at harvest		No of Tillers /m² at Maximum tillering stage												
		Aduthurai	Ghaghraghat	Chatha	Chinsurah	Chiplima	Malan	Moncompu	Nagina	Pantnagar	Pattambi	Puducherry	Pusa	ARI-Rajendranagar	Rewa	Titabar
M1	T1	-	251	-	398	251	235	-	323	156	-	-	420	441	231	297
	T2	333	174	145	325	206	156	256	224	84	314	340	245	370	225	262
	T3	175	223	230	393	230	215	271	313	145	291	376	403	407	224	249
	T4	345	243	207	386	261	229	474	318	158	301	351	400	409	221	296
M2	T1	-	241	-	368	230	221	-	324	144	-	-	408	399	271	248
	T2	304	162	206	252	195	147	303	213	89	105	315	236	277	255	214
	T3	153	204	276	312	216	212	312	305	126	200	354	388	353	254	222
	T4	303	228	247	335	243	214	341	315	132	171	337	390	393	245	238
M3	T1	-	242	-	-	224	217	-	312	143	-	-	398	-	215	182
	T2	262	162	200	-	187	150	205	206	86	191	-	225	-	212	154
	T3	135	204	270	-	213	210	213	288	148	101	-	375	-	212	173
	T4	275	228	240	-	218	215	302	319	146	163	-	384	-	209	177
Mean of Factor-1																
1		285	223	194	376	237	209	333	294	136	302	356	367	407	225	276
2		253	209	243	317	221	199	319	289	123	159	335	355	355	256	230
3		224	209	237	-	211	198	240	281	131	152	-	346	-	212	171
CD(0.05)		6.86	2.77	3.01	49.20	1.32	NS	14.56	NS	NS	77.46	10.81	8.61	NS	0.79	14.66
Mean of Factor-2																
1		-	244	-	383	235	224	-	320	148	-	-	409	420	239	242
2		300	166	184	289	196	151	255	214	87	203	327	235	324	231	210
3		154	210	259	353	220	213	265	302	140	198	365	389	380	230	214
4		308	233	231	360	241	219	372	317	145	212	344	391	401	225	237
CD(0.05)		9.48	6.26	4.86	22.89	2.16	6.31	17.41	7.00	10.57	NS	10.95	25.02	27.31	1.22	19.12
Interaction																
M and T		NS	NS	NS	NS	3.75	NS	30.15	NS	NS	NS	NS	NS	NS	2	NS
T and M		NS	NS	NS	NS	3.33	NS	25.9	NS	NS	NS	NS	NS	NS	2	NS
Experimental Mean		254	213	225	346	223	202	297	288	130	204	345	356	381	231	226

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	No of Tillers /m² at Panicle initiation stage											
		Chatha	Chiplima	Jagdalpur	Malan	Moncompu	Pantnagar	Pattambi	Puducherry	Pusa	ARI-Rajendranagar	Rewa	Titabar
M1	T1	-	251	255	238	-	143	-	-	396	408	231	293
	T2	150	206	163	154	400	95	354	294	210	331	225	218
	T3	249	230	270	216	366	139	330	349	361	371	224	245
	T4	222	261	236	230	384	140	335	320	368	396	220	291
M2	T1	-	230	268	222	-	124	-	-	375	384	271	249
	T2	220	195	139	146	307	94	127	279	202	269	255	223
	T3	291	216	269	212	303	121	234	325	355	339	254	228
	T4	282	243	202	215	378	114	196	297	364	363	245	235
M3	T1	-	224	197	218	-	106	-	-	338	-	215	178
	T2	215	187	106	151	312	94	218	-	186	-	213	154
	T3	288	213	226	210	317	120	127	-	310	-	212	169
	T4	277	218	143	216	372	106	200	-	319	-	209	171
Mean of Factor-1													
1		207	237	231	210	383	129	340	321	334	376	225	262
2		264	221	219	199	330	113	186	300	324	339	256	234
3		260	211	168	199	334	106	182	-	288	-	212	168
CD(0.05)		4.03	1.32	23.65	NS	14.12	6.19	78.73	2.80	NS	18.66	0.86	4.34
Mean of Factor-2													
1		-	235	240	226	-	124	-	287	370	396	239	240
2		195	196	136	150	340	94	233	337	199	300	231	198
3		276	220	255	212	329	127	230	308	342	355	230	214
4		260	241	194	220	378	120	244	-	350	380	225	232
CD(0.05)		4.14	2.16	50.04	6.69	21.05	16.30	NS	11.94	22.41	18.91	1.05	4.66
Interaction													
M and T		7.18	3.75	NS	NS	NS	NS	NS	NS	NS	NS	2	8
T and M		6.3	3.33	NS	NS	NS	NS	NS	NS	NS	NS	2	7
Experimental Mean		244	223	206	202	349	116	236	311	315	358	231	221

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)

M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	No of Panicles/m^2																
		ADT	CHT	CHN	CHP	GNG	GGT	JDP	MLN	MNC	NGN	PNT	PTB	PDC	PSA	RNR	RWA	TTB	VRN
M1	T1	-	-	332	244	439	244	234	228	-	327	223	-	-	341	369	254	290	315
	T2	320	102	239	188	374	166	114	153	339	219	165	247	275	177	262	258	215	228
	T3	149	234	333	224	382	215	253	217	331	314	204	222	312	304	316	256	241	237
	T4	335	201	334	253	394	234	195	221	388	317	205	239	297	309	356	260	287	156
M2	T1	-	-	307	223	347	216	246	214	-	311	309	-	-	321	359	304	243	295
	T2	282	136	247	183	245	153	88	144	341	205	209	229	250	171	260	299	211	202
	T3	135	223	265	209	321	200	245	208	268	307	236	336	293	299	311	298	220	213
	T4	288	210	306	236	279	217	184	212	396	314	271	236	272	306	320	284	236	383
M3	T1	-	-	-	216	379	232	157	205	-	307	323	-	-	282	-	220	175	209
	T2	244	134	-	176	203	156	76	140	257	201	257	237	-	153	-	211	151	156
	T3	118	214	-	204	239	199	177	205	291	277	278	279	-	241	-	212	168	302
	T4	265	205	-	214	334	218	116	202	407	271	286	275	-	251	-	212	171	354
Mean of Factor-1																			
1		268	179	310	227	397	215	199	205	352	294	199	236	295	283	326	257	258	234
2		235	190	281	213	298	197	191	195	335	284	256	267	272	274	312	296	227	273
3		209	184	-	203	289	201	132	188	318	264	286	264	-	232	-	214	166	255
CD(0.05)		6.82	2.52	NS	3.36	3.44	4.02	21.45	3.60	13.73	3.78	7.46	NS	2.66	9.60	NS	0.93	3.98	0.24
Mean of Factor-2																			
1		-	-	319	228	388	231	212	216	-	315	285	-	263	314	364	259	236	273
2		282	124	243	182	274	158	93	146	312	209	210	238	302	167	261	256	192	195
3		134	224	299	212	314	205	225	210	296	299	240	279	285	281	313	255	209	251
4		296	205	320	234	335	223	165	212	397	301	254	250	-	289	338	252	231	298
CD(0.05)		7.95	2.60	30.56	3.20	13.00	5.63	44.01	5.26	11.66	12.05	6.82	NS	1.24	14.38	22.83	0.99	3.91	9.88
Interaction																			
M and T		ns	5	NS	5.55	23	NS	NS	NS	20	NS	11.81	NS	1.76	NS	NS	2	7	17
T and M		ns	4	NS	5.21	20	NS	NS	NS	18	NS	11.19	NS	2.51	NS	NS	2	6	15
Experimental Mean		237	184	295	214	328	204	174	196	335	281	247	255	283	263	319	256	217	254

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)

M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Panicle weight(g)															
		Aduthurai	Chatha	Gangavathi	Ghaghraghat	Jagdalpur	Malan	Moncompu	Nagina	Pantnagar	Pattambi	Puducherry	Pusa	ARI-Rajendranagar	Rewa	Titabar	Varanasi
M1	T1	-	-	2.71	3.21	3.92	4.64	-	2.86	2.74	-	-	3.28	4.44	3.73	3.97	2.13
	T2	2.44	0.83	2.25	2.20	3.59	2.87	1.79	2.82	2.51	3.66	2.96	2.18	3.81	3.73	3.43	1.84
	T3	2.05	2.14	2.45	3.08	4.07	4.43	1.90	2.83	2.77	3.47	3.22	3.15	3.91	3.60	3.90	1.88
	T4	2.51	2.03	2.33	3.01	4.59	4.78	1.94	2.84	2.77	3.21	3.09	3.16	4.21	3.80	4.00	1.86
M2	T1	-	-	2.27	3.13	3.73	4.55	-	2.84	1.74	-	-	3.23	4.17	3.77	4.07	1.73
	T2	2.36	0.76	2.20	2.10	3.06	2.40	1.49	2.79	1.89	2.40	2.63	2.07	3.74	3.80	3.23	1.47
	T3	1.93	2.08	1.66	3.04	3.76	4.49	1.71	2.82	1.98	3.16	3.03	2.95	4.16	3.50	3.60	1.69
	T4	2.44	1.97	2.10	2.86	3.13	4.66	2.04	2.84	2.02	3.12	2.83	2.97	4.36	3.60	3.80	1.51
M3	T1	-	-	2.33	3.16	4.25	4.35	-	2.83	1.63	-	-	3.17	-	3.83	3.27	1.68
	T2	2.25	0.76	1.61	2.14	2.88	2.28	1.71	2.78	1.22	3.46	-	2.01	-	3.70	2.90	1.13
	T3	1.77	2.02	2.29	3.11	3.09	4.28	1.78	2.82	1.91	3.60	-	2.77	-	3.73	3.03	1.46
	T4	2.14	1.97	1.80	3.04	2.82	4.47	1.86	2.83	1.71	4.36	-	2.82	-	3.73	3.23	1.36
Mean of Factor-1																	
1		2.33	1.67	2.44	2.87	4.04	4.18	1.88	2.84	2.7	3.45	3.09	2.94	4.09	3.72	3.82	1.93
2		2.24	1.60	2.06	2.78	3.42	4.03	1.75	2.82	1.9	2.89	2.83	2.81	4.11	3.67	3.68	1.6
3		2.05	1.58	2.01	2.86	3.26	3.85	1.78	2.82	1.62	3.81	-	2.69	-	3.75	3.11	1.41
CD(0.05)		0.01	0.01	0.11	NS	NS	0.11	NS	0	0.05	0.40	0.02	0.08	NS	NS	0.10	0.01
Mean of Factor-2																	
1		-	-	2.44	3.17	3.96	4.51	-	2.84	2.04	-	-	3.23	4.30	3.78	3.77	1.84
2		2.35	0.78	2.02	2.15	3.18	2.52	1.66	2.8	1.87	3.17	2.80	2.09	3.78	3.74	3.19	1.48
3		1.91	2.08	2.13	3.08	3.64	4.40	1.80	2.82	2.22	3.41	3.12	2.96	4.03	3.61	3.51	1.68
4		2.36	1.99	2.08	2.97	3.51	4.64	1.95	2.84	2.17	3.56	2.96	2.98	4.28	3.71	3.68	1.58
CD(0.05)		0.01	0.03	0.17	0.08	NS	0.26	0.14	0.01	0.06	NS	0.11	0.09	0.29	NS	0.15	0.1
Interaction																	
M and T		0.03	NS	0.30	NS	NS	NS	NS	NS	0.1	NS	NS	NS	NS	NS	NS	NS
T and M		0.02	NS	0.26	NS	NS	NS	NS	NS	0.09	NS	NS	NS	NS	NS	NS	NS
Experimental Mean		2.21	1.62	2.17	2.84	3.57	4.02	1.80	2.83	2.07	3.38	2.96	2.81	4.10	3.71	3.54	1.65

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)

M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Test weight(g)														
		Aduthurai	Chatha	Chiplima	Gangavathi	Ghaghraghat	Jagdalpur	Malan	Moncompu	Nagina	Pantnagar	Pattambi	Puducherry	Pusa	ARI-Rajendranagar	Rewa
M1	T1	-	-	21.73	17.65	26.87	28.27	28.78	-	23.72	29.85	-	-	21.03	25.93	20.33
	T2	17.47	19.03	20.47	17.55	25.20	27.37	25.72	26.00	23.37	28.6	28.9	9.52	20.77	23.47	22.17
	T3	17.2	21.17	21.20	17.85	25.20	28.00	27.66	26.33	23.64	29.35	28.57	9.99	21.17	24.27	23.40
	T4	17.6	20.87	21.83	18.05	24.90	26.63	27.04	26.00	23.69	29.13	28.83	9.75	21.27	25.00	22.10
M2	T1	-	-	21.50	17.33	26.40	27.83	27.41	-	23.69	29.18	-	-	21.57	25.17	21.60
	T2	17.1	19.00	20.30	18.21	24.43	26.77	23.90	25.67	23.35	26.65	28.27	9.43	21.33	23.27	22.20
	T3	17	20.73	20.93	18.15	24.83	28.17	26.67	26.67	23.63	28.45	29.17	9.71	21.03	24.90	26.10
	T4	17.47	20.53	21.37	17.50	24.77	27.50	27.91	26.00	23.66	26.92	28.73	9.63	21.20	24.73	24.77
M3	T1	-	-	21.40	17.72	26.07	28.17	27.61	-	23.7	27.83	-	-	21.23	-	20.87
	T2	16.97	19.03	20.57	17.50	24.23	27.53	24.67	25.67	23.37	25.95	29.53	-	20.53	-	22.27
	T3	16.57	20.43	20.93	16.01	24.47	27.70	25.57	26.33	23.63	28.05	28.57	-	20.87	-	23.73
	T4	17.27	20.13	21.40	17.81	24.87	27.10	27.95	25.67	23.7	26.98	28.67	-	20.83	-	22.90
Mean of Factor-1																
1		17.42	20.36	21.31	17.77	25.54	27.57	27.30	26.11	23.6	29.23	28.77	9.75	21.06	24.67	22.00
2		17.19	20.09	21.03	17.79	25.11	27.57	26.47	26.11	23.58	27.8	28.72	9.59	21.28	24.52	23.67
3		16.93	19.87	21.07	17.26	24.91	27.63	26.45	25.89	23.6	27.2	28.92		20.87		22.44
CD(0.05)		0.07	0.03	0.13	NS	0.15	NS	NS	NS	NS	0.59	NS	NS	NS	NS	0.40
Mean of Factor-2																
1		-	-	21.54	17.57	26.44	28.09	27.93	-	23.7	28.96	-	-	21.28	25.55	20.93
2		17.18	19.02	20.44	17.75	24.62	27.22	24.76	25.78	23.36	27.07	28.9	9.47	20.88	23.37	22.21
3		16.92	20.78	21.02	17.33	24.83	27.96	26.64	26.44	23.63	28.62	28.77	9.85	21.02	24.58	24.41
4		17.44	20.51	21.53	17.78	24.84	27.08	27.63	25.89	23.68	27.68	28.74	9.69	21.10	24.87	23.26
CD(0.05)		0.13	0.07	0.14	NS	0.29	0.60	0.87	NS	0.02	1.12	NS	0.21	NS	NS	0.51
Interaction																
M and T		NS	0.12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.88
T and M		NS	0.10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.80
Experimental Mean		17.18	20.10	21.14	17.61	25.19	27.59	26.74	26.04	23.59	28.08	28.8	9.67	21.07	24.59	22.70

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Total dry matter g/m² at Maximum tillering stage							Total dry matter g/m² at Panicle initiation stage					
		Chatha	Chiplima	Malan	Moncompu	Pusa	ARI-Rajendranagar	Rewa	Chatha	Malan	Moncompu	Pattambi	Pusa	ARI-Rajendranagar
M1	T1	-	277.14	71.43	-	173.00	243.81	22.73	-	374.83	-	-	659.00	961.55
	T2	132.97	227.33	52.87	700.40	115.67	160.00	20.47	161.77	281.17	687.73	46.67	550.33	394.41
	T3	217.50	255.53	65.27	684.80	144.00	208.00	20.07	461.00	345.00	579.87	64.33	624.33	779.67
	T4	202.63	287.75	69.60	1552.40	146.67	237.07	19.37	432.67	351.77	968.27	130.00	630.33	925.38
M2	T1	-	255.53	66.80	-	164.00	238.97	23.20	-	344.87	-	-	629.33	943.33
	T2	134.13	217.47	49.57	644.27	111.67	158.70	20.80	161.87	265.37	431.47	128.33	527.67	384.87
	T3	210.83	239.06	63.77	735.20	136.67	217.80	21.23	453.73	344.90	407.60	80.00	610.33	836.47
	T4	198.87	269.43	67.17	820.80	140.33	211.00	19.13	430.60	345.50	563.60	177.33	613.33	798.40
M3	T1	-	250.8	62.47	-	148.33		22.30	-	339.40	-	-	616.67	
	T2	134.40	209.78	45.90	306.00	102.00		20.03	155.17	246.20	255.20	147.00	499.67	
	T3	201.52	239.44	62.23	636.93	127.67		20.07	448.20	332.77	451.20	31.00	566.33	
	T4	187.77	244.17	63.67	605.20	132.33		19.23	424.13	336.50	532.27	22.67	572.00	
Mean of Factor-1														
1		184.37	261.94	64.79	979.20	144.83	212.22	20.66	351.81	338.19	745.29	80.33	616.00	765.25
2		181.28	245.37	61.83	733.42	138.17	206.62	21.09	348.73	325.16	467.56	128.56	595.17	740.77
3		174.56	236.05	58.57	516.04	127.58		20.41	342.50	313.72	412.89	66.89	563.67	
CD(0.05)		0.32	0.8	1.20	104.95	4.43	3.85	NS	0.71	4.70	62.29	NS	22.25	NS
Mean of Factor-2														
1		-	261.16	66.90	-	161.78	241.39	22.74	-	353.03	-	-	635.00	952.44
2		133.83	218.19	49.44	550.22	109.78	159.35	20.43	159.60	264.24	458.13	107.33	525.89	389.64
3		209.95	244.68	63.76	685.64	136.11	212.90	20.46	454.31	340.89	479.56	58.44	600.33	808.07
4		196.42	267.12	66.81	992.80	139.78	224.03	19.24	429.13	344.59	688.04	110.00	605.22	861.89
CD(0.05)		1.22	1.26	2.30	115.88	7.71	9.76	0.41	1.92	3.21	74.63	NS	14.36	49.95
Interaction														
M and T		2.12	2.18	NS	200.71	NS	NS	NS	NS	5.56	NS	NS	NS	NS
T and M		1.74	1.94	NS	174.24	NS	NS	NS	NS	5.66	NS	NS	NS	NS
Experimental Mean		180.07	247.79	61.73	742.89	136.86	209.42	20.72	347.68	325.69	541.91	91.93	591.61	753.01

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)

M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: ((Contd.)) Summary on weed population no/m² of long term trial on weed dynamics in mono or double -cropped rice system under different establishment methods, kharif 2021.

Main plot	Sub plot Treatments	Aduthurai				Chiplima		
		Weed population no/m² at Active vegetative stage				Total Weed population no/m2		
		Grasses	Sedges	BLW	Total weed population	Active vegetative stage	Panicle initiation stage	heading stage
M1	T1	-	-	-	-	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	17.33(4.22)	8.00(2.89)	11.00(3.38)	36.33(6.07)	41.51(6.48)	63.27(7.98)	103.06(10.16)
	T3	11.67(3.48)	8.33(2.96)	9.67(3.18)	29.67(5.49)	18.22(4.32)	32.09(5.69)	45.46(6.76)
	T4	10.00(3.24)	4.33(2.20)	9.33(3.12)	23.67(4.91)	12.42(3.59)	21.20(4.61)	26.72(5.20)
M2	T1	-	-	-	-	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	19.67(4.48)	9.00(3.07)	14.33(3.83)	43.00(6.59)	86.96(9.30)	157.97(12.59)	177.78(13.34)
	T3	13.33(3.71)	10.67(3.32)	9.33(3.11)	33.33(5.79)	50.87(7.14)	76.13(8.72)	86.75(9.27)
	T4	9.67(3.03)	10.67(3.34)	6.33(2.60)	26.67(5.16)	19.34(4.42)	38.02(6.16)	48.06(6.95)
M3	T1	-	-	-	-	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	25.00(5.04)	17.67(4.25)	17.67(4.25)	60.33(7.78)	104.14(10.20)	175.55(13.26)	208.21(14.43)
	T3	21.67(4.69)	14.00(3.80)	11.33(3.43)	47.00(6.88)	62.99(7.95)	89.23(9.44)	105.01(10.26)
	T4	17.00(4.18)	9.00(3.07)	11.00(3.38)	37.00(6.12)	27.76(5.28)	47.67(6.91)	58.24(7.64)
Mean of Factor-1								
1		13.00(3.64)	6.89(2.68)	10.00(3.23)	29.89(5.49)	18.04(3.77)	29.14(4.75)	43.81(5.71)
2		14.22(3.74)	10.11(3.24)	10.00(3.18)	34.33(5.85)	39.30(5.39)	68.03(7.04)	78.15(7.57)
3		21.22(4.64)	13.56(3.71)	13.33(3.68)	48.11(6.93)	48.73(6.03)	78.12(7.58)	92.87(8.26)
CD(0.05)		0.49	0.27	0.26	0.44	0.37	0.34	0.6
Mean of Factor-2								
1		-	-	-	-	0.00(0.71)	0.00(0.71)	0.00(0.71)
2		20.67(4.58)	11.56(3.40)	14.33(3.82)	46.56(6.81)	77.54(8.66)	132.26(11.27)	163.01(12.64)
3		15.56(3.96)	11.00(3.36)	10.11(3.24)	36.67(6.05)	44.03(6.47)	65.82(7.95)	79.08(8.76)
4		12.22(3.48)	8.00(2.87)	8.89(3.03)	29.11(5.40)	19.84(4.43)	35.63(5.89)	44.34(6.60)
CD(0.05)		0.38	0.33	0.3	0.31	0.6	0.5	0.6
Interaction								
M and T		NS	NS	NS	NS	1.04	0.87	1.04
T and M		NS	NS	NS	NS	0.93	0.78	0.97
Experimental Mean		4.01	3.21	3.36	6.09	5.07	6.46	7.18

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Chatha											
		Weed population no/m² at Active vegetative stage				Weed population no/m² at Panicle initiation stage				Weed population no/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	T1	-	-	-	-	-	-	-	-	-	-	-	-
	T2	41.00(6.44)	36.00(6.04)	0.33(0.88)	77.33(8.82)	77.00(8.80)	66.00(8.15)	8.67(3.03)	151.67(12.33)	78.67(8.89)	57.67(7.63)	11.00(3.38)	147.33(12.16)
	T3	4.33(2.19)	0.00(0.71)	0.33(0.88)	4.67(2.26)	17.67(4.26)	4.67(2.27)	4.33(2.20)	26.67(5.21)	18.00(4.30)	8.67(3.03)	1.67(1.39)	28.33(5.37)
	T4	3.00(1.87)	27.00(5.24)	0.00(0.71)	30.00(5.52)	13.33(3.72)	6.33(2.61)	1.67(1.46)	21.33(4.67)	12.67(3.63)	7.33(2.80)	1.00(1.17)	21.00(4.64)
M2	T1	-	-	-	-	-	-	-	-	-	-	-	-
	T2	43.67(6.64)	43.00(6.59)	2.33(1.64)	89.00(9.46)	99.00(9.97)	75.00(8.69)	19.00(4.41)	193.00(13.91)	93.33(9.69)	73.00(8.57)	14.00(3.80)	180.33(13.45)
	T3	4.67(2.26)	0.00(0.71)	2.00(1.56)	6.67(2.68)	24.00(4.95)	6.67(2.67)	5.00(2.35)	35.67(6.01)	16.67(4.14)	12.67(3.63)	3.33(1.95)	32.67(5.76)
	T4	3.00(1.86)	34.33(5.90)	0.67(1.05)	38.00(6.20)	20.00(4.53)	10.00(3.24)	3.33(1.93)	33.33(5.81)	17.67(4.26)	8.67(3.03)	1.33(1.27)	27.67(5.30)
M3	T1	-	-	-	-	-	-	-	-	-	-	-	-
	T2	48.67(7.01)	45.33(6.77)	4.33(2.20)	98.33(9.94)	104.33(10.24)	83.00(9.14)	22.00(4.74)	209.33(14.49)	106.67(10.35)	79.67(8.95)	18.00(4.30)	204.33(14.31)
	T3	5.33(2.41)	0.00(0.71)	5.67(2.48)	11.00(3.38)	25.33(5.08)	9.33(3.13)	5.67(2.47)	40.33(6.39)	26.33(5.18)	14.00(3.81)	4.67(2.26)	45.00(6.74)
	T4	4.33(2.20)	39.00(6.28)	4.00(2.12)	47.33(6.92)	21.33(4.67)	16.33(4.10)	4.67(2.27)	42.33(6.54)	22.33(4.78)	12.00(3.53)	3.33(1.95)	37.67(6.18)
Mean of Factor-1													
1		16.11(3.50)	21.00(4.00)	0.22(0.82)	37.33(5.53)	36.00(5.59)	25.67(4.35)	4.89(2.23)	66.56(7.40)	36.44(5.61)	24.56(4.48)	4.56(1.98)	65.56(7.39)
2		17.11(3.59)	25.78(4.40)	1.67(1.42)	44.56(6.11)	47.67(6.48)	30.56(4.87)	9.11(2.90)	87.33(8.58)	42.56(6.03)	31.44(5.07)	6.22(2.34)	80.22(8.17)
3		19.44(3.87)	28.11(4.59)	4.67(2.27)	52.22(6.75)	50.33(6.66)	36.22(5.46)	10.78(3.16)	97.33(9.14)	51.78(6.77)	35.22(5.43)	8.67(2.84)	95.67(9.08)
CD(0.05)		0.11	0.07	0.11	0.14	0.13	0.12	0.13	0.13	0.2	0.07	NS	0.25
Mean of Factor-2													
1		-	-	-	-	-	-	-	-	-	-	-	-
2		44.44(6.70)	41.44(6.47)	2.33(1.57)	88.22(9.41)	93.44(9.67)	74.67(8.66)	16.56(4.06)	184.67(13.58)	92.89(9.64)	70.11(8.38)	14.33(3.83)	177.33(13.31)
3		4.78(2.28)	0.00(0.71)	2.67(1.64)	7.44(2.77)	22.33(4.76)	6.89(2.69)	5.00(2.34)	34.22(5.87)	20.33(4.54)	11.78(3.49)	3.22(1.87)	35.33(5.96)
4		3.44(1.97)	33.44(5.81)	1.56(1.29)	38.44(6.21)	18.22(4.30)	10.89(3.32)	3.22(1.89)	32.33(5.68)	17.56(4.22)	9.33(3.12)	1.89(1.46)	28.78(5.37)
CD(0.05)		0.18	0.2	NS	0.19	0.26	0.14	0.19	0.19	0.18	0.13	0.31	0.13
Interaction													
M and T		NS	NS	NS	NS	NS	NS	0.33	NS	NS	NS	NS	0.22
T and M		NS	NS	NS	NS	NS	NS	0.28	NS	NS	NS	NS	0.24
Experimental Mean		3.65	4.33	1.5	6.13	6.25	4.89	2.76	8.37	6.14	5	2.39	8.21

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Chinsurah											
		Weed population no/m² at Active vegetative stage				Weed population no/m² at Panicle initiation stage				Weed population no/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	T1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	1.67(1.39)	0.67(1.05)	1.67(1.44)	4.00(2.11)	1.00(1.17)	0.67(1.05)	1.67(1.44)	3.33(1.93)
	T2	5.33(2.41)	8.33(2.95)	5.33(2.25)	19.00(4.41)	19.33(4.44)	14.00(3.76)	10.00(3.21)	43.33(6.61)	25.67(5.11)	16.67(4.11)	14.33(3.85)	56.67(7.55)
	T3	5.33(2.40)	3.33(1.85)	6.33(2.60)	15.00(3.92)	1.33(1.34)	2.67(1.76)	1.00(1.17)	5.00(2.32)	8.33(2.97)	5.67(2.46)	5.00(2.32)	19.00(4.40)
	T4	2.00(1.56)	1.67(1.46)	3.00(1.81)	6.67(2.67)	1.67(1.46)	3.00(1.87)	0.67(1.00)	5.33(2.40)	5.33(2.39)	6.33(2.60)	4.00(2.10)	15.67(4.02)
M2	T1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	2.67(1.77)	8.67(3.03)	4.33(2.18)	15.67(4.02)	4.00(2.06)	2.00(1.56)	2.00(1.52)	8.00(2.89)
	T2	14.33(3.85)	6.33(2.60)	8.33(2.95)	29.00(5.43)	34.33(5.89)	25.33(5.06)	11.67(3.47)	71.33(8.47)	41.33(6.42)	24.33(4.96)	22.00(4.73)	87.67(9.38)
	T3	11.33(3.41)	5.33(2.41)	3.33(1.85)	20.00(4.47)	9.33(3.13)	9.33(3.13)	3.67(2.04)	22.33(4.78)	7.33(2.73)	10.00(3.24)	3.67(2.04)	21.00(4.62)
	T4	6.67(2.68)	4.33(2.18)	3.00(1.87)	14.00(3.80)	6.33(2.58)	8.67(3.02)	7.00(2.71)	22.00(4.72)	8.00(2.90)	9.67(3.17)	8.33(2.91)	26.00(5.10)
M3	T1	-	-	-	-	-	-	-	-	-	-	-	-
	T2	-	-	-	-	-	-	-	-	-	-	-	-
	T3	-	-	-	-	-	-	-	-	-	-	-	-
	T4	-	-	-	-	-	-	-	-	-	-	-	-
Mean of Factor-1													
1		3.17(1.77)	3.33(1.74)	3.67(1.84)	10.17(2.93)	6.00(2.16)	5.08(2.11)	3.33(1.70)	14.42(3.36)	10.08(2.91)	7.33(2.56)	6.25(2.43)	23.67(4.48)
2		8.08(2.66)	4.00(1.97)	3.67(1.84)	15.75(3.60)	13.17(3.35)	13.00(3.56)	6.67(2.60)	32.83(5.50)	15.17(3.53)	11.50(3.23)	9.00(2.80)	35.67(5.50)
3		-	-	-	-	-	-	-	-	-	-	-	-
CD(0.05)		0.38	NS	NS	0.37	0.13	1.2	NS	1.22	NS	NS	0.36	1.01
Mean of Factor-2													
1		0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	2.17(1.58)	4.67(2.04)	3.00(1.81)	9.83(3.07)	2.50(1.62)	1.33(1.31)	1.83(1.48)	5.67(2.41)
2		9.83(3.13)	7.33(2.78)	6.83(2.60)	24.00(4.92)	26.83(5.17)	19.67(4.41)	10.83(3.34)	57.33(7.54)	33.50(5.76)	20.50(4.54)	18.17(4.29)	72.17(8.46)
3		8.33(2.90)	4.33(2.13)	4.83(2.23)	17.50(4.19)	5.33(2.24)	6.00(2.45)	2.33(1.60)	13.67(3.55)	7.83(2.85)	7.83(2.85)	4.33(2.18)	20.00(4.51)
4		4.33(2.12)	3.00(1.82)	3.00(1.84)	10.33(3.23)	4.00(2.02)	5.83(2.45)	3.83(1.85)	13.67(3.56)	6.67(2.65)	8.00(2.88)	6.17(2.51)	20.83(4.56)
CD(0.05)		0.35	0.41	0.71	0.45	0.52	0.42	0.43	0.28	0.77	0.41	0.6	0.67
Interaction													
M and T		0.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
T and M		0.52	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Experimental Mean		2.22	1.86	1.84	3.26	2.75	2.84	2.15	4.43	3.22	2.89	2.61	4.99

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Gangavathi											
		Weed population no/m² at Active vegetative stage				Weed population no/m² at Panicle initiation stage				Weed population no/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	T1	6.49(2.36)	79.54(8.81)	21.31(4.44)	107.34(10.18)	5.56(2.10)	62.09(7.85)	2.78(1.66)	70.43(8.34)	4.63(2.05)	49.11(7.04)	6.49(2.22)	60.23(7.77)
	T2	25.93(4.69)	44.48(6.57)	31.51(5.38)	101.92(9.99)	6.49(2.56)	38.92(6.12)	4.63(1.74)	50.04(7.06)	2.78(1.66)	33.36(5.82)	5.56(1.85)	41.70(6.48)
	T3	9.27(3.00)	16.71(4.12)	40.77(6.37)	66.75(8.19)	12.05(3.54)	42.63(6.40)	12.97(3.21)	67.65(8.08)	10.19(3.22)	47.26(6.75)	17.61(4.16)	75.06(8.64)
	T4	9.27(3.01)	25.16(5.04)	37.07(5.53)	71.50(8.22)	5.56(2.42)	35.21(5.71)	15.75(3.68)	56.53(7.50)	1.85(1.29)	15.75(3.96)	11.12(2.41)	28.73(5.34)
M2	T1	94.52(9.72)	308.83(17.47)	23.17(4.00)	426.52(20.60)	17.61(4.22)	23.17(4.86)	11.21(3.36)	51.99(7.24)	14.83(3.85)	32.43(5.73)	9.27(2.77)	56.53(7.54)
	T2	28.71(5.24)	162.31(12.66)	68.57(8.30)	259.59(16.07)	5.56(2.46)	35.21(5.94)	12.97(3.57)	53.75(7.31)	2.78(1.46)	38.92(6.12)	17.61(4.07)	59.31(7.72)
	T3	111.21(10.54)	58.29(7.49)	6.49(1.96)	175.98(13.27)	23.17(4.68)	28.73(5.36)	3.71(2.03)	55.60(7.46)	31.51(5.64)	22.43(4.13)	11.12(3.41)	65.05(8.07)
	T4	107.49(10.05)	451.31(21.22)	9.27(2.75)	568.07(23.80)	2.78(1.66)	59.31(7.70)	10.19(3.22)	72.28(8.51)	0.00(0.71)	65.79(8.13)	12.05(3.06)	77.84(8.80)
M3	T1	204.84(14.19)	28.73(5.37)	84.28(9.15)	317.85(17.73)	13.90(3.64)	11.12(2.41)	21.22(4.63)	46.24(6.81)	12.97(3.57)	39.85(6.31)	47.26(6.82)	100.08(10.02)
	T2	40.77(5.67)	80.67(8.98)	41.70(6.38)	163.14(12.75)	15.75(4.02)	17.61(3.64)	20.94(4.52)	54.30(7.37)	25.02(4.62)	11.12(2.99)	21.31(4.50)	57.45(7.46)
	T3	33.37(5.42)	137.33(11.73)	38.17(6.15)	208.87(14.44)	10.19(3.12)	20.39(4.54)	35.68(5.77)	66.26(8.01)	12.97(2.56)	24.09(4.93)	26.87(4.77)	63.94(7.88)
	T4	162.19(12.74)	63.05(7.95)	80.70(8.95)	305.95(17.50)	15.75(3.75)	32.43(4.87)	13.90(3.78)	62.09(7.86)	17.61(3.66)	25.02(4.35)	10.19(2.61)	52.82(7.28)
Mean of Factor-1													
1		12.74(3.27)	41.47(6.13)	32.67(5.43)	86.88(9.15)	7.41(2.65)	44.71(6.52)	9.03(2.57)	61.16(7.75)	4.87(2.06)	36.37(5.89)	10.19(2.66)	51.43(7.06)
2		85.48(8.89)	245.18(14.71)	26.87(4.25)	357.54(18.44)	12.28(3.25)	36.60(5.96)	9.52(3.05)	58.40(7.63)	12.28(2.91)	39.89(6.03)	12.51(3.32)	64.68(8.03)
3		110.30(9.51)	77.44(8.51)	61.21(7.66)	248.95(15.60)	13.90(3.63)	20.39(3.86)	22.94(4.68)	57.22(7.51)	17.14(3.61)	25.02(4.64)	26.41(4.68)	68.57(8.16)
CD(0.05)		1.05	0.99	NS	1.73	0.14	NS	0.92	NS	NS	NS	0.93	NS
Mean of Factor-2													
1		101.95(8.75)	139.03(10.55)	42.92(5.86)	283.90(16.17)	12.36(3.32)	32.12(5.04)	11.74(3.22)	56.22(7.46)	10.81(3.16)	40.46(6.36)	21.00(3.94)	72.28(8.45)
2		31.81(5.20)	95.82(9.40)	47.26(6.69)	174.88(12.94)	9.27(3.01)	30.58(5.23)	12.85(3.28)	52.70(7.25)	10.19(2.58)	27.80(4.98)	14.83(3.47)	52.82(7.22)
3		51.28(6.32)	70.78(7.78)	28.48(4.83)	150.53(11.97)	15.14(3.78)	30.58(5.43)	17.45(3.67)	63.17(7.85)	18.22(3.81)	31.26(5.27)	18.53(4.12)	68.02(8.19)
4		92.99(8.60)	179.84(11.41)	42.34(5.75)	315.17(16.51)	8.03(2.61)	42.32(6.10)	13.28(3.56)	63.63(7.96)	6.49(1.89)	35.52(5.48)	11.12(2.69)	53.13(7.14)
CD(0.05)		2.2	1.52	NS	1.51	NS	NS	NS	NS	1.22	NS	NS	0.93
Interaction													
M and T		3.81	2.64	NS	2.62	NS	NS	NS	NS	2.11	NS	NS	1.61
T and M		3.35	2.35	NS	2.5	NS	NS	NS	NS	2.08	NS	NS	1.51
Experimental Mean		7.22	9.78	5.78	14.4	3.18	5.45	3.43	7.63	2.86	5.52	3.55	7.75

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Ghaghraghat		Jagdalpur							
		Weed population no/m²		Weed population no/m² at Active vegetative stage				Weed population no/m² at Panicle initiation stage			
		Active vegetative stage	Panicle initiation stage	Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	T1	0.00(0.71)	0.00(0.71)	27.33(5.27)	32.67(5.74)	15.67(4.00)	75.67(8.72)	25.00(5.05)	24.00(4.95)	23.00(4.83)	72.00(8.51)
	T2	21.33(4.67)	21.67(4.70)	67.33(8.21)	85.67(9.27)	39.00(6.21)	192.00(13.84)	50.33(7.11)	44.67(6.72)	57.00(7.53)	152.00(12.31)
	T3	15.33(3.97)	15.67(4.01)	31.67(5.66)	46.00(6.81)	17.00(4.14)	94.67(9.75)	27.00(5.24)	31.33(5.63)	33.67(5.84)	92.00(9.62)
	T4	13.33(3.72)	14.33(3.85)	35.33(5.97)	42.00(6.52)	13.33(3.69)	90.67(9.54)	28.00(5.33)	29.33(5.46)	35.33(5.98)	92.67(9.65)
M2	T1	0.00(0.71)	0.00(0.71)	36.67(6.10)	38.67(6.26)	14.00(3.76)	89.33(9.47)	28.00(5.33)	27.67(5.31)	35.00(5.95)	90.67(9.55)
	T2	24.67(5.02)	25.00(5.05)	78.67(8.90)	83.67(9.17)	37.00(6.08)	199.33(14.13)	59.33(7.73)	48.67(7.01)	51.33(7.20)	159.33(12.64)
	T3	16.33(4.10)	17.73(4.26)	47.33(6.87)	43.00(6.60)	20.00(4.45)	110.33(10.49)	33.00(5.77)	29.33(5.45)	38.67(6.24)	101.00(10.07)
	T4	12.67(3.63)	15.00(3.94)	49.33(7.03)	40.67(6.40)	18.67(4.33)	108.67(10.41)	33.67(5.84)	30.00(5.52)	34.00(5.87)	97.67(9.90)
M3	T1	0.00(0.71)	0.00(0.71)	43.00(6.59)	42.00(6.51)	15.67(4.00)	100.67(10.05)	34.33(5.89)	29.00(5.43)	37.67(6.17)	101.00(10.07)
	T2	28.33(5.37)	29.67(5.49)	104.33(10.24)	94.33(9.74)	41.00(6.44)	239.67(15.50)	57.00(7.55)	52.33(7.27)	56.00(7.51)	165.33(12.86)
	T3	22.33(4.78)	22.67(4.81)	57.00(7.56)	53.00(7.31)	24.67(4.99)	134.67(11.62)	36.00(6.04)	34.67(5.93)	25.33(5.08)	96.00(9.82)
	T4	18.00(4.30)	18.67(4.38)	51.33(7.20)	49.67(7.06)	20.33(4.54)	121.33(11.03)	34.67(5.93)	31.00(5.60)	24.67(5.01)	90.33(9.52)
Mean of Factor-1											
1		12.50(3.27)	12.92(3.32)	40.42(6.28)	51.58(7.08)	21.25(4.51)	113.25(10.46)	32.58(5.68)	32.33(5.69)	37.25(6.05)	102.17(10.02)
2		13.42(3.36)	14.43(3.49)	53.00(7.22)	51.50(7.11)	22.42(4.65)	126.92(11.13)	38.50(6.17)	33.92(5.82)	39.75(6.31)	112.17(10.54)
3		17.17(3.79)	17.75(3.85)	63.92(7.90)	59.75(7.66)	25.42(4.99)	149.08(12.05)	40.50(6.35)	36.75(6.06)	35.92(5.94)	113.17(10.57)
CD(0.05)		0.15	0.09	0.34	0.23	NS	0.47	0.27	NS	NS	NS
Mean of Factor-2											
1		0.00(0.71)	0.00(0.71)	35.67(5.99)	37.78(6.17)	15.11(3.92)	88.56(9.41)	29.11(5.43)	26.89(5.23)	31.89(5.65)	87.89(9.38)
2		24.78(5.02)	25.44(5.08)	83.44(9.11)	87.89(9.39)	39.00(6.24)	210.33(14.49)	55.56(7.46)	48.56(7.00)	54.78(7.41)	158.89(12.61)
3		18.00(4.28)	18.69(4.36)	45.33(6.70)	47.33(6.91)	20.56(4.53)	113.22(10.62)	32.00(5.68)	31.78(5.67)	32.56(5.72)	96.33(9.84)
4		14.67(3.88)	16.00(4.06)	45.33(6.73)	44.11(6.66)	17.44(4.19)	106.89(10.33)	32.11(5.70)	30.11(5.53)	31.33(5.62)	93.56(9.69)
CD(0.05)		0.17	0.18	0.48	0.38	0.75	0.64	0.47	0.24	0.39	0.43
Interaction											
M and T		0.29	NS	NS	NS	NS	NS	NS	NS	0.68	NS
T and M		0.27	NS	NS	NS	NS	NS	NS	NS	0.66	NS
Experimental Mean		3.47	3.55	7.13	7.28	4.72	11.21	6.07	5.86	6.1	10.38

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Malan											
		Weed population no/m² at Active vegetative stage				Weed population no/m² at Panicle initiation stage				Weed population no/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	T1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	25.33(5.08)	10.33(3.28)	13.33(3.71)	49.00(7.03)	35.00(5.96)	15.00(3.93)	19.33(4.45)	69.33(8.35)	34.33(5.90)	10.67(3.33)	10.00(3.24)	55.00(7.45)
	T3	16.00(4.05)	8.00(2.91)	9.00(3.07)	33.00(5.77)	23.67(4.91)	8.00(2.90)	16.67(4.13)	48.33(6.99)	26.33(5.18)	8.67(3.02)	4.67(2.27)	39.67(6.34)
	T4	5.33(2.41)	3.67(2.04)	3.33(1.95)	12.33(3.58)	6.67(2.67)	4.00(2.11)	4.33(2.18)	15.00(3.92)	6.33(2.61)	4.33(2.18)	4.33(2.19)	15.00(3.94)
M2	T1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	42.00(6.51)	27.67(5.30)	41.00(6.44)	110.67(10.54)	41.00(6.44)	26.00(5.14)	28.33(5.37)	95.33(9.79)	46.00(6.82)	21.00(4.63)	19.33(4.45)	86.33(9.32)
	T3	21.67(4.71)	17.67(4.26)	23.00(4.84)	62.33(7.92)	27.33(5.27)	19.67(4.49)	17.67(4.25)	64.67(8.07)	32.00(5.70)	17.67(4.26)	17.67(4.26)	67.33(8.23)
	T4	5.67(2.48)	4.33(2.18)	6.00(2.53)	16.00(4.06)	7.67(2.85)	5.33(2.40)	4.33(2.19)	17.33(4.22)	8.67(3.03)	4.33(2.18)	4.33(2.18)	17.33(4.22)
M3	T1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	48.67(7.01)	59.33(7.73)	48.00(6.96)	156.00(12.51)	50.33(7.13)	49.33(7.06)	55.67(7.49)	155.33(12.48)	42.67(6.57)	43.33(6.62)	53.00(7.31)	139.00(11.81)
	T3	30.33(5.55)	29.67(5.49)	25.00(5.05)	85.00(9.25)	33.67(5.84)	28.00(5.34)	22.67(4.81)	84.33(9.21)	39.00(6.28)	27.00(5.24)	31.33(5.64)	97.33(9.89)
	T4	9.00(3.08)	6.33(2.58)	8.33(2.97)	23.67(4.91)	9.00(3.07)	6.67(2.68)	8.67(3.03)	24.33(4.98)	7.00(2.73)	4.33(2.19)	4.33(2.19)	15.67(4.01)
Mean of Factor-1													
1		11.67(3.06)	5.50(2.23)	6.42(2.36)	23.58(4.27)	16.33(3.56)	6.75(2.41)	10.08(2.87)	33.17(4.99)	16.75(3.60)	5.92(2.31)	4.75(2.10)	27.42(4.61)
2		17.33(3.60)	12.42(3.11)	17.50(3.63)	47.25(5.81)	19.00(3.82)	12.75(3.18)	12.58(3.13)	44.33(5.69)	21.67(4.06)	10.75(2.94)	10.33(2.90)	42.75(5.62)
3		22.00(4.09)	23.83(4.13)	20.33(3.92)	66.17(6.84)	23.25(4.19)	21.00(3.94)	21.75(4.01)	66.00(6.84)	22.17(4.07)	18.67(3.69)	22.17(3.96)	63.00(6.60)
CD(0.05)		0.11	0.20	0.19	0.22	0.14	0.23	0.16	0.18	0.17	0.15	0.19	0.17
Mean of Factor-2													
1		0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
2		38.67(6.20)	32.44(5.44)	34.11(5.71)	105.22(10.03)	42.11(6.51)	30.11(5.38)	34.44(5.77)	106.67(10.21)	41.00(6.43)	25.00(4.86)	27.44(5.00)	93.44(9.52)
3		22.67(4.77)	18.44(4.22)	19.00(4.32)	60.11(7.65)	28.22(5.34)	18.56(4.24)	19.00(4.40)	65.78(8.09)	32.44(5.72)	17.78(4.17)	17.89(4.06)	68.11(8.15)
4		6.67(2.66)	4.78(2.27)	5.89(2.48)	17.33(4.18)	7.78(2.86)	5.33(2.40)	5.78(2.46)	18.89(4.37)	7.33(2.79)	4.33(2.18)	4.33(2.18)	16.00(4.06)
CD(0.05)		0.19	0.24	0.19	0.21	0.18	0.17	0.24	0.23	0.15	0.25	0.18	0.18
Interaction													
M and T		0.32	0.42	0.32	0.37	0.31	0.29	0.42	0.4	0.25	0.43	0.31	0.31
T and M		0.29	0.38	0.3	0.35	0.28	0.29	0.37	0.36	0.24	0.38	0.29	0.29
Experimental Mean		3.58	3.16	3.3	5.64	3.86	3.18	3.33	5.84	3.91	2.98	2.99	5.61

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Moncompu											
		Weed population no/m² at Active vegetative stage				Weed population no/m² at Panicle initiation stage				Weed population no/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	T1												
	T2	48.00(6.89)	65.33(8.05)	124.00(11.06)	237.33(15.31)	14.67(3.87)	16.00(4.01)	9.33(3.03)	40.00(6.27)	29.33(5.21)	9.33(2.72)	2.67(1.65)	41.33(6.28)
	T3	40.00(6.34)	38.67(5.32)	26.67(5.17)	105.33(10.18)	14.67(3.89)	42.67(6.24)	8.00(2.92)	65.33(7.93)	26.67(5.09)	0.00(0.71)	0.00(0.71)	26.67(5.09)
	T4	52.00(7.02)	0.00(0.71)	0.00(0.71)	52.00(7.02)	14.67(3.87)	0.00(0.71)	0.00(0.71)	14.67(3.87)	73.33(8.58)	0.00(0.71)	0.00(0.71)	73.33(8.58)
M2	T1												
	T2	46.67(6.85)	176.00(13.07)	53.33(6.95)	276.00(16.39)	14.67(3.87)	51.07(6.89)	9.33(2.59)	75.07(8.47)	144.00(11.64)	12.00(2.49)	0.00(0.71)	156.00(12.18)
	T3	50.67(7.06)	110.67(10.36)	64.00(7.91)	225.33(14.98)	13.33(3.71)	35.47(5.91)	5.33(1.83)	54.13(7.39)	128.00(11.33)	5.33(2.39)	0.00(0.71)	133.33(11.56)
	T4	44.00(6.55)	13.33(2.96)	0.00(0.71)	57.33(7.32)	20.00(4.51)	9.33(3.06)	0.00(0.71)	29.33(5.42)	65.33(8.02)	0.00(0.71)	0.00(0.71)	65.33(8.02)
M3	T1												
	T2	122.67(10.99)	117.33(10.51)	52.00(7.22)	292.00(17.02)	33.33(5.66)	21.20(4.59)	12.00(3.50)	66.53(8.18)	154.67(12.26)	56.00(7.34)	0.00(0.71)	210.67(14.46)
	T3	53.33(7.32)	21.33(4.55)	68.00(8.07)	142.67(11.92)	26.67(5.09)	18.13(4.21)	9.33(3.12)	54.13(7.24)	186.67(13.46)	12.00(3.33)	0.00(0.71)	198.67(13.97)
	T4	37.33(6.05)	24.00(4.21)	14.67(2.70)	76.00(8.54)	10.67(3.30)	18.27(3.75)	1.33(1.18)	30.27(5.44)	41.33(6.19)	2.67(1.44)	0.00(0.71)	44.00(6.36)
Mean of Factor-1													
1		46.67(6.75)	34.67(4.69)	50.22(5.65)	131.56(10.84)	14.67(3.87)	19.56(3.65)	5.78(2.22)	40.00(6.02)	43.11(6.30)	3.11(1.38)	0.89(1.02)	47.11(6.65)
2		47.11(6.82)	100.00(8.80)	39.11(5.19)	186.22(12.90)	16.00(4.03)	31.96(5.29)	4.89(1.71)	52.84(7.09)	112.44(10.33)	5.78(1.86)	0.00(0.71)	118.22(10.59)
3		71.11(8.12)	54.22(6.42)	44.89(5.99)	170.22(12.49)	23.56(4.68)	19.20(4.18)	7.56(2.60)	50.31(6.95)	127.56(10.64)	23.56(4.04)	0.00(0.71)	151.11(11.60)
CD(0.05)		NS	0.75	NS	NS	NS	NS	NS	NS	2.18	NS	NS	1.92
Mean of Factor-2													
1													
2		72.44(8.25)	119.56(10.54)	76.44(8.41)	268.44(16.24)	20.89(4.47)	29.42(5.16)	10.22(3.04)	60.53(7.64)	109.33(9.71)	25.78(4.18)	0.89(1.02)	136.00(10.97)
3		48.00(6.91)	56.89(6.74)	52.89(7.05)	157.78(12.36)	18.22(4.23)	32.09(5.45)	7.56(2.62)	57.87(7.52)	113.78(9.96)	5.78(2.14)	0.00(0.71)	119.56(10.21)
4		44.44(6.54)	12.44(2.62)	4.89(1.37)	61.78(7.63)	15.11(3.89)	9.20(2.51)	0.44(0.86)	24.76(4.91)	60.00(7.60)	0.89(0.95)	0.00(0.71)	60.89(7.66)
CD(0.05)		1.33	3.22	1.88	2.47	NS	1.9	1.28	1.58	1.58	1.55	0.28	1.59
Interaction													
M and T		NS	NS	NS	NS	NS	NS	NS	NS	2.74	NS	NS	2.75
T and M		NS	NS	NS	NS	NS	NS	NS	NS	2.62	NS	NS	2.52
Experimental Mean		7.23	6.64	5.61	12.08	4.2	4.38	2.18	6.69	9.09	2.42	0.81	9.61

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Nagina							
		Weed population no/m² at Active vegetative stage				Weed population no/m² at Panicle initiation stage			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	T1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	3.84(2.08)	1.63(1.45)	3.20(1.92)	8.68(3.03)	3.28(1.94)	4.02(2.12)	3.00(1.86)	10.30(3.29)
	T3	2.84(1.82)	2.41(1.70)	1.89(1.54)	7.14(2.76)	2.84(1.82)	3.12(1.90)	2.80(1.80)	8.76(3.04)
	T4	1.83(1.52)	1.13(1.28)	1.88(1.50)	4.84(2.29)	2.02(1.59)	1.72(1.48)	1.70(1.47)	5.43(2.43)
M2	T1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	4.29(2.19)	2.90(1.84)	2.62(1.76)	9.80(3.20)	3.56(2.01)	4.32(2.19)	3.59(2.01)	11.47(3.46)
	T3	2.94(1.85)	2.61(1.76)	2.50(1.72)	8.04(2.92)	2.75(1.80)	3.31(1.95)	3.00(1.86)	9.05(3.09)
	T4	2.22(1.65)	2.18(1.64)	1.76(1.50)	6.16(2.58)	1.95(1.56)	2.08(1.61)	2.27(1.66)	6.30(2.60)
M3	T1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	5.12(2.37)	6.32(2.61)	4.46(2.22)	15.90(4.05)	5.15(2.37)	7.73(2.87)	4.31(2.19)	17.20(4.20)
	T3	2.83(1.82)	4.01(2.10)	2.93(1.85)	9.76(3.19)	3.59(2.02)	3.51(2.00)	2.89(1.84)	9.98(3.24)
	T4	2.37(1.69)	2.46(1.72)	2.47(1.72)	7.31(2.79)	2.47(1.72)	2.31(1.68)	2.45(1.72)	7.24(2.78)
Mean of Factor-1									
1		2.13(1.53)	1.30(1.28)	1.74(1.42)	5.16(2.20)	2.03(1.51)	2.21(1.55)	1.87(1.46)	6.12(2.36)
2		2.36(1.60)	1.92(1.48)	1.72(1.42)	6.00(2.35)	2.06(1.52)	2.43(1.61)	2.21(1.56)	6.70(2.46)
3		2.58(1.65)	3.20(1.78)	2.46(1.62)	8.24(2.68)	2.80(1.70)	3.39(1.81)	2.41(1.61)	8.60(2.73)
CD(0.05)		NS	0.06	NS	0.14	NS	0.08	NS	0.06
Mean of Factor-2									
1		0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
2		4.42(2.21)	3.62(1.97)	3.43(1.97)	11.46(3.43)	4.00(2.11)	5.36(2.39)	3.63(2.02)	12.99(3.65)
3		2.87(1.83)	3.01(1.85)	2.44(1.71)	8.32(2.96)	3.06(1.88)	3.31(1.95)	2.89(1.83)	9.26(3.12)
4		2.14(1.62)	1.93(1.54)	2.04(1.57)	6.10(2.55)	2.15(1.62)	2.04(1.59)	2.14(1.61)	6.32(2.60)
CD(0.05)		0.11	0.17	0.17	0.21	0.13	0.14	0.14	0.14
Interaction									
M and T		NS	0.3	NS	NS	NS	0.24	NS	0.24
T and M		NS	0.26	NS	NS	NS	0.21	NS	0.21
Experimental Mean		1.59	1.52	1.49	2.41	1.58	1.66	1.54	2.52

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Pantnagar											
		Weed population no/m² at Active vegetative stage				Weed population no/m² at Panicle initiation stage				Weed population no/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	T1	2.37(1.53)	1.33(1.18)	0.52(0.95)	4.23(2.01)	0.67(1.00)	4.00(1.91)	1.33(1.18)	6.00(2.29)	2.67(1.65)	2.67(1.44)	1.33(1.18)	6.67(2.30)
	T2	37.59(6.16)	26.67(5.15)	6.76(2.69)	71.01(8.44)	16.67(4.13)	30.67(5.56)	26.67(5.17)	74.00(8.60)	76.00(8.60)	48.00(6.67)	28.00(5.30)	152.00(12.34)
	T3	6.08(2.51)	5.33(2.39)	2.60(1.75)	14.01(3.81)	3.67(2.02)	6.67(2.65)	9.33(3.12)	19.67(4.46)	17.33(4.22)	5.33(2.39)	8.00(2.86)	30.67(5.56)
	T4	4.23(2.16)	4.00(2.12)	1.56(1.35)	9.79(3.19)	2.33(1.68)	5.33(2.39)	9.33(3.12)	17.00(4.17)	12.00(3.50)	4.00(2.12)	6.67(2.39)	22.67(4.81)
M2	T1	2.00(1.47)	2.67(1.65)	1.33(1.29)	44.00(5.92)	1.00(1.17)	2.67(1.44)	1.33(1.18)	5.00(2.10)	6.67(2.30)	1.33(1.18)	4.00(1.91)	12.00(3.06)
	T2	40.67(6.39)	40.00(6.34)	15.33(3.96)	56.00(6.95)	26.33(5.18)	45.33(6.74)	34.67(5.93)	106.33(10.33)	154.67(12.05)	72.00(8.39)	36.00(6.02)	262.67(16.12)
	T3	6.00(2.53)	6.67(2.65)	3.33(1.94)	16.00(4.04)	3.67(2.04)	8.00(2.86)	9.33(3.12)	21.00(4.61)	13.33(3.71)	9.33(3.12)	13.33(3.59)	36.00(6.00)
	T4	4.67(2.26)	5.33(2.39)	2.67(1.76)	10.00(3.24)	2.67(1.74)	6.67(2.59)	6.67(2.30)	16.00(3.90)	13.33(3.68)	4.00(1.91)	12.00(3.39)	29.33(5.46)
M3	T1	2.50(1.59)	1.33(1.18)	1.67(1.25)	2.50(1.59)	1.33(1.29)	1.33(1.18)	2.67(1.65)	5.33(2.41)	4.00(1.65)	1.33(1.18)	2.67(1.65)	8.00(2.77)
	T2	44.17(6.67)	26.67(5.19)	16.67(4.13)	52.50(6.91)	20.00(4.52)	32.00(5.57)	33.33(5.81)	85.33(9.24)	101.33(10.06)	53.33(7.28)	30.67(5.57)	185.33(13.62)
	T3	7.50(2.83)	5.33(2.39)	6.67(2.67)	17.83(4.25)	3.00(1.86)	5.33(2.39)	9.33(3.06)	17.67(4.21)	14.67(3.84)	8.00(2.86)	8.00(2.56)	30.67(5.57)
	T4	5.83(2.46)	4.00(1.91)	5.00(2.30)	11.83(3.33)	2.00(1.56)	5.33(2.39)	8.00(2.92)	15.33(3.97)	6.67(2.39)	6.67(2.65)	6.67(2.59)	20.00(4.38)
Mean of Factor-1													
1		12.57(3.09)	9.33(2.71)	2.86(1.68)	24.76(4.36)	5.83(2.20)	11.67(3.13)	11.67(3.15)	29.17(4.88)	27.00(4.49)	15.00(3.15)	11.00(2.93)	53.00(6.25)
2		13.33(3.16)	13.67(3.26)	5.67(2.24)	31.50(5.04)	8.42(2.53)	15.67(3.41)	13.00(3.13)	37.08(5.24)	47.00(5.43)	21.67(3.65)	16.33(3.73)	85.00(7.66)
3		15.00(3.39)	9.33(2.67)	7.50(2.59)	21.17(4.02)	6.58(2.31)	11.00(2.88)	13.33(3.36)	30.92(4.95)	31.67(4.48)	17.33(3.49)	12.00(3.09)	61.00(6.58)
CD(0.05)		NS	NS	0.29	NS	NS	NS	NS	NS	NS	NS	NS	0.62
Mean of Factor-2													
1		2.29(1.53)	1.78(1.34)	1.17(1.16)	16.91(3.18)	1.00(1.15)	2.67(1.51)	1.78(1.34)	5.44(2.26)	4.44(1.87)	1.78(1.27)	2.67(1.58)	8.89(2.71)
2		40.81(6.41)	31.11(5.56)	12.92(3.59)	59.84(7.43)	21.00(4.61)	36.00(5.96)	31.56(5.64)	88.56(9.39)	110.67(10.24)	57.78(7.45)	31.56(5.63)	200.00(14.02)
3		6.53(2.62)	5.78(2.47)	4.20(2.12)	15.95(4.03)	3.44(1.97)	6.67(2.63)	9.33(3.10)	19.44(4.43)	15.11(3.92)	7.56(2.79)	9.78(3.00)	32.44(5.71)
4		4.91(2.30)	4.44(2.14)	3.08(1.80)	10.54(3.25)	2.33(1.66)	5.78(2.45)	8.00(2.78)	16.11(4.02)	10.67(3.19)	4.89(2.23)	8.44(2.79)	24.00(4.88)
CD(0.05)		0.63	0.65	0.5	1.94	0.35	0.81	0.79	0.8	1.64	0.98	1.13	1.31
Interaction													
M and T		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
T and M		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Experimental Mean		3.21	2.88	2.17	4.47	2.35	3.14	3.21	5.02	4.8	3.43	3.25	6.83

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Puducherry											
		Weed population no/m² at Active vegetative stage				Weed population no/m² at Panicle initiation stage				Weed population no/m² at heading stage			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	T1	-	-	-	-	-	-	-	-	-	-	-	-
	T2	68.96(8.33)	37.35(6.15)	37.17(6.14)	143.47(12.00)	55.99(7.51)	27.12(5.25)	29.50(5.48)	112.61(10.63)	39.57(6.33)	20.07(4.53)	22.03(4.74)	81.66(9.06)
	T3	40.94(6.44)	25.23(5.07)	26.18(5.16)	92.35(9.64)	27.77(5.32)	17.83(4.28)	18.93(4.41)	64.53(8.06)	17.07(4.19)	13.98(3.81)	11.43(3.45)	42.49(6.56)
	T4	52.04(7.25)	30.90(5.60)	29.39(5.47)	112.34(10.62)	36.02(6.04)	22.95(4.84)	23.24(4.87)	82.22(9.09)	24.54(5.00)	16.61(4.14)	16.44(4.12)	57.59(7.62)
M2	T1	-	-	-	-	-	-	-	-	-	-	-	-
	T2	76.20(8.76)	49.55(7.07)	47.84(6.95)	173.60(13.19)	68.28(8.29)	33.54(5.83)	40.55(6.41)	142.37(11.95)	46.72(6.87)	28.68(5.40)	40.07(6.37)	115.46(10.77)
	T3	54.86(7.44)	32.62(5.75)	31.71(5.67)	119.19(10.94)	40.43(6.40)	24.06(4.95)	24.44(4.99)	88.93(9.46)	24.67(5.02)	17.72(4.27)	17.74(4.27)	60.12(7.79)
	T4	65.77(8.14)	39.82(6.35)	38.71(6.26)	144.29(12.03)	58.98(7.71)	26.75(5.22)	30.90(5.60)	116.64(10.82)	34.58(5.92)	22.70(4.82)	22.25(4.77)	79.52(8.95)
M3	T1	-	-	-	-	-	-	-	-	-	-	-	-
	T2	-	-	-	-	-	-	-	-	-	-	-	-
	T3	-	-	-	-	-	-	-	-	-	-	-	-
	T4	-	-	-	-	-	-	-	-	-	-	-	-
Mean of Factor-1				-	-	-	-	-	-	-	-	-	-
1		53.98(7.34)	31.16(5.61)	30.91(5.59)	116.06(10.75)	39.93(6.29)	22.63(4.79)	23.89(4.92)	86.45(9.26)	27.06(5.17)	16.89(4.16)	16.63(4.10)	60.58(7.75)
2		65.61(8.11)	40.66(6.39)	39.42(6.30)	145.70(12.06)	55.90(7.47)	28.12(5.34)	31.96(5.67)	115.98(10.74)	35.32(5.94)	23.03(4.83)	26.69(5.14)	85.04(9.17)
3		-	-	-	-	-	-	-	-	-	-	-	-
CD(0.05)		0.16	0.18	0.07	0.22	0.17	0.15	0.07	0.22	0.06	0.13	0.02	0.11
Mean of Factor-2													
1		-	-	-	-	-	-	-	-	-	-	-	-
2		72.58(8.54)	43.45(6.61)	42.51(6.54)	158.54(12.60)	62.13(7.90)	30.33(5.54)	35.03(5.94)	127.49(11.29)	43.14(6.60)	24.37(4.97)	31.05(5.56)	98.56(9.92)
3		47.90(6.94)	28.92(5.41)	28.95(5.42)	105.77(10.29)	34.10(5.86)	20.95(4.62)	21.68(4.70)	76.73(8.76)	20.87(4.60)	15.85(4.04)	14.59(3.86)	51.31(7.17)
4		58.90(7.69)	35.36(5.98)	34.05(5.86)	128.32(11.33)	47.50(6.88)	24.85(5.03)	27.07(5.24)	99.43(9.96)	29.56(5.46)	19.65(4.48)	19.35(4.44)	68.56(8.28)
CD(0.05)		0.12	0.11	0.06	0.17	0.11	0.09	0.05	0.14	0.06	0.08	0.05	0.1
Interaction													
M and T		0.17	NS	0.09	NS	0.15	NS	0.07	NS	0.09	0.12	0.07	0.14
T and M		0.19	NS	0.09	NS	0.18	NS	0.08	NS	0.09	0.14	0.06	0.14
Experimental Mean		7.73	6	5.94	11.4	6.88	5.06	5.29	10	5.56	4.49	4.62	8.46

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Pusa											
		Weed population no/m² at Active vegetative stage				Weed population no/m² at Panicle initiation stage				Weed population no/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	T1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	87.33(9.36)	71.33(8.47)	74.00(8.62)	232.67(15.27)	131.67(11.47)	86.00(9.28)	99.00(9.97)	316.67(17.80)	144.67(12.03)	94.33(9.71)	114.67(10.73)	353.67(18.82)
	T3	18.33(4.29)	34.33(5.86)	21.67(4.70)	74.33(8.64)	32.67(5.73)	39.00(6.26)	29.67(5.49)	101.33(10.09)	39.00(6.27)	43.67(6.63)	37.67(6.18)	120.33(10.99)
	T4	12.33(3.57)	27.67(5.26)	15.67(4.00)	55.67(7.49)	26.67(5.20)	31.33(5.62)	24.33(4.98)	82.33(9.10)	32.33(5.72)	38.33(6.22)	30.67(5.58)	101.33(10.09)
M2	T1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	114.00(10.68)	85.67(9.27)	108.67(10.44)	308.33(17.57)	164.33(12.82)	109.00(10.45)	135.67(11.67)	409.00(20.23)	174.00(13.19)	122.67(11.09)	151.33(12.32)	448.00(21.17)
	T3	23.00(4.84)	46.33(6.79)	30.33(5.54)	99.67(9.99)	42.67(6.55)	54.67(7.39)	43.00(6.58)	140.33(11.85)	48.00(6.95)	60.00(7.75)	51.67(7.21)	159.67(12.64)
	T4	18.00(4.29)	33.33(5.76)	23.00(4.84)	74.33(8.64)	34.00(5.87)	42.33(6.50)	35.00(5.94)	111.33(10.56)	39.67(6.33)	52.33(7.25)	41.67(6.49)	133.67(11.57)
M3	T1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	T2	141.67(11.91)	101.00(10.07)	131.33(11.47)	374.00(19.35)	190.33(13.81)	125.33(11.21)	162.33(12.76)	478.00(21.87)	205.33(14.35)	137.00(11.72)	174.67(13.23)	517.00(22.75)
	T3	33.00(5.78)	57.00(7.51)	38.00(6.19)	128.00(11.31)	58.33(7.65)	65.67(8.06)	69.00(8.34)	193.00(13.89)	67.00(8.20)	70.00(8.33)	72.33(8.53)	209.33(14.45)
	T4	22.00(4.73)	40.00(6.34)	26.67(5.21)	88.67(9.44)	40.00(6.36)	51.67(7.15)	56.00(7.52)	147.67(12.16)	49.00(7.03)	57.33(7.54)	63.00(7.97)	169.33(13.02)
Mean of Factor-1													
1		29.50(4.48)	33.33(5.07)	27.83(4.51)	90.67(8.03)	47.75(5.78)	39.08(5.47)	38.25(5.29)	125.08(9.42)	54.00(6.18)	44.08(5.82)	45.75(5.80)	143.83(10.15)
2		38.75(5.13)	41.33(5.63)	40.50(5.38)	120.58(9.23)	60.25(6.49)	51.50(6.26)	53.42(6.22)	165.17(10.84)	65.42(6.80)	58.75(6.70)	61.17(6.68)	185.33(11.52)
3		49.17(5.78)	49.50(6.16)	49.00(5.89)	147.67(10.20)	72.17(7.13)	60.67(6.78)	71.83(7.33)	204.67(12.16)	80.33(7.57)	66.08(7.07)	77.50(7.61)	223.92(12.73)
CD(0.05)		0.28	0.08	0.4	0.28	0.43	0.24	0.26	0.41	0.41	0.3	0.27	0.39
Mean of Factor-2													
1		0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
2		114.33(10.65)	86.00(9.27)	104.67(10.18)	305.00(17.40)	162.11(12.70)	106.78(10.31)	132.33(11.46)	401.22(19.97)	174.67(13.19)	118.00(10.84)	146.89(12.09)	439.56(20.91)
3		24.78(4.97)	45.89(6.72)	30.00(5.48)	100.67(9.98)	44.56(6.65)	53.11(7.24)	47.22(6.80)	144.89(11.94)	51.33(7.14)	57.89(7.57)	53.89(7.30)	163.11(12.69)
4		17.44(4.20)	33.67(5.79)	21.78(4.68)	72.89(8.52)	33.56(5.81)	41.78(6.42)	38.44(6.15)	113.78(10.61)	40.33(6.36)	49.33(7.00)	45.11(6.68)	134.78(11.56)
CD(0.05)		0.51	0.73	0.31	0.37	0.5	0.71	0.28	0.42	0.46	0.68	0.27	0.44
Interaction													
M and T		NS	NS	0.53	0.64	NS	NS	0.48	0.73	NS	NS	0.47	0.77
T and M		NS	NS	0.52	0.58	NS	NS	0.44	0.68	NS	NS	0.44	0.7
Experimental Mean		5.13	5.62	5.26	9.15	6.47	6.17	6.28	10.81	6.85	6.53	6.7	11.47

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	ARI-Rajendranagar								Rewa		
		Weed population no/m² at Active vegetative stage				Weed population no/m² at Panicle initiation stage				Weed population no/m² at Active vegetative stage		
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	Total weed population
M1	T1	5.67(2.48)	5.67(2.47)	0.33(0.88)	11.67(3.48)	10.33(3.25)	9.67(3.17)	5.00(2.34)	25.00(5.02)	7.00(2.73)	8.67(3.03)	15.67(4.02)
	T2	33.33(5.82)	71.00(8.45)	0.67(1.05)	105.00(10.27)	29.33(5.45)	61.33(7.86)	15.33(3.94)	106.00(10.32)	7.67(2.86)	9.00(3.08)	16.67(4.14)
	T3	19.33(4.42)	21.00(4.61)	0.67(1.00)	41.00(6.42)	15.00(3.91)	22.33(4.76)	9.00(3.08)	46.33(6.82)	9.00(3.08)	8.33(2.97)	17.33(4.22)
	T4	13.67(3.74)	17.33(4.21)	0.00(0.71)	31.00(5.60)	12.00(3.50)	15.33(3.96)	8.00(2.87)	35.33(5.97)	9.00(3.08)	8.00(2.91)	17.00(4.18)
M2	T1	6.67(2.68)	7.00(2.73)	0.33(0.88)	14.00(3.80)	11.00(3.36)	10.33(3.28)	5.33(2.41)	26.67(5.19)	10.00(3.24)	10.00(3.24)	20.00(4.52)
	T2	35.00(5.95)	72.33(8.53)	1.67(1.46)	109.00(10.46)	31.33(5.63)	61.00(7.84)	22.00(4.71)	114.33(10.72)	10.67(3.34)	11.00(3.39)	21.67(4.71)
	T3	21.67(4.65)	21.33(4.65)	0.33(0.88)	43.33(6.61)	17.33(4.19)	21.00(4.62)	8.00(2.92)	46.33(6.84)	9.33(3.13)	11.00(3.39)	20.33(4.56)
	T4	19.00(4.38)	14.67(3.89)	0.33(0.88)	34.00(5.86)	16.00(4.02)	14.00(3.80)	6.67(2.68)	36.67(6.08)	11.00(3.39)	11.00(3.39)	22.00(4.74)
M3	T1	-	-	-	-	-	-	-	-	10.33(3.29)	8.67(3.02)	19.00(4.41)
	T2	-	-	-	-	-	-	-	-	9.00(3.08)	9.67(3.19)	18.67(4.37)
	T3	-	-	-	-	-	-	-	-	9.67(3.19)	10.00(3.24)	19.67(4.49)
	T4	-	-	-	-	-	-	-	-	10.00(3.24)	8.67(3.03)	18.67(4.38)
Mean of Factor-1												
1		18.00(4.12)	28.75(4.94)	0.42(0.91)	47.17(6.44)	16.67(4.03)	27.17(4.94)	9.33(3.06)	53.17(7.03)	8.17(2.94)	8.50(3.00)	16.67(4.14)
2		20.58(4.41)	28.83(4.95)	0.67(1.03)	50.08(6.69)	18.92(4.30)	26.58(4.88)	10.50(3.18)	56.00(7.21)	10.25(3.27)	10.75(3.35)	21.00(4.63)
3										9.75(3.20)	9.25(3.12)	19.00(4.41)
CD(0.05)		NS	NS	0.12	0.19	NS	NS	NS	NS	0.07	0.03	0.06
Mean of Factor-2												
1		6.17(2.58)	6.33(2.60)	0.33(0.88)	8.56(2.66)	10.67(3.31)	10.00(3.23)	5.17(2.38)	25.83(5.11)	9.11(3.09)	9.11(3.09)	18.22(4.32)
2		34.17(5.88)	71.67(8.49)	1.17(1.26)	71.33(7.15)	30.33(5.54)	61.17(7.85)	18.67(4.33)	110.17(10.52)	9.11(3.09)	9.89(3.22)	19.00(4.41)
3		20.50(4.53)	21.17(4.63)	0.50(0.94)	28.11(4.58)	16.17(4.05)	21.67(4.69)	8.50(3.00)	46.33(6.83)	9.33(3.13)	9.78(3.20)	19.11(4.42)
4		16.33(4.06)	16.00(4.05)	0.17(0.79)	21.67(4.06)	14.00(3.76)	14.67(3.88)	7.33(2.77)	36.00(6.03)	10.00(3.24)	9.22(3.11)	19.22(4.43)
CD(0.05)		0.54	0.49	NS	0.29	0.45	0.39	0.48	0.42	0.11	NS	NS
Interaction												
M and T		NS	NS	NS	0.51	NS	NS	NS	NS	0.19	NS	NS
T and M		NS	NS	NS	0.45	NS	NS	NS	NS	0.17	NS	NS
Experimental Mean		4.26	4.94	0.97	4.61	4.16	4.91	3.12	7.12	3.14	3.16	4.4

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Titabar			
		Weed population no/m2 at Panicle initiation stage			
		Grasses	Sedges	BLW	Total weed population
M1	T1	1.00(1.22)	0.00(0.71)	0.00(0.71)	1.00(1.22)
	T2	23.00(4.83)	4.67(2.27)	7.00(2.73)	34.67(5.92)
	T3	14.67(3.89)	3.67(2.04)	4.00(2.11)	22.33(4.78)
	T4	6.33(2.59)	1.67(1.46)	2.67(1.74)	10.67(3.31)
M2	T1	0.67(1.05)	0.00(0.71)	0.00(0.71)	0.67(1.05)
	T2	24.00(4.95)	6.00(2.54)	11.33(3.44)	41.33(6.47)
	T3	17.67(4.26)	4.67(2.27)	7.00(2.73)	29.33(5.46)
	T4	13.67(3.76)	2.67(1.77)	3.67(2.03)	20.00(4.52)
M3	T1	1.00(1.17)	0.00(0.71)	0.00(0.71)	1.00(1.17)
	T2	27.33(5.27)	2.67(1.77)	11.33(3.44)	41.33(6.46)
	T3	20.67(4.60)	3.33(1.95)	8.00(2.91)	32.00(5.70)
	T4	16.00(4.06)	1.33(1.34)	6.67(2.67)	24.00(4.94)
Mean of Factor-1					
1		11.25(3.13)	2.50(1.62)	3.42(1.82)	17.17(3.81)
2		14.00(3.51)	3.33(1.82)	5.50(2.23)	22.83(4.38)
3		16.25(3.77)	1.83(1.44)	6.50(2.43)	24.58(4.57)
CD(0.05)		0.06	0.09	0.14	0.06
Mean of Factor-2					
1		0.89(1.15)	0.00(0.71)	0.00(0.71)	0.89(1.15)
2		24.78(5.02)	4.44(2.20)	9.89(3.20)	39.11(6.28)
3		17.67(4.25)	3.89(2.09)	6.33(2.59)	27.89(5.31)
4		12.00(3.47)	1.89(1.53)	4.33(2.15)	18.22(4.26)
CD(0.05)		0.31	0.15	0.23	0.34
Interaction					
M and T		NS	NS	NS	NS
T and M		NS	NS	NS	NS
Experimental Mean		3.47	1.63	2.16	4.25

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Varanasi							
		Weed population no/m² at Active vegetative stage				Weed population no/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	T1	5.00(2.33)	7.33(2.77)	2.67(1.77)	15.00(3.92)	2.67(1.77)	4.33(2.19)	3.67(2.02)	10.67(3.34)
	T2	21.00(4.63)	43.33(6.62)	17.33(4.22)	81.67(9.06)	18.00(4.29)	38.00(6.20)	19.33(4.45)	75.33(8.71)
	T3	14.33(3.84)	26.33(5.17)	5.67(2.45)	46.33(6.84)	11.33(3.42)	21.33(4.65)	6.00(2.51)	38.67(6.22)
	T4	12.00(3.52)	21.33(4.65)	4.33(2.18)	37.67(6.17)	9.33(3.12)	15.33(3.97)	3.33(1.93)	28.00(5.33)
M2	T1	8.67(3.01)	9.00(3.06)	6.00(2.53)	23.67(4.91)	8.33(2.94)	6.33(2.61)	3.00(1.84)	17.67(4.26)
	T2	24.33(4.98)	58.33(7.67)	22.00(4.73)	104.67(10.25)	22.33(4.77)	61.33(7.86)	25.33(5.08)	109.00(10.46)
	T3	16.00(4.05)	21.67(4.70)	13.00(3.64)	50.67(7.15)	13.33(3.70)	18.00(4.29)	4.33(2.15)	35.67(6.00)
	T4	15.67(4.01)	16.67(4.11)	7.00(2.71)	39.33(6.31)	9.33(3.12)	15.33(3.97)	2.67(1.77)	27.33(5.27)
M3	T1	12.33(3.57)	12.33(3.57)	6.67(2.62)	31.33(5.64)	10.00(3.22)	10.00(3.22)	6.33(2.60)	26.33(5.16)
	T2	29.00(5.43)	69.33(8.36)	25.33(5.07)	123.67(11.14)	30.33(5.55)	64.00(8.03)	26.67(5.20)	121.00(11.02)
	T3	20.00(4.52)	22.33(4.77)	14.00(3.78)	56.33(7.53)	15.67(4.01)	19.00(4.41)	11.67(3.45)	46.33(6.82)
	T4	17.00(4.18)	18.67(4.35)	10.00(3.22)	45.67(6.79)	8.67(3.03)	14.00(3.80)	8.33(2.97)	31.00(5.61)
Mean of Factor-1									
1		13.08(3.58)	24.58(4.80)	7.50(2.66)	45.17(6.50)	10.33(3.15)	19.75(4.25)	8.08(2.73)	38.17(5.90)
2		16.17(4.01)	26.42(4.88)	12.00(3.40)	54.58(7.16)	13.33(3.63)	25.25(4.68)	8.83(2.71)	47.42(6.50)
3		19.58(4.42)	30.67(5.26)	14.00(3.67)	64.25(7.78)	16.17(3.95)	26.75(4.87)	13.25(3.56)	56.17(7.15)
CD(0.05)		0.08	0.14	0.14	0.08	0.24	0.16	0.15	0.25
Mean of Factor-2									
1		8.67(2.97)	9.56(3.14)	5.11(2.31)	23.33(4.82)	7.00(2.65)	6.89(2.67)	4.33(2.15)	18.22(4.25)
2		24.78(5.01)	57.00(7.55)	21.56(4.67)	103.33(10.15)	23.56(4.87)	54.44(7.36)	23.78(4.91)	101.78(10.06)
3		16.78(4.14)	23.44(4.88)	10.89(3.29)	51.11(7.17)	13.44(3.71)	19.44(4.45)	7.33(2.70)	40.22(6.35)
4		14.89(3.90)	18.89(4.37)	7.11(2.70)	40.89(6.42)	9.11(3.09)	14.89(3.91)	4.78(2.22)	28.78(5.40)
CD(0.05)		0.37	0.47	0.51	0.31	0.38	0.34	0.44	0.47
Interaction									
M and T		NS	NS	NS	0.54	NS	0.59	NS	0.81
T and M		NS	NS	NS	0.47	NS	0.52	NS	0.72
Experimental Mean		4.01	4.98	3.24	7.14	3.58	4.6	3	6.52

*(Values in parentheses are transformed values)

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.) Summary on weed dry biomass g/m² of long term trial on weed dynamics in mono or double -cropped rice system under different establishment methods, kharif 2021

Main plot	Sub plot Treatments	Aduthurai				Chinsurah											
		Weed biomass g/m² at Active vegetative stage				Weed biomass g/m² at Active vegetative stage				Weed biomass g/m² at Panicle initiation stage				Weed biomass g/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass
M1	T1					0.00	0.00	0.00	0.00	0.11	0.14	0.17	0.41	0.20	0.19	0.46	0.85
	T2	1.64	1.31	1.57	4.51	0.51	6.93	0.57	8.01	1.72	7.07	2.42	11.21	2.90	11.99	4.13	19.02
	T3	1.22	1.32	1.2	3.75	0.69	3.24	0.52	4.45	0.08	1.82	0.53	2.44	0.85	2.52	1.16	4.52
	T4	1.22	1.17	1.19	3.58	0.15	0.68	0.42	1.25	0.18	2.05	0.30	2.53	0.52	3.54	0.87	4.94
M2	T1					0.00	0.00	0.00	0.00	0.34	4.52	0.35	5.20	0.48	1.22	0.28	1.98
	T2	1.7	1.57	1.66	4.92	1.02	5.91	1.21	8.14	3.72	10.81	2.14	16.67	4.13	9.81	5.80	19.74
	T3	1.42	1.42	1.22	4.06	0.78	3.96	0.55	5.29	0.73	5.14	0.53	6.39	0.70	4.60	1.98	7.28
	T4	1.42	1.34	1.14	3.9	0.32	2.70	0.18	3.21	0.71	4.81	0.88	6.40	0.88	5.27	3.63	9.78
M3	T1																
	T2	1.86	1.76	1.95	5.58												
	T3	1.78	1.74	1.54	5.05												
	T4	1.6	1.46	1.33	4.39												
Mean of Factor-1																	
1		1.36	1.27	1.32	3.95	0.34	2.71	0.38	3.43	0.52	2.77	0.85	4.15	1.12	4.56	1.66	7.33
2		1.51	1.44	1.34	4.29	0.53	3.15	0.48	4.16	1.38	6.32	0.97	8.67	1.55	5.23	2.92	9.70
3		1.75	1.65	1.61	5.01												
CD(0.05)		0.09	0.09	0.07	0.1	NS	NS	NS	NS	0.34	3.30	NS	3.34	NS	NS	0.64	NS
Mean of Factor-2																	
1						0.00	0.00	0.00	0.00	0.22	2.33	0.26	2.81	0.34	0.71	0.37	1.42
2		1.73	1.55	1.73	5	0.76	6.42	0.89	8.08	2.72	8.94	2.28	13.94	3.51	10.90	4.96	19.38
3		1.48	1.49	1.32	4.29	0.74	3.60	0.53	4.87	0.41	3.48	0.53	4.42	0.78	3.56	1.57	5.90
4		1.41	1.33	1.22	3.96	0.23	1.69	0.30	2.23	0.45	3.43	0.59	4.47	0.70	4.41	2.25	7.36
CD(0.05)		0.14	0.1	0.15	0.26	0.24	1.97	0.35	2.16	0.31	1.73	0.46	1.38	0.73	1.56	1.21	2.16
Interaction																	
M and T		NS	NS	NS	NS	NS	NS	NS	NS	0.43	NS	NS	NS	NS	NS	NS	NS
T and M		NS	NS	NS	NS	NS	NS	NS	NS	0.46	NS	NS	NS	NS	NS	NS	NS
Experimental Mean		1.54	1.46	1.42	4.42	0.43	2.93	0.43	3.79	0.95	4.55	0.91	6.41	1.33	4.89	2.29	8.51

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Chiplima			Gangavathi											
		Weed biomass g/m²			Weed biomass g/m² at Active vegetative stage				Weed biomass g/m² at Panicle initiation stage				Weed biomass g/m² at Heading stage			
		Active vegetative stage	Panicle initiation stage	Heading stage	Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass
M1	T1	0.00	0.00	0.00	5.56	32.06	12.32	49.95	46.61	56.25	32.06	134.92	18.72	47.07	6.67	72.46
	T2	16.39	35.60	94.87	13.71	6.67	5.28	25.67	19.37	34.19	0.93	54.49	6.02	10.19	0.93	17.14
	T3	8.13	17.06	42.02	9.54	3.06	10.38	22.98	36.88	22.61	15.94	75.43	29.93	26.50	5.75	62.18
	T4	5.00	11.43	24.03	13.62	8.34	16.59	38.55	21.41	17.05	13.25	51.71	5.56	10.01	2.41	17.98
M2	T1	0.00	0.00	0.00	49.39	78.62	2.50	130.52	74.97	24.56	10.56	110.09	51.34	32.16	13.81	97.30
	T2	30.48	98.85	162.14	27.52	24.28	2.69	54.49	26.32	31.23	3.24	60.79	3.24	28.63	3.06	34.94
	T3	20.42	50.08	77.40	69.6	22.52	1.58	93.69	52.64	17.79	4.82	75.25	52.26	8.06	5.56	65.89
	T4	7.73	24.05	43.72	93.96	107.79	1.39	203.14	4.26	35.21	4.45	43.92	0.00	38.09	3.06	41.15
M3	T1	0.00	0.00	0.00	163.83	10.10	48.56	222.49	42.63	3.52	55.51	101.66	20.02	13.81	71.45	105.27
	T2	40.38	107.50	181.68	21.13	33.08	18.07	72.28	54.12	5.65	15.85	75.61	61.99	5.75	18.72	86.46
	T3	27.24	54.34	92.64	15.2	93.92	16.03	125.15	20.11	8.25	43.46	71.82	20.02	13.53	12.14	45.69
	T4	12.37	27.80	48.33	173.19	25.85	40.22	239.26	39.66	11.95	23.72	75.34	25.59	8.62	22.24	56.45
Mean of Factor-1																
1		7.38	16.02	40.23	10.61	12.53	11.14	34.29	31.07	32.53	15.54	79.14	15.06	23.44	3.94	42.44
2		14.66	43.24	70.82	60.12	58.30	2.04	120.46	39.55	27.20	5.77	72.51	26.71	26.74	6.37	59.82
3		20.00	47.41	80.66	93.34	40.74	30.72	164.80	39.13	7.34	34.63	81.11	31.90	10.43	31.14	73.46
CD(0.05)		1.79	3.19	9.28	35.39	17.07	12.53	60.86	NS	8.79	10.57	NS	NS	4.90	1.96	NS
Mean of Factor-2																
1		0.00	0.00	0.00	72.93	40.26	21.13	134.32	54.73	28.11	32.71	115.56	30.02	31.01	30.64	91.68
2		29.08	80.65	146.23	20.79	21.34	8.68	50.81	33.27	23.69	6.67	63.63	23.75	14.86	7.57	46.18
3		18.60	40.49	70.68	31.45	39.83	9.33	80.61	36.54	16.22	21.41	74.16	34.07	16.03	7.81	57.92
4		8.37	21.09	38.70	93.59	47.33	19.40	160.32	21.78	21.41	13.81	56.99	10.38	18.91	9.24	38.53
CD(0.05)		3.10	4.41	10.19	38.2	13.87	NS	35.56	NS	NS	15.09	24.95	NS	6.42	9.97	27.02
Interaction																
M and T		5.37	7.64	17.65	66.16	24.02	NS	NS	NS	15.77	NS	NS	NS	11.12	17.27	NS
T and M		4.75	6.87	16.24	61.01	23.33	NS	NS	NS	14.63	NS	NS	NS	10.04	14.99	NS
Experimental Mean		14.01	35.56	63.90	54.69	37.19	14.63	106.51	36.58	22.36	18.65	77.58	24.56	20.20	13.82	58.57

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Ghaghraghat		Malan											
		Weed Biomass g/m²		Weed biomass g/m² at Active vegetative stage				Weed biomass g/m² at Panicle initiation stage				Weed biomass g/m² at Heading stage			
		Active vegetative stage	Panicle initiation stage	Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass
M1	T1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	T2	2.21	2.21	34.07	13.90	15.90	63.87	27.93	11.97	14.10	54.00	29.10	13.67	14.07	56.83
	T3	1.97	2.17	12.77	5.60	12.90	31.27	21.53	8.07	12.57	42.17	21.57	3.43	11.63	36.63
	T4	2.20	2.45	1.77	1.47	2.77	6.00	3.87	3.70	3.17	10.73	3.47	2.43	4.37	10.27
M2	T1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	T2	3.12	3.21	36.27	31.37	47.50	115.13	43.90	27.37	27.07	98.33	42.93	22.10	28.17	93.20
	T3	2.32	2.63	22.33	17.10	22.03	61.47	21.70	2.53	17.00	41.23	22.47	20.00	12.27	54.73
	T4	2.12	2.27	2.10	3.60	4.40	10.10	2.90	0.00	3.93	6.83	6.67	2.73	2.60	12.00
M3	T1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	T2	3.55	3.61	45.43	64.63	56.47	166.53	43.03	44.97	52.07	140.07	52.90	43.07	55.03	151.00
	T3	2.62	2.45	27.40	28.80	24.83	81.03	27.10	24.87	23.83	75.80	36.47	28.90	29.80	95.17
	T4	2.43	2.17	4.33	3.40	9.40	17.13	4.53	3.10	3.97	11.60	4.40	2.23	3.10	9.73
Mean of Factor-1															
1		1.60	1.71	12.15	5.24	7.89	25.28	13.33	5.93	7.46	26.73	13.53	4.88	7.52	25.93
2		1.89	2.03	15.18	13.02	18.48	46.67	17.13	7.48	12.00	36.60	18.02	11.21	10.76	39.98
3		2.15	2.06	19.29	24.21	22.67	66.17	18.67	18.23	19.97	56.87	23.44	18.55	21.98	63.97
CD(0.05)		0.08	0.07	0.80	1.64	0.55	1.59	1.38	0.56	1.35	2.03	0.76	0.73	0.58	0.40
Mean of Factor-2															
1		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2		2.96	3.01	38.59	36.63	39.96	115.18	38.29	28.10	31.08	97.47	41.64	26.28	32.42	100.34
3		2.30	2.42	20.83	17.17	19.92	57.92	23.44	11.82	17.80	53.07	26.83	17.44	17.90	62.18
4		2.25	2.30	2.73	2.82	5.52	11.08	3.77	2.27	3.69	9.72	4.84	2.47	3.36	10.67
CD(0.05)		0.07	0.08	0.87	1.55	1.17	1.33	1.44	1.07	2.16	2.68	1.68	1.36	1.64	3.59
Interaction															
M and T		0.12	0.14	1.50	2.68	2.03	2.31	2.49	1.85	3.74	4.65	2.91	2.36	2.84	6.22
T and M		0.11	0.13	1.38	2.53	1.79	2.23	2.31	1.63	3.33	4.19	2.55	2.08	2.48	5.39
Experimental Mean		1.88	1.93	15.54	14.16	16.35	46.04	16.38	10.55	13.14	40.06	18.33	11.55	13.42	43.30

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Moncompu											
		Weed biomass g/m² at Active vegetative stage				Weed biomass g/m² at Panicle initiation stage				Weed biomass g/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass
M1	T1												
	T2	35.33	43.33	84.40	163.07	89.73	-	7.6	97.33	104.8	20	3.33	128.13
	T3	15.73	41.07	26.27	83.07	36.4	-	5.2	41.6	62.67	58.53	0.00	121.20
	T4	9.07	0.00	0.00	9.07	103.73	-	0	103.73	67.87	0	0.00	67.87
M2	T1												
	T2	14.93	94.93	27.73	137.60	56.27	-	5.73	62	184.27	56	0.00	240.27
	T3	17.47	63.73	44.40	125.60	51.2	-	13.87	65.07	185.33	55.47	0.00	240.80
	T4	18.67	13.33	0.00	32.00	53.87	-	1.07	54.93	80.53	10.53	0.00	91.07
M3	T1												
	T2	91.47	56.00	52.00	199.47	89.2	-	8.93	98.13	145.07	27.33	0.00	172.40
	T3	29.33	22.67	68.00	120.00	159.47	-	10	169.47	143.73	25.07	0.00	168.80
	T4	28.00	61.33	5.33	94.67	26.8	-	2.4	29.2	43.87	37	0.00	80.87
Mean of Factor-1													
1		20.04	28.13	36.89	85.07	76.62	-	4.27	80.89	78.44	26.18	1.11	105.73
2		17.02	57.33	24.04	98.40	53.78	-	6.89	60.67	150.04	40.67	0.00	190.71
3		49.60	46.67	41.78	138.04	91.82	-	7.11	98.93	110.89	29.8	0.00	140.69
CD(0.05)		NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS
Mean of Factor-2													
1													
2		47.24	64.76	54.71	166.71	78.4	-	7.42	85.82	144.71	34.44	1.11	180.27
3		20.84	42.49	46.22	109.56	82.36	-	9.69	92.04	130.58	46.36	0.00	176.93
4		18.58	24.89	1.78	45.24	61.47	-	1.16	62.62	64.09	15.84	0.00	79.93
CD(0.05)		20.94	28.84	16.87	27.36	NS	-	NS	NS	42.89	NS	0.99	51.82
Interaction													
M and T		NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS
T and M		NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS
Experimental Mean		28.89	44.04	34.24	107.17	74.07	-	6.09	80.16	113.13	32.21	0.37	145.71

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Nagina								Pantnagar		
		Weed biomass g/m2 at Active vegetative stage				Weed biomass g/m^2 at Panicle initiation stage				Weed Biomass g/m^2		
		Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass	Active vegetative stage	Panicle initiation stage	Heading stage
M1	T1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.87	4.92	5.38
	T2	2.64	2.37	2.27	7.28	2.62	2.93	2.66	8.21	61.03	64.00	70.13
	T3	1.88	3.18	2.34	7.40	1.92	2.19	1.72	5.83	4.07	5.01	6.41
	T4	1.10	1.45	1.40	3.96	1.66	1.49	1.55	4.69	3.80	4.87	5.83
M2	T1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.33	3.83	4.64
	T2	2.82	2.51	2.21	7.54	2.82	2.79	2.71	8.32	83.13	171.33	174.92
	T3	1.95	2.59	3.19	7.73	2.29	2.53	2.02	6.84	6.20	6.89	6.62
	T4	1.54	1.81	1.79	5.14	2.06	1.79	2.02	5.87	3.59	4.30	5.09
M3	T1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.77	3.19	4.11
	T2	2.84	2.81	3.34	9.00	2.86	2.67	2.45	7.98	90.43	91.33	91.17
	T3	1.95	1.99	2.09	6.03	2.33	2.07	2.27	6.67	4.09	4.64	5.00
	T4	2.12	1.25	1.92	5.28	1.39	2.10	2.16	5.64	1.95	2.89	3.38
Mean of Factor-1												
1		1.41	1.75	1.50	4.66	1.55	1.65	1.48	4.68	17.94	19.70	21.94
2		1.58	1.73	1.80	5.10	1.79	1.78	1.69	5.26	24.07	46.59	47.82
3		1.73	1.51	1.84	5.08	1.65	1.71	1.72	5.07	24.56	25.51	25.91
CD(0.05)		NS	NS	NS	NS	NS	NS	NS	NS	2.76	7.72	7.84
Mean of Factor-2												
1		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.66	3.98	4.71
2		2.77	2.56	2.61	7.94	2.77	2.80	2.61	8.17	78.20	108.89	112.07
3		1.93	2.59	2.54	7.05	2.18	2.26	2.00	6.44	4.79	5.51	6.01
4		1.59	1.50	1.70	4.79	1.70	1.79	1.91	5.40	3.12	4.02	4.76
CD(0.05)		0.33	0.35	0.38	0.58	0.29	0.29	0.33	0.70	5.47	9.25	8.74
Interaction												
M and T		NS	NS	0.67	1.00	NS	NS	NS	NS	9.48	16.01	15.14
T and M		NS	NS	0.60	0.89	NS	NS	NS	NS	8.35	14.58	13.90
Experimental Mean		1.57	1.66	1.71	4.95	1.66	1.71	1.63	5.00	22.19	30.60	31.89

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)

M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.)

Main plot	Sub plot Treatments	Puducherry											
		Weed biomass g/m² at Active vegetative stage				Weed biomass g/m² at Panicle initiation stage				Weed biomass g/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass
M1	T1												
	T2	36.22	26.59	24.04	86.85	31.08	19.47	21.09	71.64	23.32	13.94	15.79	53.05
	T3	22.52	16.19	16.12	54.83	15.2	10.74	11.74	37.68	10.74	6.36	7.45	24.55
	T4	27.99	21.67	18.77	68.44	20.03	14.4	14.35	48.78	14.55	9.7	10.13	34.38
M2	T1												
	T2	58.28	38.83	34.19	131.3	50.18	25.43	26.04	101.66	30.2	19.29	21.26	70.75
	T3	30.3	23.48	21.65	75.43	26.15	16.61	14.55	57.31	16.84	10	11.22	38.07
	T4	42.92	28.74	28.03	99.69	33.76	19.46	19.7	72.92	22.47	15.86	16.49	54.82
M3	T1												
	T2												
	T3												
	T4												
Mean of Factor-1													
1		28.91	21.48	19.64	70.04	22.1	14.87	15.73	52.7	16.2	10	11.13	37.33
2		43.83	30.35	27.96	102.14	36.7	20.5	20.1	77.29	23.17	15.05	16.32	54.55
3													
CD(0.05)		2.47	0.25	0.2	2.19	0.35	1.33	0.61	1.27	1.2	0.81	0.92	0.87
Mean of Factor-2													
1													
2		47.25	32.71	29.11	109.07	40.63	22.45	23.56	86.65	26.76	16.61	18.53	61.9
3		26.41	19.83	18.89	65.13	20.67	13.68	13.15	47.5	13.79	8.18	9.34	31.31
4		35.46	25.2	23.4	84.06	26.9	16.93	17.03	60.85	18.51	12.78	13.31	44.6
CD(0.05)		1.24	0.56	0.51	1.85	0.66	0.72	0.41	1.21	0.69	0.37	0.44	0.92
Interaction													
M and T		1.76	0.79	0.72	2.61	0.93	NS	0.59	1.71	NS	0.52	0.63	1.31
T and M		2.4	0.67	0.61	2.75	0.81	NS	0.68	1.72	NS	0.76	0.88	1.27
Experimental Mean		36.37	25.92	23.8	86.09	29.4	17.68	17.91	65	19.69	12.52	13.72	45.94

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: Contd

Main plot	Sub plot Treatments	Pusa											
		Weed biomass g/m² at Active vegetative stage				Weed biomass g/m² at Panicle initiation stage				Weed biomass g/m² at Heading stage			
		Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass
M1	T1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	T2	23.40	11.23	18.30	52.93	33.33	15.00	28.77	77.10	38.17	17.37	36.30	91.83
	T3	8.23	3.93	6.43	18.60	9.97	6.57	10.13	26.67	12.50	7.10	11.30	30.90
	T4	3.13	2.70	4.80	10.63	4.37	4.60	7.27	16.23	7.33	5.37	8.63	21.33
M2	T1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	T2	28.57	14.23	21.00	63.80	42.43	21.87	36.13	100.43	47.40	23.47	42.43	113.30
	T3	9.87	5.27	7.83	22.97	13.47	9.23	11.43	34.13	17.37	10.00	12.53	39.90
	T4	4.07	3.20	5.97	13.23	9.93	6.57	8.17	24.67	10.83	7.60	9.10	27.53
M3	T1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	T2	34.73	15.43	24.20	74.37	55.10	25.97	40.03	121.10	61.27	30.60	48.63	140.50
	T3	12.90	7.60	8.83	29.33	14.87	10.73	11.50	37.10	15.93	11.80	12.70	40.43
	T4	4.70	4.70	6.50	15.90	12.57	6.97	7.57	27.10	14.33	8.83	10.43	33.60
Mean of Factor-1													
1		8.69	4.47	7.38	20.54	11.92	6.54	11.54	30.00	14.50	7.46	14.06	36.02
2		10.62	5.67	8.70	25.00	16.46	9.42	13.93	39.81	18.90	10.27	16.02	45.18
3		13.08	6.93	9.88	29.90	20.63	10.92	14.77	46.33	22.88	12.81	17.94	53.63
CD(0.05)		0.98	0.20	0.30	1.12	2.66	0.97	0.81	3.68	2.97	1.24	1.34	4.44
Mean of Factor-2													
1		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2		28.90	13.63	21.17	63.70	43.62	20.94	34.98	99.54	48.94	23.81	42.46	115.21
3		10.33	5.60	7.70	23.63	12.77	8.84	11.02	32.63	15.27	9.63	12.18	37.08
4		3.97	3.53	5.76	13.26	8.96	6.04	7.67	22.67	10.83	7.27	9.39	27.49
CD(0.05)		2.39	1.04	1.82	1.79	3.82	1.69	2.21	5.39	3.92	1.80	1.77	4.92
Interaction													
M and T		NS	NS	NS	3.09	6.61	2.93	3.82	9.33	6.79	3.12	3.06	8.51
T and M		NS	NS	NS	2.75	5.92	2.59	3.34	8.34	6.13	2.79	2.76	7.83
Experimental Mean		10.80	5.69	8.66	25.15	16.34	8.96	13.42	38.71	18.76	10.18	16.01	44.94

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)

M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: Contd

Main plot	Sub plot Treatments	ARI-Rajendranagar								Titabar				Varanasi	
		Weed biomass g/m² at Active vegetative stage				Weed biomass g/m² at Panicle initiation stage				Weed biomass g/m² at Panicle initiation stage				Active vegetative stage	Heading stage
		Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass	Grasses	Sedges	BLW	Total weed biomass		
M1	T1	1.10	0.87	0.00	1.97	1.37	1.27	1.23	3.87	0.46	0.00	0.00	0.46	9.63	14.35
	T2	7.37	8.10	0.23	15.70	11.10	21.35	9.17	41.62	9.66	1.13	4.33	15.13	66.66	70.33
	T3	3.33	2.27	0.07	5.67	6.93	9.37	6.93	23.23	6.07	0.72	2.33	9.12	18.55	23.49
	T4	1.70	1.73	0.07	3.50	6.30	7.87	5.57	19.73	2.72	0.37	1.60	4.69	18.44	15.29
M2	T1	1.27	0.93	0.00	2.20	1.80	1.37	1.10	4.27	0.32	0.00	0.00	0.32	11.37	14.59
	T2	7.53	8.80	0.60	16.93	11.33	21.83	10.23	43.40	9.97	1.43	6.37	17.77	68.38	72.71
	T3	2.53	2.63	0.10	5.27	7.40	8.77	7.47	23.63	7.50	1.07	3.97	12.53	28.02	26
	T4	2.40	1.73	0.07	4.20	7.10	7.27	6.20	20.57	5.77	0.60	2.10	8.47	14.53	16.37
M3	T1									0.51	0.00	0.00	0.51	13.38	16.93
	T2									11.10	0.60	6.37	18.07	72.07	78.73
	T3									8.43	0.71	4.53	13.68	37.77	27.87
	T4									6.66	0.31	3.80	10.77	20.88	17.39
Mean of Factor-1															
1		3.38	3.24	0.09	6.71	6.43	9.96	5.73	22.11	4.73	0.56	2.07	7.35	28.32	30.86
2		3.43	3.52	0.19	7.15	6.91	9.81	6.25	22.97	5.89	0.78	3.11	9.77	30.57	32.42
3										6.68	0.40	3.68	10.76	36.02	35.23
CD(0.05)		NS	NS	NS	NS	NS	NS	NS	NS	0.31	0.03	0.27	0.30	2.53	1.04
Mean of Factor-2															
1		1.18	0.90	0.00	2.08	1.58	1.32	1.17	4.07	0.43	0.00	0.00	0.43	11.46	15.29
2		7.45	8.45	0.42	16.32	11.22	21.59	9.70	42.51	10.24	1.06	5.69	16.99	69.04	73.92
3		2.93	2.45	0.08	5.47	7.17	9.07	7.20	23.43	7.34	0.83	3.61	11.78	28.11	25.78
4		2.05	1.73	0.07	3.85	6.70	7.57	5.88	20.15	5.05	0.43	2.50	7.98	17.95	16.35
CD(0.05)		1.27	0.72	0.10	1.79	1.80	1.36	1.62	2.49	0.98	0.13	0.66	1.39	4.31	1.4
Interaction															
M and T		NS	NS	0.14	NS	NS	NS	NS	NS	NS	0.22	NS	NS	NS	NS
T and M		NS	NS	0.16	NS	NS	NS	NS	NS	NS	0.19	NS	NS	NS	NS
Experimental Mean		3.40	3.38	0.14	6.93	6.67	9.89	5.99	22.54	5.76	0.58	2.95	9.29	31.64	32.84

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

Trial 4.3.1: (Contd.) - Weed control efficiency and weed index of Long term trial on weed dynamics in mono or double -cropped rice system under different establishment methods.

Main plot	Sub plot Treatments	Weed control efficiency %		Weed Index
		PUSA	ARI-Rajendranagar	ARI-Rajendranagar
		At heading stage		
M1	T1	100	76.74	88.4
	T2	0	0.00	0.0
	T3	66	55.64	61.0
	T4	77	67.57	72.2
M2	T1	100	76.64	88.3
	T2	0	0.00	0.0
	T3	64	58.96	61.7
	T4	76	67.92	71.8
M3	T1	100		
	T2	0		
	T3	71		
	T4	76		

M1- Mechanised transplanting/Transplanting (if transplanters not available)
M2-Puddled direct seeding (preferably line sowing by drumseeder)
M3-Un-puddled dry direct seeding (line sowing)

T1-Weed free / critical period hand weeding twice
T2-Weedy check
T3-Mechanical weeding using weeder
T4-Chemical weed control (pre & post emergence herbicide application)

4.3.2. Evaluation of advanced cultures for weed competitiveness under aerobic system

Aerobic rice systems can substitute the conventional rice cultivation system in the wake of water shortage and energy crises. The rice is grown similar to Wheat in unp-uddled condition. The major constraint in the success of aerobic rice is high weed infestation. The review of several studies showed that 90 weed species were competing with rice under aerobic systems, causing 23–100% reductions in grain yield. Weed control in aerobic rice gets difficult because of shifts in weed flora and herbicide resistance development in weeds. Weed-competitive rice cultivars (with high yield ability) can be an important strategy for reducing hand weeding and herbicide inputs. Keeping in view the severity of weed infestation in this system, some of the cultures were evaluated for their weed competitiveness and identified cultures will be promoted for enhancing the productivity of the Aerobic rice. The trial was conducted in *Kharif* 2021 at six locations viz., **Ghaghraghat, Ludhiana, Mandya, Pusa, Rewa and Varanasi.** No information from eight locations viz., **Faizabad**, **Parbhani, Nagina, Ranchi, Ragolu, ICAR-NRRI, ICAR-IIRR. Jagdalpur** has not reported weed information. The trial included three main plot treatments viz., weed free condition, weedy check, chemical weed control of pre and post-emergence herbicide application and five subplot treatments comprising three elite cultures viz., IET 26168, IET 26194, IET 28675 specific to aerobic rice and two checks (national check DRR Dhan 46 and local check). The data on weed parameters, crop growth parameters at critical crop growth stages; yield attributes and the locations and the results recorded grain yield at the time of harvest after statistical analyses were presented in Table 4.3.2

The results of the data on grain yields presented in Table 4.3.2 showed that the mean grain yields ranged from 2.61 t/ha at **Mandya** to 4.33 t/ha at **Ludhiana**. The mean grain yield loss due to weeds ranged from **31.63%** at **Varanasi** to 90.10% at **Mandya**. At four out of six locations, the yield loss due to weeds was above 50%, which shows the severity of weed problem under aerobic system of cultivation. At four test locations, weed free treatment recorded significantly high grain yield and superior over chemical weed control. At two locations viz., **Ludhiana** and **Mandya**, chemical weed control was comparable to weed free condition. Among the elite cultures tested, there was no significant difference at **Rewa and Varanasi**. At all the locations, interactions were significant except **Rewa** and **Varanasi**.

At three locations viz., **Gaghraghat**, **Ludhiana** and **Mandya**, IET26168 was significantly superior over other test entries followed by IET26194. At **Mandya**, IET 26168 and IET 26194 were comparable and superior along with local check KMP175. At **Ludhiana**, IET 26168 was comparable to local check variety PR126. At **Pusa**, IET26194 was found to be statistically superior followed by local check Rajendra Nilam, IET 26168. The Crop growth parameters viz., no. of tillers and total dry matter production at maximum tillering stage by **Pusa** and **Rewa**; no of tillers and total dry matter production at panicle initiation stage by **Ghaghraghat, Ludhiana, Mandya, Pusa** and **Rewa**; yield attributes at harvest stage viz., no of panicles, panicle weight, test weight, straw yield etc were reported by all the test locations. All these parameters exhibited performance in support of the grain yield.

The species-wise weed flora was reported by Ludhiana, Mandya and Pusa. The dominant weed species are *Echinochloacolona, Echinochloacrusgalli, Cynodondactylon, Digetaria sanguinalis, Dinebraretroflexa, Eleusineindica, Leptochloachinensis among grasses; Cyperusiria, Cyperusdifformis, Cyperusprocerus, Cyperusrotundus, Fimbristylismiliaceae among sedges; and Ammaniabaccifera, Cyanotisaxillaris, Caesuliaaxillaris, Ecliptaalba, Ecliptaprostrata, Ludwigiaparviflora, Sphenocleazeylanica, Spilanthusacmella* among broad leaf weeds. Group wise and crop growth stage wise weed population was reported by Varanasi and total weed population at two crop growth stages was reported by **Gaghraghat**. At **Ludhiana** panicle initiation stage was dominated by Sedges both in population and dry biomass. At **Pusa**, Grasses-BLW-Sedges was the order of dominance at all the stages of crop growth. At **Mandya**, BLW- Grasses-Sedges was the order of dominance and the total weed population was higher at the panicle initiation stage. At **Varanasi**, total weed population and group wise weed population were higher at Active vegetative stage than heading stage. Sedges>Grasses>BLW was the order of dominance in active vegetative stage and Grasses>Sedges>BLW was the order at Heading stage.

The data on weed population showed the superiority of chemical weed control over two hand weedings. Among the elite cultures evaluated, IET 26168 recorded significantly low group wise and total weed population at **Ghaghraghat, Ludhiana** and **Varanasi**; while IET26194 recorded significantly low group wise and total weed population at **Pusa**. At **Mandya**, both IET26168 and 26194 recorded lower weed population. At **Mandya** and **Pusa** local checks KMP175 and Rajendra Nilam recorded the lowest weed population. Weed control practices and Elite culture interaction effects were significant at **Ludhiana** (Sedge weeds at panicle initiation stage), **Mandya** (BLW and Total weed population at panicle initiation stage), **Pusa** (Gresses, BLW and total weed population at seedling stage), **Varanasi** (Grasses, BLW at active vegetative stage and Sedges, BLW and Total weed population at heading stage). At **Mandya** and **Varanasi**, IET 26168 has recorded significantly lower weed population under weedy condition, whereas IET 26194 has recorded significantly lower weed population at **Pusa**.

The data on total weed dry biomass was recorded by six locations viz., **Ghaghraghat, Ludhiana, Mandya, Pusa, Rewa** and **Varanasi** and group wise by four locations viz., **Ludhiana, Mandya, Pusa** and **Rewa**. At all the locations, chemical weed control recorded lowest weed dry biomass irrespective of the stage of observation. Among the elite cultures, there was no significant difference in weed dry biomass was reported by **Ghaghraghat**, **Ludhiana**, **Mandya** (panicle initiation stage). At **Mandya**, **Rewa**, and **Varanasi**, IET 26168 has recorded lowest weed dry biomass and superior over other test entries. At **Pusa,** IET 26194 recorded lowest weed biomass and comparable to Local check. IET 26168 has shown promising weed competitiveness and weed suppression resulted in low dry weed biomass both group-wise and total. The interaction effects were non-significant at Ludhiana, Mandya9panicle initiation stage) and **Rewa**. At **Gaghraghat**, **Mandya** and Varanasi IET 26168 under weedy check has shown lower weed biomass and

statistically superior over other test cultures. At **Pusa** IET26194 under weedy check has exhibited superiority.

The weed control efficiency was computed and reported by two locations viz., **Mandya** and **Pusa**; the test cultures IET 26168 and IET26194 recorded higher weed control efficiency and comparable with local checks.

The economics (cost of weed management, cost of cultivation, Benefit –Cost ratio were reported by four locations viz., **Ludhiana, Mandya, Pusa** and **Rewa**. The cost of weed management under chemical weed control ranged from Rs 1200 at **Ludhiana** to 7871 per hectare at **Mandya**. Cost of weed management under weed free condition varied from Rs. 5,400/- at **Rewa** to 12,600/- per hectare at Ludhiana. Benefit cost ratio was reported by **Ludhiana, Mandya, Pusa** and **Rewa**. The chemical weed control practice has recorded significantly higher B.C. ratio. Among the test cultures IET26168 and IET 26194 recorded higher B.C. ratio and were comparable with each other and with local check.

In summary, the trial was conducted at six locations viz., **Gaghraghat, Ludhiana, Mandya, Pusa, Rewa and Varanasi.** the mean grain yields ranged from 2.61 t/ha at **Mandya** to 4.33 t/ha at **Ludhiana**. The mean grain yield loss due to weeds ranged from **31.63%** at Varanasi to 90.10% at **Mandya**. At four out of six locations, the yield loss due to weeds was above 50%, which shows the severity of weed problem under aerobic system of cultivation.The dominant weed species are *Echinochloa colona, Echinochloa crusgalli, Cynodon dactylon, Digetaria sanguinalis, Dinebra retroflexa, Eleusine indica, Leptochloa chinensis among grasses; Cyperus iria, Cyperus difformis, Cyperus procerus, Cyperus rotundus, Fimbristylis miliaceae among sedges; and Ammania baccifera, Cyanotis axillaris, Caesulia axillaris, Eclipta alba, Eclipta prostrata, Ludwigia parviflora, Sphenoclea zeylanica, Spilanthus acmella* among broad leaf weeds. At all the locations, chemical weed control was proved as economic, timely and efficient option along with a good weed competitive cultivar. Among the elite cultures tested at all the locations, independent and interaction effects were significant except **Rewa** and **Varanasi**. Among the test genotypes, IET 26168 was significantly superior and recorded significantly low group wise and total weed population and weed dry biomass, which in turn contributed to better crop growth, yield attributes and grain yield. Followed by IET 26194. These two elite genotypes exhibited superior performance across six locations and useful in breeding program for developing weed competitive varieties.

Table 4.3.2: Summary on yield parameters and grain yield data in evaluation of elite genotypes for weed competitiveness under aerobic rice system, Kharif-2021

Main plot	Sub plot Treatments	Grain Yield t/ha					
		Ghaghraghat	Ludhiana	Mandya	Pusa	Rewa	Varanasi
M1	V1	5.73	5.89	4.62	4.46	4.57	4.41
	V2	5.53	5.21	4.67	5.15	4.50	3.86
	V3	4.87	4.97	2.06	3.72	4.60	4.1
	V4	4.71	5.41	2.60	3.35	4.73	4.2
	V5	4.70	5.74	4.27	4.80	4.73	3.02
M2	V1	2.01	1.74	0.20	1.96	3.53	2.93
	V2	1.81	1.62	0.19	2.79	3.43	2.69
	V3	1.94	2.02	0.12	1.51	3.37	2.76
	V4	2.08	3.21	0.59	1.56	3.40	2.76
	V5	2.22	1.67	0.68	2.44	3.30	2.26
M3	V1	5.32	5.86	4.87	3.93	4.00	3.97
	V2	5.07	5.27	4.71	4.89	4.00	3.8
	V3	4.60	5.09	2.27	2.83	3.97	3.94
	V4	4.50	5.50	2.90	2.70	4.00	4.06
	V5	4.37	5.82	4.38	4.68	3.90	2.67
Mean of Factor-1							
1		5.11	5.44	3.64	4.29	4.63	3.92
2		2.01	2.05	0.36	2.05	3.41	2.68
3		4.77	5.51	3.83	3.80	3.97	3.69
CD(0.05)		0.17	0.24	0.32	0.17	0.12	0.03
Mean of Factor-2							
1		4.35	4.50	3.23	3.45	4.03	3.77
2		4.14	4.03	3.19	4.28	3.98	3.45
3		3.80	4.03	1.48	2.69	3.98	3.6
4		3.76	4.71	2.03	2.53	4.04	3.67
5		3.76	4.41	3.11	3.97	3.98	2.65
CD(0.05)		0.18	0.40	0.29	0.24	NS	0.3
Interaction							
M and T		0.31	0.69	0.50	0.41	NS	NS
T and M		0.30	0.63	0.49	0.38	NS	NS
Experimental Mean		3.96	4.33	2.61	3.38	4.00	3.43
Grain yield loss %		60.66	62.31	90.10	52.21	26.34	31.63
Applied N:P:K:Zn Kg/ha				100:50:50:20	120:60:40:25	-	
Avail N:P:K (kg/ha)			265,22.4,233	301.5:92.40:214.20	12:01.1	-	185:32:198
Name of the variety		NDR 2065	PR 126	KMP 175	Rajendra Nilam	-	HUR,4-3
Soil type			sandyloam	Red sandy loam	sandy loam	-	Sandy loam
PH			7	7.69	8.2	-	7.2
EC (dsm-1)				0.83		-	
Organic carbon			0.42	0.86	0.42	-	

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Straw Yield t/ha				
		Ghaghraghat	Ludhiana	Mandya	Pusa	Rewa
M1	V1	8.87	8.06	7.96	4.87	7.83
	V2	9.47	7.3	8.91	5.81	7.57
	V3	8.03	7.13	3.73	3.80	8.07
	V4	8.07	7.22	7.76	3.35	8.23
	V5	7.03	7.67	8.19	5.67	7.87
M2	V1	5.23	3.57	0.82	2.20	7.77
	V2	5.33	3.72	0.77	3.05	7.93
	V3	4.83	4.11	0.30	1.65	8.00
	V4	4.23	5.48	1.06	1.72	8.10
	V5	6.07	3.66	2.27	2.72	7.66
M3	V1	8.47	7.86	8.26	4.23	7.70
	V2	8.83	7.54	9.59	5.24	7.80
	V3	7.77	7.24	5.96	3.14	8.27
	V4	7.67	7.49	7.95	3.00	7.20
	V5	6.63	7.99	8.22	5.07	7.63
Mean of Factor-1						
1		8.29	7.48	7.31	4.70	7.91
2		5.14	4.11	1.04	2.27	7.89
3		7.87	7.62	8.00	4.14	7.72
CD(0.05)		0.23	0.44	0.81	0.13	NS
Mean of Factor-2						
1		7.52	6.5	5.68	3.77	7.77
2		7.88	6.19	6.42	4.70	7.77
3		6.88	6.16	3.33	2.86	8.11
4		6.66	6.73	5.59	2.69	7.84
5		6.58	6.44	6.23	4.49	7.72
CD(0.05)		0.28	0.35	0.66	0.22	NS
Interaction						
M and T		0.49	0.6	1.14	0.38	NS
T and M		0.46	0.61	1.14	0.35	NS
Experimental Mean		7.10	6.4	5.45	3.70	7.84

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Panicle no/m²					
		Ghaghraghat	Ludhiana	Mandya	Pusa	Rewa	Varnasi
M1	V1	234	457	295	261	282	332
	V2	221	470	367	290	277	321
	V3	257	440	209	240	298	346
	V4	203	427	279	219	301	334
	V5	221	433	341	284	279	355
M2	V1	164	287	70	163	278	272
	V2	168	303	107	216	271	269
	V3	176	347	74	152	298	287
	V4	170	347	125	150	304	271
	V5	136	337	152	211	284	248
M3	V1	228	450	407	250	277	317
	V2	214	473	396	268	281	322
	V3	230	437	334	190	298	279
	V4	208	427	340	191	298	289
	V5	203	447	381	254	273	303
Mean of Factor-1							
1		227	445	298	259	287	338
2		163	324	106	178	287	269
3		217	447	372	231	285	302
CD(0.05)		10.09	33	35	9	NS	2
Mean of Factor-2							
1		209	398	257	225	279	307
2		201	416	290	258	276	304
3		221	408	206	194	298	304
4		194	400	248	186	301	298
5		187	406	291	250	279	302
CD(0.05)		7.79	NS	40	14	6	NS
Interaction		3.96	9				
M and T		13.49	NS	NS	NS	NS	14
T and M		13.65	NS	NS	NS	NS	13
Experimental Mean		202	405	258	223	287	303

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Panicle Weight(g/m²)					
		Ghaghraghat	Ludhiana	Mandya	Pusa	Rewa	Varnasi
M1	V1	2.34	2.77	3.15	3.33	3.70	2.17
	V2	2.63	2.87	3.00	4.09	3.90	1.70
	V3	2.97	3.19	2.06	3.23	3.80	2.40
	V4	3.22	3.51	3.36	3.25	3.83	2.12
	V5	3.18	3.49	3.72	3.65	3.70	1.32
M2	V1	1.91	2.37	1.67	3.18	3.60	2.35
	V2	1.78	2.36	1.82	3.81	3.60	2.01
	V3	1.94	2.84	1.30	3.02	3.77	1.81
	V4	1.91	3.09	1.94	3.02	3.63	2.29
	V5	2.10	2.76	2.46	3.41	3.87	1.48
M3	V1	2.11	2.74	3.32	3.29	3.60	2.33
	V2	2.29	2.86	3.06	4.02	3.70	1.75
	V3	2.83	3.26	3.18	3.14	3.77	2.27
	V4	3.11	3.53	4.01	3.02	3.70	2.36
	V5	3.12	3.52	4.73	3.58	3.90	1.29
Mean of Factor-1							
1		2.87	3.17	3.06	3.51	3.79	1.94
2		1.93	2.68	1.84	3.29	3.69	1.99
3		2.69	3.18	3.66	3.41	3.73	2.00
CD(0.05)		0.05	0.20	0.20	0.08	NS	NS
Mean of Factor-2							
1		2.12	2.63	2.71	3.27	3.63	2.28
2		2.23	2.70	2.63	3.97	3.73	1.82
3		2.58	3.10	2.18	3.13	3.78	2.16
4		2.75	3.38	3.10	3.10	3.72	2.26
5		2.80	3.26	3.64	3.55	3.82	1.36
CD(0.05)		0.09	0.17	0.37	0.16	NS	0.15
Interaction							
M and T		0.15	NS	NS	NS	NS	0.26
T and M		0.14	NS	NS	NS	NS	0.26
Experimental Mean		2.50	3.01	2.85	3.40	3.74	1.98

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Test Weight(g/m^2)				
		Ghaghraghat	Ludhiana	Mandya	Pusa	Rewa
M1	V1	24.43	22.37	24.93	23.30	28.97
	V2	25.60	22.77	29.22	23.87	29.13
	V3	24.33	23.03	25.24	23.43	31.00
	V4	25.37	21.07	28.36	25.23	31.50
	V5	26.30	21.03	22.37	22.30	29.23
M2	V1	23.53	22.33	24.2	23.07	26.12
	V2	24.53	21.20	29.31	23.33	26.44
	V3	23.40	22.93	24.5	22.90	28.90
	V4	22.90	21.27	27.47	24.67	29.23
	V5	25.03	20.33	21.8	22.00	27.50
M3	V1	24.23	22.37	25.16	23.23	25.43
	V2	25.27	22.60	26.51	24.30	27.53
	V3	24.13	22.97	25.94	23.63	28.50
	V4	24.73	21.47	27.89	24.73	29.00
	V5	25.53	20.90	22.58	22.13	27.60
Mean of Factor-1						
1		25.21	22.05	26.02	23.63	29.97
2		23.88	21.61	25.46	23.19	27.64
3		24.78	22.06	25.62	23.61	27.61
CD(0.05)		0.48	NS	NS	NS	NS
Mean of Factor-2						
1		24.06	22.36	24.76	23.20	26.84
2		25.13	22.19	28.35	23.83	27.70
3		23.95	22.98	25.22	23.32	29.47
4		24.33	21.27	27.91	24.88	29.91
5		25.62	20.75	22.25	22.14	28.11
CD(0.05)		0.44	0.49	1.33	0.20	NS
Interaction						
M and T		NS	NS	NS	0.35	NS
T and M		NS	NS	NS	0.36	NS
Experimental Mean		24.62	21.91	25.7	23.48	28.41

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	No of Tillers/m^2 at Maximum tillering stage		No of Tillers/m^2 at Panicle initiation stage				
		Pusa	Rewa	Ghaghraghat	Ludhiana	Mandya	Pusa	Rewa
	V1	324	275	242	466	298	285	275
	V2	353	282	231	490	377	318	282
M1	V3	286	299	263	453	215	267	299
	V4	273	298	210	440	287	236	298
	V5	333	274	227	447	348	291	274
	V1	248	278	166	299	74	200	278
	V2	288	291	177	323	112	251	291
M2	V3	222	298	187	360	77	187	298
	V4	211	330	184	360	131	185	296
	V5	267	274	156	353	155	224	274
	V1	308	282	234	460	425	278	282
	V2	327	277	221	483	411	289	277
M3	V3	280	298	238	449	343	221	298
	V4	261	301	217	425	351	220	301
	V5	322	279	211	454	393	268	279
Mean of Factor-1								
1		314	285	235	459	305	279	285
2		247	294	174	339	110	209	287
3		300	288	224	454	385	255	288
CD(0.05)		17	NS	12	32	32	6	NS
Mean of Factor-2								
1		293	278	214	408	266	254	278
2		323	283	210	432	300	286	283
3		263	298	229	420	211	225	298
4		248	310	204	408	256	214	298
5		307	276	198	418	299	261	276
CD(0.05)		8	14	8	35	41	15	8
Interaction								
M and T		NS	NS	14	NS	NS	NS	NS
T and M		NS	NS	15	NS	NS	NS	NS
Experimental Mean		287	289	211	417	267	248	287

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Total dry matter g /m² at M.T stage	Total dry matter g /m² at Panicle initiation stage		
		Pusa	Ludhiana	Mandya	Pusa
M1	V1	181.00	929.67	754.30	601.00
	V2	205.00	876.33	797.90	657.33
	V3	148.33	806.67	347.64	562.67
	V4	160.67	908.67	614.65	548.00
	V5	203.33	885.00	751.05	620.67
M2	V1	124.00	365.00	60.59	517.33
	V2	151.00	369.33	64.82	573.67
	V3	117.33	442.33	28.87	506.00
	V4	112.33	534.00	105.38	487.00
	V5	149.67	371.67	179.68	559.00
M3	V1	168.00	944.00	787.42	570.67
	V2	181.33	882.67	855.95	600.67
	V3	143.33	826.00	492.44	521.33
	V4	153.00	926.67	656.68	515.00
	V5	181.00	914.00	766.00	570.67
Mean of Factor-1					
1		179.67	881.27	653.11	597.93
2		130.87	416.47	87.87	528.60
3		165.33	898.67	711.70	555.67
CD(0.05)		9.62	42.29	47.32	21.93
Mean of Factor-2					
1		157.67	746.22	534.11	563.00
2		179.11	709.44	572.89	610.56
3		136.33	691.67	289.65	530.00
4		142.00	789.78	458.90	516.67
5		178.00	723.56	565.58	583.44
CD(0.05)		12.39	49.39	44.21	23.86
Interaction					
M and T		NS	NS	76.57	NS
T and M		NS	NS	74.45	NS
Experimental Mean		158.62	732.13	484.23	560.73

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.) – Summary on weed population no/m^2 of evaluation of elite genotypes for weed competitiveness under aerobic rice system, Kharif-2021.

Main plot	Sub plot Treatments	Ghaghraghat		Ludhiana		
		Weed population (no/m^2)		Weed population at Panicle initiation stage(no/m^2)		
		Maximum tillering stage	Panicle initiation stage	Grasses	Sedges	Total weed population
M1	V1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V2	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V3	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V4	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V5	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
M2	V1	21.67(4.71)	21.67(4.70)	33.33(5.79)	25.33(5.07)	58.67(7.69)
	V2	21.67(4.70)	22.00(4.74)	33.67(5.84)	36.00(6.03)	69.67(8.38)
	V3	17.67(4.26)	18.00(4.30)	33.67(5.79)	35.00(5.95)	68.67(8.29)
	V4	21.00(4.63)	22.00(4.74)	33.00(5.77)	36.33(6.05)	69.33(8.34)
M3	V1	13.33(3.72)	15.33(3.98)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V2	14.67(3.89)	18.67(4.38)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V3	13.67(3.76)	15.67(4.01)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V4	12.67(3.63)	16.67(4.14)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V5	15.00(3.93)	15.67(4.02)	0.00(0.71)	0.00(0.71)	0.00(0.71)
Mean of Factor-1						
1		0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
2		21.07(4.64)	21.47(4.68)	32.13(5.69)	33.93(5.85)	66.07(8.14)
3		13.87(3.79)	16.40(4.11)	0.00(0.71)	0.00(0.71)	0.00(0.71)
CD(0.05)		0.12	0.07	0.12	0.2	0.14
Mean of Factor-2						
1		11.67(3.04)	12.33(3.13)	11.11(2.40)	8.44(2.16)	19.56(3.03)
2		12.11(3.10)	13.56(3.27)	11.22(2.42)	12.00(2.48)	23.22(3.26)
3		10.44(2.91)	11.22(3.01)	11.22(2.40)	11.67(2.46)	22.89(3.23)
4		11.22(2.99)	12.89(3.20)	11.00(2.39)	12.11(2.49)	23.11(3.25)
5		12.78(3.17)	13.11(3.21)	9.00(2.22)	12.33(2.51)	21.33(3.15)
CD(0.05)		0.15	0.17	NS	0.21	NS
Interaction						
M and T		NS	NS	NS	0.37	NS
T and M		NS	NS	NS	0.35	NS
Experimental Mean		3.04	3.16	2.37	2.42	3.19

*(values in parentheses are transformed values)

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Mandya							
		Weed population at Maximum tillering stage(no/m^2)				Weed population at Panicle initiation stage(no/m^2)			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	V1	2.33(1.66)	4.00(2.00)	1.33(1.18)	7.67(2.81)	2.00(1.56)	2.00(1.47)	2.33(1.57)	6.33(2.59)
	V2	2.33(1.68)	3.33(1.90)	2.00(1.32)	7.67(2.77)	1.00(1.17)	2.33(1.49)	2.33(1.54)	5.67(2.36)
	V3	5.00(2.34)	8.00(2.88)	2.67(1.65)	15.67(3.97)	4.00(2.11)	2.67(1.64)	2.33(1.57)	9.00(3.04)
	V4	5.00(2.28)	3.67(1.91)	2.67(1.61)	11.33(3.27)	1.33(1.27)	2.33(1.64)	1.67(1.35)	5.33(2.29)
	V5	3.33(1.94)	2.67(1.74)	9.33(2.67)	15.33(3.84)	0.33(0.88)	2.00(1.56)	4.67(2.27)	7.00(2.73)
M2	V1	25.33(5.08)	10.67(3.33)	58.00(7.65)	94.00(9.72)	36.33(6.07)	18.33(4.33)	59.00(7.69)	113.67(10.67)
	V2	27.67(5.29)	16.33(4.10)	73.33(8.52)	117.33(10.82)	41.67(6.48)	25.67(5.11)	81.67(8.99)	149.00(12.19)
	V3	53.00(7.20)	15.33(3.85)	83.67(9.15)	152.00(12.27)	65.00(8.00)	33.67(5.74)	93.33(9.68)	192.00(13.82)
	V4	37.00(6.11)	11.33(3.42)	76.67(8.75)	125.00(11.19)	44.00(6.66)	25.67(5.09)	99.33(9.98)	169.00(13.00)
M3	V1	0.00(0.71)	0.33(0.88)	1.67(1.25)	2.00(1.43)	0.33(0.88)	2.67(1.74)	4.33(2.19)	7.33(2.78)
	V2	0.00(0.71)	0.00(0.71)	1.00(1.17)	1.00(1.17)	0.67(1.00)	3.00(1.81)	3.00(1.79)	6.67(2.62)
	V3	1.00(1.10)	1.00(1.17)	8.00(2.89)	10.00(3.21)	2.67(1.56)	4.33(2.20)	6.33(2.60)	13.33(3.70)
	V4	0.67(1.00)	0.67(1.00)	1.00(1.10)	2.33(1.57)	1.33(1.29)	2.33(1.54)	5.33(2.39)	9.00(3.07)
	V5	0.00(0.71)	0.00(0.71)	0.67(1.05)	0.67(1.05)	0.67(1.00)	3.33(1.90)	3.33(1.90)	7.33(2.76)
Mean of Factor-1									
1		3.60(1.98)	4.33(2.09)	3.60(1.69)	11.53(3.34)	1.73(1.40)	2.27(1.56)	2.67(1.66)	6.67(2.60)
2		34.07(5.79)	13.40(3.67)	70.27(8.36)	117.73(10.81)	46.00(6.76)	25.47(5.04)	81.20(8.98)	152.67(12.31)
3		0.33(0.84)	0.40(0.89)	2.47(1.49)	3.20(1.68)	1.13(1.14)	3.13(1.84)	4.47(2.17)	8.73(2.99)
CD(0.05)		0.27	0.59	0.81	0.69	0.44	0.4	0.41	0.53
Mean of Factor-2									
1		9.22(2.48)	5.00(2.07)	20.33(3.36)	34.56(4.65)	12.89(2.83)	7.67(2.51)	21.89(3.81)	42.44(5.35)
2		10.00(2.56)	6.56(2.23)	25.44(3.67)	42.00(4.92)	14.44(2.88)	10.33(2.81)	29.00(4.11)	53.78(5.73)
3		19.67(3.54)	8.11(2.63)	31.44(4.57)	59.22(6.48)	23.89(3.89)	13.56(3.19)	34.00(4.62)	71.44(6.85)
4		14.22(3.13)	5.22(2.11)	26.78(3.82)	46.22(5.34)	15.56(3.07)	10.11(2.76)	35.44(4.57)	61.11(6.12)
5		10.22(2.64)	5.33(2.04)	23.22(3.83)	38.78(4.98)	14.67(2.82)	9.78(2.80)	26.89(4.24)	51.33(5.78)
CD(0.05)		0.54	NS	0.76	0.71	0.63	NS	0.52	0.55
Interaction									
M and T		NS	NS	NS	NS	NS	NS	0.9	0.95
T and M		NS	NS	NS	NS	NS	NS	0.84	0.91
Experimental Mean		2.87	2.22	3.85	5.28	3.1	2.81	4.27	5.97

*(values in parentheses are transformed values)

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Pusa			
		Weed population at 15 - 20 DAS (no/m^2)			
		Grasses	Sedges	BLW	Total weed population
M1	V1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V2	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V3	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V4	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V5	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
M2	V1	110.67(10.54)	38.00(6.20)	71.33(8.46)	220.00(14.85)
	V2	94.67(9.75)	42.67(6.55)	44.33(6.69)	181.67(13.50)
	V3	105.00(10.27)	35.00(5.96)	64.67(8.07)	204.67(14.32)
	V4	108.00(10.42)	43.00(6.56)	52.33(7.27)	203.33(14.27)
M3	V1	10.00(3.21)	5.00(2.34)	7.67(2.84)	22.67(4.79)
	V2	12.33(3.57)	4.67(2.22)	5.33(2.39)	22.33(4.77)
	V3	16.33(4.08)	5.00(2.32)	9.67(3.17)	31.00(5.58)
	V4	17.00(4.18)	6.00(2.53)	6.33(2.58)	29.33(5.45)
	V5	7.00(2.73)	2.00(1.58)	6.67(2.62)	15.67(4.01)
Mean of Factor-1					
1		0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
2		100.53(10.04)	40.47(6.38)	56.80(7.53)	197.80(14.07)
3		12.53(3.55)	4.53(2.20)	7.13(2.72)	24.20(4.92)
CD(0.05)		0.19	0.26	0.29	0.33
Mean of Factor-2					
1		40.22(4.82)	14.33(3.08)	26.33(4.00)	80.89(6.78)
2		35.67(4.68)	15.78(3.16)	16.56(3.26)	68.00(6.32)
3		40.44(5.02)	13.33(2.99)	24.78(3.98)	78.56(6.87)
4		41.67(5.10)	16.33(3.27)	19.56(3.52)	77.56(6.81)
5		30.44(4.22)	15.22(2.97)	19.33(3.50)	65.00(6.04)
CD(0.05)		0.25	NS	0.31	0.31
Interaction					
M and T		0.43	NS	0.53	0.53
T and M		0.4	NS	0.51	0.52
Experimental Mean		4.77	3.09	3.65	6.56

***(values in parentheses are transformed values)**

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Pusa			
		Weed population at Maximum tillering stage(no/m^2)			
		Grasses	Sedges	BLW	Total weed population
M1	V1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V2	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V3	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V4	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V5	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
M2	V1	170.67(13.06)	82.67(9.11)	106.33(10.29)	359.67(18.94)
	V2	141.00(11.87)	52.67(7.28)	92.67(9.63)	286.33(16.91)
	V3	170.00(13.06)	48.33(6.98)	100.33(10.01)	318.67(17.86)
	V4	147.00(12.11)	52.33(7.24)	86.33(9.31)	285.67(16.89)
M3	V1	18.67(4.31)	10.33(3.29)	17.67(4.25)	46.67(6.84)
	V2	10.67(3.34)	11.67(3.47)	12.67(3.57)	35.00(5.95)
	V3	23.33(4.79)	10.33(3.27)	11.33(3.44)	45.00(6.70)
	V4	18.00(4.23)	10.33(3.29)	7.67(2.82)	36.00(6.03)
	V5	16.00(4.02)	4.33(2.20)	9.67(3.15)	30.00(5.52)
Mean of Factor-1					
1		0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
2		154.13(12.40)	58.13(7.59)	91.47(9.55)	303.73(17.40)
3		17.33(4.14)	9.40(3.10)	11.80(3.45)	38.53(6.21)
CD(0.05)		0.33	0.18	0.23	0.24
Mean of Factor-2					
1		63.11(6.03)	31.00(4.37)	41.33(5.08)	135.44(8.83)
2		50.56(5.31)	21.44(3.82)	35.11(4.64)	107.11(7.86)
3		64.44(6.19)	19.56(3.65)	37.22(4.72)	121.22(8.42)
4		55.00(5.68)	20.89(3.74)	31.33(4.28)	107.22(7.87)
5		52.67(5.55)	19.67(3.41)	27.11(4.12)	99.44(7.54)
CD(0.05)		NS	0.55	0.56	0.75
Interaction					
M and T		NS	NS	NS	NS
T and M		NS	NS	NS	NS
Experimental Mean		5.75	3.8	4.57	8.1

***(values in parentheses are transformed values)**

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Pusa			
		Weed population at Panicle initiation stage(no/m^2)			
		Grasses	Sedges	BLW	Total weed population
M1	V1	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V2	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V3	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V4	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
	V5	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
M2	V1	201.67(14.21)	86.00(9.30)	116.33(10.80)	404.00(20.10)
	V2	170.00(13.06)	63.67(8.00)	124.67(11.17)	358.33(18.93)
	V3	176.33(13.29)	50.67(7.14)	140.00(11.84)	367.00(19.17)
	V4	166.67(12.91)	52.00(7.21)	139.33(11.82)	358.00(18.92)
M3	V1	24.00(4.95)	12.67(3.62)	18.00(4.28)	54.67(7.42)
	V2	15.67(4.01)	10.67(3.32)	15.00(3.93)	41.33(6.46)
	V3	23.00(4.81)	6.67(2.68)	20.00(4.52)	49.67(7.07)
	V4	17.33(4.17)	9.00(3.07)	17.33(4.22)	43.67(6.64)
	V5	15.67(3.99)	9.33(3.12)	11.00(3.37)	36.00(6.03)
Mean of Factor-1					
1		0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)
2		173.67(13.18)	62.60(7.87)	129.47(11.38)	365.73(19.12)
3		19.13(4.39)	9.67(3.16)	16.27(4.06)	45.07(6.72)
CD(0.05)		0.17	0.07	0.62	0.41
Mean of Factor-2					
1		75.22(6.62)	32.89(4.54)	44.78(5.26)	152.89(9.41)
2		61.89(5.92)	24.78(4.01)	46.56(5.27)	133.22(8.70)
3		66.44(6.27)	19.11(3.51)	53.33(5.69)	138.89(8.98)
4		61.33(5.93)	20.33(3.66)	52.22(5.58)	133.89(8.76)
5		56.44(5.70)	23.33(3.85)	46.00(5.11)	125.78(8.40)
CD(0.05)		0.48	0.57	0.37	0.5
Interaction					
M and T		NS	NS	NS	NS
T and M		NS	NS	NS	NS
Experimental Mean		6.09	3.91	5.38	8.85

*(values in parentheses are transformed values)

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Varanasi							
		Weed population at Maximum tillering stage(no/m²)				Weed population at Panicle initiation stage(no/m²)			
		Grasses	Sedges	BLW	Total weed population	Grasses	Sedges	BLW	Total weed population
M1	V1	8.00(2.89)	21.00(4.63)	4.67(2.24)	33.67(5.82)	0.00(0.71)	1.00(1.17)	1.00(1.17)	2.00(1.48)
	V2	13.00(3.66)	22.67(4.81)	8.00(2.89)	43.67(6.62)	3.67(2.02)	6.00(2.54)	2.00(1.56)	11.67(3.49)
	V3	11.67(3.48)	22.00(4.74)	7.67(2.85)	41.33(6.46)	5.00(2.32)	4.00(2.11)	1.67(1.46)	10.67(3.34)
	V4	16.00(4.05)	24.67(5.01)	1.00(1.17)	41.67(6.49)	3.00(1.86)	0.00(0.71)	1.00(1.17)	4.00(2.09)
	V5	14.67(3.89)	28.00(5.33)	4.67(2.24)	47.33(6.91)	2.00(1.56)	4.67(2.22)	2.00(1.56)	8.67(3.00)
M2	V1	18.00(4.29)	27.67(5.30)	12.67(3.61)	58.33(7.67)	10.00(3.24)	7.00(2.71)	2.67(1.77)	19.67(4.48)
	V2	35.00(5.95)	45.67(6.79)	16.00(4.05)	96.67(9.85)	9.67(3.17)	13.67(3.75)	6.00(2.54)	29.33(5.46)
	V3	46.67(6.86)	38.67(6.25)	11.67(3.48)	97.00(9.87)	9.00(3.06)	11.67(3.47)	3.00(1.86)	23.67(4.91)
	V4	27.00(5.24)	42.67(6.57)	18.00(4.29)	87.67(9.39)	10.00(3.22)	7.67(2.83)	5.00(2.33)	22.67(4.81)
M3	V1	15.00(3.93)	21.67(4.70)	10.00(3.22)	46.67(6.87)	5.67(2.45)	1.67(1.46)	1.67(1.46)	9.00(3.07)
	V2	29.67(5.49)	34.67(5.93)	8.67(3.01)	73.00(8.57)	9.00(3.06)	3.00(1.86)	0.00(0.71)	12.00(3.53)
	V3	18.67(4.37)	36.00(6.04)	10.00(3.22)	64.67(8.07)	7.00(2.71)	5.67(2.45)	2.67(1.77)	15.33(3.96)
	V4	16.00(4.05)	33.67(5.84)	10.00(3.22)	59.67(7.75)	6.67(2.62)	5.00(2.29)	1.00(1.17)	12.67(3.59)
	V5	31.00(5.61)	37.67(6.18)	12.67(3.62)	81.33(9.04)	13.00(3.67)	11.00(3.39)	3.67(2.02)	27.67(5.30)
Mean of Factor-1									
1		12.67(3.59)	23.67(4.90)	5.20(2.28)	41.53(6.46)	2.73(1.69)	3.13(1.75)	1.53(1.38)	7.40(2.68)
2		34.67(5.84)	40.53(6.38)	15.07(3.92)	90.27(9.47)	10.53(3.30)	10.60(3.28)	4.33(2.16)	25.47(5.07)
3		22.07(4.69)	32.73(5.74)	10.27(3.26)	65.07(8.06)	8.27(2.90)	5.27(2.29)	1.80(1.43)	15.33(3.89)
CD(0.05)		0.08	0.08	0.16	0.09	0.1	0.13	0.1	0.16
Mean of Factor-2									
1		13.67(3.70)	23.44(4.88)	9.11(3.02)	46.22(6.79)	5.22(2.13)	3.22(1.78)	1.78(1.47)	10.22(3.01)
2		25.89(5.03)	34.33(5.84)	10.89(3.32)	71.11(8.35)	7.44(2.75)	7.56(2.72)	2.67(1.60)	17.67(4.16)
3		25.67(4.90)	32.22(5.68)	9.78(3.18)	67.67(8.13)	7.00(2.70)	7.11(2.67)	2.44(1.70)	16.56(4.07)
4		19.67(4.45)	33.67(5.81)	9.67(2.90)	63.00(7.87)	6.56(2.57)	4.22(1.94)	2.33(1.56)	13.11(3.50)
5		30.78(5.45)	37.89(6.16)	11.44(3.35)	80.11(8.85)	9.67(3.01)	9.56(3.09)	3.56(1.97)	22.78(4.67)
CD(0.05)		0.34	0.28	NS	0.43	0.42	0.42	NS	0.4
Interaction									
M and T		0.6	NS	0.71	NS	NS	0.73	0.59	0.7
T and M		0.54	NS	0.64	NS	NS	0.66	0.53	0.63
Experimental Mean		4.71	5.67	3.15	8	2.63	2.44	1.66	3.88

***(values in parentheses are transformed values)**

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.) – Summary on weed dry biomass g/m2 of evaluation of elite genotypes for weed competitiveness under aerobic rice system, Kharif-2021.

Main plot	Sub plot Treatments	Ghaghraghat		Ludhiana		
		Weed dry biomass g/m^2		Weed dry biomass at Panicle initiation stage(g/m^2)		
		Maximum tillering stage	Panicle initiation stage	Grasses	Sedges	Total weed dry biomass
M1	V1	0.00	0.00	0.00	0.00	0.00
	V2	0.00	0.00	0.00	0.00	0.00
	V3	0.00	0.00	0.00	0.00	0.00
	V4	0.00	0.00	0.00	0.00	0.00
	V5	0.00	0.00	0.00	0.00	0.00
M2	V1	2.21	2.47	70.87	20.33	91.20
	V2	2.46	2.73	70.77	27.93	98.70
	V3	2.27	2.89	48.40	26.50	74.90
	V4	2.28	2.56	63.77	25.67	89.43
	V5	2.67	2.86	50.13	24.67	74.80
M3	V1	1.93	2.24	0.00	0.00	0.00
	V2	1.86	2.22	0.00	0.00	0.00
	V3	1.97	2.17	0.00	0.00	0.00
	V4	1.89	2.47	0.00	0.00	0.00
	V5	1.96	2.12	0.00	0.00	0.00
Mean of Factor-1						
1		0.00	0.00	0.00	0.00	0.00
2		2.38	2.70	60.79	25.02	85.81
3		1.92	2.24	0.00	0.00	0.00
CD(0.05)		0.09	0.12	6.57	3.22	3.72
Mean of Factor-2						
1		1.38	1.57	23.62	6.78	30.40
2		1.44	1.65	23.59	9.31	32.90
3		1.42	1.69	16.13	8.83	24.97
4		1.39	1.68	21.26	8.56	29.81
5		1.54	1.66	16.71	8.22	24.93
CD(0.05)		NS	NS	NS	NS	NS
Interaction						
M and T		NS	0.19	NS	NS	NS
T and M		NS	0.19	NS	NS	NS
Experimental Mean		1.43	1.65	20.26	8.34	28.60

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Mandya							
		Weed dry biomass at Maximum tillering stage(g/m²)				Weed dry biomass at Panicle initiation stage(g/m²)			
		Grasses	Sedges	BLW	Total weed dry biomass	Grasses	Sedges	BLW	Total weed dry biomass
M1	V1	0.45	0.70	0.03	1.19	4.93	6.00	1.63	12.56
	V2	0.73	1.19	0.00	1.92	3.61	4.73	1.82	10.17
	V3	0.92	2.23	0.16	3.31	11.55	1.25	2.57	15.37
	V4	0.8	1.49	0.36	2.66	6.73	2.38	2.84	11.94
	V5	0.31	1.36	2.36	4.03	0.28	1.55	6.65	8.48
M2	V1	27.68	7.50	29.01	64.19	171.45	91.03	128.57	391.05
	V2	35	19.02	47.85	101.87	156.05	81.67	192.59	430.31
	V3	65.35	16.19	48.32	129.87	167.44	102.60	188.37	458.41
	V4	47.73	14.50	36.99	99.22	185.30	80.53	198.61	464.44
	V5	34.78	14.49	33.87	83.13	194.05	90.34	172.67	457.06
M3	V1	0	0.07	0.26	0.33	3.33	6.23	7.90	17.46
	V2	0	0.00	0.08	0.08	2.31	8.15	5.34	15.80
	V3	0.12	0.17	1.35	1.64	7.97	9.07	15.87	32.91
	V4	0.01	0.14	0.07	0.22	7.42	9.38	11.29	28.09
	V5	0	0.00	0.54	0.54	4.17	4.31	8.88	17.36
Mean of Factor-1									
1		0.64	1.40	0.58	2.62	5.42	3.18	3.10	11.71
2		42.11	14.34	39.21	95.66	174.86	89.23	176.16	440.25
3		0.03	0.08	0.46	0.56	5.04	7.43	9.85	22.32
CD(0.05)		3.41	1.76	1.11	5.47	27.64	17.08	1.83	35.24
Mean of Factor-2									
1		9.38	2.76	9.77	21.90	59.90	34.42	46.03	140.36
2		11.91	6.74	15.98	34.62	53.99	31.52	66.58	152.09
3		22.13	6.20	16.61	44.94	62.32	37.64	68.94	168.90
4		16.18	5.38	12.47	34.03	66.48	30.76	70.91	168.16
5		11.7	5.28	12.26	29.24	66.17	32.07	62.73	160.97
CD(0.05)		5.25	2.32	NS	8.25	NS	NS	NS	NS
Interaction									
M and T		9.09	NS	NS	14.28	NS	NS	NS	NS
T and M		8.37	NS	NS	13.17	NS	NS	NS	NS
Experimental Mean		14.26	5.27	13.42	32.95	61.77	33.28	63.04	158.09

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Pusa											
		Weed dry biomass at 15 - 20 DAS (g/m²)				Weed dry biomass at Maximum tillering stage(g/m²)				Weed dry biomass at Panicle initiation stage(g/m²)			
		Grasses	Sedges	BLW	Total weed dry biomass	Grasses	Sedges	BLW	Total weed dry biomass	Grasses	Sedges	BLW	Total weed dry biomass
M1	V1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	V2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	V3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	V4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	V5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
M2	V1	33.70	11.89	21.23	66.82	91.77	46.07	76.57	214.4	91.23	42.63	83.10	216.97
	V2	33.70	10.33	18.57	62.6	81.20	41.87	68.23	191.3	84.03	37.30	77.43	198.77
	V3	33.60	12.33	21.43	67.37	85.90	37.50	73.33	196.73	96.07	40.83	80.47	217.37
	V4	34.43	12.63	23.83	70.9	92.23	44.23	80.50	216.97	91.77	31.50	82.20	205.47
	V5	30.20	10.40	19.50	60.1	82.53	41.97	69.10	193.6	86.03	36.87	77.10	200
M3	V1	4.74	1.76	3.05	9.55	12.04	6.03	10.50	28.57	13.30	7.03	10.90	31.23
	V2	3.44	1.24	2.56	7.24	9.26	4.54	8.46	22.26	11.40	5.48	7.00	23.88
	V3	5.32	2.12	3.05	10.49	12.83	6.42	10.48	29.74	13.90	6.12	10.83	30.85
	V4	5.88	2.21	1.88	9.97	11.22	6.15	10.03	27.4	13.17	6.50	10.05	29.71
	V5	3.39	1.59	2.15	7.12	9.70	5.07	8.47	23.24	11.17	5.44	6.80	23.41
Mean of Factor-1													
1		0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00	0
2		33.13	11.52	20.91	65.56	86.73	42.33	73.55	202.6	89.83	37.83	80.06	207.71
3		4.55	1.78	2.54	8.87	11.01	5.64	9.59	26.24	12.59	6.11	9.12	27.82
CD(0.05)		2.08	0.36	1.22	1.49	2.04	3.59	3.36	7.43	2.83	2.87	3.82	8.77
Mean of Factor-2													
1		12.81	4.55	8.10	25.46	34.60	17.36	29.02	80.99	34.84	16.55	31.33	82.73
2		12.38	3.86	7.04	23.28	30.15	15.47	25.57	71.19	31.81	14.26	28.14	74.21
3		12.97	4.82	8.16	25.95	32.91	14.64	27.94	75.49	36.66	15.65	30.43	82.74
4		13.44	4.95	8.57	26.96	34.48	16.79	30.18	81.46	34.98	12.67	30.75	78.39
5		11.20	4.00	7.22	22.41	30.75	15.68	25.86	72.28	32.40	14.10	27.97	74.47
CD(0.05)		1.35	0.33	NS	1.7	3.30	NS	2.17	5.31	2.23	NS	1.05	4.54
Interaction													
M and T		NS	0.58	NS	2.95	NS	NS	3.75	9.2	3.86	NS	1.82	NS
T and M		NS	0.56	NS	2.79	NS	NS	4.00	9.5	3.88	NS	3.10	NS
Experimental Mean		12.56	4.43	7.82	24.81	32.58	15.99	27.71	76.28	34.14	14.65	29.73	78.51

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Rewa											
		Weed dry biomass at 15 - 20 DAS (g/m²)				Weed dry biomass at Maximum tillering stage(g/m²)				Weed dry biomass at Panicle initiation stage(g/m²)			
		Grasses	Sedges	BLW	Total weed dry biomass	Grasses	Sedges	BLW	Total weed dry biomass	Grasses	Sedges	BLW	Total weed dry biomass
M1	V1	6.80	6.80	7.70	21.30	6.90	6.03	6.93	19.87	6.70	6.83	7.17	20.70
	V2	6.33	6.67	6.83	19.83	6.40	6.57	6.90	19.87	6.47	6.63	6.73	19.83
	V3	7.20	7.70	7.53	22.43	7.20	7.60	7.53	22.33	7.27	7.60	7.43	22.30
	V4	6.47	6.73	6.87	20.07	6.53	6.63	6.90	20.07	6.53	6.63	6.77	19.93
	V5	6.87	7.30	7.27	21.43	7.00	7.20	7.33	21.53	7.00	7.27	7.17	21.43
M2	V1	8.30	8.87	8.80	25.97	8.37	8.77	8.87	26.00	8.33	8.73	8.70	25.77
	V2	9.70	11.00	10.07	30.77	9.73	9.97	10.33	30.03	9.47	9.33	10.13	28.93
	V3	9.47	10.67	10.07	30.20	9.43	9.80	9.90	29.13	9.47	9.67	9.73	28.87
	V4	9.17	9.47	9.70	28.33	8.67	9.37	9.67	27.70	9.20	9.37	9.53	28.10
	V5	9.03	9.23	9.50	27.77	8.93	9.20	9.47	27.60	9.00	9.20	9.27	27.47
M3	V1	3.20	3.53	3.60	10.33	3.20	3.43	3.67	10.30	3.20	3.43	3.43	10.07
	V2	4.33	4.80	5.07	14.20	4.40	4.70	5.00	14.10	4.33	4.70	4.90	13.93
	V3	5.27	5.63	5.80	16.70	5.40	5.53	5.63	16.57	5.33	5.53	5.67	16.53
	V4	4.90	5.30	5.53	15.73	5.03	5.20	5.53	15.77	5.03	5.20	5.37	15.60
	V5	5.70	6.20	6.47	18.37	5.73	6.10	6.17	18.00	5.50	6.10	6.30	17.90
Mean of Factor-1													
1		6.73	7.04	7.24	21.01	6.81	6.81	7.12	20.73	6.79	6.99	7.05	20.84
2		9.13	9.85	9.63	28.61	9.03	9.42	9.65	28.09	9.09	9.26	9.47	27.83
3		4.68	5.09	5.29	15.07	4.75	4.99	5.20	14.95	4.68	4.99	5.13	14.81
CD(0.05)		0.49	0.49	0.45	1.40	0.54	0.73	0.40	1.63	0.35	0.54	0.43	1.27
Mean of Factor-2													
1		6.10	6.40	6.70	19.20	6.16	6.08	6.49	18.72	6.08	6.33	6.43	18.84
2		6.79	7.49	7.32	21.60	6.84	7.08	7.41	21.33	6.76	6.89	7.26	20.90
3		7.31	8.00	7.80	23.11	7.34	7.64	7.69	22.68	7.36	7.60	7.61	22.57
4		6.84	7.17	7.37	21.38	6.74	7.07	7.37	21.18	6.92	7.07	7.22	21.21
5		7.20	7.58	7.74	22.52	7.22	7.50	7.66	22.38	7.17	7.52	7.58	22.27
CD(0.05)		0.66	0.75	0.66	1.88	0.65	0.67	0.64	1.88	0.66	0.64	0.63	1.81
Interaction													
M and T		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
T and M		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Experimental Mean		6.85	7.33	7.39	21.56	6.86	7.07	7.32	21.26	6.86	7.08	7.22	21.16

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Varanasi	
		Weed dry biomass (g/m^2)	
		Maximum tillering stage	Panicle initiation stage
M1	V1	11.60	5.48
	V2	17.52	12.96
	V3	31.73	16.94
	V4	7.56	17.56
	V5	45.25	12.41
M2	V1	38.03	37.07
	V2	50.23	62.43
	V3	44.33	50.44
	V4	36.85	42.51
	V5	61.60	70.48
M3	V1	20.87	35.65
	V2	41.64	43.32
	V3	29.99	35.29
	V4	35.35	37.41
	V5	53.49	50.31
Mean of Factor-1			
1		22.73	13.07
2		46.21	52.59
3		36.27	40.4
3			
CD(0.05)		1.80	0.54
Mean of Factor-2			
1		23.50	26.07
2		36.46	39.57
3		35.35	34.22
4		26.59	32.5
5		53.45	44.4
CD(0.05)		2.23	1.16
Interaction			
M and T		3.86	2
T and M		3.61	1.82
Experimental Mean		35.07	35.35

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.) Summary on Benefit Cost Ratio, Cost of Weed Management of evaluation of advanced cultures for weed competitiveness under aerobic rice system, Kharif – 2021.

Main plot	Sub plot Treatments	Benefit Cost Ratio			
		Ludhiana	Mandya	Pusa	Rewa
M1	V1	2.16	1.74	2.03	3.58
	V2	1.91	1.77	2.35	3.52
	V3	1.82	0.84	1.68	3.82
	V4	1.98	1.11	1.52	4.00
	V5	2.10	1.64	2.19	4.00
M2	V1	0.75	0.14	1.24	3.78
	V2	0.70	0.13	1.76	3.69
	V3	0.87	0.07	0.95	3.62
	V4	1.39	0.33	0.98	3.68
	V5	0.72	0.42	1.54	3.67
M3	V1	2.46	1.97	2.23	3.74
	V2	2.21	1.94	2.78	3.71
	V3	2.14	1.05	1.61	3.65
	V4	2.31	1.32	1.54	3.71
	V5	2.44	1.81	2.66	3.77
Mean of Factor-1					
1		1.99	1.42	1.95	3.79
2		0.89	0.22	1.29	3.69
3		2.31	1.62	2.16	3.72
CD(0.05)		0.10	0.11	0.08	NS
Mean of Factor-2					
1		1.79	1.28	1.83	3.70
2		1.61	1.28	2.29	3.64
3		1.61	0.66	1.42	3.70
4		1.89	0.92	1.34	3.80
5		1.75	1.29	2.13	3.81
CD(0.05)		0.16	0.1	0.14	NS
Interaction					
M and T		0.27	0.18	NS	NS
T and M		0.25	0.17	NS	NS
Experimental Mean		1.73	1.09	1.80	3.73

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.)

Main plot	Sub plot Treatments	Cost of Cultivation Rs/ha				Cost of Weed Management Rs/ha				Gross returns (Rs./ha)
		Ludhiana	Mandya	Pusa	Rewa	Ludhiana	Mandya	Pusa	Rewa	Ludhiana
M1	V1	53530	60602	45062	23600	8050	12600	12550	5400	115516
	V2	53530	61237	45062	21600	8050	12600	12550	5733	102162
	V3	53530	56309	45062	21600	8050	12600	12550	5400	97399
	V4	53530	59201	45062	21600	8050	12600	12550	5800	106016
	V5	53530	60527	45062	21600	8050	12600	12550	5333	112550
M2	V1	45480	40687	32512	16600	0	0.00	0	0	34156
	V2	45480	40646	32512	16600	0	0.00	0	0	31772
	V3	45480	40307	32512	11067	0	0.00	0	0	39494
	V4	45480	41086	32512	16600	0	0.00	0	0	62955
	V5	45480	41909	32512	16600	0	0.00	0	0	32667
M3	V1	46680	56221	36042	19600	1200	7871	3530	2733	114934
	V2	46680	56965	36042	19600	1200	7871	3530	2667	103351
	V3	46680	53121	36042	19600	1200	7871	3530	2533	99784
	V4	46680	54783	36042	19600	1200	7871	3530	2800	107800
	V5	46680	55891	36042	19600	1200	7871	3530	2533	114039

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

Table 4.3.2: (Contd.) – Summary on weed control efficiency and weed index of evaluation of advanced cultures for weed competitiveness under aerobic rice system, Kharif – 2021.

Main plot	Sub plot Treatments	Weed control efficiency at 15-20 DAS	Weed control efficiency at Maximum tillering stage			Weed control efficiency at PI stage		Weed Index	
		PUSA	Ludhiana	Mandya	Pusa	Mandya	Pusa	Mandya	Pusa
M1	V1	100.00	100.00	98.12	100.00	96.96	100.00	-	0.00
	V2	100.00	100.00	97.91	100.00	97.65	100.00	-	0.00
	V3	100.00	100.00	97.34	100.00	96.55	100.00	-	0.00
	V4	100.00	100.00	97.54	100.00	97.42	100.00	-	0.00
	V5	100.00	100.00	95.21	100.00	98.05	100.00	-	0.00
M2	V1	0.00	0.00	-	0.00	-	0.00	0.96	0.56
	V2	0.00	0.00	-	0.00	-	0.00	0.96	0.46
	V3	0.00	0.00	-	0.00	-	0.00	0.94	0.59
	V4	0.00	0.00	-	0.00	-	0.00	0.77	0.54
	V5	0.00	0.00	-	0.00	-	0.00	0.84	0.49
M3	V1	85.69	100.00	99.52	86.59	95.54	85.56	-0.06	0.11
	V2	88.45	100.00	99.91	88.31	96.44	87.97	-0.01	0.05
	V3	84.43	100.00	98.80	84.85	92.78	85.77	-0.17	0.24
	V4	85.93	100.00	99.79	87.29	94.33	85.51	-0.11	0.19
	V5	88.13	100.00	99.30	87.99	96.01	88.29	-0.03	0.02

M1- Weed free/ Critical period hand weeding twice
M2-Weedy check
M3-Chemical weed control*(Pre & Post emergence herbicide application)

V1 - IET 26168
V2 - IET 26194
V3 - IET 28675
V4 - DRR Dhan 46
V5 - Optional (Suitable local variety of same duration)

4.3.3. Sustainable weed management in Aerobic rice system

Weed management continues to be a huge challenge in aerobic rice which is highly vulnerable to weed infestation because of dry ploughing and aerobic soil conditions. Proper weed management is considered to be one of the most important prerequisites to ensure satisfactory yield of rice. High weed pressure in direct seeded rice lowers the economic return, and in extreme cases rice cultivation results in a losing concern. This demands reappearance of physical, cultural, and biological weed management combined with judicious application of herbicides based on a thorough understanding in the crop-weed ecology, known as integrated weed management. IWM can be successfully implemented in aerobic rice. A wide increase in grain yield (15–307%) by implementing different weed control practices elaborates weed management in aerobic rice.The present study was, therefore, conducted to find out suitable herbicide and manual weeding combination(s) simultaneously incorporated with different agronomic practices to provide a comprehensive integrated weed management system for aerobic rice situation.

With the objectives of developing sustainable economic and eco-friendly weed control package for the cropping period and evaluating the feasibility of non-chemical weed control options in aerobic rice system, the trial was initiated during *kharif* 2021. The main treatments compared of 10 weed control practices viz., T-1 mulching with crop residue; T-2 mulching with crop residue followed by one post emergence herbicide application for 2nd flesh of weeds; T-3 mechanical weeding twice or thrice depending on weed intensity; T-4 mechanical weeding followed by post emergence herbicide application; T-5 chemical weed control;T-6 pre emergence herbicide application fb one mechanical weeding; T-7 intercropping with cowpea/horse gram/seabania; T-8 raised bed system of cultivation; T-9 weed free/two hand weeding and T-10 weedy check in replicated Randomized Block Design. The trial was conducted at six locations viz., **Chatha, Coimbatore, ICAR-IIRR, Navsari, Parbhani** and **Ranchi**.The results of data on weed parameters, crop growth parameters, yield attributes, grain yield and economics are presented in table 4.3.3.

The result of the field experiment revealed that the grain yield loss due to weeds ranged from 37.55% at **Navsari** to 72.70% at **Chatha**, depending on the weed intensity, type of weed flora during the critical period of competition. Across the locations, the average yield loss was 54.42% indicating the severity of weed problem in aerobic system and necessity of sustainable weed control practices during the cropping season.

Among the test locations, the mean maximum grain yield of 4.22 t/ha was recorded by Coimbatore followed by 4.18 t/ha at **Navsari** and 4.05 t/ha at Ranchi. Under aerobic system of cultivation, these locations showed greater potential indicating the scope for future expansion of area under this resource conserving rice production technology. The locations of **Chatha** and **Parbhani** have recorded lower mean grain yield of 2.74 and 2.37 t/ha respectively, where effective and resource conserving technologies have to be implemented. At **ICAR-IIRR**, Hyderabad and **Parbhani**, weed intensity is moderate and require potential measures for stabilizing higher yields. At all the locations, weed free condition in critical period of crop growth recorded 1½ to 4 times higher grain yields than weedy check. Among the test varieties,

Basmati 370 experienced higher yield loss and the grain yields in weedycheck was reduced by 4 times; Also Naveen experienced higher yield loss and the grain yields in weedy check was reduced by 3 times when compared to weed free condition. At **Chatha** and **Parbhani**, weed free condition recorded significantly higher and superior grain yield of the test varieties. At **Coimbatore** and **ICAR-IIRR**, chemical weed control alone (pre-emergence and post-emergence application) was equally effective as that of weed free condition during critical period; while mechanical weeding was on par at **Navsari**. At Ranchi, mulching followed by post-emergence herbicide application, mechanical weeding followed by post-emergence herbicide application were equally effective as that chemical weed control and weed free condition. At all the test locations, except **Parbhani**, mechanical weeding followed by post-emergence herbicide application was found promising and second in superiority among all the treatments. Straw yield has followed the similar trend of grain yield. The yield attributes viz., number of panicle per square metre, panicle weight and test weight were reported by six and five locations respectively, and wherein support of the trend exhibited by grain yield and straw yield.

The crop growth parameters viz., no. of tillers at maximum tillering stage were reported by **Chatha, Coimbatore, ICAR-IIRR** and **Navsari** and at panicle initiation stage were reported by **Chatha, Coimbatore, ICAR-IIRR, Navsari** and **Parbhani**; total dry matter production at maximum tillering and panicle initiation stage were reported by **Chatha**, **Coimbatore, ICAR-IIRR, Navsari**; **Chatha**, **Coimbatore** and **Navsari** respectively. The highest no. of tillers and total dry matter at both the stages was recorded by weed free condition. The treatments of chemical weed control, mechanical weeding followed by post-emergence herbicide application, mulching followed by post-emergence herbicide application were comparable.

The weed population at seedling, maximum tillering and panicle initiation stages were reported by the test locations and the data were analysed and the results are presented in Table 4.3.3. The total weed population trend was Grasses>Sedges>BLW at **Chatha**; Grasses>BLW>Sedges at **Coimabtore**, **ICAR-IIRR** and **Ranchi**; BLW>Grasses>sedges at **Navsari** and BLW>Grasses at **Parbhani** at all the three stages of observation. Irrespective of the stage of observation, and group of weeds, all locations reported highest and significant population in the treatments of weedy check, lowest in weed free condition during critical period. At **Chatha**, live mulch and inter-cropping recorded lower weed population and statistically superior over other test treatments. Significant reduction in weed population by straw mulching treatments and chemical control was observed at seedling stage; whereas mechanical weeding and chemical control recorded considerable reduction in weed population. All the locations reported species wise weed flora except **Ranchi**. At four locations *Echinochloa spp*. was the major grass weed followed by *Dactylactenium* spp. at two locations (**Chatha** and **Navsari**); *Panicum spp*. at Coimbatore; *Dinebra spp*. at **ICAR-IIRR**.; At Parbhani, *Cynodandactylon* was the major weed followed by *Digitariasanguinalis* and *Brachiariaerusiformis*. Among sedges, *Cyperus spp.* at **Chatha**, **Coimbatore, ICAR-IIRR**; *Fimbristylis spp*. and *Cyperus spp*. at Navsari were found prominent and dominant. Among broad leaf weeds (BLW), *Solanumnigrum* and *Physalis minima* at **Chatha**, *Eclipta prostrate*

at **Coimbatore**; *Alternantheraechinata, Commelinabenghalensis* at **ICAR-IIRR**; *Eclipta alba, Rotaladensiflora* and *Celosia argentia* at **Navsari** and *Alternantheraechinata, Abutilon indicum, Crozophorarotlerri, Partheniumhisterophorous* at **Parbhani** were major components of weed flora. At **Parbhani,** the BLW and grasses groups population was highest at seedling stage and lowest at maximum tillering stage. The species of *Dinebra* and *Digitaria* were found at seedling stages and panicle initiation stages only; whereas, *Brachiaria* and *Eragrostis* were observed at maximum tillering and panicle initiation stages. *Amiscophalociscucullata* and *Euphorbiageniculala*were noticed at seedling stage only, whereas, *Xanthiumstrumanium* at maximum tillering stage and *crozophorarotlerri* at panicle initiation stage only were recorded.

The results of total weed population including all groups of weeds showed increase from seedling stage to panicle initiation stage at **Coimbatore, Navsari** and **Parbhani**, whereas at **Chatha** and **ICAR-IIRR** highest total weed population was recorded at maximum tillering stage followed by panicle initiation stage. The seedling stage at these locations has shown minimum weed population. At **Ranchi**, total weed population reported at maximum tillering and panicle initiation stages showed increase at panicle initiation stage.

The data on weed dry biomass both group-wise and crop stage-wise was reported by **Coimbatore, ICAR-IIRR, Navsari** and **Parbhani**. The analysed data are presented in Table 4.3.3. Total weed dry biomass crop stage wise reported by **Chatha**; and two crop stages by **Ranchi**. The analysis indicated that the total weed dry biomass has increased from seedling to panicle initiation stage at **Chatha, Coimbatore, Navsari**. At **ICAR-IIRR**, the weed dry biomass was lowest at seedling stage and highest at maximum tillering stage and decreased at panicle initiation; whereas at **Parbhani** the lowest weed dry biomass was recorded at maximum tillering stage and minimum at seedling stage.

The result of group-wise weed dry biomass showed that at **Coimbatore** and **Navsari**, BLW recorded highest followed by grasses at all the three critical crop growth stages; whereas at **ICAR-IIRR**, grasses recorded highest weed dry biomass flowed by BLW. At **Parbhani**, BLW recorded highest weed dry biomass at all critical crop growth stages. Among the test treatments, chemical control, mulch or mechanical weeding followed by post-emergence herbicide application recorded lower weed biomass. The weed free condition/ two hand weeding in critical period recorded lowest or no weed biomass till panicle initiation stage and weedy check recorded maximum weed biomass and significantly higher than all the test treatments.

Weed control efficiency was computed and presented by four locations viz., **Coimbatore, ICAR-IIRR, Navsari** and **Parbhani** at the three critical crop growth stages. Weed control efficiency was highest in weed free condition at critical period. The treatments of mulching/mechanical weeding followed by post-emergence herbicide application has recorded higher weed control efficiency. The weed control efficiency was higher in seedling stage than maximum tillering and panicle initiation stages at **Navsari** and **Parbhani**, whereas, it was high at maximum tillering stage at **Coimbator**e and **ICAR-IIRR**.

The data on weed index was reported by four locations viz., **Coimbatore, ICAR-IIRR, Navsari** and **Parbhani**. The results showed that at **Coimbatore** and **Parbhani,** lower weed index was observed in the treatments of mechanical weeding followed by post-emergence herbicide application; chemical weed control, pre-emergence herbicide application followed by one mechanical weeding. At **ICAR-IIRR,** chemical weed control, live mulch, straw mulching /mechanical weeding followed by post-emergence herbicide application, recorded lower weed index. At **Navsari**, mechanical weeding, mulching/ mechanical weeding followed by post-emergence herbicide application have shown lower weed index.

The economic analysis of the weed management treatments was reported by **Coimbatore, Navsari** and **Parbhani** revealed that the cost of weed management was lowest with mechanical weeding followed by post-emergence herbicide application at **Coimbatore**; live mulch, chemical weed control and mechanical weeding followed by herbicide application at **ICAR-IIRR**; raised bed cultivation followed by post-emergence herbicide application at **Navsari** and live mulch at **Parbhani**. The benefit cost ratio was significantly high with chemical weed control at **Coimbatore**, **ICAR-IIRR** and **Parbhani** and mulching followed by combination herbicide application ranked second, live mulch and raised bed system was third in the order. At **Navsari**, both mulching and mechanical weeding followed by herbicide application recorded higher B:C ratio.

In summary, the trial was conducted at six locations viz., **Chatha**, **Coimbatore**, **ICAR-IIRR, Navsari, Parbhani** and **Ranchi** and the data of crop and weed parameters were analysed, and results revealed that, the mean grain yields ranged from 4.22 t/ha at **Coimbatore** to 2.37 t/ha at **Parbhani**. The mean grain yield loss due to weeds varied from 72.70% at **Chatha** to 37.55% at **Navsari** depending on the intensity of weed problem and cause of yield loss. The treatments of chemical weed control, mechanical weeding followed by post-emergence herbicide application, mulching followed by post-emergence herbicide application were comparable for crop growth parameters, yield attributes and grain yield. The total weed population was higher at maximum tillering and panicle initiation stages. The group-wise dominance of weed population was Grasses>Broad Leaf Weeds>Sedges at four locations and Broad Leaf Weeds>Grasses>Sedges at two locations. The major weed flora recorded over the locations included grass weed species viz., *Echinochloacolona, Echinochloacrusgalli,Dactylacteniumaegyptium,Cynodondactylon,Panicum spp*., ,*Dinebra spp*. *Digitariasanguinalis* and *Brachiariaerusiformis*; among sedges, *Cyperusiria, Cyperusrotundus, Cyperusdifformis, Fimbristylis spp*.; among BLW, S*olanumnigrum* and *Physalis minima, Ecliptaprostrata, Alternantheraechinata, Commelinabenghalensis, Eclipta alba, Rotaladensiflora, Celosia argentia, Alternantheraechinata, Abutilon indicum, Crozophorarotlerri, Partheniumhisterophorous*. The weed index, weed population and dry weed biomass were significantly low in the treatments of chemical weed control, need based mechanical weeding, mulching followed by post-emergence herbicide application, which in turn resulted in the higher weed control efficiency.

Table 4.3.3: Summary on yield parameters and grain yield of sustainable weed management in aerobic rice system, Kharif-2021

Treatments	Grain yield t/ha					
	Chatha	Coimbatore	ICAR-IIRR	Navsari	Parbhani	Ranchi
T1	2.54	4.07	3.41	4.05	2.25	3.87
T2	2.58	4.18	3.91	4.38	2.30	4.31
T3	3.36	4.39	3.55	4.47	2.52	4.00
T4	3.02	4.65	3.82	4.30	2.50	4.78
T5	2.95	4.83	5.07	4.18	2.70	4.49
T6	2.99	4.52	3.36	4.02	2.62	4.01
T7	2.81	4.32	4.17	4.19	2.13	4.21
T8	2.67	3.80	3.62	4.13	2.29	-
T9	3.48	4.97	5.13	4.98	2.81	5.02
T10	0.95	2.51	2.74	3.11	1.58	1.75
Exp Mean	**2.74**	**4.22**	**3.88**	**4.18**	**2.37**	**4.05**
CD(0.05)	0.04	0.17	0.41	0.58	0.01	0.71
Grain yield loss %	72.70	49.49	46.58	37.55	43.77	65.13
Applied fertilizer doses(N-P-K-Zn Kg/ha)		150kg N,50Kg p2o5,50Kg K2o		100-30-0-0 kg/ha		80:40:30 KgNPK/ha.
Available NPK (kg/ha)		217 kg N, 14 kg P2O5, 468 kg K2O		266-32-596 kg/ha		
Name of the variety	basmati 370	CO 53(110 DAYS)	DRR Dhan 54	GNR-3 and 120-125 days		Naveen , 125 days
Soil type	Sandy clay loam	Clay loam	Clay loam	Clay		
PH	8.03	8.23	7.6	7.88		
EC (dsm-1)	0.21	0.29	0.34	0.61 ds/m		
Organic carbon	0.57	0.44	0.42	0.54		

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing
T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha
T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)
T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha
T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)
T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS
T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)
T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS
T9. Weed free/Critical period hand weeding twice
T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	Straw yield t/ha					No of Panicles/m²						Panicle weight(g)				
	Chatha	Coimbatore	ICAR-IIRR	Navsari	Parbhani	Chatha	Coimbatore	ICAR-IIRR	Navsari	Parbhani	Ranchi	Chatha	Coimbatore	ICAR-IIRR	Navsari	Parbhani
T1	3.76	6.08	5.22	7.18	3.07	190	237	263	191	187	207	1.44	2.79	2.43	4.60	2.77
T2	3.85	6.22	5.8	6.49	3.12	194	255	276	206	196	238	1.45	2.80	2.87	4.71	2.82
T3	5.07	6.50	5.42	7.43	3.33	212	246	261	199	211	221	1.66	2.84	2.72	5.46	3.04
T4	4.53	6.82	5.97	7.04	3.32	203	273	284	199	206	264	1.59	2.85	2.89	5.22	3.02
T5	4.47	6.99	6.58	7.15	3.52	201	267	342	213	221	247	1.52	2.82	2.91	4.91	3.22
T6	4.48	6.63	5.81	6.38	3.44	202	229	301	193	215	230	1.53	2.76	2.78	5.33	3.14
T7	4.34	6.42	5.1	6.94	2.95	197	218	299	190	178	236	1.48	2.74	2.67	4.78	2.65
T8	4.01	5.81	5.61	7.20	3.11	197	207	328	203	193	-	1.47	2.72	2.31	5.37	2.81
T9	5.46	7.08	6.69	7.57	3.63	216	284	387	224	217	276	1.95	2.82	2.98	5.54	3.33
T10	1.18	4.02	3.92	5.49	2.47	127	177	176	163	163	97	0.80	2.18	1.94	3.45	2.1
Exp Mean	**4.12**	**6.26**	**5.61**	**6.89**	**3.20**	**194**	**239**	**292**	**198**	**199**	**224**	**1.49**	**2.73**	**2.65**	**4.94**	**2.89**
CD(0.05)	0.06	0.27	0.64	1.16	0.00	2.4	13	40	28	0.5	41.05	0.1	0.11	0.22	0.7	0.01

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	Test weight(g)						No. of tillers/m² at Maximum Tillering stage				No. of tillers/m² at Panicle initiation stage				
	Chatha	Coimbatore	ICAR-IIRR	Navsari	Parbhani	Ranchi	Chatha	Coimbatore	ICAR-IIRR	Navsari	Chatha	Coimbatore	ICAR-IIRR	Navsari	Parbhani
T1	19.77	23.10	26.63	32.30	22.59	23.78	243	263	272	248	244	250	280	237	252
T2	19.83	23.10	26.84	31.10	22.99	24.00	254	284	289	231	253	272	292	229	260
T3	20.63	23.20	26.41	32.63	23.49	23.89	278	267	277	255	278	258	283	254	269
T4	20.57	23.30	26.69	32.34	23.59	24.27	271	299	290	244	270	287	297	243	263
T5	20.17	23.43	27.66	29.93	24.19	24.20	266	294	319	238	266	283	369	239	282
T6	20.37	22.97	26.23	31.97	23.99	23.82	267	258	283	232	267	241	311	246	275
T7	20.40	22.77	26.56	32.20	22.44	24.10	268	252	294	251	268	234	308	244	247
T8	20.17	22.97	26.37	30.17	22.89	-	247	233	311	248	248	218	343	247	256
T9	21.13	23.47	27.84	33.41	24.63	24.73	295	326	362	266	295	309	399	270	294
T10	19.01	22.47	21.18	27.97	20.14	23.72	207	195	178	217	205	186	192	206	237
Exp Mean	**20.21**	**23.08**	**26.24**	**31.40**	**23.09**	**24.06**	**260**	**267**	**288**	**243**	**259**	**254**	**307**	**242**	**264**
CD(0.05)	0.09	0.41	1.34	4.40	0.00	0.37	4.5	8.32	29.2	34.43	4.56	15.74	40.66	30.97	0.48

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	Total dry matter g/m^2 at Max.Tillering stage				Total dry matter g/m^2 at Panicle initiation stage		
	Chatha	Coimbatore	ICAR-IIRR	Navsari	Chatha	Coimbatore	Navsari
T1	426.67	379.03	398.3	348.33	637.00	698.00	386.47
T2	429.00	394.00	401.57	349.19	643.00	716.00	351.62
T3	454.67	380.97	443.47	370.33	665.33	709.97	413.26
T4	435.00	404.00	485.1	355.53	646.00	719.03	370.24
T5	423.33	411.03	508.57	340.98	631.33	722.00	362.66
T6	433.67	372.00	435.77	329.72	642.67	700.00	332.72
T7	448.00	368.00	419.95	332.12	658.00	694.00	352.61
T8	413.00	350.97	467.32	351.97	623.33	676.00	344.91
T9	480.00	424.00	556.62	374.72	688.33	752.00	419.02
T10	166.00	216.03	384.74	272.51	173.33	466.97	303.90
Exp Mean	**410.93**	**370.00**	**450.14**	**342.54**	**600.83**	**685.40**	**363.74**
CD(0.05)	3.95	17.00	51.05	47.65	3.97	29.17	49.64

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.) Summary on weed population no/m^2 of sustainable weed management in aerobic rice system Kharif-2021.

Treatments	CHATHA							
	Weed population at 15 -20 DAS (no/ m^2)							
	GRASSES				SEDGES	BLW		Total weeds
	Echinochloa spp	*Dactylactenium aegyptium*	*Cynodon dactylon*	*Eleusine indica*	*Cyperus spp*	*Solanum nigrum*	*Physalis minima*	
T1	3.33(1.95)	2.00(1.58)	1.67(1.46)	0.00(0.71)	32.33(5.73)	0.00(0.71)	0.00(0.71)	**39.33(6.31)**
T2	3.67(2.04)	2.00(1.56)	1.33(1.29)	0.00(0.71)	31.67(5.67)	0.00(0.71)	0.00(0.71)	**38.67(6.26)**
T3	7.33(2.80)	5.67(2.48)	4.33(2.20)	0.33(0.88)	37.67(6.18)	0.33(0.88)	0.33(0.88)	**56.00(7.52)**
T4	7.67(2.86)	5.33(2.41)	3.67(2.04)	0.33(0.88)	36.00(6.04)	0.67(1.05)	0.00(0.71)	**53.67(7.36)**
T5	1.67(1.46)	0.67(1.05)	0.67(1.05)	0.00(0.71)	34.33(5.90)	0.00(0.71)	0.00(0.71)	**37.33(6.15)**
T6	1.00(1.22)	1.33(1.34)	1.33(1.34)	0.00(0.71)	38.33(6.23)	0.00(0.71)	0.00(0.71)	**42.00(6.52)**
T7	0.67(1.05)	0.67(1.05)	0.33(0.88)	0.00(0.71)	4.00(2.11)	0.00(0.71)	0.00(0.71)	**5.67(2.48)**
T8	1.67(1.46)	0.67(1.05)	1.00(1.22)	0.00(0.71)	7.00(2.73)	0.00(0.71)	0.00(0.71)	**10.33(3.29)**
T9	0.67(1.05)	0.33(0.88)	1.00(1.22)	0.00(0.71)	0.67(1.05)	0.00(0.71)	0.00(0.71)	**2.67(1.74)**
T10	22.67(4.81)	14.00(3.81)	10.00(3.23)	0.33(0.88)	44.00(6.67)	0.67(1.00)	0.33(0.88)	**92.00(9.62)**
Exp Mean	**2.07**	**1.72**	**1.59**	**0.76**	**4.83**	**0.79**	**0.74**	**5.72**
CD(0.05)	0.32	0.42	0.44	0.28	0.36	0.33	0.22	0.4

***(Values in parentheses are transformed values)**

Treatments	CHATHA							
	Weed population at Maximum tillering stage (no/ m^2)							
	GRASSES				SEDGES	BLW		Total weeds
	Echinochloa spp	*Dactylactenium aegyptium*	*Cynodon dactylon*	*Eleusine indica*	*Cyperus spp*	*Solanum nigrum*	*Physalis minima*	
T1	13.67(3.76)	11.67(3.49)	15.67(4.02)	1.67(1.46)	22.33(4.78)	1.67(1.46)	1.67(1.46)	**68.33(8.30)**
T2	9.67(3.19)	8.33(2.97)	12.33(3.58)	1.33(1.34)	19.33(4.45)	1.33(1.34)	1.67(1.46)	**54.00(7.38)**
T3	6.67(2.68)	5.67(2.48)	7.33(2.80)	2.33(1.68)	16.00(4.06)	2.00(1.56)	1.67(1.46)	**41.67(6.49)**
T4	5.67(2.48)	7.33(2.80)	7.00(2.73)	1.00(1.22)	14.67(3.89)	1.33(1.34)	2.00(1.58)	**39.00(6.28)**
T5	5.33(2.41)	7.33(2.80)	7.33(2.80)	0.67(1.05)	9.33(3.13)	1.00(1.22)	1.00(1.22)	**32.00(5.70)**
T6	6.33(2.61)	8.67(3.03)	9.00(3.08)	1.67(1.46)	11.67(3.49)	2.00(1.58)	1.33(1.34)	**40.67(6.42)**
T7	4.33(2.20)	6.67(2.68)	5.33(2.41)	1.67(1.46)	8.67(3.03)	1.00(1.22)	0.67(1.05)	**28.33(5.37)**
T8	5.33(2.41)	7.67(2.86)	5.00(2.35)	1.00(1.17)	6.67(2.68)	2.33(1.68)	2.00(1.58)	**30.00(5.52)**
T9	1.00(1.22)	0.67(1.05)	0.33(0.88)	1.00(1.22)	1.33(1.34)	0.67(1.05)	0.33(0.88)	**5.33(2.41)**
T10	45.33(6.77)	31.67(5.67)	22.00(4.74)	7.00(2.73)	77.33(8.82)	5.33(2.41)	6.67(2.68)	**195.33(13.99)**
Exp Mean	**2.97**	**2.98**	**2.94**	**1.48**	**3.97**	**1.49**	**1.47**	**6.79**
CD(0.05)	0.22	0.26	0.29	0.41	0.18	0.32	0.33	0.22

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	CHATHA							
	Weed population at Panicle initiation stage (no/ m²)							
	GRASSES				SEDGES	BLW		Total weeds
	Echinochloa spp	*Dactylactenium aegyptium*	*Cynodon dactylon*	*Eleusine indica*	*Cyperus spp*	*Solanum nigrum*	*Physalis minima*	
T1	12.33(3.58)	9.67(3.19)	15.67(4.02)	0.33(0.88)	22.33(4.78)	0.67(1.05)	0.67(1.05)	**61.67(7.88)**
T2	9.00(3.08)	7.33(2.80)	10.33(3.29)	0.67(1.05)	16.67(4.14)	0.33(0.88)	0.67(1.05)	**45.00(6.75)**
T3	5.67(2.48)	4.67(2.27)	5.33(2.41)	0.67(1.05)	14.33(3.85)	1.00(1.17)	0.67(1.05)	**32.33(5.73)**
T4	5.00(2.34)	6.33(2.61)	6.33(2.61)	0.67(1.05)	12.67(3.63)	0.33(0.88)	0.67(1.05)	**32.00(5.70)**
T5	4.67(2.27)	7.00(2.73)	6.00(2.54)	0.33(0.88)	8.67(3.03)	0.33(0.88)	0.67(1.05)	**27.67(5.30)**
T6	4.00(2.11)	7.33(2.80)	7.67(2.86)	1.00(1.22)	10.00(3.24)	0.33(0.88)	0.67(1.05)	**31.00(5.61)**
T7	3.00(1.87)	5.33(2.41)	4.67(2.27)	0.67(1.05)	7.67(2.86)	0.33(0.88)	0.33(0.88)	**22.00(4.74)**
T8	3.67(2.04)	6.67(2.68)	4.00(2.12)	0.33(0.88)	5.33(2.41)	0.67(1.05)	1.00(1.17)	**21.67(4.71)**
T9	0.67(1.05)	0.67(1.05)	0.33(0.88)	0.67(1.05)	1.00(1.17)	0.33(0.88)	0.33(0.88)	**4.00(2.11)**
T10	41.67(6.49)	30.67(5.58)	21.00(4.64)	4.67(2.26)	73.00(8.57)	4.33(2.20)	5.00(2.34)	**180.33(13.45)**
Exp Mean	**2.73**	**2.81**	**2.76**	**1.14**	**3.77**	**1.07**	**1.16**	**6.2**
CD(0.05)	0.29	0.26	0.27	0.46	0.32	0.54	0.52	0.26

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing
T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)
T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha
T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)
T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)
T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	COIMBATORE														
	Weed population at 15 -20 DAS (no/ m²)					Weed population at Maximum tillering stage (no/ m²)					Weed population at Panicle initiation stage (no/ m²)				
	GRASSES		SEDGES	BLW	Total weeds	GRASSES		SEDGES	BLW	Total weeds	GRASSES		SEDGES	BLW	Total weeds
	Echinochloa colona	*Panicum repens*	*Cyperus difformis*	*Eclipta prostrata*		*Echinochloa colona*	*Panicum repens*	*Cyperus difformis*	*Eclipta prostrata*		*Echinochloa colona*	*Panicum repens*	*Cyperus difformis*	*Eclipta prostrata*	
T1	10.67(3.32)	8.00(2.91)	8.00(2.88)	8.33(2.97)	**35.00(5.94)**	19.33(4.45)	8.33(2.95)	10.33(3.29)	15.00(3.91)	**53.00(7.31)**	30.67(5.58)	9.67(3.15)	15.33(3.97)	27.33(5.26)	**83.00(9.13)**
T2	9.33(3.12)	8.67(3.01)	6.67(2.65)	8.00(2.90)	**32.67(5.76)**	16.67(4.12)	9.00(3.08)	8.00(2.87)	13.33(3.69)	**47.00(6.89)**	21.33(4.66)	8.67(3.00)	8.33(2.96)	22.00(4.72)	**60.33(7.79)**
T3	16.00(4.06)	12.00(3.52)	8.33(2.96)	12.67(3.62)	**49.00(7.03)**	17.67(4.26)	11.33(3.42)	8.67(3.02)	11.33(3.42)	**49.00(7.03)**	29.00(5.42)	9.67(3.15)	14.00(3.79)	34.33(5.89)	**87.00(9.34)**
T4	15.33(3.97)	7.33(2.78)	7.33(2.75)	13.00(3.66)	**43.00(6.59)**	13.67(3.76)	5.33(2.38)	6.00(2.54)	9.67(3.17)	**34.67(5.93)**	15.33(3.97)	7.00(2.72)	8.00(2.90)	19.00(4.41)	**49.33(7.05)**
T5	6.67(2.67)	4.00(2.08)	4.00(2.08)	7.67(2.85)	**22.33(4.77)**	7.00(2.71)	5.33(2.40)	6.67(2.67)	10.00(3.23)	**29.00(5.41)**	12.33(3.58)	9.00(3.06)	8.67(3.02)	18.33(4.34)	**48.33(6.98)**
T6	6.33(2.60)	3.67(2.00)	4.67(2.16)	8.00(2.88)	**22.67(4.81)**	6.67(2.68)	6.33(2.59)	5.67(2.46)	9.67(3.19)	**28.33(5.36)**	27.33(5.26)	10.33(3.27)	14.33(3.83)	30.67(5.57)	**82.67(9.10)**
T7	10.00(3.23)	4.67(2.24)	7.33(2.76)	18.33(4.33)	**40.33(6.38)**	9.33(3.11)	5.00(2.33)	9.67(3.19)	16.67(4.14)	**40.67(6.41)**	37.00(6.12)	10.33(3.29)	13.67(3.76)	33.67(5.84)	**94.67(9.75)**
T8	16.33(4.10)	10.33(3.29)	9.00(3.06)	16.33(4.10)	**52.00(7.24)**	25.33(5.06)	9.33(3.13)	13.67(3.76)	32.00(5.70)	**80.33(8.97)**	47.67(6.94)	13.33(3.70)	16.00(4.06)	46.00(6.81)	**123.00(11.11)**
T9	14.33(3.84)	5.33(2.40)	6.33(2.60)	11.33(3.42)	**37.33(6.14)**	1.00(1.17)	1.33(1.27)	1.67(1.46)	1.67(1.44)	**5.67(2.47)**	3.67(2.03)	3.00(1.86)	1.67(1.35)	2.67(1.74)	**11.00(3.38)**
T10	27.67(5.30)	11.33(3.44)	11.33(3.44)	21.33(4.66)	**71.67(8.49)**	35.33(5.98)	11.33(3.44)	18.00(4.30)	43.67(6.64)	**108.33(10.43)**	60.00(7.78)	19.33(4.45)	19.67(4.49)	61.67(7.88)	**160.67(12.69)**
Exp Mean	**3.62**	**2.77**	**2.73**	**3.54**	**6.32**	**3.73**	**2.7**	**2.95**	**3.85**	**6.62**	**5.13**	**3.17**	**3.41**	**5.25**	**8.63**
CD(0.05)	0.55	0.66	0.82	0.62	0.61	0.61	0.7	0.55	0.68	0.67	0.47	0.65	0.72	0.68	0.71

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	ICAR-IIRR							
	Weed population at 15 -20 DAS (no/ m^2)							
	GRASSES		SEDGES	BLW				Total weeds
	Echinochloa colona	*Dinebra retroflexa*	*Cyperus rotundus*	*Alternanthera echinata*	*Eclipta alba*	*Commelina benghalensis*	*Chorchorus trilocularis*	
T1	12.00(3.50)	0.00(0.71)	32.00(5.69)	25.33(5.08)	4.00(2.12)	12.00(3.50)	5.33(2.39)	**90.67(9.55)**
T2	9.33(3.12)	0.00(0.71)	20.00(4.51)	13.33(3.68)	0.00(0.71)	4.00(1.91)	9.33(3.12)	**56.00(7.50)**
T3	56.00(7.50)	20.00(4.51)	25.33(5.08)	21.33(4.64)	0.00(0.71)	4.00(1.91)	8.00(2.59)	**134.67(11.60)**
T4	53.33(7.33)	14.67(3.89)	22.67(4.81)	18.67(4.36)	0.00(0.71)	1.33(1.18)	10.67(3.30)	**121.33(11.03)**
T5	0.00(0.71)	9.33(3.12)	17.33(4.22)	13.33(3.66)	0.00(0.71)	1.33(1.18)	1.33(1.18)	**42.67(6.56)**
T6	6.67(2.39)	4.00(1.91)	25.33(5.08)	52.00(7.22)	0.00(0.71)	2.67(1.65)	1.33(1.18)	**92.00(9.61)**
T7	82.67(9.11)	26.67(5.19)	22.67(4.81)	13.33(3.71)	8.00(2.86)	4.00(1.91)	9.33(3.12)	**166.67(12.92)**
T8	64.00(8.02)	0.00(0.71)	21.33(4.65)	21.33(4.64)	0.00(0.71)	2.67(1.65)	12.00(3.50)	**121.33(11.03)**
T9	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	**0.00(0.71)**
T10	165.33(12.87)	30.67(5.55)	45.33(6.76)	86.67(9.32)	12.00(3.50)	21.33(4.61)	30.67(5.56)	**392.00(19.81)**
Exp Mean	**5.53**	**2.7**	**4.63**	**4.7**	**1.34**	**2.02**	**2.67**	**10.03**
CD(0.05)	1.08	0.85	0.58	1.04	0.48	1.35	1.33	0.91

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	ICAR-IIRR							
	Weed population at Maximum tillering stage (no/ m^2)							
	GRASSES		SEDGES	BLW				Total weeds
	Echinochloa colona	*Dinebra retroflexa*	*Cyperus rotundus*	*Alternanthera echinata*	*Eclipta alba*	*Commelina benghalensis*	*Chorchorus trilocularis*	
T1	21.33(4.67)	10.67(3.33)	37.33(6.14)	9.33(3.12)	4.00(1.91)	17.33(4.22)	13.33(3.71)	**113.33(10.66)**
T2	17.33(4.22)	6.67(2.65)	22.67(4.81)	0.00(0.71)	0.00(0.71)	4.00(1.91)	4.00(1.91)	**54.67(7.40)**
T3	40.00(6.34)	29.33(5.46)	29.33(5.45)	8.00(2.86)	2.67(1.44)	6.67(2.65)	12.00(3.50)	**128.00(11.33)**
T4	32.00(5.69)	22.67(4.80)	24.00(4.95)	0.00(0.71)	0.00(0.71)	5.33(2.39)	9.33(3.12)	**93.33(9.69)**
T5	0.00(0.71)	5.33(2.18)	21.33(4.64)	0.00(0.71)	0.00(0.71)	0.00(0.71)	1.33(1.18)	**28.00(5.30)**
T6	10.67(3.30)	6.67(2.39)	32.00(5.67)	0.00(0.71)	0.00(0.71)	8.00(2.86)	2.67(1.65)	**60.00(7.77)**
T7	58.67(7.69)	17.33(4.18)	29.33(5.42)	0.00(0.71)	1.33(1.18)	4.00(1.91)	10.67(3.24)	**121.33(11.02)**
T8	48.00(6.96)	18.67(4.34)	33.33(5.80)	5.33(2.18)	0.00(0.71)	4.00(1.91)	14.67(3.89)	**124.00(11.16)**
T9	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	**0.00(0.71)**
T10	137.33(11.72)	53.33(7.33)	57.33(7.60)	40.00(6.34)	12.00(3.50)	24.00(4.90)	29.33(5.45)	**353.33(18.81)**
Exp Mean	**5.2**	**3.74**	**5.12**	**1.87**	**1.23**	**2.42**	**2.84**	**9.38**
CD(0.05)	0.68	1.31	0.84	0.85	1.02	1.32	1	0.84

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	ICAR-IIRR						
	Weed population at Panicle initiation stage (no/ m^2)						Total weeds
	GRASSES		SEDGES	BLW			
	Echinochloa colona	*Dinebra retroflexa*	*Cyperus rotundus*	*Alternanthera echinata*	*Commelina benghalensis*	*Chorchorus trilocularis*	
T1	21.33(4.67)	16.00(4.04)	25.33(5.07)	8.00(2.92)	9.33(3.12)	6.67(2.65)	**86.67(9.34)**
T2	18.67(4.37)	9.33(3.12)	21.33(4.67)	5.33(2.39)	4.00(1.91)	4.00(1.91)	**62.67(7.94)**
T3	24.00(4.94)	14.67(3.84)	36.00(6.04)	9.33(3.12)	6.67(2.39)	5.33(2.39)	**96.00(9.80)**
T4	18.67(4.36)	13.33(3.71)	30.67(5.58)	5.33(2.39)	2.67(1.65)	4.00(2.12)	**74.67(8.67)**
T5	8.00(2.86)	6.67(2.65)	8.00(2.86)	2.67(1.65)	1.33(1.18)	4.00(1.91)	**30.67(5.48)**
T6	25.33(5.06)	18.67(4.37)	22.67(4.78)	6.67(2.65)	4.00(2.12)	10.67(3.30)	**88.00(9.41)**
T7	21.33(4.67)	16.00(4.04)	37.33(6.14)	12.00(3.54)	6.67(2.65)	6.67(2.65)	**100.00(10.01)**
T8	14.67(3.89)	24.00(4.94)	46.67(6.86)	6.67(2.65)	5.33(2.18)	1.33(1.18)	**98.67(9.95)**
T9	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	**0.00(0.71)**
T10	64.00(8.01)	50.67(7.15)	60.00(7.78)	14.67(3.87)	17.33(4.18)	36.00(6.04)	**242.67(15.59)**
Exp Mean	**4.35**	**3.86**	**5.05**	**2.59**	**2.21**	**2.49**	**8.69**
CD(0.05)	0.76	0.7	0.71	0.76	1.38	1.03	0.94

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	NAVSARI											
	Weed population at 15 -20 DAS (no/ m^2)											
	GRASSES			SEDGES			BLW				BLW	Total weeds
	Echinochloa crusgalli	*Dactylaclameum spp*	*Seteria glauca*	*Cyperus iria*	*Cyperus difformis*	*Fimbristylis littoralis*	*Eclipta alba*	*Marselia quadrifolia*	*Rotala densiflora*	*Bergia capensis*	*Celosia argentea*	
T1	1.67(1.46)	1.00(1.22)	1.00(1.22)	0.67(1.05)	1.67(1.46)	1.33(1.34)	1.67(1.44)	1.00(1.22)	1.33(1.29)	1.33(1.29)	1.33(1.34)	**14.00(3.81)**
T2	1.67(1.46)	1.33(1.34)	1.00(1.22)	1.67(1.46)	2.00(1.58)	1.33(1.34)	1.00(1.17)	1.00(1.17)	1.67(1.44)	1.00(1.17)	1.67(1.46)	**15.33(3.98)**
T3	1.33(1.34)	1.33(1.34)	1.00(1.22)	1.00(1.22)	1.33(1.34)	2.00(1.58)	1.00(1.17)	1.33(1.34)	1.33(1.34)	0.33(0.88)	0.67(1.05)	**12.67(3.63)**
T4	1.33(1.34)	1.33(1.34)	1.33(1.29)	1.00(1.17)	1.67(1.46)	1.67(1.39)	1.33(1.34)	1.00(1.17)	1.67(1.46)	1.00(1.22)	1.00(1.22)	**14.33(3.84)**
T5	2.00(1.58)	0.67(1.05)	1.33(1.34)	1.00(1.22)	1.67(1.46)	1.67(1.46)	2.00(1.58)	0.33(0.88)	1.67(1.44)	1.67(1.46)	1.33(1.29)	**15.33(3.98)**
T6	0.67(1.05)	1.33(1.34)	1.33(1.34)	1.00(1.22)	1.33(1.34)	1.33(1.34)	2.00(1.58)	0.33(0.88)	0.67(1.05)	0.67(1.05)	1.00(1.22)	**11.67(3.49)**
T7	2.00(1.56)	1.33(1.34)	1.33(1.34)	1.33(1.34)	1.67(1.46)	2.00(1.58)	1.67(1.46)	1.67(1.46)	1.67(1.46)	1.00(1.22)	1.00(1.22)	**16.67(4.14)**
T8	1.33(1.34)	1.67(1.46)	1.00(1.17)	1.33(1.34)	1.33(1.34)	1.33(1.34)	1.33(1.34)	0.67(1.05)	1.00(1.22)	1.33(1.34)	1.67(1.46)	**14.00(3.81)**
T9	1.33(1.34)	1.00(1.22)	0.33(0.88)	0.67(1.05)	1.33(1.34)	1.00(1.22)	1.00(1.22)	0.67(1.05)	0.67(1.05)	0.00(0.71)	0.67(1.05)	**8.67(3.03)**
T10	2.67(1.77)	2.00(1.58)	2.00(1.58)	1.33(1.29)	2.00(1.58)	2.00(1.58)	2.00(1.58)	2.33(1.68)	1.33(1.34)	2.00(1.56)	2.67(1.77)	**22.33(4.78)**
Exp Mean	**1.43**	**1.33**	**1.26**	**1.24**	**1.44**	**1.42**	**1.39**	**1.19**	**1.31**	**1.19**	**1.31**	**3.85**
CD(0.05)	0.37	0.31	0.39	0.48	0.33	0.37	0.45	0.53	0.53	0.51	0.44	0.27

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	NAVSARI											
	Weed Population no/m^2 at Maximum tillering stage											
	GRASSES			SEDGES			BLW					Total weeds
	Echinochloa crusgalli	*Dactylaclameum spp*	*Seteria glauca*	*Cyperus iria*	*Cyperus difformis*	*Fimbristylis litoralis*	*Eclipta alba*	*Marselia quadrifolia*	*Rotala densiflora*	*Bergia capensis*	*Celosia argentea*	
T1	2.33(1.68)	2.00(1.58)	1.67(1.46)	1.67(1.46)	2.00(1.58)	1.33(1.34)	2.00(1.58)	1.67(1.46)	1.67(1.46)	3.67(1.84)	1.67(1.46)	**19.00(4.42)**
T2	1.67(1.46)	1.67(1.46)	1.67(1.46)	1.00(1.22)	1.67(1.44)	1.67(1.46)	1.67(1.46)	1.33(1.34)	1.33(1.34)	1.67(1.46)	1.00(1.22)	**16.33(4.10)**
T3	2.00(1.56)	2.00(1.58)	1.67(1.44)	2.67(1.77)	1.67(1.46)	1.67(1.46)	1.67(1.46)	2.00(1.58)	1.67(1.46)	1.33(1.34)	1.33(1.34)	**19.67(4.49)**
T4	2.67(1.77)	1.67(1.46)	1.67(1.46)	2.00(1.58)	1.67(1.46)	1.33(1.34)	1.33(1.34)	1.33(1.34)	1.67(1.46)	1.00(1.22)	1.67(1.46)	**18.00(4.30)**
T5	1.67(1.46)	2.33(1.68)	2.00(1.56)	1.67(1.46)	1.67(1.46)	2.00(1.58)	0.67(1.05)	2.00(1.58)	1.67(1.46)	1.00(1.17)	1.00(1.22)	**17.67(4.26)**
T6	2.33(1.68)	1.67(1.46)	2.33(1.68)	2.00(1.56)	2.00(1.56)	1.67(1.46)	2.00(1.58)	1.00(1.22)	1.33(1.34)	1.33(1.34)	0.67(1.05)	**18.33(4.34)**
T7	2.33(1.68)	1.67(1.46)	1.00(1.22)	2.67(1.77)	2.00(1.58)	1.33(1.34)	1.00(1.22)	2.00(1.58)	1.33(1.34)	1.33(1.34)	1.00(1.22)	**17.67(4.26)**
T8	2.00(1.56)	1.67(1.46)	1.67(1.44)	1.67(1.46)	1.67(1.46)	1.67(1.46)	1.67(1.46)	1.00(1.17)	1.67(1.46)	1.67(1.46)	1.33(1.34)	**17.67(4.26)**
T9	1.67(1.46)	1.33(1.34)	1.33(1.34)	0.33(0.88)	1.67(1.46)	1.67(1.46)	0.00(0.71)	1.00(1.17)	1.00(1.22)	0.33(0.88)	0.67(1.05)	**11.00(3.39)**
T10	4.00(2.12)	3.00(1.87)	3.67(2.04)	2.67(1.77)	3.67(2.04)	3.00(1.87)	3.67(2.04)	2.67(1.76)	3.33(1.95)	2.33(1.68)	2.67(1.77)	**34.67(5.93)**
Exp Mean	**1.64**	**1.54**	**1.51**	**1.5**	**1.55**	**1.48**	**1.39**	**1.42**	**1.45**	**1.38**	**1.32**	**4.37**
CD(0.05)	0.38	0.3	0.43	0.34	0.39	0.32	0.29	0.36	0.34	0.67	0.31	0.2

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	NAVSARI											
	Weed Population no/m² at Panicle initiation stage											
	GRASSES			SEDGES			BLW					Total weeds
	Echinochloa crusgalli	*Dactylaclameum spp*	*Seteria glauca*	*Cyperus iria*	*Cyperus difformis*	*Fimbristylis litoralis*	*Eclipta alba*	*Marselia quadrifolia*	*Rotala densiflora*	*Bergia capensis*	*Celosia argentea*	
T1	3.00(1.87)	2.33(1.68)	2.00(1.58)	2.33(1.68)	2.00(1.58)	2.67(1.77)	2.67(1.77)	2.00(1.58)	2.00(1.56)	1.67(1.46)	1.67(1.46)	**24.33(4.98)**
T2	2.67(1.77)	2.33(1.68)	2.00(1.58)	2.00(1.58)	2.33(1.68)	2.33(1.68)	2.00(1.58)	1.67(1.46)	1.33(1.34)	1.67(1.46)	1.33(1.34)	**21.67(4.71)**
T3	2.33(1.68)	2.67(1.77)	1.67(1.46)	2.33(1.68)	2.33(1.68)	2.33(1.68)	2.00(1.58)	1.67(1.46)	2.00(1.58)	1.33(1.34)	2.00(1.58)	**22.67(4.81)**
T4	2.67(1.77)	2.33(1.68)	2.00(1.58)	2.33(1.66)	2.33(1.68)	2.00(1.58)	2.00(1.58)	1.67(1.46)	2.00(1.58)	1.67(1.46)	1.33(1.34)	**22.33(4.78)**
T5	2.00(1.58)	2.33(1.68)	1.67(1.46)	2.33(1.68)	2.00(1.56)	2.67(1.77)	1.33(1.34)	1.67(1.46)	2.00(1.56)	1.33(1.34)	1.33(1.34)	**20.67(4.60)**
T6	2.00(1.58)	2.67(1.77)	1.67(1.46)	2.00(1.58)	2.33(1.68)	2.00(1.58)	1.67(1.46)	1.67(1.46)	2.00(1.58)	2.00(1.58)	0.67(1.05)	**20.67(4.60)**
T7	3.33(1.95)	2.67(1.77)	1.00(1.22)	2.00(1.56)	2.00(1.58)	1.67(1.46)	2.00(1.58)	2.00(1.58)	1.67(1.46)	1.67(1.46)	1.00(1.22)	**21.00(4.63)**
T8	3.00(1.87)	2.33(1.68)	2.00(1.56)	3.00(1.87)	2.00(1.58)	1.67(1.46)	1.67(1.46)	1.67(1.46)	1.67(1.46)	1.67(1.46)	1.67(1.46)	**22.33(4.78)**
T9	1.67(1.46)	1.00(1.22)	1.33(1.34)	0.67(1.05)	1.00(1.22)	1.33(1.34)	0.67(1.00)	0.33(0.88)	1.00(1.22)	0.67(1.05)	0.67(1.05)	**10.33(3.29)**
T10	4.00(2.11)	4.33(2.20)	4.67(2.27)	4.00(2.11)	3.67(2.02)	3.67(2.04)	4.00(2.11)	3.67(2.03)	3.67(2.04)	3.33(1.94)	3.67(2.04)	**42.67(6.57)**
Exp Mean	**1.77**	**1.71**	**1.55**	**1.64**	**1.63**	**1.64**	**1.55**	**1.48**	**1.54**	**1.46**	**1.39**	**4.77**
CD(0.05)	0.24	0.25	0.3	0.39	0.33	0.28	0.38	0.33	0.28	0.33	0.36	0.24

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	PARBHANI								
	Weed population at 15 -20 DAS (no/ m²)								
	GRASSES			BLW					
	Cynadon dactylon	*Dinebra retroflexa*	*Digitaria sanguinalis*	*Alternanthera echinata*	*Abutilon indicum*	*Amiscophalocis cuculata*	*Parthenium hysterophorous*	*Euphorbia helioscopia*	Total weeds
T1	12.00(3.52)	11.00(3.38)	0.00(0.71)	4.00(2.06)	2.00(1.43)	6.00(2.52)	2.00(1.43)	0.00(0.71)	**37.00(6.04)**
T2	10.00(3.22)	0.00(0.71)	0.00(0.71)	0.00(0.71)	9.00(3.06)	6.00(2.52)	5.00(2.30)	3.00(1.79)	**33.00(5.72)**
T3	0.00(0.71)	0.00(0.71)	9.00(3.06)	18.00(4.29)	6.00(2.52)	10.00(3.22)	6.00(2.52)	5.00(2.30)	**54.00(7.33)**
T4	0.00(0.71)	0.00(0.71)	13.00(3.66)	15.00(3.93)	8.00(2.89)	0.00(0.71)	8.00(2.89)	5.00(2.30)	**49.00(7.00)**
T5	10.00(3.22)	0.00(0.71)	15.00(3.93)	4.00(2.06)	3.00(1.79)	0.00(0.71)	1.33(1.18)	13.00(3.66)	**46.33(6.78)**
T6	10.00(3.22)	0.00(0.71)	18.00(4.29)	2.00(1.43)	5.00(2.30)	0.00(0.71)	2.00(1.43)	13.00(3.66)	**50.00(7.05)**
T7	14.00(3.80)	5.00(2.30)	0.00(0.71)	9.00(3.06)	0.00(0.71)	7.00(2.71)	6.00(2.52)	6.00(2.52)	**47.00(6.83)**
T8	18.00(4.29)	10.00(3.22)	0.00(0.71)	0.00(0.71)	8.00(2.89)	9.00(3.06)	7.00(2.71)	0.00(0.71)	**52.00(7.21)**
T9	0.00(0.71)	2.00(1.43)	1.67(1.35)	1.67(1.35)	2.00(1.43)	2.00(1.43)	1.33(1.18)	0.00(0.71)	**10.67(2.90)**
T10	8.00(2.89)	0.00(0.71)	0.00(0.71)	18.00(4.29)	12.00(3.52)	9.00(3.06)	7.00(2.71)	13.00(3.66)	**67.00(8.18)**
Exp Mean	**2.63**	**1.46**	**1.98**	**2.39**	**2.25**	**2.06**	**2.09**	**2.2**	**6.5**
CD(0.05)	0.32	0.52	0.44	0.51	0.42	0.47	0.33	0.43	0.58

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	PARBHANI							
	Weed population at Maximum tillering stage (no/ m^2)							
	GRASSES			BLW				
	Cynadon dactylon	*Brachiaria erusiformis*	*Eragrotis nemaquensis*	*Alternanthera echinata*	*Abutilon indicum*	*Zanthium strumenum*	*Parthenium hysterophorous*	Total weeds
T1	15.17(3.96)	9.17(3.11)	0.00(0.71)	7.17(2.76)	5.17(2.37)	4.17(2.16)	4.17(2.15)	**45.00(6.74)**
T2	12.17(3.56)	0.00(0.71)	0.00(0.71)	3.17(1.90)	3.17(1.90)	2.17(1.61)	4.83(2.30)	**25.50(5.08)**
T3	10.17(3.26)	0.00(0.71)	0.00(0.71)	4.17(2.15)	2.17(1.61)	2.17(1.61)	4.17(2.15)	**22.83(4.81)**
T4	8.17(2.94)	3.17(1.90)	0.00(0.71)	7.17(2.76)	0.00(0.71)	4.17(2.15)	2.17(1.61)	**24.83(5.01)**
T5	7.17(2.76)	0.00(0.71)	0.00(0.71)	4.17(2.15)	3.17(1.90)	2.17(1.61)	0.00(0.71)	**16.67(4.12)**
T6	5.17(2.37)	5.17(2.38)	0.00(0.71)	0.00(0.71)	2.17(1.61)	4.17(2.16)	2.17(1.60)	**18.83(4.38)**
T7	14.17(3.83)	0.00(0.71)	12.17(3.56)	9.17(3.11)	0.00(0.71)	7.17(2.76)	4.17(2.15)	**46.83(6.87)**
T8	8.17(2.94)	4.17(2.16)	4.17(2.15)	8.17(2.94)	0.00(0.71)	0.00(0.71)	5.17(2.37)	**29.83(5.50)**
T9	1.17(1.23)	0.33(0.88)	0.00(0.71)	0.67(1.05)	1.17(1.23)	0.00(0.71)	1.17(1.23)	**4.50(2.02)**
T10	19.17(4.43)	13.17(3.70)	0.00(0.71)	15.17(3.96)	3.17(1.90)	0.00(0.71)	4.17(2.15)	**54.83(7.43)**
Exp Mean	**3.13**	**1.69**	**1.14**	**2.35**	**1.46**	**1.62**	**1.84**	**5.2**
CD(0.05)	0.18	0.23	0.14	0.17	0.28	0.25	0.23	0.41

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	PARBHANI								
	Weed population at panicle initiation stage (no/ m^2)								
	GRASSES				BLW				Total weeds
	Cynadon dactylon	*Eragrotis nemaquensis*	*Digitaria sanguinalis*	*Brachiaria erusiformis*	*Alternanthera echinata*	*Abutilon indicum*	*Crozophora rotlerri*	*Parthenium hysterophorous*	
T1	13.13(3.69)	8.13(2.93)	7.13(2.76)	0.00(0.71)	12.13(3.55)	6.13(2.56)	6.13(2.57)	0.00(0.71)	**52.80(7.29)**
T2	0.00(0.71)	7.13(2.76)	3.13(1.89)	5.13(2.37)	0.00(0.71)	7.13(2.76)	11.13(3.41)	0.00(0.71)	**33.67(5.83)**
T3	6.13(2.57)	3.13(1.89)	0.00(0.71)	4.13(2.14)	11.13(3.41)	5.13(2.37)	0.00(0.71)	0.00(0.71)	**29.67(5.48)**
T4	7.13(2.76)	5.13(2.37)	0.00(0.71)	0.00(0.71)	3.13(1.89)	7.13(2.76)	0.00(0.71)	5.13(2.37)	**27.67(5.29)**
T5	0.00(0.71)	0.00(0.71)	4.13(2.14)	5.13(2.37)	2.13(1.60)	5.13(2.37)	0.00(0.71)	3.13(1.89)	**19.67(4.46)**
T6	0.00(0.71)	7.13(2.76)	0.00(0.71)	3.47(1.97)	3.13(1.89)	4.13(2.14)	0.00(0.71)	3.13(1.88)	**21.00(4.61)**
T7	16.13(4.08)	0.00(0.71)	0.00(0.71)	12.13(3.55)	13.13(3.69)	6.13(2.57)	4.13(2.14)	0.00(0.71)	**51.67(7.22)**
T8	0.00(0.71)	0.00(0.71)	12.13(3.55)	6.13(2.57)	6.13(2.57)	3.13(1.89)	7.13(2.76)	0.00(0.71)	**34.67(5.92)**
T9	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	0.00(0.71)	**0.00(0.71)**
T10	10.13(3.26)	6.13(2.57)	12.13(3.55)	7.13(2.76)	24.13(4.96)	9.13(3.10)	8.13(2.93)	0.00(0.71)	**76.93(8.79)**
Exp Mean	**1.99**	**1.81**	**1.74**	**1.98**	**2.5**	**2.32**	**1.73**	**1.11**	**5.56**
CD(0.05)	0.15	0.19	0.2	0.22	0.2	0.17	0.18	0.27	0.31

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	RANCHI							
	Weed population at Max.tillering stage (no/ m^2)				Weed population at Panicle initiation stage (no/ m^2)			
	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL
T1	32.00(5.69)	7.83(2.89)	16.93(4.16)	**56.77(7.56)**	41.37(6.47)	10.20(3.26)	18.20(4.32)	**69.77(8.38)**
T2	12.50(3.59)	3.83(2.07)	5.90(2.50)	**22.23(4.77)**	17.20(4.20)	6.10(2.56)	11.50(3.46)	**34.80(5.93)**
T3	23.90(4.93)	5.50(2.45)	11.20(3.42)	**40.60(6.40)**	27.50(5.29)	8.30(2.96)	14.30(3.84)	**50.10(7.11)**
T4	3.03(1.86)	2.17(1.63)	3.20(1.90)	**8.40(2.97)**	5.10(2.34)	2.80(1.82)	5.20(2.39)	**13.10(3.68)**
T5	6.80(2.69)	2.77(1.80)	4.80(2.28)	**14.37(3.85)**	11.40(3.44)	4.80(2.29)	5.80(2.51)	**22.00(4.74)**
T6	28.60(5.38)	5.00(2.33)	14.50(3.86)	**48.10(6.97)**	22.20(4.76)	6.80(2.70)	16.20(4.08)	**45.20(6.75)**
T7	20.70(4.59)	6.13(2.57)	8.20(2.91)	**35.03(5.95)**	26.37(5.17)	4.60(2.26)	11.70(3.49)	**42.67(6.56)**
T8	-	-	-	**-**	-	-	-	**-**
T9	2.33(1.68)	2.67(1.75)	2.07(1.60)	**7.07(2.74)**	3.40(1.95)	2.70(1.78)	3.80(2.07)	**9.90(3.22)**
T10	77.27(8.81)	18.30(4.33)	40.10(6.37)	**135.67(11.66)**	122.00(11.06)	36.43(6.07)	127.17(11.29)	**285.60(16.91)**
Exp Mean	**4.36**	**2.42**	**3.22**	**5.88**	**4.96**	**2.86**	**4.16**	**7.03**
CD(0.05)	0.74	0.41	0.64	0.61	0.69	0.33	0.41	0.67

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.) Summary on group-wise weed population no/m² of sustainable weed management in aerobic rice system Kharif-2021.

Treatments	CHATHA											
	Weed population at 15 -20 DAS (no/ m²)				Weed population at Max.tillering stage (no/ m²)				Weed population at Panicle initiation stage (no/ m2)			
	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL
T1	7.00(2.73)	32.33(5.73)	0.00(0.71)	**39.33(6.31)**	42.67(6.57)	22.33(4.78)	3.33(1.95)	**68.33(8.30)**	38.00(6.20)	22.33(4.78)	1.33(1.34)	**61.67(7.88)**
T2	7.00(2.74)	31.67(5.67)	0.00(0.71)	**38.67(6.26)**	31.67(5.67)	19.33(4.45)	3.00(1.86)	**54.00(7.38)**	27.33(5.28)	16.67(4.14)	1.00(1.22)	**45.00(6.75)**
T3	17.67(4.26)	37.67(6.18)	0.67(1.05)	**56.00(7.52)**	22.00(4.74)	16.00(4.06)	3.67(2.04)	**41.67(6.49)**	16.33(4.10)	14.33(3.85)	1.67(1.44)	**32.33(5.73)**
T4	17.00(4.18)	36.00(6.04)	0.67(1.05)	**53.67(7.36)**	21.00(4.64)	14.67(3.89)	3.33(1.95)	**39.00(6.28)**	18.33(4.34)	12.67(3.63)	1.00(1.17)	**32.00(5.70)**
T5	3.00(1.87)	34.33(5.90)	0.00(0.71)	**37.33(6.15)**	20.67(4.60)	9.33(3.13)	2.00(1.58)	**32.00(5.70)**	18.00(4.30)	8.67(3.03)	1.00(1.17)	**27.67(5.30)**
T6	3.67(2.03)	38.33(6.23)	0.00(0.71)	**42.00(6.52)**	25.67(5.12)	11.67(3.49)	3.33(1.95)	**40.67(6.42)**	20.00(4.52)	10.00(3.24)	1.00(1.22)	**31.00(5.61)**
T7	1.67(1.46)	4.00(2.11)	0.00(0.71)	**5.67(2.48)**	18.00(4.30)	8.67(3.03)	1.67(1.46)	**28.33(5.37)**	13.67(3.76)	7.67(2.86)	0.67(1.05)	**22.00(4.74)**
T8	3.33(1.95)	7.00(2.73)	0.00(0.71)	**10.33(3.29)**	19.00(4.41)	6.67(2.68)	4.33(2.20)	**30.00(5.52)**	14.67(3.89)	5.33(2.41)	1.67(1.46)	**21.67(4.71)**
T9	2.00(1.56)	0.67(1.05)	0.00(0.71)	**2.67(1.74)**	3.00(1.86)	1.33(1.34)	1.00(1.17)	**5.33(2.41)**	2.33(1.57)	1.00(1.17)	0.67(1.05)	**4.00(2.11)**
T10	47.00(6.89)	44.00(6.67)	1.00(1.17)	**92.00(9.62)**	106.00(10.32)	77.33(8.82)	12.00(3.53)	**195.33(13.99)**	98.00(9.92)	73.00(8.57)	9.33(3.13)	**180.33(13.45)**
Exp Mean	**2.97**	**4.83**	**0.82**	**5.72**	**5.22**	**3.97**	**1.97**	**6.79**	**4.79**	**3.77**	**1.43**	**6.2**
CD(0.05)	0.31	0.36	0.32	0.4	0.28	0.18	0.33	0.22	0.47	0.32	0.51	0.26

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	COIMBATORE											
	Weed population at 15 -20 DAS (no/ m^2)				Weed population at Max.tillering stage (no/ m^2)				Weed population at Panicle initiation stage (no/ m2)			
	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL
T1	18.67(4.37)	8.00(2.88)	8.33(2.97)	**35.00(5.94)**	27.67(5.30)	10.33(3.29)	15.00(3.91)	**53.00(7.31)**	40.33(6.39)	15.33(3.97)	27.33(5.26)	83.00(9.13)
T2	18.00(4.30)	6.67(2.65)	8.00(2.90)	**32.67(5.76)**	25.67(5.10)	8.00(2.87)	13.33(3.69)	**47.00(6.89)**	30.00(5.51)	8.33(2.96)	22.00(4.72)	60.33(7.79)
T3	28.00(5.33)	8.33(2.96)	12.67(3.62)	**49.00(7.03)**	29.00(5.42)	8.67(3.02)	11.33(3.42)	**49.00(7.03)**	38.67(6.24)	14.00(3.79)	34.33(5.89)	87.00(9.34)
T4	22.67(4.80)	7.33(2.75)	13.00(3.66)	**43.00(6.59)**	19.00(4.40)	6.00(2.54)	9.67(3.17)	**34.67(5.93)**	22.33(4.77)	8.00(2.90)	19.00(4.41)	49.33(7.05)
T5	10.67(3.34)	4.00(2.08)	7.67(2.85)	**22.33(4.77)**	12.33(3.55)	6.67(2.67)	10.00(3.23)	**29.00(5.41)**	21.33(4.66)	8.67(3.02)	18.33(4.34)	48.33(6.98)
T6	10.00(3.21)	4.67(2.16)	8.00(2.88)	**22.67(4.81)**	13.00(3.66)	5.67(2.46)	9.67(3.19)	**28.33(5.36)**	37.67(6.16)	14.33(3.83)	30.67(5.57)	82.67(9.10)
T7	14.67(3.89)	7.33(2.76)	18.33(4.33)	**40.33(6.38)**	14.33(3.82)	9.67(3.19)	16.67(4.14)	**40.67(6.41)**	47.33(6.91)	13.67(3.76)	33.67(5.84)	94.67(9.75)
T8	26.67(5.21)	9.00(3.06)	16.33(4.10)	**52.00(7.24)**	34.67(5.91)	13.67(3.76)	32.00(5.70)	**80.33(8.97)**	61.00(7.84)	16.00(4.06)	46.00(6.81)	123.00(11.11)
T9	19.67(4.48)	6.33(2.60)	11.33(3.42)	**37.33(6.14)**	2.33(1.68)	1.67(1.46)	1.67(1.44)	**5.67(2.47)**	6.67(2.66)	1.67(1.35)	2.67(1.74)	11.00(3.38)
T10	39.00(6.28)	11.33(3.44)	21.33(4.66)	**71.67(8.49)**	46.67(6.87)	18.00(4.30)	43.67(6.64)	**108.33(10.43)**	79.33(8.93)	19.67(4.49)	61.67(7.88)	160.67(12.69)
Exp Mean	**4.52**	**2.73**	**3.54**	**6.32**	**4.57**	**2.95**	**3.85**	**6.62**	**6.01**	**3.41**	**5.25**	**8.63**
CD(0.05)	0.52	0.82	0.62	0.61	0.75	0.55	0.68	0.67	0.59	0.72	0.68	0.71

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	ICAR - IIRR											
	Weed population at 15 -20 DAS (no/ m^2)				Weed population at Max.tillering stage (no/ m^2)				Weed population at Panicle initiation stage (no/ m2)			
	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL
T1	12.00(3.50)	32.00(5.69)	46.67(6.86)	**90.67(9.55)**	32.00(5.70)	37.33(6.14)	44.00(6.65)	**113.33(10.66)**	37.33(6.15)	25.33(5.07)	24.00(4.95)	**86.67(9.34)**
T2	9.33(3.12)	20.00(4.51)	26.67(5.21)	**56.00(7.50)**	24.00(4.94)	22.67(4.81)	8.00(2.77)	**54.67(7.40)**	28.00(5.33)	21.33(4.67)	13.33(3.57)	**62.67(7.94)**
T3	76.00(8.73)	25.33(5.08)	33.33(5.73)	**134.67(11.60)**	69.33(8.35)	29.33(5.45)	29.33(5.46)	**128.00(11.33)**	38.67(6.24)	36.00(6.04)	21.33(4.64)	**96.00(9.80)**
T4	68.00(8.27)	22.67(4.81)	30.67(5.56)	**121.33(11.03)**	54.67(7.43)	24.00(4.95)	14.67(3.89)	**93.33(9.69)**	32.00(5.68)	30.67(5.58)	12.00(3.54)	**74.67(8.67)**
T5	9.33(3.12)	17.33(4.22)	16.00(4.04)	**42.67(6.56)**	5.33(2.18)	21.33(4.64)	1.33(1.18)	**28.00(5.30)**	14.67(3.84)	8.00(2.86)	8.00(2.56)	**30.67(5.48)**
T6	10.67(3.33)	25.33(5.08)	56.00(7.49)	**92.00(9.61)**	17.33(4.22)	32.00(5.67)	10.67(3.33)	**60.00(7.77)**	44.00(6.65)	22.67(4.78)	21.33(4.64)	**88.00(9.41)**
T7	109.33(10.46)	22.67(4.81)	34.67(5.91)	**166.67(12.92)**	76.00(8.74)	29.33(5.42)	16.00(3.84)	**121.33(11.02)**	37.33(6.14)	37.33(6.14)	25.33(5.07)	**100.00(10.01)**
T8	64.00(8.02)	21.33(4.65)	36.00(6.00)	**121.33(11.03)**	66.67(8.18)	33.33(5.80)	24.00(4.94)	**124.00(11.16)**	38.67(6.25)	46.67(6.86)	13.33(3.71)	**98.67(9.95)**
T9	0.00(0.71)	0.00(0.71)	0.00(0.71)	**0.00(0.71)**	0.00(0.71)	0.00(0.71)	0.00(0.71)	**0.00(0.71)**	0.00(0.71)	0.00(0.71)	0.00(0.71)	**0.00(0.71)**
T10	196.00(14.01)	45.33(6.76)	150.67(12.28)	**392.00(19.81)**	190.67(13.81)	57.33(7.60)	105.33(10.27)	**353.33(18.81)**	114.67(10.72)	60.00(7.78)	68.00(8.26)	**242.67(15.59)**
Exp Mean	**6.33**	**4.63**	**5.98**	**10.03**	**6.43**	**5.12**	**4.3**	**9.38**	**5.77**	**5.05**	**4.16**	**8.69**
CD(0.05)	0.81	0.58	1.17	0.91	0.97	0.84	1.29	0.84	0.91	0.71	1.17	0.94

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	NAVSARI											
	Weed population at 15 -20 DAS (no/ m^2)				Weed population at Max.tillering stage (no/ m^2)				Weed population at Panicle initiation stage (no/ m2)			
	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL
T1	3.67(2.04)	3.67(2.03)	6.67(2.68)	**14.00(3.81)**	6.00(2.55)	5.00(2.35)	8.00(2.92)	**19.00(4.42)**	7.33(2.80)	7.00(2.73)	10.00(3.24)	**24.33(4.98)**
T2	4.00(2.12)	5.00(2.34)	6.33(2.61)	**15.33(3.98)**	5.00(2.35)	4.33(2.20)	7.00(2.74)	**16.33(4.10)**	7.00(2.74)	6.67(2.68)	8.00(2.92)	**21.67(4.71)**
T3	3.67(2.04)	4.33(2.20)	4.67(2.27)	**12.67(3.63)**	5.67(2.48)	6.00(2.55)	8.00(2.91)	**19.67(4.49)**	6.67(2.68)	7.00(2.74)	9.00(3.08)	**22.67(4.81)**
T4	4.00(2.12)	4.33(2.15)	6.00(2.55)	**14.33(3.84)**	6.00(2.55)	5.00(2.35)	7.00(2.74)	**18.00(4.30)**	7.00(2.74)	6.67(2.68)	8.67(3.02)	**22.33(4.78)**
T5	4.00(2.12)	4.33(2.20)	7.00(2.74)	**15.33(3.98)**	6.00(2.54)	5.33(2.41)	6.33(2.61)	**17.67(4.26)**	6.00(2.55)	7.00(2.73)	7.67(2.86)	**20.67(4.60)**
T6	3.33(1.95)	3.67(2.03)	4.67(2.26)	**11.67(3.49)**	6.33(2.61)	5.67(2.48)	6.33(2.61)	**18.33(4.34)**	6.33(2.61)	6.33(2.61)	8.00(2.91)	**20.67(4.60)**
T7	4.67(2.27)	5.00(2.35)	7.00(2.74)	**16.67(4.14)**	5.00(2.34)	6.00(2.55)	6.67(2.68)	**17.67(4.26)**	7.00(2.73)	5.67(2.48)	8.33(2.97)	**21.00(4.63)**
T8	4.00(2.12)	4.00(2.11)	6.00(2.55)	**14.00(3.81)**	5.33(2.41)	5.00(2.35)	7.33(2.80)	**17.67(4.26)**	7.33(2.80)	6.67(2.68)	8.33(2.97)	**22.33(4.78)**
T9	2.67(1.77)	3.00(1.87)	3.00(1.87)	**8.67(3.03)**	4.33(2.20)	3.67(2.04)	3.00(1.87)	**11.00(3.39)**	4.00(2.11)	3.00(1.87)	3.33(1.95)	**10.33(3.29)**
T10	6.67(2.68)	5.33(2.41)	10.33(3.29)	**22.33(4.78)**	10.67(3.34)	9.33(3.13)	14.67(3.89)	**34.67(5.93)**	13.00(3.67)	11.33(3.44)	18.33(4.34)	**42.67(6.57)**
Exp Mean	**2.12**	**2.17**	**2.56**	**3.85**	**2.54**	**2.44**	**2.78**	**4.37**	**2.74**	**2.66**	**3.03**	**4.77**
CD(0.05)	0.17	0.4	0.22	0.27	0.19	0.17	0.18	0.2	0.21	0.19	0.22	0.24

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	PARBHANI								
	Weed population at 15 -20 DAS (no/ m^2)			Weed population at Max.tillering stage (no/ m^2)			Weed population at Panicle initiation stage (no/ m2)		
	GRASSES	BLW	TOTAL	GRASSES	BLW	TOTAL	GRASSES	BLW	TOTAL
T1	23.00(4.83)	14.00(3.65)	**37.00(6.04)**	24.33(4.98)	20.67(4.59)	**45.00(6.74)**	28.40(5.37)	24.40(4.98)	**52.80(7.29)**
T2	10.00(3.22)	23.00(4.77)	**33.00(5.72)**	12.17(3.56)	13.33(3.69)	**25.50(5.08)**	15.40(3.97)	18.27(4.33)	**33.67(5.83)**
T3	9.00(3.06)	45.00(6.70)	**54.00(7.33)**	10.17(3.26)	12.67(3.60)	**22.83(4.81)**	13.40(3.71)	16.27(4.09)	**29.67(5.48)**
T4	13.00(3.66)	36.00(6.00)	**49.00(7.00)**	11.33(3.43)	13.50(3.73)	**24.83(5.01)**	12.27(3.57)	15.40(3.97)	**27.67(5.29)**
T5	25.00(5.03)	21.33(4.59)	**46.33(6.78)**	7.17(2.76)	9.50(3.13)	**16.67(4.12)**	9.27(3.11)	10.40(3.28)	**19.67(4.46)**
T6	28.00(5.32)	22.00(4.66)	**50.00(7.05)**	10.33(3.29)	8.50(2.97)	**18.83(4.38)**	10.60(3.32)	10.40(3.27)	**21.00(4.61)**
T7	19.00(4.39)	28.00(5.28)	**47.00(6.83)**	26.33(5.18)	20.50(4.57)	**46.83(6.87)**	28.27(5.36)	23.40(4.88)	**51.67(7.22)**
T8	28.00(5.32)	24.00(4.91)	**52.00(7.21)**	16.50(4.12)	13.33(3.71)	**29.83(5.50)**	18.27(4.33)	16.40(4.10)	**34.67(5.92)**
T9	3.67(1.84)	7.00(2.37)	**10.67(2.90)**	1.50(1.33)	3.00(1.72)	**4.50(2.02)**	0.00(0.71)	0.00(0.71)	**0.00(0.71)**
T10	8.00(2.89)	59.00(7.68)	**67.00(8.18)**	32.33(5.73)	22.50(4.79)	**54.83(7.43)**	35.53(6.00)	41.40(6.47)	**76.93(8.79)**
Exp Mean	**3.96**	**5.06**	**6.5**	**3.76**	**3.65**	**5.2**	**3.94**	**4.01**	**5.56**
CD(0.05)	0.36	0.47	0.58	0.23	0.32	0.41	0.22	0.27	0.31

***(Values in parentheses are transformed values)**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.) Summary on weed Dry biomass g/m^2 of Sustainable weed management in aerobic rice system, Kharif-2021.

Treatments	CHATHA			COIMBATORE											
	Total Weed dry biomas g/m^2			Weed biomas at 15 -20 DAS (g/ m^2)				Weed biomass at Max.tillering stage (g/ m^2)				Weed biomass at Panicle initiation stage (g/ m^2)			
	15 -20 DAS	Maximum.tillering stage	Panicle initiation stage	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL
T1	0.53	14.55	22.23	6.05	1.49	5.11	**12.65**	10.71	2.86	8.37	**21.95**	16.53	6.72	14.14	**37.39**
T2	0.47	14.08	19.77	5.47	1.36	4.39	**11.21**	10.07	2.77	7.86	**20.71**	8.99	4.34	13.76	**27.09**
T3	16.80	22.51	25.23	6.58	1.56	5.5	**13.63**	11.34	2.83	6.92	**21.09**	19.76	6.61	16.99	**43.36**
T4	15.01	30.69	42.73	5.77	1.42	5.65	**12.84**	5.54	2.21	5.89	**13.65**	8.81	4.72	9.86	**23.39**
T5	12.92	35.30	43.09	1.95	1.08	2.27	**5.3**	3.94	2.06	4.08	**10.08**	8.62	3.88	9.73	**22.23**
T6	12.96	37.36	46.41	1.71	0.91	2.64	**5.26**	4.23	2.19	5.59	**12.01**	11.39	4.04	16.19	**31.62**
T7	0.31	26.95	24.97	5.3	1.41	7.62	**14.33**	6.27	2.97	8.87	**18.11**	18.22	6.16	16.63	**41.00**
T8	0.51	24.84	22.18	6.54	1.67	7.37	**15.58**	12.4	4.45	15.89	**32.74**	22.14	7.35	22.14	**51.63**
T9	0.45	1.82	2.16	4.49	1.36	5.29	**11.14**	1.2	0.98	0.79	**2.98**	3.7	1.55	1.76	**7.01**
T10	23.00	323.33	329.85	7.47	2.11	8.2	**17.79**	14.58	5.19	19.64	**39.41**	29.32	10.4	33.42	**73.14**
Exp Mean	**8.30**	**53.14**	**57.86**	**5.133**	**1.437**	**5.404**	**11.97**	**8.028**	**2.851**	**8.39**	**19.27**	**14.748**	**5.577**	**15.462**	**35.79**
CD(0.05)	1.26	2.22	3.45	0.95	0.53	1.16	1.59	1.83	0.52	2.22	3.54	1.65	1.38	2.94	3.43

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	ICAR-IIRR								ICAR-IIRR							
	Weed Dry biomass at 15 -20 DAS (g/ m^2)								Weed dry biomass at Maximum tillering stage (g/ m^2)							
	GRASSES		SEDGES	BLW					GRASSES		SEDGES	BLW				
	Echinochloa colona	Dinebra retroflexa	Cyperus rotundus	Alternanthera echinata	Eclipta alba	Commelina benghalensis	Chorchorus trilocularis	Total weeds	Echinochloa colona	Dinebra retroflexa	Cyperus rotundus	Alternanthera echinata	Eclipta alba	Commelina benghalensis	Chorchorus trilocularis	Total weeds
T1	1.93	0.00	11.63	3.61	0.37	0.73	0.99	19.25	37.91	30.39	18.11	3.93	2.92	11.08	3.17	107.50
T2	1.05	0.00	11.25	2.28	0.00	0.39	0.29	15.26	11.84	4.25	14.59	0.00	0.00	3.19	2.23	36.11
T3	21.57	1.03	8.65	1.90	0.00	0.71	0.93	34.78	51.84	37.15	22.11	4.46	1.32	10.16	9.45	136.50
T4	17.81	1.69	2.99	1.77	0.00	0.04	0.42	24.72	45.45	20.51	18.98	0.00	0.00	6.65	4.95	96.53
T5	0.00	1.29	2.32	1.58	0.00	0.16	0.04	5.40	0.00	4.40	11.51	0.00	0.00	0.00	0.21	16.11
T6	0.75	1.67	7.17	2.53	0.00	0.25	0.14	12.51	14.24	5.07	28.42	0.00	0.00	14.02	4.34	66.09
T7	15.27	3.27	4.32	1.76	1.70	0.93	0.76	28.00	69.76	17.12	12.24	0.00	0.91	3.53	6.46	110.02
T8	5.32	0.00	2.53	1.79	0.00	0.85	1.06	11.55	63.33	33.82	5.05	4.04	0.00	3.71	5.58	115.53
T9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T10	20.60	3.17	13.24	4.79	2.60	4.34	3.44	52.19	217.61	41.63	38.35	9.87	3.63	21.24	7.36	339.68
Exp Mean	**10.54**	**2.02**	**7.12**	**2.45**	**1.56**	**0.93**	**0.90**	**22.63**	**64.00**	**21.59**	**18.82**	**5.58**	**2.20**	**9.20**	**4.86**	**113.79**
CD(0.05)	6.74	1.72	2.80	1.21	1.54	1.38	1.03	8.28	12.27	8.55	6.70	4.03	2.62	4.66	3.69	16.60

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	ICAR-IIRR						
	Weed dry biomass at Panicle initiation stage (g/ m^2)						
	GRASSES		SEDGES	BLW			Total weeds
	Echinochloa colona	Dinebra retroflexa	Cyperus rotundus	Alternanthera echinata	Commelina benghalensis	Chorchorus trilocularis	
T1	44.67	6.48	6.15	4.06	4.74	4.05	70.15
T2	35.40	5.88	4.33	1.57	3.74	2.50	53.42
T3	45.16	8.05	9.78	3.22	3.86	4.21	74.27
T4	32.00	7.55	7.88	2.68	2.92	3.10	56.12
T5	19.79	4.64	2.06	0.67	1.61	2.23	31.00
T6	42.25	7.66	4.75	3.06	3.46	5.24	66.41
T7	38.29	7.56	12.15	1.57	7.12	4.24	70.94
T8	26.99	8.46	13.31	3.99	2.17	0.69	55.63
T9	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T10	117.64	28.13	14.26	9.69	8.93	8.01	186.66
Exp Mean	**44.69**	**9.38**	**8.30**	**3.39**	**4.28**	**3.81**	**73.84**
CD(0.05)	8.83	4.97	3.52	3.04	4.18	2.33	10.89

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	NAVSARI											
	Weed Dry biomass at 15 -20 DAS (g/ m^2)											
	GRASSES			SEDGES			BLW					Total weeds
	Echinochloa crusgalli	Dactyloclameum spp	Seteria glauca	Cyperus iria	Cyperus difformis	Fimbristylis litoralis	Eclipta alba	Marselia quadrifolia	Rotala densiflora	Bergia capensis	Celosia argentea	
T1	2.02	1.41	1.54	0.92	2.18	1.81	1.66	1.47	1.75	1.68	1.73	**18.17**
T2	2.09	1.65	1.53	2.19	2.62	1.37	1.21	1.20	2.20	1.41	2.22	**19.70**
T3	1.87	1.36	1.59	1.47	1.85	2.17	1.17	1.53	2.02	0.48	0.95	**16.44**
T4	1.83	1.69	1.85	1.19	2.27	1.70	1.67	1.08	2.16	1.53	1.45	**18.41**
T5	2.28	0.91	1.80	1.28	2.19	1.74	2.28	0.54	2.36	2.28	1.59	**19.24**
T6	1.02	2.06	1.80	1.24	1.68	2.16	2.39	0.42	1.15	0.98	1.43	**16.33**
T7	2.65	1.93	1.78	1.83	2.06	2.33	2.10	2.19	2.42	1.54	1.48	**22.31**
T8	2.37	2.16	1.30	1.66	1.67	2.12	1.75	1.15	1.68	1.90	1.89	**19.65**
T9	2.15	1.53	0.49	0.75	1.64	1.31	1.37	0.97	1.09	0.00	1.07	**12.38**
T10	3.55	2.58	2.70	1.46	2.57	2.66	2.54	2.63	2.01	2.63	3.02	**28.33**
Exp Mean	**2.18**	**1.73**	**1.64**	**1.40**	**2.07**	**1.94**	**1.81**	**1.32**	**1.88**	**1.60**	**1.68**	**19.10**
CD(0.05)	0.88	0.77	1.12	1.14	0.90	0.98	1.18	1.36	1.50	1.51	1.31	2.05

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	NAVSARI											
	Weed dry biomass g/m^2 at Maximum tillering stage											
	GRASSES			SEDGES			BLW					Total weeds
	Echinochloa crusgalli	Dactyloclameum spp	Seteria glauca	Cyperus iria	Cyperus difformis	Fimbristylis litoralis	Eclipta alba	Marselia quadrifolia	Rotala densiflora	Bergia capensis	Celosia argentea	
T1	3.54	3.18	3.05	2.84	3.62	3.14	3.66	3.36	3.07	2.33	3.18	**34.97**
T2	2.95	2.85	2.98	2.34	3.19	3.37	3.12	2.90	2.89	3.25	2.59	**32.44**
T3	2.55	3.27	3.14	3.68	3.49	3.25	3.13	3.43	3.11	2.85	2.86	**34.76**
T4	3.54	2.98	2.87	3.20	3.19	3.00	3.03	2.86	3.26	2.43	3.44	**33.79**
T5	2.93	3.07	3.39	3.30	3.28	3.44	1.72	3.64	3.02	2.00	2.52	**32.31**
T6	3.36	3.54	3.23	2.98	3.70	3.37	3.30	2.56	2.76	2.90	1.77	**33.47**
T7	3.18	2.66	2.39	3.66	3.52	2.95	3.01	3.51	2.82	2.87	2.65	**33.21**
T8	3.03	2.92	3.37	2.95	3.11	3.26	2.66	2.00	3.38	3.16	2.95	**32.80**
T9	2.97	2.56	2.93	0.79	3.33	3.42	0.00	2.06	2.49	0.87	1.65	**23.07**
T10	5.07	4.25	5.18	4.10	4.69	4.36	4.85	4.22	4.71	3.89	4.21	**49.54**
Exp Mean	**3.31**	**3.13**	**3.25**	**2.98**	**3.51**	**3.36**	**3.16**	**3.05**	**3.15**	**2.66**	**2.78**	**34.04**
CD(0.05)	1.16	0.83	1.36	1.20	1.31	0.96	1.37	1.37	1.00	1.34	1.35	2.56

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	NAVSARI											
	Weed dry biomass g/m² at Panicle initiation stage											
	GRASSES			SEDGES			BLW					Total weeds
	Echinochloa crusgalli	Dactyloclameum spp	Seteria glauca	Cyperus iria	Cyperus difformis	Fimbristylis litoralis	Eclipta alba	Marselia quadrifolia	Rotala densiflora	Bergia capensis	Celosia argentea	
T1	4.71	3.82	3.72	3.9	2.86	4.26	4.54	3.95	3.73	3.63	3.3	**42.42**
T2	4.44	3.97	3.72	3.62	3.75	3.92	3.93	3.55	3.07	3.55	3.15	**40.66**
T3	4.32	4.2	3.42	3.84	3.69	3.81	3.99	3.4	3.7	3.21	3.81	**41.39**
T4	4.64	3.97	3.69	3.91	3.72	3.67	3.8	3.4	3.76	3.36	3.42	**41.34**
T5	3.7	4.05	3.1	4.13	3.28	4.39	3.22	3.61	3.7	3.67	3.14	**39.98**
T6	3.87	4.34	3.63	3.67	3.7	3.48	3.5	3.65	4.07	3.78	2.13	**39.80**
T7	5.18	4.39	2.64	2.32	3.47	3.3	3.86	3.97	3.45	3.32	2.6	**38.49**
T8	4.93	3.96	3.77	4.57	3.6	3.48	3.58	3.86	4.39	3.42	3.66	**43.20**
T9	3.68	2.8	3.08	1.82	2.69	3.11	1.19	1.05	3.09	1.89	1.93	**26.34**
T10	5.68	6.03	6.35	5.7	5.1	5.27	6.07	5.51	5.46	5.55	5.44	**62.16**
Exp Mean	**4.515**	**4.153**	**3.712**	**3.748**	**3.586**	**3.869**	**3.768**	**3.595**	**3.842**	**3.538**	**3.258**	**41.58**
CD(0.05)	0.87	1.09	0.93	1.44	1.25	0.84	1.43	1.31	1.37	1.26	1.73	3.24

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	PARBHANI								
	Weed dry biomass at 15 -20 DAS (g/ m^2)								
	GRASSES			BLW					
	Cynadon dactylon	Dinebra retroflexa	Digitaria sanguinalis	Altrnanthera echinata	Abutilon indicum	Amiscophalocis cuculata	Parthenium hysterophorous	Euphorbia helioscopia	Total weeds
T1	17.38	15.93	0.00	7.16	3.58	10.74	3.58	0.00	**58.36**
T2	14.48	0.00	0.00	0.00	16.11	10.74	8.95	4.34	**54.62**
T3	0.00	0.00	13.03	32.22	10.74	17.90	10.74	7.24	**91.87**
T4	0.00	0.00	18.83	26.85	14.32	0.00	14.32	7.24	**81.55**
T5	14.48	0.00	21.72	7.16	5.37	0.00	2.39	18.82	**69.94**
T6	14.48	0.00	26.07	3.58	8.95	0.00	3.58	18.82	**75.48**
T7	20.27	7.24	0.00	16.11	0.00	12.53	10.74	8.69	**75.58**
T8	26.07	14.48	0.00	0.00	14.32	16.11	12.53	0.00	**83.50**
T9	0.00	2.90	2.41	2.98	3.58	3.58	2.39	0.00	**17.84**
T10	11.59	0.00	0.00	32.22	21.48	16.11	12.53	18.82	**112.74**
Exp Mean	**16.96**	**4.05**	**16.41**	**16.04**	**10.94**	**12.53**	**8.18**	**8.40**	**72.15**
CD(0.05)	0.00	3.40	1.41	1.28	0.00	0.00	0.75	3.18	4.04

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	PARBHANI							
	Weed dry biomass at Maximum tillering stage (g/ m^2)							
	GRASSES			BLW				
	Cynadon dactylon	Brachiaria erusiformis	Eragrotis nemaquensis	Alterrnanthera echinata	Abutilon indicum	Zanthium strumenum	Parthenium hysterophorous	Total weeds
T1	21.96	13.27	0.00	12.83	9.25	7.46	7.46	**72.23**
T2	17.62	0.00	0.00	5.67	5.67	3.88	8.65	**41.48**
T3	14.72	0.00	0.00	7.46	3.88	3.88	7.46	**37.39**
T4	11.83	4.59	0.00	12.83	0.00	7.46	3.88	**40.57**
T5	10.38	0.00	0.00	7.46	5.67	3.88	0.00	**27.38**
T6	7.48	7.48	0.00	0.00	3.88	7.46	3.88	**30.18**
T7	20.51	0.00	17.62	16.41	0.00	12.83	7.46	**74.82**
T8	11.83	6.03	6.03	14.62	0.00	0.00	9.25	**47.76**
T9	1.69	0.48	0.00	1.19	2.09	0.00	2.09	**7.54**
T10	27.76	19.07	0.00	27.15	5.67	0.00	7.46	**87.09**
Exp Mean	**14.58**	**8.49**	**11.83**	**11.74**	**5.16**	**6.69**	**6.40**	**46.65**
CD(0.05)	0.39	1.35	1.80	0.75	0.00	0.77	0.74	2.27

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	PARBHANI									RANCHI	
	Weed dry biomass at panicle initiation stage (g/ m²)									Weed dry biomass g/m²	
	GRASSES				BLW				Total weeds	Maximum tillering stage	Panicle initiation stage
	Cynadon dactylon	Eragrotis nemaquensis	Digitaria sanguinalis	Brachiaria erusiformis	Alterrnanthera echinata	Abutilon indicum	Crozophora rotlerri	Parthenium hysterophorous			
T1	19.02	11.78	10.33	0.00	21.72	10.98	10.98	0.00	**84.80**	90.20	127.70
T2	0.00	10.33	4.54	7.43	0.00	12.77	19.93	0.00	**55.00**	49.00	77.40
T3	8.88	4.54	0.00	5.98	19.93	9.19	0.00	0.00	**48.52**	88.20	97.40
T4	10.33	7.43	0.00	0.00	5.61	12.77	0.00	9.19	**45.33**	18.70	21.50
T5	0.00	0.00	5.98	7.43	3.82	9.19	0.00	5.61	**32.03**	32.80	40.90
T6	0.00	10.33	0.00	5.02	5.61	7.40	0.00	5.61	**33.96**	98.23	104.83
T7	23.36	0.00	0.00	17.57	23.51	10.98	7.40	0.00	**82.81**	80.10	107.40
T8	0.00	0.00	17.57	8.88	10.98	5.61	12.77	0.00	**55.81**		
T9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	16.10	20.60
T10	14.67	8.88	17.57	10.33	43.20	16.35	14.56	0.00	**125.56**	293.80	616.80
Exp Mean	**15.25**	**8.88**	**11.20**	**8.95**	**16.80**	**10.58**	**13.13**	**6.80**	**56.38**	85.24	134.95
CD(0.05)	0.01	0.01	0.49	0.56	1.11	1.03	0.60	1.50	5.92	15.06	17.68

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.) Summary on group-wise weed Dry biomass g/m^2 of Sustainable weed management in aerobic rice system, Kharif-2021.

Treatments	ICAR -IIRR											
	Weed biomas at 15 -20 DAS (g/ m^2)				Weed biomass at Max.tillering stage (g/ m^2)				Weed biomass at Panicle initiation stage (g/ m2)			
	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL
T1	1.93	11.63	5.70	**19.25**	68.29	18.11	21.1	**107.5**	51.15	6.15	12.85	**70.15**
T2	1.05	11.25	2.96	**15.26**	16.09	14.59	5.43	**36.11**	41.28	4.33	7.81	**53.42**
T3	22.59	8.65	3.54	**34.78**	88.99	22.11	25.4	**136.5**	53.21	9.78	11.29	**74.27**
T4	19.51	2.99	2.23	**24.72**	65.96	18.98	11.59	**96.53**	39.54	7.88	8.70	**56.12**
T5	1.29	2.32	1.78	**5.40**	4.4	11.51	0.21	**16.11**	24.44	2.06	4.51	**31.00**
T6	2.41	7.17	2.93	**12.51**	19.31	28.42	18.36	**66.09**	49.90	4.75	11.76	**66.41**
T7	18.54	4.32	5.15	**28.00**	86.88	12.24	10.9	**110.02**	45.86	12.15	12.93	**70.94**
T8	5.32	2.53	3.70	**11.55**	97.16	5.05	13.33	**115.53**	35.45	13.31	6.86	**55.63**
T9	0.00	0.00	0.00	**0.00**	0	0	0	**0**	0.00	0.00	0.00	**0.00**
T10	23.78	13.24	15.17	**52.19**	259.24	38.35	42.09	**339.68**	145.77	14.26	26.63	**186.66**
Exp Mean	**10.71**	**7.12**	**4.80**	**22.63**	**78.48**	**18.82**	**16.49**	**113.79**	**54.07**	**8.30**	**11.48**	**73.84**
CD(0.05)	6.57	2.80	2.36	8.28	14.51	6.70	7.35	16.60	10.17	3.52	5.23	10.89

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	NAVSARI											
	Weed biomas at 15 -20 DAS (g/ m^2)				Weed biomass at Max.tillering stage (g/ m^2)				Weed biomass at Panicle initiation stage (g/ m2)			
	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL	GRASSES	SEDGES	BLW	TOTAL
T1	4.96	4.91	8.30	**18.17**	9.77	9.61	15.60	**34.97**	12.24	11.02	19.16	**42.42**
T2	5.27	6.18	8.24	**19.70**	8.78	8.90	14.75	**32.44**	12.12	11.30	17.25	**40.66**
T3	4.82	5.49	6.14	**16.44**	8.96	10.41	15.38	**34.76**	11.94	11.34	18.11	**41.39**
T4	5.36	5.16	7.89	**18.41**	9.38	9.39	15.02	**33.79**	12.30	11.29	17.75	**41.34**
T5	4.98	5.20	9.05	**19.24**	9.39	10.02	12.90	**32.31**	10.85	11.80	17.34	**39.98**
T6	4.88	5.08	6.37	**16.33**	10.13	10.05	13.29	**33.47**	11.83	10.84	17.12	**39.80**
T7	6.36	6.22	9.74	**22.31**	8.23	10.13	14.85	**33.21**	12.20	9.09	17.20	**38.49**
T8	5.83	5.45	8.37	**19.65**	9.32	9.33	14.15	**32.80**	12.65	11.64	18.91	**43.20**
T9	4.17	3.71	4.50	**12.38**	8.46	7.54	7.08	**23.07**	9.57	7.62	9.15	**26.34**
T10	8.82	6.69	12.82	**28.33**	14.51	13.15	21.88	**49.54**	18.06	16.07	28.03	**62.16**
Exp Mean	**5.55**	**5.41**	**8.14**	**19.10**	**9.69**	**9.85**	**14.49**	**34.04**	**12.38**	**11.20**	**18.00**	**41.58**
CD(0.05)	1.07	0.92	1.38	2.05	1.19	1.36	1.55	2.56	1.43	1.41	1.92	3.24

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.)

Treatments	PARBHANI								
	Weed biomas at 15 -20 DAS (g/ m^2)			Weed biomass at Max.tillering stage (g/ m^2)			Weed biomass at Panicle initiation stage (g/ m2)		
	GRASSES	BLW	TOTAL	GRASSES	BLW	TOTAL	GRASSES	BLW	TOTAL
T1	33.31	25.06	**58.36**	35.24	36.99	**72.23**	41.13	43.67	**84.80**
T2	14.48	40.14	**54.62**	17.62	23.86	**41.48**	22.30	32.69	**55.00**
T3	13.03	78.84	**91.87**	14.72	22.67	**37.39**	19.40	29.12	**48.52**
T4	18.82	62.73	**81.55**	16.41	24.16	**40.57**	17.76	27.56	**45.33**
T5	36.20	33.74	**69.94**	10.38	17.00	**27.38**	13.42	18.61	**32.03**
T6	40.55	34.93	**75.48**	14.96	15.21	**30.18**	15.35	18.61	**33.96**
T7	27.51	48.07	**75.58**	38.13	36.69	**74.82**	40.93	41.88	**82.81**
T8	40.55	42.96	**83.50**	23.89	23.86	**47.76**	26.45	29.35	**55.81**
T9	5.31	12.53	**17.84**	2.17	5.37	**7.54**	0.00	0.00	**0.00**
T10	11.58	101.16	**112.74**	46.82	40.27	**87.09**	51.45	74.10	**125.56**
Exp Mean	**24.13**	**48.01**	**72.15**	**22.03**	**24.61**	**46.65**	**24.82**	**31.56**	**56.38**
CD(0.05)	3.36	4.61	4.04	1.44	2.36	2.27	2.74	3.75	5.92

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.) Summary on Benefit Cost Ratio, Cost of Weed Management of Sustainable weed management in aerobic rice system, Kharif-2021.

Treatments	Cost of Weed Management(Rs/ha)					Benefit Cost ratio of Treatments			
	CHATHA	COIMBATORE	ICAR-IIRR	NAVSARI	PARBHANI	COIMBATORE	ICAR-IIRR	NAVSARI	PARBHANI
T1	6000	6700	6284	8936.00	7500	1.67	2.15	1.97	2.33
T2	7500	8700	8084	9916.00	10220	1.66	2.1	1.98	2.21
T3	2250	7700	9056	10775.33	19500	1.98	1.99	2.05	1.92
T4	3750	4700	5118	8600.67	7420	1.97	2.33	2.06	2.59
T5	3000	5050	5069	10784.00	5440	2.23	2.61	1.93	2.98
T6	2250	4500	5170	8709.33	9220	2	2.25	1.91	2.58
T7	3400	4700	4700	10700.00	4000	1.87	2019	1.92	2.46
T8	5000	8000	5622	6568.00	6920	1.56	2.27	2.12	2.41
T9	9000	11400	11296	10785.33	18000	1.78	2.23	2.23	2.22
T10	-	-	-	-	-	1.38	1.65	1.91	2.11
Exp Mean						**1.81**	**2.18**	**2.008**	**2.381**
CD(0.05)						0.08	0.11	0.22	0.04

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

Table 4.3.3: (Contd.) Summary on weed control efficiency and Weed Index of sustainable weed management in aerobic rice system Kharif-2021.

Treatments	Weed control efficiency at 15-20 DAS				Weed control efficiency at Maximum tillering stage				Weed control efficiency at Panicle initiation stage				Weed Index			
	Coimbatore	ICAR-IIRR	Navsari	Parbhani	Coimbatore	ICAR-IIRR	Navsari	Parbhani	Coimbatore	ICAR-IIRR	Navsari	Parbhani	Coimbatore	ICAR-IIRR	Navsari	Parbhani
T1	45.01	62.86	35.92	48.23	51.01	68.33	29.19	37.51	48.31	62.31	31.8	32.69	19.72	41.40	18.57	19.93
T2	49.22	70.21	30.42	50.64	56.41	89.35	34.34	64.00	62.44	71.35	34.58	56.51	17.54	29.29	11.76	18.15
T3	23.68	33.52	41.88	18.51	54.85	59.83	29.58	68.15	45.8	60.06	33.35	61.73	13.4	38.36	10.32	10.32
T4	33	52.62	34.99	27.66	67.86	71.56	31.57	65.28	69.31	70.05	33.46	64.34	8.28	31.55	13.87	11.03
T5	65.16	89.4	31.99	38.49	73.42	95.25	34.7	76.75	69.9	83.71	35.57	75.06	4.74	1.17	15.92	3.91
T6	64.72	75.95	42.25	33.05	73.76	80.53	32.23	74.49	48.52	64.38	35.85	72.72	10.86	42.88	19.18	6.76
T7	36.7	44.77	21.16	32.96	62.26	67.61	32.72	34.95	41.08	61.94	37.99	34.13	14.57	23.17	15.59	24.20
T8	19.78	77.32	30.59	25.93	25.32	66.03	33.6	58.87	23.45	70.17	30.42	55.90	25.02	36.26	16.66	18.51
T9	42.65	100	56.25	100.00	94.74	100	53.28	100.00	93.15	100	57.66	100.00	-	-	-	-
T10	-	-	-	-	-	-	-	-	-	-	-	0.00	50.54	57.76	37.45	43.77

***Not analysed statistically**

Treatments:

T1. Mulching with paddy straw @ 5 t/ha at the time of sowing

T2. Mulching with paddy straw @ 5 t/ha at the time of sowing fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T3. Mechanical weeding using weeder (twice or thrice depending on weed intensity)

T4.Mechanical weeding once at 15 to 20 DAS fb post emergence herbicide application of bispyribac sodium @ 250 ml /ha or (penoxsulam + cyhalofopbyutyl) @ 2500ml/ha

T5 Chemical weed control (preemergence application of Pendimethalin 30% @1 lit/ha & post emergance application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS)

T6. Pre emergence herbicide application of preemergence application of Pendimethalin 30% @1 lit/ha fb one mechanical weeding at 25 -30 DAS

T7. Live mulch (Inter-cropping) in Rice with Cowpea/ Horsegram/ Sesbania (incorporation after 1 to 1 ½ month of sowing)

T8. Raised bed system of cultivation with post emergence application of Bispyribac-sodium @ 200-250ml/ha at 2-3 leaf stage of weeds at 20-25 DAS

T9. Weed free/Critical period hand weeding twice

T10. Weedy check

4.3.4. Integrated Pest Management–(Collaborative trial with Entomology and Pathology)

In recent years, intensive cultivation of rice has resulted in the frequent occurrence of biotic stresses that formed major constraint in rice production. Although, IPM has been accepted as the most effective option for protection of crops from the ravages of pests, however, its implementation at the farmer's level has been limited. As IPM involves a number of components, farmers must have capability of taking decisions and selecting IPM options accordingly for economical and long term management. Most of these options also need to be refined at individual farm level keeping in view the availability of resources and feasibility of farmers. Therefore, IPM involves working with the farmers in their fields and devising technologies suitable to their conditions. Keeping this in view, IPM special trial was conducted with an aim to manage pests (including insects, diseases and weeds) in a holistic way in farmers' fields involving them in a participatory way and allowing them to select IPM practices from a basket of options available.

During *Kharif* 2021, the trial was conducted zone-wise at 16 locations viz. **ARI-Rajendranagar, Coimbatore, Chinsurah, Jagdalpur, Karjat, Kaul. Ludhiana, Malan, Mandya, Navsari, Nawagam, Pusa, Puducherry, Sakoli, Titabar and Vadagaon.** The data on weed population and weed dry biomass in critical period of crop weed competition (vegetative stage and panicle initiation stage) and grain yields were reported and the results after statistical analyses are summarized and presented in **Tables 4.3.4.**

Zone I – Hilly Regions

Himachal Pradesh, Malan: IPMs trial was conducted in Sri Santokh Singh's field at Hatwas village, Kangra district, Himachal Pradesh State. HPR 2880 was grown in IPM field and Jheni, a local variety was grown in FP plot. The IPM practices followed are given in the table below. In this zone, the weed population at active vegetative stage and panicle initiation stage in IPM plots was lower than farmers practice by 43.70 and 69.79% respectively. The dry weed biomass was lower in IPM implemented fields by 5.67 and 50.08% respectively. The mean grain yield advantage was 38% in IPM adopted plots.

Practices followed in IPMs trial at Malan, *Kharif* 2021

	IPM Practices	Farmers Practices
Area	10 ha	10 ha
Variety	HPR 2880	Jheni, a local variety
Nursery	• Line sowing • Application of FYM	• Broadcast nursery • Application of urea @ 30 kg
Main field	• Application of 90 kg N, 40 kg P and 40 kg K. • Application of herbicide – Bispyribac sodium • Sprayed Chlorpyriphos	• Applied of 30 kg urea • Manual weeding

	• Application of Bavistin	

Zone II – Northern areas

In this zone, IPMs trial was conducted by two locations in four farmers' fields.

At **Kaul,** the field trial was conducted in the village Rasina, Sambhi of Kaithal District, using variety CSR30. The IPM practices followed are given in the table below. The weed population at active vegetative stage and panicle initiation stage in IPM plots was lower than farmers practice by 100% and 50% respectively. The mean grain yield advantage was 14.84% in IPM adopted plots.

Practices followed in IPMs trial at Kaul, *Kharif* 2021

	IPM Practices	Farmer Practices
Area	0.4 ha	0.4 ha
Variety	CSR 30	CSR 30
Nursery	Seed treatment with Bavistin 10 g + Streptocycline 1g / 10 kg seed	Seed treatment with Bavistin 10 g + Streptocycline 1g / 10 kg seed
	Application of 1 kg DAP, 1 kg urea and FYM 40 kg	Application of 1 kg DAP and 2 kg urea
	Spray of Bispyribacsodium 10% SC @ 0.4 ml/ liter water at 15 – 20 DAS	
Main Field	Cutting of leaf tips before transplanting	Application of 150 kg urea as top dressing
	Application of 25 kg DAP, 40 kg Urea, Zinc 10 kg	
	Application of Pretilachlor @ 600 ml/ acre	Application of Pretilachlor @ 600 ml/ acre
	Release of Trichogrammachilonis @ 40000/ acre, 3-4 times starting at 31 DAT	
	Installation of bird perches @ 10/ acre	
	Mid-season drainage of field	
	Spray ofFlubendiamide 20 WG @ 50 g/ acre	Application of cartap hydrochloride @ 10 kg/ acre

	Applied Lustre @ 400 ml/ acre for sheath blight control	Applied Streptocycline @ 15g/ha + Copper oxycloride @ 500g/ha
	Sprayed Propiconazole @ 1 ml/ liter water	Two sprays of Buprofezin @ 330 ml per acre
	Application of Triflumezopyrim 10 SC @ 94 ml/ acre at 55 DAT	Spray of a mixture of insecticide and fungicide
	Applied streptocycline @15 g/ha + copper oxicloride @ 500g/ha	Applied Streptocycline @ 15g/ha + Copper oxycloride @ 500g/ha, Propiconazole 25 EC @ 1000ml/ha

At **Ludhiana,** the field trial was conducted in Ludhiana. The IPM practices followed are given in the table below. The weed population at PI stage was reported. IPM plots showed lower weed population than farmers practice by 45.45%. The mean grain yield advantage was 2.96% in IPM adopted plots, reflecting the farmers progress in implementing IPM practices in their regular rice production system.

Practices followed in IPMs trial at Ludhiana, *Kharif* 2021

	IPM Practices	**Farmers Practices**
Area	Half acre	Half acre
Variety	PR 121	PR 121
Nursery	• Application of urea @ 1.0 kg and Zinc sulphate @ 1 kg/ acre nursery	• Application of urea @ 1.0 kg/ acre nursery and Zinc sulphate @ 1 kg/ acre nursery
Main field	• Alley ways of 30 cm after every 2 m • Application of Butachlor @ 1.2 L/ acre • Sprayed Fame 480 SC @ 20 ml/acre • Sprayed Pexalon @ 94 ml/ acre & Tilt @ 200ml/ acre • Recommended dose of neem coated urea- 90 kg/ acre • Growing flowering plants like marigold, soybean, cowpea, moong, sesamum on bunds • Water management for planthoppers	• Applied urea 120 kg and zinc sulphate 25 kg/ acre • Application of Butachlor @ 1.2 L/ acre • Application of Mortar @ 170 g/ acre • Sprayed Confidor 17.8 SL @ 40 ml/ acre Sprayed Tilt + Nativo @ 200 + 80 ml/ acre

In the Northern zone, the yield advantage of 8.9% was recorded by implementing IPM practices. The weed population showed reduction of 100% at active vegetative stage and 45.76% at panicle initiation stage.

Zone III – Eastern areas

IPMs trial was conducted by 2 locations in 2 farmer's fields and the IPM practices followed were given in table below:

At **Chinsurah**, the trial was conducted in Chinsurah, Hooghly District. The data on weed population and weed biomass were recorded at active vegetative stage and panicle initiation stage. Significant decrease in weed population by 44.75 and 35.15% and weed dry biomass by 48.35 and 35.26% respectively in IPM implemented fields, resulted in higher growth, yield attributes and grain yield increase by 25.91% of the variety Swarna.

Practices followed in IPMs trial at Chinsurah, *Kharif* 2021

IPM practices	Farmers practices
1 acre; Swarna	1 acre; Swarna
• Application of 8 kg of 10:26:28 complex • Application of mustard cake @ 3 kg	• Application of mustard cake @ 3 kg
• Application of 105:100:27 kg urea, SSP & MOP • Application of Butachlor + one hand weeding • Application of Ferterra @ 4 kg/ acre • Application of Coragen @ 60 ml/ acre • Application of carbendazim • Installation of pheromone traps @ 6/acre for stem borer mass trapping	• Application of 80 kg10-26-26; Urea 40 kg • Hand weeding two times • Application of Phorate 10 G @ 4.5 kg/ acre • Triazophos @ 750 ml/ acre two times • Application of Carbendazim

At **Pusa,** the field trial was conducted in the village Selmpur Meyari Sarairanjan of Samastipur District, Sukhet of Madhubani District using the variety Rajendra Mahsuri. The weed population at active vegetative stage and panicle initiation stage in IPM plots was lower than farmers practice by 25.51 and 25.18% respectively. The dry weed biomass also was lower in IPM implemented fields by 23.62 and 19.31% respectively. The mean grain yield advantage was 23.83% in IPM adopted plots.

Practices followed in IPMs trial at Pusa, *Kharif* 2021

	IPM Practices	Farmer Practices
Area	1 acre	1 acre
Variety	Rajendra Mahsuri	Rajendra Mahsuri
Main Field	• Seed treatment with Carbendazim @ 2 g/ kg seed • Transplanting at 20 x 15 cm spacing • Application of RDF • Application of Butachlor @ 1.5 kg ai/ ha after one week of transplantation • Installed pheromone traps for YSB @ 3/ acre • Application of Bispyribac sodium 20 g ai/ ha at 20 DAT • Application of cartap hydrochloride 50 WP @ 600g / ha at 50 DAT	• Transplanting at 20 x 15 cm spacing • Application of RDF • Hand weeding at 30 DAT • Application of butachlor @ 1.5 kg a.i. / ha after one week of transplanting • Hand weeding at 30 DAT • Application of Padan soluble powder @ 2 kg formulation / ha

In the Eastern zone, yield advantage of 24.87% was recorded in IPM implemented fields. The weed population was reduced by 41.02% at active vegetative stage and 33.55% at panicle initiation stage respectively in IPM fields. The reduction in weed biomass was 31.55% at active vegetative stage and 25.29% at panicle initiation stage.

Zone IV – North-Eastern areas

Assam – Titabar: In zone IV, IPMs trial was conducted in Titabar, Jorhat district of Assam. Ranjit sub-1 variety was grown in both IPM and FP plots. Practices followed in IPM and farmers' practices were given in the table. In this zone Weed population and biomass were reported for panicle initiation stage only. Significant reduction in weed population (42.60%) and dry weed biomass (38.6%) at panicle initiation stage in IPM fields with variety Ranjit Sub1. Significant improvement in grain yield was noticed with 20.54% higher in IPM adopted fields.

Practices followed in IPMs trial at Titabar, *Kharif* 2021

	IPM Practices	Farmers Practices
Variety	Ranjit Sub-1	Ranjit Sub-1
Nursery	• Seed treatment with Bavistin @ 2 g/ kg seed	
Main field	• Fertilizer application @ 20, 10, 10 kg NPK/ha • Applied Pretilachlor within a week of transplanting • Applied paddy weeder to lessen weeds • Installed pheromone traps @ 12/ ha for stem borer • Applied Cartap hydrochloride 50% SC for stem borer • Placed tricho cards for stem borer and leaffolder management • Sprayed fresh cowdung solution @250g/L water at mid tillering stage against BLB	• Fertilizer application @ 60,20,40 kg NPK/ha • Manual weeding done two times

Zone V – Central areas

In this zone, IPMs trial was conducted by one location (Jagdalpur) in 3 farmer's fields. The package of practices followed by various farmers are given below:

Table... Practices followed in IPMs trial at Zone V (Central), *Kharif* 2021

Practices followed by three farmers at Jagdalpur		
	IPM Practices	**Farmers Practices**
Area	1 acre each farmer	1 acre each farmer
Variety	Bamleswari/Safri	Bamleswari/Safri
Nursery	• Application of 5 kg N, 3 kg P, 1.2 kg K / 400m^{2}nursery	• Application of 2 kg N, 1 kg P / 400m^2 nursery
Main field	• Application of 80:50:30 kg NPK per hectare • Seedlings transplanted at spacing of 20/15 cm; Left alleyways of 30 cm after 10 rows. • Applied Pyrazosulfuron ethyl 10 wp 500gm./ha+ 1 hand weeding • Nitrogen top dressing at 45 DAT	• Application of 80 kg N, 50 kg P & 30 Kg K/ acre • Applied Carbofuran 3G @ 5kg/acre • Hand weeding twice

The weed population was recorded at active vegetative stage only. In this zone, in IPM plots the weed population was lower than farmers practice by 56.91%. The mean grain yield advantage was 16.47% in IPM adopted plots.

Zone VI – Western areas

IPMs trial was conducted by five locations in 10 farmers' fields in this zone. The IPM practices adopted in this zone are detailed below.

Practices followed in IPMs trial at Karjat, *Kharif* 2021

Practices	**IPM practices**	**Farmers practices**
Area	1 acre	1 acre
Varieties	F1- Sri TukaramRaghunathShinde – Karjat 3 F2 - Sri GovindBadekar - Karjat 4 F3- Sri ShantaramBhoir – Karjat 3	
Nursery	Seed treatment with carbendazim @ 10 g/ 10 kg seed Raised bed 3x1m treated with rice husk (hull) ash @3kg/bed	Land burned with waste materials
Main field	• Deep ploughing • Application of FYM 4 T, Suphala 215 Kg, Urea 87 Kg • 2-3 seedlings transplanted at a spacing 20 x15 cm. • Alleyways of 40cm left after every 10 rows • Bispyribasodium 250ml/ha (Nomini gold). • Pheromone traps @ 8 / acre • Use of bird perches in the field • Use Vaibhav sickle for harvesting • Application of Cartap hydrochloride 18 kg/ha (one application)	• Deep ploughing • Application of FYM 2 T, Urea 180 kg, Suphala 75 kg • 4-5 seedlings transplanted randomly • Hand weeding once • Phorate 10 kg/ha (two applications)

Practices followed in IPMs trial at Sakoli, *Kharif* 2021

1	**IPM Practices**	**Farmer Practices**

Variety	PDKV Tilak	PDKV Tilak
Nursery	• Seed treatment with Trichoderma @ 10 g/kg seed • Applied 20:20:0:13 complex @ 12.5 kg • Applied fipronil 0.3 G @ 25 kg/ha, 5 days before pulling seedlings	• Seed treatment with Thirum @ 3g/kg seed • Applied urea – 5 kg
Main field	• Seedlings planted at spacing of 20 x 15 cm • Left alleyways of 30 cm after every 2 m or 10 rows. • Application of 187.5 kg DAP and 62.5 kg urea • Applied Butachlor @ 3 liter/ ha on 5th day after transplanting + 1 manual weeding • Mid-season drainage for BPH management • Applied Chlorantraniliprole (Ferterra)0.4 G @ 10 kg/ha at 40 DAT • Installation of pheromone traps with 5 mg lure @ 8 traps/ ha for stem borer monitoring • Released Tricho cards @ 40,000/ acre at 36 DAT • Application of Cannon (Chlorpyriphos 50 % +Cypermethrin 5 % @ 1250ml/ ha at 70 DAT	• Seedlings were planted randomly at a spacing of 20 x 15 cm • Application of 187.5 kg DAP and 62.5 kg urea • Applied Saathi (Pyrazosulfuron ethyl 10 % WP) @200g/ha at 5th day after transplanting+ 1 manual weeding • Applied Chlorantraniliprole (Ferterra)0.4 G @ 10 kg/ha at 40 DAT • Application of Cannon (Chlorpyriphos 50 % +Cypermethrin 5 % @ 1250ml/ ha at 70 DAT
2	**IPM Practices**	**Farmers Practices**
Variety	IR 64	IR 64
Nursery	• Seed treatment with Trichoderma @ 10 g/kg seed • Application of fipronil 0.3 G @ 25 kg/ha, 5 days before pulling seedlings	Applied urea @ 10 kg/ ha
Main field	• Seedlings transplanted at spacing of 20 x 15 cm • Alleyways of 30 cm after every 2 m or 10 rows. • Application of 20:20:0:13 @ 125 kg/ ha and Urea 10 kg/ha • Application of Butachlor @ 3 liter. / ha on 5th day after transplanting + 1 manual weeding • Installation of pheromone traps with 5 mg lure @ 3 traps/ acre for stem borer monitoring • Released Tricho cards @ 40,000/ acre at 36 DAT	• Seedlings were transplanted randomly • Application of 20:20:0:13 @ 125 kg/ ha and Urea 10 Kg/ha • Applied Eraze (Pretilachlor 50 % EC)@ 1 litre/ha at 5th day after transplanting+ 1 manual weeding

	• Mid-season drainage for BPH management	
3	**IPM Practices**	**Farmers Practices**
Variety	P - 4444	P - 4444
Nursery	• Seed treatment with Trichoderma @ 10 g/kg seed • Applied 18:18:10 complex @ 25 kg/ ha • Applied fipronil 0.3 G @ 25 kg/ha, 5 days before pulling seedlings from nursery	• Seed treatment with Thirum @ 3g/kg seed • Applied 18:18:10 complex @ 25 kg/ha
Main field	• Seedlings transplanted at spacing of 20 x 15 cm • Alleyways of 30 cm after every 2 m or 10 rows. • Application of 20:20:0:13 @ 125 kg/ ha and Urea 10 kg/ha • Application of Butachlor @ 3 liter. / ha on 5th day after transplanting + 1 manual weeding • Installation of pheromone traps with 5 mg lure @ 3 traps/ acre for stem borer monitoring • Released Tricho cards @ 40,000/ acre at 36 DAT • Mid-season drainage for BPH management • Applied fipronil 0.3 G @ 25 kg/ha at 45 DAT • Application of Triflumezopyrium 10 % SC @ 94 ml/ acre	• Seedlings were transplanted randomly • Application DAP @ 125 kg/ ha • One manual weeding • Applied Chlorantraniliprole (Ferterra) 0.4 G @ 10 kg/ha at 45 DAT • Sprayed Flonicamid 50 %WG @150 g/ha at 95 DAT

Practices followed in IPMs trial at Navsari, *Kharif* 2021

Practices	**IPM practices**	**Farmers practices**
Area	1250 sq.m	1250 sq.m
Variety	Gurjari	Gurjari
Varieties	F7 - Sri ShaileshbhaiBhulabhai Patel F8 - Sri VipulbhaiJayantibhaiBharwad F9 - Sri Chandra-kantbhai Patel	
Nursery	• Seed treatment with Trichoderma @ 10 g/kg seed • Applied fipronil 0.3 G @ 25 kg/ha, 5 days before pulling seedlings from nursery	• Application of Chlorantraniliprole 0.4 GR @ 10 kg/ha

Main field	• Application of 220 kg urea, 54 kg DAP and 5 kg Zinc sulphate • 2-3 seedlings transplanted at a spacing 20 x15 cm. • Alleyways of 40cm left after every 10 rows • Bispyribasodium 10% SC @ 0.4 ml/ liter water (Nomini gold). • Applied Neemazal @ 3 ml/ liter waterUse of bird perches in the field • Released *Trichogrammajaponicum* @ 6 tricho card/ha • Sprayed Chlorantraniliprole 18.5 SC @ 150 ml/ ha • Applied Carbendazim + mancozeb @ 2-2.5 g/lit • Applied Triflumezopyrim 10% SC @ 94 ml/ acre	• Application of 220 kg urea, and 5 kg Zinc sulphate • 4-5 seedlings transplanted randomly • Applied Pendimethalin 30% EC @ 50 ml/ 10 liter water + One Hand weeding • Applied Chlorantraniliprole 0.4 GR @ 20 kg/ha

Practices followed in IPMs trial at Nawagam, *Kharif* 2021

Practices	**IPM practices**	**Farmers practices**
Area	1250 sq.m	1250 sq.m
Variety	Gurjari	Gurjari
Varieties	F7 - Sri ShaileshbhaiBhulabhai Patel F8 - Sri VipulbhaiJayantibhaiBharwad F9 - Sri Chandra-kantbhai Patel	

Nursery	• Seed treatment with Trichoderma @ 10 g/kg seed • Applied fipronil 0.3 G @ 25 kg/ha, 5 days before pulling seedlings from nursery	• Application of Chlorantraniliprole 0.4 GR @ 10 kg/ha
Main field	• Application of 220 kg urea, 54 kg DAP and 5 kg Zinc sulphate • 2-3 seedlings transplanted at a spacing 20 x15 cm. • Alleyways of 40cm left after every 10 rows • Bispyribasodium 10% SC @ 0.4 ml/ liter water (Nomini gold). • Applied Neemazal @ 3 ml/ liter waterUse of bird perches in the field • Released *Trichogrammajaponicum* @ 6 tricho card/ha • Sprayed Chlorantraniliprole 18.5 SC @ 150 ml/ ha • Applied Carbendazim + mancozeb @ 2-2.5 g/lit • Applied Triflumezopyrim 10% SC @ 94 ml/ acre	• Application of 220 kg urea, and 5 kg Zinc sulphate • 4-5 seedlings transplanted randomly • Applied Pendimethalin 30% EC @ 50 ml/ 10 liter water + One Hand weeding • Applied Chlorantraniliprole 0.4 GR @ 20 kg/ha

Practices followed in IPMs trial at Vadgaon, *Kharif* 2021

Practices	**IPM practices**	**Farmers practices**
Area	1250 sq.m	1250 sq.m
Variety	Gurjari	Gurjari
Varieties	F7 - Sri ShaileshbhaiBhulabhai Patel F8 - Sri VipulbhaiJayantibhaiBharwad F9 - Sri Chandra-kantbhai Patel	
Nursery	• Seed treatment with Trichoderma @ 10 g/kg seed • Applied fipronil 0.3 G @ 25 kg/ha, 5 days before pulling seedlings from nursery	• Application of Chlorantraniliprole 0.4 GR @ 10 kg/ha
Main field	• Application of 220 kg urea, 54 kg DAP and 5 kg Zinc sulphate	• Application of 220 kg urea, and 5 kg Zinc sulphate

	• 2-3 seedlings transplanted at a spacing 20 x15 cm. • Alleyways of 40cm left after every 10 rows • Bispyribasodium 10% SC @ 0.4 ml/ liter water (Nomini gold). • Applied Neemazal @ 3 ml/ liter waterUse of bird perches in the field • Released *Trichogrammajaponicum* @ 6 tricho card/ha • Sprayed Chlorantraniliprole 18.5 SC @ 150 ml/ ha • Applied Carbendazim + mancozeb @ 2-2.5 g/lit • Applied Triflumezopyrim 10% SC @ 94 ml/ acre	• 4-5 seedlings transplanted randomly • Applied Pendimethalin 30% EC @ 50 ml/ 10 liter water + One Hand weeding • Applied Chlorantraniliprole 0.4 GR @ 20 kg/ha

At **Karjat,** the field trial was conducted in the villages of Haliwali, Kirwali, with varieties Karjat3 and Karjat4. The weed population at active vegetative and panicle initiation stages in IPM plots was lower than farmers practice by 45.93%. The dry weed biomass also was lower in IPM implemented fields by 100 and 18.43% respectively. The mean grain yield advantage was 19.36% in IPM adopted plots.

At **Sakoli,** the field trial was conducted in the village Dharmapuri of Bhandara District using the variety Manisha. The weed population at active vegetative and panicle initiation stages in IPM plots was lower than farmers practice by 30.00 and 26.08% respectively. The dry weed biomass also was lower in IPM implemented fields by 41.27 and 30.04% respectively. The mean grain yield advantage was 10.44% in IPM adopted plots.

At **Vadgaon**, the trial was conducted in the research farm, Agrl Research Station. Vadgaon, Mawal. Significant reduction in weed population (74.01 and 68.59%) and dry weed biomass (74.27 and 68.92%) at active vegetative and panicle initiation stages in IPM implemented fields was experienced with variety Phule Samrudhi. Significant improvement in grain yield was noticed with 44.89% higher in IPM adopted fields.

At **Navsari**, the trial was conducted in the Research Farm, Main Rice Research Centre. Significant reduction in weed population (42.37 and 35.24%) and dry weed biomass (37.92 and 26.23%) at active vegetative and panicle initiation stages in IPM implemented fields was experienced with variety GNR3. Significant improvement in grain yield was noticed with 4.89% higher in IPM adopted fields.

At **Nawagam**, the trial was conducted in the village Khathwada, significant reduction in weed population (23.28 and 15.59%) and dry weed biomass (18.09 and 16.41%) at active vegetative and panicle initiation stages in IPM implemented fields was experienced with

variety Gurjari. Significant improvement in grain yield was noticed with 4.89% higher in IPM adopted fields.

In this Western Zone, adoption of IPM package resulted in yield advantage of 18.06% over the farmers practice. The weed population in IPM implemented fields was lower by 53.64% at Active Vegetative stage and 48.04% at Panicle Initiation stage. The reduction in weed dry biomass was 64.84% at active vegetative stage and 55.28% at panicle initiation stages respectively.

Zone VII – Southern areas

IPMs trial was conducted by four locations in two farmers' fields in this zone. The IPM practices adopted are given below:

Practices followed in IPMs trial at Mandya, *Kharif* 2021

	IPM practices	**Farmers Practices**
Area	1 acre	1 acre
Variety	MTU 1001	MTU 1001
Nursery	• Seed treatment with Carbandezim @ 2g / kg seed	
Main field	• Urea 45 kg/ acre, SSP 125 kg/ acre, MOP 35 kg/ acre, Top dressing 45 kg urea • Transplanting with 20 x 15cm spacing • Forming alleyways of 30 cm • Londax power @ 4kg/ac - herbicide at 3 DAT + one hand weeding • Installation of pheromone traps for monitoring stem borer @ 8 traps / ha • Application of Cartap hydrochloride 50 WP @ 240 g/ acre at 60 DAT • Zinc sulphate @ 8 kg/ acre Tricyclazole 75WP @ 0.6g/lit	• Urea 50 kg/ acre, 10:26:26 complex fertilizer 100 kg/ ac, MOP 25 kg/ acre • Random transplanting • Applied Pretilachlor 50 EC @ 400 ml/ acre (Refit) + two hand weedings • Carbofuran 4G application @ 8 kg/ acre • Chlorantraniliprole @ 60 ml/ acre • Propiconazole 25 EC @ 1 ml/ litre

		• Dinotefuron 20 SG @ 250 g/ ha at 70 DAT
Area	1 acre	1 acre
Variety	Jyothi	Jyothi
Nursery	• Seed treatment with Carbandezim @ 2g / kg seed	
Main field	• Urea 45 kg/ acre, SSP 125 kg/ acre, MOP 35 kg/ acre, Top dressing 45 kg urea • Transplanting with 20 x 15cm spacing • Forming alleyways of 30 cm • Londax power @ 4kg/ac - herbicide at 3 DAT + one hand weeding • Installation of pheromone traps for monitoring stem borer @ 8 traps / ha • Application of Fipronil 0.3G @ 10 kg/acre • Sprayed Tricyclazole 75 WP @ 0.6g/ liter water • Zinc sulphate @ 8 kg/ acre • Alternate wetting and drying	• Randomly transplanted • Londax power @ 4 kg/ acre + 2 hand weedings • Fipronil 0.3G @ 10 kg/ acre • Flubendiamide 48 SC @ 0.1 ml/ liter □ Hexaconazole @ 2 ml/l□ • Buprofezin 25 EC @ 104 ml/ liter • Continuous irrigation

Practices followed in IPMs trial at ARI-Rajendranagar, *Kharif* 2021

	IPM Practices	**Farmers Practices**
Variety	Telangana Sona (RNR 15048)	Telangana Sona (RNR 15048)

Nursery	• Applied of 4 kg urea, 6 kg SSP and 2 kg MOP • Applied Carbofuran 3 G	Application of 4 kg urea, 6 kg SSP and 2 kg MOP
Main field	Applied 100 kg N,80 kg P and 30 kg K Applied Chlorantraniliprole @ 0.3 ml/liter water (60ml/ acre) at panicle initiation stage Adopted alleyways Applied weedicide Topstar @ 36 g/ acre at 3-5 DAT(except farmer 3) + one hand weeding Applied Propiconazole @ 1 ml/litre water (200 ml/ acre)	• Application of 120 kg N, 120 kg P and 20 kg K. • Sprayed Chlorpyriphos @ 2.5 ml/ liter water • Hand weeding • Sprayed Cartap hydrochloride 50SP @ 2g/l (400g/ acre) • Sprayed Trifloxystrobin + Tebuconazole @ 0.4g/litre (80g/ acre)

At ARI-Rajendranagar, the field trial was conducted in three farmers' fields. The weed population was reported for panicle initiation stages only. In IPM plots, the weed population was lower than farmers practice by 19.28%. No weed biomass was reported. The mean grain yield advantage of 7.70 % in IPM adopted plots.

At **Coimbatore**, the field trial was conducted in the village Bhavani, Erode District using the variety ASD16. The weed population at active vegetative and panicle initiation stages in IPM plots was lower than farmers practice by 65.24 and 58.78% respectively. The weed dry biomass at active vegetative and panicle initiation stages in IPM plots was lower than farmers practice by 69.76 and 57.91% respectively and contributed to the mean grain yield advantage of 11.97 % in IPM adopted plots.

At **Puducherry,** the field trial was conducted in the villages of Katterikuppam, Pandachozanallur using the variety DRR Dhan 52 and VGD1. The weed population at active vegetative and panicle initiation stages in IPM plots was lower than farmers practice by 24.39and 37.67% respectively with lower weed biomass in IPM implemented fields by 34.66 and 47.23% respectively. The mean grain yield advantage was 4.34% in IPM adopted plots.

At **Mandya,** the field trial was conducted in the villages Ganadalu and Mallanayakanakatte of Mandya District, using variety MTU 1001. The weed population at tillering stage was reported and in IPM plots, was lower than farmers practice by 83.01. The dry weed biomass also was lower in IPM implemented fields by 86.49. The mean grain yield advantage was 10.17% in IPM adopted plots.

In the Southern Zone, the yield advantage of 8.54% was recorded in IPM implemented fields. The weed population reduction in IPM fields was 41.37% at active vegetative stage and 45.06% at panicle initiation stage. The % reduction in weed biomass in IPM implemented fields was 49.67% at active vegetative stage and 51.76% at panicle initiation stage.

In summary, the Integrated Pest Management special (IPMs) trial was conducted at 16 locations during *Kharif* 2021 with an objective of managing all pests i.e., weeds, insects, diseases in a holistic way in farmer's fields involving them in a participatory mode. Across the locations, weeds, insect pests, and disease incidence was significantly low in IPM plots. In IPM implemented plots, adoption of the package of biotic stress management resulted in higher grain yields by 37.97% in Zone I comprising Hilly areas, where IPM implementation has to further penetrate into farmers practices; to 8.54 and 8.9% in Zone VII (Southern areas) and Zone II (Northern areas) where Farmer practice was comparable to IPM (farmers are adopting improved rice production technologies). In IPM adopted fields, the mean weed population reduction over the zones ranged from 41.02% in Zone III (Eastern areas) to 100 % in Zone II at active vegetative stage; and at panicle initiation stage, it's range is from 33.55% in zone III to 69.79% in Zone I. The dry weed biomass reported by 12 locations showed that, both at Active Vegetative and Panicle Initiation stages was significantly reduced by 5.67% in Zone I to 64.84% in Zone VI (Western areas); 25.29% in Zone III to 55.28% in Zone VI (Western areas).

(For more details regarding pest and diseases please see Volume.2 Progress Report 2020 (**Entomology and Pathology –IPMspecial trial).**

Table 4.3.4: Weed parameters, Yield parameters and Grain yield of IPM trial as influenced by IPM vs Farmers Practice in Kharif - 2021.

Location-wise

Location	Treatments	Panicle No/m²	Panicle wt (g)	Grain Yield t/ha	Yield advantage	Straw Yield t/ha	Weed Population No/m²		Weed Dry Biomass g/m²	
							Active vegetative stage	Panicle initiation stage	Active vegetative stage	Panicle initiation stage
Coimbatore	IPM	334	3.2	5.76	11.97	7.48	9.80(3.21)	13.60(3.75)	5.72	9.97
	Farmers Practice	283	3.13	5.07		6.94	28.20(5.35)	33.00(5.78)	18.92	23.69
	Exp. mean	308	3.165	5.415		7.21	4.28	4.77	12.32	16.83
	CD(0.05)	13.92	0.01	0.19		0.24	0.3	0.2	0.7	0.72
	Variety	ASD 16								
Chinsurah	IPM	334	3.22	4.94			32.80(5.71)	52.20(7.22)	3.92	6.92
	Farmers Practice	297	3.08	3.66	25.91		59.37(7.71)	80.50(8.93)	7.59	10.69
	Exp. mean	316	3.15	4.3			6.71	8.08	5.755	8.805
	CD(0.05)	19.37	0.13	0.13			1.1	1.43	1.53	2.51
	Variety	Swarna								
Jagdalpur	IPM			4.31			12.87(3.65)			
	Farmers Practice			3.6	16.47		29.87(5.50)			
	Exp. mean			3.95			4.57			
	CD(0.05)			0.16			0.21			
	Variety	Bamleshwari, Culture safri								
Karjat	IPM			3.46			1.73(1.39)	2.40(1.68)	0	2.13
	Farmers Practice			2.79	19.36		3.20(1.90)	2.40(1.68)	3.14	2.17
	Exp. mean			3.12			1.65	1.68	1.57	2.15
	CD(0.05)			0.11			0.31	0.17	0.69	0.64
	Variety	Karjat3,Karjat 4								
Kaul	IPM			3.84			0.00(0.71)	0.20(0.79)		
	Farmers Practice			3.27	14.84		1.80(1.40)	0.40(0.88)		
	Exp. mean			3.56			1.05	0.84		
	CD(0.05)			0.3			0.52	0.35		
	Variety	CSR 30								
Ludhiana	IPM	352	3.26	7.76	2.96	9.38		3.00(1.85)		
	Farmers Practice	341	3.15	7.53		9.21		5.50(2.41)		
	Exp. mean	347	3.205	7.645		9.295		2.13		
	CD(0.05)	3.3	0.03	0.03		0.02		0.27		
	Variety									

***(Values in parentheses are transformed values)**

Table 4.3.4: (Contd.)

Location	Treatments	Panicle No/m²	Panicle wt (g)	Grain Yield t/ha	Yield advantage	Straw Yield t/ha	Weed Population No/m²		Weed Dry Biomass g/m²	
							Active vegetative stage	Panicle initiation stage	Active vegetative stage	Panicle initiation stage
Malan	IPM			3.45	37.97		16.10(4.06)	15.36(3.97)	18.26	17.62
	Farmers Practice			2.14			28.60(5.37)	50.80(7.13)	17.28	35.3
	Exp. mean			2.79			4.72	5.55	17.77	26.46
	CD(0.05)			0.31			0.48	0.65	2.13	6.01
	Variety	HPR 2880								
Mandya	IPM	380	3.37	6.29	10.17	9.56	1.80(1.40)		1.18	
	Farmers Practice	361	3.00	5.65		8.66	10.60(3.28)		8.74	
	Exp. mean	370	3.185	5.97		9.11	2.34		4.96	
	CD(0.05)	25.96	0.15	0.69		1.07	0.51		2.36	
	Variety	MTU 1001								
Navsari	IPM	217	3.89	5.31	4.89	7.7	6.80(2.68)	15.80(4.02)	8.92	22.04
	Farmers Practice	205	3.72	5.05		7.52	11.80(3.47)	24.40(4.98)	14.37	29.88
	Exp. mean	211	3.805	5.18		7.61	3.08	4.5	11.645	25.96
	CD(0.05)	3.53	0.13	0.22		0.24	0.48	0.29	3.35	2.52
	Variety	GNR-3								

Nawagam	IPM			3.54			16.21(4.08)	14.83(3.91)	5.34	4.43
	Farmers Practice			3.17	10.45		21.13(4.65)	17.57(4.24)	6.52	5.3
	Exp. mean			3.35			4.37	4.07	5.93	4.86
	CD(0.05)			0.12			0.17	0.2	0.32	0.34
	Variety	Gurjari								
Puducherry	IPM	315	3.26	6.21	4.34	9.52	49.59(7.08)	30.06(5.53)	30.5	16.88
	Farmers Practice	299	3.14	5.94		9.12	65.59(8.13)	48.23(6.98)	46.68	31.99
	Exp. mean	307	3.2	6.08		9.32	7.6	6.25	38.59	24.44
	CD(0.05)	3.82	0.04	0.07		0.1	0.07	0.06	0.87	0.62
	Variety	DRR Dhan 52, VGD 1								

Table 4.3.4: (Contd.)

Location	Treatments	Panicle No/m²	Panicle wt (g)	Grain Yield t/ha	Yield advantage	Straw Yield t/ha	Weed Population No/m²		Weed Dry Biomass g/m²	
							Active vegetative stage	Panicle initiation stage	Active vegetative stage	Panicle initiation stage
Pusa	IPM			5.79	23.83		10.57(3.32)	11.88(3.51)	12.25	14.33
	Farmers Practice			4.41			14.19(3.83)	15.88(4.05)	16.04	17.76
	Exp. mean			5.1			3.58	3.78	14.14	16.04
	CD(0.05)			0.36			0.19	0.18	1.68	1.14
	Variety	Rajendramahsuri								
ARI-Rajendranagar	IPM			7.27	7.70			1.13(1.11)		
	Farmers Practice			6.71				1.40(1.19)		
	Exp. mean			6.99				1.15		
	CD(0.05)			0.76				0.18		
	Variety									
Sakoli	IPM			4.69	10.44		10.73(3.33)	12.47(3.59)	8.85	10.13
	Farmers Practice			4.2			15.33(3.96)	16.87(4.15)	15.07	14.48
	Exp. mean			4.45			3.65	3.87	11.96	12.31
	CD(0.05)			0.28			0.29	0.3	2.21	1.6
	Variety	Manisha								
Titabar	IPM	228	5.56	4.38	20.54	9.42	38.80(6.25)			18.42
	Farmers Practice	194	4.36	3.48		7.82	67.60(8.21)			30
	Exp. mean	211	4.96	3.93		8.62	7.23			24.21
	CD(0.05)	11.95	0.66	0.23		1.42	0.85			9.54
	Variety	Ranjit Sub-1								
Vadgaon	IPM	236	5.15	5.68	44.89	5.98	14.82(3.90)	20.90(4.62)	25.46	35.5
	Farmers Practice	169	2.91	3.13		3.93	57.04(7.58)	66.54(8.18)	98.98	114.24
	Exp. mean	203	4.03	4.41		4.955	5.74	6.4	62.22	74.87
	CD(0.05)	8.56	0.18	0.09		0.19	0.36	0.19	6.94	5.02
	Variety	Phule Samruddhi								

Table 4.3.4: (Contd.)

Zone-wise

Location	Treatments	Panicle No/m²	Panicle wt (g)	Grain Yield t/ha	Yield advantage	Straw Yield t/ha	Weed Population No/m²		Weed Dry Biomass g/m²	
							Active vegetative stage	Panicle initiation stage	Active vegetative stage	Panicle initiation stage
Zone I – Hilly areas										
Malan	IPM			3.45	37.97		16.1	15.36	18.26	17.62
	Farmers Practice			2.14			28.6	50.8	17.28	35.3
Zone II – Northern areas										
Kaul, Ludhiana	IPM	352	3.26	5.8	8.9	9.38	0	1.6		
	Farmers Practice	341	3.15	5.4		9.21	1.8	2.95		
Zone III – Eastern areas										
Chinsurah, Pusa	IPM	334	3.22	5.37	24.87		21.69	32.02	8.09	10.63
	Farmers Practice	297	3.08	4.04			36.78	48.19	11.82	14.23
Zone IV – North-Eastern areas										
Titabar	IPM	228	5.56	4.38	20.54	9.42	38.8			18.42
	Farmers Practice	194	4.36	3.48		7.82	67.6			30.00
Zone V – Central areas										
Jagdalpur	IPM			4.31	16.47		12.87			
	Farmers Practice			3.6			29.87			
Zone VI – Western areas										
Karjat, Sakoli, Nawagam, Navsari, Vadgoan	IPM	227	4.52	4.54	18.06	6.84	10.06	13.28	9.71	14.85
	Farmers Practice	187	3.32	3.67		5.73	21.70	25.56	27.62	33.21
Zone VII – Southern areas										
Coimbatore, Puducherry, Mandya, ARI-Rajendranagar	IPM	343	3.28	6.38	8.54	8.85	20.40	15.13	12.47	13.43
	Farmers Practice	314	3.08	5.84		8.24	34.80	27.54	24.78	27.84

RICE -BASED CROPPING SYSTEMS

4.4. RESOURCE CONSERVATION TECHNOLOGIES

4.4.1. Conversation Agriculture/system based management practices in rice and rice-based cropping systems (crop diversification) for higher profitability

Conservation agriculture systems utilize soils for the production of crops with the aim of reducing excessive mixing of the soil and maintain crop residues on the soil surface to minimize damage to the environment. **The three principles** of CA are: minimum tillage and soil disturbance, permanent soil cover with crop residues live mulches and crop rotation and intercropping.

Among the various cropping systems being practiced in India, Rice-based cropping systems is considered to be the most important because of its large area coverage and contribution to overall food grain production. Transplanting is the most dominant and traditional method of establishment in irrigated lowland rice. However, due to the non-availability of irrigation water, shortage of labour during the peak period of transplanting and escalating labour costs make the transplanting technique more expensive which invariably leads to delay in transplanting and resulting in a reduction of yield. Crop residue especially Rice-Straw containing about 1-2% of 'K' a good source of nutrient especially for intensively cropped soils. Residue incorporation is known to help *Rabi* crops in rice-based cropping systems. To address this problem, alternate methods of crop establishment need to be evolved to substitute manual transplanting methods under various agro-ecologies. Hence, this trial was initiated to evaluate systems of rice crop establishment under different residue management during 2017 and continued in *Kharif* 2020, rabi 2020 and kharif 2021 to realize the production potential of alternate systems of crop establishment under different residue retention.

The trial was laid out in split-plot design during *Kharif* 2021 at four locations continued at **Vadagaon, Titabar, Ghaghraghat** and **Karjat** to assess the effect of different crop establishment methods under various residue/straw management practices. Main plot treatments comprised of three different crop establishment methods (M_1: Transplanting, M_2: Wet seeding (line sowing under puddled conditions) and M3: Aerobic rice – Dry rice cultivation). The subplot treatments comprised of three different residue/straw management (S_1: No residue, S_2: 15cm height of rice straw from ground, S_3: 30 cm height of rice straw from the ground) to be superimposed for *Rabi* crops. The results are summarized and presented in Table 4.4.1 and the salient findings are summarized below.

Crop establishment methods influenced the grain yield significantly at all locations. At **Vadagaon**, results revealed that $M_{1:}$ Transplanting of rice recorded significantly higher yield attributes and grain yield (5.62 t/ha) as compared to other crop establishment methods. Similarly, at **Titabar** the grain yields were higher (4.42 t/ha), **Ghagraghat** (5.93 t/ha) and **Karjat** (4.33 t/ha) also during Kharif 2021. The transplanting method showed superiority in minimizing the weed population and weed dry biomass at 30 and 60 DAS over wet seeding at most of the locations and recorded better yields. Among the residue management practices, rice straw incorporation (30 cm) during *Rabi* season gave better yields over no residue at **Vadagoan** (5.86 t/ha) with reduced weed population and weed dry matter.

The system productivity analysis (Kharif and rabi) indicated the superiority of transplanting at **Vadgaon** (8.77 t/ha), **Titabar** (6.33 t/ha) and **ARI-Rajendranagar** (8.31 t/ha). Aerobic rice yielded higher system productivity at **Karjat** (8.57 t/ha) based on the REY. Rice residue incorporation (30 cm height) was found to be superior at all three locations with higher REY values (9.25 t/ha, 8.59 t/ha, 6.03 t/ha and 7.59 t/ha at **Vadagaon**, **Karjat, Titabar** and **ARI-Rajendranagar** respectively).

Among crop establishment methods, transplanting exhibited significant higher values for growth and yield attributes at **Vadgaon, Titabar, Ghagraghat** and **Karjat**. The REY of the system productivity indicated superiority of the residue application at all four locations (**Vadagaon**, **Karjat, Titabar** and **ARI-Rajendranagar**) indicating the superiority of residue incorporation (6%-17% higher grain yield with residue incorporation).

Table 4.4.1: Summary of data on grain yield and ancillary characters of conservation Agriculture/ system based management practices in rice and rice based cropping systems to utilise the resources and enhancing the profitability and productivity, Kharif - 2021.

Main plot	Sub plots	VADGAON										
		Grain Yield (t/ha)	Tillers/m^2 (No.)	Panicle/m^2 (No.)	Panicle weight (g)	Test weight (g)	Days 50% flowering	Germination %	Weed population at 30 DAS (No/m2)	Weed population at 60 DAS (No/m2)	Weed Dry wt at 30 DAS (g/m2)	Weed Dry wt at 60 DAS (g/m2)
M1- Transplanting	S1	5.05	241	238	2.96	21.32	96.67	98.67	9.33(3.11)	10.33(3.28)	16	17.97
	S2	5.83	277.67	275	3.41	21.42	96.33	98.33	5.00(2.35)	6.67(2.67)	9.33	12.07
	S3	5.99	285.67	283	3.51	22.03	96.67	98.33	4.00(2.11)	4.00(2.11)	7	7
M2- Wet seeding	S1	4.78	223	220.33	2.56	20.86	96.67	98	11.00(3.38)	14.00(3.79)	16.33	20.7
	S2	5.61	261.67	258.67	3.01	21.16	95.67	98	5.67(2.48)	6.33(2.59)	9	10
	S3	5.89	275	272	3.16	22.22	96.33	98.33	4.00(2.11)	5.00(2.32)	12.33	12.73
M3- Aerobic rice	S1	4.61	210.33	208.33	2.29	21.05	96.67	98	13.67(3.75)	16.00(4.06)	19.67	23.27
	S2	5.45	249	246	2.7	21.11	96.67	98	5.67(2.48)	6.00(2.54)	8.67	8.97
	S3	5.7	260.33	257.33	2.83	22.08	96.33	98	4.00(2.11)	5.33(2.41)	7	8.7
Mean of main plots												
M1		5.62	268.11	265.33	3.29	21.59	96.56	98.44	6.11(2.52)	7.00(2.69)	10.78	12.35
M2		5.43	253.22	250.33	2.91	21.41	96.22	98.11	6.89(2.66)	8.44(2.90)	12.55	14.48
M3		5.25	239.89	237.22	2.61	21.41	96.56	98	7.78(2.78)	9.11(3.00)	11.78	13.65
C.D.(0.05)		0.01	0.58	0.51	0.01	0	NS	NS	0.1	NS	NS	NS
C.V.(%)		0.12	0.27	0.24	0.57	0.02	2.5	0.66	4.34	7.83	46.04	28.76
Mean of Sub plots												
S1		4.81	224.78	222.22	2.6	21.08	96.67	98.22	11.33(3.41)	13.44(3.71)	17.33	20.65
S2		5.63	262.78	259.89	3.04	21.23	96.22	98.11	5.44(2.44)	6.33(2.60)	9	10.35
S3		5.86	273.67	270.78	3.17	22.11	96.44	98.22	4.00(2.11)	4.78(2.28)	8.78	9.48
C.D.(0.05)		0.17	8.05	7.95	0.09	0.66	NS	1.06	0.32	0.21	5.07	4.12
C.V. (%)		3.02	3.09	3.08	3.06	2.97	0.85	1.06	11.6	7.25	42.15	29.75
Interaction												
M at same S		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
S at same M		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Expt. Mean		5.43	253.74	250.96	2.94	21.47	96.45	98.18	2.65	2.86	11.7	13.49
Variety		-										
Soil type		Medium										
pH		7.6										
RDF N:P:K (kg/ha)		100;50;50										
Aval. N:P:K of soil (kg/ha)		183:18:260										

S1 - No residue S3 - 30cm height of rice straw from ground S2 - 15cm height of rice straw from ground

Table 4.4.1: (Contd.)

Main plot	Sub plots	TITABAR							Over all mean	Rank
		Grain Yield (t/ha)	Tillers/m² (No.)	Panicle/m² (No.)	Panicle weight (g)	Days 50% flowering	Weed population at 60 DAS (No/m2)	Weed Dry wt at 60 DAS (g/m2)		
M1- Transplanting	S1	4.47	243	240	4.73	120	45.67(6.79)	96.00	4.76	4
	S2	4.70	235	236	5.07	118	44.00(6.66)	89.33	5.27	1
	S3	4.10	227	219	4.13	119	32.33(5.73)	80.00	5.05	2
M2- Wet seeding	S1	3.83	271	259	4.17	119	43.67(6.64)	82.67	4.31	6
	S2	4.13	267	262	4.27	119	35.33(5.99)	69.00	4.87	3
	S3	3.57	229	213	3.60	120	29.00(5.42)	68.67	4.73	5
M3- Aerobic rice	S1	3.20	230	217	3.60	115	58.00(7.65)	100.67	3.91	9
	S2	3.13	213	219	3.80	116	49.67(7.08)	97.67	4.29	8
	S3	2.90	243	225	3.40	118	44.00(6.67)	86.67	4.30	7
Mean of main plots										
M1		4.42	235	232	4.64	119	40.67(6.39)	88.44	5.02	1
M2		3.84	256	245	4.01	119	36.00(6.02)	73.45	4.64	2
M3		3.08	229	220	3.60	116	50.56(7.13)	95.00	4.17	3
C.D.(0.05)		0.17	NS	NS	0.12	0.62	0.32	5.84		
C.V.(%)		5.28	14.1	14.5	3.54	0.63	5.93	8.14		
Mean of Sub plots										
S1		3.83	248	239	4.17	118	49.11(7.03)	93.11	4.32	3
S2		3.99	238	239	4.38	118	43.00(6.58)	85.33	4.81	1
S3		3.52	233	219	3.71	119	35.11(5.94)	78.45	4.69	2
C.D.(0.05)		0.17	15.8	14.25	0.19	NS	0.24	4.87		
C.V. (%)		4.45	6.41	5.97	4.59	1.1	3.63	5.54		
Interaction										
M at same S		NS	27.36	24.68	NS	NS	NS	NS		
S at same M		NS	28.85	27.32	NS	NS	NS	NS		
Expt. Mean		3.78	240	232	4.09	118	6.51	85.63	4.61	
Variety		-								
Soil type		Clay loam								
pH		5.34								
RDF N:P:K (kg/ha)		60:20:40								
Aval. N:P:K of soil (kg/ha)		-								

S1 - No residue S3 - 30cm height of rice straw from ground S2 - 15cm height of rice straw from ground

Table 4.4.1: (Contd.)

Main Methods	GHAGHRAGHAT							
	Grain Yield (t/ha)	Straw Yield (t/ha)	Tillers/m2 (No.)	Panicle/m2 (No.)	Panicle weight (g)	Test weight (g)	Days 50% flowering	Germination %
M1	5.93	9.07	266	259	3.25	26.97	111	88.67
M2	5.07	8.22	224	215	2.56	26.07	107	80.33
M3	3.80	7.54	176	164	2.18	24.87	104	75.33
Exp. mean	**4.93**	**8.28**	**222**	**213**	**2.66**	**25.97**	**107**	**81.44**
CD(0.05)	0.57	0.22	18.01	13.47	0.13	0.55	1.45	4.98
CV	8.02	1.83	5.6	4.37	3.47	1.46	0.93	4.21
Variety	NDR 359							
Soil type	-							
pH	-							
RDF N:P:K (kg/ha)	120:60:40:25							
Aval. NPK of soil (kg/ha)	-							

M1 – Transplanting
M2 – Wet seeding
M3 – Aerobic rice

Table 4.4.1: (Contd.)

Main Methods	KARJAT											Over all mean	Rank
	Grain Yield (t/ha)	Straw Yield (t/ha)	Tillers/m2 (No.)	Panicle/m2 (No.)	Panicle weight (g)	Test weight (g)	Days 50% flowering	Weed population at 30 DAS (No/m2)	Weed population at 60 DAS (No/m2)	Weed Dry wt at 30 DAS (g/m2)	Weed Dry wt at 60 DAS (g/m2)		
M1	4.33	6.13	304	298	3.32	23.47	94	3.33(1.95)	2.67(1.77)	0.40	0.61	5.13	1
M2	3.96	5.45	288	279	3.18	22.97	93	4.67(2.27)	3.33(1.95)	0.56	0.77	4.52	2
M3	3.79	5.17	277	267	2.68	22.65	94	5.67(2.48)	4.33(2.20)	0.69	1.04	3.80	3
Exp. mean	**4.03**	**5.58**	**290**	**281**	**3.06**	**23.03**	**94**	**2.24**	**1.97**	**0.55**	**0.81**	**4.48**	
CD(0.05)	0.27	0.38	15.08	13.71	0.52	0.92	1.93	0.22	0.25	0.12	0.22		
CV	4.68	4.66	3.59	3.36	11.69	2.76	1.42	6.93	8.69	14.63	19.21		
Variety	-												
Soil type	-												
pH	-												
RDF N:P:K (kg/ha)	100:50:50												
Aval. NPK of soil (kg/ha)	-												

M1- Transplanting
M2- Wet seeding
M3- Aerobic rice

Table 4.4.1(R): Summary of data on grain yield and ancillary characters of conservation Agriculture/system based management practices in rice and rice based cropping systems to utilise the resources and enhancing the profitability and productivity, Rabi 2020-21.

Main plot	Sub plots	KARJAT																	
		Grain Yield (t/ha)	Straw yield (t/ha)	Kharif Grain Yield (t/ha) Rice	Germination %	Branches /plant	No of pods/ plant	Length of pod (cm)	Test weigjt (g)	Days for 50% flowering	Wt. of grain / plant (g)	Weed population at 30 DAS (No/m2)	Weed population at 60 DAS (No/m2)	Weed Dry wt at 30 DAS (g/m2)	Weed Dry wt at 60 DAS (g/m2)	Cost of cultivation (Rs/ha)	System Productivity kg/ha/day on basis of REY	REY	K +R (REY)
M1- Transplanting	S1	1.06	2.78	3.35	95.33	3.42	14.5	9.67	29.54	45.33	3.53	3.67(2.04)	2.67(1.76)	0.46	0.8	47693	23.68	4.09	7.44
	S2	1.27	3.34	3.35	95.33	3.8	17.15	10.53	29.96	46	4.15	5.67(2.48)	2.33(1.68)	0.69	0.72	47693	25.89	4.90	8.25
	S3	1.46	3.85	3.35	96	4.18	19.8	11.43	30.02	46.33	4.77	6.33(2.61)	2.33(1.68)	0.77	0.75	47693	27.95	5.63	8.98
M2- Wet seeding	S1	1.06	2.77	3.54	95.33	3.3	14.87	10	29.64	46.33	3.53	3.67(2.04)	3.33(1.95)	0.48	0.97	47693	23.37	4.09	7.63
	S2	1.27	3.34	3.54	96	3.78	17.06	10.57	29.96	45.67	4.16	5.67(2.48)	2.67(1.77)	0.74	0.8	47693	25.61	4.90	8.44
	S3	1.47	3.88	3.54	96	4.26	19.25	11.13	30.14	45.67	4.79	5.67(2.48)	2.33(1.68)	0.74	0.72	47693	27.74	5.67	9.21
M3- Aerobic rice	S1	1.07	2.8	3.67	96.33	3.43	15.04	9.8	29.84	45.33	3.56	4.33(2.20)	3.67(2.04)	0.56	1.03	47693	23.17	4.13	7.80
	S2	1.27	3.34	3.67	95.67	3.8	16.97	10.57	29.96	46	4.15	6.00(2.54)	3.00(1.86)	0.77	0.87	47693	25.27	4.90	8.57
	S3	1.46	3.85	3.67	96.33	4.16	18.9	11.33	30.07	46.33	4.74	5.33(2.41)	2.67(1.77)	0.69	0.8	47693	27.33	5.63	9.30
Mean of main plots																			
M1		1.26	3.32	3.35	95.55	3.8	17.15	10.54	29.84	45.89	4.15	5.22(2.38)	2.44(1.71)	0.64	0.76	47693	25.84	4.86	8.21
M2		1.27	3.33	3.54	95.78	3.78	17.06	10.57	29.91	45.89	4.16	5.00(2.33)	2.78(1.80)	0.65	0.83	47693	25.57	4.90	8.44
M3		1.27	3.33	3.67	96.11	3.8	16.97	10.57	29.96	45.89	4.15	5.22(2.38)	3.11(1.89)	0.67	0.9	47693	25.26	4.90	8.57
C.D.(0.05)		NS	NS		NS	NS	NS	NS	0.02	NS	NS	NS	NS	NS	NS	NS	0.18		
C.V.(%)		1.22	1.13		0.68	1.14	2.09	1.94	0.1	1.26	0.21	3.14	8.46	7.07	20.15	0	0.82		
Mean of Sub plots																			
S1		1.06	2.78	3.52	95.66	3.38	14.8	9.82	29.67	45.66	3.54	3.89(2.09)	3.22(1.92)	0.5	0.93	47693	23.41	4.09	7.61
S2		1.27	3.34	3.52	95.67	3.79	17.06	10.56	29.96	45.89	4.15	5.78(2.50)	2.67(1.77)	0.73	0.8	47693	25.59	4.90	8.42
S3		1.46	3.86	3.52	96.11	4.2	19.32	11.3	30.08	46.11	4.77	5.78(2.50)	2.44(1.71)	0.73	0.76	47693	27.67	5.63	9.15
C.D.(0.05)		0.02	0.05		NS	0.14	0.76	0.28	0.08	NS	0.03	0.14	NS	0.09	NS	NS	0.18		
C.V. (%)		1.27	1.36		0.85	3.53	4.31	2.56	0.25	1.85	0.79	5.86	12.09	12.87	28.42	0	0.67		
Interaction																			
N at same V		NS	NS		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		
V at same N		NS	NS		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		
Expt. Mean		1.27	3.33	4.03	95.81	3.79	17.06	10.56	29.9	45.89	4.15	2.37	1.8	0.65	0.83	47693	25.56	4.90	8.93
Variety		-																	
Soil type		-																	
pH		-																	
RDF NPK (kg/ha)		-																	
Aval. NPK of soil (kg/ha)		25;50:0																	

S1 - No residue
S2 - 15cm height of rice straw from ground
S3 - 30cm height of rice straw from ground

System: Rice-Green Gram

*Selling rate : Rice Grain Rs. 18000 /t, Rice straw Rs. 3000 /t, Green gram Rs. 70000/t, Stover of green gram Rs. 2000/t

Table 4.4.1(R): (Contd.)

Main plot	Sub plots	GHAHRAGHAT				Over all mean	Rank
		Grain Yield (t/ha)	Kharif Grain Yield(t/ha)	REY	K +R (REY)		
M1- Transplanting	S1	3.6	3.35	3.71	7.06	2.33	7
	S2	4.2	3.35	4.33	7.68	2.74	5
	S3	4.63	3.35	4.77	8.12	3.05	2
M2- Wet seeding	S1	3.37	3.54	3.47	7.01	2.22	9
	S2	4.07	3.54	4.19	7.73	2.67	6
	S3	4.7	3.54	4.84	8.38	3.09	1
M3- Aerobic rice	S1	3.53	3.67	3.64	7.31	2.30	8
	S2	4.33	3.67	4.46	8.13	2.80	4
	S3	4.57	3.67	4.71	8.38	3.02	3
Mean of main plots							
M1		4.14	3.35	4.27	7.62	2.70	2
M2		4.05	3.54	4.17	7.71	2.66	3
M3		4.14	3.67	4.27	7.94	2.71	1
C.D.(0.05)		4.83					
C.V.(%)							
Mean of Sub plots							
S1		3.5	3.52	3.61	7.13	2.28	3
S2		4.2	3.52	4.33	7.85	2.74	2
S3		4.63	3.52	4.77	8.29	3.05	1
C.D.(0.05)		0.11					
C.V. (%)		2.69					
Interaction							
N at same V		NS					
V at same N		NS					
Expt. Mean		4.11	3.52	4.23	7.75	2.69	
Variety		Maize					
Soil type		Clay loam					
pH		7.3					
RDF N:P:K (kg/ha)		-					
AvalN:P:K of soil (kg/ha)		145:18:187					
System		Rice-Maize					

S1 - No residue MSP Maize Rs.18700/t

S2 - 15cm height of rice straw from ground

S3 - 30cm height of rice straw from ground

Table 4.4.1(R): (Contd.)

Crop Establishment Methods	Sub plot	Sub-Sub plot	TITABAR		
			Germination(%)	Yield (t/ha)	REY
M1: Transplanting	S1-No residue	C1-Pulse (Green Gram)	86.2	0.56	2.16
		C2- Oil seed (Toria)	91	0.41	1.58
		C2- Oil seed (Linseed)	90.2	0.46	1.77
	S2-15cm height of rice straw from ground	C1-Pulse (Green Gram)	88.4	0.58	2.24
		C2- Oil seed (Toria)	93.5	0.47	1.81
		C2- Oil seed (Linseed)	91.4	0.5	1.93
	S3-30cm height of rice straw from ground	C1-Pulse (Green Gram)	85.1	0.46	1.77
		C2- Oil seed (Toria)	89	0.45	1.74
		C2- Oil seed (Linseed)	88	0.47	1.81
M2: Wet seeding (Line sowing under puddle condition)	S1-No residue	C1-Pulse (Green Gram)	86.8	0.58	2.24
		C2- Oil seed (Toria)	91.7	0.52	2.01
		C2- Oil seed (Linseed)	91.3	0.54	2.08
	S2-15cm height of rice straw from ground	C1-Pulse (Green Gram)	90.1	0.59	2.28
		C2- Oil seed (Toria)	94.5	0.54	2.08
		C2- Oil seed (Linseed)	92	0.52	2.01
	S3-30cm height of rice straw from ground	C1-Pulse (Green Gram)	86.1	0.5	1.93
		C2- Oil seed (Toria)	90.3	0.53	2.04
		C2- Oil seed (Linseed)	88.6	0.52	2.01
M3- Aerobic rice (Dry rice cultivation)	S1-No residue	C1-Pulse (Green Gram)	83	0.5	1.93
		C2- Oil seed (Toria)	87.5	0.42	1.62
		C2- Oil seed (Linseed)	88	0.47	1.81
	S2-15cm height of rice straw from ground	C1-Pulse (Green Gram)	86.5	0.53	2.04
		C2- Oil seed (Toria)	91.5	0.51	1.97
		C2- Oil seed (Linseed)	87.8	0.49	1.89
	S3-30cm height of rice straw from ground	C1-Pulse (Green Gram)	82.7	0.44	1.70
		C2- Oil seed (Toria)	86.1	0.43	1.66
		C2- Oil seed (Linseed)	85.5	0.47	1.81
Interactions					
A X C			NS	NS	
B X C			NS	0.037	
A X B X C			NS	NS	
Mean of Main Plots					
M1			89.2	0.49	
M2			90.2	0.54	
M3			86.5	0.47	
C.D (0.05%)			0.384	0.032	
SE(m)			0.098	0.008	
Mean of Sub Plots					
S1			88.4	0.5	
S2			90.6	0.53	
S3			86.8	0.47	
C.D (0.05%)			0.841	0.028	
SE(m)			0.273	0.009	
Mean of Sub-Sub plots					
C1			86.1	0.53	
C2			90.6	0.48	
C3			89.2	0.49	
C.D (0.05%)			1.109	0.021	
SE(m)			0.387	0.007	
Expt Mean			88.6	0.5	

Soil type: Clay loam

Table 4.4.1(R): Summary of data on grain yield and ancillary characters of conservation Agriculture/system based management practices in rice and rice based cropping systems to utilise the resources and enhancing the profitability and productivity, Kharif – 2021 & Rabi 2020-21.

Main plot	Sub plots	VADAGAON											
		Kh-18	Rb 18-19	REY (Gram)	K +R (REY)	Kh-19	Rb19-20	REY (Gram)	K +R (REY)	Kh-20	Grain yield Mean of Two years	Rank	Kh-21
		Kharif Grain Yield (t/ha) Rice	Grain Yield (t/ha) Gram			Grain Yield (t/ha)	Grain Yield (t/ha) Gram			Kharif Grain Yield (t/ha) Rice			Kharif Grain Yield (t/ha) Rice
M1- Transplanting	S1	4.89	0.90	2.92	7.81	4.96	0.92	3.04	8.00	5.07	7.90	7	5.05
	S2	5.61	1.03	3.34	8.95	5.68	1.06	3.50	9.18	5.85	9.07	4	5.83
	S3	5.72	1.06	3.44	9.16	5.83	1.11	3.67	9.50	6.01	9.33	1	5.99
M2- Wet seeding	S1	4.7	0.85	2.76	7.46	4.69	0.87	2.88	7.57	4.79	7.51	8	4.78
	S2	5.78	0.99	3.21	8.99	5.47	1.02	3.37	8.84	5.62	8.92	5	5.61
	S3	5.89	1.04	3.37	9.26	5.73	1.07	3.54	9.27	5.91	9.26	2	5.89
M3- Aerobic rice	S1	4.91	0.82	2.66	7.57	4.52	0.84	2.78	7.30	4.62	7.43	9	4.61
	S2	5.97	0.97	3.15	9.12	5.31	0.99	3.27	8.58	5.47	8.85	6	5.45
	S3	6.07	1.01	3.28	9.35	5.55	1.04	3.44	8.99	5.72	9.17	3	5.7
Mean of main plots													
M1		5.41	1.00	3.24	8.65	5.49	1.03	3.40	8.89	5.64	8.77	1	5.62
M2		5.45	0.96	3.11	8.56	5.30	0.99	3.27	8.57	5.44	8.57	2	5.43
M3		5.65	0.93	3.02	8.67	5.13	0.95	3.14	8.27	5.27	8.47	3	5.25
C.D.(0.05)		0.16	0.00			0.00	0.01			0.00			0.01
C.V.(%)		2.85	0.10			0.10	0.70			0.10			0.12
Mean of Sub plots													
S1		4.83	0.86	2.79	7.62	4.72	0.87	2.88	7.60	4.83	7.61	3	4.81
S2		5.78	1.00	3.24	9.02	5.49	1.02	3.37	8.86	5.65	8.94	2	5.63
S3		5.89	1.04	3.37	9.26	5.70	1.07	3.54	9.24	5.88	9.25	1	5.86
C.D.(0.05)		0.19	0.03			0.14	0.02			0.16			0.17
C.V. (%)		3.93	2.57			2.57	2.42			2.94			3.02
Interaction													
N at same V		NS	NS			NS	NS			NS			NS
V at same N		NS	NS			NS	NS			NS			NS
Expt. Mean		**5.50**	0.96	3.11	8.61	5.31	0.99	3.27	8.58	5.45	8.60		5.43
Variety			Gram			Phule samruddhi	Gram						
Soil type			Clay loam			-							
pH			7.2			7.8							
RDF N:P:K (kg/ha)			152:15:210			100;50;50							
Aval. N:P:K of soil (kg/ha)			Rice-Gram			172:16:219							

S1 - No residue S2 - 15cm height of rice straw from ground S3 - 30cm height of rice straw from ground

Table 4.4.1(K &R): (Contd.)

Main plot	Sub plots	TITABAR						ARI-RAJENDRANAGAR										
		Kh-18	Kh-19	Kh-20	Rb 20-21	REY	K +R (REY)	Kh-18	Rb 18-19	REY	K +R (REY)	Kh-19	Rb 19-20	REY (Maize)	K +R (REY)	Grain yield Mean of Two years	Rank	Kh-20
		Grain Yield (t/ha)	Grain Yield (t/ha)	Grain Yield (t/ha)	Grain Yield (t/ha) GRAM			Kharif Grain Yield (t/ha) Rice	Grain Yield (t/ha) Maize			Grain Yield (t/ha)	Grain Yield (t/ha) Gram					Kharif Grain Yield (t/ha) Rice
M1- Transplanting	S1	4.96	4.96	4.50	0.48	1.84	6.34	5.67	4.02	3.91	9.58	7.12	3.88	3.85	7.87	8.72	2	4.47
	S2	4.59	4.93	4.73	0.52	1.99	6.72		2.48	2.41	8.08	7.12	4.59	4.55	7.03	7.56	5	
	S3	3.91	4.64	4.13	0.46	1.77	5.90		2.84	2.76	8.43	7.12	6.09	6.04	8.88	8.65	3	
M2- Wet seeding	S1	3.69	3.01	3.83	0.55	2.11	5.94	5.00	4.41	4.28	9.28	6.75	4.93	4.89	9.30	9.29	1	3.86
	S2	3.5	3.17	4.13	0.55	2.12	6.25		3.84	3.73	8.73	6.75	4.14	4.11	7.95	8.34	4	
	S3	2.95	3.12	3.57	0.52	1.99	5.56		2.34	2.27	7.27	6.75	3.73	3.70	6.04	6.66	6	
M3- Aerobic rice	S1	2.19	2.09	3.20	0.46	1.79	4.99	3.73	2.33	2.26	5.99	3.44	3.24	3.21	5.54	5.77	9	3.53
	S2	2.16	2.21	3.13	0.51	1.97	5.10		1.83	1.78	5.51	3.44	4.60	4.56	6.39	5.95	8	
	S3	2.01	2.13	2.90	0.45	1.72	4.62		1.69	1.64	5.37	3.44	6.30	6.25	7.94	6.65	7	
Mean of main plots																		
M1		4.49	4.84	4.46	0.48	1.87	6.33	5.67	3.11	3.02	8.69	7.12	4.85	4.81	7.92	8.31	1	
M2		3.38	3.10	3.84	0.54	2.07	5.91	5.00	3.53	3.43	8.43	6.75	4.27	4.23	7.76	8.10	2	
M3		2.12	2.14	3.08	0.47	1.83	4.91	3.73	1.95	1.89	5.62	3.44	4.71	4.67	6.62	6.12	3	
C.D.(0.05)		0.14	0.27	0.16				0.57	0.45			0.84	NS					
C.V.(%)		4.96	9.71	4.96				8.16	18.64			10.06	33.49					
Mean of Sub plots																		
S1		3.61	3.35	3.84	0.50	1.91	5.75	3.79	3.59	3.49	7.28		4.02	3.99	7.58	7.43	2	
S2		3.42	3.43	4.00	0.53	2.03	6.03	4.52	2.72	2.64	7.16		4.44	4.40	7.12	7.14	3	
S3		2.95	3.30	3.53	0.47	1.83	5.36	5.32	2.29	2.22	7.54		5.38	5.34	7.63	7.59	1	
C.D.(0.05)		0.23	NS	0.17					0.92				NS					
C.V. (%)		6.74	3.48	4.44					31.27				25.36					
Interaction																		
N at same V		NS	NS	NS					NS				NS					
V at same N		NS	NS	NS					NS				NS					
Expt. Mean		**3.33**	3.36	3.79	0.50	1.93		4.54	2.86	2.78	7.32		4.61	4.57	7.43	7.38		
Variety		Shraboni	Numoli						-				-					
Soil type		-	Clay loam						-				-					
pH		-	5.2						-				-					
RDF N:P:K (kg/ha)		-	60:20:40						-				-					
Aval. N:P:K of soil (kg/ha)		-	440:21:335						Rice-Maize				-					

S1 - No residue S3 - 30cm height of rice straw from ground S2 - 15cm height of rice straw from ground Rice-Maize

Table 4.4.1(K &R): (Contd.)

Main plot	Sub plots	GHAGHRAGHAT			
		Kh-19	Kh-20	Rb 20-21	Kh-21
		Grain Yield (t/ha)	Grain Yield (t/ha)	Grain Yield (t/ha) GRAM	Grain Yield (t/ha)
M1- Transplanting	S1	3.33	3.35	3.6	5.93
	S2			4.2	
	S3			4.63	
M2- Wet seeding	S1	3.17	3.54	3.37	5.07
	S2			4.07	
	S3			4.7	
M3- Aerobic rice	S1	2.92	3.67	3.53	3.80
	S2			4.33	
	S3			4.57	
Mean of main plots					
M1		3.33		4.14	
M2		3.17		4.05	
M3		2.92		4.14	
				NS	
C.D.(0.05)		0.54		4.83	
C.V.(%)		11.85			
Mean of Sub plots					
S1				3.5	
S2				4.2	
S3				4.63	
C.D.(0.05)				0.11	
C.V. (%)				2.69	
Interaction					
N at same V				NS	
V at same N				NS	
Expt. Mean				4.11	
Variety		NDR 359		GRAM	
Soil type		Sandy loam			
pH		8.06			
RDF N:P:K (kg/ha)		100:50:30			
Aval. N:P:K of soil (kg/ha)		-			

S1 - No residue
S2 - 15cm height of rice straw from ground
S3 - 30cm height of rice straw from ground

4.4.2 Evaluation of promising cultivars for late planting and management for higher productivity and mitigate the effect climate change

Late planning of rice is becoming very common due to number of reasons such as changes in weather, late onset of monsoon, machinery breakdown and water availability and severe yield reduction due to delay in planting. Late planting also delays harvest, reduces the turnaround time for second crop and effects the cropping system productivity. There is a need to find out superior cultivars adopted to late planting and to minimize the loss in productivity of rice with suitable management practices and also fit these cultivars in suitable rice-based cropping systems.

The trail to evaluate promising cultivars for normal sowing and one-month late sowing was conducted at **Aduthurai, Chatha, Jagadalpur, Mandya** and **Titabar** under direct sowing in puddle condition (M_1) and normal transplanting ($M_{2)}$.

At **Aduthurai,** the trial was conducted during *kharif* 2021 with five cultivars Viz., AD 08219, AD 16028, AD 17152, AD 18006 and ADT 53 which were evaluated for direct line sowing in puddle condition (M_1) and normal planting (M_2). Normal sowing (M_1) and delayed sowing (M_2) were tested with five cultivars (Jammu Basmati 564, Basmati 370, Jammu Basmati 138, Jammu Basmati 123, Jammu Basmati 118 and Pusa Basmati 1728) at **Chatha**. Five cultivars (AD 08219, AD 16028, AD 17152, AD 18006 and ADT 53) were tested at **Jagadalpur**. At **Mandya,** ten cultivars Viz., Raksha, MTU 1010, IR 64, Jyothi, RNR 15048, Rasi, KMP 175, MSN 99, T Hamsha and CTH 1 were evaluated for direct line sowing in puddle condition (M_1) and normal planting (M_2) while at **Titabar,** five cultivars (Luit, Dishang, Dikhow, Kopilee, Bina 11 and Gitesh) under direct line sowing in puddle condition (M_1) were evaluated for their performance.

The results of the trial indicate that normal sowing (M_1) gave significantly higher yield (5.02 t/ha) over delayed sowing under puddle condition (M_2) at **Aduthurai**. Among the cultivars tested AD 16028 (5.47 t/ha) followed by ADT 53 (5.31 t/ha) were found promising over other cultivars. Hence, AD 16028 and ADT 53 can be recommended under late planting situation and transplanting can be delayed by one month at this location.

At Chatha, the results of the trial indicate that normal transplanting condition (M_1) gave significantly higher yield (3.80 t/ha) over delayed planting (M_2). Among the cultivars tested Pusa Basmati 1728 (4.21 t/ha) followed by Jammu Basmati 118 (4.02 t/ha) were found promising over other cultivars. Hence, Pusa Basmati 1728 and Jammu Basmati 118 can be recommended under late planting situation and transplanting can be delayed by one month at this location.

At **Jagadalpur**, trial indicate that normal sowing (M_1) gave significantly higher yield (3.58 t/ha) over delayed planting (M_1). Among the cultivars tested AD 17152 (4.82 t/ha) followed by AD 08219 (4.70 t/ha) and AD 16028 (4.70 T/HA) were found promising over other

cultivars. Hence, AD 17152, AD 08219 and AD 16028 can be recommended under late planting situation and transplanting can be delayed by one month at this location.

The results of the trial indicate that normal sowing with NTP (M_1) gave significantly higher yield (6.20 t/ha) delayed sowing (M_2) (4.91 t/ha) at **Mandya.** Among the cultivars tested CTH 1(8.65 t/ha) followed by KMP 175 (8.51 t/ha) were found promising over other cultivars and can be recommended under late planting situation. Hence, CTH 1 and KMP 175 can be recommended under late planting situation and transplanting can be delayed by one month due to better grain yield at this location.

At **Titabar**, under direct seeding method, normal sowing time (M_1) gave significantly higher yield (2.57 t/ha) over late sowing (30 days late) (M_2). Among the cultivars tested Gitesh (3.88 t/ha) followed by Bina 11 (2.94 t/ha) were found promising over other cultivars. Hence, Gitesh and Bina 11 can be recommended under late planting situation and transplanting can be delayed by one month due to better grain yield at this location.

The results indicated that, AD 16028 and ADT 53 at **Aduthurai,** Pusa Basmati 1728 and Jammu Basmati 118 at **Chatha**, AD 17152, AD 08219 and AD 16028 at **Jagdalpur**, CTH 1 and KMP 175 at **Mandya**, Gitesh and Bina 11 at **Titabar** were found promising with better yields under late planting situation. At all the locations, normal sowing outyielded delayed sowing and grain yield increase of 6.51% to 21% was noted except at Jagdalpur (42% yield decline).

Table 4.4.2: Evaluation of promising cultivars for late planting and management for higher productivity & mitigate the effect of climate change, Kharif-2021.

Main plot: Crop Establishing methods	Sub plot: Crop methods	Cultures	ADUTHURAI			
			Panicle No./m2	Grain Yield (t/ha)	Test weight (g)	Rank (Grain Yield)
M_1: Normal Sowing	S_1: Direct Sowing	V_1- AD 08219	226	4.50	19.30	12
		V_2- AD 16028	262	5.40	18.23	3
		V_3- AD 17152	241	4.43	17.63	15
		V_4- AD 18006	235	3.97	17.23	19
		V_5- ADT 53	219	5.20	17.60	6
	S_2: Normal planting	V_1- AD 08219	260	5.37	19.23	4
		V_2- AD 16028	302	6.17	18.43	1
		V_3- AD 17152	253	4.77	17.83	10
		V_4- AD 18006	260	4.47	17.20	14
		V_5- ADT 53	272	5.97	17.70	2
M2: Delayed Sowing (30 days)	S_1: Direct Sowing	V_1- AD 08219	211	4.20	19.10	17
		V_2- AD 16028	240	5.00	18.37	8
		V_3- AD 17152	221	4.10	17.50	18
		V_4- AD 18006	216	3.50	17.27	20
		V_5- ADT 53	207	4.87	17.40	9
	S_2: Normal planting	V_1- AD 08219	220	4.77	19.17	10
		V_2- AD 16028	263	5.30	18.10	5
		V_3- AD 17152	244	4.47	17.50	13
		V_4- AD 18006	233	4.23	17.33	16
		V_5- ADT 53	219	5.20	17.43	6
Mean of Main plots						
M1			253	5.02	18.04	1
M2			227	4.56	17.92	2
C.D.			9.38	0.13	0.07	
SE(m)			1.52	0.02	0.01	
Mean of Sub plots						
S1			228	4.52	17.96	2
S2			253	5.07	17.99	1
C.D.			3.13	0.18	N/A	
SE(m)			0.80	0.05	0.02	
Mean of Sub-sub						
V1			229	4.71	19.20	3
V2			267	5.47	18.28	1
V3			240	4.44	17.62	4
V4			236	4.04	17.26	5
V5			229	5.31	17.53	2
C.D.			5.59	0.19	0.17	
SE(m)			1.94	0.07	0.06	
Intraction						
AXB			4.43	N/A	N/A	
AXC			7.90	N/A	N/A	
BXC			7.90	N/A	N/A	
AXBXC			11.18	N/A	N/A	
Expt. Mean			240	4.79	17.98	

Table 4.4.2: (Contd.)

Main plot: Crop Establishing methods	Sub plot	Sub-sub plot: Varieties	CHATHA				
			Panicle No./m2	Panicle weight (g)	Test weight (g)	Grain Yield (t/ha)	Rank (Grain Yield)
M1-Normal	S1- Direct sowing in Puddled soil (Line sowing) with RDF	V1 Jammu Basmati 564	191	1.86	21.0	3.45	16
		V2 Basmati 370	184	1.83	20.7	3.02	17
		V3 Jammu Basmati 138	195	1.90	21.4	3.71	13
		V4 Jammu Basmati 123	201	1.97	21.6	3.84	10
		V5 Jammu Basmati 118	206	2.15	24.1	4.01	4
		V6 Pusa Basmati1728	215	2.26	24.4	4.23	3
	S2- Normal Transplanting with RDF	V1 Jammu Basmati 564	162	1.95	21.5	3.65	12
		V2 Basmati 370	155	1.87	21.2	3.17	14
		V3 Jammu Basmati 138	166	1.95	21.6	3.83	10
		V4 Jammu Basmati 123	166	1.99	22.0	4.04	9
		V5 Jammu Basmati 118	173	2.25	24.6	4.23	2
		V6 Pusa Basmati1728	178	2.36	24.8	4.43	1
M2- 30 days late	S1- Direct sowing in Puddled soil (Line sowing) with RDF	V1 Jammu Basmati 564	178	1.80	20.1	3.02	23
		V2 Basmati 370	173	1.76	19.7	2.73	24
		V3 Jammu Basmati 138	184	1.86	20.2	3.44	21
		V4 Jammu Basmati 123	187	1.91	20.5	3.51	19
		V5 Jammu Basmati 118	197	2.10	23.1	3.82	8
		V6 Pusa Basmati1728	204	2.22	23.4	3.95	7
	S2- Normal Transplanting with RDF	V1 Jammu Basmati 564	153	1.88	20.4	3.46	20
		V2 Basmati 370	145	1.81	20.1	3.01	22
		V3 Jammu Basmati 138	156	1.92	20.5	3.65	18
		V4 Jammu Basmati 123	156	1.94	21.1	3.78	15
		V5 Jammu Basmati 118	165	2.17	23.4	4.01	6
		V6 Pusa Basmati1728	166	2.27	23.7	4.24	5
Maen of main plot							
M1			183	2.03	22.41	3.80	1
M2			172	1.97	21.35	3.55	2
C.D.			1.72	0.01	0.15	0.03	
SE(m)			0.28	0.00	0.03	0.00	
Mean of Sub plots							
S1			193	1.97	21.69	3.56	2
S2			162	2.03	22.08	3.79	1
C.D.			2.83	0.01	0.06	0.01	
SE(m)			0.73	0.00	0.02	0.00	
Mean of Sub-sub							
V1 Jammu Basmati 564			171	1.87	20.73	3.40	5
V2 Basmati 370			164	1.81	20.45	2.99	6
V3 Jammu Basmati 138			175	1.91	20.93	3.66	4
V4 Jammu Basmati 123			178	1.95	21.32	3.79	3
V5 Jammu Basmati 118			185	2.17	23.80	4.02	2
V6 Pusa Basmati1728			191	2.28	24.07	4.21	1
C.D.			1.86	0.02	0.06	0.02	
SE(m)			0.65	0.01	0.02	0.01	
Interaction							
AXB			N/A	N/A	0.09	0.02	
AXC			N/A	N/A	N/A	0.03	
BXC			2.63	0.02	0.08	0.03	
AXBXC			N/A	N/A	0.11	0.04	
Expt.Mean			**177.32**	**2.00**	**21.88**	**3.68**	

Table 4.4.2: (Contd.)

Main plot: Crop Establishing methods	Sub plot: Crop methods	Cultures	JAGDALPUR				
			Panicle No./m2	Test weight (g)	Grain Yield (t/ha)	Straw Yield (t/ha)	Rank (Grain Yield)
M_1: Normal Sowing	S_1: Direct Sowing	V_1- AD 08219	163	32.2	3.38	5.07	8
		V_2- AD 16028	209	29.2	3.56	5.35	5
		V_3- AD 17152	170	31.9	3.51	5.27	6
		V_4- AD 18006	210	41.0	3.46	5.19	7
		V_5- ADT 53	130	25.3	1.90	2.85	14
	S_2: Normal planting	V_1- AD 08219	193	34.7	4.56	6.84	1
		V_2- AD 16028	212	29.8	4.50	6.75	2
		V_3- AD 17152	282	32.1	4.45	6.68	3
		V_4- AD 18006	229	41.6	4.34	6.52	4
		V_5- ADT 53	207	25.1	2.17	3.26	13
M2: Delayed Sowing (30 days)	S_1: Direct Sowing	V_1- AD 08219	119	30.9	1.44	2.17	18
		V_2- AD 16028	115	28.8	1.84	2.87	16
		V_3- AD 17152	104	31.8	1.86	2.79	15
		V_4- AD 18006	134	35.0	1.74	2.61	17
		V_5- ADT 53	100	24.1	1.23	1.85	20
	S_2: Normal planting	V_1- AD 08219	233	32.0	3.16	4.74	9
		V_2- AD 16028	247	29.3	2.55	3.83	12
		V_3- AD 17152	226	31.3	3.04	4.56	10
		V_4- AD 18006	213	35.3	2.59	3.88	11
		V_5- ADT 53	161	24.6	1.28	1.92	19
Mean of Main plots							
M1			201	32.3	3.58	5.37	1
M2			165	30.3	2.07	3.12	2
C.D.			N/A	1.67	0.76	1.10	
SE(m)			8.64	0.27	0.12	0.18	
Mean of Sub plots							
S1			146	31.0	2.39	3.60	2
S2			220	31.6	3.26	4.90	1
C.D.			23.74	0.40	0.32	0.48	
SE(m)			6.08	0.10	0.08	0.12	
Mean of Sub-sub							
V1- AD 08219			177	32.4	3.13	4.70	2
V2- AD 16028			196	29.3	3.11	4.70	3
V3- AD 17152			196	31.8	3.21	4.82	1
V4- AD 18006			197	38.2	3.03	4.55	4
V5- ADT 53			150	24.8	1.64	2.47	5
C.D.			23.12	2.32	0.47	0.71	
SE(m)			8.03	0.80	0.16	0.25	
Interaction							
AXB			33.58	N/A	N/A	N/A	
AXC			N/A	N/A	N/A	N/A	
BXC			N/A	N/A	N/A	N/A	
AXBXC			46.25	N/A	N/A	N/A	
Expt. Mean			**183**	**31.3**	**2.83**	**4.25**	

Table 4.4.2: (Contd.)

Main plot: Crop Establishing methods	Main plot: Crop Establishing methods	Sub plot: Varieties	MANDYA					
			Panicle No./m2	Panicle weight (g)	Test weight (g)	Grain Yield (t/ha)	Straw Yield (t/ha)	Rank (Grain Yield)
M1-Normal (26.07.2021)	**M1-Normal time of planting with NTP**	V1.Raksha	388	2.63	20.89	6.71	7.77	1
		V2. MTU 1010	384	2.78	28.87	6.27	7.48	5
		V3. IR 64	394	2.76	30.79	5.63	6.32	11
		V4. Joythi	395	2.17	31.35	5.69	7.68	10
		V5. RNR 15048	388	2.98	22.22	5.91	8.97	8
		V6. Rasi	393	3.08	25.38	6.69	8.26	2
		V7.KMP 175	373	4.07	24.89	6.60	9.95	3
		V8.MSN 99	396	2.92	23.70	6.40	7.95	4
		V9. T Hamsha	381	3.22	27.37	6.03	8.32	7
		V 10.CTH 1	390	3.57	30.40	6.04	9.72	6
M2- 30 days late(26.08.2021)	**M1-30 Days delayed with NTP**	V1.Raksha	363	1.88	20.47	4.97	5.76	14
		V2. MTU 1010	366	2.39	25.32	5.88	6.78	9
		V3. IR 64	360	2.30	29.58	4.41	5.93	19
		V4. Joythi	363	2.16	30.00	5.14	6.27	13
		V5. RNR 15048	331	2.04	17.60	4.92	7.70	15
		V6. Rasi	361	2.20	26.26	5.52	6.52	12
		V7.KMP 175	350	3.42	24.06	4.86	7.08	16
		V8.MSN 99	345	2.15	20.61	4.55	7.73	17
		V9. T Hamsha	333	2.47	26.63	4.36	6.56	20
		V 10.CTH 1	321	2.89	28.40	4.48	7.57	18
Mean of Main plot								
M1			387.95	3.02	26.59	6.20	8.24	1
M2			349.23	2.39	24.89	4.91	6.79	2
C.D.			N/A	0.552	N/A	1.08	0.37	
SE(m)			7.937	0.031	0.141	0.06	0.02	
Mean of Sub plots								
V1.Raksha			375	2.25	20.68	5.84	6.76	3
V2. MTU 1010			375	2.59	27.09	6.07	7.13	2
V3. IR 64			377	2.53	30.18	5.02	6.13	10
V4. Joythi			379	2.17	30.67	5.41	6.97	7
V5. RNR 15048			359	2.51	19.91	5.42	8.33	6
V6. Rasi			377	2.64	25.82	6.10	7.39	1
V7.KMP 175			361	3.75	24.47	5.73	8.51	4
V8.MSN 99			370	2.54	22.16	5.47	7.84	5
V9. T Hamsha			357	2.84	27.00	5.20	7.44	9
V 10.CTH 1			356	3.23	29.40	5.26	8.65	8
C.D.			N/A	0.511	2.218	N/A	0.87	
SE(m)			25.1	0.097	0.447	0.19	0.07	
Interaction								
AXB			N/A	N/A	N/A	N/A	N/A	
BXA			N/A	N/A	N/A	N/A	N/A	
Expt.Mean			**369**	**2.70**	**25.74**	**5.55**	**7.51**	

Table 4.4.2: (Contd.)

Main plot: Crop Establishing methods	Sub plot	Sub-sub plot: Varieties	TITABAR						
			Panicle No./m2	Panicle weight (g)	Test weight (g)	Days for 50% flowering	Grain Yield (t/ha)	Straw Yield (t/ha)	Rank (Grain Yield)
M1-Normal	S1- Direct sowing in Puddled soil (Line sowing) with RDF	V1 (Luit)	185	3.00	20.7	61	2.43	2.20	10
		V2 (Dishang)	207	2.93	24.4	64	2.23	2.30	12
		V3 (Dikhow)	210	2.73	19.5	63	1.47	1.67	21
		V4 (Kopilee)	227	3.63	27.1	62	1.27	1.63	22
		V5 (Bina-11)	212	2.33	26.5	91	1.90	3.00	16
		V6 (Gitesh)	233	3.83	20.9	127	2.90	3.50	4
	S2- Normal Transplanting with RDF	V1 (Luit)	142	3.70	22.0	67	2.67	2.30	8
		V2 (Dishang)	270	3.33	24.2	67	1.77	2.10	18
		V3 (Dikhow)	239	3.03	19.7	66	2.70	2.37	7
		V4 (Kopilee)	285	4.00	27.8	66	2.97	2.23	2
		V5 (Bina-11)	214	2.57	26.8	91	2.17	3.30	13
		V6 (Gitesh)	240	3.80	21.8	127	3.17	4.23	1
M2- 30 days late	S1- Direct sowing in Puddled soil (Line sowing) with RDF	V1 (Luit)	178	2.77	22.4	62	2.10	2.00	14
		V2 (Dishang)	203	2.70	24.6	62	2.07	1.97	15
		V3 (Dikhow)	199	2.60	20.1	62	1.27	1.40	22
		V4 (Kopilee)	220	3.50	28.2	61	1.20	1.43	24
		V5 (Bina-11)	208	2.50	26.9	91	1.70	2.63	19
		V6 (Gitesh)	226	3.73	21.3	123	2.90	3.73	4
	S2- Normal Transplanting with RDF	V1 (Luit)	180	3.03	21.2	67	2.43	2.03	10
		V2 (Dishang)	209	2.90	23.8	67	1.63	1.83	20
		V3 (Dikhow)	204	2.83	19.5	64	2.67	2.03	8
		V4 (Kopilee)	224	3.83	27.3	65	2.83	2.03	6
		V5 (Bina-11)	213	2.60	26.3	93	1.87	2.83	17
		V6 (Gitesh)	230	3.97	21.2	127	2.97	4.03	2
Mean of main plot									
M1			222	3.24	23.45	79.39	2.30	2.57	1
M2			208	3.08	23.58	78.61	2.14	2.33	2
C.D. (0.05%)			4.77	N/A	N/A	N/A	0.128	0.211	
SE(m)			0.77	0.038	0.071	0.297	0.021	0.034	
Mean of Sub plots									
S1			209	3.02	23.55	77.36	1.95	2.29	2
S2			221	3.30	23.48	80.64	2.49	2.61	1
C.D. (0.05%)			1.00	0.083	N/A	0.991	0.084	0.1	
SE(m)			0.26	0.021	0.053	0.254	0.021	0.026	
Mean of Sub-sub									
V1 (Luit)			171	3.13	21.58	64.17	2.41	2.13	2
V2 (Dishang)			222	2.97	24.28	64.92	1.93	2.05	5
V3 (Dikhow)			213	2.80	19.70	63.83	2.03	1.87	4
V4 (Kopilee)			239	3.74	27.59	63.58	2.07	1.83	3
V5 (Bina-11)			212	2.50	26.61	91.58	1.91	2.94	6
V6 (Gitesh)			232	3.83	21.33	125.92	2.98	3.88	1
C.D. (0.05%)			10.53	0.159	0.407	1.261	0.122	0.205	
SE(m)			3.68	0.056	0.142	0.441	0.043	0.072	
Interaction									
AXB			1.41	N/A	0.294	N/A	N/A	N/A	
AXC			14.89	0.225	N/A	N/A	N/A	N/A	
BXC			14.89	N/A	N/A	1.784	0.173	0.29	
AXBXC			21.06	N/A	N/A	N/A	N/A	N/A	
Expt.Mean			**214.89**	**3.16**	**23.51**	**79**	**2.22**	**2.45**	

4.4.3 Assessing the performance and yielding ability of kharif sorghum hybrids in Rice-Sorghum sequence cropping system

In rice-fallows, sorghum cultivation was found to be high yield potential with labour and inputs intensive cropping system. It is found that use of high inputs Viz., pesticides, weedicides, fertilizers, labourers, and skillful management of all the innovative practices including irrigations, were resulted into the high yield. It is implied that the farmers were highly profit oriented and obtained high returns from the sorghum cultivation. Their profit margin could be further increased by mechanization and introducing standard package of practices. Keeping the yield benefits in view, the farmers innovative knowledge should be validated on their fields to develop standardize location-specific production technologies so that the productivity and soil health will sustain in long run. These innovative farmers would be able to educate and transfer the viable technologies more effectively among the other sorghum growers in rice-fallows as change agent. Further very efficient genotypes had been developed which are very much suitable for rice fallows. There is need to test these cultivars in rice fallows of different locations to gain the benefit of the Rice sorghum cropping system.

A trial was laid out with four replications during *Kharif* 2021 at **Mandya** and **Ragolu** to assess the effect of different crop establishment methods (T_1: Transplanting, T_2: Wet Direct Seeding (line sowing under puddled conditions) and T_3: Dry DSR – Dry rice cultivation method) during *Kharif* 2021 and during *Rabi* 2020-21 promising sorghum hybrids IIMRH 1, IIMRH 3, IIMRH 4, IIMR-7 AKSH778, SPH1943, 372A X AKR150, RFSH5-19, CSH16 (C), CSH 25 (C), CSH 30 (C) and CSH 41 (C) were assessed at **Mandya** and **Jagdalpur**. The results are summarized and presented in Table 4.4.3.

Among crop establishment methods, transplanting gave comparable higher yields (6.40 t/ha) followed by wet direct seeded rice (6.05 t/ha) at **Ragolu**. At **mandya** also, transplanting method recorded the highest grain yield (6.4 t/ha).

During Rabi 2020-21, the effect of promising cultivars of sorghum in rice fallows indicated significant difference at **Mandya** and **Jagdalpur**. The mean grain yield ranged from 2.17 t/ha to 3.47 t/ha at **Mandya** and 1.64 to 5 t/ha at **Jagdalpur**. CSH25 gave significantly higher yields over IIMRH cultures both the locations.

In conclusion, transplanted rice was found promising and sorghum hybrids in rice fallows showed promising (1.64 to 5 t/ha) yield in rice-sorghum cropping system at **Mandya** and **Jagdalpur.**

Table- 4.4.3: Assessing the performance and yielding ability of kharif sorghum hybrids in Rice-Sorghum sequence cropping system, Kharif-2021.

Treatments	MANDYA										
	Grain Yield (t/ha)	Straw Yield (t/ha)	Plant height(cm)	Tillers No./m^2	Panicle No./m^2	Panicle length(cm)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	filled grains/ panicle	Spikelet sterility %
T1	5.17	7.44	63.3	365.71	345.38	20.87	2.24	26.54	85.75	113.15	11.53
T2	5.36	8	65.78	379.25	390.38	20.34	2.29	26.97	81.75	115.6	11.97
T3	-	-	-	-	-	-	-	-	-	-	-
Expt. Mean	5.26	7.72	64.54	372.48	367.88	20.61	2.26	26.75	83.75	114.38	11.75
CD(0.05)	0.51	1.29	5.64	78.19	52.92	1.75	0.07	2.16	1.3	30.25	3.41
CV(%)	4.33	7.43	3.89	9.33	6.39	3.77	1.43	3.58	0.69	11.76	12.9
Variety	MTU1010										
Soil type	Red sandy clay loam										
pH	8.01										
Available NPK kg/ha	265.4:91:268										
Fertilizer applited kglha	100:50:50:20										

T1: Transplanting

T2: Wet DSR

T3: Dry DSR

Table 4.4.3: (Contd.)

Treatments	RAGOLU											Overall Mean	Rank
	Grain Yield (t/ha)	Straw Yield (t/ha)	Plant height(cm)	Tillers No./m^2	Panicle No./m^2	Panicle length(cm)	Panicle wt (g)	Test wt (g)	Days for 50% flowering	filled grains/ panicle	Spikelet sterility %		
T1	6.4	7.56	108.54	318.8	297.2	23.98	3.25	15.22	97.8	214.16	15.64	**5.79**	1
T2	6.05	7.67	104.7	346.1	325.5	23.06	2.89	14.72	93.2	194.72	13.97	**5.71**	2
T3	-	-	-	-	-	-	-	-	-	-	-		
Expt. Mean	6.225	7.615	106.62	332.45	311.35	23.52	3.07	14.97	95.5	204.44	14.805	**5.74**	
CD(0.05)	0.25	0.26	3.75	10.83	10.25	0.39	0.2	0.13	0.44	7.45	2.32		
CV(%)	3.64	3.08	3.13	2.9	2.93	1.48	5.76	0.75	0.41	3.25	13.96		
Variety	-												
Soil type	Red sandy clay loam												
pH	7.76												
Available NPK kg/ha	237;23:289												
Fertilizer applited kglha	120:60:50												

T1: Transplanting

T2: Wet DSR

T3: Dry DSR

Table- 4.4.3(R): Assessing the performance and yielding ability of kharif sorghum hybrids in Rice-Sorghum sequence cropping system, Rabi 2020-21.

Main plot: Fertilizer treatments	Sub plot: Cultivars	MANDYA			
		Grain yield (t/ha)	Grain yield (t/ha)	Test wt (g)	Ear head wt (g)
M1: Transplanting	V1	3.28	9.10	32.10	80.50
	V2	3.83	12.05	33.97	99.60
	V3	2.84	11.35	32.00	101.87
	V4	3.79	9.88	30.27	96.80
	V5	2.06	7.09	33.93	87.53
	V6	3.46	10.62	31.20	92.77
	V7	3.26	11.14	34.43	77.90
	V8	2.64	10.97	34.47	121.23
	V9	2.75	12.12	28.58	87.50
	V10	2.22	8.21	28.50	105.00
	V11	2.60	10.51	30.80	100.10
M2: Wet seeding	V1	3.21	10.13	31.17	106.02
	V2	3.66	12.19	33.77	90.88
	V3	2.47	11.03	32.13	104.70
	V4	3.42	10.75	31.70	98.50
	V5	2.24	11.90	31.90	106.40
	V6	2.98	9.35	31.17	100.50
	V7	3.05	10.35	33.90	109.90
	V8	2.63	10.98	34.25	78.57
	V9	2.89	11.58	29.30	88.30
	V10	2.11	8.26	29.17	73.43
	V11	2.27	10.40	32.46	72.90
Mean of Factor-1					
M1		2.98	10.28	31.84	95.53
M2		2.81	10.63	31.90	93.65
CD(0.05)		NS	NS	NS	NS
CV(%)		11.41	7.43	3.12	16.29
Mean of Factor-2					
V1	IIMRH 1	3.25	9.62	31.63	93.26
V2	IIMRH 3	3.74	12.12	33.87	95.24
V3	IIMRH 4	2.65	11.19	32.07	103.29
V4	IIMR-7 AKSH778	3.60	10.31	30.99	97.65
V5	SPH1943	2.15	9.50	32.92	96.97
V6	372A X AKR150	3.22	9.98	31.18	96.63
V7	RFSH5-19	3.16	10.75	34.16	93.90
V8	CSH16 (C)	2.64	10.98	34.36	99.90
V9	CSH 25 (C)	2.82	11.85	28.94	87.90
V10	CSH 30 (C)	2.17	8.23	28.83	89.22
V11	CSH 41 (C)	2.43	10.46	31.63	86.50
CD(0.05)		0.5	1.12	2.47	NS
CV(%)		14.71	9.14	6.65	10.68
Interaction					
M and T		NS	1.58	NS	16.66
T and M		NS	1.63	NS	20.37
Experimental Mean		2.89	10.45	31.87	94.59
Soil type:		-			
pH:		-			
Applied Fertiliser (NPK)kg/ha:		-			
Available NPK (kg/ha):		-			

Table- 4.4.3(R): (Contd.)

Main Plot	Varieties			JAGDALPUR										
		Grain yield (q ha^{-1})	Stover yield (q ha^{-1})	Panicle Initiation Days	50% Flowering	Test weight (g)	Physiological maturity Days	Lodging (%)(ha^{-1})	Panicle length (cm)	Panicle weight (gm)	Panicle $plant^{-1}$ (No.)	Grain weight $panicle^{-1}$ (g)	Seed set (%)	Harvest index (%)
Transplanting	IIMRH 1	-	-	-	-	-	-	-	-	-	-	-	-	-
	IIMRH 3	-	-	-	-	-	-	-	-	-	-	-	-	-
	IIMRH 4	-	-	-	-	-	-	-	-	-	-	-	-	-
	IIMR-7	-	-	-	-	-	-	-	-	-	-	-	-	-
	AKSH778													
	SPH1943	2.68	6.85	65.33	71.67	27.01	113.67	0	29.67*	67.12	1.56	31.09	88.31	28.14
	372A X AKR150	5.05	7.69	69.67	74.67	26.2	113	0	27.97	95.67	1.4	64.74	93.42	39.64
	RFSH5-19	-	-	-	-	-	-	-	-	-	-	-	-	-
	CSH16 (C)	4.31	7.32	67.33	73	29.64	115	0	26.97	93.77	1.36	62.23	87.53	37.12
	CSH 25 (C)	4.54	7.59	63.33	69.67	26.02	112.33	0.58	26.81	76.2	1.36	59.71	89.91	37.4
	CSH 30 (C)	4.35	7.41	64.67	71.33	29.95	112.67	0	23.53	69.8	1.4	57.43	88.5	36.98
	CSH 41 (C)	1.68	6.67	66.67	74.68	27.54	114.67	0	27.61	68.28	1	29.67	87.94	20.15