उत्पादनोन्मुखी सर्वेक्षण: Production Oriented Survey

सहयोग: राज्य कृषि विश्वविध्यालय एवं कृषि विभाग

In collaboration with

State Agricultural Universities and Department of Agriculture

अखिल भारतीय समन्वित अनुसंधान परियोजना: चावल

All India Coordinated Research Project on Rice (AICRPR)

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भाकृअनुप-भारतीय चावल अनुसंधान संस्थान

ICAR-Indian Institute of Rice Research

Indian Council of Agricultural Research

Rajendranagar, Hyderabad - 500 030

PRODUCTION ORIENTED SURVEY 2023

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AGRICULTURAL UNIVERSITIES

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SUMMARY

Production oriented survey is conducted by a team of subject matter specialists (from different AICRPR centres) along with officials from state department of agriculture with an objective to collect information on different aspects of rice cultivation from different rice growing states of India. The survey is based on both eye-ball survey and questionnaire based survey. The different aspects that are covered in the survey are prevailing climatic conditions for rice cultivation, varietal profile in a particular region, rice consumption pattern, extent of use of organic manure and inorganic fertilizers, occurrence of different biotic and abiotic problems and their management and various needs of the farmers and problems faced by the farmers. During 2023, the survey was conducted in 16 states of India *viz*., Andhra Pradesh, Bihar, Chhattishgarh, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Maharashtra, Puducherry, Punjab, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand and West Bengal by 18 AICRIP centres. A total of 118 Scientific staffs from the different cooperating centres and several officials from state department of agriculture surveyed 734 villages in 108 districts in 16 states.

The monsoon season, spanning from June to September, witnessed rainfall across the country amounting to 94% of its long period average (LPA). This indicates that the monsoon was near-normal for the year. Different regions of India experienced varying degrees of rainfall. Northwest India received 101% of its LPA, Central India received 100%, South Peninsula received 92%, and Northeast (NE) India received 82% of their respective LPAs. The southwest monsoon seasonal (June to September) rainfall over the monsoon core zone, which consists of most of the rainfed agriculture regions in the country received 101% of LPA and thus was normal (94-106% of LPA). Out of India's 36 meteorological subdivisions, 3 subdivisions (9% of the country's area) received excess rainfall, 26 subdivisions (73% of the area) received normal rainfall, and 7 subdivisions (18% of the area) experienced deficient season rainfall. Notable among those with deficient rainfall are Nagaland, Manipur, Mizoram & Tripura (NMMT), Gangetic West Bengal, Jharkhand, Bihar, East UP, South interior Karnataka, and Kerala. Monthly rainfall percentages varied throughout the monsoon season, with June receiving 91% of LPA, July with 113%, August at 64%, and September at 113% of LPA. The monsoon onset began in the south Andaman Sea and Nicobar Islands on May 19th, slightly ahead of its normal date, but it was delayed in reaching Kerala, arriving on June 8. Monsoon withdrawal started on September 25th in west Rajasthan, delayed by 8 days compared to the normal date.

In addition to several monsoon depressions in Bay of Bengal and Arabian sea, there were 5 major cyclones during 2023. Extremely severe cyclonic storm 'Mocha' occurred between 9-15 May, 2023 affecting parts of Andaman and Nicober islands and parts of North east India. Extremely severe cyclonic storm 'Biparjoy' over the Arabian sea occurred in between 6-19 June, 2023 affecting Kutch and Rajkot districts of Gujarat and parts of Maharashtra and Rajasthan. Very severe cyclonic storm 'Hamoon' happened in between 21-25 October, 2023 and affected parts of West Bengal and Mizoram. Cyclone 'Midhili' took place in between 14-18 November, 2023 and affected parts of North east India and parts of West Bengal. Severe cyclonic storm 'Michaung' occurred in between 1-6 December, 2023 and affected several parts of Tamil Nadu, Andhra Pradesh, Odisha and West Bengal. Predominant rice varieties cultivated by the farmers in different

states are presented in Table 2. The prevalence of different diseases and insect pests in different rice growing regions of India is presented in Table 3 and Table 4. Hybrid rice varieties occupied a significant area in states like Uttar Pradesh, Haryana, Chhattishgarh and Gujarat and its area is increasing in states like Karnataka, West Bengal and Maharashtra. Diseases like leaf and neck blast, sheath blight, sheath rot, brown spot, false smut and bacterial blight were widespread throughout India. Sheath blight has become a major problem in many areas like eastern India, Kerala and north western India. Bacterial blight was recorded in high intensity in several places like Bihar, Jammu region, Kerala, Konkan region of Maharashtra, Puducherry, Telangana and parts of West Bengal. There was no report of SRBSDV (southern rice black streaked dwarf virus) from any of the surveyed areas in 2023. Among the insect pests, stem borer, leaf folder and BPH were very wide spread. Leaf folder was severe in parts of Kerala and brown plant hopper was severe in parts of Kerala and West Bengal.

Andhra Pradesh: Production Oriented Survey (POS) was conducted in the Godavari Zone during October and November months of 2023. Timely onset of monsoon has been recorded. Deficit rainfall with a range of 12.0 to 33.4% was recorded in the entire Godavari zone. The crop growth is good. The cyclone 'Michaung' caused inundation of the crop, caused problems to harvesting of the crop. The yields were also reduced due to the cyclone, had some impact on open air-dried paddy grain and late transplanted crop. Swarna (MTU 7029) is a widely preferred variety followed by MTU 1318, PLA 1100, Sampadh Swarna, MTU 1061, MTU 1064, BPT- 5204, RP bio-226, NP 9558, PR-126, SL-10 were the preferred varieties. In the West Godavari district of Andhra Pradesh, rice-rice is the predominant cropping pattern in majority of the locations. Rice-pulse, Rice-Maize cropping system was also prevalent in Kakinada and East Godavari districts. Transplantation was found to be the preferred method of crop establishment in rice. Direct seeding is practiced in some locations of East Godavari and Kakinada. Due to labour shortage, herbicide application has increased among the farmers. Herbicides like Londax Power (bensulfuron methyl 0.8% + pretilachlor 6%) @ 4 kg/acre, Topstar (oxadiargyl), Rifit (pretilachlor), Sofit (pretilachlor with safener), Sathi (pyrazosulfuran ethyl), Nominee gold (bispyribac sodium), Almix (metsulfuran methyl + chlorimuran ethyl) commonly used in most of the locations surveyed. Farmers commonly applied DAP, 14-35-14, 20-20-0, 10-26-26, 28-28-0 for top dressing in all instalments. Application of organic manure like FYM has less common. Diseases like sheath blight and bacterial blight in low to moderate intensities and neck blast, sheath rot, false smut and grain discoloration in low intensities and insect pests like stem borer and leaf folder in low to moderate intensities and brown plant hopper, gall midge and mites in low intensities were observed. Farmers in the Godavari zone of Andhra Pradesh resorted to 2-4 foliar sprays for protection against pests and diseases. Deficiency of Zinc and sulphide injury was reported during *rabi* season. Farmers necessarily resort to 1-3 sprays with zinc sulphate during rabi season. Some of the common needs of the farmers in the region were short duration and stress tolerant high yielding rice varieties, increase in support price, supply of inputs through RBKs (Rythu Bharosa Kendras) under subsidy basis and increased availability of equipments on hire basis.

Bihar: Production oriented survey was conducted in Rohtas district when the crops were in booting to milk stage. The fields surveyed were either under irrigated or rainfed lowland ecosystem. In general, the weather conditions for favourable for rice cultivation. Commonly cultivated rice varieties were MTU 7029, BPT 5204, Sabour Shree, Swarna Sub -1, Sampurna, Rajendra Mahsuri 1, Rajendra Sweta, Moti, Damini, Sonachur and others. Common crop rotation

practices followed by the farmers were rice-wheat-green gram, rice lentil-dhaincha, rice-lentil +chick pea-dhaincha, rice-chick pea-dhaincha, rice-pigeon pea and others. Most of the farmers contacted were from medium income group and the per capita rice consumption was 6-12 kg/month. All of them told that their main meal consisted of both rice and wheat. In general, they preferred polished and fine grain rice varieties. In the main fields, fertilizers were applied @ 140-160 kg N/ha, 50-60 kg P_2O_5/ha and 15-25 kg K_2O/ha. About 80% of the farmers contacted told that they applied zinc sulphate (5-6 kg/ha) in the field. Intensity of common weeds like *Cyperus rotundus, Cynodon dactylon, Echinochloa* spp., and other unidentified weeds was high. Most of the farmers applied pre-emergence herbicide like pretilachlor and also adopted hand weeding. Some of the common needs of the farmers were improvement in the irrigation facilities, availability of fertilizers in time and availability of good quality seeds of HYVs. Among the diseases, sheath blight, false smut and bacterial blight were recorded in high intensity in some fields. Most of the insect pests were observed in low to moderate intensity. Majority of the farmers adopted plant protection measures. In some fields, there were symptoms of zinc deficiency.

Chhattishgarh: Production oriented survey was conducted in four rice growing districts of Chhattishgarh when most of the crops were in dough to maturity stage. Majority of the fields surveyed were under irrigated or rainfed lowland ecosystem. Weather conditions were in general favourable for rice cultivation in the region. Common crop rotation practices followed by the farmers were rice-wheat, rice-rice, rice-mustard, rice-chickpea, rice-vegetables, rice-sugarcane, rice-lathyrus, rice-linseed and others. Most predominant rice varieties cultivated by the farmers were HYVs or improved varieties like Swarna, Mahamaya, MTU 1010, Jamuna, Sonam, Sambleshwari, Kalinga, Indira Sona, Indira Barani 1, Danteshwari and others and hybrids like Arize 6444 Gold, PAN 2423, Dhananjay Gold, Mahyco hybrid, PHB 71, Advanta hybrid, VNR 2111, Kaveri 9090, Mahyco hybrid, Arize AZ 8433 DT, Delta Max, Kaveri 468 and Ankur hybrids. Majority of the farmers contacted were in the medium income group. Average per capita consumption of rice per month was 7.5-12 kg rice. On an average about 67% of the farmers contacted told that they consumed only rice. In general, there was no change in the food habit. In general, planting was done from 3rd week of June to 2nd week of July. Average seed rate for direct seeded rice (broadcasting) was 60-100 kg/ha. For regular transplanting, average seed rate was 30-40 kg/ha for HYVs and about 15 kg/ha for hybrids. In the main fields, fertilizers were applied @ 50-130 kg N/ha, 10-100 kg P_2O_5/ha and 10-40 kg K_2O/ha. About 59.1-72.7% of the farmers contacted applied FYM in the main field. Some farmers applied vermicompost. The intensity of common weeds was low. Hand weeding was common among the farmers. About 50-81% of the farmers contacted applied different herbicide. Some of the common needs of the farmers timely availability of fertilizers and pesticides and good quality seeds of HYVs, improvement in the irrigation facilities, custom hiring centres, subsidy in pumps and other inputs, availability of broad-spectrum herbicides and short duration rice varieties. Intensity of most of the biotic stresses was low to moderate except stem borer which was recorded in higher intensity in some of the fields surveyed. Majority of the farmers adopted plant protection measures.

Gujarat: Production oriented survey was conducted in the 10 major rice growing districts of Gujarat State when the crops were in heading to milk stage. Weather conditions were favourable for rice cultivation. Rain fall was timely, sufficient and well distributed during the season. Varieties like Gurjari, GAR 13, Mahisagar, GAR 14, GR 21, GNR 3, GR 7, GR 11, GR 101, GR 17, GR 18, Masuri, Jaya, IR 28, Narmada, Indrani, Bayer 6444, Moti Gold, Surya moti, Sonam, Sriram

125, Kaveri, Versha, Nath Pauha, Krishna Kamod, Versha, Pioneer 121, US-312, Hyb 27P37, MC-13, 25P25, Laxmi, Gangamani, etc. were mainly cultivated in different districts of Gujarat. Among the varieties, Gurjari and GAR 13 were widely cultivated. Common crop rotation practices followed by the farmers were rice-wheat, rice-rice, rice-mustard, rice-vegetables, rice-tobacco, rice-pulses, rice-sugarcane, rice-wheat-rice, rice-wheat-maize, rice-castor, rice-bean-summer green gram and rice-chick pea. On an average about 69% of the farmers contacted belonged to medium income group and rest were from low-income group. Average per capita consumption of rice per month ranged from 3-10 kg rice in different districts. Almost all the farmers contacted in different districts told that they used polished rice. Regarding grain quality, most of the farmers expressed that though they preferred fine grain. However, many farmers used both fine grain rice varieties for consumption. In general, there was no change in the food habit. Average seed rate used by the farmers in different districts ranged from 20-30 kg/ha. On an average about 74% of the farmers contacted told that they adopted seed treatment or used treated seeds for sowing. Most of the farmers used certified seeds. Farmers from Dang did not apply any chemical fertilizers either in the nursery or in the main fields as it is a organic district. Planting was mainly done during 1st week of July to 4th week of July. In the main fields, fertilizers were applied @ 32-109 kg N/ha, 12-80 kg P_2O_5/ha and 20 kg $ZnSO_4$/ha. Application of potassic fertilizers was not common among the farmers. All the farmers contacted applied organic manure like FYM in the main field. In general, the intensity of common weeds like *Echinochloa colona, E. crusgalli, Cynodon dactylon, Cyperus rotundus, Eclipta alba* and others was low to medium. Hand weeding (1-2) was the most common practice for weed management. Only few applied herbicides. Some of the common needs of the farmers were short duration rice varieties, varieties with resistance to different diseases and insect pests, bold rice varieties suitable for rice poha making, aromatic rice varieties, special policy and higher price for organic rice, improvement in irrigation facilities and varieties suitable for organic rice cultivation. In general, the intensity of different diseases and insect pests was low to moderate. More than 80% of the farmers contacted in different districts except Dang adopted chemical plant protection measures. Zinc deficiency symptoms were commonly observed in surveyed field.

Haryana: Production oriented survey was conducted in 8 rice growing districts of Haryana when the crops were booting to maturity stage. The fields surveyed were under irrigated ecosystem and in general the weather conditions for rice cultivation were favourable though in some places there were reports of excess rainfall. Widely prevalent rice varieties were HYVs like PR 114, PR 126, PR 128, PR 113; hybrids like Sava 7301, Sava 7501, Sava 127, Hybrid 2222, Sava 134, Hybrid 927, Hybrid 25p35, Hybrid 7425, Hybrid 7299, Hybrid 27p31, Hybrid 471, Arize 6444, Hybrid 27p22, Hybrid 468, Hybrid 8222, Delta hybrid, Swift Gold, Hybrid 28p67 and Arize 6444 and basmati varieties like Pusa Basmati 1121, Pusa Basmati 1718, Pusa Basmati 1509, Pusa Basmati 1401, Pusa Basmati 1509, Pusa Basmati 1847, Pusa Basmati 1692, Pusa Basmati 1847, CSR 30, HBC 19 and Pusa Basmati 1. The main crop rotation followed by the farmers was rice-wheat. Some farmers also followed rice-vegetables, rice-wheat-sugarcane, rice-wheat-maize, rice-sunflower, rice-mustard, rice-wheat-mustard, rice-potato, rice-wheat-sorghum, rice-fodder and rice-potato. Majority of the farmers contacted were in the medium income group. Average per capita consumption of rice per month was 1-4 kg rice. All the farmers contacted told that their main meal consisted of both rice and wheat and all of them they told that they preferred polished rice. About 80-100% farmers in different districts told that they preferred basmati rice. Average seed rate was low (8-15 kg/ha). On an average about 71% of the farmers contacted told that they

treated the seeds with chemicals before sowing. Average nitrogen dose was 68.75-252.5 kg N/ha. Other fertilizers were applied @ 10-115 kg P_2O_5/ha and 37.5-150 kg K_2O/ha. On an average, about 32% farmers contacted applied potash in the main field. On an average about 63% farmers applied zinc sulphate (containing either 21% or 33% zinc) @ 10-25 kg/ha. Some farmers applied chelated zinc (500-1000 gm/acre). Intensity of common weeds was low to medium. About 70-100% farmers in different districts applied weedicides. Many farmers also practiced hand weeding along with herbicide application. Some of the common needs of the farmers were availability of quality seeds and suitable pesticides in time for management of biotic stresses, increase in the MSP and price of basmati rice, subsidy on implements, permanent solution for residue management, suitable herbicides for management of weeds, subsidy in seeds and other inputs and reduction in the cost of cultivation. Intensity of different biotic stresses was low to moderate. Most of the farmers contacted adopted plant protection measures. On an average, 63% farmers contacted told that they mixed 2-3 different pesticides while application. In few fields in Kaitha, Jind, Karnal and Panipat symptoms of zinc deficiency were observed.

Jammu and Kashmir-1 (Khudwani): Production oriented survey was conducted in two districts viz., Anantnag and Kulgam when the crop was mainly at dough/maturity stage. The general climatic conditions were normal as far as rice is concerned. The main crop rotation practices followed by the farmers were rice-rapeseed and rice-oats. Most predominant rice varieties cultivated in this region were HYVs like SR-4 and SR-3 and some local varieties like Budjichina and China 1039. Some farmers are growing local landraces like Zag and Mushkbudji for special attributes. However, HYVs are spreading very fast and replacing the local varieties. Optimum time of sowing was Ist week of May and optimum time of transplanting was 1st week of June. Average seed rate was 80-100 kg/ha and majority of the farmers contacted (90-100%) adopted seed treatment with carbendazim (2g/kg seed). In the main fields, farmers applied 100-120 kg N/ha, 60 kg P_2O_5/ha, 30 kg k_2O/ha and Zinc Sulphate 20 kg/ha. All the farmers contacted, applied FYM (5-10 t/ha) in the main field. Random method of transplanting was common among the farmers. The intensity of common weeds like *Echinochloa* spp., *Potamogeton* spp., *Rotalia indica*, *Cyprus* spp. and *Ammannia* spp. was moderate. All the farmers contacted adopted hand weeding and in addition they applied herbicides like butachlor (1.5 kg a.i./acre) and Eros (pretilachlor 6% + pyrazosulfuron ethyl 0.15%) (10 kg/acre). Some of the common needs of the farmers were availability of certified seeds of good HYVs, timely supply of inputs, irrigation facilities and advices from experts regarding rice production technology. The intensity of most of the biotic constraints was low to moderate and application of pesticides was not common among the farmers.

Jammu and Kashmir-2 (Chatha): An extensive production oriented survey was conducted during *Kharif 2023* in the four basmati and non-basmati growing districts. In general, the weather conditions were normal for rice cultivation except some incidences of dry spell in some places in Udhampur and Reasi. Because of climate and ecosystem, part of the land was also used for cultivation of other crops like maize, maize + black gram/ green gram intercropping, sesame, vegetables and fodder. Common crop rotation practices followed by the farmers were rice-wheat (main), rice-potato, rice-potato-cucurbits, rice-barseem, rice-oats-cucurbits and rice-vegetables (cauliflower, knol khol etc.). Predominant rice varieties cultivated by the farmers were Basmati 370, Pusa 1121, Jammu Basmati 118, Jammu Basmati 129, K 39, Giza-14, SJR 5, SR-2, K 343 and Sharbati and hybrids like Arize 6444 Gold, PAC 807 and others. Farmers still prefer the Basmati 370 and Pakistani Basmati due to its taste, fragrance, and higher market value. Average

rice yield in the district ranged from 2000-3850 kg/ha in different basmati and hybrid varieties. Most of the planting was done in 1st week to 2nd week of July. Most of the farmers contacted were in the medium income group and their average monthly per capita rice consumption was 8-15 kg. All of them contacted told that their main meal consisted of both rice and wheat. In general, they preferred polished and fine/basmati rice for consumption. About 60-80% of the farmers told that they adopted seed treatment with carbendazim (2 g/kg) or thiram (2.5 g/kg). Majority of the farmers applied chemical fertilizers like DAP (8-18 kg/kanal) and/or urea (6-10 kg/kanal) (1 Kanal= ~ 500 mt^2). In the main field, fertilizers were applied @ 50-80 kg N/ha, 30-60 kg P_2O_5/ha and 20-40 kg K_2O/ha. Comparatively less number of farmers applied potash. Some farmers applied zinc sulphate (10-15 kg/ha). Many farmers also applied FYM (6-10 t/ha) depending on availability. Some also applied green manure. Planting was mostly random and plant population per unit area was not maintained. Intensity of common weeds *Echinochloa* spp., *Cyperus rotundus*, *Cynodon dactylon*, *Eclipta alba* and others was low to medium. Seed replacement rate in different surveyed districts is low (12-20%). Among the diseases, brown spot and bacterial blight were recorded in moderate to high intensity. Among the insect pests, rice hispa was recorded in higher intensity. Some farmers adopted plant protection measures. Major problems faced by the farmers were shortage of labours, unavailability of inputs in time, appropriate price of the produce, fragmented and scattered land, lack of modern knowledge on rice production technology, lack of irrigation facilities, marketing problem and hailstorm at the time of maturity.

Karnataka: Production oriented survey was conducted in eight districts of Karnataka. The climatic condition prevailed during the cropping period was normal except with dry spells during September at tillering stage in Mandya, Mysuru and Shivamogga district. Commonly cultivated varieties in different districts of Karnataka were HYVs like Super amman, Kaveri Price, MTU-1001, JAYA, MPR-606, Jyothi, GK- Chethan, Meenakshi, Sanmadhu, Shreya, Tunga, Gangavati sona, KPR1, Rajamudi, IR64, Samruddi, Samrat, RNR 15048, Sona Mahsuri, Tella Hamsa, BPT 5204, Kaveri sona, D R 8336, BR 2655, Penna super, KMP-220, Abhilash, Ramdev, Sonaraja, MSN-99, JGL 1798, Sri ram, Jaishree Sona, Onkar, Uma, Kempu mukti and MPR606 and hybrids like VNR-2233 Plus, PAC 837 and others. Majority of the fields surveyed were under irrigated ecosystem. The prevailing cropping pattern in the districts surveyed is Rice-Rice followed by rice-sugarcane, rice-ragi, rice-vegetables, rice-maize, rice-pulses, green manure crops, and rice-fallow. On an average about 91% of the farmers contacted were in medium income group. Average per capita consumption of rice per month was 6.5-10 kg rice. Majority of the farmers contacted from different surveyed districts told that their main mean consisted of only rice. In general, they preferred polished rice. Regarding grain quality, though farmers preferred fine grain quality rice. In general, planting was done from 1st week to 4th week of August. Average seed rate used by the farmers ranged from 25-30 kg/ha and majority of the farmers contacted adopted seed treatment. Fertilizers were applied @ 23-165 kg N/ha, 20-148.5 kg P_2O_5/ha and 15-107.5 kg K_2O/ha. About 20-60% of the farmers applied zinc sulphate in the field. Most of the farmers applied organic manure like FYM in the fields. In general, intensity of common weeds was low. Hand weeding was common among the farmers. Some applied herbicides like Londax power, butachlor, pretilachlor and Nominee gold. Some of the common needs of the farmers were improvement in irrigation system, pest and disease resistant HYVs, improvement in marketing facility, timely availability of micronutrients, crop insurance, timely availability of quality seeds and other inputs like fertilizers and pesticides, mechanization in rice farming and proper supply of electricity. Among the diseases, leaf and neck blast and sheath blight was recorded in higher intensity in some

places. Most of the insect pests were recorded in low to moderate intensity. Most of the farmers contacted adopted plant protection measures. During this year zinc and potassium deficiency was observed in many districts as the farmers could not apply the zinc due to non-availability and cost of complex fertilizer.

Kerala: Production oriented survey was conducted during Kharif 2023 in diffferent districts of Kerala *viz*., Alappuzha, Kottayam, Pathanamthitta, Thiruvananthapuram, Ernakulam, and Kollam. Predominant rice varieties cultivated by the farmers were Uma (MO 16), Manuratna, Pournami (MO 23), Prathyasa, Manuratna, Red Triveni, Shreyas and Cherady. In Kuttanad region, crop was severely affected by severe rainfall followed by flash flood. Rice crop in many of the padasekharams in the Kuttanad region were totally lost due to over flow/bund breaching in the floods which occurred during the 2nd week of July 2023. *Cyperus difformis, Echinochloa crusgalli, Fimbristylis* sp., *Echinocloa* sp., *Echichornia crassipes, Salvinia molesta, Monochoria vaginalis* and few others were the major weeds observed in moderate to high intensity in the surveyed districts and it was found along with wild rice. Severe incidence of wild rice problem was noticed in Alappuzha, Kottayam and Pathanamthitta District. It is great menace to direct sown rice crop area. KAU weed wiper was supplied to many of the padasekarams to control the wild rice population in Kuttanad. Diseases like brown spot, sheath blight, grain discoloration and bacterial blight was recorded in moderate to high intensity while blast was recorded in low intensity. Among the insect pests, leaf folder and brown plant hopper was recorded in moderate to high intensity in many places. Other insect pests like stem borer, gall midge, thrips, case worm and leaf minor recorded in low to moderate intensity. Severe black bug attack was noticed during tillering stage in some fields of Kottayam district.

Maharashtra: Production oriented survey was conducted in the Konkan region of Maharashtra comprising of of five districts *viz*. Thane, Raigad, Palghar, Ratnagiri and Sindhudurg. The farmers of this region cannot grow any crop other than rice in Kharif because of high rainfall and geographically low land. Weather conditions were in general favourable for rice cultivation in the region. The onset of monsoon was delayed by 15-20 days in the month of June in both South Konkan Costal Zone and in North Konkan Costal Zone of the region. Moderate to heavy rainfall was received in almost all districts of Konkan region in the month of July. Commonly cultivated rice varieties in the region were HYVs like Jaya, Jordar, YSR, Rupali, MTU 1010, Karjat-3, Komal, Karjat-5 and many other and hybrids like Arize 6444, Kaveri 9090, Loknath, Ankur 7434, NP 125, Gorakhnath, NP-150, NP-125, Nirmal-NPH, Tej Gold, Rashi 113, Ankur 7576, Syn 5251, Mahiko 5629, Upaj, Mahico 5556, Arize 6129 and NPH 30. Rice is grown as a rain fed crop due to heavy rainfall in the region. Most common cropping patterns adopted by farmers in the region are rice-fallow, rice-pulses, rice-vegetables and rice-groundnut. Average rice yield was low in the region and ranged from 2000-4000 kg/ha. Majority of the farmers contacted were in the medium income group. Average per capita consumption of rice per month was 3-7 kg rice. More than 80% of the farmers contacted told that their main meal consisted of both rice and wheat. Few also told that they took finger millet and sorghum along with rice. In general, planting was done during 1st week to 4th week of July. Average seed rate used by the farmers ranged from 30-45 kg/ha. On an average, about 55% of the farmers contacted told that they treated the seeds with thiram (2.5-3 g/kg seeds) or carbendazim (2 g/kg). Few farmers from Raigad treated the seeds with Trichoderma formulation (25 g/kg). Some of the farmers said that they purchased fungicide

treated seeds. Fertilizers were applied @ 12.6-230 kg N/ha, 7.5-75 kg P_2O_5/ha and 7.5-75 kg K_2O/ha. Some farmers applied FYM depending on availability. Overall, intensity of weeds was low to medium. Common practice of weed management was hand weeding. For managing weeds in the nursery, farmers followed a local method, called *Rab*. Some of the common needs of the farmers were subsidy on inputs, better market price, improvement in irrigation facilities, financial support and low-cost mechanization. Intensity of most of the biotic constraints was low to moderate except bacterial blight was high in different fields in Thane, Raigad and Palghar. Very few farmers adopted plant protection measures.

Puducherry: Survey was conducted in 14 villages in Karaikal Puducherry. The rice varieties TKM 9, ADT 37, ADT 43, Karuppu kavani and Seeraga samba were cultivated during Kuruvai season. i.e before samba season. Conversely, the major rice varieties cultivated during the Samba season were Improved White Ponni, ADT 38, ADT 39, ADT 46, ADT 54, SAVITR1, BPT 5204, Co46, IR 20, CR 1009 and KKL(R) l. These varieties were also grown during Thaladi wherever irrigation is done from filter point wells/deep bore wells. Among these varieties farmers of this region prefer BPT 5204 due to its high selling price. The cropping pattern prevaling in this region is rice-pulse, rice-rice-pulse and others. In some areas, farmers are opting rice-cotton cropping system where there is an assured water source from filter point wells/deep borewells. Due to labour shortage, many farmers have shifted to direct sowing where they use 50-90 kg seeds per hectare. Some farmers also adopt transplanting where they use 40-70 kg seeds per hectare. In the nursery, most of the farmers applied DAP (10-20 kg/ha) and urea (10-20 kg/ha). In the main field, fertilizers were applied @ 100-150 kg N/ha, 30-50 kg P_2O_5/ha and 30-50 kg K_2O/ha. Different species of grasses, sedges and broad leaved weeds were observed in rice fields. Hand weeding was common among the farmers. Some farmers applied herbicides like bispyribac sodium (10% SC), pendimethalin 30% EC and fenoxaprop-p-ethyl for weed management. Among the diseases, BLB, grain discoloration and leaf blast were found to be the major diseases during the period of survey and were observed in higher intensity in many fields. Farmers applied different pesticides and botanicals for management of biotic stresses. Some of the common needs of the farmers were improvement of irrigation system, availability of farm implements on rental basis, timely availability of seeds and other inputs, increase in MSP and crop insurance.

Punjab: Production oriented survey was conducted in 18 districts of Punjab during Kharif season of 2023. Survey was conducted when the crops were in booting to heading stage. The climatic conditions were favourable for rice cultivation. During Kharif-2023 in Punjab state, paddy was cultivated on an area of around 31 lakh hectares of which 80 percent area was under non-Basmati rice and 20 percent area was under Basmati rice. Among non-basmati rice, PR126 was most popular variety occupying 33 per cent area. Other popular non-basmati varieties cultivated in the state were PR 114, PR 121, PR 128, PR130, PR 131 and Pusa 44. An area of about 0.7 lakh ha was under direct seeded rice (DSR), whereas rest was under puddled transplanted rice (PTR). Among the basmati varieties, Pusa Basmati 1121 was most popular variety followed by Pusa Basmati 1509, Pusa Basmati 1401 and Pusa Basmati 1847. The fields surveyed were under irrigated ecosystem. During 2023, the predominant crop rotation remained the rice-wheat system followed by rice-potato. Most ofthe farmers used 8-14 kg/ha of seed rate for nursery sowing but for direct seeding they used 15-20 kg seed per ha. The seed treatments practices were applied by majority of the farmers. Rice crop was transplanted between June 14 to June 30 and Basmati was transplanted during first week to 3 rd week of July at farmer's field. Most of the surveyed farmers used over dose of nitrogen but many farmers skipped the application of P_2O_5 and K_2O in paddy

crop or applied much reduced dose of P_2O_5 and K_2O owing to higher status of these nutrients in their soils. Application of Zinc sulphate (either 21 or 33%) is practiced by majority of the farmers. Overall intensity of weeds was low throughout the state. Many farmers applied different pre- and post-emergence herbicides along with hand weeding. Overall incidence of rice diseases was low to moderate during the *Kharif*-2023. Farmers applied different pesticides to manage the pests and diseases. Some farmers still applied 7.5 kg of cartap hydrochloride as prophylactic treatment.

Tamil Nadu: In the Production Oriented Survey (POS) program during the year 2023-24, eight districts were surveyed. The fields surveyed were under irrigated ecosystem and were in different stages starting from tillering to maturity stage. In general, weather conditions were normal for rice cultivation. Timely release of water from Mettur dam ensured very good coverage in Kuruvai and samba seasons. Farmers solely depend on canal irrigation were able to cultivate rice during Kuruvai season. As in the past, short and medium duration varieties were generally chosen by the farmers for cultivation. Predominant rice varieties cultivated by the farmers were CO 51, CO 55, ADT 37, ADT 38, ASD 16, ADT 45, BPT 5204, Sadana, Amman, ADT 43, IR 20 and Lakshmi. Most of the farmers contacted were in medium income group and majority of them told that their main meal consisted of only rice. Very few expressed that they included wheat or millets in their diet. Average seed rate was 35-60 kg/ha. The seeds were purchased by the farmers every year from the local retailers and Agricultural Department. Some farmers treated the seeds with fungicides like carbendazim or thiram. Some farmers adopted seed treatment with Bacillus subtilis @ 10 gm/kg. Seedling root dipping is also followed in few pockets. In the nursery, the farmers applied DAP or mixture of urea and DAP. In the main field, fertilizers were applied @ 140-180 kg N/ha, 50-80 kg P_2O_5/ha and 40-75 kg K_2O/ha. Very few applied zinc sulphate. Random transplanting was the most widely adopted method. Line transplanting, SRI, and direct sowing were also adopted by some farmers. In general, weed intensity was low. Most of the farmers adopted hand weeding and some applied herbicide along with hand weeding. Implements like power sprayer, tractor, power tiller and combined harvesters were used by the farmers. Harvesting is done by combine harvester in most places. Among the biotic stresses, stem borer, blast and BLB emerged as major biotic problems during this year. However, there was no major outbreak of any pest or disease during this year. Insecticides viz., imidachloprid, thiomethaxim, acephate, profenophos, melathion, and chlorpyriphos were used for the control of BPH, leaf folder and stem borer. Many farmers have used two sprays of plant protection chemicals as prophylactic spray along with micronutrients. Labour scarcity was very high for rice cultivation. In most of the places, farmers are advised by the pesticide dealers for the usage fertilizers, pesticides and seed.

Telangana: Production Oriented Survey was conducted in 11 rice growing districts of Telangana *viz.*, Nizamabad, Kamareddy of Northern Telangana Zone, Warangal, Sangareddy and Khammam of Central Telangana Zone, Yadadri Bhuvanagiri, Rangareddy, Nagarkurnool, Narayanpet, Vikarabad, Nalgonda of Southern Telangana Zone covering 58 villages. Overall, the weather conditions were favourable for rice cultivation. Overall, the average rainfall received in Telangana state from 01.06.2022 to 27.03.2024 is 920.3 mm as against the normal rainfall of 875.3 mm with deviation of 5.0 per cent. Among the cropping systems, rice followed by rice was the predominant cropping system in all the surveyed districts. The other systems were rice–fallow, green manure-rice-rice, rice-pulses, rice-zero tillage sunflower, rice-rice–vegetables depending on the water availability and other factors. During *kharif*, 2023, the major fine varieties grown in the surveyed districts are Jai Sreeram grain type (Chintoo, Pooja, Sriram gold, Ankur Sona, Super Aman,

Sowbhaya, Aman gold), Samba Mahsuri (BPT 5204), Telangana Sona (RNR 15048), HMT Sona, MTU 1061, MTU 1262, MTU 1224, MTU 1064, RNR 21278, MTU 1271 aibrand other fine varieties (Mahindra Sowbhagya), whereas coarse varieties are Kunaram Sannalu, MTU 1010, Jagtial Rice-1, IR 64, Tellahamsa, Bathukamma, MTU 1061, MTU 1153, MTU 1156, 7029 and MTU 1001. DSR has become very popular in the state. The seed rate used for dry direct sowing is 15 kg for fine and 18-20 kg per acre for coarse grain varieties. In transplanting, the farmers are adopting the seed rate of 20-25 kg per acre. The farmers are adopting wet seed treatment to an extent of 8-10% across the surveyed villages by using carbendazim @ 1.0 g or mancozeb + carbendazim @ 2.5 g per kg of seed per liter of water by soaking for 24 hours. Majority of the farmers are applying the complex fertilizers (50-150 kg/acre) as basal followed by top dressing of Urea (150-200 kg/acre) in 2-3 split doses at tillering stage, booting and just before panicle initiation depending on duration of the varieties. The predominant weed flora includes *Echinocloa colanum, E. crusgalli, Cyandon dactylon, Cyprus rotundus, Leersia hexandra, Panicum repens*, *Euphorbia* spp. and *Parthenium* spp. In DSR, the weeds *Ischaemum regosum* (Tonagi in local language) and Jungle rice are the major weeds observed in the farmer fields. Majority of the farmers applied herbicides for weed management. The most commonly used herbicide molecule for mixing with other weedicide is Bispyribac sodium 10% SC (Nomnee gold) @ 100 ml/acre as post emergence herbicide. Majority of the farmers mixing the herbicide i.e. nominee gold with other herbicides such as vivaya or assert or council activ. Incidence of different insect pests was in the low to moderate level except thrips which was observed in severe form in some fields in Rangareddy district. Among the diseases, bacterial blight was a major problem. Bacterial blight was observed in high intensity in several fields in Nizamabad, Warangal and Khammam. Some farmers adopted plant protection measures and majority of them mixed two or more pesticides before application.

Uttar Pradesh: Production oriented survey of rice growing areas was conducted in six districts of eastern Uttar Pradesh when the crops were in booting to dough stage in *Kharif* 2023. This year rice crop suffered with drought during whole season except in Barabanki district. Commonly cultivated rice varieties were HYVs like NDR 97, NDR 359, NDR 2064, NDR 3112-1, NDR 2065, NDR 3112-1, Samba Mahsuri-Sub 1, BPT 5204, MTU 7029, Chintu, Narendra Lalmati, Pusa Basmati 1, Moti Gold, Swarna-Sub-1, Damini and hybrids like Arize 6444 Gold, Gorakhnath -509, 27P63, 27P37, 27P31, Bayer 6633, Kaveri 668, US 305, Kaveri, 27P65 and Pusa RH 10. The rice fields surveyed were under irrigated ecosystem. Major crop rotations followed by the farmers were rice-wheat (main), Rice-wheat-black gram, rice-mustard, rice-pulses, rice-potato, rice-sugarcane, rice-vegetables and others. Average rice yield among different HYVs ranged from 3000-4500 kg/ha while in case of hybrid varities the yield ranged from 5000-5800 kg/ha. Majority of the farmers contacted were from medium income group and rest were from higher income group. Average per capita consumption of rice per month was 4-6 kg rice and 100% of the farmers contacted told that their main meal consisted of both rice and wheat. All the farmers contacted told that they preferred polished rice over parboiled rice. Average seed rate used by the farmers ranged from 30-35 kg/ha for HYVs while in case of hybrids it was 15 kg/ha. Practice of treating the seeds before sowing was not very common among the farmers. In the main fields, fertilizers were applied @ 80-130 kg N/ha, 40-60 kg P_2O_5/ha and 50-60 kg K_2O/ha. Zinc and Sulphur deficiency were observed in surveyed districts. More than 50% of the farmers contacted applied FYM in the main field. Some farmers applied green manure and plant growth regulators to improve the soil health and yield potential of the crop. Overall intensity of weeds was low to medium. Most of the farmers adopted hand weeding along with herbicide application. Some of the common needs of the farmers were

timely availability of seeds HYVs of medium duration, availability of labours, timely availability of fertilizers and other inputs, marketing facility, disease and pest tolerant rice varieties, subsidy in seeds, agro-chemicals, plant protection inputs and farm machineries including solar pumps. Overall, the incidences of different diseases like brown spot, sheath blight, false smut and bacterial blight were low to moderate except false smut was recorded in moderate to high intensity in parts of Barabanki district. Among the insect pests, stem borer, leaf folder, gundhi bug, green leaf hoppers and termites were observed in low to moderate intensities. Majority of the farmers contacted adopted plant protection measures. In many places, deficiency symptoms of zinc were observed. Some of the common problems were shortage of labours and their high wages, damage by stray animals, difficulty in selling the produce, storage problem, unavailability of fertilizers and quality seeds in time and micronutrient deficiency.

Uttarakhand: Production oriented survey was conducted in two rice growing districts of Uttarakhand viz., Udham Singh Nagar and Nainital at tillering to maturity stage of the crop. Most of the farmers in these districts were marginal or sub-marginal. In general weather conditions were normal for rice cultivation. Due to favourable weather conditions, there was good crop stand, in almost all the areas surveyed. In Nainital district, the area under rice cultivation was more in Bhabar as compared to hills. Good crop stand was noticed in Bhabar compared to hilly areas. Most predominant varieties in US Nagar were HYVs like PR 113, PR 121, PR 126, PR 127, PR 128, PR 129, PR 130 and HKR 47 and basmati varieties like Pusa Basmati 1509, Pusa Basmati 1121, Pusa Basmati 1692 and Pant Sugandh Dhan 27. In Nainital districts, varieties like Pant Dhan 11, Govind, Pant Dhan 18, PR 113, PR 121 and HKR 47 were grown by the farmers in Bhabar region, whereas, Govind, VL Dhan 210, VL Dhan 211 and VL Dhan 69 were mainly grown in foot and lower hills. The farmers adopted different cropping systems like rice-wheat, rice-mustard, rice-pea, rice-sugarcane, rice-potato-ginger, rice-mustard/wheat/pea-pulses and rice-tomato. Rice-wheat and rice-mustard were commonly followed by the farmers. Majority of the farmers contacted were in the medium income group. Average per capita consumption of rice per month was 8-10 kg rice. All the farmers contacted told that their main meal consisted of both rice and wheat. Planting was done between 1st week to 4th week of July. Average seed rate was 20-25 kg/ha and farmers adopted random planting where plant population per unit area was not maintained. Majority of the farmers told that they adopted seed treatment before sowing. In the main fields, farmers applied fertilizers @ 115-130 kg N/ha, 40-60 kg P_2O_5/ha and 40-60 kgK_2O/ha. Almost all the farmers contacted told that they applied zinc sulphate @ 25 kg/ha. Zinc deficiency is a common problem in this region. Some farmers sprayed the crop with 5 kg zinc sulphate + 20 kg urea/ha to manage Zinc deficiency/Khaira disease. Overall, intensity of weeds was low. Most of the farmers practiced hand weeding along with herbicide application. Among the diseases, sheath blight, false smut, brown spot and grain discoloration were wide spread in low to moderate intensity. Bacterial blight was recorded in high intensity in some fields in Udham Singh Nagar district. Most of the insect pests were observed in low to moderate intensities. Most of the farmers contacted adopted plant protection measures.

West Bengal-1 (Bankura): Production oriented survey was conducted in three rice growing districts of this part of West Bengal viz., Jhargram, Bankura and Birbhum when the crops were in dough to maturity stage. Most of the fields surveyed were under rainfed (upland or lowland) ecosystem. In general, weather conditions were not very favourable for rice cultivation except Birbhum. Predominant rice varieties cultivated were HYVs like Swarna (MTU 7029), CS-1, BB-

11, Lalat, Kanak, MTU 1010, IET 4786 (Shatabdi), IET 4094 (Khitish), GB 3, MTU 1017, MTU 1153 (Chandra), IR 36, Dunkel, Super Shyamali, IR 64, MTU 1001, CR Dhan 800, Ranjit, Pratiksha and others and hybrids like PAN 2430. Many farmers cultivated local and aromatic short grain rice varieties like Khejur Thori, Raghusal, Basmati Local, Gobindobhog, Badshabhog, Dudheswar and others. Common crop rotations followed by the farmers were rice-mustard-vegetables, rice-potato-sesame, rice-vegetables-fallow, rice-mustard-sesame, rice-vegetables-sesame, rice-mustard, rice-onion, rice-sesame, rice-rice, rice-mustard-fallow, rice-pulses, rice-potato and others. On an average about 67% farmers contacted belonged to medium income group and rest were from low income group. Average per capita consumption of rice per month was 7-20 kg rice and all the farmers contacted told that they consumed only rice. In general, planting was done from 1st week of July to 1st week of August. Average seed rate ranged from 40-55 kg/ha. On an average about 56% of the farmers contacted told that they adopted seed treatment with carbendazim and mancozeb. In the main fields, fertilizers were applied @ 18-80 kg N/ha, 14-66 kg P_2O_5/ha and 10-45 kg K_2O/ha. Very few farmers contacted applied zinc sulphate as foliar application. Many farmers applied FYM in the fields. Overall, intensity of weeds was low to medium. Most of the farmers practiced one to two hand weeding for managing weeds. Some of the common needs of the farmers were improvement in irrigation facilities, improvement in marketing facility and increase in rate of price of the produce, availability of implements on hire basis, timely availability of quality seeds, subsidy in fertilizers, high yielding varieties with drought resistance, coarse grain varieties suitable for puffed rice, short duration HYVs and pest and disease resistant rice varieties. Among the diseases, blast, brown spot, sheath blight and bacterial blight were observed in higher intensities in some of the fields surveyed. Most of the insect pests were recorded in low to moderate intensities. Zinc deficiency symptoms observed in some of the surveyed fields in Bankura and Birbhum. Common problems expressed by the farmers were scarcity of agricultural labours, lack of irrigation facilities, poor market price, high weed intensity and high intensity of different pests and diseases, lack of short duration high yielding rice varieties, high cost of fertilizers and lack of knowledge on improved method rice cultivation.

West Bengal-2 (Chinsurah): Production oriented survey was conducted in six districts of this part of West Bengal viz. Nadia, Howrah, Hooghly, Purba Bardhaman, North 24-Parganas and South 24-Parganas when the crops were in dough to maturity stage. In general, weather conditions were normal for rice cultivation except in Hooghly and south 24-Parganas where there were incidences of excess rainfall during later part of the season. Commonly cultivated varieties were HYVs like Swarna (MTU 7029), Lalat, Khitish, Swarna Sub-1, GS-4, Bullet, Jamuna, CR 1017, CR 1018, Shatabdi (IET 4786), Pratiksha, Rajendra Mahsuri, IET 4096, MTU 1010, Shamali, Super Shyamali, Mali 4, N. Shankar, Santoshi, Ajit, Samba Mahsuri, Nilanjana, Ranjit, Sabita, Bangabandhu, Jatayu and others and some local scented varieties like Gobindobhog, Kalma, Khas Dhan, Biharikhas, Kartikbhog and Badshabhog. Some farmers cultivated hybrids like PAN 802, Arize 6444 Gold, Bio 453, Arize 6129 Gold, PAC 8744 and others. Common crop rotation practices followed by farmers were Rice-rice, rice-mustard-rice, Rice-fallow-Jute, rice-lentil-rice, rice-rice-jute, rice-vegetables-rice, rice-potato, rice-potato-sesame and others. Average rice yield among different HYVs and hybrids ranged from 4000-5850 kg/ha while in case of aromatic short grains the yield was 2250-6000 kg/ha. Average per capita consumption of rice per month was 4-15 kg rice. On an average about 42% farmers told that their main mean consisted of both rice and wheat. Average seed rate used by the farmers ranged from 20-75 kg/ha. On an average about 31% of the farmers contacted told that they adopted seed treatment with carbendazim or mancozeb. In

the main fields, fertilizers were applied @ 10-11.3 kg N/ha, 20-108 kg P_2O_5/ha and 30-112 kg K_2O/ha. On an average 42% farmers applied organic manure like FYM, oilcake, cow dung manure and vermicompost. Overall intensity of weeds was low to medium except in Nadia and Howrah where weed intensity was recorded high in some places. More tan 80% of the farmers contacted told that they applied different herbicides along with practicing hand weeding. Some of the common needs of the farmers were subsidy in inputs like fertilizers, pesticides, seeds and minor equipments, proper availability of labours, supply of irrigation water and improvement in irrigation facilities, availability of organic manure, increase in minimum support price, availability of agricultural equipment on hire basis, supply of proper plant protection chemicals and herbicides and disease and pest resistant rice varieties. Intensity of most of the biotic constraints was in low to moderate intensities except sheath blight which was recorded in higher intensity in some fields in Hooghly and brown plant hopper which was recorded in high intensities in some fields in South and North 24-Parganas. Most of the farmers contacted adopted plant protection measures.

Table 1: Production oriented survey, 2023-2024: Name of the state, districts surveyed, survey period and survey personnel

State/Region	District surveyed	Survey period	Survey Personnel
Andhra Pradesh	*Kakinada, Konaseema, Eluru, East Godavari* and *West Godavari*	October-November, 2023	**R.A.R.S (ANGRAU), Maruteru-534 122, Andhra Pradesh** Dr. V. Bhuvaneswari, Principal Scientist, Pl. Path Dr. M. Ramabhadra Raju, Principal Scientist, Pl. Path Dr. K. Dakshina Murthy, Prin. Scientist, Agronomy Dr. Y. Suneetha, Senior Scientist, GPBR Dr. N. Veronica, Scientist, Crop Physiology Dr. M.V. Krishnaji, Prin. Scientist, Ag. Extension Dr. N. Srinivasa rao, Principal Scientist, Entomology Dr. A D V S L Anand Kumar, Scientist, Entomology Dr. K. Phani Kumar, DAATTC, Eluru Dr. Rajitha, SMS, KVK, Undi Dr. Ch. V. Narasimha Rao, Coordinator, DAATTC, Kakinada Dr. M. Nanda Kishore, Coordinator, DAATTC, Kakinada Dr. B. Bhavani, Coordinator, DAATTC, Amalapuram Dr. V. Gouri, Senior Scientist, DAATTC, Amalapuram Dr. N. Mallikharjun, Project Coordinator, KVK, Undi The staff of four DAATTCs, KVK, Undi, ADAs, A.Os and Department Staff of five districts
Bihar	*Rohtas*	20-30 Nov, 2023	**Botanical Research Unit, Dhangain, Bikramganj, Rohtas, Bihar** Dr. Md. Reyaz Ahmed, Univ. Prof.-cum-Chief Scientist, Rice Pathologist Dr. K. K Prasad, Asstt. Prof.-cum Jr. Sci, Rice Agronomist Dr. Prakash Singh, Asstt. Prof.-cum Jr. Sci, Rice Breeder
Chhattishgarh	*Jashpur, Kabirdham, Boladobazar* and *Bemetara*	Nov 29-30 Dec 9, 28-29; 2023	**Indira Gandhi Krishi Viswavidyalaya, Raipur-492012** Dr. P. K. Tiwari, Pr. Scientist, Pl, Plant Pathology Dr. Sanjay Sharma, Pr. Scientist, Entomology

State/Region	District surveyed	Survey period	Survey Personnel
			Dr. Sunil Nayar, Pr. Scientist, Genetics & Pl Breeding Dr. Anil Kumar Verma, Principal Scientist Dr. Abhinav Sao, Asst. Prof, Plant Breeding Dr. Bhavna Sharma, Assistant Professor Dr. V. B. Kuruwanshi, Associate Professor
Gujarat	*Ahmedabad, Anand, Dang, Kheda, Mahisagar, Navsari, Panchmahals, Tapi, Vadodara and Valsad*	Sept 14, 20, 22, 29; Oct 3, 4-6, 10, 23, 25-27; Nov 2, 4, 8, 10; 2023	**Main Rice Research Station, AAU, Nawagam-387 540** Dr. Rakesh K Gangwar, Asso. Res Scientist (Pl Pathology) Dr. M. B. Parmar, Research Scientist, Plant Breeding Rice I/C Dr. D. G. Kachha, Asst Res Scientist (Agronomy) Shri S. S. Thorat, Asso. Res Scientist (Entomology)
Haryana	*Kaithal, Kurukshetra, Karnal, Jind, Jamunanagar, Ambala, Panipat and Sonepat*	September to October, 2023	**CCS HAU, Rice Research Station, Kaul 136 021** Dr Mahaveer Singh Bochalya, Plant Pathologist & Pl Pathology Dr. Sumit Saini, Entomologist Dr. Rakesh Kumar, Plant Breeder Dr. Amit Kumar, Agronomist Dr. Charan Singh, Soil Scientist
Jammu & Kashmir-1 Khudwani	*Anantnag and Kulgam*	Kharif season, 2023	**Mountain Research Center for Field Crops (MRCFC)- Khudwani-192 102, SKUAST-Kashmir** Prof. Tasneem Mubarak, Chief Scientist, Agronomy Dr. F. A. Mohiddin, Sr. Scientist, Plant Pathology Dr. Bashir Ahmad Rather, Senior Scientist, entomology
Jammu & Kashmir-2 Chatha	*Jammu, Udhampur, Reasi and Ramban*	Aug 24; Sept 10; Oct 24, 25, 26; 2023	**SKUAST-Jammu, Chatha-180 009, Jammu** Dr. Vijay Bahadur Singh, Chief Scientist, Pl. Path Dr. Ravinder Singh Sudan, Chief Scientist, Pl. Breed Dr. Rajan Salalia, Chief Scientist, Entomology Dr. Subash C. Kashyap, Principal Scientist, Genetics and Plant Breeding Dr. Sanjay Kaushal, SMS, KVK, Reasi Dr. Rakesh Sharma Sh. J. Singh, AEO, Reasi Shri Sandeep Gupta, AEO, Udhampur Dr. Raj Kumar Gupta, Head, KVK, Ramban Shri Narendra Verma, AEO, Ramban
Karnataka	*Mandya, Mysuru, Chamarajanagara, Hassan, Chikkamangalur, Tumkuru, Davangere and Shivamogga*	Sept 13; Oct 26, 31; Nov 7, 9, 10; Dec 13, 14; 2023	**ZARS, VC Farm, Madya-571405, Karnataka** Dr. V. B. Sanath Kumar, Prof. Plant Pathology Dr. G. R. Denesh, Agronomist Dr. M. S. Kitturmatt, Entomologist Dr. C. A. Deepak, Rice Breeder Dr. H. R. Savitha, Soil Scientist
Kerala	*Alappuzha, Kottayam, Pathanamthitta, Thiruvananthapuram, Ernakulam* and *Kollam*	Kharif 2023	**RRS, Moncompu– 688 503, Alappuzha, Kerala** Dr. M. Surendran, Professor, Plant Pathology Dr. Nimmy Jose, Professor, Agronomy Dr. Biju Joseph, Assoc. Prof. Ag. Chem and Soil Sci Dr. Jyothi Sara Jacob, Asst. Prof., Entomology Smt. Hani babu, Asst. Prof., Pl. Breeding and Genet.

State/Region	District surveyed	Survey period	Survey Personnel
Maharashtra	*Thane, Raigad, Palghar, Ratnagiri and Sindhudurg*	Oct 9, 16-20, 25, 30-31; Nov 3; 2023	**RARS, KARJAT, Raigad, Maharashtra 410201** Dr. (Smt.) P. D. Patil, Plant Pathologist Dr. V. V Sagvekar, Agronomist Dr. J. P. Devmore, Jr. Rice Breeder Dr. (Smt.) V. P. Sawant, Jr. Entomologist Dr. M. P. Gawai, Jr. Rice breeder
Puducherry	*Karaikal*	December 2023 to February 2024	**PJNCOA & RI, Karaikal – 609 603, UT of Puducherry** Dr. C. Jeyalakshmi, Prof & Head, Plant Pathology Dr. R. Renuka, Asst. Prof., Plant Pathology Dr. Santosh Kumar Meena, Asst Prof., Agronomy Dr. M. Anandhan, Asst. Prof., Genet & Pl. Breeding Dr. R. Tamil Selvan, Asst. Prof. Entomology
Punjab	*Patiala, Barnala, Malerkotla, Sangrur, Faridkot, Ferozepur, Muktsar Sahib, Jalandhar, Ludhiana, Moga, SAS Nagar, Rupnagar, Fatehgarh Sahib, Tran Taran, Amritsar, Hoshiarpur, Gurdaspur* and *Pathankot*	Kharif, 2023	**Punjab Agricultural University, Ludhiana-141004** Dr. R. S. Gill, Principal Rice Breeder Dr. Jagjeet Singh Lore, Principal Plant Pathologist Dr. P. S. Sarao, Principal Entomologist Dr. Buta Singh Dhillon, Agronomist Dr. Rupinder Kaur, Principal Rice Breeder Dr. Gurpreet Kaur, Agronomist Dr. Jyoti Jain, Plant Pathologist Dr. Renu Khanna, Plant Breeder
Tamil Nadu (Coimbatore)	*Thiruvannamalai, Salem, Karur, Erode, Coimbatore, Krishnagiri, Kallakurichi and Namakkal*	Sep 12; Oct 18-19; Nov 7-8; Dec 18-19; 2023 Jan 5-6; Feb 12-13; 2024	**TNAU, Coimbatore - 641 003. Tamil Nadu** Dr. S. Manonmani, Professor and Head, Dr. C. Gopalakrishnan, Professor (Plant Pathology) Dr. K.N. Ganesan, Professor (PB&G) Dr. R. Suresh, Associate Professor(PB&G) Dr. G. Senthil Kumar, Assoc Professor (Agronomy) Dr. N. Sridharan, Assoc Professor (Crop Physiology) Dr. Sheela Venugopal, Assit Professor (Entomology)
Telangana	*Nizamabad, Kamareddy, Warangal, Sangareddy, Khammam, Yadadri Bhuvanagiri, Rangareddy, Nagarkurnool, Narayanpet, Vikarabad and Nalgonda*	May 15-16; july 3; Aug 23-24; Sept 15; Oct 23; Nov 8; 2023 Jan 25; Feb 3, 6, 9; 2024	**Rice Research Center, ARI, Rajendranagar, Hyderabad-30, TS** Dr. T. Kiran Babu, Scientist (Pl. Path.) Dr. N.R.G. Varma, Principal Scientist (Ento.) Dr. L. Krishna, Principal Scientist (G&PB) Dr. Y. Chandra Mohan, Principal Scientist (G&PB) Dr. Ch. Damodhar Raju, Principal Sci. (Rice) & Head Dr. P. Spandana Bhatt Dr. P. R. R. Reddy Dr. K. Vanisree Dr. Ravi Kumar, KVK, Wyra Sri. Laksman, DAATTC, Tandur Dr. Anil Kumar, DAATTC, Yadadri Bhuvanagiri ICAR-IIRR, Rajendranagar, Hyderabad All the DAATTC and KVKs of the University. Department of Agriculture, Govt. of Telangana
Uttar Pradesh	*Ayodhya, Ambedkar Nagar, Amethi, Barabanki, Sultanpur and Basti*	Sept 22, 23, 30; Oct 6, 14, 21, 27; 2023	**Crop Research Station, Masodha-224 133 (ANDUAT), Ayodhya, Uttar Pradesh** Dr. V. Prasad, Pathologist & Team Leader Dr. D.K. Dwivedi, Officer In-charge Dr. Saurabh Dixit, Rice Breeder Dr. S. K. S. Rajpoot, Asstt. Entomologist

State/Region	District surveyed	Survey period	Survey Personnel
			Dr. M. K. Maurya, Assistant Plant Pathologist Dept. of Agriculture, Govt. of U.P.
Uttarakhand	Udham Singh Nagar and Nainital	Aug 5, 13, 19, 26; Sept 2, 9, 16, 23, 30; Oct 7, 14, 21; 2023	**GBPUA&T, Pantnagar-263145, Uttarakhand** Dr. Bijendra Kumar, Professor, Plant Pathology Dr. A. K. Pandey, Professor, Entomology
West Bengal-1 (Bankura)	Jhargram, Bankura and Birbhum	Oct-Nov, 2023	**Rice Research Station, Bankura-722101, WB** Dr. Chandan K Bhunia, Plant Patholgist & JDA Dr. Vivekananda Mandi, Asst. Botanist Dr. Rajib Das, Asst. Agronomist
West Bengal-2 (Chinsurah)	*Nadia, Howrah, Hooghly, Purba Bardhaman, North 24-Parganas and South 24-Parganas*	Nov 11, 17; Dec 1, 5, 6, 18, 26; 2023	**Rice Research Station, Government of WB, Chinsurah712102** Dr. Dilip Patro, Plant Pathologist Dr. Rajib Das, Asst. Botanist Dr Keya Banerjee, Asst Agronomist Dr. Chiroshree Gangopadhyay, Asst. Entomologist Dr Suparna Gupta, Asst. Botanist Dr. Sitesh Chatterjee, Entomologist Dr. Kaushik Majumdar, Jr. Soil Scientist Dr. Suman Debnath, Asst. Botanist Dr. Kinkar Saha, Entomologist Shri Sumit Murmu, Asst. Botanist Dr. Mitali Chatterjee, Asst. Botanist Dr. Avijit Duray, Asst. D. A., Raina II Adrija Bhattacharya Nabanita Pal Shri Chitta Ranjan Mudi

Table 2: Widely prevalent rice varieties cultivated in surveyed districts of India during 2023-2024

State	Varieties
Andhra Pradesh	**HYVs:** MTU 7029 (Swarna), MTU 1318, Sampadh Swarna, PLA 1100, MTU 1064, MTU 1061, RGL 2537, BPT 5204, RP Bio 226, MTU 1262, MTU 1224, NP 9558, Sadhana, Amulya, PR 126, SL 10, MTU 1001 and others
Bihar	**HYVs:** MTU 7029, BPT 5204, Sabour Shree, Swarna Sub -1, Sampurna, Rajendra Mahsuri 1, Rajendra Sweta, Moti, Damini, Sonachur and others
Chhattishgarh	**HYVs/Improved:** Swarna, HMT, Swarna, Mahamaya, Rajeswari, Indira Barani 1, MTU 1010, Jamuna, Sonam, Sambleshwari, Kalinga, Indira Sona, Danteshwari, Karma Mahsuri, Bamleswari, MTU 1156, Shri Ram, Debvhog, Kalimunchh, Dubraj Mutant, Pratiksha and others; **Hybrids:** Kaveri9090, Arize AZ 8433 DT, Delta Max, Kaveri468, RH super 444, Arize 6444 Gold, PAN 2423, Dhananjay Gold, Mahyco hybrid, PHB 71, Advanta hybrid, VNR 2111, Ankur7576, Ankur7274, Ankur13550, Basanth Agro pratap KRH-1 and others; **Local**: Sona, Safri, Jawaphool, Kalajeera, Tulsimala , Vishnubhog and Dubraj others.
Gujarat	**HYVs/Improved:** GR 7, GR 11, GAR 13,IR 28, GAR 14, GAR 22, GR 21, NAUR1, Moti, Krishna kamod, Gurjari, Sriram 125, Moti gold, Sonam, GR 101, GR 17, Masuri, Surya moti, Laxmi, GNR 3,GNR 4, GNR 6, Mahisagar, Jaya, Doodhmalai, Desi colum, Ambemore, Masuri, Dhanya Gold, Annapurna, Pusa

State	Varieties
	1638,Kiran 3, Punjab S, Nath Pauha, Shri 101, JK Suraksha, Gangamani, Bayer 6444, Versha, Kaveri, Navtej and others; **Hybrids:** US-312, Gold 807, PAC 807, S 251, US25P25, DRRH-3, Advanta 807, Kavri 468, Sri 2277, GNR 7, Kaveri 471, Swtha, US-2111, Buland (Signet 5050) , Arize 6129 Gold, Siri 5123, US-807, Syngenta S-9001, Suruchi 5629, Arize 6444, Arise 9444, MC-13, UNR 2111, NPR 6532, Hybrid 25p25, 2333, US 316 Arize 6201, Hyb.5151, Ankur, 2666, Hyb 27P37, HYb. 716, JK-208, Hyb. 745, 786,Reshma , Goraknath, and others
Haryana	**HYVs**: PR 114,PR 128, PR 126 and others; **Hybrids**: Sava 134, Hybrid 471, Hybrid 8222, Kaveri 468, Delta Hybrid, Swift Gold, Hybrid 28P67, Arise 6444, Hybrid 468, Pioneer Hybrid, Hybrid 27p22, Sava 7301, Hybrid 777, Hybrid 7425, Hybrid 7299, Sava 7501, Hybrid 2222, Hybrid 927, Sava 134, Hybrid 25P35, Sava 127, Hybrid 27p31 and others; **Basmati**/**Scented**:Pusa Basmati 1509, Pusa Basmati 1886, HBC 19, Pusa Basmati 1847, Pusa Basmati 1121, Pusa Basmati 1718, CSR 30, Pusa Basmati 1847, Pusa basmati 1401, Pusa Basmati 1692 and Pusa Basmati 1885, Pusa Basmati 1718 and Pusa Basmati 1.
Jammu and Kashmir-1 Khudwani	**HYVs:** SR-I, SR-2, SR-3, SR-4, SR-5 and others; **Local:** K-39, K-332, China-1039, China-1007, Mushkbudji and others
Jammu Kashmir-2 Chatha	**HYVs:** Basmati 370, Pusa Basmati 1121, Jammu Basmati 118, K 39, Giza 14, SJR 5, Local basmati, SR-2, Jammu Basmati 129, Sharbati and K-343 (local japonica type grown in Sangal dhan area.); **Hybrids:** Arize 6444 Gold, PAC 807, Bayer Hybrid etc.
Karnataka	**HYVs:** Super amman, Kaveri Price, MTU-1001, MTU 1010, Uma, Kempu mukti, JAYA, MPR-606, Jyothi, Meenakshi, Sanna madhu, Shreya, Samruddi, KMP-220, MSN-99, Tunga, Rajamudi, Gangavathi sona, KPR-1, VNR, Ramdev, Sonaraja, RNR 15048, D R 8336, IR-64, IET Sanna, BR-2655, Red rice, Sona masuri, Tella Hamsa, JGL 1798, Sri ram, BPT-5204, Kaveri Sona, Jai Shree Sona, Abhilash, Penna super, Onkar and MPR606; **Hybrids:** VNR-2233 Plus, GK- Chethan, Samrat, PAC 837 and others
Kerala	**HYVs:** Uma (MO 16), Manuratna, Jyothi, Pokkali varieties, Prathyasa, Manuratna, Red triveni, Shreyas, Cherady, Pournami (MO 23) and others
Maharashtra	**HYVs**: Suma, Karjat-2, Karjat-3, Karjat-6, Karjat-7, Karjat-9, Sonal, Kaveri Sona, Safal 1010, Shubangi, Rupali, Avani, Chintu, Trupti, NP-125, Hashita,Vijaya, Janaki, Ratnagiri-6, Ratnagiri-5, MTU-1010, MTU-7029, Sundar, Indrayani, Jaya, Komal, Karjat-5, Akshet, Daptari-108, Manisha, Dapatari-125, Suprema Sona, Spriha 911, Shabri, Silkey, Shree 1001, Avani, Devaki, Zordar, Raja, Suvarna, YSR, Komal 101, Silky 277, Wadakolam, Dapturi, Durga, Mahuli, Mahalaxmi, Saguna, Kuber, Sindhu, Sampada, Punam, Kranti, Punam Gold, Akshad, Komal-101, Gangotri, Bhavna, Vikrant, Swabagya, N.P.H.-242, Gaytri, Asmita, Sarathi, Ratnagiri-8, Sadna, Prasanya, Vaishnavi, Pooja, Sairam, Suvarna, Punam, Sri 100, Gold 78, Kranti-89, Avni, Jaishriram Gold, Shatayu, Samrudhi and Om Shri Ram; **Hybrids:** Raja, Ankur 7576, Syn 5251, Loknath 505, Goraknath, Mahiko 6529, Upaj, Mahiko 5556, Ankur-6444, Arise 6444, Kaveri 9090, NPH, Loknath, Arize6129, NPH 30, Ankur 7434,NP-

State	Varieties
	150, Nirmal-NPH, Tej Gold ,NP-125, Goraknath, Rashi 113 and others; **Locals:** Wada Zinia, Wada Kolam,
Puducherry	**Samba Season**: White Ponni, ADT 38, ADT 39, ADT 46, ADT 54, SAVITR1, BPT 5204, Co46, IR 20, CR 1009 and KKL(R) l; **Kuruvai Season**: TKM 9, ADT 37, ADT 43, Karuppu Kavani and Seeraga Samba
Punjab	**HYVs**: PR 126, PR 114, PR 113, PR 144, Peeli Pusa, PR 131, PR 128, Pusa 44, PR 121, PR 130 and others; **Basmati/Scented**: Pusa Basmati 1121, Pusa Basmati 1401, Pusa Basmati 1847 and Pusa Basmati 1509 , Pusa Basmati 5 and Pusa Basmti-7.
Tamil Nadu – Coimbatore	**HYVs:** CO 51, ADT-37, NLR 3449, Archana, Amman, CO(R) 51, IR 20, Dhanushka, BPT5204, ADT 45, ADT 43, Paiyur 1, Akshaya, ADT 39,Ponni, Lakshmi, ASD 16, IR 20, Sowbackya, Danista, white ponni and Sadana
Telangana	**HYVs:** Jai Sreeram grain type (Chintoo, Pooja, Sriram gold, Ankur Sona, Super Aman, Sowbhaya, Aman gold), Samba Mahsuri (BPT 5204), Telangana Sona (RNR 15048), HMT Sona, MTU 1061, MTU 1262, MTU 1224, MTU 1064, RNR 21278, MTU 1271, Kunaram Sannalu, MTU 1010, Jagtial Rice-1, IR 64, Tellahamsa, Bathukamma, MTU 1061, MTU 1153, MTU 1156, 7029 and MTU 1001; **Hybrids:** Kaveri 272, Kaveri 175, VNR 22258, Rasi 113, Mahindra 303, Kaveri 468, 27P31, RX 100 and Bio 799
Uttar Pradesh-Masodha	**HYVs**: NDR 2065, NDR 359, NDR 3112-1, Moti Gold, Sarjoo 52, Samba Mahsuri, Samba Masuri, Sarjoo 52, Pusa Basmati 1, Swarna, Narendra Lalmati, Sambha Mahsuri-Sub 1, Swarna Sub-1, NDR 97, Purva, Khusi 27, BPT 5204, KN-3, NDR 2064, Kalanamak, Sampoorna, NDR 2065, Dilpasand, Damini, Moti, Shahi Dawat, Dhanrekha and Chintu; **Hybrids**: 27P31, 27P37, Ganga Kaveri, 27P63, Pusa RH-10, Kaveri, Bayer 6633, Kaveri 668, Dilkhush, US 305, Arize 6444 Gold and Gorakhnath 509
Uttarakhand	**HYVs:** PR 113, PR 121, PR 126, PR 127, PR 128, PR 129, PR 130, HKR 47 and Pant Dhan 23; **Basmati/Scented**: Pusa Basmati 1509, Pusa Basmati 1121, Pusa Basmati 1692 and Pant Sugandh Dhan 27; **Bhabar area:** Pant Dhan 11, Govind, Pant Dhan 18 and PR 113; **Hilly area:** Govind, VL Dhan 210 and VL Dhan 2011
West Bengal-1 Bankura	**HYVs:** Swarna (MTU 7029), CS-1, BB-11, Kanak, Lalat, GB 3, MTU 1017, China, MTU 1010, IET 4786 (Shatabdi), IET 4094 (Khitish), MTU 1153 (Chandra), IR 36, Dunkel, Super Shyamali, IR 64, MTU 1001, CR Dhan 800, Ranjit, Pratiksha and others; **Hybrids**: PAN 2430; **Local/Scented**: KhejurThori, Raghusal, Basmati Local, Gobindobhog, Badshabhog, Dudheswar and others.
West Bengal-2 Chinsurah	**HYVs**: MTU 1010, Pratikshya, Shamali, IET 4786, Khitsih, Shatabdi, Super Shyamali, Mali 4, N. Shankar, Santoshi, Ajit, Lal Minikit, IET 4094, Swarna, Lalat, Swarna Sub-1, Kanak, Bullet, Jamuna, Rajendra Mahsuri, CR Dhan 800, CR 1018, CR 1017, Bangabandhu, Gitanjali, Kritish, IR-36, IR-64, GB-3, GS-1, Jatayu, Samba Mahsuri, Nilanjana, Ranjit, Sabita, Kesari Gold and others; **Hybrids**: KRH 2, PAN 802, PAC 802, Arize 6201, PAC 8744, Bio 453, Arize 6129 Gold, Arize 6444 Gold and others; **Local:** Gobindobhog, Dudheswar, Kalma, Khas Dhan, Biharikhas, Kartikbhog and Badshabhog.

Table 3: Biotic constraints (diseases) in different states of India during 2023

Sates	Bl	NBl	BS	ShBl	ShR	FS	GD	StR	BAK	NBLS	Khaira	UDB	BLB	SRBSDV
Andhra Pradesh		L		L-M	L	L	L						L-M	
Bihar	M	L	M	M-S	L	M-S							M-S	
Chhattishgarh	T	M	T	L-M	T	L-M	L-M						L-M	
Gujarat	L-M	L		L-M	L-M	L-M	L-M						L-M	
Haryana	L-M	L		L-M	L	L-M	L		L-M				L-M	
J&K-1-Khudwani	L	L	L		L				L					
J&K-2-Chatha	M-S		L-S		L-M	L	L-M						M-S	
Karnataka	L	L-M	L	M	L-M	L							L	
Kerala	L		M	M-S		M							M-S	
Maharashtra	L-M			L-M	M	L-M	L						M-S	
Puducherry	M	L			L-M	L-M	M-S			M			M-S	
Punjab	L	L-M	L-M	L-M	T	L-M	T-L		L-M					
Tamil Nadu	L-M	L-M	L	L	L	L-M							L-M	
Telangana		L-M	L-M	L-M			L						L-S	
UP			L-M	L-M		L-M							L-M	
Uttarakhand	L-M		L-M	L-M	L	L-M	L		L		L		M	
WB-1-Bankura	M	L-M	M-S	M-S	L		L-M						M-S	
WB-2-Chinsurah	L-M	L-M	L-M	L-M	L-M	L-M							L-M	

Bl: Blast, **NBl**: Neck Blast, **BS**: Brown spot, **ShBl**: Sheath blight, **ShR**: Sheath rot, **FS**: False smut, **GD**: Glume discoloration, **LS**: Leaf scald, **StR**: Stem rot, **NBLS**: Narrow brown leaf spot, **BAK**: Bakanae, **KSm**: Kernel Smut, **LSm**: Leaf Smut, **CR**: Crown Rot, **BLB**: Bacterial leaf blight, **BLS**: Bacterial leaf streak, **RTD**: Rice tungro disease; L: Low; M: Moderate; S: Severe.

Table 4: Biotic constraints (insect pests) in different states of India during 2023

Sates	SB	LF	BPH	WBPH	GLH	GM	RH	WM	GH	CW	GB	LM/ PM	RT	Rats	Term
Andhra Pradesh	L-M	L-M	L			L						L		L-M	
Bihar	L-M	L-M	M	L	M	L	M	L						L	
Chhattishgarh	M	L-M	L-M		L-M	L									
Gujarat	L-M	L-M	T-L	L							T-L	T			
Haryana	T-L	L-M	T-L	T-L					T						T
J&K-1-Khudwani	L	L													
J&K-2-Chatha	L-M	L-M			L-M		M-S		L-M		M				
Karnataka	L	L-M	L-M												
Kerala	L-M	M-S	M-S			L				L-M			M		
Maharashtra	L	L			L						L			L	
Puducherry	L-M	M											L-M		
Punjab	T-L	T-L	T-L	T-L	T-L										
Tamil Nadu	L-M	L-M	L			L				L		L	L		
Telangana	L-M	L-M				L		L					M		
UP	L-M	L-M			L						L-M				T-L
Uttarakhand	L-M	L-M	L-M	L			L-M	L-M			L				
WB-Bankura	L-M	M	M		L-M	L								L	L
WB-2-Chinsurah	L-M	L-M	M-S	L		L									

- **Low to moderate incidence of leaf miner and black bugs in parts of Kerala; Low incidence of army worm in parts of Maharashtra; Low incidence of mealy bug and root knot nematode in parts of West Bengal**
- **SB**: Stem Borer, **LF**: Leaf Folder, **BPH**: Brown Plant Hopper, **WBPH**: White Backed Plant Hopper, **GLH**: Green Leaf Hopper, **GM**: Gall Midge, **RH:** Rice Hispa, **WM:** Whorl Maggot, **GH**: Grass Hopper, **CW**: Case Worm, **GB**: Gundhi Bug, **PM**: Panicle Mite, **MT**: Mite, **RT:** Rice Thrips, **RB**: Rice Bug, **AW**: Army Worm, **SC**: Swarming caterpillar, **Term**: Termites; **EHB**: Ear head bugs; **MB**: Mealy Bug, **WTN**: White Tip Nematode, **LM**: Leaf Miner; **BB**: Blue beetles: **T**: Traces, **L**: Low, **M**: Moderate, **S**: Severe.

INTRODUCTION

The primary aim of Production oriented survey (POS) is to collect information on various aspects of rice cultivation *viz*., general weather and crop conditions, varieties cultivated in a particular region and yield range, extent of use of organic manure and inorganic fertilizer, different inputs and their availability, different biotic and abiotic problems and their management in different states. The survey assesses the needs and problems of the farmers and determines their degree of knowledge and perceptions of crop management problems. POS gives information about the various constraints faced by the farmers in dealing with the problems. The survey also provides information on various indigenous technical knowledge of the farmers regarding rice cultivation. These surveys can help to identify the gaps in knowledge that need to be addressed by research and extension. The main objectives of the survey are:

- To undertake extensive periodical survey in rice growing areas of the country, and to study the practices and constraints in rice cultivation.

- To suggest suitable remedial measures on the spot to solve the farmers' problems, if any.

- To minimize input costs and suggest methods to avoid any wasteful practices.

Survey team included scientists from co-operating centres of All India Co-ordinated Research Project on Rice of the ICAR-Indian Institute of Rice Research and the agricultural and extension officials of respective State Departments of Agriculture. The report contains the names of districts and subunits covered during survey and also the period of survey. Further, it describes the particulars of rice areas, popular varieties under cultivation, and crop production and management technologies adopted in respective regions. In addition, information on different biotic and abiotic production constraints prevalent in different rice growing states during the crop season and usage of plant protection chemicals are also described.

Andhra Pradesh-Maruteru (2023-2024)

Districts surveyed: *Kakinada, Konaseema, Eluru, East Godavari* and *West Godavari,*

Particulars of survey

District	Name of the mandals
Kakinada	Peddapuram, Jaggampeta and Pithapuram
Konaseema	Razole and P. Gannavaram
Eluru	Lingapalem, Unguturu, Chintalapudi, Bhimadole, Pedavegi and Old Chintalapudi
East Godavari	Anaparthi, Rajamundry Rural and Rajanagaram mandal
West Godavari	Undi, Veeravasaram, Penumantra, Akiveedu, Palakol and Maruteru

Widely prevalent rice varieties in Godavari zone of Andhra Pradesh in *Kharif*, 2023

Varieties
MTU 7029 (Swarna), MTU 1318, Sampadh Swarna, PLA 1100, MTU 1064, MTU 1061, RGL 2537, BPT 5204, RP Bio 226, MTU 1262, MTU 1224, NP 9558, Sadhana, Amulya, PR 126, SL 10, MTU 1001 etc.

Production Oriented Survey (POS) was conducted during October and November months of 2023 in the Godavari Zone (East Godavari, Kakinada, Konaseema, Eluru and West Godavari districts) of Andhra Pradesh. The team of Scientists from RARS, Maruteru, DAATTC Scientists and KVK, Undi had participated in the survey. Major variety Swarna followed by MTU 1318 (Non lodging, medium duration, medium slender grain category) was cultivated in large extent in all the five districts. However, Swarna variety of paddy (MTU 7029) was still the most preferred variety during *Kharif 2023*. Seasonal conditions were found favourable for paddy cultivation. Due to deficit rainfall in districts, irrigation water was a problem some places. Over reliance on migrant labour for transplanting operations and preference for mechanization (combined harvester) in rice was observed in all the locations. Direct seeding was followed in Kakinada district during both seasons. Among the biotic constraints, bacterial leaf blight disease problem at initial stages but later the BLB severity came down. Insect pests like BPH, stem borer and leaf folder were observed in low level during the season. Rodent problem is low to moderate in season in many locations surveyed.

A. GENERAL INFORMATION:

A1: Seasonal conditions

Timely onset of monsoon has been recorded. Deficit rainfall with a range of 12.0 to 33.4% was recorded in the entire five districts. The crop growth is good and 70-80% of the crop was harvested by November. Cyclonic weather prevailed in December month and Michaung cyclone was recorded in the first week of December, 2023 i.e. 4th to 6th December, 2023. The cyclone caused inundation of the crop, caused problems to harvesting of the crop. The yields were also reduced due to the cyclone, had some impact on open air dried paddy grain and late transplanted crop.

Table 1: Rainfall pattern in the Godavari zone of Andhra Pradesh (2023-24)

Month	Kakinada District			Konaseema District			Eluru District		
	Normal (mm)	Actual (mm)	% Deviation	Normal (mm)	Actual (mm)	% Deviation	Normal (mm)	Actual (mm)	% Deviation
June, 2023	112.8	60.1	-46.7	111.4	70.6	-37	155.5	89.9	-42.1
July, 2023	198.0	223.8	13.0	221.0	194.1	-12	224.5	324.0	44.32
August, 2023	179.9	69.9	-61.1	256.5	70.7	-72	239.3	91.9	-62.0
Sept, 2023	179.5	147.1	-18.1	190.4	167.9	-12	171.1	141.2	-17.5
October, 23	201.3	24.2	-86.0	280.2	25.8	-91	134.4	18.8	-86.0
Nov, 23	92.1	38.7	-58.0	96.9	36.2	-63	42.0	43.17	2.79
Dec, 23	6.8	199.4	2832	16.1	290.4	1702	7.1	212.4	2891
Jan, 2024	9.3	0	-100	12.5	0	-100	5.0	0	-100
Total				**1184.7**	**855.7**	**-27.8**	**978.9**	**862.5**	**-12.0**

Table 1 contd..: Rainfall pattern in the Godavari zone of Andhra Pradesh (2023-24)

Month	East Godavari District			West Godavari District		
	Normal (mm)	Actual (mm)	% deviation	Normal (mm)	Actual (mm)	% Deviation
June,2023	117.0	87.4	-25.3	110.6	75.7	-31.6
July, 2023	156.5	176.6	12.8	245.6	192.9	-21.5
August, 2023	238.6	126.4	-47.0	176.9	34.4	-80.6
September, 2023	173.2	171.1	-1.2	185.5	175.3	-5.5
Total	**685.3**	**561.5**	**-18.1**	**718.6**	**478.3**	**-33.4**

A2: Crop coverage

Godavari Zone of Andhra Pradesh has re-organized into five districts (Kakinada, Konaseema and East Godavari; Eluru and West Godavari districts). Significant reduction in total cultivated area was observed in all the five districts of Godavari Zone. Decrease in total cropped area and proportionate decrease in paddy area was highest in West Godavari district (85%) followed by Konaseema district (86.1%). Decrease in these districts could be attributed to conversion to aqua culture, commercial lands etc. In Eluru district, although total cropped area decreased (91% of the normal area), 94.5% of paddy area was retained. In other districts, viz., Kakinada, Konaseema, East Godavari, West Godavari paddy was cultivated to the tune of 94.2%, 86.3%, 91.4% and 85.4% of the normal area.

Table 2: Total cultivated area, area under rice particulars in Godavari Zone (Kharif 2023)

District	Total Cultivated Area (ha)			Area under Rice (ha)		
	Normal	Actual (2023)	% Area Covered	Normal	Actual (2023)	% Area Covered
Kakinada	101559	90540	89.2	92082	86772	94.2
Konaseema	75119	64676	86.1	74959	64668	86.3
Eluru	102218	92940	91.0	89937	84999	94.5
East Godavari	85409	74567	87.3	78789	71986	91.4
West Godavari	101757	86510	85.0	101237	86438	85.4

Table 3: Crop Coverage in different district of Godavari Zone (*Kharif* 2023)

Table 3a. Kakinada District

S. No	Crop	Normal area (ha)	Actual Area (ha)	% coverage
1	Paddy	92082	86772	94.2
2	Maize	238	216	90.8
3	Cotton	4095	1682	41.1
4	Sugarcane	3755	1282	34.1
5	Greengram	12	22	183.3
6	Blackgram	1125	391	34.8
7	Redgram	153	45	29.4
8	Sesamum	92	37	40.2
9	Groundnut	7	0	0.0
10	Ragi	0	93	-
	Total	**1,01,559**	**90,540**	**89.2**

Table 3b. Konaseema

S. No.	Crop	Normal area (ha)	Actual area (ha)	% coverage
1	Paddy	74959	64668	86.3
2	Maize	12	0.8	6.7
3	Greengram	0	0	-
4	Blackgram	0	0	-
5	Redgram	137	5	3.6
6	Sugarcane	8	0	-
7	Sesamum	3	2	66.7
	Total	**75119**	**64676**	**86.1**

Table 3c. Eluru District

S. No	Crop	Normal Area (ha)	Actual Area (ha)	% coverage
1	Paddy	89937	84,999	94.5
2	Jowar	10.0	5	50.0
3	Maize	1385	228	16.5
4	Green gram	133.0	107	80.5
5	Blackgram	2164.0	1831	84.6
6	Groundnut	754.0	1339	177.6
7	Cotton	4947	3349	67.7
8	Sugarcane	2888	1082	37.5
	Total	**102218**	**92,940**	**91.0**

Table 3d. East Godavari and West Godavari Districts

	East Godavari			West Godavari		
Crop	**Normal area (ha)**	**Actual Area (ha)**	**% coverage**	**Normal area (ha)**	**Actual Area (ha)**	**% coverage**
Paddy	78789	71986	91.4	101237	86438	85.4
Maize	239	9	3.8			
Green gram	20	7	35.0	1	0	0
Black gram	2695	1280	47.5	19	0	0
Cotton	761	63	8.3			
Sugarcane	2310	960	41.6	455	72	15.8
Redgram	73	0	0			
Sesamum	10	0	0			
Groundnut	285	180	63.2	9	0	0
Turmeric	82	8	9.76	36	0	0
Chillies	145	74	51.0			
Total	**85409**	**74567**	**87.3**	**101757**	**86510**	**85.0**

A3: Varietal spread

Swarna (MTU 7029) is a widely preferred variety followed by MTU 1318, PLA 1100, Sampadh Swarna, MTU 1061, MTU 1064, BPT- 5204, RP bio-226, NP 9558, PR-126, SL-10 were the preferred varieties. Farmers of Godavari Zone now giving preference to fine grain varieties cultivating wide no. of varieties of paddy, preference of varieties was based on marketability, millers' preference, personal consumption and seed sale. PR 126 and SL 10, Pusa samba 1850, 1853, Ankur Sona were preferred by farmers of Tadepalligudem and adjoining areas of West Godavari district.

In Kakinada district, Swarna (MTU 7029) followed by Sampadh swarna, MTU 1064, MTU 1318, Sadhana, RGL 2537, BPT 5204, RP Bio-226 were the preferred varieties in Kakinada district. RP bio-226 is the variety grown in Pitapuram area alternative to BPT-5204. In Konaseema district, Swarna (MTU 7029) is a widely preferred variety followed by MTU 1318, NP 9558, Sampadh swarna, MTU 1064 were the preferred varieties in Konaseema district. NP 9381 Kanak Plus is also a cultivated variety. In Eluru district, Mega variety, Swarna (MTU 7029), MTU 1318, PLA 1100, MTU 1061, Sampada swarna, MTU 1064, MTU 1224, MTU 1262, MTU 1121, BPT 5204 were the preferred varieties in Eluru district. PR-126 is widely grown in Tadepalligudem area, which is a miller preferred variety, procured by millers at harvest and exported variety. In East Godavari district, Swarna (MTU 7029) is a widely grown variety followed by PLA 1100, MTU 1318, Sampadhswarna, MTU 1064, BPT 5204, RP Bio-226, MTU 1061 were the preferred varieties in East Godavari district. RP Bio-226, PR-126 varieties were also preferred varieties. In West Godavari district, widely cultivated varieties were MTU 1318, Swarna (MTU 7029), Sampada Swarna, PLA 1100, MTU 1064, PR -126, MTU 1061, MTU 1121, NP 9381 Kanak Plus were the

preferred varieties in West Godavari district. PR-126 is widely grown in Tadepalligudem area, which is a miller preferred variety, procured by millers at harvest and exported variety.

Table 4: Variety wise area coverage (ha) in different surveyed districts of Andhra Pradesh

Variety	Districts				
	Kakinada	**Konaseema**	**Eluru**	**East Godavari**	**West Godavari**
MTU 7029	36790	46680	22625	27806	23462
MTU 1064	9144	1098	7850	1198	1814
MTU-1318	6356	11252	12500	6711	34093
Sampadh Swarna	14115	1281	1425	10091	16618
NP 9558		2560			
Amulya	541	52			
NP 9381 Kanak Plus		111			174
PLA 1100			6400	19480	4560
BPT 5204	2983		3250	3397	
MTU 1061	408		20210	1079	1385
MTU 1698				1000	
RP Bio-226				766	
PR-126				36	1667
MTU 1224				34	
MTU 3626				31	
RGL 2537	3874				
RP Bio 226	884				
Sadhana	5517				
MTU 1271	99.6				
MTU 1121			8075		221
Others	6060	1634	688	357	
Total	**86,772**	**64,668**	**83,023 ha**	**71,986**	**86,438**

A4: Crop condition

Timely South West monsoon and release of canal water during *khari*f, 2023 resulted in timely transplanting first fortnight of July. Generally, in the tail end areas (canal irrigation), transplantations were delayed. Drainage problem was noticed in some places. The year 2023-24 witnessed deficit rainfall in most of the areas during entire season. The crop growth is good up to November month. Kresek phase of BLB was observed during initial stages of crop growth in West Godavari, East Godavari and Konaseema districts of Andhra Pradesh. Comparably low to moderate incidence of BLB was observed. The crop near to harvest stage, at fag end of season the Michoung cyclone caused damage to crop at certain places. The harvestings were completed at 80% area by that time; the left over crop was suffered with lodging problem. The remaining crop of MTU 1318, the harvesting charges were more due to cyclone. Yields in the range of 30-42

bags/acre (75 kg bags) were recorded during the season. Reduced yields were observed in cyclone affected areas.

A5: Cropping pattern
In the West Godavari district of Andhra Pradesh, rice-rice is the predominant cropping pattern in majority of the locations. Rice-pulse, Rice-Maize cropping system was also prevalent in Kakinada and East Godavari districts.

A6: Rice Consumption Pattern
The farmers belong to medium to poor income status in most of the areas. Sona mahsuri, BPT 5204, PLA 1100, Swarna, MTU 1075, RP bio varieties were used for consumption purpose in the surveyed area. Polished rice, coarse grain is consumed. Parboiled rice is preferred at some places. RP bio rice along with millets is consumed in some areas of Eluru district. Brown rice is also preferred. Rice + wheat also preferred in chakrayagudem area. 25-30 kg rice is consumed per month for a family size of 6-10 members.

A7: Crop establishment methods
Transplantation was found to be the preferred method of crop establishment in rice. Migrant labour from Bengal, Chhattisgarh contributed to transplantation in *kharif*, 2023. Bengal planting is the most preferred method in Godavari zone. Majority of the transplantation was done using migrant labour, commonly called as Bengal transplantation, the cost of pulling and transplantation per acre has ranged from Rs. 3500-4200/acre. Direct seeding is practiced in some locations of East Godavari and Kakinada. In Kakinada district 33.6% crop as wet direct seeding crop during *kharif* 2023 and 64% is under direct wet sown seeding method during *rabi*, 2023.

B. CROP MANAGEMENT

B1: Seed rate and Seed treatment
Most of the farmers purchased seed from local dealers/ farmers for the season. However, 20% of the farmers utilized own seed from the previous crop season. Seed rate used was 8-20 kg/acre for transplanted rice. Average seed rate adopted by farmers is in the range of 15-20 kg/ac from the locations surveyed. However, for Bengal mode of planting, seed rate of 8-15 kg/acre was seen used. For Direct seeding 8-12/14 kg seed rate is used for wet direct seeding conditions. Many of the farmers preferred to soaking, incubation and broadcasting seed in nursery only. Seed treatment is generally not preferred during kharif season. Only 23% of the farmers under survey have adopted seed treatment with carbendazim @ 1.0 g/kg seed. Farmers invariably would undertake nitric acid seed treatment during *rab*i, for seed procured from previous season crop. Seed treatment is followed during rabi in some areas.

B2: Transplanting
Seedlings with an age of 18-25 days were transplanted in most of the locations in Godavari zone. Migrant labour preferred 15-18 day old seedlings for transplanting. However, seedling length was taken into consideration for planting by local labourers. Random transplantation was the most common practice in the Zone. However, migrant labour maintained alley ways during transplanting by using ropes.

B3: Plant Population
In the system of planting done by migrant labour from Chhattisgarh, Bengal etc. population per square meter ranged from 14 to 16 in Bengal transplanting in comparison to 20-25 seedlings in random transplanting done by local labour. Alley ways were maintained by majority of the farmers of the Zone. Special instructions were given for maintenance of plant population/sq.mt for gaining good yields during rabi season.

B4: Weed management
Awareness among farmers on possible benefits of herbicides and shortage of labour lead to wide scale adoptability of herbicides viz., Londax Power (Bensulfuron methyl 0.8% + pretilachlor 6%) @ 4 kg/acre, Topstar (oxadiargyl), Rifit (pretilachlor), Sofit (pretilachlor with safener), Sathi (pyrazosulfuran ethyl), Nominee gold (bispyribac sodium), Almix (Metsulfuran methyl + Chlorimuran ethyl) commonly used in most of the locations surveyed. Under direct seeding conditions also the weedicides were used timely for good crop growth. Pre emergence and post emergence weedicides were used and mostly in conjunction with fertilizer for saving labour cost. Weedicide spraying using drone was operated at research station premises.

B5: Fertilizer application
The use of chemical fertilizer was reduced for *kharif* paddy. Only 1/3 of farmers surveyed resorted to application of organic manures i.e FYM/Green Manure crops. Farmers commonly applied DAP, 14-35-14, 20-20-0, 10-26-26, 28-28-0 for top dressing in all installments. Recent innovation, nano urea was applied through mixing with other fertilizers. Farmers received nano urea under promotion by local dealers. Potash at the time of P.I stage was applied effectively.

B6: Plant Protection
Farmers in the Godavari zone of Andhra Pradesh resorted to 2-4 foliar sprays for protection against pests and diseases. Pesticides viz., Pexalon, Azoxystrobin Pulsar, copper hydroxide, Plantomycin, Token, Chess, Fipronil, Profenofos, Carbofuran granules, Acephate, Monocrotophos, Hexaconazole, Custodia, Chlorantriniprole etc. were used against biotic constraints. Farmers adopted pesticide sprays immediately after observation of first symptoms. Farmers resorted to mixing of 2-3 chemicals for management of biotic constraints. Farmers took advice of the State Department Officials, Krishi Vigyan Kendra, Undi, local dealers and scientists from DAATTC and RARS, Maruteru were also instrumental in educating farmers regarding decision on pesticide use in agriculture. **Drone spraying**: Two drones were available to farmers. Drone facility was extended to the farmers on hiring basis or demonstrations were conducted to promote drone spraying in farmers' fields.

C. PRODUCTION CONSTRAINTS

C1: Abiotic constraints
Deficiency of Zinc and sulphide injury was reported during *rabi* season. Farmers necessarily resort to 1-3 sprays with zinc sulphate during rabi season. Deficit rainfall during kharif season resulted in good paddy crop. Water stress was observed in some places. After Michoung cyclone the crop was lodged at some places, there germination was observed in lodged crop.

C2: Biotic constraints

Major biotic constraints – among diseases bacterial leaf blight- kresek phase at initial stages on PLA 1100, BPT 5204 and other varieties, sheath blight at low level were the major biotic constraints recorded in most locations. BPH, Stem borer and leaf folder were the pest constraints as opined by the farmers. Kresek phase of bacterial leaf blight was observed on 20-35 DAT crop in West Godavari, Eluru, Kakinada and Konaseema districts. In appropriate application of fungicides was observed for management of BLB. University staff (RARS, Maruteru, DAATTC and KVK) through State Agricultural Department has taken up steps for timely identification and management of the problem with suitable bactericides. At later stages the BLB disease is at low level only. BLB problem was observed at Bhimadole area on PLA 1100 and on MTU 1318 at places of Undi and Penumantra mandals during November month. BPH, stem borer, leaf folder were effectively managed through use of latest available pesticides. Low stem borer infestation was observed in all the districts. Low to Moderate Rodent damage was reported in all the districts.

Incidence of diseases and insect pests in surveyed districts of Andhra Pradesh in 2023

District	Diseases					
	NBl	ShBl	ShR	FS	GD	BLB
Kakinada	L	L	L	L	L	L-M
Konaseema	L	L-M	L	L	L	L-M
Eluru	L	L-M	L	L	L	L-M
West Godavari	L	L-M	L	L	L	M
East Godavari	L	L	L	L	L	L-M

District	Insect Pest					
	SB	LF	BPH	GM	Rats	Mite
Kakinada	L	L	L	L	L-M	L
Konaseema	L	L	L	L	L-M	L
Eluru	L-M	L-M	L	L	L-M	L
West Godavari	L-M	L-M	L	L	L-M	L
East Godavari	L	L	L	L	L-M	L

C3: Other Constraints

1. Increase in cost of hiring combined harvesters, contract labour wages and marketing of produce are the problems.
2. Timely purchase, timely payment of money after sale of paddy produce
3. Bacterial leaf blight resistant varieties are needed
4. MSP for Rice Produce
5. Deficit rainfall during crop growth period
6. High yielding, pest and disease resistant and high price giving variety is needed
7. Godowns problem, drying equipment, timely provision of gunny bags and MSP
8. Submergence tolerant/resistant entries
9. Rodent Problem, Subsidy for TBS or rodent management practices
10. Short duration fine grain varieties for kharif and rabi seasons are needed.

D. MECHANIZATION

Majority of the farmers hired different implements *viz*., power tillers, tractors (mini and big), battery sprayers, combined harvesters in Godavari Zone of Andhra Pradesh.

Drone technology: Farmers are widely using drones for spraying purpose. ANGRAU promoted farmers to go for spraying with drones for pesticide spraying operations. Demonstrations were conducted by RARS, Maruteru and utilized drones for spraying purpose to farmers on custom hiring facility @ 200-300/- per acre.

E. PLANT PROTECTION

Farmers in general, adopted 2-4 sprays during crop season. Community rodent management campaigns were undertaken by Agricultural Department in coordination with ANGRAU. Farmers paid competitive price of Rs. 50 – 100 per catch depending on the need. Progressive farmers adopted drone spraying by hiring from private startups @ Rs.400- 500/- per acre. ANGRAU was very much instrumental in popularization Agricultural Drone technology. Demonstrations and supply of sprayers for spraying purpose was provided. Low level of BLB was observed at initial stages in Eluru, West Godavari, Kakinada and Konaseema districts. Due to deficit rainfall the disease load is less during crop season. Minor diseases sheath rot, false smut are low level only. During November to December months BLB was recorded from Undi, Penumantra mandals on MTU 1318 and on PLA 1100 in Ungutur, Bhimadole locations.

F. MARKETTING

Rice farmers in the Godavari Zone faced problems in marketing of produce during *Kharif*, 2023. Farmers sold the produce to RBK's. They are in need of early payment of money after selling of their produce.

G. YIELDS

The season (*Kharif*, 2023) witnessed deficit rainfall starting from June 2023 to October, 2023. Pest and disease incidence was also low during the season. At initial stages the kresek phase of BLB at low level was observed. The swarna growing farmers reported 30-35 bags due to favourable weather and no rains during crop season. Farmers reported 30-34 bags/ acre due to cultivation of non-lodging variety MTU 1318 compared to swarna. 80-90% of crop was harvested by November ending. The left over crop of MTU 1318 damaged due to Michoung Cyclone (December 5^{th} -6^{th}, 2023). The reduced yields 22-30 bags were recorded from lodged crops.

H. COST OF CULTIVATION

A number of factors viz., hike in fertilizer costs, hike in labour wages, increased machine hiring costs, use of pesticides etc influenced the cost of cultivation. Farmers reported incurring an amount of Rs. 30000-38000 per acre towards cultivation of rice.

I. NEEDS OF THE FARMERS

- Short duration fine grain varieties with pest and disease resistance for both *kharif* and *rabi* seasons

- High yielding and biotic stress resistant varieties suitable to local needs
- Submergence tolerant varieties
- Timely or early payment of money after selling of produce through RBK's
- Minimum support price for the produce
- Supply of seeds, inputs, fertilizers, Gunny bags through RBKs (Rythu Bharosa Kendras) under subsidy basis
- Short duration, fine grain varieties with consumer preferred, miller preferred varieties good for export purpose
- High yielding BPH and BLB resistant varieties
- High yielding, quality seed with 135-140 duration varieties
- Labour problem, so mechanization should be taken under hire basis.
- Drones/ availability for spraying on suitable costs
- Provision for proper drainage facilities, timely cleaning of drainage channels
- Provision of rodent management practices on subsidy basis

J. RESEARCHABLE ISSUES

Districts	**Issues**
West Godavari District	Tolerant varieties to submergence or non-lodging varieties
	Flood tolerant varieties
	Timely cleaning of drainage channels
	Medium grain quality and medium duration (130-145 days) varieties
Eluru	Short duration fine grain varieties suitable to export purpose and consumer preferred varieties
	Varieties with resistance to BLB and BPH
	Non-lodging varieties, fine grain varieties with medium duration varieties
	Drought tolerant varieties
	Constraints:Irrigation water
	High Zinc rich varieties
	Preferred grain quality: HYVs with MS grain quality/aromatic short grain
	Variety alternative to MTU 1001
East Godavari District	Medium to Long Duration HYVs with lodging resistance/ Medium duration HYV fine grain varieties for both seasons
	BLB tolerant/resistant varieties
	Sheath blight, leaf folder problem, high temperatures
	Farm mechanization (Implements availability at low cost), Implements and sprayers individually
	Bailers
	High protein rich varieities
	Alternative to MTU 1121
Kakinada district	Non-lodging varieties
	Alternative to BPT 5204, BLB tolerant varieties
Konaseema district	Non loding varieites (resistant to cyclonic rains)
	Measures for rapid decomposition of stubbles

Bihar-Dhangain (2023-2024)

District surveyed: *Rohtas*

Particulars of survey

District	Block	Villages
Rohtas	Karaghar, Bikramganj, Dawath and Suraypura	Karaghar, Nonhar, Mishrawali, Motha, Rakasiya Barkagaon, Dawath, Sonwarsha and Balihar

Widely predominant rice varieties

District	Varieties
Rohtas	MTU 7029, BPT 5204, Sabour Shree, Swarna Sub -1, Sampurna, Rajendra Mahsuri 1, Rajendra Sweta, Moti, Damini, Sonachur and others

Particulars of rice area in Rohtas

Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Total irrigated area(ha)	Area under rice (ha)
375000	250000	250000	NA	200000

Weather particulars in Rohtas district of Bihar in 2023

Month	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
# of Rainy days	08	19	19	20	08	00	03	02
Total rainfall (mm)	68.44	218.67	125.50	165.85	57.36	00	11.67	23.5
Monthly Mean Temp	44.63	35.19	32.44	30.8	29.3	28.26	22.61	20.48
Tem. Max (^{O}C)	47^{0}C	40^{0}C	35.8^{0}C	34^{0}C	31^{0}C	33^{0}C	28^{0}C	24^{0}C
Tem. Min (^{O}C)	28^{0}C	26^{0}C	26^{0}C	25^{0}C	18^{0}C	15^{0}C	8^{0}C	8^{0}C

Variety wise area coverage in Rohtas district of Bihar in 2023

Variety	Area covered	Variety	Area covered
MTU 7029	48%	Rajendra Mahsuri 1	4%
BPT 5204	14%	Rajendra Sweta	3%
Sabour Shree	12%	Moti	2%
Swarna Sub 1	8%	Damini	1%
Sampurna	5%	Sonachur	1%

Production oriented survey was conducted in 8 villages (in 4 blocks) in Rohtas district when the crops were in booting to milk stage. Ten farmers were contacted during the survey. The fields surveyed were either under irrigated or rainfed lowland ecosystem. In general, the weather conditions for favourable for rice cultivation. The details of the places surveyed, details of rice varieties cultivated and weather conditions are presented in the above tables.

General questions on rice cultivation in district (Tobe filled by the co-operatorin consultation with the Officials from State department of Agriculture)

Parameters	**Rohtas District**
Total area under HYVs in the district	2.00 lakh ha
Most prevalent HYVs in the district	MTU 7029
Total area under rice hybrids in the district	Very few
Most prevalent rice hybrids in the district	Kostal King
Total area under basmati in the district	Less than 1000 ha
Most prevalent basmati varieties in the district	Sonachur
Seed replacement rate	2-4%
Whether farmers are using any heavy equipments like transplanter/combine harvester	Use Combine harvester only
Mention water saving technologies like SRI/laser levelling/DSR being used by the farmers	Yes, very few
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Yes, Use SRI, DSR, Laser lavelling Mechanization
What are the general problems in rice cultivation in the district?	45 days after transplanting, almost all diseases observed, timely availability of fertilizer and pesticides and irrigation
Please provide any farmers association in the district	20 FPOs
Whether availability of agricultural labours is sufficient?	No
Whether there is any marketing problem of the produce?	Yes
Any major irrigation/power generation project in the district	No
Any soil testing program undertaken?	Yes
Any farmers' training program was organized by the state department of Agriculture/University	Yes

District wise details

Rohtas: Production oriented survey was conducted in 8 villages (in 4 blocks) in Rohtas district when the crops were in booting to milk stage. Ten farmers were contacted during the survey. The fields surveyed were either under irrigated or rainfed lowland ecosystem. In general, the weather conditions for favourable for rice cultivation. In addition to rice, some farmers also cultivated crops like maize, black gram and pigeon pea in part of their land. Commonly cultivated rice varieties were MTU 7029, BPT 5204, Sabour Shree, Swarna Sub -1, Sampurna, Rajendra Mahsuri 1, Rajendra Sweta, Moti, Damini, Sonachur and others. Common crop rotation practices followed by the farmers

were rice-wheat-green gram, rice lentil-dhaincha, rice-lentil +chick pea-dhaincha, rice-chick pea-dhaincha, rice-pigeon pea and others. Average rice yield in the district ranged from 5200-7000 kg/ha in different high yielding varieties and about 3000-3200 kg/ha in local varieties. Most of the farmers contacted were from medium income group and the per capita rice consumption was 6-12 kg/month. All of them told that their main meal consisted of both rice and wheat. In general, they preferred polished and fine grain rice varieties. Average seed rate was 25-35 kg/ha. The farmers told that they treated the seeds with carbendazim (2 g/kg). About 30% farmers told that they applied green manure in the nursery. However, all of them applied chemical fertilizers like urea or NPK complex fertilizer in the nursery. In the main fields, fertilizers were applied @ 140-160 kg N/ha, 50-60 kg P_2O_5/ha and 15-25 kg K_2O/ha. About 80% of the farmers contacted told that they applied zinc sulphate (5-6 kg/ha) in the field. Fertilizers like urea, DAP, MOP and complex NPK fertilizers were used by the farmers. Few farmers applied green manure in the fields. Intensity of common weeds like Cyperus rotundus, Cynodon dactylon, Echinochloa spp., and other unidentified weeds was high. Most of the farmers applied pre-emergence herbicide like pretilachlor and also adopted hand weeding. There were incidences of weedy rice in some places surveyed. Some of the common needs of the farmers were improvement in the irrigation facilities, availability of fertilizers in time and availability of good quality seeds of HYVs.

Implements like tractor, pumpset, reaper, thresher and combine harvester were used by the farmers. Seed replacement rate was very low. Canal was the main source of irrigation and most of the farmers expressed that there was deficiency of irrigation water. Farmers in general were not happy with the availability of fertilizers and their quality. Among the diseases, sheath blight, false smut and bacterial blight were recorded in high intensity in some fields. Most of the insect pests were observed in low to moderate intensity. Most of the farmers contacted applied fungicides like propiconazole (0.1%) and carbendazim (0.1%) for different fungal diseases and copper oxychloride + streptocycline (0.3% + 0.01%) for bacterial blight of rice. In general, farmers adopted 2 sprays. In some fields, there were symptoms of zinc deficiency. Major biotic problems in the region were sheath blight, false smut, bacterial blight and stem borer and abiotic problems like flash flood. Farmers expressed lack of irrigation facilities and scarcity of labours. Farmers wanted MS grain bio-fortified varieties with lodging resistance having tolerance/resistance to the above mentioned biotic and abiotic stresses.

Incidence of different diseases and insect pests in Rohtas district of Bihar in 2023

Diseases						
Bl	**NBl**	**ShBl**	**BS**	**ShR**	**FS**	**BLB**
M (20-23%)	L (2-3%)	M-S (25-30%)	M (20-22%)	L (5-6%)	M-S (25-32%)	M-S (20-35%)

Insect pests								
SB	**LF**	**BPH**	**WBPH**	**GM**	**RH**	**WM**	**GLH**	**Rats**
L-M (5-10%)	L-M (5-12%)	M (12-14%)	L (2-3%)	L (5-6%)	M (10-12%)	L (5-6%)	M (12-14%)	L (2-5%)

Chhattishgarh-Raipur (2023-2024)

Districts surveyed: *Jashpur, Kabirdham, Boladobazar* and *Bemetara*

Table 1: Particulars of survey

District	Blocks	Villages (latitude; longitude)
Jashpur	Patthalgaon and Kansabel	Gala, Chidora, Mirjapur, Harrbahar, Gallu, Chidora Kohli, Korwapara, Gharjyabathan and Bhaisa Muda
Kabirdham	Kawardha and Bodla	Joratal (22.02286; 81.24185) and Bendarchi (22.01422; 81.177469)
Boladobazar	Simag	Chaurenga (21.69164; 81.791739);
Bemetara	Bemetara	Piparbhatta (21.701859; 81.593346)

Table 2: Widely prevalent rice varieties

Districts	Varieties
Jashpur	**HYVs/Improved:** Swarna, MTU 1010, Jamuna, Sonam, Sambleshwari, Kalinga, Indira Sona, Danteshwari, Karma Mahsuri, Bamleswari, MTU 1156, Shri Ram, Pratiksha and others; **Hybrids:** Arize 6444 Gold, PAN 2423, Dhananjay Gold, Mahyco hybrid, PHB 71, Advanta hybrid, VNR 2111, KRH-1 and others; **Local**: Sona, Safri, Jawaphool, Kalajeera, Tulsimala and others
Kabirdham	**HYVs/Improved:** HMT, Swarna, Mahamaya, Rajeshwari, Indira Barani 1, Shri Ram and others; **Hybrids:** Kaveri 9090, Mahyco hybrid, Arize AZ 8433 DT, Delta Max, Arize 6444 Gold, Kaveri 468, RH Super 444 and others; **Local:** Vishnubhog and Dubraj
Boladobazar	**HYVs/Improved:** Swarna, HMT, Mahamaya, MTU 1010, Rajeshwari, Sambleswari, Indira Barani 1, Shri Ram and others; **Hybrids:** Arize AZ 8433 DT, Ankur 7576, Ankur 7274, Ankur 13550, Arize 6444, Basant Agro Pratap and others
Bemetara	**HYVs/Improved:** Swarna, HMT, Mahamaya, MTU 1010, Debvhog, Indiara Barani 1, Kalimuchh, Dubraj Mutant, Shri Ram and others; **Hybrids:** Arize AZ 8433 DT, Arize 6444 Gold, Ankur 13550, Ankur 7576 and others

Table 3: Particulars of rice areas in the surveyed districts of Chhattisgarh during 2022

District	Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Total irrigated area (ha)	Area under paddy (ha)	Area under DSR (ha)
Jashpur	645741	325149	284210	63380	172038	63250
Kabirdham	444000	290000	185000	135000	82830	28200
Boladobazar	467000	309000	280000	138000	240000	11000
Bemetara	285481	224750	211820	126872	169831.55	33150

Table 4: Details of weather data in the surveyed districts

Weather parameters	Months						
	Jun	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
Jashpur							
# of rainy days	6	14	12	17	3	0	3
Total rainfall (mm)	149.6	239.5	205.6	376.6	29.5	0	36.0
Maximum temp (^{O}C)	37.4	30.5	29.3	29.6	30.7	29.1	25.1
Mnimum temp (^{O}C)	23.3	23.1	21.1	21.7	16.9	12.3	8.3
Sunshine hours	6.8	3.6	3.0	4.0	7.7	6.2	6.3
Kabirdham							
# of rainy days	6	10	13	12	0	-	-
Total rainfall (mm)	117.3	202.3	296.3	379.0	0	-	-
Maximum temp (^{O}C)	41.7	32.6	32.3	32.2	31.2	-	-
Mnimum temp (^{O}C)	24.5	21.4	20.4	21.2	20.4	-	-
Sunshine hours	4.2	1.2	1.3	2.6	8.4	-	-
Boladobazar							
Total rainfall (mm)	181.9	256.0	285.3	484.5	18.9	-	-
Bemetara							
Total rainfall (mm)	78.9	284.9	187.9	383.7	8.1	-	-

Production oriented survey was conducted in four rice growing districts of Chhattishgarh viz., Jashpur, Kabirdham, Boladobazar and Bemetara when most of the crops were in dough to maturity stage. Thirteen villages in 6 blocks were covered during the survey. A total of 60 farmers were contacted during the survey. The details of the survey are presented in Table 1. Majority of the fields surveyed were under irrigated or rainfed lowland ecosystem. Weather conditions were in general favourable for rice cultivation in the region. Common crop rotation practices followed by the farmers were rice-wheat, rice-rice, rice-mustard, rice-chickpea, rice-vegetables, rice-sugarcane, rice-lathyrus, rice-linseed and others (Table 7). Most predominant rice varieties cultivated by the farmers were HYVs or improved varieties like Swarna, Mahamaya, MTU 1010, Jamuna, Sonam, Sambleshwari, Kalinga, Indira Sona, Indira Barani 1, Danteshwari, HMT, Karma Mahsuri, Bamleswari, Rajeshwari, MTU 1156, Shri Ram, Debvhog, Kalimuchh, Dubraj Mutant (TCDM-1: developed through IGKV and BARC collaboration), Pratiksha and others and hybrids like Arize 6444 Gold, PAN 2423, Dhananjay Gold, Mahyco hybrid, PHB 71, Advanta hybrid, VNR 2111, Kaveri 9090, Mahyco hybrid, Arize AZ 8433 DT, Delta Max, Kaveri 468, RH Super 444, Ankur 7576, Ankur 7274, Ankur 13550, KRH-1 and others. Some farmers cultivated local rice varieties like Sona, Safri, Jawaphool, Kalajeera, Tulsimala, Vishnubhog, Dubraj and others The details of the varieties are presented in Table 2. The particulars of rice area are presented in Table 3. The details of district wise area of predominant rice varieties are presented in Table 6. The details of rice yield of different varieties in different surveyed rice growing districts of Chhattishgarh are presented in Table 8. Average rice in farmers' field ranged from 3500-6600 kg/ha in case of HYVs, 1500-4500 kg/ha in case of local varieties and 5000-6300 kg/ha in case of hybrids. In some of the fields, yield was drastically reduced due to lack of irrigation, erratic rainfall, sub-normal dose of fertilizers and biotic stresses like BPH and some diseases

Table 5: General Question of Rice Cultivation In District (To Be Filled By The Cooperator In With The Officials From State Department of Agriculture

Parameters	Districts			
	Jashpur	**Kabirdham**	**Boladobazar**	**Bemetara**
Total Area under HYVs in the district (ha)	38400 ha	21805 ha	64700 ha	4380 ha
Most prevalent HYVs in the District	Mahamaya	MTU 1010	MTU 1010	MTU 1010
Total area under rice hybrids in the district (ha.	48931 ha	44430 ha	51970 ha	63475 ha
Most prevalent rice hybrids in the district	Arize 6444, PHB 71,KRH-1	Arize 6444	Arize 6444	Arize 6444
Total area under basmati/scented in the district	Nil	-	-	-
Most prevalent basmati varieties in the district	NA	-	-	-
Seed replacement rate	NA	NA	NA	NA
Whether farmers are using any heavy equipments like transplanted/combine harvester	Combine harvester (limited)	Combine harvester	Combine harvester	Combine harvester
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	DSR, (5-10% of total cultivated area)	SRI & DSR	DSR and SRI by some farmers	NA
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Overall crop management	Proper crop management	Timely application of fertilizers	Farm mechanization and proper crop management
What are the general problems in rice cultivation in the district?	Undulating soil topography	Lack of canal irrigation	Stem borer	False smut of rice
Please provide any farmers association in the district	Nil	Yes; FPOs	Yes; FPOs	Yes; FPOs
Whether availability of labors is sufficient?	Yes	Yes	No	No
Whether there is any marketing problem of the produce?	No	No	No	No
Any major irrigation/power generation project in the district	NA	NA	NA	NA
Any soil testing program undertaken?	No (earlier by dept of Ag)	No (earlier by dept of Ag)	Yes; by Dept. of Ag	Yes; by Dept. of Ag
Any farmers' training program was organized by the state department of Agriculture/ University	Yes; training program by Dept of Ag and university	Yes; training program by Dept of Ag and university	Yes; by KVKs, Ag college and Dept. of Ag	Yes

Table 6: Variety wise area coverage (ha) in different districts of Chhattishgarh during *Kharif* 2023

Variety/hybrid	Districts			
	Jashpur	**Kabirdham**	**Boladobazar**	**Bemetara**
HYVs/Improved				
Sambleshwari	15623		750	
Kalinga	4212			
Swarna	43316	17200	80300	28295
MTU 1010	12220	12000	62700	8080
Indira Sona	1305			
Mahamaya	15230	18580	38450	25780
Danteswari	820			
Karma Mahsuri	530			
Bamleshwari	911			
Rajeswari		9805	1250	
Dubraj		205		
Vishnubhog		830		
Indira Barani-1		150	208	3300
Shri Ram			14850	3200
Devbhog				1578
Kalimuchh				1250
Dubraj Mutant				300
HMT				18350
Hybrids				
Arize 6444/6444 Gold	8480	17200	21900	21800
PHB 71	12280			
KRH-1	17800			
RH Super 444		12000		
Arize AZ 8433 DT		9000	10580	18695
Ankur 7576			17000	3200
Ankur 7274			890	
Ankur 13550			1080	19780
Basant Agro Pratap			320	
Other hybrids	10371	6230		
Other local	28940	7830	1050	14673.55

Table 7: General information

Parameters	Districts			
	Jashpur	**Kabirdham**	**Boladobazar**	**Bemetara**
# of talukas/blocks covered	2	2	1	1
# of villages surveyed	9	2	1	1
# of farmers interviewed	17	22	11	10
Field ecosystem	IR (41.2%); RL (64.7%); UP (23.5%)	IR (86.4%); RL (45.5%); UP (4.5%)	IR (100%)	IR (100%)
Weather conditions during cropping season	Weather conditions were in general favourable for rice cultivation in the region.			
Crop stage when survey was made	Dough to Maturity	Dough to maturity	Dough to maturity	Dough to Maturity
Crop rotations	Common crop rotation practices followed by the farmers were rice-wheat, rice-rice, rice-mustard, rice-chickpea, rice-vegetables, rice-sugarcane, rice-lathyrus, rice-linseed and others			

IR: Irrigated; RL: Rainfed lowland; UP: Uplands

Table 8: Average yields of different rice varieties as reported by the cooperators/farmers

Varieties	Yield (kg/ha)				Remarks (*)
	Jashpur	**Kabirdham**	**Boladobazar**	**Bemetara**	
Swarna	5000	4800-5800	4700-6800	4800-5900	In some of the fields, yield was drastically reduced due to lack of irrigation, erratic rainfall, sub-normal dose of fertilizers and biotic stresses like BPH and some diseases
Sonam	3500-5000				
Jamuna	4000-5000				
Pratiksha	1800-2000*				
Mahamaya		5000-5300	5500-6600	5600-5700	
Vikram TCR		4600			
HMT		4700		4500	
Indira Barani		6600			
MTU 1010			6200		
Jawaphool	3000-4500				
Sona	1500-3300				
Arize 6444 Gold	2000-6000*	6000			
PAN 2423	2000*				
Pioneer hybrid	5000				
Arize AZ 8433 DT		5800-6000	5800	6100	
Hybrids (general)		5600-7000	5800-6300	6200	

Table 9: Details of rice consumption pattern

Parameters	Districts			
	Jashpur	**Kabirdham**	**Boladobazar**	**Bemetara**
Status of farmers	Medium income (70.5%); Poor (29.5%)	Medium income (91%); Rich (4.5%); Poor (4.5%)	Medium income (54.5%) Rich (36.4%); Poor (9.1%)	Medium income (80%) Rich (20%)
Per capita monthly rice consumption (kg)	8-12 kg	7.5-14 kg	8-11 kg	8-12 kg
Composition of main meal	Only rice (35.3%); Rice + Wheat (64.7%)	Rice + Wheat (18.2%); only rice (81.8%)	Rice + Wheat (36.4%); only rice (63.6%)	Rice + Wheat (10%); only rice (90%)
Preferred rice types	Polished rice (94.1%); parboiled rice (23.5%)	Parboiled (100%); Polished (9.1%)	Parboiled (100%); Polished (9.1%)	Parboiled (100%)
Rice grain type preference	Fine grain (70.5%); Coarse grain (29.5%)	Coarse grain (72.7%); fine grain (36.3%)	Coarse grain (54.5%); fine grain (45.5%)	Coarse grain (80%); fine grain (20%)
Any changes in food habit in last 10 years	No (88.2%)	No (100%)	No (100%)	No (100%)

A. Rice consumption pattern: Survey was conducted on consumption pattern of rice among the farmers in different districts of Chhattishgarh. Majority (50-90%) of the farmers contacted were in the medium income group (Table 9). Average per capita consumption of rice per month was 7.5-12 kg rice (Table 9). On an average about 67% of the farmers contacted told that they consumed only rice. Rest of the farmers told that their main meal consisted of both rice and wheat. Almost all the farmers from Kabirdham, Boladobazar and Bemetara told that they preferred parboiled rice (Table 9). On an average about 43% farmers told that they preferred fine grain rice and rest used coarse grain rice for consumption. In general, there was no change in the food habit.

B. Nursery and main field Management: In general, planting was done from 3rd week of June to 2nd week of July. Average seed rate for direct seeded rice (broadcasting) was 60-100 kg/ha. For regular transplanting, average seed rate was 30-40 kg/ha for HYVs and about 15 kg/ha for hybrids (Table 10). Practice of seed treatment was not very common among the farmers and about 11-22% of the farmers contacted in Jashpur, Kabirdham and Bemetara treated the seeds with carbendazim (1-2 g/kg), thiram (1-2 gm/kg) and *Trichoderma* formulation (8 g/kg). Some farmers used already fungicide treated rice seeds. On an average about 71% of the farmers contacted from different districts applied organic manure like FYM, vermicompost or poultry manure in the nursery. About 75-100% of the farmers from different districts applied chemical fertilizers like Urea (15-40 kg/acre) and DAP (15-25 kg/acre) or only DAP (8-25 kg/acre) in the nursery. Few applied NPK (25 kg/acre) and MOP (10 kg/acre). Most of the farmers adopted random transplanting method where plant population per unit area was not maintained. Some farmers in Jashpur practiced line planting. Fertilizers were applied @ 50-130 kg N/ha, 10-100 kg P_2O_5/ha and 10-40 kg K_2O/ha. Few farmers from Jashpur applied zinc sulphate in the main field. About 59.1-72.7% of the farmers contacted applied FYM (1-3 trolley/ha) in the main field. Some farmers applied vermicompost.

Table 10: Details of nursery management

Parameters	Districts			
	Jashpur	**Kabirdham**	**Boladobazar**	**Bemetara**
Planting time	3rd week of June to middle of July	2nd week of June to 2nd week of July	2nd week of June to 1st week of July	2nd week of June to 1st week of July
Seed rate	80-100 kg/ha (broadcasting; Direct sowing); 30-35 kg/ha; hy-brids: 15-30 kg/ha	80 kg/ha (broad-casting; Direct sowing); 30-40 kg/ha; hybrids: 15-25 kg/ha	80 kg/ha (broadcasting; Direct sowing); 25-35 kg/ha; hy-brids: 15 kg/ha	60-80 kg/ha (broadcasting; Direct sowing); 25-38 kg/ha; hy-brids: 15 kg/ha
Seed treatment (% farmers adopted)	Yes (~11.8% only)	Yes (~22.7% only)	Nil	Yes (20% only)
Chemicals used for seed treatment	Carbendazim (1-2 g/kg)	Carbendazim (1-2 g/kg), *Tricho-derma* (8 g/kg); some used treated seeds	-	*Trichoderma* (8 g/kg); some used treated seeds
Organic manure in nursery (% farmers adopted)	53.8% (FYM, vermicompost, poultry manure)	72.7% (FYM, vermicompost)	100% (FYM, vermicompost)	60% (FYM)
Inorganic manure in nursery (% farmers adopted)	76.9% adopted; Urea (15-40 kg/acre) and/or DAP (15-25 kg/acre); Few applied NPK (25 kg/acre) and MOP (10 kg/acre)	95.2% adopted; DAP (8-25 kg/acre)	100% adopted; DAP (10-23 kg/acre)	90% adopted; DAP (10-20 kg/acre)

Table 11: Details of main field management

Details	Districts				Remarks
	Jashpur	**Kabirdham**	**Boladobazar**	**Bemetara**	
Planting method	Direct sowing (13.3%); Transplanting (86.7%)	Direct sowing (9.1%); Transplanting (90.9%)	Direct sowing (9.1%); Transplanting (90.9%)	Transplanting (100%)	Very few in Bemetara adopted SRI
Total N applied	50-120 kg/ha (100% applied)	50-120 kg/ha (100% applied)	100-125 kg/ha (100% applied)	100-130 kg/ha (100% applied)	Urea
Total P_2O_5 applied	10-100 kg/ha (100% applied)	30-60 kg/ha (100% applied)	40-60 kg/ha (100% applied)	50-60 kg/ha (100% applied)	DAP
Total K_2O applied	10-30 kg/ha (46.7% applied)	15-40 kg/ha (100% applied)	15-30 kg/ha (100% applied)	12-34 kg/ha (100% applied)	MOP
$ZnSO_4$ applied	10-20 kg/ha (13.3 % applied)	Nil	Nil	Nil	
Organic fertilizers applied	Most of the farmers adopted random transplanting method where plant population per unit area was not maintained. Some farmers in Jashpur practiced line planting. About 59.1-72.7% of the farmers contacted applied FYM (1-3 trolley/ha) in the main field. Some farmers applied vermicompost.				

Table 12: Weeds and weed management

Details	Districts				Remarks
	Jashpur	**Kabirdham**	**Boladobazar**	**Bemetara**	
Weed intensity	Low to medium	Low to medium	Low to medium	Low	
Names of the weeds	*Commelina benghalensis* (Kankawa), *Cyperus rotundus* (Motha), *Echinochloa colona* (Sanwa), *Cynodon dactylon* (Doob grass), *Cyperus iria*, *Paspalum distichum*, *Cyanotis* spp., *Euphorbia hirta* (Badi dudhi), *Ischaemum rugosum* (Badauri), *Convolvulus arvensis* (Hirankhuri), *Eleusine indica* (Bankado) and some unidentified narrow and broad-leaved weeds				Weeds were common in most of the fields surveyed
Weedicides used	Pretilachlor (800 ml/acre), Nominee Gold/Adora (bis-pyribac Sodium), Saathi (pyrazosulfuron ethyl 10% WP), Almix (metsulfuron methyl 10% + chlorimuron ethyl 10% WP) @ 1 kg/acre, bentazone, metsulfuron methyl 10% + chlorimuron Ethyl 10% WP (Pimix), metsulfuron methyl 20% WP and others				Many of these farmers (35.3% - 54.5) also followed hand weeding additionally; About 18.2-50% farmers in different districts followed only hand weeding
Percentage of farmers applied herbicides	76.5%	50%	81.8%	50%	
Wild rice incidence	Few fields in Jashpur were infested with wild rice				

C. Weeds and their Management: Overall, intensity of weeds was low to medium. The details of different weeds recorded in different districts are presented in Table 12. Weeds were common in most of the fields surveyed. The details of different weedicides used by the farmers are presented in Table 12. About 50-81% of the farmers contacted applied different herbicide. Many of these farmers (35.3% -54.5) also followed hand weeding in addition to herbicide application. About 18.2-50% farmers in different districts followed only hand weeding. Few fields in Jashpur were infested with wild rice.

D. Specific needs of farmers: Some of the common needs of the farmers timely availability of fertilizers and pesticides, availability of good quality seeds of HYVs, seed processing plants, guidance for weed, pest and disease management, improvement in the irrigation facilities, availability of biopesticides in large quantity, custom hiring centres, subsidy in pumps and other inputs, availability of broad spectrum herbicides, short duration rice varieties and technical guidance.

F. Input use: Farmers used different equipments like tractor with cultivator, seed drill, thresher, sprayer, reaper, power tiller, rotavator and harvester. Majority of the farmers hired these implements on rent. In majority cases, farmers used their own (previous year's seeds). However, they purchased hybrid rice seeds. Seed replacement rate in general was low. Canal and deep tube wells were the main sources of irrigation (Table 13). Majority of the farmers told inputs like fertilizers and pesticides were available and they were also happy with their quality. In addition to

their own decisions, farmers took advices from private dealers, officials of state department of agriculture and university staffs.

Table 13: Details of inputs used

Details	Districts			
	Jashpur	**Kabirdham**	**Boladobazar**	**Bemetara**
Implements used	Tractor with cultivator (own or hire), seed drill (own or hire), thresher (own or hire), sprayer (own), reaper (own), power tiller (own or hire), rotavator (own or hire) and harvester (hire)			
Source of seeds	Farmers used mostly previous years' seeds except for rice hybrids			
Source of irrigation	Canal (47.1%), shallow tube well & solar lift pump (17.6%); others	Canal (13.6%), Deep tube well (100%)	Canal (63.6%), Deep tube well (90.9%); others	Deep tube well (90%); Shallow tube well (10%)
Scarcity of irrigation water	Yes (23.5%)	Yes (50%)	No (100%)	Yes (20%)
Availability of fertilizers/pesticides	Available (86.7%)	Available (100%)	Available (100%)	Available (100%)
Quality of fertilizers/pesticides	Satisfied (100%)	Satisfied (100%)	Satisfied (100%)	Satisfied (100%)
Advisors to the farmers	Own decisions (17.6%); State dept (11.8%); University (70.6%); Dealers (5.8%)	Own decisions (36.4%); State dept (86.4%); University (45.5%); Dealers (54.5%)	Own decisions (100%); State dept (90.9%); University (9.1%); Dealers (36.4%)	Own decisions (80%); State dept (90%); University (40%); Dealers (60%)

Table 14: Prevalence of diseases and insect pests in Chhattisgarh during *Kharif*' 2023

Districts	Diseases							
	Bl	**NBl**	**BS**	**ShBl**	**ShR**	**FS**	**GD**	**BB**
Jashpur	T (1%)	M (10-15%)	T (1-2%)	L-M (5-10%)		L-M (5-15%)		L-M (4-10%)
Kabirdham			T (2%)	L-M (2-10%)		L-M (2-15%)	L-M (2-10%)	L-M (3-10%)
Boladobazar			T (1%)	L (2-6%)	T (1%)	L (2-5%)		L (2-5%)
Bemetara				L-M (2-10%)	T (1-2%)	L (2-5%)	L (1-3%)	L (2-5%)

Table 14: Contd..

Districts	Insect pests				
	SB	**LF**	**BPH**	**GLH**	**GM**
Jashpur	L-S (3-30%)	L-M (3-10%)	M (8-20%)	L (1-8%)	L (2-5%)
Kabirdham	L-M (2-10%)	L (2-5%)	L (2-5%)	L-M (5-10%)	
Boladobazar	L (2-5%)		L (2-3%)		
Bemetara	L (2-5%)		L (2-5%)		

Table 15: Details of pest Management

Details	Districts				Remarks
	Jashpur	**Kabirdham**	**Boladobazar**	**Bemetara**	
% age farmers adopting plant protection	70.6%	100%	100%	100%	
Names of pesticides	**Insecticides:** Confidor (2 ml/4 l) and pymetrozine (150 g/acre) for BPH; cartap hydrochloride (15 kg/ha), cartap hydrochloride (200 g/acre), lamda cyhalothrin (2 ml/l), Hamla (chlorpyrifos 50% + cypermethrin 5% EC) (2 ml/l), cypermethrin (2 ml/l), Coragen (0.4 ml/l) and acephate (2 g/l) for stem borer and leaf folder and chlorpyriphos (1.5 ml/l) for GLH **Fungicides:** hexaconazole (2 ml/l), azoxystrobin (1.5 ml/l) and validamycin (1.5 ml/l) for sheath blight and sheath rot; propiconazole (1 ml/l) and tebuconazole (1.5 ml/l) for false smut; tricyclazole (0.6 g/l) for blast and neck blast; carbendazim (1 g/l) for brown spot and antibiotic + copper oxychloride mixture, tetracycline (8 g/10 l) and copper oxychloride (200 g/acre) for bacterial blight of rice				Some farmers applied Metarrhizium formulation for BPH, Neem oil (2 ml/l) for leaf folder and Cow urine + neem leaf extract (8-10 ml/l) for bacterial blight of rice
# of pesticide sprays	1-2	1-2	1-2	1-2	
Mixing of pesticides before application	Yes (35.3%); 2 pesticides	Yes (18.2%); 2 pesticides	Yes (9.1%); 2 pesticides	Yes (10%); 2 pesticides	

G. Biotic stress and their management: District wise prevalence of different diseases and insect pests are presented in Table 14. Most of diseases like leaf blast, neck blast, brown spot, sheath blight, sheath rot, false smut, grain discoloration and bacterial blight were recorded in low to moderate intensities. Among the insect pests, stem borer was recorded in higher intensity in some fields of Jashpur. Other insect pests like leaf folder, brown plant hoper, green leaf hopper and gall midge were recorded in low to moderate intensity. Majority (70-100%) of the farmers adopted plant protection measures. The details of different pesticides used are presented in Table 15. The number of pesticide application ranged from 1-2 and on an average about 18% farmers told that they mixed two pesticides before application.

H. Researchable issues: Among the biotic stresses, major problems in the region are sheath blight, bacterial blight and false smut among the diseases and stem borer, leaf folder and BPH among the insect pests (Table 16). Among the abiotic problems, Submergence/ drought (early drought) was reported by some farmers. Lack of irrigation facilities, scarcity of labours, unavailability of quality seeds and lack of mechanization were reported by some farmers. Farmers expressed the need for varieties suitable for DSR, varieties having resistance to sheath blight, false smut, bacterial blight, stem borer and BPH. Farmers also expressed the need for varieties having tolerance to submergence, drought and salinity. Farmers also expressed the need of high yielding varieties with medium slender grain and with high zinc and high protein.

Table 16: Researchable issues

Parameters/Issues	**Districts**			
	Jashpur	**Kabirdham**	**Boladobazar**	**Bemetara**
Rice ecology in your area	IR (17.6%); RL (47.1%); RU (47.1%)	IR	IR	IR
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif (46.7%) Kharif + Rabi (53.3%)	Kharif	Kharif + Rabi	Kharif
Number of years of experience in rice farming	>20 Years	5-20 years	>20 Years	>20 Years
Main biotic constraints (diseases) in your area according to you	Sheath blight, BLB and false smut			
Extent of disease damage	<10%			
Main biotic constraints (Insect pests) in your area according to you	Stem borer, leaf folder and BPH			
Extent of insect pest damage	<10%			
Main abiotic constrains in your area according to you	Drought/ Submergence	NA		
Production constraints in your area according to you	Lack of irrigation facilities, scarcity of labours, unavailability of quality seeds, lack of mechanization			
Irrigation facilities in your area	Yes (58.8%); bore and open well	Yes (100%); Bore well; Canal	Yes (100%); Bore well	Yes (50%); Bore well
Normally how many years it takes to change the rice variety	5-20 years	5-20 years	10-20 years	10-20 years
Any other rice production issues in your area which the rice scientists need to address	Non-availability of quality seeds of HYVs, adoption of new rice varieies			
What is urgently required in your area as far as rice varieties are concerned				
Duration	Rice varieties suitable direct seeded rice and HYVs with lodging resistance			
Biotic stress resistance	HYVs with tolerance to bacterial blight, sheath blight, false smut, stem borer and BPH			
Abiotic stress resistance	HYVs having tolerance to salinity, drought and submergence			
Preferred grain quality	HYVs with MS grain quality			
Nutritional quality	HYVs with high zinc and high protein			

Gujarat-Nawagam (2023-2024)

Districts surveyed: *Ahmedabad, Anand, Dang, Kheda, Mahisagar, Navsari, Panchmahals, Tapi, Vadodara* and *Valsad*

Table 1: Particulars of survey

District	Taluka	Villages
Ahmedabad	Daskroi, Bavla and Dholka	Devdi, Nandej, Naaj, Muktipura, Bavla, Baldana, Metal, Degamda, Ambaliyara and Keliyawasna
Anand	Anand, Umreth, Khambat, Borsad and Petlad	Chikhodra, Pipaliya, Lambvel, Badapura, Kesavnagar, Vansol, Nagra, Malu, Anklav, Borsad, Changa, Petlad, Ras, Navli and Sunav
Dang	Waghai	Ambavadi, Navtad and Nani Waghai
Kheda	Kheda, Matar, Nadiad and Mahmedabad	Lali, Mahij, Nawagam, Dharoda, Heranj, Dabhan, Molaj, Vadhvana, Piplata, Pinj, Mankva and Vanthwadi
Mahisagar	Balasinor, Lunawada, Santrampur and Khanpur	Thakriya, Dev, Napania, Motizanzari, Ram Patelna Muvada, Chunthana Muvada, Dehgamda and Dolriya
Navasari	Navsari, Vansda and Chikhli	Bhattai, Dhantej, Damaliya, Mendawadi, Anklash, Radhwaniya, Kukeri and Mahuwas
Panchmahals	Shahera	Matariya, Undara and Padeli
Tapi	Valod and Vyara	Bajeepura, Borkhadi, Tichakpura, Panihari, Musa, Mangarkui and Jetwadi
Vadodara	Dabhoi and Waghodia	Dabhoi, Molaj, Vadhvana, Bakrol, Navrangpura, Bhalod Khurd and Limda
Valsad	Dharampur and Kaprada	Bilpudi, Dhamani, Makadban, Bhesdara, Fulvadi, Nana Ponda, Gopma and Rolida
Districts: 10	**Talukas: 27**	**Villages: 81**

Production oriented survey was conducted in the 10 major rice growing districts of Gujarat State viz., Ahmedabad, Anand, Dang, Kheda, Mahisagar, Navsari, Panchmahals, Tapi, Vadodara and Valsad when the crops were in heading to milk stage. A total of 27 talukas and 81 villages were covered during this survey. The details of the survey are presented in Table 1. A total of 120 farmers were contacted during the period of survey (Table 7). Weather conditions were favourable for rice cultivation. Rain fall was timely, sufficient and well distributed during the season. Kharif 2023 witnessed on time monsoon (third week of June) with 780.4 mm rainfall in 39 days at Nawagam station. The rain was sufficient and well distributed during the season at Nawagam, where as in some of the areas it was scattered. The particulars of rice area in different rice growing districts of Gujarat are presented in Table 3. The details of different weather parameters in different surveyed districts are presented in Table 4. Varieties like Gurjari, GAR 13, Mahisagar, GAR 14, GR 21, GNR 3, GR 7, GR 11, GR 101, GR 17, GR 18, Masuri, Jaya, IR 28, Narmada, Indrani, Bayer 6444, Moti Gold, Surya moti, Sonam, Sriram 125, Kaveri, Versha, Nath Pauha, Krishna Kamod, Versha, Pioneer 121, US-312, Hyb 27P37, MC-13, 25P25, Laxmi, Gangamani, etc. were mainly cultivated in different districts of Gujarat. The details of different varieties cultivated in different surveyed districts are presented in Table 2. Variety wise are coverage in different surveyed districts are presented in table 6.

Table 2: Widely Prevalent varieties:

District	Varieties
Ahmedabad	**HYVs:** Gurjari, GAR 13, GR 21, GR 22, GAR 14, Mahisagar, Jaya, GR 101, GR 11, GR 17, Masuri, Moti Gold, Sonam, Surya Moti, Laxmi etc.
Anand	**HYVs:** GAR 13, GR 11, Mahisagar, GR 21, GAR 14, GAR 22, Moti, Krishna Kamod, Gurjari, Sriram 125, Jaya, Masuri, Moti Gold and Sonam: **Hybrids:** Arize 6444, Buland (Signet 5050) and others
Dang	**HYVs/Improved:** GR 7, GR 11, GNR 3, GNR 6, Mahisagar, Jaya, Doodhmalai, Desi colum, Ambemore, Masuri, Dhanya Gold, Annapurna, Kaveri, Navtej and others; **Hybrids:** US-312, US-2111, Arize 6129 Gold, Siri 5123, US-807, Syngenta S-9001, Suruchi, Arize 6444, MC-13, UNR 2111, NPR 6532, Hybrid 25p25 and others
Kheda	**HYVs:** Gurjari, GAR 13, GAR 14, Mahisagar, GR 11, Pusa 1638, Masuri, Kiran 3, Punjab S, Surya Moti, Nath Pauha, Moti Gold, Sonam, GR 101, Shri 101, Krishna Kamod, JK Suraksha, Gangamani and others; **Hybrids:** Arize 9444 and others
Mahisagar	**HYVs:** Gurjari, GAR 13, Mahisagar, Nath Pauha, Bayer 6444, Versha, Laxmi, GR 11 and others
Navsari	**HYVs:** Gurjari, GAR 13, GR 11, Jaya, Masuri, GNR-3, Nath Pauha and others: **HYVs:** DRRH-3, Advanta 807, Kaveri 468, Sri 2277, MC-13, GNR-7, US-312, Kaveri 471, Arize 6444, Sweta etc.
Panch-mahals	**HYVs:** Gurjari, GAR 13, GR 11, Jaya, Masuri, Mahisagar, Versha, Sonam, Moti Gold etc.
Tapi	**HYVs:** Gurjari, Masuri, NAUR1, GAR 13, Jaya and others; **HYVs:** Gold 807, MC 13, PAC 807, S 251, Annapurna, 9001, Navtej, 801, Bayer 6444, US 312, US25P25, US 2111 etc.
Vadodara	**HYVs:** GAR 13, GR 11, Mahisagar, Jaya, Gurjari, Nath Pauha, Surya moti, Moti gold and others; **Hybrids:** US 312, US 25 P 25 Kaveri 468 etc.
Valsad	**HYVs:** GNR 3, GNR 4, Mahisagar, GAR 13, GR-11, Gurjari, Masuri, Jaya, IR 28 and others; **Hybrids:** Kaveri 471, Kaveri, 2333, US-316, Arize 6201, Hyb. 5151, US 312, Arize 6444, Ankur, 2666, Hyb 27P37, US 312, Hyb. 716, JK-208, Hyb.745, 786, Reshma, Gorakhnath, Suruchi 5629 etc.

Table 3: Particulars of rice area in different districts of Gujarat in 2023

Name of District	Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Total Irrigated area (ha)	Area under rice (ha)
Ahmedabad	6,79,414	4,00,000	3,22,000	1,10,000	1,44,000
Anand	2,94,760	2,16,870	1,77,835	2,08,320	1,29,909
Dang	1,76,600	61,852	58,208	16,390	30,757
Kheda	3,94,388	2,49,433	2,41,278	1,72,116	1,14,728
Mahisagar	1,98,973	1,50,550	1,15,697	75,742	41,424
Navsari	2,20,458	1,33,763	53,065	89,799	45,337
Panchmahals	3,21,656	1,81,800	1,72,460	83,948	47,488
Tapi	3,43,474	1,60,401	1,13,144	80,596	68,840
Vadodara	4,06,700	2,93,687	2,48,000	2,08,250	33,826
Valsad	2,94,412	1,52,115	1,00,919	61,751	75,510

Table 4: Weather data for different districts of Gujarat during *Kharif*' 2023

District/ Parameters	Months					
	Jun	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**
Ahmedabad						
RD	6	13	1	5	1	1
TR (mm)	198.9	339	5.4	114.5	7	24.8
MMT (^{0}C)						
T. Max (^{0}C)	36.2	33.2	32.8	33.8	35.7	32.3
T. Min (^{0}C)	26.7	26.0	25.7	25.5	22.5	10.6
Ananad						
RD	7	17	2	13	0	1
TR (mm)	194.5	501.7	15.2	216.6	0.0	10.6
MMT (^{0}C)						
T. Max (^{0}C)	36.0	32.6	32.5	32.9	35.2	32.3
T. Min (^{0}C)	27.2	26.5	26.2	25.9	22.3	18.5
SH	7.0	3.2	3.2	5.4	9.6	8.5
Dang						
RD	7	28	18	17	1	2
TR (mm)	282.5	842.5	168.5	486.5	9.50	34.5
MMT (^{0}C)						
T. Max (^{0}C)	35.6	29.3	30	31.2	34.8	33.7
T. Min (^{0}C)	27.1	25.3	24.4	20.9	18.1	17.1
SH						
Kheda						
RD	7	15	3	6	0	1
TR (mm)	214.8	334.4	19.0	126.1	0	29.5
MMT (^{0}C)						
T. Max (^{0}C)	36	32.2	31.4	32.3	34.8	32.4
T. Min (^{0}C)	25.1	24.9	24.3	25.2	21.1	17.2
SH	6.2	3.8	4.6	6	8.9	6.9
Navsari						
RD	9	26	7	12	0	2
TR (mm)	306	1130.7	40	289	0	42
MMT (^{0}C)						
T. Max (^{0}C)	33.8	29.5	30.6	31.8	35.1	33.7
T. Min (^{0}C)	26.9	24.8	25.2	24.3	21.8	19.1
SH	6.2	0.9	3.2	4.5	0.2	7.3
Panchamahal						
RD	9	16	5	9	0	0
TR (mm)	242	525	82	451	0	0
MMT (^{0}C)						
T. Max (^{0}C)	36.05	31.90	38.40	31.70	32.70	33.60
T. Min (^{0}C)	27.41	25.40	24.90	24.20	22.20	17.60
SH	6.4	6.2	6.8	6.4	7.7	7.8
Tapi						
RD	7	22	9	11	1	1
TR (mm)	502.5	797.5	80.0	285.0	8.0	47.0
MMT (^{0}C)						
T. Max (^{0}C)	35.6	30.1	32.1	32.9	35.7	33.8
T. Min (^{0}C)	27.8	25.1	25.9	26.8	25.0	19.8
SH	5.7	0.2	2.5	3.5	7.7	6.9
Vadodara						
RD	5	18	2	11	0	2

District/ Parameters	Months					
	Jun	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**
TR (mm)	117.0	424.6	15.0	219.4	0	49.0
MMT (^{0}C)						
T. Max (^{0}C)	37.21	36.16	32.79	32.46	35.18	32.92
T. Min (^{0}C)	28.37	25.46	25.66	26.71	24.76	17.0
SH	5.76	1.93	2.80	4.46	9.48	6.60
Valsad						
RD	7	29	12	16	0	1
TR (mm)	493.5	1683.9	122.0	289.7	0	25.0
MMT (^{0}C)						
T. Max (^{0}C)	35.25	30.14	30.84	31.70	34.91	34.89
T. Min (^{0}C)	25.99	26.08	26.69	26.09	24.20	19.65
SH						

Table 5: General question on rice cultivation in district (to be filled by the cooperator in consultation with the officials from state department of agriculture)

Parameters	**Ahmedabad**	**Anand**	**Dang**	**Kheda**
Total area under HYVs (ha)	134000	82257	4500	84698
Most prevalent HYVs in the district	Gurjari, GAR-13	GAR-13	Gurjari, GR-7, Jaya, GAR-13 etc.	Gurjari, GAR-13, GAR-14, Mahisagar, etc.
Total area under rice hybrids in the district	10000	47652	23175	30030
Most prevalent rice hybrids in the district	Bayer-6444, Bayer-6129, US-312, 364 etc.	MC-13, proagro-6444, Bayer-6129 etc.	US-312	Proagro-6444
Total area under basmati in the district	-	-	-	-
Most prevalent basmati varieties in the district	-	-	-	-
Seed replacement rate	20-50%	20-50%	75-100%	25-50%
Whether farmers are using any heavy equipments	YES	YES	No	Yes
Mention water saving technologies being used by the farmers	Laser leveler	Laser leveler	Laser leveler(only few farmers)	-
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Yes about IDM, IPM, INM and high yielding varieties.	Yes about IDM, IPM, HYV etc.	SRI Technique, IDM and IPM.	Yes about IDM, IPM, INM and high yielding varieties
General problems in rice cultivation in the district?	Labour problem at the time of transplanting.	-	Disease and insect-pests.	Disease and insect-pests infestation.
Please provide any farmers association in the district	-	Yes	Yes, FPO	Kisan sangh
Whether availability of agricultural labours is sufficient?	Yes, (but at the time of T.P. not sufficient)	Yes	Yes	Yes
Whether there is any marketing problem of the produce?	No	No	No	No
Any major irrigation/ power generation project in the district	Sardar sarovar project	No	No	Yes Wanakbori Thermal Power Station.
Any soil testing program undertaken?	Yes	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Ag/ University	Yes	Yes	Yes	Yes

Table 5 contd..: General question on rice cultivation in district (to be filled by the cooperator in consultation with the officials from state department of agriculture)

Parameters	Mahisagar	Navsari	Panchmahals
Total area under HYVs (ha)	40500	24666	32215
Most prevalent HYVs in the district	Gurjari, GAR-13, Mahisaga etc.	Jaya, Gurjari, Masuri, etc.	Gurjari, GAR-13, Mahisagar, Jaya etc.
Total area under rice hybrids in the district	900	20671	13367
Most prevalent rice hybrids in the district	Proagro 6444, Versha etc.	US-312, Bayer-6444 etc.	Gangamani, 6444 etc
Total area under basmati in the district	-	-	-
Most prevalent basmati varieties in the district	-	-	-
Seed replacement rate	50-100%	30-100%	50-100%
Whether farmers are using any heavy equipments	Yes	Yes	Yes
Mention water saving technologies being used by the farmers	Laser leveler	Yes	Laser leveler
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	About disease management and HYv	About IDM, IPM, HYv	POP of rice
General problems in rice cultivation in the district?	Rice cultivation is now more expensive	Wild animals	Disease and insect pest incidence
Please provide any farmers association in the district	Yes	-	F I G Youth
Whether availability of agricultural labours is sufficient?	Yes	Yes	No
Whether there is any marketing problem of the produce?	No	No	No
Any major irrigation/ power generation project in the district	Yes kadana project, maralnaka project	Yes -1.Jui project, 2.keliya project 3. Ukai daba project.	Yes, Ponam project, kanad project and Haday project.
Any soil testing program undertaken?	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Ag/ University	Yes	Yes	Yes

Table 5 contd..: General question on rice cultivation in district (to be filled by the cooperator in consultation with the officials from state department of agriculture)

Parameters	Tapi	Vadodara	Valsad
Total area under HYVs (ha)	27890	33826	7694
Most prevalent HYVs in the district	Gurjari, Jaya, IR-28, GAR-13	GAR-13, GR-11, Surya moti	GR-11, Gurjari, Jaya, IR-28
Total area under rice hybrids in the district	40950	352	6729
Most prevalent rice hybrids in the district	US-312, Bayer-6444, MC-13, PAC-807 etc.	Bayer-9444, Kaveri, 468 etc	JK 401, US-32, 2233, Goraknath etc.
Total area under basmati in the district	-	-	-
Most prevalent basmati varieties in the district	-	-	-
Seed replacement rate	20-100%	20-100%	30-100%
Whether farmers are using any heavy equipments	No	Yes	No
Mention water saving technologies being used by the farmers	Yes	No	No

Parameters	Tapi	Vadodara	Valsad
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Organic farming, disease & Insect pest management.	About IDM, IPM, INM, HYV etc	About IPM, IDM & HYV
General problems in rice cultivation in the district?	No	Disease and insect pest incidence	No
Please provide any farmers association in the district	Yes	Yes	No
Whether availability of agricultural labours is sufficient?	Yes	Yes	No
Whether there is any marketing problem of the produce?	No	No	No
Any major irrigation/ power generation project in the district	Yes	No	No
Any soil testing program undertaken?	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Ag/ University	Yes	Yes	Yes

Table 6: Variety/hybrid wise area coverage (ha) in different districts of Gujarat during 2023

Variety/hybrids	Districts/area (ha)				
	Ahmedabad	Anand	Dang	Kheda	Mahisagar
GR-11		21438		5700	
GR-14				5000	
GR-17	5000				
Gurjari	90000	7641	4500 (Gurjari + Jaya)	56314	22000
GAR-13	25000	47364		10150	15000
Mahisagar				6015	3500
Krishna Kamod		2391	200		
Indrani			2000		
Doodhmalai			700		
Mahsuri		3423			
US-312			8500		
US 312 Gold			4500		
NRP 5632			550		
Pioneer hybrid				5700	
VNR 2111			5500		
Arize 6444				5000	
Others	24000	47652	4125	20849	

Table 6 contd..: Variety/hybrid wise area coverage (ha) in different districts of Gujarat during 2023

Variety/hybrids	Districts/area (ha)				
	Navsari	Panchmahals	Tapi	Vadodara	Valsad
GR-11			1389	2500	
GR-4		695	2365		
GR-17				1500	
Gurjari	10616	18778	6168		1209

Variety/hybrids	Districts/area (ha)				
	Navsari	**Panchmahals**	**Tapi**	**Vadodara**	**Valsad**
GAR-13		7012	4666	19990	
Mahisagar		4522		2115	
Mahsuri	6074				
Jaya	6357	2610	6022		1243
IR 28			5536		1284
Moti Gold				1751	
Surya Moti				950	
Narmada					2006
Sona					3854
US-312	5918		9066		4285
US 312 Gold	2420				
Indam 022	3066				
VNR 2111			2387		
Arize 6444	1099		2766		3102
Arize 6201			1269		
MC-13	1351		9856		
PAC 807			8699		
VNR 2233					6989
Goraknath					5804
JIC 401					5372
Suruchi 5629					4490
Others	8436	13871	8651	5020	4581

Table 7: General information

Parameters	**Ahmedabad**	**Anand**	**Dang**	**Kheda**	**Mahisagar**
# of talukas/blocks covered	3	5	1	4	4
# of villages surveyed	10	15	4	12	8
# of farmers interviewed	17	31	6	19	23
Field ecosystem	Irrigated (100%)	Irrigated (100%)	Irrigated (100%)	Irrigated (100%)	Irrigated (100%)
Weather conditions during cropping season	Weather conditions were favourable for rice cultivation. Rain fall was timely, sufficient and well distributed during the season. Kharif 2023 witnessed on time monsoon (third week of June) with 780.4 mm rainfall in 39 days at Nawagam station. The rain was sufficient and well distributed during the season at Nawagam, where as in some of the areas it was scattered.				
Crop stage when survey was made	Heading to milk	Heading to milk	Heading to milk	Heading to milk	Heading to milk
Crop rotations	Common crop rotation practices followed by the farmers were rice-wheat, rice-rice, rice-mustard, rice-vegetables, rice-tobacco, rice-pulses, rice-sugarcane, rice-wheat-rice, rice-wheat-maize, rice-castor, rice-bean-summer green gram and rice-chick pea				

Table 7 contd..: General information

Parameters	Navsari	Panchmahals	Tapi	Vadodara	Valsad
# of talukas/blocks covered	3	1	2	2	2
# of villages surveyed	8	3	7	7	8
# of farmers interviewed	18	9	14	13	17
Field ecosystem	Irrigated (100%)	Irrigated (100%)	Irrigated (100%)	Irrigated (100%)	Irrigated (100%)
Weather conditions during cropping season	In general, weather conditions were normal and favourable for rice cultivation. Rain fall was timely, sufficient and well distributed during the season. Kharif 2023 witnessed on time monsoon (third week of June).				
Crop stage when survey was made	Heading to milk	Heading to milk	Heading to milk	Heading to milk	Heading to milk
Crop rotations	Common crop rotation practices followed by the farmers were rice-rice, rice-sugarcane, rice-pulses, rice-vegetables, rice-wheat, rice-tobacco, rice-wheat-rice, rice-wheat-maize, rice-bean-summer green gram and rice-chick pea				

Table 8: Average yields of different rice varieties as reported by the cooperators/farmers

Variety/hybrids	Yield (kg/ha)				
	Ahmedabad	Anand	Dang	Kheda	Mahisagar
HYVs					
GR-11	3500-4100	4100-4150			3500-3980
GR-21	4350	4550		4500	
Gurjari	3900-4750	3980-4600		4150-4600	3950-4150
Surya Moti	3750			4600	
GAR-13	4000-4800	3950-4600		4150-4900	4150-4600
GR-101	4150-4700			4100-4600	
GAR-14	4100			3900-4350	
Moti Gold	4100	4150-4600			
Laxmi	4350				4100-4200
Jaya		3950-4150			
Mahsuri		3850-4150			
Annapurna			3400		
Nath Poha					3800-4550
Varsha					4100
Hybrids					
US-312		3880	4200-4400		
Kaveri hybrid			3800		
Mahyco Navtej			4100		
VNR 2111			3500		
Arize 6444					4250-5050

A. Cropping system and rice yield: The fields surveyed were mostly under irrigated ecosystem. Common crop rotation practices followed by the farmers were rice-wheat, rice-rice, rice-mustard, rice-vegetables, rice-tobacco, rice-pulses, rice-sugarcane, rice-wheat-rice, rice-wheat-maize, rice-castor, rice-bean-summer green gram and rice-chick pea (Table 7). Among the varieties, Gurjari and GAR 13 were widely cultivated. The average yield among different HYVs and hybrids in different surveyed districts ranged from 3400-5050 kg/ha (Table 8).

Table 8 contd..: Average yields of different rice varieties as reported by the cooperators/farmers

Variety/hybrids	Yield (kg/ha)				
	Navsari	**Panchmahals**	**Tapi**	**Vadodara**	**Valsad**
HYVs					
GNR	4100				
GR-11					4150-4250
GR-17				4800	
Gurjari	4100	4050-4200	4150	4200	
Surya Moti				4600	
GAR-13	4200	4100-4250	3950-4300	3790-4750	4250-4600
GAR-4				4150	
Moti Gold				4150	
Jaya	4100	3850	4100-4300	4250	3900-4100
Mahsuri	4400		4100-4200		4300
Nath Poha	3800	3880		4250	
GNR-3	4200				
Sonam		4100			
MC-13					4200
Hybrids					
US-312	3900-4100		4300-4500		4500
Mahyco Navtej			3800-4500		
Arize 6444	3800				4250
Kaveri 471	4100				
Gold 807			3900		
US 25p25			4300		
Ankur hybrid					4150
Reshma					4380

B. Rice consumption pattern: Survey was conducted on consumption pattern of rice among the farmers in different districts of Gujarat. On an average about 69% of the farmers contacted belonged to medium income group and rest were from low-income group. Average per capita consumption of rice per month ranged from 3-10 kg rice in different districts. Most of the farmers from Mahisagar, Navsari, Tapi and Valsad told that they mainly consumed rice (Table 9). Almost all the farmers contacted in different districts told that they used polished rice. Regarding grain quality, most of the farmers expressed that though they preferred fine grain. However, many

farmers used both fine grain rice varieties for consumption. In general, there was no change in the food habit.

Table 9: Details of rice consumption pattern in different districts of Gujarat

Parameters	Districts				
	Ahmedabad	**Anand**	**Dang**	**Kheda**	**Mahisagar**
Status of farmers	Medium Income (100%)	Medium Income (83.9%); rich (9.7%); poor (6.5%)	Medium Income (50%); poor (50%)	Medium Income (89.5%); rich (10.5%)	Medium Income (86.9%); poor (13.1%)
Per capita monthly rice consumption (kg)	3-5 kg	3-5 kg	4-8 kg	3-5 kg	3-10 kg
Composition of main meal	Rice + Wheat (88.2%); only rice (11.8%)	Rice + Wheat (74.2%) ; only rice (25.8%)	Rice + Wheat (33.3%) ; only rice (66.7%)	Rice + Wheat (94.7%) ; only rice (5.3%)	only rice (100%)
Preferred rice types	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)
Rice grain type preference	Fine grain (100%), Coarse grain (11.8%)	Fine grain (100%), Coarse grain (66.7%)	Fine grain (100%), Coarse grain (100%)	Fine grain (100%), Coarse grain (26.3%)	Fine grain (95.6%), Coarse grain (43.5%)
Any changes in food habit in last 10 years	No (100%)	No (100%)	No (100%)	No (100%)	No (100%)

Table 9 contd..: Details of rice consumption pattern in different districts of Gujarat

Parameters	Districts				
	Navsari	**Panchmahals**	**Tapi**	**Vadodara**	**Valsad**
Status of farmers	Medium Income (22.2%); Poor (77.8%)	Medium Income (100%)	Medium Income (57.1%); poor (42.9%)	Medium Income (61.5%); Poor (30.8%); rich (7.7%)	Medium Income (52.9%); poor (47.1%)
Per capita monthly rice consumption (kg)	3-7 kg	3-6 kg	3-8 kg	3-6 kg	3-10 kg
Composition of main meal	Only rice (100%)	Rice + Wheat (33.3%) ; only rice (66.7%)	Only rice (100%)	Rice + Wheat (23.1%) ; only rice (76.9%)	Only rice (100%)
Preferred rice types	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)
Rice grain type preference	Fine grain (94.4%), Coarse grain (33.3%)	Fine grain (100%), Coarse grain (33.3%)	Fine grain (100%), Coarse grain (50%)	Fine grain (100%), Coarse grain (23.1%)	Fine grain (100%), Coarse grain (23.5%)
Any changes in food habit in last 10 years	No (100%)	No (100%)	No (100%)	No (100%)	No (100%)

Table 10: Details of nursery management

Parameters	Ahmedabad	Anand	Dang*	Kheda	Mahisagar
Planting time	1st week to 3rd week of July	1st week to 3rd week of July	1st week to 2nd week of July	1st week to 3rd week of July	1st week to 2nd week of July
Seed rate	20-30 kg/ha (HYVs)	20-30 kg/ha (HYVs)	20-30 kg/ha (HYVs)	20-30 kg/ha (HYVs)	20-30 kg/ha (HYVs)
Seed treatment (% farmers adopted)	Yes (100%)	Yes (100%)	Nil (100%)	Yes (100%)	Yes (86.9%)
Chemicals used for seed treatment	NA; However, many farmers used certified seeds which were already treated				
Organic manure in nursery (% farmers adopted)	Yes (100%) FYM	Yes (100%) FYM	Yes (100%) FYM	Yes (100%) FYM	Yes (17.4%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (100%); Urea (100-150 kg/ha) or DAP (40-70 kg/ha)	Yes (96.8%); Urea (60-150 kg/ha) or DAP (20-65 kg/ha)	Nil; Dang is a organic district for crop cultivation. Only FYM was applied	Yes (100%); Urea (80-140 kg/ha) or DAP (30-80 kg/ha)	Yes (91.3%); Urea (62-140 kg/ha) or DAP (25-100 kg/ha); Some applied ammonium sulphate (200 kg/ha)

Table 10 contd..: Details of nursery management

Parameters	Navsari	Panchmahals	Tapi	Vadodara	Valsad
Planting time	1st week to 3rd week of July	1st week to 3rd week of July	2nd week to 4th week of July	1st week to 3rd week of July	1st week to 3rd week of July
Seed rate	20-30 kg/ha (HYVs)	25-30 kg/ha (HYVs)	20-30 kg/ha (HYVs)	20-30 kg/ha (HYVs)	20-30 kg/ha (HYVs)
Seed treatment (% farmers adopted)	Yes (44.4%)	Yes (77.8%)	Yes (85.7%)	Yes (100%)	Yes (47.1%)
Chemicals used for seed treatment	NA; However, many farmers used certified seeds which were already treated				
Organic manure in nursery (% farmers adopted)	Yes (22.2%) FYM	Yes (77.8%) FYM	Yes (64.3%) FYM	Yes (61.5%) FYM	Yes (82.4%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (83.3%); Urea (80-140 kg/ha) or DAP (30-70 kg/ha)	Yes (100%); Urea (100-120 kg/ha) or DAP (40-60 kg/ha)	Yes (85.7%); Urea (100-130 kg/ha) or DAP (40-60 kg/ha)	Yes (100%); Urea (100-140 kg/ha) or DAP (40-65 kg/ha)	Yes (88.2%); Urea (90-150 kg/ha) or DAP (30-70 kg/ha)

C. Nursery and main field Management: Average seed rate used by the farmers in different districts ranged from 20-30 kg/ha. On an average about 74% of the farmers contacted told that they adopted seed treatment or used treated seeds for sowing. Most of the farmers used certified seeds. Farmers from Dang did not adopt any chemical seed treatment as this is a organic district (Table 10). On an average about 72% of the farmers contacted applied organic manure like FYM in the nursery. More than 80% of the farmers from different districts except Dang applied chemical fertilziers like urea and DAP in the nursery. Few also applied ammonium sulphate. Farmers from

Dang did not apply any chemical fertilizers either in the nursery or in the main fields as it is a organic district. Planting was mainly done during 1st week of July to 4th week of July. Majority of the farmers adopted random planting where plant population per unit area was not maintained. Some farmers in Ahmedabad tried DSR. Few farmers from Anand, Kheda and Mahisagar adopted line planting. In the main fields, fertilzers were applied @ 32-109 kg N/ha, 12-80 kg P_2O_5/ha and 20 kg $ZnSO_4$/ha (Table 11). Application of potassic fertilizers was not common among the farmers. All the farmers contacted applied organic manure like FYM in the main field. Fertilizers like urea, DAP, SSP and ammonium sulphate were used by the farmers.

Table 11: Details of main field management

Details	Districts				
	Ahmedabad	**Anand**	**Dang**	**Kheda**	**Mahisagar**
Planting method	Majority of the farmers adopted random planting where plant population per unit area was not maintained. Some farmers in Ahmedabad tried DSR. Few farmers from Anand, Kheda and Mahisagar adopted line planting				
Total N applied	53-80 kg/ha	33-89 kg/ha	Nil; Dang is a organic district for crop cultivation. Only FYM was applied	48-109 kg/ha	32-73 kg/ha
Total P_2O_5 applied	Yes (100%) @ 18-32 kg/ha	Yes (100%) @ 14-40 kg/ha		Yes (100%) @ 14-37 kg/ha	Yes (100%) @ 12-46 kg/ha
Total K_2O applied	Nil	Nil		Nil	Nil
$ZnSO_4$ applied (21% or 33%)	Yes (100%) @ 20 kg/ha	Yes (100%) @ 20 kg/ha		Yes (100%) @ 20 kg/ha	Yes (100%) @ 20 kg/ha
Organic fertilizers applied	Yes (100%); FYM (8-11 t/ha)	Yes (100%); FYM (9-15 t/ha)	Yes (100%); FYM (15-20 t/ha)	Yes (100%); FYM (9-13 t/ha)	Yes (100%); FYM (6-16 t/ha)
Remarks	Nutrients were applied in the form of urea, DAP, SSP, Ammonium sulphate and zinc sulphate				

Table 11 contd..: Details of main field management

Details	Districts				
	Navsari	**Panchmahals**	**Tapi**	**Vadodara**	**Valsad**
Planting method	Majority of the farmers adopted random planting where plant population per unit area was not maintained				
Total N applied	42-80 kg/ha	53-66 kg/ha	54-88 kg/ha	55-89 kg/ha	48-82 kg/ha
Total P_2O_5 applied	Yes (100%) @ 18-32 kg/ha	Yes (100%) @ 18-28 kg/ha	Yes (100%) @ 18-80 kg/ha	Yes (100%) @ 18-30 kg/ha	Yes (100%) @ 14-32 kg/ha
Total K_2O applied	Nil	Nil	Nil	Nil	Nil
$ZnSO_4$ applied (21% or 33%)	Yes (100%) @ 20 kg/ha	Yes (100%) @ 20 kg/ha	Yes (100%) @ 20 kg/ha	Yes (100%) @ 20 kg/ha	Yes (100%) @ 20 kg/ha
Organic fertilizers applied	Yes (100%); FYM (8-18 t/ha)	Yes (100%); FYM (8-13 t/ha)	Yes (100%); FYM (10-19 t/ha)	Yes (100%); FYM (8-16 t/ha)	Yes (100%); FYM (6-16 t/ha)
Remarks	Nutrients were applied in the form of urea, DAP, SSP, Ammonium sulphate, NPK mixture and zinc sulphate				

D. Weeds and their Management: In general, the intensity of common weeds like *Echinochloa colona, E. crusgalli, Cynodon dactylon, Cyperus rotundus, Eclipta alba* and others was low to

medium. Hand weeding (1-2) was the most common practice for weed management. On an average about 18% farmers applied weedicides like pendimethalin (2 l/ha), bispyribac Sodium 10 SC (200 ml/ha) and pyrazosulfuron Ethyl 70% WDG (30 gm/ha) in addition to hand weeding. Remaining farmers followed only hand weeding (Table 12).

Table 12: Weeds and weed management

Details	**Districts**				
	Ahmedabad	**Anand**	**Dang**	**Kheda**	**Mahisagar**
Weed intensity	Low to medium	Low to medium	Low to medium	Low to medium	Low to medium
Names of the weeds	Commonly recorded weeds were *Echinochloa colona, E. crusgalli, Cynodon dactylon, Cyperus rotundus, Eclipta alba* and others				
Weedicides used	pendimethalin (2 l/ha), bispyribac Sodium 10 SC (200 ml/ha), pyrazosulfuron Ethyl 70% WDG (30 gm/ha)				
%age of farmers applied herbicides	Only hand weeding (64.7%); Hand weeding + herbicide (35.3%)	Only hand weeding (58.1%); Hand weeding + herbicide (41.9%)	Only hand weeding (100%)	Only hand weeding (73.7%); Hand weeding + herbicide (26.3%)	Only hand weeding (78.3%); Hand weeding + herbicide (21.7%)
Wild/weedy rice incidence	Nil	Nil	Nil	Nil	Nil
Remarks	One to two hand weeding was a general practice in the management of weeds				

Table 12 contd..: Weeds and weed management

Details	**Districts**				
	Navsari	**Panchmahals**	**Tapi**	**Vadodara**	**Valsad**
Weed intensity	Low to medium	Low to medium	Low to medium	Low to medium	Low to medium
Names of the weeds	Commonly recorded weeds were *Echinochloa colona, E. crusgalli, Cynodon dactylon, Cyperus rotundus, Eclipta alba* and others				
Weedicides used	pendimethalin (2 l/ha), bispyribac Sodium 10 SC (200 ml/ha)				
%age of farmers applied herbicides	Only hand weeding (100%)	Only hand weeding (66.7%); Hand weeding + herbicide (33.3%)	Only hand weeding (100%)	Only hand weeding (84.6%); Hand weeding + herbicide (15.4%)	Only hand weeding (94.1%); Hand weeding + herbicide (5.9%)
Wild/weedy rice incidence	Nil	Nil	Nil	Nil	Nil
Remarks	One to two hand weeding was a general practice in the management of weeds				

E. Needs of the farmers: Some of the common needs of the farmers were short duration rice varieties, fine grain and early maturing high yielding varieties, varieties with resistance to different diseases and insect pests, bold rice varieties suitable for rice poha making, aromatic rice varieties, salt tolerant rice varieties, special policy and higher price for organic rice, bio-fortified varieties, increase in minimum support price, improvement in irrigation facilities, varieties suitable for organic rice cultivation and technical support to farmers.

Table 13: Details of inputs used

Details	Districts				
	Ahmedabad	**Anand**	**Dang**	**Kheda**	**Mahisagar**
Implements used	Implements like sprayer (knapsack and power), tractor, cultivator, rotavator, puddler, thresher, combine harvester were used by the farmers. Progressive farmers had some of their own equipment and other farmers hired the implements. Most of the farmers used combine harvester on hire basis				
Seed replacement (as reported by Cooperator)	20-50%	20-50%	75-100%	20-50%	50-100%
Source of seeds	About 70-100% of the farmers contacted in different districts told that they purchased 40-100% of their seed requirement.				
Source of irrigation	Canal (23.5%); shallow tube well (76.5%)	Canal (~4%); shallow tube well (100%)	Shallow tube well (100%)	Canal (5.2%); shallow tube well (94.8%)	Shallow tube well (100%)
Scarcity of irrigation water	Yes (~6%)	Yes (~4%)	No (100%)	No (100%)	No (100%)
Availability of fertilizers/pesticides	Yes (94.1%)	Yes (96.8%)	NA	Yes (100%)	Yes (95.6%)
Quality of fertilizers/pesticides	Satisfied (76.5%)	Satisfied (93.5%)	NA	Satisfied (94.7%)	Satisfied (73.9%)
Advisors to the farmers	Own decisions (47.1%); Dealers (29.4%); Univ (82.3%)	Own decisions (45.2%); Dealers (~4%); Univ (100%); State dept (~4%)	Own decisions (100%); Univ. (83.3%)	Own decisions (36.8%); Univ (94.7%)	Own decisions (8.7%); Univ (95.6%); Dealers (4.3%)

Table 13 contd..: Details of inputs used

Details	Districts				
	Navsari	**Panchmahals**	**Tapi**	**Vadodara**	**Valsad**
Implements used	Implements like sprayer (knapsack and power), tractor, cultivator, rotavator, puddler, thresher, combine harvester were used by the farmers. Progressive farmers had some of their own equipment and other farmers hired the implements. Most of the farmers used combine harvester on hire basis				
Seed replacement (as reported by Cooperator)	30-100%	50-100%	20-100%	20-100%	30-100%
Source of seeds	About 58-100% of the farmers contacted in different districts told that they purchased 25-100% of their seed requirement.				
Source of irrigation	Canal (5.6%); shallow tube well (94.4%)	Shallow tube well (100%)	Shallow tube well (100%)	Canal (61.5%); shallow tube well (61.5%)	Shallow tube well (100%)
Scarcity of irrigation water	Yes (~5.6%)	No (100%)	No (100%)	Yes (23.1%)	No (100%)
Availability of fertilizers/pesticides	No (83.3%)	Yes (88.9%)	No (92.8%)	Yes (92.3%)	Yes (88.2%)
Quality of fertilizers/pesticides	Satisfied (100%)	Satisfied (88.9%)	Satisfied (78.5%)	Satisfied (100%)	Satisfied (82.3%)
Advisors to the farmers	Own decisions (94.4%); Dealers (27.8%); Univ (77.8%)	Own decisions (33.3%); Dealers (22.2%); Univ (100%)	Own decisions (92.8%); Dealers (21.4%); Univ. (85.7%)	Own decisions (53.8%); Dealers (15.4%); Univ (92.3%)	Own decisions (29.4%); Univ (82.3%); Dealers (23.5%)

F. Input Use: Implements like sprayer (knapsack and power), tractor, cultivator, rotavator, puddler, thresher, combine harvester were used by the farmers. Progressive farmers had some of their own equipment and other farmers hired the implements. Most of the farmers used combine harvester on hire basis (Table 13). About 58-100% of the farmers contacted in different districts told that they purchased 25-100% of their seed requirement. Average seed replacement rate was 25-40%. Major sources of irrigation were shallow tube wells and canal. Very few farmers contacted expressed that there was scarcity of irrigation water. Majority of the farmers told that inputs like fertilizers and pesticides were available in time and they were happy with their quality. In addition to their own decisions, farmers took advices from private dealers and officials from university.

Table 14: Prevalence of diseases and Insects in Gujarat during *Kharif2022*

Districts	Diseases						
	Bl	NBl	ShBl	ShR	FS	GD	BLB
Ahmedabad	L-M (5-8%)		-	L-M (6-10%)	L-M (5-10%)	L-M (5-16%)	L-M (6-14%)
Anand	L-M (6-9%)		L-M (5-11%)	M (9-12%)	L-M (6-12%)	M (9-15%)	L-M (6-15%)
Dang	L		-	L-M (5-11%)	L (5-6%)	L	L (5-10%)
Kheda	L-M (6-9%)	L (2-3%)	L-M (5-13%)	L-M (6-12%)	L-M (6-10%)	L-M (5-13%)	L-M (6-10%)
Mahisagar	M (8-12%)		M (9-13%)	L-M (3-13%)	L-M (5-12%)	M (8-13%)	L-M (6-9%)
Navsari	L-M (5-9%)	L (3-5%)	T	L-M (6-13%)	L-M (6-9%)	L-M (5-11%)	L-M (2-12%)
Panchmahals	T		L-M (6-10%)	M (9-12%)	L-M (6-13%)	L-M (6-13%)	L-M (5-9%)
Tapi	L-M (5-11%)	L (3-6%)	-	L-M (6-16%)	L-M (4-13%)	M (9-15%)	L-M (6-11%)
Vadodara	L-M (6-11%)		-	L-M (4-13%)	L-M (5-12%)	L-M (6-13%)	L-M (6-12%)
Valsad	L-M (4-9%)	L (4-5%)	-	L-M (6-13%)	L-M (4-11%)	L-M (5-12%)	M (8-13%)

There was low to moderate (5-11%) incidence of brown spot in some fields in Navsari

Districts	Insect pests					
	SB	LF	BPH	WBPH	GB	Leaf/ Sheath Mite
Ahmedabad	L-M (3-11%)	L-M (3-12%)	L (<6%)		-	-
Anand	L-M (3-9%)	L-M (2-8%)	L (3-4%)		-	T
Dang	L (2-6%)	N (2-5%)	T		L	-
Kheda	L-M (4-9%)	L (3-4%)	L-M		T	T
Mahisagar	L-M (3-10%)	L-M (3-9%)	T		-	-
Navsari	L-M (3-9%)	L (3-6%)	T-L		L	T
Panchmahals	L-M (3-9%)	L (3-6%)	T		-	-
Tapi	L-M (5-16%)	L-M (3-9%)	T	L-M (3-8%)	T-L	T
Vadodara	L-M (4-12%)	L (2-5%)	T		-	T
Valsad	L-M (2-13%)	L-M (2-8%)	L (3-5%)		L	T

There was low incidence (2-3%) of green leaf hopper incidence in Ahmedabad

G. Biotic stresses and their management: In general, the intensity of different diseases and insect pests was low to moderate (Table 14). Stem borer and leaf folder were wide spread in low to moderate intensities. Low incidence of mite was observed in low intensity in some of the surveyed districts. Farmers used different pesticides for managing different pests and diseases (Table 15). More than 80% of the farmers contacted in different districts except Dang adopted chemical plant protection measures. Zinc deficiency symptoms were commonly observed in surveyed field. Some of the common problems faced by the farmers were low market price for paddy, scarcity of labours, high cost of inputs resulting higher cost of cultivation and less profitability, uncertain rainfall, high price of diesel engine fuel and micro-nutrient deficiency. A general view shared by most of rice growing farmers during our survey that day by day the profitability of rice cultivation is decreasing because of increase in input cost.

Table 15: Details of pest management

Details	**Districts**				
	Ahmedabad	**Anand**	**Dang**	**Kheda**	**Mahisagar**
% age farmers adopting plant protection	100%	90.3%	Nil	100%	95.6%
Names of pesticides	**Insecticides**: chlorantraniliprole (0.4%) @ 10 kg/ha, cartap hydrochloride 4G (20 kg/ha), carbofuran 3G (20 kg/ha) for stem borer and leaf folder and leaf folder **Fungicides**: tricyclazole 75 WP (300 g/ha) for blast and neck blast; propiconazole (500 ml/ha), carbendazim (12%) + mancozeb (63%) @ 1.25 kg/ha and mancozeb 75 WP @ 1.25 kg/ha, for false smut, grain discoloration and sheath rot and hexaconazole (500 ml/ha) for sheath blight				
# of pesticide sprays	1	1	Nil	1	1
Mixing of pesticides before application	No (100%)	No (100%)	No (100%)	No (100%)	No (100%)

Table 15: Details of pest management

Details	**Districts**				
	Navsari	**Panchmahals**	**Tapi**	**Vadodara**	**Valsad**
% age farmers adopting plant protection	83.3%	88.9%	78.6%	100%	82.3%
Names of pesticides	**Insecticides**: chlorantraniliprole (0.4%) @ 10 kg/ha, cartap hydrochloride 4G (20 kg/ha), carbofuran 3G (20 kg/ha) for stem borer and leaf folder and leaf folder **Fungicides**: tricyclazole 75 WP (300 g/ha) for blast and neck blast; propiconazole (500 ml/ha), carbendazim (12%) + mancozeb (63%) @ 1.25 kg/ha and mancozeb 75 WP @ 1.25 kg/ha, for false smut, grain discoloration and sheath rot and hexaconazole (500 ml/ha) for sheath blight				
# of pesticide sprays	1	1	Nil	1	1
Mixing of pesticides before application	No (100%)	No (100%)	No (100%)	No (100%)	No (100%)

Table 16: Researchable issues

Parameters/Issues	Districts				
	Ahmedabad	**Anand**	**Dang**	**Kheda**	**Mahisagar**
Rice ecology in your area	Irrigated	Irrigated	Irrigated	Irrigated	Irrigated
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif	Kharif	Kharif	Kharif	Kharif
Number of years of experience in rice farming	5-10/10-20 years	5-10/10-20 years	5-10 years	5-10/10-20 years	5-10/10-20 years
Main biotic constraints (diseases) in your area according to you	False smut, grain discolor-ration and BLB	False smut, grain discolor-ration and BLB	False smut, sheath rot and BLB	Blast, False smut, GD and BLB	Blast, sheath blight, False smut, GD and BLB
Extent of disease damage	10-25%	10-25%	<10%	10-25%	10-25%
Main biotic constraints (Insect pests) in your area according to you	Stem borer and leaf folder	Stem borer and leaf folder	Stem borer and leaf folder	Stem borer and leaf folder	Stem borer and leaf folder
Extent of insect pest damage	<10%	<10%	<10%	<10%	<10%
Main abiotic constrains in your area according to you	Salinity	Drought/ submergence	-	-	-
Production constraints in your area according to you	Scarcity of agricultural labours, lack of irrigation facilities, unavailability of quality seeds and other inputs, micronutrient deficiency and lack of mechanization				
Irrigation facilities in your area	Available; Bore well, canal	Available; Bore well	Available; Bore well	Available; Bore well	Available; Bore well
Normally how many years it takes to change the rice variety	10-20 years	10-20 years	5-10 years	10-20 years	10-20 years
Any other rice production issues in your area which the rice scientists need to address					
What is urgently required in your area as far as rice varieties are concerned					
Duration	Varieties suitable for DSR and varieties resistant to lodging				
Biotic stress resistance	Varieties tolerant to blast, BLB, false smut, sheath blight, leaf folder and stem borer				
Abiotic stress resistance	Varieties with resistance to submergence, drought and salinity				
Preferred grain quality	MS grain rice varieties and aromatic short grain/scented varieties				
Nutritional quality	Varieties with high zinc and low GI				

H. Researchable issues: Among the biotic stresses, major problems in the region are leaf blast, grain discoloration, false smut and bacterial blight among the diseases and stem borer and leaf folder among the insect pests. Among the abiotic problems, drought/submergence and salinity were the main problem. Major problems faced by the farmers were scarcity of agricultural labours and lack of mechanization. Farmers want high yielding rice varieties suitable for DSR, short duration rice varieties, varieties with lodging resistance, varieties having tolerance leaf blast, BLB, false smut, grain discoloration, leaf folder and stem borer. Farmers also expressed the need for

varieties having tolerance to salinity, submergence and drought, varieties with medium slender grains and with high zinc and low GI.

Table 16 contd..: Researchable issues

Parameters/Issues	Districts				
	Navsari	**Panchmahals**	**Tapi**	**Vadodara**	**Valsad**
Rice ecology in your area	Irrigated	Irrigated	Irrigated	Irrigated	Irrigated
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif	Kharif	Kharif	Kharif	Kharif
Number of years of experience in rice farming	5-10 years	5-20 years	5-10/10-20 years	5-10/10-20 years	5-10/10-20 years
Main biotic constraints (diseases) in your area according to you	False smut, Sheath rot and BLB	Sheath blight, False smut and sheath rot	Blast, false smut, sheath rot and BLB	Blast, False smut, GD and BLB	False smut, GD and BLB
Extent of disease damage	10-25%	<10%	10-25%	10-25%	10-25%
Main biotic constraints (Insect pests) in your area according to you	Stem borer and leaf folder	Stem borer and leaf folder	Stem borer and leaf folder	Stem borer and leaf folder	Stem borer and leaf folder
Extent of insect pest damage	<10%	<10%	<10%	<10%	<10%
Main abiotic constrains in your area according to you	-	-	-	-	-
Production constraints in your area according to you	Scarcity of agricultural labours, lack of irrigation facilities, unavailability of quality seeds and other inputs, micronutrient deficiency and lack of mechanization				
Irrigation facilities in your area	Available; Bore well, canal	Available; Bore well	Available; Bore well, canal	Available; Bore well, canal	Available; Bore well, canal
Normally how many years it takes to change the rice variety	5-10 years	5-20 years	10-20 years	10-20 years	5-20 years
Any other rice production issues in your area which the rice scientists need to address					
What is urgently required in your area as far as rice varieties are concerned					
Duration	Varieties suitable for DSR, Short duration varieties and varieties resistant to lodging				
Biotic stress resistance	Varieties tolerant to blast, BLB, false smut, sheath blight, BPH, leaf folder and stem borer				
Abiotic stress resistance	Varieties with resistance to submergence, drought and salinity				
Preferred grain quality	MS grain rice varieties and aromatic short grain/scented varieties				
Nutritional quality	Varieties with high zinc, iron and low GI				

Haryana-Kaul (2023-24)

Districts surveyed: *Kaithal, Kurukshetra, Karnal, Jind, Jamunanagar, Ambala, Panipat* and *Sonepat*

Table 1: Particulars of survey

Districts	Blocks	Villages (latitude; longitude)
Kaithal	Pundri, Guhla Cheeka, Kalayat, Rajaund and Siwan	Fatehpur (29.796484, 76.560356), Jatehari (29.736587, 76.546648), Bhana (29.656877, 76.574457), Dhand (29.875417, 76.612208), Pabnawa (29.906167, 76.682275), Peedal (30.00233, 76.341478), Peyodha (9.751084, 76.415632), Rajaund (29.57582, 76.488158), Siwan (29.424883, 76.8537) and Sinh (30.066733, 76.42648)
Kurukshetra	Shahbad, Thanesar, Ladwa and Pehowa	DoluMajra (30.118503, 76.864896), KhanpurKoliyan (30.03054, 76.883684), Samani (29.920794, 76.90522), Rattanghar (30.140428, 76.853944), Mukhala (30.005433, 77.087564), Dhantori (30.074466, 76.878613), Ishak (30.027747, 76.49485), Bhateri (29.925857, 76.56978), Hamira Farm (30.001054, 76.554361) and KhanpurRodan (29.938523, 76.757157)
Karnal	Karnal, Nilokheri, Indri, Gharaunda and Nigahu	Kachhawa (29.73786, 76.88087), Patanpuri (29.850185, 76.764857), MajraRoran (29.79009, 76.730472), Andhgarh (29.923525, 77.04943), Karsadod (29.842792, 76.693153), Nilokheri (29.842113, 76.911384), Bastada (29.558667, 76.976245), Janjheri (29.755245, 76.958698), Garhi Multan (29.507449, 76.973648) and Modi Jagir (29.779077, 76.780181)
Jind	Pillu Khera, Safidon, Alewa, Jind, Julana and Uchana	BeriKhera (29.386776, 76.529856), Bambhewa (29.219629, 76.56503), Ritauli (29.427824, 76.507515), Ludana (29.247302, 76.500493), Dudhona (29.52548, 76.471319), BudhaKhera (29.38244, 76.557417), Habatpur (29.342675, 76.326642), Kinana (29.242503, 76.352783), NandGhar (29.214359, 76.484323) and KheriSaffa (29.511672, 76.174538)
Jamunanagar	Chachrauli, Bilaspur, Sadaura, Yamunanagar, Saraswatinagar (Mustafabad) and Radaur,	Pheruwala (30.25809, 77.307493), Chachroli (32.23912, 77.357746), DharamKot (30.293606, 77.315391), KaooriKhurd, Sarawan (30.0342352, 77.183004), HaluWalaMajra (30.203719, 77.196987), Majrapura (30.209741, 77.13094), Satgoli (30.139711, 77.139926), Mausurpur (30.076907, 77.149775) and Bubka (30.045095, 77.124678)
Ambala	Barara, Saha, Ambala Cantt. And Narain Garh	DeraMulana (30.301012, 77.046912), Kalpi (30.293469, 77.00123), Milk Dhankota (30.226586, 77.156964), Alipur (30.249113, 77.13211), Bihta (30.269796, 76.939496), Chheni (30.250692, 76.91909), Mohra (30.256766,

		76.050654), Ambli, Dhukheri (30.278477, 76.873569) and BarheriChhoti
Panipat	Madlauda, Ishrana, Samalkha, Bapoli and Panipat	Urlana Kalan (29.352475, 76.657814), seenk (29.315341, 76.669476), Chulkana, Nanhera (29.358992, 77.088), Kurar (29.383792, 77.070027), Bhainswal (29.425336, 77.004925), Garhi (Patti Kalyan) (29.20918, 77.063102), Karans (29.31659, 77.085046), Garhi Balor (29.31659, 77.085046) and Babail (29.422737, 77.047631)
Sonepat	Rai, Murthal, Ganaur, Sonipat and Gohana	Nathupur, Levan, Dhturi (29.03532, 77.070714), Ghasauli (29.34357, 77.094118), Ramnagar (29.103763, 77.098838), Murthal (29.041078, 77.090082), Malikpur (29.079832, 77.106266), Nasifgarhi (Baktawarpur) (29.050855, 77.12476), Jagsi (29.248492, 76.651632) and Datoli (29.160888, 77.08037)

Table 2: Widely prevalent rice varieties

Districts	Varieties
Kaithal	**HYVs:** PR 114, PR 126, PR 128 and others; **Hybrids:**Sava 7301, hybrid 777, Sava 7501, Sava 127, Hybrid 2222 and others ; **Basmati/Scented:** Pusa Basmati 1121, Pusa Basmati 1718, Pusa Basmati 1509, CSR 30, Pusa Basmati 1847 and Pusa Basmati 1
Kurukshetra	**HYVs:** PR 126, PR 114, PR 113 and others; **Hybrids:**Sava 7301, Sava 127, Sava 134, Hybrid 927, Hybrid 25p35 and others; **Basmati/Scented:**Pusa Basmati 1692, Pusa Basmati 1121, Pusa Basmati 1509 andPusa Basmati 1718
Karnal	**HYVs**: PR 114, PR 126 and others; **Hybrids**: Hybrid 7425, Hybrid 7299, Hybrid 2222 and others; **Basmati**/**Scented**: Pusa Basmati 1692, Pusa Basmati 1509, Pusa Basmati 1847, CSR 30 andPusa Basmati 1718
Jind	**HYVs**: PR 114, PR 126 and others; **Hybrids**:Sava 134, Hybrid 27p22, Sava 7301, Sava 127, Hybrid 27p31 and others; **Basmati**/**Scented**:Pusa Basmati 1509, Pusa Basmati 1121, Pusa Basmati 1718, CSR 30, Pusa Basmati 1847, Pusa basmati 1401, Pusa Basmati 1692 and Pusa Basmati 1885
Jamunanagar	**HYVs**: PR 126 and others; **Hybrids**: Hybrid 471, Arize 6444, Hybrid 27p22, Hybrid 468, Sava 127, Hybrid 25p35, Hybrid 7299, Pioneer hybrid and others; **Basmati**/**Scented**:Pusa Basmati 1401, Pusa Basmati 1692, Pusa Basmati 1 and Pusa Basmati 1509
Ambala	**HYVs**: PR 126, PR 114 and others; **Hybrids**:Sava 7301, Hybrid 8222, Hybrid 7425, Kaveri 468, Delta hybrid, Swift Gold, Sava 127, Sava 134, Hybrid 2222, Hybrid 25p35, Hybrid 28p67, Hybrid 25p35, Arize 6444 and others; **Basmati**/**Scented**:Pusa Basmati 1509, Pusa Basmati 1121 and others
Panipat	**HYVs**:PR 126, PR 114 and others; **Hybrids**: Hybrid 27p31, Hybrid 28p67, Hybrid 25p35, Hybrid 7299 and others; **Basmati**/**Scented**:Pusa Basmati 1886, Pusa Basmati 1121, Pusa Basmati 1401, HBC 19, Pusa Basmati 1718, Pusa Basmati 1509, PusaBasmati 1692, Pusa Basmati 1847 andCSR 30
Sonepat	**HYVs**:PR 126 and others; **Hybrids**: Sava 134 and others **Basmati**/**Scented**: CSR 30, Pusa Basmati 1718, Pusa Basmati 1121, Pusa Basmati 1509, Pusa Basmati 1692 and Pusa Basmati 1847

Production oriented survey was conducted in 8 rice growing districts of Haryana viz., Kaithal, Kurukshetra, Karnal, Jind, Yamunanagar, Ambala, Panipar and Sonepat during Kharif season of 2023 when the crops were booting to maturity stage. A total of 80 villages in 8 districts were surveyed. The details of survey particulars are presented in Table 1 and Table 3. The fields surveyed were under irrigated ecosystem and in general the weather conditions for rice cultivation were favourable. However, in about 10-70% places surveyed in different districts there were reports of excess rainfall. Widely prevalent rice varieties were HYVs like PR 114, PR 126, PR 128, PR 113; hybrids like Sava 7301, hybrid 777, Sava 7501, Sava 127, Hybrid 2222, Sava 134, Hybrid 927, Hybrid 25p35, Hybrid 7425, Hybrid 7299, Hybrid 27p31, Hybrid 471, Arize 6444, Hybrid 27p22, Hybrid 468, Hybrid 8222, Delta hybrid, Swift Gold, Hybrid 28p67 and Arize 6444 and basmati varieties like Pusa Basmati 1121, Pusa Basmati 1718, Pusa Basmati 1509, Pusa Basmati 1401, Pusa Basmati 1509, Pusa Basmati 1847, Pusa Basmati 1692, Pusa Basmati 1847, CSR 30, HBC 19 and Pusa Basmati 1. The details of different rice varieties cultivated in different districts of Haryana are presented in Table 2.

Table 3: General information

Parameters	Kaithal	Kurukshetra	Karnal	Jind
# of talukas/blocks covered	5	4	5	6
# of villages surveyed	10	10	10	10
# of farmers interviewed	10	10	10	10
Field ecosystem	Irrigated	Irrigated	Irrigated	Irrigated
Weather conditions during cropping season	Normal (60%); Excess rainfall (40%)	Normal (30%); Excess rainfall (70%)	Normal (20%); Excess rainfall (20%)	Normal (90%); Excess rainfall (10%)
Crop stage when survey was made	Booting to milk	Heading to mature	Booting to dough	Booting to dough
Crop rotations	Rice-wheat was the main crop rotation followed by the farmers. Some farmers also followed rice-wheat-mustard/vegetables/barseem, rice-wheat-sugarcane, Rice-wheat-sorghum, rice-vegetables			

Table 3 Contd..: General information

Parameters	Yamunanagar	Ambala	Panipat	Sonepat
# of talukas/blocks covered	6	4	5	5
# of villages surveyed	10	10	10	10
# of farmers interviewed	10	10	10	10
Field ecosystem	Irrigated	Irrigated	Irrigated	Irrigated
Weather conditions during cropping season	Normal (40%); Excess rainfall (60%)	Normal (30%); Excess rainfall (70%)	Normal (100%)	Normal (60%); Excess rainfall (40%)
Crop stage when survey was made	Booting to mature	Booting to dough	Booting to dough	Booting to milk
Crop rotations	The main crop rotation followed by the farmers was rice-wheat. Some farmers also followed rice-vegetables, rice-wheat-sugarcane, rice-wheat-maize, rice-sunflower, rice-mustard, rice-wheat-mustard, rice-potato, rice-fodder and rice-potato			

Table 4: Average yields of different rice varieties as reported by the cooperators/farmers

Variety/hybrids	Yield (kg/ha)			
	Kaithal	Kurukshetra	Karnal	Jind
HYVs				
PR 126	7500-8000	5000-7000	6000-8750	7000
PR 113		8500		
PR 114	6750-8250	7000-7500	5000-7500	5500
Basmati				
CSR 30	3750		4000	
Pusa Basmati 1121		5000-5250		5000-6250
Pusa Basmati 1509	6000-6500	4500-5750	5250-6500	4500-6250
Pusa Basmati 1	4000-5750			
Pusa Basmati 1718	5750		5500	4750-6250
Pusa Basmati 1692	5000-5750	5500	5500-5750	6250
Pusa Basmati 7			5000	
Hybrids				
Sava 7501	8250			
Sava 7301		8500		8000
Sava 134		8000-8500		
KRH 7299			8750	
HYb. 927		8000		
Hyb. 27P31				7500
Hyb. 25P35		7500		
Hyb. 27p22				7000

Table 4 contd..: Average yields of different rice varieties as reported by the cooperators/ farmers

Variety/hybrids	Yield (kg/ha)			
	Yamunanagar	Ambala	Panipat	Sonepat
HYVs				
PR 126	6250	7500		
PR 114		6250-7500	6250	
Basmati				
CSR 30			4000	3750-4500
Pusa Basmati 1121			5000-6250	4500-5500
Pusa Basmati 1509			5000-6250	5250-5500
Pusa Basmati 1	5000			
Pusa Basmati 1718			6000	5250-6250
Pusa Basmati 1692	4750		5500	5000
HBC 19			3750	
Hybrids				
Sava 7501				
Sava 7301		8000		
Sava 127	6250-7500	8000		
Sava 134		6250-7750		7500
Hyb 468	8000			
Arize 6444	7500			
Swift Gold		8000		
Hyb. 27P31			8250	
Hyb. 25P35	8000	8000	7750	
Kaveri hybrid	8000			
Pioneer Hybrid	8750			

A. Cropping system and rice yield: The main crop rotation followed by the farmers was rice-wheat. Some farmers also followed rice-vegetables, rice-wheat-sugarcane, rice-wheat-maize, rice-sunflower, rice-mustard, rice-wheat-mustard, rice-potato, rice-wheat-sorghum, rice-fodder and rice-potato (Table 3). The details of variety wise yield (as reported by the farmers during survey) are presented in Table 4. Average rice yield among HYVs ranged from 5500-8500 kg/ha while in case of hybrid varieties it ranged from 6250-8750 kg/ha. In case of basmati varieties, average yield ranged from 3750-6500 kg/ha.

Table 5: Details of rice consumption pattern in different districts of Haryana

Parameters	Districts			
	Kaithal	Kurukshetra	Karnal	Jind
Status of farmers	Medium Income (100%)	Medium Income (80%); Poor (20%)	Medium Income (90%); Poor (10%)	Medium Income (70%); Poor (10%); rich (20%)
Per capita monthly rice consumption (kg)	2-3 kg	2-3 kg	2-3 kg	2-4 kg
Composition of main meal	Rice + Wheat (100%)	Rice + Wheat (100%)	Rice + Wheat (100%)	Rice + Wheat (100%)
Preferred rice types	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)
Rice grain type preference	Basmati (90%); Fine grain (10%)	Basmati (80%); Fine grain (20%)	Long grain Basmati (100%)	Long grain Basmati (100%)
Any changes in food habit in last 10 years	No (80%); 20% told rice included in diet	No (90%); 10% told rice included in diet	No (60%); 40% told rice included in diet	No (50%); 50% told rice included in diet

Table 5 contd..: Details of rice consumption pattern in different districts of Haryana

Parameters	Districts			
	Yamunanagar	Ambala	Panipat	Sonepat
Status of farmers	Medium Income (100%)	Medium Income (80%); Poor (10%); rich (10%)	Medium Income (70%); Poor (10%); rich (10%)	Medium Income (100%)
Per capita monthly rice consumption (kg)	1-3 kg	1.5-3 kg	2-3 kg	2 kg
Composition of main meal	Rice + Wheat (100%)	Rice + Wheat (100%)	Rice + Wheat (100%)	Rice + Wheat (100%)
Preferred rice types	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)
Rice grain type preference	Long grain Basmati (100%)	Long grain Basmati (100%)	Long grain Basmati (100%)	Long grain Basmati (100%)
Any changes in food habit in last 10 years	No (100%)	No (90%); 10% told rice included in diet	No (60%); 40% told rice included in diet	No (90%); 10% told rice included in diet

B. Rice consumption pattern: Survey was conducted on consumption pattern of rice among the farmers in different districts of Haryana. Majority (average 86%) of the farmers contacted were in the medium income group while 10-20 farmers belonged to poor category. Average per capita consumption of rice per month was 1-4 kg rice (Table 5). All the farmers contacted told that their main meal consisted of both rice and wheat and all of them they told that they preferred polished

rice. About 80-100% farmers in different districts told that they preferred basmati rice and about 10-20% farmers from Kaithal and Kurukshetra consumed fine grain varieties. In general, there was no change in the food habit except that some farmers told that they included of rice in their diet.

Table 6: Details of nursery management

Parameters	Districts			
	Kaithal	**Kurukshetra**	**Karnal**	**Jind**
Planting time	2nd week of June to 3rd week of July; Some did re-transplanting in2nd week of August	Middle of June to end of June; DSR was done in 3rd to 4th week of June; some re-transplanted in end of July	2nd week to end of June; In some cases it went up to 2nd week of July	3rd week of June to 2nd week of July
Seed rate	8-10 kg/ha	9-15 kg/ha	8-12 kg/ha	9-15 kg/ha
Seed treatment (% farmers adopted)	Yes (50%); Used treated seeds (50%)	Yes (70%); Used treated seeds (30%)	Yes (90%); Used treated seeds (10%)	Yes (80%); Used treated seeds (20%)
Chemicals used for seed treatment	Soaking 10 kg seeds in carbendazim (1-2 g/kg) or mixture of carbendazim (10g) + streptocycline (1g) or mixture of carbendazim (12%) + mancozeb (63%) @ 2 g/kg in 10 litre of water for 24 h			
Organic manure in nursery (% farmers adopted)	Yes (10%) FYM	Yes (10%) Poultry manure	Yes (20%); FYM	Yes (10%); poultry manure
Inorganic manure in nursery (% farmers adopted)	Yes (80%); Urea (5-10 kg/kanal) and/or DAP @ 5 kg/kanal*	Yes (60%): DAP (5-10 kg) + urea (5-10 kg) per kanal	Yes (80%): DAP @ 8-10 kg and/or urea @ 5-15 kg/ kanal; Some applied MOP and Fe	Yes (60%): Urea (5-10 kg) and/or DAP (5-10 kg) per kanal

* 1 Kanal = 500 m^2

Table 6 contd..: Details of nursery management

Parameters	Districts			
	Yamunanagar	**Ambala**	**Panipat**	**Sonepat**
Planting time	Middle of June to middle of July	3rd Week of June to 4th week of July; Some did re-transplanting in 2nd week of August	3rd week of June to 1st week of July	2nd to 4th week of June; Some did re-transplanting in 1st week of August
Seed rate	8-10 kg/ha	8-10 kg/ha	9-12 kg/ha	8-12 kg/ha
Seed treatment (% farmers adopted)	Yes (40%); Used treated seeds (60%)	Yes (60%); Used treated seeds (40%)	Yes (100%)	Yes (80%); Used treated seeds (20%)
Chemicals used for seed treatment	Soaking 10 kg seeds in carbendazim (1-2 g/kg) or mixture of carbendazim (10g) + streptocycline (1g) or mixture of carbendazim (12%) + mancozeb (63%) @ 2 g/kg in 10 litre of water for 24 h			
Organic manure in nursery (% farmers adopted)	Yes (30%); Poultry manure, vermin-compost	Yes (10%); poultry manure	Yes (10%); FYM	Yes (30%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (50%); Urea (5-10 kg/kanal) and/or DAP @ 5-10 kg/kanal*	Yes (70%): DAP (5-12 kg) + urea (5-15 kg) per kanal	Yes (60%): DAP (5-20 kg) + urea (5-10 kg) per kanal	Yes (80%): DAP (5-15 kg) + urea (5-10 kg) per kanal

C. Nursery and main field Management: Average seed rate was low (8-15 kg/ha). On an average about 71% of the farmers contacted told that they treated the seeds by soaking them in carbendazim (1-2 g/kg) or a mixture of Bavistin (10g) + streptocycline (1g) or mixture of carbendazim (12%) + mancozeb (63%) @ 2 g/kg in 10 litre of water for 24 h (Table 6). Planting was done during second week of June to third week of July. Some farmers in Ambala and Sonepat did re-transplanting during 1st to 2nd week of August. Very less number of farmers (10-30%) applied organic manure like FYM, vermicompost or poultry manure in the nursery. However, on an average about 67% farmers applied chemical fertilizers like urea (5-10 kg/kanal) and/or DAP (5-20 kg/kanal). Almost all the farmers adopted random planting where plant population per unit area was not maintained. The details of fertilizers applied in the main field are given in Table 7. Average nitrogen dose in case of HYVs was 80-252.5 kg N/ha while in case of basmati N dose was 68.75-252.5 kg N/ha. Other fertilizers were applied @ 10-115 kg P_2O_5/ha and 37.5-150 kg K_2O/ha. On an average, about 32% farmers contacted applied potash in the main field. On an average about 63% farmers applied zinc sulphate (containing either 21% or 33% zinc) @ 10-25 kg/ha. Some farmers applied chelated zinc (500-1000 gm/acre). About 43% farmers applied farm yard manure or vermicompost or green manure in the main field. Many farmers applied organic matter in the main field once in 2-3 years depending on its availability.

Table 7: Details of main field management

Details	Districts			
	Kaithal	**Kurukshetra**	**Karnal**	**Jind**
Planting method	Almost all the farmers adopted random planting where plant population per unit area was not maintained; Some farmers in Kurukshetra (10%) adopted direct sowing			
Total N applied	HYVs: 143.75-230 kg/ha Basmati: 126.25-143.75 kg/ha	HYVs: 143.75-252.5 kg/ha Basmati: 115-143.75 kg/ha	HYVs: 97.5-252.5 kg/ha; Basmati: 68.75-126 kg/ha	HYVs: 172.5-252.5 kg/ha; Basmati: 80-195 kg/ha
Total P_2O_5 applied	Yes (60%) @ 10-28.75 kg/ha	Yes (40%) @ 20-57.5 kg/ha	Yes (70%) @ 28.75-57.5 kg/ha	Yes (70%) @ 20-115 kg/ha
Total K_2O applied	Yes (20%) @ 37.5 kg/ha	Yes (20%) @ 37.5 kg/ha	Yes (30%) @ 37.5-75 kg/ha	Yes (50%) @ 37.5-150 kg/ha
$ZnSO_4$ applied (21% or 33%)	Yes (60%) @ 12.5 kg/ha	Yes (60%) @ 12.5-25 kg/ha	Yes (80%) @ 12.5-25 kg/ha	Yes (50%) @ 12.5 kg/ha
Organic fertilizers applied	Yes (40%); FYM (2-3 trolly/acre) or vermi-compost once in 2-3 years depending on availability; Few applied green manure	Yes (60%); FYM (2-3trolly/acre) once in 2-3 years depending on availability; Few applied green manure	Yes (50%); FYM or Vermicompost Applied once in 3-4 years; few farmers practiced green manuring	Yes (50%); FYM (2-3 trolley/acre) once in 2-3 years depending on availabilty; few farmers also practiced green manuring
Remarks	Nutrients were applied in the form of urea, DAP, SSP, MOP and zinc sulphate (21% or 33%). Some farmers applied chelated zinc (500-1000 gm/acre). Few farmers in Kurukshetra and Jind applied sulphur (5-10 kg/acre).			

Table 7 Contd..: Details of main field management

Details	Districts			
	Yamunanagar	**Ambala**	**Panipat**	**Sonepat**
Planting method	Almost all the farmers adopted random planting where plant population per unit area was not maintained			
Total N applied	HYVs: 80-230 kg/ha; Basmati: 68.75-252.5 kg/ha	HYVs: 137-252.5 kg/ha; Basmati: 115-172.5 kg/ha	HYVs: 166.25-183.75 kg/ha; Basmati: 97.5-252.5 kg/ha	Basmati: 102.5-241.25 kg/ha
Total P_2O_5 applied	Yes (80%) @ 10-57.5 kg/ha	Yes (70%) @ 20-57.5 kg/ha	Yes (90%) @ 20-57.5 kg/ha	Yes (90%) @ 30-115 kg/ha
Total K_2O applied	Yes (20%) @ 37.5 kg/ha	Yes (30%) @ 37.5-75 kg/ha	Yes (50%) @ 37.5-75 kg/ha	Yes (40%) @ 75-150 kg/ha
$ZnSO_4$ applied (21% or 33%)	Yes (80%) @ 12.5-25 kg/ha	Yes (70%) @ 10-25 kg/ha	Yes (70%) @ 12.5 kg/ha	Yes (40%) @ 10-25 kg/ha
Organic fertilizers applied	Yes (20%); FYM or vermicompost once in 3-4 years depending on availability	Yes (40%); FYM or green manure once in 3-4 years depending on availability	Yes (40%); FYM (2-3 trolley/acre) once in 2-3 yrs, Vermicompost (2-3 trolley/acre) or green manuring once in 2-3 years	Yes (50%); Applied FYM or practiced green manuring once in 3-4 years
Remarks	Nutrients were applied in the form of urea, DAP, SSP, MOP and zinc sulphate (21% or 33%). Some farmers applied chelated zinc (250-500 gm/acre). Few farmers in Yamunanagar applied sulphur			

Table 8: Weeds and weed management

Details	Districts			
	Kaithal	**Kurukshetra**	**Karnal**	**Jind**
Weed intensity	Low-medium			
Names of the weeds	Commonly recorded weeds were Samak (*Echinochloa colona*), doob (*Cynodon dactylon*), *Leptochloa chinensis*, Deela (*Cyperus rotundus*), Chinese grass (local name), Ghoda grass (local name), Chaatri grass (local name) and some unidentified weeds			
Weedicides used	Pretilachlor (500 ml/acre), Rifit Plus (500 ml/acre), butachlor (1 litre/acre), pendimethalin (1.25 l/acre), Nominee Gold and others			
Percentage of farmers applied herbicides	About 90-100% farmers in different districts applied weedicides. About 10-50% farmers in the surveyed districts also practiced hand weeding along with herbicide application. About 10% farmers in Jind practiced only hand weeding			
Wild/weedy rice incidence	NA	NA	NA	NA

D. Weeds and their Management: Intensity of commonly recorded weeds like *Echinochloa colona*, *Cynodon dactylon*, *Leptochloa chinensis*, *Cyperus rotundus*, *Convolvulus arvensis,* Chinese grass (local name), Ghoda grass (local name), Chaatri grass (local name) and some unidentified weeds was low to medium (Table 8). About 70-100% farmers in different districts applied weedicides. About 10-60% farmers in the surveyed districts also practiced hand weeding along with herbicide application. The details of weedicides are presented in Table 8.

Table 8 contd..: Weeds and weed management

Details	Districts			
	Yamunanagar	**Ambala**	**Panipat**	**Sonepat**
Weed intensity	Low-medium			
Names of the weeds	Commonly recorded weeds were Samak (*Echinochloa colona*), doob (*Cynodon dactylon*), *Leptochloa chinensis*, Deela (*Cyperus rotundus*), Chinese grass (local name), hiran khuri (*Convolvulus arvensis*), Makra weed (*Dactyloctenium aegyptium*), Ghoda grass (local name) and some unidentified weeds			
Weedicides used	Fast Mix (butachlor @ 1 lt/acre), Pretilachlor (500 ml/acre), pendimetalin, Nominee Gold and others			
Percentage of farmers applied herbicides	About 70-90% of the farmers in different districts applied herbicides. About 20-60% farmers told that they also practiced hand weeding along with herbicide application. About 10-30% farmers in the surveyed districts told that they practiced only hand weeding			
Wild/weedy rice incidence	NA	NA	NA	NA

E. Common needs of the farmers: Some of the common needs of the farmers were availability of quality seeds and suitable pesticides in time for management of biotic stresses, increase in the MSP and price of basmati rice, subsidy on implements, permanent solution for residue management, suitable herbicides for management of weeds, subsidy in seeds and other inputs and reduction in the cost of cultivation.

Table 9: Details of inputs used

Details	Districts			
	Kaithal	**Kurukshetra**	**Karnal**	**Jind**
Implements used	Implements like harrow, rotavator, tractor, trolley, power tiller, combined harvester were used by the farmers. Progressive farmers had some of their own equipments and other farmers hired the implements. Combine harvester was mostly used on hire basis			
Source of seeds	Many farmers (90% in Kaithal, 80% in Kurukshetra, 80% in Karnal and 70% in Jind) told that they purchased 100% of their seed requirement. Remaining farmers told that they purchased part (50%) of their seed requirement.			
Source of irrigation	Deep tube well (70%); canal (30%)	Deep tube well (100%)	Deep tube well (100%)	Deep tube well (100%); Canal (10%)
Scarcity of irrigation water	No (100%)	No (100%)	No (100%)	No (90%)
Availability of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Quality of fertilizers/pesticides	Satisfied (100%)	Satisfied (100%)	Satisfied (90%)	Satisfied (100%)
Advisors to the farmers	Own decisions (10%); Dealers (100%); State dept (30%); Univ (10%)	Own decisions (40%); Dealers (80%); State dept (40%); Univ (10%)	Own decisions (20%); Dealers (100%); State dept (50%)	Own decisions (20%); Dealers (70%); State dept (40%); Univ (10%)

F. Input Use: The details of inputs used by the farmers are presented in Table 9. Implements like harrow, rotavator, tractor, trolley, power tiller, combined harvester were used by the farmers. Progressive farmers had some of their own equipments and other farmers hired the implements. Combine harvester was mostly used on hire basis. On an average 86% of the farmers in different districts told that they purchased 100% of their seed requirement. Remaining farmers told that they used part (50%) of last years harvested seeds. The main source of irrigation was deep tube well. Majority of the farmers told that there was no scarcity of irrigation water. Majority (>80%) of the farmers contacted also told that inputs like fertilizers and pesticides were available. The main advisors to the farmers were private dealers followed by officials from state department of Agriculture and Univeristy.

Table 9 contd..: Details of inputs used

Details	**Districts**			
	Yamunanagar	**Ambala**	**Panipat**	**Sonepat**
Implements used	Implements like harrow, rotavator, tractor, trolley, power tiller, combined harvester were used by the farmers. Progressive farmers had some of their own equipments and other farmers hired the implements. Combine harvester was mostly used on hire basis			
Source of seeds	Majority of the farmers contacted (100% in Yamunanagr, Ambala and Sonepat and 70% in Panipat) told that they purchased 100% of their seed requirement. Remaining farmers told that they purchased part (50%) of their seed requirement.			
Source of irrigation	Deep tube well (100%)	Deep tube well (100%)	Deep tube well (100%); Canal (10%)	Deep tube well (100%)
Scarcity of irrigation water	No (100%)	No (100%)	No (100%)	No (100%)
Availability of fertilizers/pesticides	Yes (80%)	Yes (100%)	Yes (90%)	Yes (80%)
Quality of fertilizers/pesticides	Satisfied (90%)	Satisfied (100%)	Satisfied (90%)	Satisfied (70%)
Advisors to the farmers	Dealers (90%); State dept (20%)	Own decisions (10%); Dealers (100%); State dept (50%)	Own decisions (20%); Dealers (90%); State dept (20%); Univ. (20%)	Own decisions (10%); Dealers (60%); State dept (30%)

Table 10: Prevalence and severity of rice diseases recorded in different districts of Haryana during *Kharif* 2023

District	Sheath blight	Leaf blast	Neck blast	Bakanae	False smut	Grain Discoloration	Bacterial leaf blight	Sheath rot
Kaithal (10 %) [C]	70 % L-M[b] CSR 30, PB 1121, PB 1692, PB 1, PR 114, PR 126, PR 128, Sava 7301, 2222	30 % L-M[b] CSR 30, PB 1509, PB 1692, PB 1121	10 % Tr. –L[a] PB 1121	50 % L –M[a] PB 1692, PB 1509, CSR 30, PB 1, PB 1121	10 % Tr. –L [a] Sava 7301	10 % Tr. –L PB 1718, PR 114	60 % Tr. -L[b] PR 114, Sava 7301, PR 126, CSR 30, PB 1692	--
Kuruks-hetra (10 %)	50 % L-M[b] PR 126, PB 1121, Sava 134, Sava 7301	20 % L-M[b] PB 1401, PB 1509	20 % Tr. –L[a] PB 1509, PB 1401	30 % Tr. -L[a] PB 1509, PB 1121, PB 1692	30 % Tr. –L [a] PR 113, PR 126	20 % Tr. –L PR 114, Sava 134, Sava 7301	50 % Tr. -L[b] PR 113, PR 1236, Sava 7301, PB 1692, 25P30, Sava 134,	10 % Tr. –L [a] Sava 7301
Karnal (0 %)	90 % L-M[b] 7425, PB 1509, PR 126, PR 114, 2222	40 % L-M[b] CSR 30, PB 1718, PB 1509	40 % Tr. -L[a] CSR 30, PB 1718, PB 1509	50 % Tr. –L[a] PB 1847, PB 1509, CSR 30, PB 1692	40 % L –M[a] PR 126, PR 114, PB 1509, PB 1718, PR 114	20 % Tr. –L PR 126, PR 114,	80 % L-M[b] PR 126, CSR 30, PB 1692, PR 114, PB 1509	40 % Tr. –L [a] PR 126, PR 114
Jind (10 %)	70 % L-M[b] CSR 30, PB 1847, PR 126, PB 1509, Sava 134, PB 1121, PB 1718, PB 1692	60 % L-M[b] PB 1121, PB 1509, CSR 30, PB 1718, PB 1692	30 % Tr. -L[a] PB 1121, PB 1718	50 % L –M[a] PB 1121, PB 1509, PB 1847, PB 1401	10 % L –M[a] PB 1121	40 % Tr. –L PB 1121, PB 1718, PB 1692, PB 1847	70 % L-M[b] PB 1121, PB 1509, PB 1718, PR 126, 27P22, Sava 134, Sava 7301, PB 1692, PB 1847	10 % Tr. –L [a] Sava 7301
Yamuna Nagar (20 %)	50 % L-M[b] 471, 2222, 468, Sava 127, PR 126	10 % L-M[b] PB 1509	10 % Tr. –L[a] PB 1509	10 % Tr. –L [a] PB 1509	20 % Tr. –L [a] 471, 2222, pioneer hyb.	10 % Tr. –L 471, 2222,	60 % Tr. -L[b] 471, 2222, 7299, pioneer hyb., Sava 127, PB 1509	40 % Tr. –L [a] 471, 2222, 468, pioneer hyb., PB 1509, PB 1401
Ambala (20 %)	70 % L-M[b] 8222, 7725, Sava 127, PB 1509, PR 126, 2222, 28P67, PB 1121, Sava 134, PR 126	20 % L-M[b] PB 1509, PB 1121	10 % Tr. –L[a] PB 1121	20 % Tr. –L [a] PB 1509, PB 1121	30 % Tr. –L [a] 25P30, 28P67, 6444, Sava 127	40 % Tr. –L 25P30, 28P67, Sava 134, PR 126, Sava 127	50 % Tr. -L[b] PR 126, 468, 2222, Sava 127, 28P67, Sava 134	30 % Tr. –L [a] 2222, 25P30, 28P67, 6444
Panipat (10 %)	90 % L-M[b] 27P31, 28P67, PB 1121, PB 1718, PB 1692, PB 1718, 7299, PB 1847, PR 126, PB 1509, PB 1885, CSR 30	40 % L-M[b] PB 1121, PB 1509, PB 1718, CSR 30	40 % Tr. -L[a] PB 1509, PB 1121, CSR 30	50 % L –M[a] PB 1121, HBC 19, PB 1509, PB 1718, CSR 30	10 % L –M[a] PR 126	30 % Tr. –L PB 1509, PB 1718, PR 126	70 % Tr. -L[b] 27P31, 28P67, PB 1718, PB 1692, PB 1121, 7299, PR 126, PB 1509, CSR 30	20 % Tr. –L [a] PB 1847, PR 126, CSR 30
Sonepat (30 %)	50 % L-M[b] CSR 30, Sava 134, PR 126, PB 1121	30 % L-M[b] PB 1121, CSR 30, PB 1509	30 % Tr. -L[a] PB 1121, PB 1692	40 % L –M[a] PB 1121, PB 1509, PB 1718	20 % L –M[a] Sava 134, PB 1121	30 % Tr. –L Sava 134, PR 126, PB 1121	60 % Tr. -L[b]; PB 1121, PB 1718, PB 1509, Sava 134, PR 126	10 % Tr. –L [a] Sava 134

[a]: Disease incidence [b]: % disease severity Severity: Tr: traces; L: low; M: moderate; S: severe Disease incidence: < 10%, 10-25% and > 25% were designated as L, M and S in case of **neck blast, stem rot, bakanae and false smut**. Likewise for **sheath blight, leaf blast and bacterial leaf blight**, disease score of 3, 5 and >5 were treated as L, M and S, respectively: [C]: Disease free locations

Table 11: Occurrence and severity of rice insect- pests recorded in different districts of Haryana during *Kharif*, 2023

District	Stem borer	Planthoppers (WBPH /BPH)	Leaf folder	Grass hopper	Termite	Insect-pests free locations (%)
Kaithal	80 % Tr.- L[b]; (0.5-1 % dead heart/WE) PB1692, PB 1509, PB-1, PR128, 126,& 114, hyb 2222, SAVA 7301 & 7501	100 % Tr- L[b]; 10 % Tr (1-2 nymphs/hill); PB 1509 & 1, Sava 7501, PB 1692	100 % L-M[b]; (0.5-5.0% damaged leaves); PB1692, PB 1509, PB-1, PR128, 126 & 114, hyb 2222, SAVA 7301 & 7501	10 % Tr[b] PR 114 & PB 1718	-	-
Kurukshetra	100 % Tr-L[b] (0.5-1.0% dead heart/WE)[a] PR 126& 114,PB 1692, Sawa 7301, 127 & 134, PB1121, PB 1509	70% Tr; (1-5 nymphs/hill)[a]; PR 126, Sawa 7301,127& 134, 25P30, PB 1509, 1692, PR 114, PB 1121, 25P30	100% L[b]-M (0.5-5.0% damaged leaves)[a] PR 126, Sava 7301,127& 134, 25P30, PB 1509, 1692, PR 114, PB 1121, 25P30	20 % Tr[b] PR 126, PB 1121& Sava 7301	-	-
Karnal	100 % Tr-L[b]; (0.5-1.0 % dead heart/WE)[a]; PR 114, PR 128, PR 126, CSR30, PB1692, HYB222, PB 1121, 1718, PB 1509	80 % L-M[b]; (1-10 nymphs/hill)[a]; PR 114, PR 128, PB 1509, PR 126, HYB2222, HYB7425, PB 1121, 1718, 1847, CSR30	100 % Tr-L[b]; (0.5-5.5 % damaged leaves)[a]; PR 114, PR 128, PB 1509, PR 126, HYB2222, HYB7425, PB 1121, 1718, 1847 , CSR30	10 % Tr[b] PR 126 & CSR30	-	-
Jind	100 % Tr.- L[b]; (0.5-1.5 % dead heart/WE)[a]; PB 1718, PB 1121, PB 1509, PB1847 & 1885, 27P22CSR30, sava 134, PR 1409	30 % Tr-L[b]; (1-5 nymphs/hill)[a]; PB 1718, PB 1121, PB 1509, PR 1409, PR 114	100 % Tr-L[b]; (5- 20 % damaged leaves)[a]; PB 1718, PB 1121, PB 1509, PB1847 & 1885, 27P22 CSR30, sava 134, PR 1409	10 % Tr[b] PB 1509 & PB1121	10 % Tr[b]; (<0.5 % infested plants)[a]; PB 1509 & PB1121	-
Yamuna Nagar	90 % Tr-L[b]; (0.5-1.0% dead heart/WE)[a]; Sava127, Pioneer, Hyb7299, 468 & 471, 22P22 Sava 134 PB 1, Hyb 7301, PB 1692, PB 1509, PR 126	50 % Tr; (2-12 nymphs/hill)[a]; PR126,HYB 2222, Hybrid 7299,	100 % Tr-L[b]; (0.5-10.0 % damaged leaves)[a]; Sava 127, Pioneer, Hyb7299, 471 & 468 Sava 134 PB 1, Hyb 7301, PB 1692, PB 1509, 1401, PR 126	-	-	-
Ambala	100 % Tr -L[b]; (0.5-1.5 % dead heart/WE)[a]; 25P30, 25P67, Hyb 2222, Sava 7301, 7501 & 134, Sava 127, PB1121 & 1509,Kaveri468, PR 126,PR 114	50% Tr- L[b]; (1-10 nymphs/hill)[a]; 25P67, Hyb 2222, Sava 7301, 7501&134, Sava 127, PB1121, Kaveri 468	100 % Tr-L[b]; (0.5-6.0 % damaged leaves)[a]; 25P30, 25P67, Hyb 2222, Sava 7301, 7501 & 134, Sava 127, PB1121 & 1509,Kaveri 468, PR 126,PR 114	-	-	-
Panipat	100 % L-M[b]; (0.5-1.5 % dead heart/WE)[a] CSR30, PB 1847, 1885 1121, PB1692, 1401,HBC-19, PR 126, HYB7299, 27P31, 23P67, PB 1509	-	90% L[b]-M; (1.0-5.0 % damaged leaves)[a] CSR30, PB 1847, 1885 1121, PB1692, 1401,HBC-19, PR 126, HYB7299, 27P31, 23P67, PB 1509	30 % Tr[b] (<0.01%) PB 1847, 1121,1509 & PR126	-	-
Sonepat	80% Tr. -L[b]; (0.5-1.0% dead heart/WE)[a]; PB 1121, PB 1718 & PB 1692, 1509, PR 126, Sava 134, CSR 30	20 %Tr- L[b]; (2.0- 20 nymphs/hill)[a] PB 1121, PB 1718	90 % Tr-L[b]; (0.5-2.0 % damaged leaves)[a] PB 1121, PB 1718 & PB 1692, 1509, PR 126, Sava 134, CSR 30	-	10 % Tr[b] PB1509	-

[a]: Insect-pests population/damage [b]: Severity of insect-pests; **Severity: Tr: Traces, L: Low, M: Moderate, S: severe**

Stem borers: Traces: <1.0% dead heart/white ear, Low: 1.0-10.0% DH/WE, Moderate: 10.1-20.0% DH/WE, Severe: > 20.0 % DH/WE. **WBPH/ BPH**: Traces: <1.0 nymphs or adults/hill, Low: 1.0-5.0 nymphs or adults/hill, Moderate: 5.1- 15.0 nymphs or adults/hill; Severe: >15.0 nymphs or adults/hill. **Leaf folder & whorl maggot**: Traces: < 1.0% damaged leaves, Low: 1.1-10.0% damaged leaves, Moderate: 10.1-20.0% damaged leaves; Severe: > 20.0% damaged leaves. **Termites**: Traces: <1.0 % infested plants; Low: 1.0 -5.0 infested plants; Moderate: 5.1-10.0% infested plants; Severe: >10% infested plants

G. Biotic stresses and their management: The details of different diseases and insect pests in different surveyed districts are presented in Table 10 and 11. Among the disease, sheath blight, leaf and neck blast, bakanae, false smut, grain discoloration and bacterial blight were wide spread in low to moderate form. Among the insect pests, stem borer, leaf folder and plant hoppers (BPH and WBPH) were wide spread in low to moderate intensity. All the farmers contacted applied different pesticides for the management of different diseases and insect pests (Table 12). The number of pesticide application in different districts ranged from 1-6. On an average, 63% farmers contacted told that they mixed 2-3 different pesticides while application. In few fields in Kaitha, Jind, Karnal and Panipat symptoms of zinc deficiency were observed. There was no report of rice stunting problem due to southern rice black-streaked dwarf virus (SRBSDV) (which was widespread in 2022) from any of the surveyed districts.

Table 12: Details of pest management

Details	**Districts**			
	Kaithal	**Kurukshetra**	**Karnal**	**Jind**
% age farmers adopting plant protection	100% farmers adopted chemical plant protection measures			
Names of pesticides	**Insecticides**: Ferterra (4 kg/acre), Cartap hydrochloride (5-7.5 kg/acre), fifronil (7.5 kg/acre), furadon (5 kg/acre), Lamda cyhalothrin (300-400 ml/acre), chlorpyriphos + cypermethrin (200 ml/acre), flubendiamide 20% WG (Takumi @ 50-100 g/acre), fipronil (500 ml/acre), emamectin benzoate, acephate, Gunther (novaluron 5.25% + Eemamectin benzoate 0.9 % SC), Coragen (100 ml/acre)cartap + emamectin (3 kg/acre), indoxacarb, Black (indoxacarb 5% + fipronil 5% SC) @ 400 ml/acre, cypermethrin (200 ml/acre) and quinalphos (400 ml/acre) for leaf folder and stem borer; Chess (pymetrozine) (120 g/acre), Osheen (Dinitofuran) (80 gm/acre), thiomethoxam (100 g/acre) and Checkmate (dinotefuran + pymetrozine) for BPH/WBPH and chlorpyriphos (400 ml/acre) for termite **Fungicides**: Nativo (80 g/acre), azoxystrobin + difenconazole (150 ml/acre), Avancer Glow (8.3% Azoxystrobin + 66.7% WG Mancozeb), Tebuconazole (200 ml/acre), Azoxystrobin + tebuconazole (200 ml/acre), hexaconazole (400 ml/acre), Epic (hexaconazole 75% WG, tebuconazole + Captan (250 ml/acre), Iglare (thifluzamide 24 Sc) (150 ml/acre), Lusture (Flusilazole 12.5% + Carbendazim 25% SE) @ 400 ml/acre and Nativo (100 g/acre) for sheath blight; Jatayu (chlorothalonil) (500 gm/acre for false smut; azoxystrobin + difenconazole (200 ml/acre), carbendazim + mancozeb (500 g/acre), Beam (tricyclazole) @ 120 gm/acre, Fuji One (400 ml/acre) and carbendazim (1 g/l) for blast; Propiconazole (200 ml/acre), Diathane M 45 (500 g/acre) for sheath rot; Amister top (150-200 ml/acre) for blast and sheath blight; copper oxychloride (400-500 g/acre) for false smut and bacterial blight; azoxystrobin + tebuconazole (200 ml/acre) for sheath blight and grain discoloration; Validamycin + Tagmycin (Streptomycin Sulphate 90 + Tetracycline Hydrochloride 10 SP) for BLB and azoxystrobin + thiophenate methyl + thiomethoxam for sheath blight and BPH/WBPH			
# of pesticide sprays	2-5	3-5	2-6	3-6
Mixing of pesticides before application	Yes (70%) 2-3 pesticides	Yes (80%) 2 pesticides	Yes (90%) 2-3 pesticides	Yes (80%) 2-3 pesticides

Table 12 contd..: Details of pest management contd..

Details	Districts			
	Yamunanagar	**Ambala**	**Panipat**	**Sonepat**
% age farmers adopting plant protection	100% farmers adopted chemical plant protection measures			
Names of pesticides	**Insecticides**: Regent (7.5 kg/acre), Fertera (3-5 kg/acre), cartap hydrochloride (7.5 kg/acre), lamda cyhalothrin (200 ml/acre), thiamethoxam + lamda cyhalothrin (150 ml/acre), flubendiamide 20% WG (Takumi @ 50-100 g/acre), Fame (Flubendiamide) @ 50 g/acre, Ampligo (chlorantraniliprole 10% + lambdacyhalothrin 5% ZC), fenopropathrin, cypermethrin (150 g/acre, furadan (4 kg/acre), Coragen (100 ml/acre), profenophos + cypermethrin (150-200 ml/acre) and fipronil (8 kg/acre) for stem borer and leaf folder; Chess (pymetrozine) (120 g/acre), Osheen (Dinitofuran) (80 gm/acre), thiomethoxam (100 g/acre) and Checkmate (dinotefuran + pymetrozine) and pexalon (triflumezopyrim 10% SC) @ 100 ml/acre for BPH/WBPH and chlorpyriphos (400 ml/acre) for termite **Fungicides**: tebuconazole (250 ml/acre), propiconazole (250 g/acre), Iglare (thifluzamide 24 Sc) (150 ml/acre), Sheathmar (450 ml/acre), azoxystrobin + difenoconazole (200 ml/acre), Galileo (Picoxystrobin) @ 300 ml/acre and hexaconazole (300 ml/acre) for sheath blight; Godiwa (azoxystrobin + difenoconazole) @ 200 ml/acre, Saaf (carbendazim + mancozeb) @ 200-250 gm/acre, Amister Top (200 ml/acre), Fuji One (300 ml/acre), Beam (tricyclazole) @120 g/acre and carbendazim (1 g/l) for blast; copper oxychloride (600 gm/acre) for BLB; carbendazim (1 g/l) as protective spray; tebuconazole + captan (200-250 g/acre) and propiconazole (200 ml/acre) for sheath blight, grain discoloration and sheath rot; propiconazole (200 ml/acre) for sheath rot and grain discoloration; copper oxychloride (500 g/acre) + propiconazole (200 ml/acre) for false smut and grain discoloration; azoxystrobin + tebuconazole (200 ml/acre), Amister Top (150-200 ml/acre) for sheath blight and blast			
# of pesticide sprays	1-4	1-6	4-6	1-5
Mixing of pesticides before application	Yes (20%) 2-3 pesticides	Yes (50%) 2 pesticides	Yes (100%) 2-3 pesticides	Yes (20%) 2 pesticides

H. Researchable issues: Among the biotic stresses, major problems in the region are sheath blight followed by leaf and neck blast among the diseases and leaf folder, BPH and stem borer among insect pests. Farmers want varieties suitable for DSR, HYVs resistant to lodging and varieties resistant/tolerant to above mentioned biotic constraints.

Table 13: Researchable issues

Parameters/Issues	Districts			
	Kaithal	**Kurukshetra**	**Karnal**	**Jind**
Rice ecology in your area	Irrigated			
Rice cultivation only in Kharif or both Kharif and Rabi	Only Kharif season			
Number of years of experience in rice farming	Some less than 5 years; majority 5-10 years			
Main biotic constraints (diseases) in your area according to you	Sheath blight followed by leaf blast			
Extent of disease damage	Below 10%			
Main biotic constraints (Insect pests) in your area according to you	Leaf folder, BPH and stem borer			
Extent of insect pest damage	Below 10%			
Main abiotic constrains in your area according to you	Flash flood	Flash flood	Flash flood	Flash flood
Production constraints in your area according to you	Scarcity of agricultural labours, lack of mechanization and unavailability of quality seeds and fertilizers and pesticides			
Irrigation facilities in your area	Yes, Available; Bore wells			
Normally how many years it takes to change the rice variety	Majority 5-10 years followed by 10-20 years			
Any other rice production issues in your area which the rice scientists need to address	NA	NA	NA	NA
What is urgently required in your area as far as rice varieties are concerned				
Duration	Medium duration varieties with lodging resistance	NA	NA	NA
Biotic stress resistance	HYVs resistance to sheath blight, BPH	NA	NA	NA
Abiotic stress resistance	NA	NA	NA	NA
Preferred grain quality	NA	NA	NA	NA
Nutritional quality	NA	NA	NA	NA

Table 15 contd..: Researchable issues

Parameters/Issues	Districts			
	Yamunanagar	**Ambala**	**Panipat**	**Sonepat**
Rice ecology in your area	Irrigated			
Rice cultivation only in Kharif or both Kharif and Rabi	Only Kharif season			
Number of years of experience in rice farming	5-10 years	5-10 years		5-10 years <5 years
Main biotic constraints (diseases) in your area according to you	Sheath blight (Main); blast/Neck blast			

Parameters/Issues	**Districts**			
	Yamunanagar	**Ambala**	**Panipat**	**Sonepat**
Extent of disease damage	Below 10%			
Main biotic constraints (Insect pests) in your area according to you	Leaf folder (main), stem borer and BPH			
Extent of insect pest damage	Below 10%			
Main abiotic constrains in your area according to you	Flash flood	Flash flood		Flash flood
Production constraints in your area according to you	Scarcity of agricultural labours, lack of mechanization and unavailability of quality seeds			
Irrigation facilities in your area	Yes, Available; Bore wells			
Normally how many years it takes to change the rice variety	5-10 years			
Any other rice production issues in your area which the rice scientists need to address	NA	NA	Residue problem	NA
What is urgently required in your area as far as rice varieties are concerned				
Duration	NA	NA	NA	NA
Biotic stress resistance	HYVs resistance to sheath blight, stem borer	HYVs resistance to sheath blight, stem borer	NA	HYVs resistance to sheath blight, stem borer
Abiotic stress resistance	NA	NA	NA	NA
Preferred grain quality	NA	NA	NA	NA
Nutritional quality	NA	NA	NA	NA

Jammu and Kashmir-1-Khudwani (2023-2024)

Districts surveyed: *Anantnag* and *Kulgam*

Particulars of survey

Districts	Blocks	Villages
Anantnag	Achabal, Pahalgam and Vessu	Kheribal, Ganiepora, Salar and Palpora
Kulgam	Qaimoh and Frisal	Redwani, Khudwani, Qaimoh, Yaripora and Kujar

Widely prevalent varieties

Districts	Varieties
Anantnag	**HYVs:** SR-I, SR-2, SR-3, SR-4 and SR-5; **Local:** K-39, K-332, China-1039, China-1007 and Mushkbudji
Kulgam	**HYVs:** SR-I, SR-3 and SR-4; **Local:** China 1039, K-332 and others

Particulars of rice area in the district (in hectares):

District	Total geographical area (ha)	Total Cultivable area (ha)	Total Cultivated area (ha)	Total irrigated area (ha)	Area under rice (ha)	Area under DSR (ha)
Anantnag	72,149	48,123	47,861	31,127	24,000	Nil
Kulgam	47,642	35,605	27,397	20,046	16,748	Nil

Variety wise area coverage (ha) in surveyed districts during Kharif- 2023

Varieties	Anantnag	Kulgam
Jhelum	13700	9700
SR-1	1000	800
SR-2	100	-
SR-3	400	700
SR-4	2100	1200
SR-5	100	-
K-39	1200	500
K-332	400	-
China 1039/1007	4200	3400
Mushk Budji	800	-
Others	-	448

General Weather Conditions for disease development: Favourable

Months	May	June	July	Aug	Sep	Oct	Nov	Dec
# of Rainy Days	14	12	14	2	3	5	4	2
Total Rain Fall (mm)	96.1	92.6	206.6	12.8	37.4	59.4	31.5	23
Temp Maximum (^{O}C)	21.8	28.8	27.9	31.4	29.4	22.5	15	10.3
Temp Minimum (^{O}C)	8.1	13.6	16.6	16.2	12.8	5.2	0.5	-3.5
RH Morning (%)	85.8	83.7	89.3	86.3	88.5	90.1	92.3	91.6
RH Evening (%)	62.8	53.4	62.5	50.8	44.3	61.5	78.4	80.1

General question on rice cultivation in district (to be filled by the cooperator in consultation with the officials from state department of agriculture)

Parameters	**Anantnag**	**Kulgam**
Total area under HYVs in the district (ha)	17400	12400
Most prevalent HYVs in the district	SR4	SR4
Total area under rice hybrids in the district (ha)	Nil	Nil
Most prevalent rice hybrids in the district	Nil	Nil
Total area under basmati in the district	Nil	Nil
Most prevalent basmati varieties in the district	Nil	Nil
Seed Replacement rate	65%	70%
Whether farmers are using any heavy equipments like transplanted/combine harvester	No	No
Mention water saving technologies like SRI/laser levelling/DSR being used by the farmers	Nil	Nil
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Use of HYV, RFD, proper nursery mgt.	Use of HYV, RFD, proper nursery mgt.
What are the general problems in rice cultivation in the district	Untimely availability of inputs	Untimely availability of inputs
Please provide any farmers association in the district	Mushk Budji Growers' Association Sagam	Nil
Whether availability of labours is sufficient?	Yes	Yes
Whether there is any marketing problem of the produce?	No	No
Any major irrigation/power generation project in the district	Nil	Irrigation canals: Maw, Sonman
Any soil testing program undertaken?	Yes	Yes
Any farmers training programme was organized by the state department of Agriculture/University	Yes	Yes

Rice is the staple food of majority of the population inhabiting the Kashmir valley and the crop is grown in all the districts of the valley. By and large, farmers of the valley are highly skilled in rice cultivation but most of the farmers need to improve in proper nursery management and learn the technology of raising protected nurseries as the temperatures sometimes dip low in the valley when the seeds are sown. Production oriented survey was conducted in two districts viz., Anantnag and Kulgam when the crop was mainly at dough/maturity stage. The general climatic conditions were normal as far as rice is concerned. The main crop rotation practices followed by the farmers were rice-rapeseed and rice-oats. Most predominant rice varieties cultivated in this region were HYVs like SR-4 and SR-3 and some local varieties like Budjichina and China 1039. Some farmers are growing local landraces like Zag and Mushkbudji for special attributes. However, HYVs are spreading very fast and replacing the local varieties. Optimum time of sowing was Ist week of May and optimum time of transplanting was 1st week of June. Average seed rate was 80-100 kg/ha and

majority of the farmers contacted (90-100%) adopted seed treatment with carbendazim (2 g/kg seed). In the main fields, farmers applied 100-120 kg N/ha, 60 kg P_2O_5/ha, 30 kg k_2O/ha and Zinc Sulphate 20 kg/ha. All the farmers contacted, applied FYM (5-10 t/ha) in the main field. Random method of transplanting was common among the farmers. The intensity of common weeds like *Echinochloa* spp., *Potamogeton* spp., *Rotalia indica*, *Cyprus* spp. and *Ammannia* spp. was moderate. All the farmers contacted adopted hand weeding and in addition they applied herbicides like butachlor (1.5 kg a.i./acre) and Eros (pretilachlor 6% + pyrazosulfuron ethyl 0.15%) (10 kg/acre). Some of the common needs of the farmers were availability of certified seeds of good HYVs, timely supply of inputs, irrigation facilities and advices from experts regarding rice production technology. The intensity of most of the biotic constraints was low to moderate and application of pesticides was not common among the farmers.

District wise observations

Anantnag: Production oriented survey was conducted in four villages in this district involving 10 farmers. The rice fields surveyed were under irrigated conditions and the general weather conditions were normal for rice production. The crops were at maturity stage at the time of survey. About 40% farmers told that they used part of their land (10-25%) for raising other crops like pulses and vegetables mainly for domestic consumption. The main crop rotation practice followed by the farmers was rice-rapeseed/oats. Predominant rice varieties cultivated by the farmers were HYVs like SR-4 and SR-3 and local varieties like China-1039 and Budjichina. Optimum time of sowing was 1st week of May and optimum time of planting was 1st week of June. Average seed rate was 80-100 kg/ha and the co-operator reported that majority of the farmers contacted (90%) adopted seed treatment with carbendazim (2 g/kg). All the farmers contacted told that they applied FYM in the nursery bed and all of them applied urea (500-1000 g/25 m^2), DAP (550 g/25 m^2) and MOP (200 g/25 m^2). In the main fields, farmers applied 100-120 kg N/ha, 60 kg P_2O_5/ha, 30 kg K_2O/ha and Zinc Sulphate (20 kg/ha). All the farmers contacted applied FYM (5-7 t/ha) in the main field. Random method of transplanting was common among the farmers. The intensity of common weeds like *Echinochloa* spp., *Potamogeton* spp., *Rotalia indica*, *Cyprus* spp. and *Ammannia* spp. was medium. All the farmers contacted had applied herbicides like Eros (pretilachlor 6% + pyrazosulfuron ethyl 0.15%) (10 kg/acre) and butachlor (1.5 kg a.i./acre) followed by one hand weeding. Some of the common needs of the farmers were availability of certified seeds of good HYVs, timely supply of inputs, irrigation facilities and advices from experts regarding rice production and protection technology. Tractor was the only agricultural implement used by the farmers. Seed replacement rate was high. Canal was the main source of irrigation and farmers received advices from officials of State Department of Agriculture and University. Intensity of different biotic constraints was low to moderate and none of the farmers had applied any pesticides.

Kulgam: Five villages involving 10 farmers were covered for production oriented survey in this district when the crop was at maturity/dough stage. All the fields surveyed were under irrigated ecosystem and the general climatic conditions were normal for rice cultivation. Most of the farmers contacted told that they are using 10-25% of their land for cultivation of other crops like vegetables, pulses and maize for domestic consumption. The main crop rotation practice followed by the farmers was rice-rapeseed/oats. The region was mainly dominated by high yielding rice variety SR-4 and the average yield was 6850-7200 kg/ha. Primary reasons for higher yields were

use of recommended package of practices, proper spacing, timely irrigation and use of balanced dose of fertilizers. Optimum time of sowing was 1st week of May and optimum time of transplanting was 1st week of June. Average seed rate was 80 kg/ha and majority of the farmers adopted seed treatment with carbendazim (2 g/kg seed). All the farmers contacted applied FYM in the nursery beds and all of them applied urea (800-1000 g/25 m^2), DAP (550 g/25 m^2) and MOP (200 g/25 m^2). In the main fields, farmers applied 80-120 kg N/ha, 60 kg P_2O_5/ha, 30 kg K_2O/ha and Zinc Sulphate (20 kg/ha). All the farmers contacted, applied FYM (5-10 t/ha) in the main field. Random method of transplanting was common among the farmers. Lodging was the main problem in one of the villages of district Kulgam. The intensity of common weeds like *Echinochloa* spp., *Potamogeton* spp., *Rotalia indica*, *Cyprus* spp. and *Ammannia* spp. was medium. All the farmers applied herbicides like Eros (pretilachlor 6% + pyrazosulfuron ethyl 0.15%) (10 kg/acre) and butachlor (1.5 kg a.i./ha) followed by one hand weeding. Some of the common needs of the farmers were availability of inputs, quality seeds and assured irrigation. Commonly used equipments in this district was tractor. Canal is the main source of irrigation and farmers received advices from officials of State Department of Agriculture and University.

Jammu & Kashmir-2-Chatha (2023-2024)

Districts Surveyed: *Jammu, Udhampur, Reasi* and *Ramban*

Particulars of survey

District	Block	Villages
Jammu	Miran Sahib (Tali Morh), Bhalwal, Marh, Phalian Mandyal and R.S. Pura	Pandoria, Malpur Dingra, Tarlokpur, Khanpur Bhawan, Karloop, Prahladpur, Kotia Miah, Sohanjna, Laswara and Darsopur.
Udhampur	Udhampur, Sewna, RamNagar, Kulwanta, Khoon and Charunta	Vishal Jattan, Bant, Gossi, Kheri, Kathul Ganju, Masti and Kail.
Reasi	Panthal, Reasi, Pouni and Katra	Tikri, Ladura, Aghar Balian, Panasa, Babar, Dubkhalsa, Bamaliya, Bhant, Kakryal and Dadura
Ramban	Chanderkote, Sangaldhan Banihal	Sarathi Swami, Karma, Sangal Dhan, Seripura, Farnote, Dalwah Lower, Alanbas, Bhangra and Heman

Widely Grown Varieties

District	Prevalent Varieties
Jammu	**HYVs:** Basmati 370, Pusa Basmati 1121, Jammu Basmati 118, Jammu Basmati 129 and Sharbati; **Hybrids:** Arize 6444 Gold, PAC 807, Bayer Hybrid etc.
Udhampur	**HYVs:** K 39, PAC 807, Arize 6444 Gold, SJR 5, Giza-14 and local basmati
Reasi	**HYVs:** Basmati 370, Pusa Basmati 1121, local basmati and others; **Hybrids:** PAC807 and Arize 6444 Gold
Ramban	**HYVs:** Giza 14, K-39, SR-2, K 343 local japonica type grown in Sangal Dhan area

Particulars of Rice Area

District	Total Geographical area (ha)	Total Cultivable area (ha)	Area Under Rice (ha)	Irrigated Area (ha)
Jammu	237024	168030	51330	67212
Udhampur	279310	83841	9850	25152
Reasi	151701	38202	1213	9932
Ramban	113787	24991	3302	5748

Table 4: Weather data for Jammu district during *Kharif*' 2023

District/ Parameters	Months						
	Jun	Jul	Aug	Sep	Oct	Nov	Dec
# RD	6	10	12	8	4	3	2
TR (mm)	182.06	388.8	356.2	114.6	100	66.8	9.0
MMT (^{0}C)	30.2	29.6	30	28.5	23.3	18.6	13.7
T. Max (^{0}C)	36.2	33.6	34.8	33.9	30.3	26.2	21.4
T. Min (^{0}C)	24.2	25.5	25.2	23.1	16.3	109	5.9
SH	6.3	4.8	6.3	6.4	7.6	6.0	5.6

RD: Rainy days; TR: Total rainfall; MMT: Monthly Mean Temperature; T. Max: Maximum temperature; T. Min: Minimum temperature; SH: Sunshine hours

Table 5: General question on rice cultivation in district (to be filled by the cooperator in consultation with the officials from state department of agriculture)

Parameters	Jammu	Udhampur	Reasi	Ramban
Total area under HYVs (ha)	60-70%	30%	30%	-
Most prevalent HYVs in the district	Basmati 370, Pusa Basmati 1121, Sharbati	SJR 5, Giza 14	Basmati 370	SR 4, K 39, Giza 14
Total area under rice hybrids in the district	8-10%	10%	10-15%	Nil
Most prevalent rice hybrids in the district	PAC 807, Arize 6444 Gold	PAC 807, Arize 6444 Gold	PAC 807, Arize 6444 Gold	-
Total area under basmati in the district	70%	10-20%	10%	Nil
Most prevalent basmati varieties in the district	Basmati 370, Pusa Basmati 1121, JB 118, SJR 129	Pusa Basmati 1121	Basmati 370, JB-118	NA
Seed replacement rate	16-18%	12-14%	1-14%	10-12%
Whether farmers are using any heavy equipments	Yes; Combine harvester	Nil	Nil	Nil
Mention water saving technologies being used by the farmers	-	Nil	Nil	Nil
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Judicious use of inputs, regular contact with KVKs, importance of seed replacement	Regular contact with state dept. of agriculture and use of K fertilizers	Regular contact with KVKS	Regular contact with KVK Ramban
General problems in rice cultivation in the district?	Scarcity of labours and lodging of varieties like Basmati 370	Scarcity of irrigation water	Shortage of labours and hailstorm at the time of harvesting	Shortage of irrigation water
Please provide any farmers association in the district	-	-	-	-
Whether availability of agricultural labours is sufficient?	No	No	No	No
Whether there is any marketing problem of the produce?	NA	Yes; especially in hilly areas	Yes; especially in hilly areas	Yes; especially in hilly areas
Any major irrigation/ power generation project in the district	-	-	-	-
Any soil testing program undertaken?	Yes; by State department of Ag	Yes	Yes	Yes
Any farmers' training program was organized by state dept of Ag/ University	NA	Yes	Yes	Yes

An extensive production oriented survey was conducted during *Kharif 2023* in the four basmati and non-basmati growing districts *viz.,* Jammu, Udhampur, Reasi and Ramban districts of Jammu and Kashmir by a team of scientists from the SKUAST-Jammu, officials from agriculture department and the respective KVK's. In general, the weather conditions were normal for rice cultivation except some incidences of dry spell in some places in Udhampur and Reasi. Because of climate and ecosystem, part of the land was also used for cultivation of other crops like maize, maize + black gram/ green gram intercropping, sesame, vegetables and fodder. Common crop rotation practices followed by the farmers were rice-wheat (main), rice-potato, rice-potato-cucurbits, rice-barseem, rice-oats-cucurbits and rice-vegetables (cauliflower, knol khol etc.). Predominant rice varieties cultivated by the farmers were Basmati 370, Pusa 1121, Jammu Basmati

118, Jammu Basmati 129, K 39, Giza-14, SJR 5, SR-2, K 343 and Sharbati and hybrids like Arize 6444 Gold, PAC 807 and others. Farmers still prefer the Basmati 370 and Pakistani Basmati due to its taste, fragrance, and higher market value. Average rice yield in the district ranged from 2000-3850 kg/ha in different basmati and hybrid varieties. Most of the planting was done in 1st week to 2nd week of July. Most of the farmers contacted were in the medium income group and their average monthly per capita rice consumption was 8-15 kg. All of them contacted told that their main meal consisted of both rice and wheat. In general, they preferred polished and fine/basmati rice for consumption. About 60-80% of the farmers told that they adopted seed treatment with carbendazim (2 g/kg) or thiram (2.5 g/kg). Majority of the farmers applied chemical fertilizers like DAP (8-18 kg/kanal) and/or urea (6-10 kg/kanal) (1 Kanal= ~ 500 mt^2). In the main field, fertilizers were applied @ 50-80 kg N/ha, 30-60 kg P_2O_5/ha and 20-40 kg K_2O/ha. Comparatively less number of farmers applied potash. Some farmers applied zinc sulphate (10-15 kg/ha). Many farmers also applied FYM (6-10 t/ha) depending on availability. Some also applied green manure. Planting was mostly random and plant population per unit area was not maintained. Intensity of common weeds *Echinochloa* spp., *Cyperus rotundus*, *Cynodon dactylon*, *Eclipta alba* and others was low to medium. Seed replacement rate in different surveyed districts is low (12-20%). Among the diseases, brown spot and bacterial blight were recorded in moderate to high intensity. Among the insect pests, rice hispa was recorded in higher intensity. Some farmers adopted plant protection measures. Major problems faced by the farmers were shortage of labours, unavailability of inputs in time, appropriate price of the produce, fragmented and scattered land, lack of modern knowledge on rice production technology, lack of irrigation facilities, marketing problem and hailstorm at the time of maturity.

District-wise Observations

Jammu: Paddy is most important crop both in terms of area and as staple cereal after wheat in district Jammu. The Crop occupies an area of 51330 ha in the district and is mainly cultivated in blocks of Miran Sahib (Tali Morh), Bhalwal, Marh, Phalian Mandyal and R.S. Pura and to a very small extent in other blocks. Survey was conducted in 10 villages in this district when the crops were in booting to dough stage. Because of climate and ecosystem, part of the land was also used for cultivation of other crops like vegetables and fodder. Common crop rotation practices followed by the farmers were rice-wheat (main), rice-potato, rice-potato-cucurbits, rice-barseem, rice-oats-cucurbits and rice-vegetables (cauliflower, knol khol etc.). Commonly grown rice varieties in the district were Basmati 370, Pusa Basmati 1121, Jammu Basmati 129, Jammu Basmati 118, Sharbati and little extent of hybrid rice. Farmers still prefer the Basmati 370 and Pakistani Basmati due to its taste, fragrance, and higher market value *i.e.,* Rs. 4500-4800 per quintal. Average rice yield in the district ranged from 2200-3250 kg/ha in different basmati and hybrid varieties. Planting was done in 1st week to 2nd week of July. Most of the farmers contacted were in the medium income group and their average monthly per capita rice consumption was 8-13 kg. All of them contacted told that their main meal consisted of both rice and wheat. In general, they preferred polished and fine/basmati rice for consumption. About 40% farmers contacted told that due to diabatic problem, they have started using other cereals also. About 60% farmers told that they adopted seed treatment with carbendazim (2 g/kg). Majority of the farmers applied chemical fertilizers like DAP (12-18 kg/kanal) + urea (6-10 kg/kanal) (1 Kanal= ~ 500 mt^2). In the main field, fertilizers were applied @ 60-70 kg N/ha, 40-45 kg P_2O_5/ha and 30-40 kg K_2O/ha. About 50% farmers contacted applied K fertilizer. In basmati, dose of N was less (20-30 kg/ha). Many farmers applied zinc sulphate (10-

15 kg/ha). Many farmers also applied FYM (6-8 t/ha) depending on availability. Some also applied green manure. Planting was mostly random and plant population per unit area was not maintained.

Intensity of common weeds like *Echinochloa* spp., *Cyperus rotundus*, *Cynodon dactylon*, *Eclipta alba* and others was low to medium. Most of the farmers practiced hand weeding along with application of pre-emergence herbicide butachlor. Some of the common needs of the farmers were timely availability of inputs, promotion/demonstration of DSR/SRI, creation of self-help group and training on rice production technology. There were incidences of weedy rice called Chobha (*Oryza sativa* var *spontanea*) in most of the places surveyed. Implements like tractor, rotavator, cultivator, paddy thresher and combine harvester were used by the farmers mainly on hire basis. Seed replacement rate is low (14-20%). Among the diseases, brown spot and bacterial blight were recorded in moderate to high intensity on varieties like Basmati 370, Sharbati, Pusa Basmati 1121 and Arize 6444 Gold. Sheath rot and grain discoloration were observed in low to moderate intensity. Among the insect pests, rice hispa was recorded in higher intensity (sudden outbreak) on varieties like Basmati 370, Pusa Basmati 1121. Most of the farmers contacted told that they applied chlorpyriphos (1.5-1.75 ml/l) for managing rice hispa. There was sudden outbreak of rice hispa (*Diclodispa armigera*) in first fortnight of August especially in late transplanted crop and advisory was issued by AICRIP scientists in joint collaboration with state department of agriculture to the farmers regarding management of this pest. Major problems faced by the farmers were shortage of labours and lodging of Basmati 370 due to rain and wind during maturing period. Major problems expressed by the farmers were bacterial blight, brown spot and leaf folder among biotic stresses and submergence among the abiotic stresses. Farmers want HYVs with tolerance to the above mentioned stresses and MS grain and aromatic rice varieties with high zinc and preferably having low GI.

Udhampur: Paddy is also an important crop both in terms of area and as staple cereal after wheat and maize in district Udhampur. The Crop occupies an area of 9850 ha in the district and is mainly cultivated in blocks of Udhampur, Sewna, RamNagar, Kulwanta, Khoon and Charunta and to a very small extent in other blocks. Survey was conducted in 7 villages involving 10 farmers in this district when the crops were in heading to dough stage. Majority of the fields surveyed were under hill ecosystem. In general, the weather conditions were good except there were reports of dry spell in some of the places surveyed. Most of the farmers told that in addition to rice, they used their land for other crops like maize and maize-cowpea/broad bean intercropping. Common crop rotations were rice-wheat, rice-oat/barseem, rice-vegetables and others. Commonly grown rice varieties in the district were K-343, Pusa Basmati 1121, Giza 14, Sharbati and little extent of hybrid rice. Average rice yield among HYVs and hybrids in the district ranged from 2000-2850 kg/ha. Planting was done in 1st week to 2nd week of July. About 50% of the farmers contacted were in the medium income group and another 50% were from low income group and their average monthly per capita rice consumption was 8-15 kg. All of them contacted told that their main meal consisted of both rice and wheat. In general, they preferred polished and both fine/basmati and coarse grain rice for consumption. About 30% farmers contacted told that due to diabatic problem, they have started using other cereals like maize and finger millet. About 80% farmers told that they adopted seed treatment with carbendazim (2 g/kg) or thiram (2.5 g/kg). Application of organic manure in the nursery was not common. All the farmers applied chemical fertilizers like DAP (18-20 kg/kanal) + urea (10 kg/kanal) or only DAP (12-25 kg/kanal) (1 Kanal= ~ 500 mt^2). In the main field, fertilizers were applied @ 50-80 kg N/ha, 40-60 kg P_2O_5/ha and 40 kg K_2O/ha. About 20% farmers contacted applied K fertilizer. Few farmers applied zinc sulphate (15 kg/ha). Many farmers

also applied FYM (4-12 t/ha) depending on availability. Planting was mostly random and plant population per unit area was not maintained.

Intensity of common weeds like *Echinochloa* spp., *Cyperus rotundus*, *Cynodon dactylon*, *Eclipta alba* and others was low to medium. Most of the farmers (~70%) practiced hand weeding along with application of pre-emergence herbicide butachlor. Some of the common needs of the farmers were timely availability of inputs like quality seeds, promotion/demonstration of DSR/SRI, training program on seed processing and storage, availability of small equipment suitable for hilly areas, grain mandi at block level, development of FPOs and Kisan credit card. There were incidences of weedy rice called Chobha (*Oryza sativa* var *spontanea*) in most of the places surveyed. Implements like tractor, rotavator, cultivator, paddy thresher and small rice harvester were used by the farmers mainly on hire basis. Seed replacement rate is low (12-18%). Among the diseases, bacterial blight was recorded in moderate to high intensity on varieties like PC 19, Giza 14 and others. Other diseases were observed in low to moderate intensity. Among the insect pests, rice hispa was recorded in higher intensity in some of the places surveyed. Some of the farmers applied imidaloprid for managing rice hispa and carbendazim (1 g/l), propiconazole (1 ml/l) and copper oxychloride (2.5 g/l) for managing different diseases. Major problems faced by the farmers were shortage of labours, unavailability of inputs in time, marketing problem/lack of grain market, shortage of irrigation water, unavailability of small equipment suitable for hill ecosystem and unavailability of DAP and MOP and their high cost. Major problems expressed by the farmers were leaf blast, bacterial blight, brown spot, stem borer, rice hispa and leaf folder among biotic stresses and drought among the abiotic stresses. Farmers want HYVs with tolerance to the above mentioned stresses and MS grain and aromatic rice varieties with high zinc and preferably having low GI.

Reasi: Paddy is also an important crop both in terms of area and as staple cereal after wheat and maize in district Reasi. The crop occupies an area of 1213 ha in the district and is mainly cultivated in blocks of Panthal, Reasi, Pouni and Katra and to a very small extent in other blocks. Ten villages were covered for production oriented survey in this district when the crops were in dough stage. Almost all the fields surveyed were under hill ecosystem. In general, the weather conditions were good except there were reports of dry spell in few places. Most of the farmers told that in addition to rice, they used their land for other crops like maize, maize-pulse (black gram, moong bean) intercropping, turmeric, sesame and others. Common crop rotations were rice-wheat, rice-oat/barseem, rice-vegetables and others. Commonly grown varieties in the district were Basmati 370, Pusa Basmati 1121, local basmati and rice hybrids like PAC807 and Arize 6444 Gold. Some of the farmers are still cultivating local varieties because of their taste and less input requirement. Average rice yield among HYVs and hybrids in the district ranged from 2000-2850 kg/ha. Planting was done in 1st week to 2nd week of July. Majority of the farmers contacted were in the medium income group and their average per capita rice consumption was 8-12 kg/month. All of them contacted told that their main meal consisted of both rice and wheat. In general, they preferred polished and both fine/basmati and coarse grain rice for consumption. About 40% farmers contacted told that due to diabatic problem, they have started using other cereals like maize, barley and finger millet. Few farmers (~ 40%) told that they adopted seed treatment with carbendazim (2 g/kg). Application of organic manure in the nursery was not common. Majority of the farmers applied chemical fertilizers like DAP (10-18 kg/kanal) + urea (6-9 kg/kanal) (1 Kanal= ~ 500 mt^2). In the main field, fertilizers were applied @ 50-80 kg N/ha, 30-60 kg P_2O_5/ha and 30-40 kg K_2O/ha. About 30% farmers contacted applied K fertilizer. About 50% farmers contacted applied

zinc sulphate (10-20 kg/ha). Many farmers (~ 70%) also applied FYM (3-12 t/ha) depending on availability. Planting was mostly random and plant population per unit area was not maintained.

Intensity of common weeds like *Echinochloa* spp., *Cyperus rotundus*, *Cynodon dactylon*, *Eclipta alba* and others was low to medium. Most of the farmers (~60%) practiced hand weeding along with application of pre-emergence herbicide butachlor. Remaining farmers practiced only hand weeding. Some of the common needs of the farmers were timely availability of inputs like quality seeds and fertilizers, promotion/demonstration of DSR/SRI, improvement in irrigation facilities, soil testing, development in transportation facilities and Kisan credit card. There were incidences of weedy rice called Chobha (*Oryza sativa* var *spontanea*) in most of the places surveyed. Implements like tractor, rotavator, cultivator, paddy thresher and sprayer were used by the farmers. Seed replacement rate is low (12-14%). Among the diseases, bacterial blight was recorded in moderate to high intensity on varieties like PAC 807 and some local cultivars. Other diseases were observed in low to moderate intensity. Most of the insect pests were observed in low to moderate intensities. Some of the farmers applied imidaloprid for managing rice hispa and carbendazim (1 g/l) and copper oxychloride (2.5 g/l) for managing different diseases. Major problems faced by the farmers were shortage of labours, unavailability of inputs in time, shortage of irrigation water and fragmented and scattered land. Major problems expressed by the farmers were bacterial blight, brown spot and stem borer among biotic stresses and drought and high temperature among the abiotic stresses. Farmers want HYVs with tolerance to the above mentioned stresses and MS grain and varieties with high zinc and preferably having low GI.

Ramban: Paddy is also an important crop both in terms of area and staple cereal after wheat and maize in district Ramban and some minor millets are also cultivated in hilly villages. The Crop occupies an area of 3302 ha in the district and is mainly cultivated in blocks of Chanderkote and Sangaldhan Banihal and these areas mostly fall in intermediate temperate zone. Survey was conducted in 10 villages in this district when the crops were in dough to maturity stage. Almost all the fields surveyed were under hill ecosystem. In general, the weather conditions were good except there were reports of dry spell in few places. Most of the farmers told that in addition to rice, they used their land for other crops like maize, maize-ramash (French bean) or maize + black gram intercropping, fodder, sesame and others. Common crop rotations were rice-wheat, rice-oat, rice-pea, rice-knol khol, rice-barseem and others. Commonly grown varieties in the district were Giza 14, K-39, SR-2, K 343 local japonica type grown in Sangal Dhan area. Average rice yield among HYVs and hybrids in the district ranged from 1800-2850 kg/ha. Yield in some places was reduced due to rainfed ecology, scarcity of irrigation water, sudden fall in night temperature at the time of flowering resulting in spikelet sterility and hailstorm at the time maturity. Planting was done in 4th week of June to 2nd week of July. Majority (~ 60%) of the farmers contacted were in the medium income group and their average per capita rice consumption was 10-16 kg/month. All of them contacted told that their main meal consisted of both rice and wheat. Some farmers also consumed maize along with rice and wheat. In general, they preferred polished and both fine and coarse grain rice for consumption. About 40% farmers contacted told that due to diabatic problem, they have started using other cereals like maize. About 80% farmers contacted told that they adopted seed treatment with carbendazim (2 g/kg) or thiram (2.5 g/kg). Application of organic manure in the nursery was not common. Majority of the farmers applied chemical fertilizers like DAP (5-14 kg/kanal) + urea (5-10 kg/kanal) or only urea (8-10 kg/kanal) or only DAP (10-12 kg/kanal) (1 Kanal= ~ 500 mt^2). In the main field, fertilizers were applied @ 75-80 kg N/ha, 30-60 kg P_2O_5/ha and 20-25 kg K_2O/ha. About 20% farmers contacted applied K fertilizer. About

20% farmers contacted applied zinc sulphate (10-12 kg/ha). Many farmers (~ 80%) also applied FYM (1.5-10 t/ha) depending on availability. Planting was mostly random and plant population per unit area was not maintained.

Intensity of common weeds like *Echinochloa* spp., *Cyperus rotundus*, *Cynodon dactylon*, *Eclipta alba* and others was low to medium. About 50% practiced hand weeding along with application of pre-emergence herbicide butachlor. Remaining 50% farmers practiced only hand weeding. Some of the common needs of the farmers were timely availability of inputs like quality seeds and fertilizers (DAP, MOP), training on rice production technology, soil testing, balance use of fertilizers and plant protection measures, creation of more number of FPOs, development of small equipment suitable for hill ecosystem, improvement in irrigation facilities and improvement in marketing facility. There were incidences of weedy rice called Chobha (*Oryza sativa* var *spontanea*) in most of the places surveyed. Implements like tractor, rotavator and cultivator were used by the farmers. Seed replacement rate is low (12-14%). Among the diseases, rice blast was observed in moderate to severe intensity bacterial blight was recorded in moderate intensity on varieties like K-343, Giza 14, China and local Japonica rice varieties. Other diseases were observed in low to moderate intensity. Most of the insect pests were observed in low to moderate intensities. In Ramban, there was moderate level (8-22%) incidence of red worm/blood worm in many fields and moderate level incidence (15-18%) of army worm in some fields. Very few (~ 20%) farmers applied imidaloprid for managing rice hispa and hexaconazole (1.8 g/l) for managing blast and brown spot diseases. Major problems faced by the farmers were shortage of labours, unavailability of inputs in time, appropriate price of the produce, fragmented and scattered land, lack of modern knowledge on rice production technology, lack of irrigation facilities, marketing problem and hailstorm at the time of maturity. Major problems expressed by the farmers were leaf blast, bacterial blight, brown spot, stem borer and leaf folder among biotic stresses and drought and low light intensity among the abiotic stresses. Farmers want HYVs with tolerance to the above mentioned stresses and MS grain and varieties with high zinc, high iron and preferably having low GI.

Prevalence of diseases and insect pests in Jammu in K'2023

Districts	Diseases					
	Bl	**BS**	**ShR**	**GD**	**FS**	**BB**
Jammu	-	M-S (15-28%)	L-M (5-12%)	M (10-24%)	-	M-S (10-32%)
Udhampur	M (15-25%)	L-M (6-20%)		L-M)6-18%)	L-M (6-18%)	M-S (10-42%)
Reasi	-	L-S (5-28%)	L-M (5-10%)	L-M (5-18%)	-	M-S (12-32%)
Ramban	M-S (15-30%)	L-M (5-16%)		L-M (5-18%)		M (16-24%)

Districts	Insect pests					
	SB	**LF**	**GLH**	**RH**	**GB**	**GH**
Jammu	L-M (8-10%)	L-M (5-14%)	M (8-14%)	M-S (15-30%)	M (12-24%)	L-M (5-10%)
Udhampur	L-M (5-20%)	L-M (5-12%)	L-M (5-10%)	M-S (10-26%)		L-M (4-16%)
Reasi	L-M (6-18%)	-	M (10-18%)	M (12-22%)	M (10-15%)	L-M (5-10%)
Ramban	L-M (6-20%)	L-M (6-14%)	L-M (5-10%)	M (16-24%)		

In Ramban, there was moderate level (8-22%) incidence of red worm/blood worm in many fields and moderate level incidence (15-18%) of army worm in some fields

Karnataka-Mandya (2023-2024)

Districts surveyed: *Mandya, Mysuru, Chamarajanagara, Hassan, Chikkamangalur, Tumkuru, Davangere* and *Shivamogga*

Table 1: Particulars of survey

District	Taluqs/Blocks	Villages (Latitude; longitude)
Mandya	Mandya, Pandavapura, Srirangapatna, Malavalli and Maddur	Nela Makanahalli (12º 25' 32"; 77º 3' 1"), Nelluru (12º 25' 53"; 77º 4' 18"), Kande gala (12º 25' 5"; 77º 4' 33"), Melahalli (12º 28' 25"; 77º 2' 25"), Yaladahalli (12º 26' 45"; 77º 0' 15"), Budana hossuru (12º 31' 9"; 76º 55' 60"), Yattagadahally (12º 30' 39"; 76º 55' 6"), Kottatthi (12º 28' 20"; 76º 51' 42"), Arakere (12º 24' 19"; 76º 48' 16") and Swadanahally
Mysuru	KR Nagara, HD Kote, T. Narsipura and Hunusur	K.R Nagara (12º 27' 2 3"; 76º 23' 30"), Chunchankatte (12º 29' 59"; 76º 17' 28"), Hosuru (12º 29' 59"; 76º 17' 27"), Hosuru (12º 29' 29"; 76º 17' 26"), Gowdagere (12º 22' 53"; 76º 19' 27"), Gowdagere (12º 22' 53"; 76º 19' 27"), Katte malavadi (12º 21' 34"; 76º 17' 52"), Katte malavadi (12º 21' 34"; 76º 17' 52"), Harave (12º 23' 59"; 76º 15' 16"), Harave (12º 23' 57"; 76º 15' 6"), Harave (12º 7' 34"; 77º 2' 23"), Danayakanapura and Kodagalli
Chamaraja-nagara	Kollegala, Kasaba and Hanuru	Kunturu (12º 7' 35"; 77º 2' 23"), Yalanduru (12º 2' 8"; 77º 2' 7"), Y. K. Mole (12º 2' 3"; 77º 2' 5"), Kunturu (12º 7' 34"; 77º 2' 23"), Y. K. Mole (12º 2' 9"; 77º 2' 7"), Y.K Mole (12º 2' 3"; 77º 2' 7") and Y. K. Mole (12º 7' 43"; 77º 1' 43")
Hassan	Hassan, Channarayapatna and Hole Narasipura	Nagalapura (12º 47' 32"; 77º 12' 54"), Kattebelaguli 912º 49' 13"; 76º 11' 11"), Hanta Kattebelaguli (12º 48' 50"; 76º 11' 59"), Yalleshpura (12º 48' 48"; 76º 12' 14"), Yalleshpura (12º 48' 52"; 76º 12' 23"), Hirebelaguli (12º 48' 53"; 76º 13' 12"), Chikkanalli (12º 48' 58"; 76º 13' 0"), Sankarahally (12º 47' 32"; 76º 12' 54") and Hanta Kattebelaguli (12º 48' 50";76º 11' 59")
Chikkaman-galur	Mudigere, Chikmangaluru and Kaduru	Kottigehara (12.1' 24"; 75.5' 30"), Kottigehara (13.1' 24"; 75.5' 30"), Banakal (13.1' 28"; 75.5' 35"), Banakal (13.1' 28"; 75.5' 35"), Hiresigere (13º 2' 37"; 75º 43' 48"), Hiresigere (13º 2' 37"; 75º 43' 48"), Chimmatagere (13º 4' 1"; 75º 43' 15"), Gonibeedu (13º 4' 40"; 75º 42' 3") and Anachuru (13º 4' 49"; 75º 40' 9")
Tumakuru	Sira, Kunigal and Tumakuru	Kunigal (13º 2' 26"; 77º 1' 18"), Honnenahalli (13º 3' 46"; 77º 1' 35"), Alagonahalli (13º 6' 6"; 77º 1' 35"), Naraganalli (13º 15' 7"; 77º 5' 9"), Guluru (13º 17' 54"; 77º 5' 12"), Guluru (13º 16' 7"; 77º 5' 21"), Guluru Hosuru (13º 16' 8"; 77º 5' 42"), Manangi (13º 16' 7"; 77º 5' 41"), Sira (13º 36' 46"; 76º 57' 16") and Bychenalli (13º 48' 20"; 76º 55' 54")
Davangere	Channagiri, Harihara and Davangere	Kukkavada (14º 20' 26"; 75º 53' 12"), Kariganuru (14º 18' 35"; 75º 52' 25"), Kattalagere (14º 17' 56"; 75º 50' 36"), Kattalagere (14º 18' 5"; 75º 50' 5"), Thimmenalli (14º 18' 38"; 75º 50' 15"), Thimmenalli (14º 18' 25"; 75º 50' 8"), Thimmenalli (14º 18' 15"; 75º 50' 4"), Kattalagere (14º 17' 30"; 75º 49' 57"), Kattalagere (14º 16' 20"; 75º 49' 56"), Kattalagere (14º 16' 17"; 75º 49' 50"), Kariganuru (14º 18' 5"; 75º 51' 39") and Davanagere (14º 25' 30"; 75º 34' 52")
Shivamogga	Shivamogga and Bhadravati	Honalli (14º 17' 42"; 77º 47' 43"), Holaluru (14º 10' 49"; 77º 39' 56"), Kuruva (14º 9' 8"; 75º 40' 15"), Cheeluru (14º 6' 9"; 75º 40' 50"), Hosamalali (14º 2' 46"; 77º 41' 2"), Holaluru (14º 2' 47"; 77º 41' 10"), Holaluru (14º 2' 47"; 77º 41' 1"), Holaluru (13º 58' 41"; 75º 37' 36"), Badravathi (Kasaba) (13º 52' 14"; 75º 40' 40"), Sundahalli (13º 49' 51"; 75º 43' 4") and K H Nagara (13º 50' 9"; 75º 44' 51")

Table 2: Predominant rice varieties

Districts	Varieties
Mandya	**HYVs:** Super amman, Kaveri Price, MTU-1001, JAYA, MPR-606, Jyothi, Meenakshi, Sanmadhu, RNR 15048, D R 8336, Penna super, Onkar and MPR606; **Hybrids:** VNR-2233 Plus, GK- Chethan, PAC 837 and others
Mysuru	**HYVs:** Sanna madhu, Shreya, Samruddi, Super Aman, Sanna madhu, Pennasuper, RNR15048, Meenakhsi, Jyothi, MTU 1001, KMP-220, MSN-99 and Shreya; **Hybrids:** VNR2233, GK-Chethana, Samrat and others
Chamarajanagara	**HYVs:** RNR15048, Jyoti, IR64, Superamman and Pennasuper
Hassan	**HYVs:** RNR 15048, Tunga, Rajamudi, Jyoti, Gangavati sona, KPR1, VNR, Ramdev, Sonaraja and Sanna madhu
Chikkamagaluru	**HYVs**: Tunga, RNR15048, KPR-1, Jyoti, Rajmudi, IET Sanna, Gangavati Sona, BR 2655 and Red rice
Tumakuru	**HYVs:** Sona Mahsuri, IR-64, BR 2655 and Tella Hamsa
Davanagere	**HYVs**: RNR 15048, JGL 1798, Sri ram, Jyothi, MTU 1001, BPT 5204, Kaveri sona and Jaishree Sona; **Hybrids:** VNR2233
Shivamogga	**HYVs:** Abhilash, MTU1001, Jyoti, RNR15048, MTU1010, Superamman, JGL 1798, Uma and Kempu mukti

Production oriented survey was conducted in eight districts of Karnataka *Viz*., Mandya, Mysuru, Chamarajanagara, Hassan, Chikmagaluru, Tumakuru, Davangere and Shivamogga districts of Southern Karnataka during *Kharif* 2023. The particulars of survey are presented in Table 1. Rice is grown in the state under Canal irrigated, rainfed and tank fed conditions. The south west monsoon entered the Karnataka state during June and the onset of monsoon was timely and but less than normal rainfall was recoded in all the districts surveyed. The rainfall received between May and June was less than normal thus all reservoirs Krishna Raja Sagar, Hemavathi, Tungabhadra, Hemavathi and Bhadra project got partially filled. The farmer started paddy sowing and transplanting prolonged due to less rainy days in all the districts surveyed. Crop health was good at all the stages in most of the fields due to on and off system of irrigation, it enhanced the root respiration and the leaves showed healthy green appearance in all varieties. The climatic condition prevailed during the cropping period was normal except with dry spells during September at tillering stage in Mandya, Mysuru and Shivamogga district. The particulars of weather conditions are presented in Table 3. The particulars of rice area in surveyed districts of Karnataka are presented in Table 3. The details of rice varieties cultivated in different surveyed districts are presented in Table 2. Commonly cultivated varieties in different districts of Karnataka were HYVs like Super amman, Kaveri Price, MTU-1001, JAYA, MPR-606, Jyothi, GK- Chethan, Meenakshi, Sanmadhu, Shreya, Tunga, Gangavati sona, KPR1, Rajamudi, IR64, Samruddi, Samrat, RNR 15048, Sona Mahsuri, Tella Hamsa, BPT 5204, Kaveri sona, D R 8336, BR 2655, Penna super, KMP-220, Abhilash, Ramdev, Sonaraja, MSN-99, JGL 1798, Sri ram, Jaishree Sona, Onkar, Uma, Kempu mukti and MPR606 and hybrids like VNR-2233 Plus, PAC 837 and others.

Table 3: Particulars of Rice area in different rice growing districts of Karnataka in 2023

Districts	Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Total irrigated area (ha)	Area under rice (ha)	Area DSR (ha)
Mandya	498244	309307	253118	140309	35244	225
Mysuru	676382	332535	154517	140519	76950	110
Chamarajanagara	569901	235691	158550	97832	5708	120
Hassan	662602	449313	389076	163699	36610	70
Chikkamagaluru	569901	312856	230690	96850	10849	-
Tumakuru	1059800	651236	324527	33498	1607	-
Davanagere	597597	549902	515000	189500	53200	-
Shivamogga	847784	262267	248706	156666	72135	5500

Table 4: Weather parameters in different rice growing districts of Karnataka in the cropping season *Kharif*' 2023

District/ Parameters	Months							
	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Mysore								
TR (mm)	58.0	82.0	31.0	100.4	66.2	39.0	0.0	15
RD	1	7	4	8	5	6	0	0
MMT (^{0}C)	27.8	26.0	27.4	27.4	27.7	26.4	26.7	24.4
T. Max (^{0}C)	33.5	30.3	31.9	31.5	32.1	30.3	29.8	30.1
T. Min (^{0}C)	22.1	21.7	22.9	23.3	23.3	22.5	23.7	19
MMRH	76	84	74	80	75	74	68	68
RH-Max	88	92	88	85	83	83	81	83.5
RH Min	65	76	61	75	66	65	56	52
Mandya								
TR (mm)	57.6	44.1	33.4	54.8	52.5	42.0	0.0	1.8
RD	0	5	2	6	04	05	00	-
MMT (^{0}C)	27.3	25.9	26.7	26.6	26.0	25.5	24.2	23.9
T. Max (^{0}C)	33.2	30.3	32.4	31.6	31.9	30.8	30.3	30.8
T. Min (^{0}C)	21.5	21.4	21.1	21.7	20.1	20.2	18.1	17
MMRH	68	76	66	71	68	73	72	67
RH-Max	78	83	79	79	83	84	84	84
RH Min	57	69	54	62	53	61	60	50
Chamaraja Nagara								
TR (mm)	77.9	39.4	88.5	25.5	24.0	60.0	9.0	0.0
RD	3	6	3	3	3	4	1	0
MMT (^{0}C)	26.8	25.4	26.2	26.4	25.8	25.4	24.2	24.2
T. Max (^{0}C)	32.3	29.2	32.0	31.1	32.0	30.7	30.1	31.2
T. Min (^{0}C)	21.2	21.6	20.4	21.7	19.5	20.0	18.4	17
MMRH	77	82	73	78	77	83	80	74
RH-Max	87	87	90	88	93	95	96	91
RH Min	67	77	56	69	62	70	65	56
Hassan								

District/ Parameters	Months							
	Jun	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**
TR (mm)	55.0	297.2	42.6	21.4	27.2	131.8	0.0	8.6
RD	NA	NA	NA	NA	NA	NA	NA	NA
MMT (^{0}C)	27.4	22.5	25.1	25.4	26.2	27.4	24.2	22.4
T. Max (^{0}C)	32.7	29.9	32.5	31.9	32.1	33.3	30.7	31.7
T. Min (^{0}C)	22.1	15.2	17.8	19.0	20.3	21.4	17.7	13.0
MMRH	81	83	81	82	82	76	82	79.6
RH-Max	84	81	83	85	84	85	82	80
RH Min	78	85	78	79	80	68	82	79
Chikkamagaluru								
TR (mm)	53	182	11	57	58	64	6	15
RD	NA	NA	NA	NA	NA	NA	NA	NA
MMT (^{0}C)	21.9	20.5	21.1	20.3	20.7	21.0	20.4	19.1
T. Max (^{0}C)	25.8	23.2	25.0	23.8	25.3	26.0	26.2	25.1
T. Min (^{0}C)	17.9	17.8	17.2	16.7	16.1	15.9	14.7	13
MMRH	76	84	73	81	75	71	72	74
RH-Max	82	87	78	86	83	80	84	85
RH Min	69	81	67	76	67	62	61	62
Tumakuru								
TR (mm)	172.5	4.5	51.5	32.0	1.0	39.0	0.0	0.0
RD	NA	NA	NA	NA	NA	NA	NA	NA
MMT (^{0}C)	27.4	25.5	26.4	26.5	26.2	24.9	23.3	23.4
T. Max (^{0}C)	33.2	29.6	32.3	32.2	33.3	30.8	30.3	30.7
T. Min (^{0}C)	21.5	21.4	20.4	20.9	19.1	19.0	16.3	16
MMRH	80	90	78	95	90	94	88	77
RH-Max	83	88	88	93	93	96	94	88
RH Min	76	92	68	96	87	91	82	65
Davanagere								
TR (mm)	26.4	196.6	23.8	63.4	10.2	55.6	0.0	0.0
RD	NA	NA	NA	NA	NA	NA	NA	NA
MMT (^{0}C)	27.9	23.9	25.2	24.9	25.5	24.2	23.2	23.4
T. Max (^{0}C)	33.4	26.8	29.4	28.9	31.5	30.2	29.7	30.9
T. Min (^{0}C)	22.4	21.0	20.9	20.9	19.4	18.1	16.7	16
MMRH	63	81	76	79	69	68	69	64.2
RH-Max	82	88	88	89	84	81	81	86
RH Min	44	74	65	69	53	56	56	43
Shivamogga								
TR (mm)	62.6	237.0	41.4	42.2	4.8	103.2	0.0	10.0
RD	7	21	5	5	0	5	0	0
MMT (^{0}C)	26.8	24.5	25.8	25.6	26.2	25.5	24.1	24.4
T. Max (^{0}C)	31.3	27.2	30.0	29.9	31.9	30.9	30.6	31.3
T. Min (^{0}C)	22.4	21.7	21.6	21.4	20.6	20.1	17.5	17
MMRH	75	87	82	85	75	79	74	67
RH-Max	83	90	92	91	88	88	86	85
RH Min	66	84	73	78	62	69	61	49

Table 5: General question on rice cultivation in district (to be filled by the cooperator in consultation with the officials from state department of agriculture)

Parameters	Districts			
	Mandya	**Mysuru**	**Chamaraja Nagara**	**Hassan**
Total area under rice HYV in the district	35244	76950	5708	36610
Most prevalent HYVs in the district	RNR-15048, Super Aman, Kaveri price, MTU-1001, MPR-606, TATA-836, Jyothi and GK- Chethana, Meenakshi and Cauvery Rice.	V.N.R-2233, GK- Chethan, Samrat, Sanna madhu, Samruddi, Super Aman, Meenakhsi, Jyothi, KMP-220,	RNR15048, Jyoti, IR64,, Superamman and Pennasuper	RNR 15048, Tunga, Rajamudi, Jyoti, Gangavati sona, KPR1, VNR, Ramdev, Sonaraja and Sanna madhu
Most prevalent rice hybrids in the district	Mahalakshmi	VNR2233	Superamman	VNR2233
Total area under rice hybrids in the district (ha.)	1600	1000	256	2200
Whether farmers are using any heavy equipments like transplanter/combine harvester	Combine harvester	Combine harvester and baler	-	Combine harvester and baler
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	DSR and Alternate wetting and drying	Direct seeded Rice and alternate wetting and drying	-	Alternate drying and wetting method and Direct seeded Rice
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Water saving technologies, Application of Zn, pest and disease control, crop insurance, SRI Method.	Water saving technologies and plant protection measures	Water saving technologies and plant protection measures	Water saving technologies and plant protection measures
What are the general problems in rice cultivation in the district?	Labour Mini. Support price Wild animals menase	Labour and marketing, less minimum support price	Labour, marketing and less minimum support price	Labour marketing, less minimum support price
Please provide any farmers' association in the district	-	Karnataka Farmers association	-	Karnataka Farmers association
Whether availability of agricultural labours is the sufficient?	No	No	No	No
Whether there is any marketing problem of the produce?	Yes	Yes	Yes	Yes
Any major irrigation/power generation project in the district	Krishna Raja Sagara	Krishna Raja sagara	KABINI	Hemavathi irrigation project
Any soil testing program undertaken?	Soil health card scheme	Soil health card scheme government	Soil health card scheme	Soil health card scheme
Any farmers training program was organized by the state department of Agriculture/University	KSDA under ATMA	KSDA under ATMA	KSDA under ATMA	KSDA under ATMA

Table 5 contd..: General question on rice cultivation in district (to be filled by the cooperator in consultation with the officials from state department of agriculture)

Parameters	Districts			
	Chikkamagaluru	**Tumakuru**	**Davanagere**	**Shivamogga**
Total area under rice HYV in the district	6580	3260	53200	72135
Most prevalent HYVs in the district	Tunga, KPR-1, IET Sanna, BR 2655 and Red rice	IR64, VNR2233, MTU1001, Sona, RNR-15048, Poineer and Tella Hamsa	RNR15048, JGL 1798, Sri ram, Jyothi, MTU1001, BPT 5204, Kaveri sona,	Abhilash, MTU1001, Jyoti, RNR15048, MTU1010, Superamman, JGL 1798
Most prevalent rice hybrids in the district	Sona	-	-	RNR15048
Total area under rice hybrids in the district (ha.)	3000	-	-	10100
Whether farmers are using any heavy equipments like transplanter/combine harvester	Transplanter, harvester and baler	Combine harvester	Combine harvester	Combine harvester and Baler
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	Alternate drying and wetting method and Direct seeded Rice	-	Alternate drying and wetting method	Alternate drying and wetting method and Direct seeded Rice
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Acidic soil measures, Water saving technologies and plant protection measures, crop insurance	Water saving technologies and plant protection measures Use of HYV, crop insurance	Water saving technologies and plant protection measures	Mechanized transplanting, Water saving technologies and Plant protection measures
What are the general problems in rice cultivation in the district?	Wild animal menase Iron toxicity Labour issues Marketing price	Low rainfall Wild animal menase	Labour, marketing problems and less minimum support price	Labour, marketing problems and less minimum support price
Please provide any farmers' association in the district	Karnataka Farmers association	-	Karnataka Farmers association	Karnataka Farmers association
Whether availability of agricultural labours is the sufficient?	No	No	No	No
Whether there is any marketing problem of the produce?	Yes	Yes	Yes	Yes
Any major irrigation/power generation project in the district	Hemavathi	Hemavathi irrigation project	Bhadra reservoir	Tunga Bhadra reservoir
Any soil testing program undertaken?	Soil health card scheme	Soil health card scheme	Soil health card scheme	Soil health card scheme
Any farmers training program was organized by the state department of Agriculture/University	KSDA under ATMA	KSDA under ATMA	KSDA under ATMA	KSDA under ATMA

Table 6: Variety wise acreage (ha) in different rice growing districts of Karnataka in 2023

Variety	Districts			
	Mandya	Mysuru	Chamaraja Nagara	Hassan
sanmadhu	4048	5580		
GK chetana	4035	8560		
Super amman	3544	6553		
RNR15048	2525	2500	4238	7132
Kaveri price	3090			
Meenakshi	2474	5680		
VNR2233 plus	2079	8575		
Oenna super	2047			
OAC 837	835			
MPR606	732			
Jyothi	1027	4525		531
DR 8336	1090			
Onkar	1662			
MTU 1001	2191	2560		
Others	3865	16495		
Samrat		6500		
Shreya		3560		
Penna super		2560		
IR-64			1206	
Jyothi and others			264	
Tunga				11050
Rajmudi				3026
Gangavathi sona				750
Private varieties				2780

Table 6 contd..: Variety wise acreage (ha) in different rice growing districts of Karnataka in 2023

Variety	Districts			
	Chikkamagaluru	Tumakuru	Davanagere	Shivamogga
Tunga	1910			
IET5600	1650			
BR-2655	850	950		
Red rice	1520			
Others	650	290		31586
Sona masuri		1020		
IR-64		550		
Hamsa		450		
RNR15048			22000	5410
Sri ram sona			9850	
BPTsona			4800	
MTU-1001			3500	5760
Jyothi			1250	7905
Abhilash				12905
MTU-1010				8566

Table 7: General information

Parameters	Districts			
	Mandya	**Mysuru**	**Chamaraja Nagara**	**Hassan**
# of talukas/blocks covered	5	4	3	3
# of villages surveyed	10	8	3	7
# of farmers interviewed	10	15	7	9
Field ecosystem	IR (100%)	IR (100%)	IR (100%)	IR (100%)
Weather conditions during cropping season	Normal (100%)	Normal (100%)	Normal (100%)	Normal (100%)
Crop stage when survey was made	Tillering to milk	Tillering to booting	Tillering to heading	Tillering to heading
Crop rotations	Farmers followed diverse crop rotation practices like rice-rice, rice-dhaincha-rice, rice-dhaincha, rice-sesamum, rice-cowpea, rice-black gram/green gram, rice-finger millet, rice-finger millet-black gram, rice-groundnut-cowpea, rice-maize, rice-potato.			

Table 7 contd..: General information

Parameters	Districts			
	Chikkamagaluru	**Tumakuru**	**Davanagere**	**Shivamogga**
# of talukas/blocks covered	3	3	3	2
# of villages surveyed	6	9	5	8
# of farmers interviewed	10	10	10	11
Field ecosystem	IR (100%)	IR (100%)	IR (100%)	IR (100%)
Weather conditions during cropping season	Normal (100%)	Normal (100%)	Normal (100%)	Normal (100%)
Crop stage when survey was made	Milk to mature	Maturity	Maturity	Maturity
Crop rotations	Farmers followed diverse cropping practices like rice-cowpea, rice-finger millet, rice-finger millet-cowpea, rice-cowpea-finger millet, rice-vegetables, rice-pulses, rice-dhaincha and others. Many farmers are growing green manure crop and incorporating into the soil.			

IR: Irrigated

A. General Information, cropping system and rice yield: The details of the number of villages surveyed and number of farmers contacted are presented in Table 7. Majority of the fields surveyed were under irrigated ecosystem. The prevailing cropping pattern in the districts surveyed is Rice-Rice followed by rice-sugarcane, rice-ragi, rice-vegetables, rice-maize, rice-pulses, green manure crops, and rice-fallow. Average rice yield in different high yielding rice varieties and hybrids in different districts ranged from 3500-6200 kg/ha. Yield in some of the fields were affected due to problematic soil, water stress, salinity and biotic constraints.

Table 8: Average yields of different rice varieties as reported by the cooperators/ farmers

Variety/hybrids	Yield (kg/ha)			
	Mandya	**Mysuru**	**Chamaraja Nagara**	**Hassan**
HYVs				
Jyothi	4960	4850	5620	
RNR 15048	5520		4550-5920	5500
Super Amman	6022	5300		
Rajamudi				3530-5000
MPR 606	4820			
Jaya	5521			
MTU 1001	4920			4250
KMP-220		4850		
Samrudddhi		5450		
Shreya		5650		
Sannmadhu		4850-5450		5420-5650
Meenkashi		5400		
MSN-99		4280		
Gangavathi Sona			5625	
Penna Super			5520	
Ramdev				5500
Sona raja				5320
Hybrids				
VNR2233	5340			
G. K. Chethana	5620	5200-6250		
Tata 836	5520			
Kaveri	5920			

Table 8 contd..: Average yields of different rice varieties as reported by the cooperators/ farmers

Variety/hybrids	Yield (kg/ha)			
	Chikkamagaluru	**Tumakuru**	**Davanagere**	**Shivamogga**
HYVs				
HYVs				
Jyothi				4210-4220
RNR 15048		5850	5250-5850	5300-5600
Amman Sona				5345-5400
Tunga	5025-5450			
IR 64		4450-4670		
BR 2655	5225-5510			
MTU 1001			5400	
IET 5600	5850-6010			
Red Rice	4650			
Sona		4850-6150	5450-6200	
Sri Ram			6050	
Kempu Mukti				4650
Hybrids				
Pioneer hybrid		5150		

Table 9: Details of rice consumption pattern in different districts of Karnataka in 2023

Parameters	Districts			
	Mandya	**Mysuru**	**Chamaraja Nagara**	**Hassan**
Status of farmers	Medium Income (70%); Poor (20%); Rice (10%)	Medium Income (100%)	Medium Income (100%)	Medium Income (100%)
Per capita monthly rice consumption (kg)	8-10 kg	7-10 kg	7.5-9 kg	8.5-10 kg
Composition of main meal	Only rice (90%); Rice+ Wheat (10%)	Only rice (100%)	Only rice (100%)	Only rice (100%)
Preferred rice types	Polished rice (90%); Parboiled (10%)	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)
Rice grain type preference	Fine grain (60%); Coarse grain (40%)	Fine grain (60%); Coarse grain (40%)	Fine grain (85.7%); Coarse grain (14.3%)	Fine grain (88.9%); Coarse grain (11.1%)
Any changes in food habit in last 10 years	No (100%)	No (100%)	No (100%)	No (100%)

Table 9 contd..: Details of rice consumption pattern in different districts of Karnataka in 2023

Parameters	Districts			
	Chikkamagaluru	**Tumakuru**	**Davanagere**	**Shivamogga**
Status of farmers	Medium Income (80%); Poor (20%)	Medium Income (90%); Poor (10%)	Medium Income (100%)	Medium Income (90.9%); Poor (9.1%)
Per capita monthly rice consumption (kg)	8-10 kg	7.5-9 kg	6.5-9 kg	7-8 kg
Composition of main meal	Only rice (100%)	NA	Only rice (100%)	Only rice (100%)
Preferred rice types	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)
Rice grain type preference	Fine grain (80%); Coarse grain (20%)	Fine grain (70%); Coarse grain (30%)	Fine grain (100%)	Fine grain (72.7%); Coarse grain (27.3%)
Any changes in food habit in last 10 years	No (100%)	No (100%)	No (100%)	No (100%)

B. Rice consumption pattern: Survey was conducted on consumption pattern of rice among the farmers in different surveyed districts of Karnataka (Table 9). On an average about 91% of the farmers contacted were in medium income group and rest were from low income group. Average per capita consumption of rice per month was 6.5-10 kg rice. About 90-100% of the farmers contacted from different surveyed districts told that their main mean consisted of only rice. In general, they preferred polished rice. Regarding grain quality, though farmers preferred fine grain

quality rice, about 10-40% farmers contacted also used coarse grain rice. In general, there was no change in the food habit.

Table 10: Details of nursery management

Parameters	Districts			
	Mandya	**Mysuru**	**Chamaraja Nagara**	**Hassan**
Planting time	2nd to 3rd week of August	1st to 4th week of August	4th week of August to end of September	2nd to 3rd week of August
Seed rate	25-30 kg/ha	20-25 kg/ha	20-25 kg/ha	25-30 kg/ha
Seed treatment (% farmers adopted)	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Chemicals used for seed treatment	Not available			
Organic manure in nursery (% farmers adopted)	Yes (100%) FYM	Yes (100%) FYM	Yes (100%) FYM	Yes (88.9%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (100%); DAP; Urea	Yes (100%); DAP; Urea	Yes (100%); DAP; Urea	Yes (100%); DAP; Urea

Table 10 contd..: Details of nursery management

Parameters	Districts			
	Chikkamagaluru	**Tumakuru**	**Davanagere**	**Shivamogga**
Planting time	4th week of July to 3rd week of August	1st to 2nd week of August	1st to 2nd week of August	1st to 2nd week of August
Seed rate	25-30 kg/ha	25-30 kg/ha	25-30 kg/ha	25-30 kg/ha
Seed treatment (% farmers adopted)	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Chemicals used for seed treatment	Not available			
Organic manure in nursery (% farmers adopted)	Yes (100%) FYM	Yes (100%) FYM	Yes (100%) FYM	Yes (100%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (100%); DAP; Urea	Yes (100%); DAP; Urea	Yes (100%); DAP; Urea	Yes (100%); DAP; Urea

C. Nursery and main field Management: In general, planting was done from 1st week to 4th week of August (Table 10). Average seed rate used by the farmers ranged from 25-30 kg/ha. It has been reported that all the farmers contacted in different districts adopted seed treatment. Almost all the farmers contacted told that they applied FYM in the nursery. All the farmers contacted also applied chemical fertilizers like DAP and urea in the nursery (Table 10). Majority of the farmers (63-100%) contacted adopted random planting where plant population per unit area was not maintained. Some farmers from followed line planting and some farmers adopted direct sowing. In recent years' farmers are adopting drum seeder method of direct sowing, Alternate drying and wetting method of irrigation is slowly picking up in Mandya and Mysuru districts in Cauvery command area due to technology spread and practicing in canal tail end farmers. Farmers have

adopted it mainly due to yield advantage and to save the water. Fertilizers were applied @ 23-165 kg N/ha, 20-148.5 kg P_2O_5/ha and 15-107.5 kg K_2O/ha. About 20-60% of the farmers applied zinc sulphate in the field (Table 11). Almost all the farmers contacted applied organic manure (mainly FYM followed by green manure) in the field. Farmers used different fertilizers like 20:20:0:13 (factomphos), 19:19:19, 10:26:26, 15:15:15, urea, DAP, SSP, MOP and zinc sulphate (Table 11).

Table 11: Details of main field management

Details	Districts			
	Mandya	**Mysuru**	**Chamaraja Nagara**	**Hassan**
Planting method	Majority of the farmers (80-100%) contacted adopted random planting where plant population per unit area was not maintained. About 9-15% farmers followed line planting. Very few adopted direct sowing			
Total N applied	45-102.5 kg/ha	25-160 kg/ha	70-102.5 kg/ha	23-73.75 kg/ha
Total P_2O_5 applied	32.75-45 kg/ha (50% applied)	20-45 kg/ha (93.3% applied)	32.5-148.5 kg/ha (85.7% applied)	22.5-45 kg/ha (77.8% applied)
Total K_2O applied	32.75-45 kg/ha (90% applied)	45-75 kg/ha (46.7% applied)	18-107.5 kg/ha (71.4% applied)	30-75 kg/ha (88.9% applied)
$ZnSO_4$ applied (21% or 33%)	Yes (20%) @ 20-25 kg/ha	Yes (40%) @ 13-29 kg/ha	Yes (57.1%) @ 29 kg/ha	Yes (44.4%) @ 14-29 kg/ha
Organic fertilizers applied	Yes (100%); FYM (80%); Green manure (20%)	Yes (100%); FYM (26.6%); Green manure (73.4%)	Yes (100%); FYM (71.4%); Green manure (28.6%)	Yes (100%); FYM (100%)
Remarks	Nutrients were applied in the form of 20:20:0:13 (factomphos), 19:19:19, 10:26:26, 15:15:15, urea, DAP, SSP, MOP and zinc sulphate.			

Table 11 contd..: Details of main field management

Details	Districts			
	Chikkamagaluru	**Tumakuru**	**Davanagere**	**Shivamogga**
Planting method	Majority of the farmers (63-100%) contacted adopted random planting where plant population per unit area was not maintained. Some farmers from Shivmoga followed line planting. Some farmers adopted direct sowing			
Total N applied	28.75-126.25 kg/ha	47-105 kg/ha	57.5-165 kg/ha	22.75-149.5 kg/ha
Total P_2O_5 applied	14.25-28.75 kg/ha (60% applied)	32.5-107.5 kg/ha (90% applied)	50-65 kg/ha (80% applied)	12.93-77.5 kg/ha (81.8% applied)
Total K_2O applied	14.25-75 kg/ha (70% applied)	15-75 kg/ha (50% applied)	45-110 kg/ha (80% applied)	32.5-75 kg/ha (90.9% applied)
$ZnSO_4$ applied (21% or 33%)	Nil	Nil	8-32.5 kg/ha (20% applied)	29-32 kg/ha (63.6% applied)
Organic fertilizers applied	Yes (100%); FYM (100%)	Yes (100%); FYM (100%)	Yes (100%); FYM (90%); GM (10%)	Yes (100%); FYM (100%)
Remarks	Nutrients were applied in the form of 20:20:0:13 (factomphos), 19:19:19, 10:26:26, 15:15:15, urea, DAP, SSP, MOP and zinc sulphate.			

Table 12: Weeds and weed management

Details	Districts			
	Mandya	**Mysuru**	**Chamaraja Nagara**	**Hassan**
Weed intensity	Low	Low	Low to Medium	Low
Names of the weeds	*Cyperus procerus, C. difformis, C. iria, Fimbristylis miliaceae, Glinus oppositifolius, Eclipta alba, Scirpus* spp., *Spilanthus acmella, Echinochloa colona, Leptochloa chinensis, Panicum trypheron, Marsilia quadrifolia, Ludwigia Parviflora* and *Cuperus rotundus,*			
Weedicides used	Londax power, Butachlor and Nominee gold			
Percentage of farmers applied herbicides	Yes (10%); Only hand weeding (90%)	Only hand weeding (60%); hand weeding + herbicides (40%)	Only hand weeding (71.4%); hand weeding + herbicides (28.6%)	Only hand weeding (100%)
Wild/weedy rice incidence	Nil	Nil	Nil	Nil
Only hand weeding	Most of the farmers who applied herbicides, also adopted 1-2 hand weeding hand weeding at 30 and 60 days after planting. More than 60% farmers contacted in different districts told that they practice only hand weeding			

Table 12 contd..: Weeds and weed management

Details	Districts			
	Chikkamagaluru	**Tumakuru**	**Davanagere**	**Shivamogga**
Weed intensity	Low	Low-medium	Low to Medium	Low-medium
Names of the weeds	*Cyperus difformis, Cyperus rotundus, Echinochloa colona, Leptochloa chinensis, Marsilia quadrifolia, Glinus oppositifolius, Ludwigia Parviflora, Panicum trypheron, Lindernia veronicaefolia, Fimbristylis miliaceae, Eclipta alba* and others			
Weedicides used	Londax power, butachlor, pretilachlor and Nominee gold			
Percentage of farmers applied herbicides	Yes (10%); Only hand weeding (90%)	Only hand weeding (80%); hand weeding + herbicides (20%)	Only hand weeding (50%); hand weeding + herbicides (30%); only herbicides (20%)	Only hand weeding (36.4%); hand weeding + herbicides (27.3%); Only herbicides (36.4%)
Wild/weedy rice incidence	Nil	Nil	Nil	Nil
Only hand weeding	Most of the farmers who applied herbicides, also adopted 1-2 hand weeding hand weeding at 30 and 60 days after planting. On an average about 64% farmers contacted in different districts told that they practice only hand weeding			

D. Weeds and their Management: Overall, intensity of weeds was low to medium. The details of different weeds recorded in different districts are presented in Table 12. Usage of herbicides was in general less. About 10-40% farmers from different surveyed districts applied herbicides. Most of the farmers who applied herbicides, also adopted 1-2 hand weeding hand weeding at 30 and 60 days after planting. Commonly used herbicides were Londax power, butachlor, pretilachlor and Nominee gold. On an average about 64% farmers contacted in different districts told that they practice only hand weeding.

Table 13: Details of inputs used

Details	Districts			
	Mandya	**Mysuru**	**Chamaraja Nagara**	**Hassan**
Implements used	Implements like rotavator, tractor, power tiller, drum seder and combined harvester were used by the farmers mostly on hire basis. Progressive farmers had some of their own equipment.			
Source of seeds	Many farmers told that they purchased part of their seed requirement.			
Source of irrigation	Canal (100%)	Canal (100%)	Canal (100%)	Canal (100%)
Scarcity of irrigation water	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Availability of fertilizers/pesticides	No (100%)	Yes (100%)	Yes (85.7%)	Yes (66.67%)
Quality of fertilizers/pesticides	Not Satisfied (100%)	Not Satisfied (93.3%)	Not Satisfied (100%)	Not Satisfied (100%)
Advisors to the farmers	Dealers (80%); State dept. (90%); Univ (60%)	Dealers (100%); State dept. (100%); Univ (100%)	Dealers (100%); State dept. (100%); Univ (100%)	Dealers (100%); State dept. (100%); Univ (100%)

Table 13: Details of inputs used contd..

Details	Districts			
	Chikkamagaluru	**Tumakuru**	**Davanagere**	**Shivamogga**
Implements used	Implements like rotavator, tractor, power tiller, drum seeder, cultivator, grass cutter and combined harvester were used by the farmers mostly on hire basis. Progressive farmers had some of their own equipment.			
Source of seeds	Many farmers told that they purchased part of their seed requirement.			
Source of irrigation	Canal (100%)	Canal (90%); Shallow tube well (10%)	Canal (100%)	Canal (81.8%); shallow tube well (18.2%)
Scarcity of irrigation water	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Availability of fertilizers/pesticides	No (100%)	No (100%)	No (100%)	No (100%)
Quality of fertilizers/pesticides	Not Satisfied (100%)	Not Satisfied (80%)	Not Satisfied (100%)	Not Satisfied (100%)
Advisors to the farmers	Dealers (90%); State dept. (100%); Univ (100%)	Dealers (90%); State dept. (100%); Univ (80%)	Dealers (80%); State dept. (80%); Univ (80%)	Dealers (100%); State dept. (100%); Univ (100%)

E. Specific needs of the farmers: Some of the common needs of the farmers were improvement in irrigation system, pest and disease resistant HYVs, improvement in marketing facility, timely availability of micronutrients, crop insurance, timely availability of quality seeds and other inputs like fertilizers and pesticides, mechanization in rice farming, proper supply of electricity and knowledge/ training on improved rice production technology.

F. Input use: Implements like rotavator, tractor, power tiller, drum seeder, cultivator, grass cutter and combined harvester were used by the farmers mostly on hire basis. Progressive farmers had some of their own equipment. Harvesting of rice and baling of straw was followed by using by using combine harvesters and baler and slowly mechanization is picking up in all the districts. Mechanical Rice transplanters are being promoted from state department by providing subsidies in Davangere and other districts. Drum seeding technology (wet direct) is picking up in the district however farmers are facing problem of weed management as there are no pre-emergent selective weedicides available in the market. Many farmers told that they purchased part of their seed requirement. State department of Agriculture distributed the seeds to the farmers timely during the season. Canal was the main source of irrigation followed by shallow tube well. Almost all the farmers contacted expressed that there was scarcity of irrigation water. Majority of the farmers expressed that fertilizers especially complex fertilizer (10:26:26) and zinc micronutrient were not available in time. Major advisors to the farmers were private dealers followed by officials from university and state department of agriculture.

Table 14: Prevalence of different diseases and insect pests in surveyed districts of Karnataka in 2023

Districts	Disease						
	Bl	**NBl**	**BS**	**ShBl**	**ShR**	**FS**	**BLB**
Mandya	L (1-5%)	L-M (5-12%)	L	L-S (3-35%)	L-M (4-12%)	L	L
Mysuru	L-M (2-25%)	L-S (6-29%)	L	L-S (4-32%)	L-M (4-18%)	L	L
Chamaraja-nagara	L	L	L	L (2-4%)	L-M (2-8%)	L	L
Hassan	L (5%)	L-M (2-13%)	L (2%)	L-M (2-14%)	L-M		
Chikkama-galuru	L-S (3-30%)	L	L	L (2-6%)	L-M (4-16%)	L	
Tumakuru	L (1-4%)	L	M	L (2-3%)	L (2-6%)		
Davanagere	L (2-3%)	L	L	L (3-6%)	L (2-6%)		L
Shivamogga	L (2-5%)	M	L	L-M (2-8%)	L (2-6%)	L	L (2-6%)

Districts	Insect pests		
	SB	**LF**	**BPH**
Mandya	L (2-5%)	L-M (2-15%)	L-M
Mysuru	L (2%)	T-M (1-8%)	M
Chamarajanagara	L (2%)	L (1-6%)	M
Hassan	L	L-M (2-10%)	
Chikkamagaluru		L-M (2-15%)	L (3%)
Tumakuru	L (2-6%)	L (1-3%)	L (1-2%)
Davanagere	L (2-3%)	L (3-4%)	L (2-3%)
Shivamogga	L (1-3%)	L (3-4%)	L (2-6%)

G. Biotic stress and their management: District wise prevalence of different diseases and insect pests are presented in Table 14. Diseases like leaf brown spot, sheath rot, false smut and bacterial blight were recorded in low to moderate intensity indifferent surveyed districts (Table 14) due to less rain fall. Leaf blast severity of up to 25% was recorded in GK Chethana, Samrat, VNR and sannamadhu in Mysuru district and up to 30% intensity in some fields in Chikmagaluru. Neck and panicle blast of 6-29% was recorded in Superamman, Meenakshi, Jyothi and in Shreya in some fields of Mysuru. High incidence of sheath blight (up to 35%) was recorded in some fields of Mandya and Mysuru on varieties like Jyothi. Insect pests like stem borer, leaf folder and brown plant hopper were recorded in low to moderate intensity. Comparatively higher intensity of BPH was noticed in some fields in Manday, Mysuru and Chamarajanagara on varieties like Jyoti, GK Chetana. In Mysuru, outbreak of brown plant hopper was recorded in T. Narasipura, Nanjungud and Bannur block of the district at dough and grain filling stage affecting to the range of 22-35%. The details of different pesticides used for management of different diseases and insect pets are presented in Table 15. It was reported 100% of the farmers contacted adopted chemical plant protection measures. In general, the farmers adopted 1-2 sprayings and some farmers from mandya and Mysusru mixed 2 or more pesticides before spraying. At tillering stage stunted growth and yellowing was observed due to potash deficiency in jyothi variety. During this year zinc and potassium deficiency was observed in many districts as the farmers could not apply the zinc due to non-availability and cost of complex fertilizer.

Table 15: Details of pest management

Details	**Districts**			
	Mandya	**Mysuru**	**Chamaraja Nagara**	**Hassan**
% age farmers adop-ting plant protection	100% farmers adopted chemical plant protection measures			
Names of pesticides	**Insecticides**: fipronil (1.5 ml/l), chlorpyriphos (2 ml/l), imidacloprid (0.5 ml/l), Fame (Flubendiamide) (0.2 ml/l) and cypermethrin (1-2 ml/l) for stem borer, leaf folder and other pests; **Fungicides**: hexaconazole (2 ml/l), propiconazole (1 ml/l), carbendazim (1 g/l), difenoconazole (1 ml/l) and Nativo (0.4 g/l) for different fungal diseases and copper oxychloride (3 g/l) for bacterial blight			
# of pesticide sprays	1-2	1-2	1	1
Mixing of pesticides before application	Yes (60%) 2-3 pesticides	Yes (13.3%) 2 pesticides	Nil	Nil

Details	**Districts**			
	Chikkamagaluru	**Tumakuru**	**Davanagere**	**Shivamogga**
% age farmers adop-ting plant protection	100% farmers adopted chemical plant protection measures			
Names of pesticides	**Insecticides**: Ekalux (2 ml/l), imidacloprid (0.5 ml/l) and chlorpyriphos (2 ml/l) for stem borer, leaf folder and other pests; **Fungicides**: carbendazim (1 g/l), propiconazole (1 ml/l), Nativo (0.4 g/l), hexaconazole (2 ml/l),tricyclazole (0.6 g/l) and Saaf (carbendazim + mancozeb) (2 g/l) for different fungal diseases			
# of pesticide sprays	1	1-2	1	1-2
Mixing of pesticides before application	Nil	Nil	Nil	Nil

Table 16: Researchable issues

Parameters/Issues	**Districts**			
	Mandya	**Mysuru**	**Chamaraja Nagara**	**Hassan**
Rice ecology in your area	Irrigated	Irrigated	Irrigated	Irrigated
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif and Kharif + Rabi			
Number of years of experience in rice farming	5-10 years			
Main biotic constraints (diseases) in your area according to you	Leaf and neck blast, sheath blight and bacterial blight			
Extent of disease damage	10-25%			
Main biotic constraints (Insect pests) in your area according to you	BPH, stem borer and leaf folder			
Extent of insect pest damage	10-25%; below 10% in some places			
Main abiotic constrains in your area according to you	NA	NA	NA	NA
Production constraints in your area according to you	Scarcity of agricultural labours, lack of irrigation facilities, unavailability of fertilizers and pesticides in time, micronutrient deficiency and unavailability of quality seeds of HYVs			
Irrigation facilities in your area	Available Canal, bore well	Available canal	Available Canal, bore well	Available canal
Normally how many years it takes to change the rice variety	10-20 Years/More than 20 years			
Any other rice production issues in your area which the rice scientists need to address				
What is urgently required in your area as far as rice varieties are concerned				
Duration	Not available			
Biotic stress resistance	Not available			
Abiotic stress resistance	Not available			
Preferred grain quality	Not available			
Nutritional quality	Not available			

H. Researchable issues: Among the biotic stresses, major problems in the region leaf and neck blast, sheath blight and bacterial leaf blight among the diseases and BPH, stem borer and leaf folder among the insects. Farmers want varieties suitable for DSR, HYVs with lodging resistance, short duration high yielding rice varieties, varieties resistant/tolerant to above mentioned biotic constraints and bio-fortified varieties with higher zinc and protein.

Table 16 contd..: Researchable issues

Parameters/Issues	**Districts**			
	Chikkamagaluru	**Tumakuru**	**Davanagere**	**Shivamogga**
Rice ecology in your area	Irrigated	Irrigated	Irrigated	Irrigated
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif and Kharif + Rabi			
Number of years of experience in rice farming	5-10 years/ 10-20 years			
Main biotic constraints (diseases) in your area according to you	Leaf and neck blast and sheath blight			
Extent of disease damage	10-25%			
Main biotic constraints (Insect pests) in your area according to you	BPH, stem borer and leaf folder			
Extent of insect pest damage	10-25%; below 10% in some places			
Main abiotic constrains in your area according to you	NA	NA	NA	NA
Production constraints in your area according to you	Scarcity of agricultural labours, lack of irrigation facilities, unavailability of fertilizers and pesticides in time, micronutrient deficiency and unavailability of quality seeds of HYVs			
Irrigation facilities in your area	Available Canal	Available Canal, Bore well	Available Canal, Bore well	Available Bore well
Normally how many years it takes to change the rice variety	5-10 years/ 10-20 Years			
Any other rice production issues in your area which the rice scientists need to address				
What is urgently required in your area as far as rice varieties are concerned				
Duration	Not available			
Biotic stress resistance	Not available			
Abiotic stress resistance	Not available			
Preferred grain quality	Not available			
Nutritional quality	Not available			

Kerala-Moncompu (2023-2024)

Districts surveyed: *Alappuzha, Kottayam, Pathanamthitta, Thiruvananthapuram, Ernakulam* and *Kollam*

Particulars of survey

District	Blocks/Panchayath
Alappuzha	Ambalapuzha, Alappuzha, Champakulam and Ramankary
Kottayam	Ettumanoor, Kottayam and Vaikom
Pathanamthitta	Thiruvalla
Thiruvananthapuram	Parasala, Pallichal, Vamanapuram, Nedumangadu, Kattakada, Kazhakkuttam, Attingal, Varkala, Pulimath, Aryankode and Neyyatthinkara
Ernakulam	Narakkal, Paravoor, Aluva, Nedumbassery, Kalamassery, Vyttila, Perumbavoor, Angamaly, Keezhmad, Poothrikka, Moovattupuzha and Kothamangalam
Kollam	Kollam, Kottarakkara, Karunagappalli, Kunnathoor and Punaloor

Widely cultivated rice varieties

Districts	Varieties
Alappuzha, Kottayam and Pathanamthitta	Uma (MO 16), Manuratna, Pournami (MO 23) and others
Thiruvananthapuram	Uma and others
Ernakulam	Uma, Jyothi and Pokkali varieties
Kollam	Uma, Jyothi, Prathyasa, Manuratna, Red Triveni, Shreyas and Cherady

Particulars of rice area

District	Total cropped area (ha)	Total cultivable area(ha)	Total irrigated area (ha)	Total rice area (ha)
Alappuzha	125032	33999	32621	10509
Kottayam	184672	18169	15000	5801
Pathanamthitta	205415.82	161707	18350	19041.75
Thiruvananthapuram	157909	169359.28	13842.17	1319.351
Ernakulam	166827.54	4600	3500	3800
Kollam	1579.5	1792.1	325.96	1278.72

The production oriented survey was conducted during Kharif 2023 in diffferent districts of Kerala *viz*., Alappuzha, Kottayam, Pathanamthitta, Thiruvananthapuram, Ernakulam, and Kollam. Predominant rice varieties cultivated by the farmers were Uma (MO 16), Manuratna, Pournami (MO 23), Prathyasa, Manuratna, Red Triveni, Shreyas and Cherady. In Kuttanad region, crop was severely affected by severe rainfall followed by flash flood. Rice crop in many of the padasekharams in the Kuttanad region were totally lost due to over flow/bund breaching in the floods which occurred during the 2nd week of July 2023. *Cyperus difformis, Echinochloa crusgalli,*

Fimbristylis sp., *Echinocloa* sp., *Echichornia crassipes, Salvinia molesta, Monochoria vaginalis* and few others were the major weeds observed in moderate to high intensity in the surveyed districts and it was found along with wild rice. Severe incidence of wild rice problem was noticed in Alappuzha, Kottayam and Pathanamthitta District. It is great menace to direct sown rice crop area. KAU weed wiper was supplied to many of the padasekarams to control the wild rice population in Kuttanad. Diseases like brown spot, sheath blight, grain discoloration and bacterial blight was recorded in moderate to high intensity while blast was recorded in low intensity. Among the insect pests, leaf folder and brown plant hopper was recorded in moderate to high intensity in many places. Other insect pests like stem borer, gall midge, thrips, case worm and leaf minor recorded in low to moderate intensity. Severe black bug attack was noticed during tillering stage in some fields of Kottayam district.

District wise details

Kuttanad (Alappuzha, Kottayam and Pathanamthitta): Production oriented survey was conducted in four taluks in Alappuzha District, *viz*., Ambalapuzha, Alappuzha, Champakulam and Ramankary. A total of 10509 ha area was cultivated rice at Alappuzha district during Kharif season. Severe rainfall followed by flash floods affected rice cultivation in many parts of Alappuzha district and Kuttanad was specifically affected. Rice crop in many of the padasekharams in the Kuttanad region were totally lost due to over flow/bund breaching in the floods which occurred during the 2nd week of July 2023. The dry spell during the month of August and heavy rainfall during September was recorded. About 906 ha rice area of Alappuzha District was vitiated due to flood (728.1 ha of Kharif and 177.8 ha of Virippu season). The predominant varieties in this district were Uma and Manuratna. The ruling variety in this Kuttanad area is Uma (MO 16). The farmers are interested to cultivate the latest Moncompu variety Pournami (MO 23). It was cultivated in a small padasekharam of 64 ha area and yielded 3 0 to 3.25 t/acre. High weed infestation especially wild rice germination was noticed due to drought situation in August month. Severe incidence of wild rice problem was noticed in Alappuzha, Kottayam and Pathanamthitta District. It is great menace to direct sown rice crop area. *Cyperus difformis* and *Echinochloa crusgalli* and few others were the major weeds observed and it was found along with wild rice. KAU weed wiper was supplied to many of the padasekarams to control the wild rice population in Kuttanad. It is a special device to touch over wild rice panicle with total weedicide to destroy its panicle before the rice crop flowering starts. Severe attack of brown plant hopper (368 ha), leaf folder (346 ha), thrips (181 ha), case worm (146 ha), and bacterial leaf blight were noticed in Alleppey District. The grain discolouration and brown spot diseases occurred in the soil acidity and high iron toxicity field. During Kharif 2023, a total of 6334 ha area was cultivated rice in Kottayam District and 100 ha area was lost due to flood immediately after sowing. Severe black bug attack was noticed during tillering stage in Nattakom Panchayat area (110 ha). BPH, leaf folder and bacterial blight were major problems. In Pathanamthitta District, only 25 ha area was cultivated during Virippu Season.

Thiruvananthapuram: In Thiruvananthapuram district rice cultivation was practiced mainly in Parasala, Pallichal, Vamanapuram, Nedumangadu, Kattakada, Kazhakkuttam, Attingal, Varkala, Pulimath, Aryankode, Neyyatthinkara blocks in an area of 1319.351 ha. The cultivation was carried out in Virippu, Mundakan and Puncha seasons. Uma was the most preferred variety for cultivation. Occurrence of wild rice, *Fimbristylis* sp., *Echinocloa* sp., *Echichornia crassipes,*

Salvinia molesta etc. were severe in many areas under rice cultivation. Even though the incidence of insect pests and diseases was low, under favourable conditions the infestation of thrips, stem borer, leaf folder and brown plant hopper was recorded.

Ernakulam: In Ernakulam district, rice cultivation was taken up in Virippu, Mundakan and Puncha seasons. The rice cultivation was practiced in Narakkal, Paravoor, Aluva, Nedumbassery, Kalamassery, Vyttila, Perumbavoor, Angamaly, Keezhmad, Poothrikka, Moovattupuzha, Kothamangalam, Piravam blocks. The total cropped area in the district is 166827.54 ha. Out of that 4600 ha is under rice and about 3800 ha was under cultivation. Total irrigated area under rice was 3500 ha. Rice varieties namely, Uma, Jyothi and Pokkali varieties were the common varieties cultivated. Farmers mainly rely on canal irrigation system for farming. Rainfed cultivation is also practiced. Weedy rice, *Echinocloa* sp., *Cyperus* sp. etc. were the commonly observed weeds. Application of weedicides was practiced for the management of weeds and 2, 4-D, Nominigold (Bispyribac Sodium 10% SC), Adora (Bispyribac Sodium 10% SC), Tarak (Bispyribac Sodium 10% SC) etc. were the commonly used weedicides. Incidence of several diseases, namely, brown spot, sheath blight, blast, false smut (lakshmi rogam) was recorded during the cultivation. Infestation of stem borer, leaf roller, brown plant hopper was common during the season. Timely application pesticides were done to reduce the incidence of both insects and diseases. No application of pesticides was done in pokkali cultivation. Avian pests and rodents were recorded to cause damage in paddy fields.

Kollam: Production oriented survey was conducted in five Taluks of Kollam district, namely, Kollam, Kottarakkara, Karunagappalli, Kunnathoor and Punaloor. Total cropped area of the district is 1579.5 ha of which 1278.72 is occupied by rice cultivation. Uma, Jyothi, Prathyasa, Manuratna, Red Triveni, Shreyas and Cherady were the rice varieties commonly cultivated by the farmeres. Cultivation was practiced in Virippu, Mundakan and Puncha seasons by adopting direct sowing and transplanting. The weeds *viz*., wild rice, *Echinocloa* sp., nagapola (*Monochoria vaginalis*), *Salvinia* spp. etc were the major weeds observed. Farmers use weedicides for management of these weeds. Hand weeding was also practiced. Low incidence of shealth blight, bacterial blight, brown spot and grain discolouration was recorded and moderate incidence of blast was also observed. Thrips, stem borer, leaf folder brown plant hopper, case worm, leaf miner and gall midge were the insect pests recorded. Front line demonstrations were carried out in farmers' field for 'the management of *Limnocharis flava*, a major weed in the rice growing tracts of Kollam district' by adopting stale seed bed technology and application of Almix @6 g ai/ha @ 15-20 days after sowing under the guidance of Krishi Vigyan Kendra, Kollam.

Prevalence of diseases and insect pests in Kerala

Districts	**Diseases**				
	Bl	**BS**	**ShBl**	**GD**	**BLB**
Alappuzha	L	S	M-S	S	S
Kottayam	L	M	S	M	S
Pathanamthitta	L	M	S	M	S
Thiruvananthapuram	L	M	S	M	S
Ernakulam	L	M	M	M	S
Kollam	L	M	M	M	M

Districts	**Insect pests**							
	SB	**LF**	**BPH**	**GM**	**CW**	**Thrips**	**Leaf Miner**	**Black bug**
Alappuzha	L	M	S	L	S	M	M	-
Kottayam	L	S	S	-	L	M	L	S
Pathanamthitta	-	-	-	-	-	-	-	-
Thiruvananthapuram	L	S	S	-	L	M	-	-
Ernakulam	L	L	M	-	L	M	L	-
Kollam	M	S	M	-	L	L	L	-

Maharashtra-Karjat (2023-2024)

Districts surveyed: *Thane, Raigad, Palghar, Ratnagiri* and *Sindhudurg*

Table 1: Details of survey

Districts	Taluka/Block	Villages
Thane	Kalyan, Bhiwandi, Murbad and Shahapur	Goveli, Bapsai, Kolimb, Kunde, Kolivali, Angaon, Borpada, Vaghivali, Kakadpada, Kanol, Shelari, Shiravali, Kinhavali, Partoli and Cheravali
Raigad	Karjat, Panvel, Khalapur, Mahad, Uran and Mangaon	Ladiwali, Varai, Vadap, Kiravali, Wanjale, Khanavale, Poyanje, Barvai, Nadal, Chauktarapur, Hatnoli, Jambhivali, Kurle, Karanjadi, Revtale, Kalambsure, Bhom, Dighote, Lonere, Potner and Salegaon
Palghar	Palghar, Mokada, Wada, Jawhar and Vikramgad	Sagave, Vadrai, Mahim, Charanwadi, Takpada, Ghatkarpada, Sawarkhand, Chendwali, Golghar, Vangani, Kashivali (Tarf), Rajanpada, Walwande, Sajan, Vasuri and Alonde
Ratnagiri	Dapoli, Chiplun, Rajapur, Ratnagiri, Lanja, Khed and Sangmeshwar	Shiwnari, Sakhaloli, Talsure, Aagve, Kokre, Kondmala, Juvathi, Kondaye, Hativale, Golap, Bhatye, Shirgaon, Kuve, Kurne, Punas, Gunade, Ambdas, Bhelsai, Ozarkhol, Kolambe, Manaskond and Phansavale
Sindhudurg	Kankavali, Kudal, Malvan, Sawantwadi, Vengurla and Dodamarg	Lore No.1, Phondaghat, Karul, Bambarde Tarf, Wasoli, Zarap, Aamberi, Dhamapur, Kalse, Sawantwadi, Talawade, Wyetye, Insuli (Banda), Bhendmala, Aansur, Tulas, Zarebambar, Ghotage, Maneri and Sasoli

Production oriented survey was conducted in the Konkan region of Maharashtra is predominant rice growing belt with an average productivity of 2.69 (3.83 rough rice) t/ha. The region comprises of five districts *viz*. Thane, Raigad, Palghar, Ratnagiri and Sindhudurg. In Kharif' 2023 season, 361772.76 ha area was sown under rice cultivation in the region with HYVs. The farmers of this region cannot grow any crop other than rice in Kharif because of high rainfall and geographically low land. Production Oriented Survey for rice was undertaken at dough to maturity stage of crop during the month of middle of October-to first week of November 2023. The details of the places surveyed are presented in Table 1. The particulars of rice area in different districts of Konkan region are presented in Table 3. The details of different weather variables during the cropping season of 2023 in the five surveyed district are presented in Table 4. Weather conditions were in general favourable for rice cultivation in the region. The onset of monsoon was delayed by 15-20 days in the month of June in both South Konkan Costal Zone and in North Konkan Costal Zone of the region. Moderate to heavy rainfall was received in almost all districts of Konkan region in the month of July. The maximum rainy days were in Sindhudurg, Ratnagiri, Raigad and Thane districts were 107, 106, 92 and 92 days respectively. Whereas, the highest rainfall was in Ratnagiri

district (4005.2 mm) received in 106 rainy days. Total rainfall and its distribution in Konkan region were much satisfactory.

The details of the varieties cultivated by different farmers are given in Table 2. Commonly cultivated rice varieties in the region were HYVs like Jaya, Jordar, YSR, Rupali, MTU 1010, Karjat-3, Komal, Karjat-5, Akshet, Daptari-108, Manisha, Daptari-125, Suprema Sona, Komal 101, Spriha 911, Shabri, Silky, Silki 277, Shree 101, Avani, Devaki, Suvarna, Gangotri, Karjat-7, Sonal, Kaveri Sona, Safal 1010, Shubhangi, Rupali, Chintu, Trupti, NP-125, Hashita, Vijaya, Janaki, Bhavna, Vikrant, Swabhagya, N.P.H-242, Gaytri, Kranti, Asmita, Gold 78, Suma, Karjat-6, Ratnagiri-5, MTU-7029, Sundar, Indrayani, Raja, Durga, Mahuli, Mahalaxmi, Saguna, Kuber, Sindhu, Sampada, Punam, Punam Gold, Akshad, Samrudhi and Om Shri Ram, Karjat 2, Sarathi, Ratnagiri 8, Sadna, Prasanya, Vaishnavi, Pooja, Wada Kolam, Karjat 9, Ratnagiri 6, Sri 100, Jaishriram Gold, Vaishnavi and Shatayu andhybrids like Arize 6444, Kaveri 9090, Loknath, Ankur 7434, NP 125, Gorakhnath, NP-150, NP-125, Nirmal-NPH, Tej Gold, Rashi 113, Ankur 7576, Syn 5251, Mahiko 5629, Upaj, Mahico 5556, Arize 6129 and NPH 30. Some of the farmers cultivated local varieties like Vada Kolam and Wada Zinia.

Table 2: Widely prevalent rice varieties

Districts	Varieties
Thane	**HYVs:** Jaya, Jordar, YSR, Rupali, MTU 1010, Karjat-3, Komal, Karjat-5, Akshet, Daptari-108, Manisha, Daptari-125, Suprema Sona, Komal 101, Spriha 911, Shabri, Silky, Silki 277, Shree 101, Avani and Devaki; **Hybrids:** Arize 6444, Kaveri 9090, NPH , Loknath, Ankur 7434, NP 125, Gorakhnath; **Locals:** Vada Kolam
Raigad	**HYVs**: Jaya, Suvarna, Komal 101, Zordhar, Gangotri, Karjat-3, Karjat-7, Sonal, Kaveri Sona, Safal 1010, Shubhangi, Rupali, Avani, Supersona, Chintu, Trupti, NP-125, Hashita, MTU1010, Karjat-5, Vijaya, Janaki, Bhavna, Vikrant, Swabhagya, N.P.H-242, Gaytri, Kranti, Asmita and Gold 78; **Hybrids:** NP-150, NP-125, Nirmal-NPH and Tej Gold; **Locals:** Wadakolam
Palghar	**HYVs**: Suma, Karjat-3, Karjat-6, Ratnagiri-5, MTU-1010, MTU-7029, Sundar, Indrayani, Zordar, Raja, Suvarna, YSR, Komal 101, Silky 277, Wadakolam, Dapturi, Durga, Mahuli, Mahalaxmi, Saguna, Kuber, Sindhu, Sampada, Punam, Kranti, Punam Gold, Akshad, Samrudhi and Om Shri Ram; **Hybrids:** Raja, Rashi 113 and others; **Locals:** Wada Zinia
Ratnagiri	**HYVs**: Komal-101, Jaya, Sonan, Karjat 2, Sarathi, Ratnagiri 8, Sadna, Rupali, Trupti, Prasanya, Vaishnavi, Pooja, Wada Kolam, Sairam, Chintu, Suvarna, Punam, Karjat 9, Karjat 7, Karjat-3, Ratnagiri 6 and Others; **Hybrids:** Arize 6444, Ankur 7576, Syn 5251, Loknath 505, Gorakhnath, Mahiko 5629, Upaj, Mahico 5556, Ankur 6444 and Others
Sindhudurg	**HYVs:** Jaya, Sonam, Suvarna, Komal 101, Sri 100, Rupali, Komal, Shubhangi, Chintu, Kranti-89, Avni, Jaishriram Gold, Vaishnavi, Trupti, Punam, Shatayu, Indrayani and Others; **Hybrids:** Arize 6444, Gorakhanath, Arize 6129, NPH 30 and Others; **Locals:** Wada Kolam

Table 3: Particulars of rice area in different districts of Konkan region of Maharashtra (*Kharif*' 2023)

District	Total Geographical Area (ha.)	Total Cultivable Area (ha.)	Total Cultivated Area (ha.)	Net Irrigated Area (ha.)	Area sown Under Rice (ha.)
Thane	464000	214900	164300	1181.27	54923.21
Raigad	686800	282500	161900	9455.5	98918.86
Palghar	469700	176300	142200	782.52	77426.68
Ratnagiri	816400	558500	253400	11874	68088.37
Sindhudurg	504000	348600	140500	2832.27	61518.93

Table 4: Weather data for different districts of Mahararahtra during *Kharif*' 2023

District/ Parameters	Months					
	Jun	Jul	Aug	Sep	Oct	Nov
Thane						
RD	10	31	25	22	2	2
TR (mm)	470.34	1445.91	253.45	485.89	12.54	43.8
MMT (^{0}C)	33.28	28.18	29.09	29.52	28.87	28.36
T. Max (^{0}C)	42.74	32.64	34.34	35.88	38.76	38.09
T. Min (^{0}C)	23.82	23.72	23.84	23.16	18.99	18.63
Raigad						
RD	10.00	31.0	25.00	22.00	2.00	2
TR (mm)	462.80	2238.1	392.9	612.6	83	41.8
MMT (^{0}C)	30.72	25.9	27.62	27.18	21.1	27.15
T. Max (^{0}C)	35.30	27.8	30.25	30.21	24.57	34.39
T. Min (^{0}C)	26.14	24.0	24.99	24.16	17.63	19.92
SH	2.11	1.5	2.67	4.67	3.76	5.88
Palghar						
RD	12	30	13	18	0	1
TR (mm)	814.2	2026	221	453	0	42
MMT (^{0}C)	28.5	27.5	27.95	27.65	28.8	26.75
T. Max (^{0}C)	31.8	29.5	30.5	30.4	32.6	32.2
T. Min (^{0}C)	25.2	25.5	25.4	24.9	25	21.3
SH	3.4	0	0	0.2	7.3	9
Ratnagiri						
RD	16.0	31	29	27	2	1
TR (mm)	580.8	2060.2	465	771.6	126.2	1.4
MMT (^{0}C)	28.1	25.55	26.1	28.8	26.65	25.95
T. Max (^{0}C)	32.3	27.9	28.9	35	32.6	33.4
T. Min (^{0}C)	23.8	23.2	23.3	22.6	20.7	18.5
SH	7.1	7	3.2	3.5	6.8	7.2
Sindhudurg						
RD	16	31	27	24	5	4
TR (mm)	503.5	1966	371.9	511.4	108.8	77.8
MMT (^{0}C)	28.5	25.05	26.35	26.55	27.95	27.7
T. Max (^{0}C)	33.8	28.4	30.9	31.3	34.4	35.5
T. Min (^{0}C)	23.2	21.7	21.8	21.8	21.5	19.9
SH	6.6	0.9	3.8	3.6	4.8	5.3

RD: Rainy days; TR: Total rainfall; MMT: Monthly Mean Temperature; T. Max: Maximum temperature; T. Min: Minimum temperature; SH: Sunshine hours

Table 5: General question on rice cultivation in district (to be filled by the cooperator in consultation with the officials from state department of agriculture)

Parameters	Thane	Raigad	Palghar
Total area under HYVs (ha)	53928 ha	108374	78209.2
Most prevalent HYVs in the district	YSR, Jaya, Daptari 125, Spriha 901, Komal, MTU 1010, Shabri, Rupali, Komal, Silki, Aawani, Indrayani, Ratna Samrat, Vaishnavi Zordar ,Gujrat 911, Karjat-3, RTN-8, Karjat-7, RP-14, Bitako and HMT	Jaya, Karjat-3, Karjat-5, Karjat-7, Suvarna, MTU 1010, Komal 101, Jaya, Rupali, Trupti, Avani, Sonam, Shubhangi, Viaya, Supersona, Zordhar, Sonal, YSR, Bhavna, Kaveri Sona, Janaki, Safal 1010, Bhavna, Vikrant, Swabhagya, M.P.H-242 and Hashita,	Karjat-3, Karjat-6, Ratnagiri-5, MTU-1010, MTU-7029, Sundar, Indrayani, Zordar, Raja, Suvarna, YSR, Komal 101, Silk 277, Dapturi, Mahuli, Mahalaxmi, Saguna, Kuber, Sindhu, Sampada, Punam, Kranti, Punam Gold, Akshad, and Om Shri Ram
Total area under rice hybrids in the district	3005 ha	160	1250 ha
Most prevalent rice hybrids in the district	Arize 6444, Kaveri 9090, Loknath, Ankur 7434, Gorakhnath, NPH, NP 125	NP-150, NP125, Nirmal-NPH, Tej Gold and Janaki	Arize 6444,Raja,Rasi336,Ankur 788
Total area under basmati in the district	Nil	Nil	Nil
Most prevalent basmati varieties in the district	Nil	Nil	90%
Seed replacement rate	30-40%	80%	Nil
Whether farmers are using any heavy equipments	No	Yes, use transplanter and power tiller operated harvester.	Used Power tiller opareated harvester. Small Thresher.
Mention water saving technologies being used by the farmers	Some farmers of the Thane district used DSR.	No	Nil
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Yes, Guidence on integrated pest, disease and weed management and mechanization in rice cultivation. Different methods of rice cultivation.	Different methods of rice cultivation, INM in rice IPM in rice and mechanization in rice cultivation	Different methods of Rice cultivation, IPDM, INM and mechanization in rice cultivation.
General problems in rice cultivation in the district?	Non-availability of labour and High wages of the labour. Lack of storage irrigation facilities.	Non availability and high weges of the labour.	Due to small land holding, farmers needs low cost mechanization.
Please provide any farmers association in the district	Farmer's groups registered under ATMA and "Agricultural Tools Bank" Association.	Co-operative Rice Seed Production Society, Vadap, Karjat, Shetkari Vikas Sanstha, Mahad. Vegetables growers and marketing groups under ATMA.	Farmer's groups registered under ATMA as a vegetables grower and Marketing purpose.
Whether availability of agricultural labours is sufficient?	No.	No	No, Non availability and High wages of the labour.
Whether there is any marketing problem of the produce?	Yes	Yes.	Lack of marketing facilities.
Any major irrigation/ power generation project in the district	3 Major and 15 Small Irrigation projects.	Ravalaje, Patnus, Kal, Rajnala, Hetawane major and 28 minor irrigation projets.	Bhatsa, lendi,Surya and Wandri major and 16 minor irrigation projects in the district.
Any soil testing program undertaken?	Yes. Soil Health Improvement Programme.	No.	Yes. Soil Health Improvement Programme.
Any farmers' training program was organized by the state department of Ag/ University	Integrated Rice Improvement Programme and demostations.	Hybrid Rice Improvement Programme and demostations.	Integrated Rice Improvement Programme and demostations.

Table 5 contd..: General question on rice cultivation in district (to be filled by the cooperator in consultation with the officials from state department of agriculture)

Parameters	Ratnagiri	Sindhudurg
Total area under HYVs (ha)	68088 ha	58686.66 ha
Most prevalent HYVs in the district	Punam, Trupti, Sarthi , Vaishnavi, NR-241, Jaya, Sai Ram, NR-9, Suvarna, Rupali, Karjat-2, Karjat-3, Karjat-7, Karjat-6, Karjat-9, Ratnagiri-1, Ratnagiri-8, Ratnagiri-6, Sonam, Bahubali, Ratna, Daptari, Puja, Mohini, Prasanya , Komal 101, Trupti, Kasturi, Saguna, Poonam Gold, Sadana, Turati and Shriram	Jaya, Sonam, Suvarna, Karjat-3, Sonam, Indrayani, Rupali, Komal101, Komal, Poonam, Poonam Gold, Mahsuri, Ratnagiri-8, Shri-101, Jai Shriram Gold, Chintu, Sonam, Shatayu, Shubhangi, Kranti Vaishnavai and Jyoti
Total area under rice hybrids in the district	1281 ha	1109.88 ha
Most prevalent rice hybrids in the district	Sahyadri -2, Gorakhnath, Arize- 6444, Sahyadri-4, Loknath 505, Synjenta 5251, Ankur 7576, Lokhnath and NPH-30	Arize 6444, Gorakhnath, Arize 6219,
Total area under basmati in the district	Nil	Nil
Most prevalent basmati varieties in the district	Nil	Nil
Seed replacement rate	70-80%	60-70%
Whether farmers are using any heavy equipments	Use power tiller operated transplanter and harvester, electric thresher	No, Use power tiller for land cultivation
Mention water saving technologies being used by the farmers	Nil	Some farmers used DSR technique.
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Different methods of rice cultivation, INM, IPM of rice, chemical weed management and Machanization.	Mechanization in harvesting, threshing, drum seeding and INM, IPDM in rice cultivation.
General problems in rice cultivation in the district?	Shortage of labour, limitation for mechanization due to geographical situation and high labour wages.	Labour shortage, limitation on mechanization due to small land holding
Please provide any farmers association in the district	Nil	Shetkari Kharedi Vikri Sangha-8, Shraddha Swayam Sahayata Bachatagat
Whether availability of agricultural labours is sufficient?	No, Shortage of labour and high wage rate	No, Labour shortage and high rate of wages
Whether there is any marketing problem of the produce?	Yes	Yes.
Any major irrigation/ power generation project in the district	Natu Nagar Irrigation Project, Ratnagiri Power Company is Major and 38 minor small scale projects.	Talamba, Aruna Tilari, Sarmala and Mahmmad Wadi Irrigation projects and 28 other minor projects.
Any soil testing program undertaken?	NIl	Yes. Soil Health Improvement Programme organized by State govt.
Any farmers' training program was organized by the state department of Ag/ University	Integrated Hybrid Rice Improvement Programme and field demostations, Ksheti Shala etc	Integrated Rice Improvement Programme and demostations.

Table 6: Variety/hybrid wise area coverage (ha) in different districts of Maharashtra during 2023

Variety/hybrids	Districts/area (ha)				
	Thane	**Raigad**	**Palghar**	**Ratnagiri**	**Sindhudurg**
HYVs/Improved					
Jaya	2775	6225	425	672.5	957.97
Jordar	985	700	1375		
YSR	3145.25				
Rupali	1484.5	475		352.25	488.5
MTU 1010	840.5	302.5	2250		
Karjat-2				520.22	
Karjat-3	1115	625	5788	30	
Komal	294				
Karjat-5	92.50	262.5			
Karjat-6			1375		
Karjat-7		625		37.82	
Karjat 9				67.27	
Karjat184			88		
Akshet	639.25				
Daptari 108	354				
Manisha	292				
Daptari 125	1570.25				
Suprema Sona	304.82	450			
Komal 101	538.25	1700	1625	1004	502.95
Komal					435.12
Spriha 911	1264				
Shabri	1160.25				
Silky	406.5				
Vada Kolam	601	500	2125	208.5	1771.62
Silki 277	254.25				
Shree 101	353.37				494.55
Avani	369.75	455			153.35
Devaki	401.25				
Suvarna		4000	200	116.5	542
Gangotri		675			
Sonal		500			
Kaveri Sona		500			
Safal 1010		500			
Subhangi		475			395.12
Chintu		387.5		132.2	168.0
Trupti		375		329.6	131.98
NP-125		375			
Hashita		375			
Vijaya		262.5			

Variety/hybrids	Districts/area (ha)				
	Thane	**Raigad**	**Palghar**	**Ratnagiri**	**Sindhudurg**
HYVs/Improved					
Janaki		270			
Bhavana		250			
Vikrant		250			
Swabhagya		270			
NPH 242		250			
Gayatri		250			
Kranti		250			
Asmita		250			
Gold 78		250			
Nath Poha		20			
Punam			8000	96.82	130.85
Punam Gold				1125	
Suma			2550		
Sunder			3750		
Akshad			625		
Saghuna			2125		
Ratnagiri-5			363		
Ratnagiri 6				45	
Ratnagiri-8				401.55	
MTU 7029			1875		
Samrudhi			625		
Mahuli			900		
Silky 277			2500		
Indrayani			250		78.72
Om Shri Ram 125			350		
Mahalakshmi			600		
Durga			375		
Kuber			250		
Sindhu			2100		
Sampada			1250		
Wada Zinia			750		
Sonam				538	922.75
Sarathi				498	
Sadna				374.75	
Prasanya				320.87	
Vaishnavi				253.25	140.52
Pooja				258.9	
Sairam				172.8	
Kranti-89					163.15
Jai Shriram Gold					150.37
Shatayu					82.20

Variety/hybrids	Districts/area (ha)				
	Thane	**Raigad**	**Palghar**	**Ratnagiri**	**Sindhudurg**
HYVs/Improved					
Others		3117.5	4655	2788	4250
Hybrids					
Arize 6444	1508.9			324.52	543.9
Arize 6129					40.8
Kaveri 9090	184.72				
NPH	542				
Loknath	206.2			102.2	
Ankur 7434	202.04				
Ankur 7576				122.88	
NP 125	188.8	36			
NP 150		32			
NPH 30					13.16
Syn 5251				112.52	
Nirmal NPH		20			
Gorakhnath	172.76			74.48	52.80
Tej Gold		12			
Raja			400		
Rashi 113			175		
Mahyco 5629				49.32	
Upaj Mahyco 5556				49.52	
Ankur 6444				28.54	
Others			675	346.44	459

A. General Information, cropping system and rice yield: The details of the number of villages surveyed and number of farmers contacted are presented in Table 7. Rice is grown as a rain fed crop due to heavy rainfall in the region. Most common cropping patterns adopted by farmers in the region are rice-fallow, rice-pulses, rice-vegetables and rice-groundnut. Sometimes farmers also adopted rice-marigold/jasmine cropping sequence. Some farmers in Palghar and Sindhudurg also followed rice-finger millet, rice-barnyard millet, rice-maize, rice-sunflower and rice-sesamum. The farming systems of *Konkan* also included goat farming in Palghar district and fish farming in Raigad district. Pulses after *Kharif* rice on residual moisture is a common practice in Palghar, Raigad, Thane, Sindhudurg and Ratnagiri districts. Common pulses grown by the farmers in the region were horse gram, green gram, chick pea, pigeon pea, black gram, moth bean, cowpea, kidney bean etc. Common vegetables cultivated by the farmers in the region were lady's finger, cucurbits, dolichos bean, chilli, tomato, turmeric etc. Area covered by different rice varieties in different districts is presented in Table 6. Average rice yield was low in the region and ranged from 2000-4000 kg/ha (Table 8). Rice yield in some of the surveyed places in most of the districts was affected due to low/ sub-normal dose of fertilizers, uneven rainfall especially during early part of the crops season, excess rainfall, flash flood/submergence during later part of the season or maturity stage of the crops in some areas, stem borer and bacterial blight and crop damage by wild animals and cultivation of low yielding local rice varieties.

Table 7: General information

Parameters	Thane	Raigad	Palghar	Ratnagiri	Sindhudurg
# of talukas/blocks covered	4	6	5	7	6
# of villages surveyed	15	21	16	22	20
# of farmers interviewed	15	21	16	22	20
Field ecosystem	RL (100%)	RL (100%)	RL (100%)	RL (100%)	RL (100%)
Weather conditions during cropping season	Weather conditions were in general favourable for rice cultivation in the region. The onset of monsoon was delayed by 15-20 days in the month of June in both South Konkan Costal Zone and in North Konkan Costal Zone of the region. Moderate to heavy rainfall was received in almost all districts of Konkan region in the month of July. The maximum rainy days were in Sindhudurg, Ratnagiri, Raigad and Thane districts were 107, 106, 92 and 92 days respectively. Whereas, the highest rainfall was in Ratnagiri district (4005.2 mm) received in 106 rainy days. Total rainfall and its distribution in Konkan region were much satisfactory.				
Crop stage when survey was made	Maturity	Maturity	Maturity	Maturity	Maturity
Crop rotations	Rice is grown as a rain fed crop due to heavy rainfall in the region. Most common cropping patterns adopted by farmers in the region are rice-fallow, rice-pulses, rice-vegetables and rice-groundnut. Sometimes farmers also adopted rice-marigold/jasmine cropping sequence. Some farmers in Palghar and Sindhudurg also followed rice-finger millet, rice-barnyard millet, rice-maize, rice-sunflower and rice-sesamum. The farming systems of *Konkan* also included goat farming in Palghar district and fish farming in Raigad district. Pulses after *Kharif* rice on residual moisture is a common practice in Palghar, Raigad, Thane, Sindhudurg and Ratnagiri districts.				

Table 8: Average yields of different rice varieties as reported by the cooperators/farmers

Varieties	Yield (kg/ha) in different districts of Maharashtra					Remarks
	Thane	Raigad	Palghar	Ratnagiri	Sindhudurg	
Vaishnavi	4861					Rice yield in some of the surveyed places in most of the districts was affected due to low/ sub-normal dose of fertilizers, uneven rainfall especially during early part of the crops season,
YSR	1500-2250	2500	1000-1500			
Vatana	3200					
Jordar	2500-2700		3000-4000			
Sri Lakshmi	100					
Karjat 7	1500-2000					
Karjat 3		2799-3900	3333-5000		3000-4000	
Ratna		2083-3500				
Komal		3500			2650-4000	
Jaya		2142-4200			3000-3400	

Varieties	Yield (kg/ha) in different districts of Maharashtra					Remarks
	Thane	Raigad	Palghar	Ratnagiri	Sindhudurg	
Suvarna		3400	1500-3500	2000-3000	2800	excess rainfall, flash flood/submergence during later part of the season or maturity stage of the crops in some areas, stem borer and bacterial blight and crop damage by wild animals and cultivation of low yielding local rice varieties. Some of the farmers are still growing local rice varieties for local preference
Gujrat-II		2900-3000	1600			
Rupali		3600	2500	2900-4100	750	
Sarthi		3000		2000-2700		
Indrayani		3333				
Manisha			3500			
Trupti				3100-3300		
RTN-8				4000	3200	
RTN-1				3125		
Anami				2000		
Sadana				2500		
Saurabh				2700		
RTN-6				3200		
Sonam				3300	1875-2700	
Subhangi				4000	2600-4000	
Supriya					4000	
Dodik					2666	
Silky					2800	
Jyothi					2400	
Mahsuri					2500-3500	
Vikram					2500	
Kolam		2500				
Wada Kolam	4375	1450	3500-4375		3200	
Zinnia	1320					
Walaya					2000-2500	
Walai					1500	
Goraknath					2700	
Sahyadri				2900		
Arize 6444	4000			2200-7000	2700	

B. Rice consumption pattern: Survey was conducted on consumption pattern of rice among the farmers in different districts of Konkan region of Maharashtra (Table 9). Majority (~84%) of the farmers contacted were in the medium income group. Average per capita consumption of rice per month was 3-7 kg rice. More than 80% of the farmers contacted told that their main meal consisted of both rice and wheat (chapatti). Few also told that they took finger millet and sorghum along with rice. About 94% farmers in different districts told that they used polished rice. Many farmers (50-75%) from Thane, Ratnagiri and Sindhudurg also took parboiled rice along with polished rice. Regarding grain quality, on an average 94% farmers told that they preferred fine grain quality rice. However, many farmers (about 53%) farmers told that they also used coarse grain rice varieties for consumption. In general, there was no change in the food habit except that some farmers included finger millet and sorghum in their diet.

Table 9: Details of rice consumption pattern

Parameters	Districts				
	Thane	**Raigad**	**Palghar**	**Ratnagiri**	**Sindhudurg**
Status of farmers	Medium income (66.7%); Poor (33.3%)	Medium income (100%)	Medium in-come (87.5%); Poor (12.5%)	Medium income (90.9%); Poor (9.1%)	Medium in-come (75%); Poor (25%)
Per capita monthly rice consumption (kg)	3-5 kg	4-6 kg	4-7 kg	3-6 kg	3-7 kg
Composition of main meal	Rice + Wheat (93%); Rice + Jowar (7%)	Rice + Wheat (100%)	Only rice (18.7%); Rice + Wheat (81.3%); Few finger millet	Only rice (9.1%); Rice + Wheat (90.1%); Few finger millet	Only rice (55%); Rice + Wheat (45%)
Preferred rice types	Polished rice (93%); Polished + Parboiled (53%)	Polished rice only (100%)	Polished rice only (93.7%); Parboiled (6.3%)	Polished rice only (95.5%); Parboiled (50%)	Polished rice (90%); parboiled (75%)
Rice grain type preference	Fine grain (86.7%%); Coarse grain (40%)	Fine grain only (100%); Coarse grain (71.4%)	Fine grain (100%); Coarse grain (37.5%)	Fine grain only (100%); Coarse (45.5%)	Fine grain only (90%); Coarse (75%)
Any changes in food habit in last 10 years	No (86.7%); Yes (13.3%)-Rice + Jowar	No (100%)	No (100%)	No (100%)	No (100%)

C. Nursery and main field Management: In general, planting was done during 1st week to 4th week of July (Table 10). Average seed rate used by the farmers ranged from 30-45 kg/ha. On an average, about 55% of the farmers contacted told that they treated the seeds with thiram (2.5-3 g/kg seeds) or carbendazim (2 g/kg). Few farmers from Raigad treated the seeds with Trichoderma formulation (25 g/kg). Some of the farmers said that they purchased fungicide treated seeds. More than 90% of the farmers contacted during the survey told that they applied organic matter (FYM) in the nursery. On an average about 92% of the farmers contacted told that they applied chemical fertilizers like urea (0.5-2 kg/R) and/or suphala (15:15:15) (0.5-1.5 kg/R). Some farmers applied other complex fertilizers like 18:18:18 or DAP (1-2 kg/R) and SSP (0.5 kg/R). Most common practice for weed management in nursery in Palghar, Thane, Raigad, Ratnagiri and Sindhudurg (Partly) district is burning of nursery area with organic waste referred as 'Rab'. In few cases farmers will manually remove the weeds. Farmers used 25 to 32 days old seedlings for transplanting. Due to delay in monsoon in the month of June this year, transplanting was delayed by one week or so. In most of the cases, transplanting was random and average plant population was 30-35 hills/m2. In some parts of Raigad district in saline soils farmers do not transplant the rice seedling but uprooted seedlings are uniformly scattered in the puddle fields which is locally called as 'Awatni'. Very few in Ratnagiri adopted direct sowing. Fertilizers were applied @ 12.6-230 kg N/ha, 7.5-75 kg P_2O_5/ha and 7.5-75 kg K_2O/ha (Table 11). None of the farmers contacted applied zinc sulphate. While most of the farmers applied nitrogenous fertilizers, about 48% of the farmers applied P and K fertilizers. Many farmers used complex fertilizers like 15:15:15, 18:18:10,

Suphala (15:15:15), 18:18:18, 19:19:19 (Sampurna) and DAP (18:46:0). Few farmers applied only urea. About 31% farmers applied FYM depending on availability (Table 11).

Table 10: Details of nursery management

Parameters	Districts				
	Thane	**Raigad**	**Palghar**	**Ratnagiri**	**Sindhudurg**
Planting time	2nd-4th Week of July	2nd week of July to 1st week of August	1st-3rd week of July	2nd -4th Week of July	1st-4th week of July
Seed rate	30-40 kg/ha	35-45 kg/ha	35-45 kg/ha	30-45 kg/ha	35-45 kg/ha
Seed treatment (% farmers adopted)	Yes (53.3%); Many used treated seeds	Yes (42.8%); Many used treated seeds	Yes (37.5%)	Yes (90.9%); Many used already treated seeds	Yes (55% only)
Chemicals used for seed treatment	Thiram (3 g/kg seeds)	Thiram (2.5 g/kg seeds); carbendazim (2 g/kg); Trichoderma (25 g/kg)	Thiram (2.5-3 g/kg)	Thiram (3 g/kg); carbendazim (2 g/kg)	Thiram (3 g/kg);
Organic manure in nursery (% farmers adopted)	Yes (93.3% only); FYM	Yes (100%); FYM	Yes (100% only); FYM	Yes (100 %); FYM	Yes (95%); FYM
Inorganic manure in nursery (% farmers adopted)	Yes (100% farmers); Urea @ 0.5-1 kg/R; suphala (15:15:15) @ 0.5-1 kg/R*	Yes (100% farmers); Urea @ 0.5-2 kg/R; Suphala @ (0.5-1.5 kg/R; 18:18:18 @ 2 kg/5R	Yes (100% farmers); Urea @ 0.5-2 kg/R; Suphala @ (0.5-1 kg/R	Yes (77.3% farmers); Urea @ 0.5-1.5 kg/R: Suphala @ (0.5 kg/R	Yes (85% farmers); Urea @ 0.4-2 kg/R; Suphala (0.1-1 kg/R) and 18:46:0 (1 kg/R); Few applied SSP (0.5 kg/R)
Weed management in nursery	Most common practice for weed management in nursery in Palghar, Thane, Raigad, Ratnagiri and Sindhudurg (Partly) district is burning of nursery area with organic waste referred as 'Rab'. In few cases farmers will manually remove the weeds				

1R=1000 sq. ft

Table 11: Details of main field management

Details	Districts					Remarks
	Thane	**Raigad**	**Palghar**	**Ratnagiri**	**Sindhudurg**	
Planting method	Farmers used 25 to 32 days old seedlings for transplanting. Due to delay in monsoon in the month of June this year, transplanting was delayed by one week or so. In most of the cases, transplanting was random and average plant population was 30-35 hills/m2. In some parts of Raigad district in saline soils farmers do not transplant the rice seedling but uprooted seedlings are uniformly scattered in the puddle fields which is locally called as 'Awatni'. Very few in Ratnagiri adopted direct sowing					Fertilizers like urea, 15:15:15 18:18:10, Suphala (15:15:15), 18:18:18, 19:19:19 (Sampurna) and DAP (18:46:0) were used by the farmers; Few farmers applied only urea. FYM app-lication by progressive farmers
Total N applied	30-133.75 kg/ha (100 % farmers applied)	12.6-185.5 kg/ha (100 % farmers applied)	16.9-138 kg/ha (100 % farmers applied)	15.25-158 kg/ha (77.3 % farmers applied)	41-230 kg/ha (100 % farmers applied)	
Total P_2O_5 applied	9.37-37.5 kg/ha (66.7 % farmers applied)	13.5-60 kg/ha (38.1 % farmers applied)	35-58 kg/ha (25% farmers applied)	7.5-50 kg/ha (50 % farmers applied)	11.25-75 kg/ha (65 % farmers applied)	
Total K_2O applied	9.37-37.5 kg/ha (66.7 % farmers applied)	13.5-33 kg/ha (38.1 % farmers applied)	35-50 kg/ha (25% farmers applied)	7.5-50 kg/ha (50 % farmers applied)	10-75 kg/ha (60 % farmers applied)	
$ZnSO_4$ applied	Nil	Nil	Nil	Nil	Nil	
Organic fertilizer applied	Yes (20%) FYM (2.5-5 t/ha)	Yes (28.6%) FYM (2-5 t/ha)	Yes (31.3%) FYM (2-5 t/ha)	Yes (50%) FYM (1-5.5 t/ha); Few Growth Factor	Yes (25%) FYM (2-4.5 t/ha)	

D. Weeds and their Management: Overall, intensity of weeds was low to medium. The details of different weeds recorded in different districts are presented in Table 12. For managing weeds in the nursery, farmers followed a local method, called *Rab*. None of the farmers contacted applied any herbicides and all of them followed 1-2 hand weeding for managing the weed problem.

E. Specific needs of farmers:

- Farmers need all inputs on subsidized rate as paddy cultivation is not profitable
- Farmers need good market price for their produce
- Farmers want irrigation facilities or finance for developing irrigation facilities with electricity
- Farmers need financial support to purchase farm inputs for crop management
- Farmers need low-cost mechanization suitable for Konkan region to overcome labour problem and availability of seeds and fertilizers in time

Table 12: Weeds and weed management

Details	Districts					Remarks
	Thane	**Raigad**	**Palghar**	**Ratnagiri**	**Sindhudurg**	
Weed intensity	Low to Medium	Low-medium	Low to medium	Low-medium	Low-medium	
Names of the weeds	*Isachne globosa, Cyperus dufformis, Cyperus rotundus, Cyperus iria, Echinochloa colona, Echinochloa crusgalli, Eleusine indica, Convolvulus arvensis, Celosia argentea, Ludwigia octovalvis, Ischaemum rugosum, Ischaemum rugosum, Alternanthera triandra, Brachiaria mutica (Para grass), Amaranthus spinosus, Leptochloa chinensis, Alternanthera ficoidea, Saccharum spp., Saccharum spontaneum, Coix lacryma-Jobi, Digitaria sanguinalis, Cynodon dactylon* and *Mimosa pudica*					Weeds were common in most of the fields surveyed
Weedicides used	Nil; Out of 94 farmers contacted, none used weedicide for the management of weeds. All the farmers contacted practiced only hand weeding (1-2)					
Percentage of farmers applied herbicides	Nil	Nil	Nil	Nil	Nil	
Wild/weedy rice incidence	Nil	Nil	Nil	Nil	Nil	

F. Input use: Most of the farmers prepared their land by own plough or hired Power Tiller/Tractor. Only few progressive farmers were having their own Power Tiller, Tractor and Harvester. In Thane and Palghar districts farmer has formed some "Farmers Agricultural Machinery and Tool Bank" to overcome labours problem in the district with support of Zilla-parishad. Most of the farmers in Konkan region are having small land holding. The average seed replacement ratio in the region during Kharif 2023 was 40-43% (according to Maharashtra state agriculture department). Some farmers used their own seed especially of local varieties. Seeds of improved varieties are supplied by Government agencies viz. Panchayat Samittee, Zilla Parishad, Agricultural Department, Agricultural University, Research Stations, Krishi Udyog Kendras etc. Most of the farmers purchased seed every season, from private agro-service centers and private seed companies. Shallow tube well, canal (few), river water and natural rain water were the main sources of irrigation. On an average 63% of the farmers contacted told that there was scarcity of irrigation water. More than 90% of the farmers in different district expressed that inputs like fertilizers and pesticides were available in time and about 76-100% of them told that they were satisfied with their quality. In addition to their own decisions, farmers got advices from private dealers and officials of state department of agriculture and university.

Table 13: Details of inputs used

Details	Districts				
	Thane	**Raigad**	**Palghar**	**Ratnagiri**	**Sindhudurg**
Implements used	Most of the farmers prepared their land by own plough or hired Power Tiller/Tractor. Only few progressive farmers were having their own Power Tiller, Tractor and Harvester. In Thane and Palghar districts farmer has formed some "Farmers Agricultural Machinery and Tool Bank" to overcome labours problem in the district with support of Zilla-parishad.				
Seed replacement rate in 2022	The average seed replacement ratio in the region during Kharif 2023 was 40-43% (according to Maharashtra state agriculture department).				
Source of seeds	Most of the farmers in Konkan region are having small land holding. Some farmers used their own seed especially of local varieties. Seeds of improved varieties are supplied by Government agencies viz. Panchayat Samittee, Zilla Parishad, Agricultural Department, Agricultural University, Research Stations, Krishi Udyog Kendras etc. Most of the farmers purchased seed every season, from private agro-service centers and private seed companies				
Source of irrigation	Shallow tube well, Bore well, river and Rain water	River water, Canal, bore wells, rain water	River water, Well, canal, bore well and rain water	Shallow tube wells, river, canal and rain water	Shallow tube wells, river, canal, Dam/reservoir and rain water
Scarcity of irrigation water	Yes (86.7% farmers)	Yes (85.7% farmers)	Yes (43.75% farmers)	Yes (86.4% farmers)	Yes (15% farmers)
Availability of fertilizers/pesticides	Available (100%)	Available (90.1%)	Available (93.75%)	Available (100%)	Available (100%)
Quality of fertile-zers/pesticides	Happy (100%)	Happy (76.2%)	Happy (93.75%)	Happy (95.5%)	Happy (100%)
Advisors to the farmers	Own decisions (93.3%) Dealers (33.3%)	Own deci-sions (85.7%), Dealers (61.9%), University (14.3%)	State dep. Ag (6.3%), Own decisions (93.75%) Dealers (25%) University (18.75%)	Own deci-sions (100%), Dealers (50%), Univ (9.1%), State dept (9.1%)	Own decision (90%), State dept (5%)

G. Biotic stress and their management: District wise prevalence of different diseases and insect pests are presented in Table 14. During 2023, intensity of most of the diseases were low to moderate except bacterial blight was high in different fields in Thane, Raigad and Palghar. The incidence of bacterial leaf blight disease was found medium to severe particularly in lowland areas where crop submerged with water during heavy rainfall in Raigad, Thane and Palghar districts of konkan region. Most of the fields were observed infected with bacterial leaf blight disease in Raigad, Palghar and Thane districts, particularly on Karjat-8, Samruddhi, YSR Rupali, Zordhar, Daptari Komal to the tune of 2-50 per cent. Leaf blast was low in Thane and Raigad and was moderate in Ratnagiri and Sindhudurg district. Severity of false smut was found low to moderate in some variety but more in variety Karjat -8 in *Konkan* region.

Sheath rot incidence was in moderate range in all the districts of Konkan, but on Karjat-8 it was severe (50 % incidence) at RARS, Karjat farm. Intensity of different insect pests like stem borer, leaf folder, gundhi bug, army worm, crab and rats was in low to moderate intensities. Stem borer incidence was noticed on varieties like Ratna, Vaishnavi, Arize 6444, Vatana, Zordhar, Wadakolam and YSR during survey in most of the fields in all the districts but in low intensity. Pesticides use by the farmers in the region was very low. Ver few farmers from Thane, Raigad and Palghar applied pesticides like dimethoate 30% EC (2 ml/l), imidacloprid 0.5 ml/l), chlorpyriphos (1-2 ml/l) and cypermethrin (1-2 ml/l) for management of stem borer and gundhi bug (Table 15).

Table 14: Prevalence of diseases and insect pests in Konkan region of Maharashtra during *Kharif*' 2023

District	Bl	ShBl	GD	FS	ShR	BLB
Thane	L	-	L	L (2-5%)	L-M (2-10%)	M-S
Raigad	L (1-5%)	L	L	L (2-7%)	M-S	M -S
Palghar	L (1-5%)	L (2-5%)	L	L (4-5%)	L-M (5-10%)	M-S
Ratnagiri	L-M (2-10%)	M	L	L (4-5%)	M	L (5%)
Sindhudurg	L-M (2-10%)	-	L	L-M (8-10%)	L-M (5-10%)	-

District	SB	LF	GLH	AW	GB	CRB/ Rat
Thane	L (1-5%)	L	-	-	-	L
Raigad	L (1-5%)	L	L	-	L	L
Palghar	L (1-5%)	L	-	-	-	L
Ratnagiri	L-M (5-10%)	L (4-5%)	-	L	L (5%)	L
Sindhudurg	L (2%(	L (2-5%)	-	-	L	L

Low incidence of cut worm (2-10%) in some fields of Palghar and Ratnagiri district; Low incidence (4-5%) of rice skipper in some fields of Ratnagiri

Table 15: Details of pest management

Details	Districts				
	Thane	Raigad	Palghar	Ratnagiri	Sindhudurg
% age farmers adopting plant protection	6.7%	4.8%	6.25	Nil	18.2%
Names of pesticides	Dimethoate 30% EC (2 ml/l), imidacloprid 0.5 ml/l), chlorpyriphos (1-2 ml/l) and cypermethrin (1-2 ml/l) for management of stem borer and gundhi bug			NA	NA
# of pesticide sprays	1	1	2	NA	NA
Mixing of pesticides before application	Nil	Nil	Nil	Nil	Nil

H. Researchable issues: Among the biotic stresses, major problems in the region are bacterial blight, blast, false smut and stem borer and among abiotic stresses, submergence and flash flood are the major problems (Table 16). Farmers want varieties suitable for DSR, medium duration varieties with lodging resistance, varieties resistant/tolerant to above mentioned biotic constraints and bio-fortified varieties with higher zinc, high irn and low GI.

Table 16: Researchable issues

Parameters/Issues	Thane	Raigad	Palghar	Ratnagiri	Sindhudurg
Rice ecology in your area	Rainfed lowland				
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif				
Number of years of experience in rice farming	>20 years in all the districts except Sindhudurg where about 50% farmers have 5-20 years of experience				
Main biotic constraints (diseases) in your area according to you	bacterial blight, sheath Rot	bacterial blight, sheath Rot	Blast, false smut, sheath rot	Sheath rot, Blast and sheath blight	Leaf blast and bacterial blight
Extent of disease damage	<10%	<10%	<10%	<10%	<10%
Main biotic constraints (Insect pests) in your area according to you	Stem borer	Stem borer	Stem borer	Stem borer, Leaf folder	Stem borer, leaf folder
Extent of insect pest damage	Below 10%				
Main abiotic constrains in your area according to you	Submergence/flash flood				
Production constraints in your area according to you	Scarcity of agricultural labours, lack of irrigation facilities and lack of mechanization				
Irrigation facilities in your area	Lacking	Lacking	Lacking	lacking	Lacking in some areas
Normally how many years it takes to change the rice variety	10-20 years	10-20 years	10-20 years	10-20 years	10-20 years
Any other rice production issues in your area which the rice scientists need to address	-				
What is urgently required in your area as far as rice varieties are concerned					
Duration	HYVs suitable for DSR	HYVs suitable for DSR and HYVs having lodging resistance	HYVs varieties with lodging resistance	HYVs suitable for DSR	HYVs suitable for DSR
Biotic stress resistance	Varieties having resistance to BLB, blast, sheath rot, stem borer and false smut				
Abiotic stress resistance	Varieties tolerant to submergence and drought				
Preferred grain quality	MS grain rice varieties and aromatic short grain				
Nutritional quality	Varieties with high Zn and iron and low GI				

Puducherry-Karaikal (2023-24)

District surveyed: *Karaikal*

Particulars of Survey

District	Villages
Karaikal	Thennankudy, Sethur, Sellur, Ambagarathur, Surakudy, Nedungadu, Thirunallar, Annavasal, Agalangannu, Kurumbagaram, Neravy, Kottucherry, Kottapakkam and Vizhidiyur

Widely cultivated varieties

District	Varieties
Karaikal	**Samba Season**: White Ponni, ADT 38, ADT 39, ADT 46, ADT 54, SAVITR1, BPT 5204, Co46, IR 20, CR 1009 and KKL(R) l; **Kuruvai Season**: TKM 9, ADT 37, ADT 43, Karuppu Kavani and Seeraga Samba

In the Karaikal district, during 2023 - 24 the area under *Kuruvai* crop (June-July) was recorded as 610.89 hectares, with a production of 2117.605 M.T and productivity of 3.466 M.T/ha. The area under *Samba* crop (August - January) was reported as 3832.53 hectares whereas thalady (September - October) and Navarai (December – January) was reported to be 590.76 and 15.18 hectares respectively. The crop was cultivated by utilizing canal water, bore wells and also farm ponds by some farmers. Recognizing the significance of intensive rice cultivation amidst uncertain or limited Cauvery water availability, an exhaustive production-oriented survey was conducted in 14 villages of Karaikal district. Survey was conducted in 14 villages *viz.,* Thennankudy, Sethur, Sellur, Ambagarathur, Surakudy, Nedungadu, Thirunallar, Annavasal, Agalangannu, Kurumbagaram, Neravy, Kottucherry, Kottapakkam and Vizhidiyur of Karaikal district. During the survey about 50 farmers from diverse categories belonging to small, marginal and big farmers were personally interviewed by the team members from December 2023 to February 2024.

Varieties and cropping system

The rice varieties TKM 9, ADT 37, ADT 43, Karuppu kavani and Seeraga samba were cultivated during Kuruvai season. i.e before samba season. Conversely, the major rice varieties cultivated during the Samba season were Improved White Ponni, ADT 38, ADT 39, ADT 46, ADT 54, SAVITR1, BPT 5204, Co46, IR 20, CR 1009 and KKL(R) l (a promising, Samba variety released from PAJANCOA &RI, Karaikal). These varieties were also grown during Thaladi wherever irrigation is done from filter point wells/deep bore wells. Among these varieties farmers of this region prefer BPT 5204 due to its high selling price. The traditional rice varieties, Mapillai samba and Seeraga samba were cultivated by few farmers for their own use. The cropping pattern prevaling in this region is rice-pulse, rice-rice-pulse and others. In some areas, farmers are opting rice-cotton cropping system where there is an assured water source from filter point wells/deep borewells. Most of the farmers rely on seeds purchased from Agro Service Centres located in Karaikal and nearby districts of Tamil Nadu, while about 10% of farmers use their own saved seeds especially the tranitional varieties. Due to labour shortage, many farmers have shifted to direct sowing where they use 50-90 kg seeds per hectare. Some farmers also adopt transplanting where they use 40-70 kg seeds per hectare.

Nursery and main field management

In the nursery, most of the farmers applied DAP (10-20 kg/ha) and urea (10-20 kg/ha). In the main field (in case of transplanted rice and direct seeded rice), fertilizers were applied @ 100-150 kg N/ha, 30-50 kg P_2O_5/ha and 30-50 kg K_2O/ha. Different species of grasses, sedges and broad leaved weeds were observed in rice fields. Grasses and sedges were the dominant weed flora found in this region. The important grassy weeds observed in the fields include *Echinochloa colona, Echinochloa crusgalli, Leptochloa chinensis* and *Digiteria spp.* Among the sedges, *Cyperus rotundus, Cyperus iria, Cyperus deformis and Fimbristylis miliacea* are common weeds. The broad-leaved weeds such as *Eclipta alba, Ludvigia parviflora, Ludwigia abyssinica* and *Marsilia quadrifoliata* were found to be major competitors for rice crop in most of the areas surveyed. The farmers of Karaikal region use both mechanical and chemical methods to control the weed growth. Farmers were typically engaged in hand weeding twice on the 25th and 45th day after transplanting by engaging 6-7 labours per acre. Some of the farmers use herbicides such as bispyribac sodium (10% SC) (Nominee gold) @ 200 ml/ha as post-emergence application on 15-20 DAT, pendimethalin 30% EC @ 3.3 litre/ha aspPre-emergence application on 3 DAT and fenoxaprop-p-ethyl (Rice Star) @ 350 ml/ha on 10-15 days after sowing / transplanting when weeds are in 3–5 leaf stage

Biotic stresses and their management

Common insect pests like leaf folder, stem borer and thrips were observed during the survey. Leaf folder and stem borer incidence was observed during samba at the range of 10 to 20% and 05 to 10% respectively with highest incidence in BPT 5204. Similarly, moderate incidence of stem borer were also noted in varieties like CR1009, ADT 51, ADT 42, ADR 46 and ADT 39. To manage the pest problem farmers were usually taking up 1-2 rounds of pesticide spray. Commonly used pesticides were profenophos 50 % EC (Curacron) (400 ml/acre), phenthoate 45% + cypermethrin 6% EC (Phendal Plus) (400 ml/acre), profenophos 40% + cypermethrin 04 % EC (Roket) (400 ml/acre) and chlorantraniliprole 0.4% GR (Ferterra) (1 kg/acre) for stem borer and thiamethoxam 25 % WG (Actara) (40 g/acre) for thrips.

The diseases observed during the period of survey include leaf blast (15.1%), neck blast (2.8%), narrow brown spot (28.6%), sheath rot (8.1%), false smut (13.8%), grain discoloration (68.5%) and bacterial leaf blight (BLB) (83.3%). Among these, BLB, grain discoloration and leaf blast were found to be the major diseases during the period of survey. bacterial leaf blight was found in varieties like ADT 46, BPT 5204, Co46 and IR 20. Grain discoloration was noticed in the varieties like CR 1009 and BPT 5204. The leaf blast and neck blast were observed in the varieties like ADT 46, BPT 5204 and Seeraga Samba with more incidence in Seeraga Samba (leaf blast - 15.1% and neck blast - 2.8%). BPT 5204 recorded highest incidence of Bacterial leaf blight (83.3%) and Grain discoloration (68.5%). Farmers used different fungicides lke carbendazim 50% WP (Bavistin) (500 g/ha) and carbendazim 12% + mancozeb 63% WP (Saaf) (1000 g/ha) for grain discoloration and sheath rot, azoxystrobin 23%SC (Amistar) (500 ml/ha), *Pseudomonas fluorescens* as seed treatment (10 gm or ml/kg of seed) and *Pseudomonas fluorescens* as foliar spray (2.5 kg or 500 ml/ha) for blast, Five leaf extract [Neem Leaves, *Vitex negundo* (Nochi), Guduchhi/Amruth (Seenthil Kodi), *Jatropha curcas* (Kattu Amanaku), *Calotropis gigantea* (Erukkan) and Cow's Urine] for sheath rot and bacterial leaf blight and copper hydroxide 46.1% (Kocide) (0.2%) for bacterial blight

Problems faced by the farmers

- ✓ The major problems faced by the farmers of Karaikal district is the water and labour scarcity. To overcome the irrigation water scarcity some of the farmers were utilizing the water from bore wells installed by Government of Puducherry @ Rs. 5 / hour and some of them were purchasing water from their neighbor borewells @ Rs. 50 / hour.
- ✓ In certain Kuruvai regions, the continuous exploitation of underground water and intrusion of sea water resulted in an increase in the electrical conductivity (EC) and pH of irrigation water. This, in turn, adversely affected the survival of rice plants, especially in villages such as Sellur, Muppaithankudy, Madur, Sethur, Nallambal, Kannapore and Ambagarathore, ultimately impacting the Kuruvai crop yield.
- ✓ In most of the fields, water is found to be salty which affects the crop growth and yield.
- ✓ Due to labour shortage farmers have shifted to direct sowing and most of the farmers were adopting hand weeding where labour scarcity is major constraint for hand weeding.
- ✓ Though many farmers were shifting towards organic farming, labour scarcity propels them to use herbicides for the management of weed problem in the field.

Needs of the farmers

- ✓ Early release of Cauvery water to mitigate the scarcity of irrigation water.
- ✓ Installation of more bore wells by the Government of Puducherry.
- ✓ Farm implements should be supplied to the farmers on rental basis with subsidized cost.
- ✓ Small machinery for harvesting especially for the farmers of small holdings.
- ✓ Mechanical harvester cum thresher should be made available to the farmers through Government departments.
- ✓ Timely supply of seeds and other agricultural inputs such as biofertilizers and biocontrol agents at subsidized cost.
- ✓ Minimum support price for the produce.
- ✓ Popularization of natural farming.
- ✓ Cultivation of the traditional varieties should be popularized among the farmers to conserve high yielding local varieties.
- ✓ Subsidy for the purchase of farm implements and fencing.
- ✓ Farmers need crop insurance.

Highlights of the survey

- ➢ During the Kuruvai season, high-yielding varieties such as ADT 37 and ADT 43 were extensively cultivated, while in the Samba (Rabi) season, prominent varieties like BPT 5204, IR 20 and ADT 46 dominated the rice cultivation, primarily utilizing Cauvery water.
- ➢ Few farmers were cultivating some of the traditional rice varieties such as Maapillai samba and Jeeraga samba in the Nedungadu village.
- ➢ Majority of farmers, exceeding 80%, opted for a transition from transplanting rice to direct sowing due to labor shortage during the crop season. This strategic shift was motivated by a desire to reduce cultivation costs. However, these farmers encountered challenges related to weed management, which they effectively addressed by employing pre-emergence herbicides.

- *Echinochloa colona, Echinochloa crus-galli, Leptochloa chinensis, Digiteria spp.*, *Cyperus rotundus, Cyperus iria, Cyperus deformis* and *Fimbristylis miliacea, Eclipta alba, Ludvigia parviflora, Ludwigia abyssinica* and *Marsilia quadrifoliata* were the common weeds observed in the farmer's field. Among which *Cypreus rotundus* and *Echinocloa crus-galli* were found to be major competitors for the paddy crop in most of the areas surveyed.
- Farmers use both mechanical and chemical methods to control the weeds in the paddy field. Farmers go for hand weeding on 25th and 45th day after transplanting. bispyribac sodium (10% SC) (Nominee gold) @ 200 ml/ha, pendimethalin 30% EC @ 3.3 litre/ha and fenoxaprop-p-ethyl (Rice Star) @ 350 ml/ha were the herbicides used for the management of weeds.
- Leaf folder and stem borer were the major insect pest observed in most of the farmer's field. profenophos, phenthoate + cypermethrin, profenophos + cypermethrin, chlorantraniliprole and thiamethoxam were the insecticides used by the farmers for managing leaf folder, stem borer and thrips.
- Leaf blast, neck blast, narrow brown spot, sheath rot, false smut, grain discoloration and bacterial leaf blight were prevalent during samba. Of which BLB, grain discoloration and leaf blast were found to be the major diseases during the period of survey. BPT 5204 recorded highest incidence of Bacterial leaf blight and Grain discoloration. This occurrence was attributed to excessive nitrogen application as a top dressing, coupled with favorable environmental conditions prevailed during the cropping season.
- Carbendazim 50% WP (Bavistin), carbendazim 12% + mancozeb 63% WP (Saaf), azoxystrobin 23%SC (Amistar) and copper hydroxide 46.1% (Kocide) were the fungicides used by the farmers for the management of rice diseases.
- The use of talc and liquid formulation of biocontrol agent *Pseudomonas fluorescens* has gained significance among the farmers for the management of major rice diseases. Farmers are employing *Pseudomonas fluorescens* as foliar spray as a recognized practice.
- ✓ Spraying of natural products such as 5 % Five leaf extract is also practiced for the management of BLB and sheath rot.
- ✓ Application of organic manures *viz.,* FYM @ 12.5 t/ha, Green manure @ 6.25 t/ha and neem cake @ 12.5 t/ha is being followed by the farmers.
- ✓ Cultural practice *viz.,* summer ploughing is being practiced by the farmers for the management of weeds and soil borne pathogens.
- ✓ Mechanical harvesting by harvester cum thresher is adopted by the farmers due to acute shortage of labours.
- ✓ Due to labour scarcity and irrigation water problem, some of the farmers were expressing their view that it is better to leave farming and search some other jobs for survival.

Punjab-Ludhiana (2023-2024)

Districts surveyed: *Patiala, Barnala, Malerkotla, Sangrur, Faridkot, Ferozepur, Muktsar Sahib, Jalandhar, Ludhiana, Moga, SAS Nagar, Rupnagar, Fatehgarh Sahib, Tran Taran, Amritsar, Hoshiarpur, Gurdaspur* and *Pathankot*

Table 1: Particulars of Survey

District	Villages (Lat; Long)
Patiala	Meemsa (30.3942N; 75.9594E), Bagrian (304306N; 76.0348E), Rauni (30.20'45''N; 76.19'25''E), Bahadurpur Miranwala (30.335457; 76.4066506), Galwati, Bhedpura and Channa
Barnala	Uppli and Khuba (30.3745; 75.5487)
Malerkotla	Maholi Kalan (30.66738; 75.83069) and Aamir Nagar
Sangrur	Bhasour (30.4380N; 75.8955E), Bhadalwad (30.3520N; 75.9282E), Benra (30.3341N; 75.8490E) and Basori
Faridkot	Kareeswali (30.4061; 74.8259)
Ferozepur	Karmuwala (30.9169N; 74.8193E), Rukan Shahwala (30.75; 76.78) and Rattaul Rohi (30.9168N; 74.9479 E)
Muktsar Sahib	Jagat Singh Wala (30.5656N; 74.6129 E) and Jammuana (30.5656N; 74.6129 E)
Jalandhar	Kadianwali (31.2496 N; 75.5808E) and Jallowal
Ludhiana	Dehlon and Alamgir
Moga	Dhudike (30.7744N; 75.3441E),Saffuwala (30.7925N; 75.0772E) and Nidhanwala (30.8435 N; 75.0567E)
SAS Nagar	Ajitgarh (30.67995; 76.72211), Madan Heri (30.704549; 76.717873), Barri (30.6245N; 76.7596E) and Machhli Kalan (30.75; 76.78)
Rupnagar	Mahlan (30.9332N; 76.4729E), Barsalpur (30.8775N; 76.6283E), Kajauli (30.9144N; 6.31E) and Fatehgarhviran (30.9572591; 76.3253754)
Fatehgarh Sahib	Samaspur (30.8656325; 76.3369469) and Jalwera (31.3207900; 75.873100)
Tran Taran	Kasel (31.5369N; 74.7476E), Rampur Narotampur (31.27N; 74.55E) and Kot Mohammed Khan (30.75; 76.78),
Amritsar	Ballian (30.3051N; 75.6761E)
Hoshiarpur	Panjora (30.1893N; 76.3746E); Jian (31.445N; 75.9964E) and Pandori Ganga Singh (31.2935N; 75.9275E),
Gurdaspur	Kahnuwan (31.9064N; 75.4476E); Jagatpur and Kolian
Pathankot	Narot Mehra (32.3022N; 75.46164E), Manwal and Malikpur (32.27; 75.59)

Production oriented survey was conducted in 18 districts of Punjab viz., Patiala, Barnala, Malerkotla, Sangrur, Faridkot, Ferozepur, Muktsar Sahib, Jalandhar, Ludhiana, Moga, SAS Nagar, Rupnagar, Fatehgarh Sahib, Tran Taran, Amritsar, Hoshiarpur, Gurdaspur and Pathankot during Kharif season of 2023. Survey was conducted when the crops were in booting to heading stage. The details of survey are presented in Table 1. The climatic conditions were favourable for rice cultivation. During Kharif-2023 in Punjab state, paddy was cultivated on an area of around 31 lakh hectares of which 80 percent area was under non-Basmati rice and 20 percent area was under Basmati rice. Among non-basmati rice, PR126 was most popular variety occupying 33 per cent

area. Other popular non-basmati varieties cultivated in the state were PR 114, PR 121, PR 128, PR130, PR 131 and Pusa 44. An area of about 0.7 lakh ha was under direct seeded rice (DSR), whereas rest was under puddled transplanted rice (PTR). Among the basmati varieties, Pusa Basmati 1121 was most popular variety followed by Pusa Basmati 1509, Pusa Basmati 1401 and Pusa Basmati 1847.

Table 2: Widely prevalent rice varieties

Districts	**Varieties**
Patiala	**HYVs**: PR 114, PR 126, PR 121, PR 131, Pusa 44 and others; **Basmati/Scented**: Pusa Basmati1509, Pusa Basmati 1847 and Pusa Basmati 1401
Barnala, Malerkotla and Sangrur	**HYVs**: PR 126, PR 121, Pusa 44, PR 131, Peeli Pusa and other; **Basmati/Scented**: Pusa Basmati 1121 and Pusa Basmati 1401
Faridkot, Ferozepur and Muktsar Sahib	**HYVs**: PR 126, PR 131, PR 114 and others; **Basmati/Scented**: Pusa Basmati 1121 and Pusa Basmati 1401
Jalandhar, Ludhiana and Moga	**HYVs**: Pusa 44, PR 126, PR 121, PR 128, PR 131 and others; **Basmati/Scented**: Pusa Basmati 1121
SAS Nagar, Rupnagar and Fatehgarh Sahib	**HYVs**: PR 126, PR 131, PR 128, Pusa 44, PR 121, PR 130 and others; **Basmati/Scented**: Pusa Basmati 1121, Pusa Basmati 1847 and Pusa Basmati 1509
Tran Taran, Amritsar, Hoshiarpur,Gurdaspur and Pathankot	**HYVs**: PR 126, PR 131, PR 128, PR 114, PR 113, PR 121, Pusa 44 and others; **Basmati/Scented**: Pusa Basmati 1121, Pusa Basmati 1401, Pusa Basmati 1509, Pusa Basmati 1847, Pusa Basmati 5 and Pusa Basmti 7

Table 3: General informations

Parameters	**Districts**		
	Patiala	**Barnala, Malerkotla & Sangrur**	**Faridkot, Ferozepur & Muktsar Sahib**
# of villages surveyed	7	8 (2 + 2 + 4)	6 (1 + 3 + 2)
# of farmers interviewed	7	10 (2 + 2 + 6)	6 (1 + 3 + 2)
Field ecosystem	Irrigated	Irrigated	Irrigated
Weather conditions during cropping season	Nornal	Nornal	Nornal
Crop stage when survey was made	Heading to booting	Heading to booting	Heading to booting
Main Crop rotations	Rice-Wheat	Rice-Wheat	Rice-Wheat

A. Cropping system and rice yield: The fields surveyed were under irrigated ecosystem. During 2023, the predominant crop rotation remained the rice-wheat system followed by rice-potato (Table 3). Average rice yield among the HYVs ranged from 6000-8200 kg/ha while in case of basmati varieties, the yield ranged from 5500-7000 kg/ha.

Table 3 contd..: General informations

Parameters	Districts		
	Jalandhar, Ludhiana & Moga	**SAS Nagar, Rupnagar & Fatehgarh Sahib**	**Tran Taran, Amritsar, Hoshiarpur, Gurdaspur & Pathankot**
# of villages surveyed	7 (2 + 2 + 3)	10 (4 + 4 + 2)	13 (3 + 1 + 3 + 3 + 3)
# of farmers interviewed	7 (2 + 2 + 3)	11 (4 + 4 + 3)	13 (3 + 1 + 3 + 3 + 3)
Field ecosystem	Irrigated	Irrigated	Irrigated
Weather conditions during cropping season	Nornal	Nornal	Nornal
Crop stage when survey was made	Heading to booting	Heading to booting	Heading to booting
Main Crop rotations	Rice-Potato, Rice-Wheat	Rice-Wheat	Rice-Wheat, Rice-Potato

Table 4: Average yields of different rice varieties as reported by the cooperators/farmers

Varieties	Yield (Kg/ha)					
	Patiala	**Barnala, Malerkotla & Sangrur**	**Faridkot, Ferozepur & Muktsar Sahib**	**Jalandhar, Ludhiana & Moga**	**SAS Nagar, Rupnagar & Fatehgarh Sahib**	**Tran Taran, Amritsar, Hoshiarpur, Gurdaspur & Pathankot**
PR 126	6500	7600-7700	7500-7800	7300-7600	7250-7850	7300-7800
PR 128						
PR 121	7300	7350-7600		7300	7500	7250
PR 113						7200
PR 114			6000			6050
Pusa 44	7400-7800	7800-8700		7800		7900
PR 130					7600	
PR 131			8200	7800	7600-7700	7600-8000
PR 128				7400-7500	7200	7600
Peeli Pusa		7700-7900				
PB 1121		5900-7800	5700-7800	7700	5500-7500	5500-7800
PB 1509	7400-7600					7700
PB 1401	6500	5500	5500-7600			6500
PB 5						7900

B. Nursery and main field Management: Most ofthe farmers used 8-14 kg/ha of seed rate for nursery sowing but for direct seeding they used 15-20 kg seed per ha. The seed treatments practices were applied by majority of the farmers. On an average about 52% of the farmers contacted adopted seed treatment mostly with Sprint (mancozeb 50% + marbendazim 25% WP) @ 3 g/kg (Table 5). Almost all the farmers contacted told that they applied FYM in the nursery. All the farmers contacted in different districts told that they applied chemical fertilizers like urea and SSP in the nursery (Table 5). Many farmers also applied zinc sulphate in the nursery. Majority of

farmers did direct seeding between May 20 to June 15. Rice crop was transplanted between June 14 to June 30 and Basmati was transplanted during first week to 3 rd week of July at farmer's field. In some of the flood hit areas, transplanting continued up to Mid August, where majority farmers transplanted PR 126 and Pusa Basmati 1509. Mostly farmers transplanted 30-35 days old nursery. In most of the cases, planting density was inadequate i.e. it varied from 17-23 plants/m^2 as against recommended density of 33 plants/ m^2. Most of the surveyed farmers used over dose of nitrogen but many farmers skipped the application of P_2O_5 and K_2O in paddy crop or applied much reduced dose of P_2O_5 and K_2O owing to higher status of these nutrients in their soils (Table 6). Application of Zinc sulphate (either 21 or 33%) is practiced by majority of the farmers. Application of organic manure in the main fields was not common among the farmers (Table 6).

Table 5: Details of nursery management

Parameters	**Districts**		
	Patiala	**Barnala, Malerkotla & Sangrur**	**Faridkot, Ferozepur & Muktsar Sahib**
Planting time	Majority of farmers did direct seeding between May 20 to June 15. Rice crop was transplanted between June 14 to June 30 and Basmati was transplanted during first week to 3 rd week of July at farmer's field. In some of the flood hit areas, transplanting continued up to Mid August, where majority farmers transplanted PR 126 and Pusa Basmati 1509.		
Seed rate	15-18 kg/ha	14-18 kg/ha	16-20 kg/ha
Seed treatment (% farmers adopted)	Yes (71.4%)	Yes (80%)	Yes (50%)
Chemicals used for seed treatment	Sprint (mancozeb 50% + marbendazim 25% WP) @ 3 g/kg	Sprint (mancozeb 50% + marbendazim 25% WP) @ 3 g/kg	Sprint (mancozeb 50% + marbendazim 25% WP) @ 3 g/kg
Organic manure in nursery (% farmers adopted)	Yes (100%); FYM	Yes (100%); FYM	Yes (100%); FYM
Inorganic manure in nursery (% farmers adopted)	Yes (100%); urea (55-65 kg/acre) and SSP (10-65 kg/acre); Some applied zinc sulphate (5-10 kg/acre)	Yes (100%); urea (52-65 kg/acre) and SSP (52-65 kg/acre); Zinc sulphate (5-20 kg/acre)	Yes (100%); urea (52-65 kg/acre) and SSP (50-60 kg/acre); Zinc sulphate (5-8 kg/acre)

Table 5 contd..: Details of nursery management

Parameters	**Districts**		
	Jalandhar, Ludhiana & Moga	**SAS Nagar, Rupnagar & Fatehgarh Sahib**	**Tran Taran, Amritsar, Hoshiarpur, Gurdaspur & Pathankot**
Planting time	Majority of farmers did direct seeding between May 20 to June 15. Rice crop was transplanted between June 14 to June 30 and Basmati was transplanted during first week to 3 rd week of July at farmer's field. In some of the flood hit areas, transplanting continued up to Mid August, where majority farmers transplanted PR 126 and Pusa Basmati 1509.		
Seed rate	15-20 kg/ha	14-20 kg/ha	14-20 kg/ha
Seed treatment (% farmers adopted)	Yes (14.3%)	Yes (36.5%)	Yes (63.8%)

Chemicals used for seed treatment	Sprint (mancozeb 50% + marbendazim 25% WP) @ 3 g/kg	Sprint (mancozeb 50% + marbendazim 25% WP) @ 3 g/kg	Sprint (mancozeb 50% + marbendazim 25% WP) @ 3 g/kg
Organic manure in nursery (% farmers adopted)	Yes (100%); FYM	Yes (100%); FYM	Yes (100%); FYM
Inorganic manure in nursery (% farmers adopted)	Yes (100%); urea (55-65 kg/acre) and SSP (52-60 kg/acre); Zinc sulphate (5-15 kg/acre)	Yes (100%); urea (55-68 kg/acre) and SSP (50-65 kg/acre); Zinc sulphate (5-15 kg/acre)	Yes (100%); urea (52-65 kg/acre) and SSP (52-60 kg/acre); Zinc sulphate (5-10 kg/acre)

Table 6: Details of main field management

Details	**Districts**			**Remarks**
	Patiala	**Barnala, Malerkotla & Sangrur**	**Faridkot, Ferozepur & Muktsar Sahib**	
Planting method	Mostly farmers transplanted 30-35 days old nursery. In most of the cases, planting density was inadequate i.e. it varied from 17-23 plants/m^2 as against recommended density of 33 plants/ m^2.			
Total N applied (Kg/ha)	100-130 kg/ha (100% farmers)	120-150 kg/ha (100% farmers)	120-130 kg/ha (100% farmers)	Urea, DAP
Total P_2O_5 applied (Kg/ha)	10-15 kg/ha (100% farmers)	10-15 kg/ha (100% farmers)	10-15 kg/ha (100% farmers)	DAP
Total K_2O applied (Kg/ha)	10-12 kg/ha (100% farmers)	8-15 kg/ha (100% farmers)	5-12 kg/ha (100% farmers)	MOP
$ZnSO_4$ applied (Kg/ha)	5-10 kg /ha (85.7 % farmers)	3-10 kg /ha (90 % farmers)	3-8 kg /ha (16.7 % farmers)	Zinc sulphate (21 or 33%)
Organic fertilizers applied	FYM (~ 15% farmers)	NA	NA	

Table 6 contd..: Details of main field management

Details	**Districts**			**Remarks**
	Jalandhar, Ludhiana & Moga	**SAS Nagar, Rupnagar & Fatehgarh Sahib**	**Tran Taran, Amri-tsar, Hoshiarpur, Gurdaspur & Pathankot**	
Planting method	Mostly farmers transplanted 30-35 days old nursery. In most of the cases, planting density was inadequate i.e. it varied from 17-23 plants/m^2 as against recommended density of 33 plants/ m^2.			
Total N applied (Kg/ha)	120-130 kg/ha (100% farmers)	110-135 kg/ha (100% farmers)	120-130 kg/ha (100% farmers)	Urea, DAP
Total P_2O_5 applied (Kg/ha)	10-15 kg/ha (100% farmers)	10-15 kg/ha (100% farmers)	8-15 kg/ha (100% farmers)	DAP SSP
Total K_2O applied (Kg/ha)	5-12 kg/ha (100% farmers)	8-15 kg/ha (100% farmers)	8-12 kg/ha (100% farmers)	MOP
$ZnSO_4$ applied (Kg/ha)	5-10 kg /ha (100 % farmers)	5-10 kg /ha (~82 % farmers)	2-6 kg /ha (100 % farmers)	$ZnSO_4$ (21 or 33%)
Organic fertilizers applied	NA	NA	NA	

Table 7: Weeds and weed management

Details	Districts			Remarks
	Patiala	**Barnala, Malerkotla & Sangrur**	**Faridkot, Ferozepur & Muktsar Sahib**	
Weed intensity	Low	Low	Low	Many farmers practiced hand weeding along with herbicide application. Majority (70%) of the farmers from Barnala, Malerkotla & Sangrur practiced only hand weeding. Some farmers did not use any weedicide in transplanted crop but they adopted cultural method of weed control i.e. ponding of water for the first 15 days of crop cycle.
Names of the weeds	Predominant weeds observed during the survey were *Leptochloa chinensis* and *Echnochloa crusgalli* etc. in puddled transplanted rice. Weeds like *Eragrostis* spp. *Leptochloa chinensis*, *Echinichloa colona* and *Ammania* sp. were reported in case of direct seeded rice (DSR).			
Weedicides used	Most of farmers used pretilachlor (Rifit @500-600 ml/acre), butachlor as pre-emergence and some farmers also used bispyribac Sodium as a post-emergence herbicide for weed control in transplanted rice. In DSR condition, pendimethalin alone or pendimethalin+ pyrazosulfuron ethyl was commonly used as pre-emergence herbicides. Although bispyribac Sodium was widely adopted post emergence herbicide but many other post emergence herbicides such as fenoxaprop, Clincher (cyhalofop-butyl) etc. were also used by some farmers.			
%age of farmers applied herbicides	Yes (71.5%)	Yes (30%)	Yes (83.3%)	
Wild rice incidence	Nil	Nil	Nil	

C. Weeds and their Management: Overall intensity of weeds was low throughout the state. Predominant weeds observed during the survey were *Leptochloa chinensis* and *Echnochloa crusgalli* etc. in puddled transplanted rice. Weeds like *Eragrostis* spp. *Leptochloa chinensis*, *Echinichloa colona* and *Ammania* sp. were reported in case of direct seeded rice (DSR). Most of farmers used pretilachlor (Rifit @500-600 ml/acre), butachlor as pre-emergence and some farmers also used bispyribac Sodium as a post-emergence herbicide for weed control in transplanted rice. In DSR condition, pendimethalin alone or pendimethalin+ pyrazosulfuron ethyl was commonly used as pre-emergence herbicides. Although bispyribac Sodium was widely adopted post emergence herbicide but many other post emergence herbicides such as fenoxaprop, Clincher (cyhalofop-butyl) etc. were also used by some farmers. Many farmers practiced hand weeding along with herbicide application. Many farmers from some of the districts practiced only hand weeding (Table 7). Some farmers did not use any weedicide in transplanted crop but they adopted cultural method of weed control i.e. ponding of water for the first 15 days of crop cycle.

Table 7 contd..: Weeds and weed management

Details	Districts			Remarks
	Jalandhar, Ludhiana & Moga	**SAS Nagar, Rupnagar & Fatehgarh Sahib**	**Tran Taran, Amritsar, Hoshiarpur, Gurdaspur & Pathankot**	
Weed intensity	Low	Low	Low	Majority (42-90%) of the farmers from these districts practiced only hand weeding. Some farmers did not use any weedicide in transplanted crop but they adopted cultural method of weed control i.e. ponding of water for the first 15 days of crop cycle.
Names of the weeds	Predominant weeds observed during the survey were *Leptochloa chinensis* and *Echnochloa crusgalli* etc. in puddle transplanted rice. Weeds like *Eragrostis* spp. *Leptochloa chinensis*, *Echinichloa colona*, *Ammania* sp. were reported in case of direct seeded rice (DSR).			
Weedicides used	Most of farmers used pretilachlor (Rifit @500-600 ml/acre), butachlor as pre-emergence and some farmers also used bispyribac Sodium as a post-emergence herbicide for weed control in transplanted rice. In DSR condition, pendimethalin alone or pendimethalin+ pyrazosulfuron ethyl was commonly used as pre-emergence herbicides. Although bispyribac Sodium was widely adopted post emergence herbicide but many other post emergence herbicides such as fenoxaprop, Clincher (cyhalofop-butyl) etc. were also used by some farmers.			
%age of farmers applied herbicides	Yes (57.1%)	Yes (10%)	Yes (15.4%)	
Wild rice incidence	Nil	Nil	Nil	

Table 8: Details of inputs used

Details	Districts		
	Patiala	**Barnala, Malerkotla & Sangrur**	**Faridkot, Ferozepur & Muktsar Sahib**
Implements used	Tractor, harrow, cultivator, planker, combined harvester. Most of the farmers contacted were progressive farmers and they owned many implements. Most of the farmers used combine harvester on hire basis.		
Seed replacement rate	Not available. However, all the farmers contacted in these districts told that they purchased the seeds and used for sowing		
Source of irrigation	Canal (42.8%); Deep Tube well (100%)	Canal (30%); Deep Tube well (100%)	Canal (50%); Deep Tube well (100%)
Scarcity of irrigation water	No (100%)	No (100%)	No (100%)
Availability of fertilizers/ pesticides	Yes (100%)	Yes (100%)	Yes (100%)
Quality of fertilizers/ pesticides	Satisfied (100%)	Satisfied (100%)	Satisfied (100%)
Advisors to the farmers	Own Decision (100%), State Dept (100%); University (100%)	Own Decision (100%), State Dept (100%); University (100%)	Own Decision (100%), State Dept (100%); University (100%)

Table 8 contd..: Details of inputs used

Details	Districts		
	Jalandhar, Ludhiana & Moga	**SAS Nagar, Rupnagar & Fatehgarh Sahib**	**Tran Taran, Amritsar, Hoshiarpur, Gurdaspur & Pathankot**
Implements used	Tractor, harrow, cultivator, planker, combined harvester. Most of the farmers contacted were progressive farmers and they owned many implements. Most of the farmers used combine harvester on hire basis.		
Seed replacement rate	Not available. However, all the farmers contacted in these districts told that they purchased the seeds and used for sowing		
Source of irrigation	Canal (42.8%); Deep Tube well (100%)	Canal (9%); Deep Tube well (91%)	Canal (30.8%); Deep Tube well (100%)
Scarcity of irrigation water	No (100%)	No (100%)	No (100%)
Availability of fertilizers/ pesticides	Yes (100%)	Yes (100%)	Yes (100%)
Quality of fertilizers/ pesticides	Satisfied (100%)	Satisfied (100%)	Satisfied (100%)
Advisors to the farmers	Own Decision (100%), State Dept (100%); University (100%)	Own Decision (100%), State Dept (100%); University (100%)	Own Decision (100%), State Dept (100%); University (100%)

D. Input use: Implements like Tractor, harrow, cultivator, planker, combined harvester and others were used by the farmers. Most of the farmers contacted were progressive farmers and they owned many implements (Table 8). Most of the farmers used combine harvester on hire basis. However, all the farmers contacted in these districts told that they purchased the seeds and used for sowing. Deep tube wells were the main sources of irrigation followed by canal (Table 8). Majority of the farmers expressed that there no scarcity of irrigation water. Farmers also expressed that fertilizers and pesticides were available in time and they were satisfied with their quality. In addition to their own decisions, farmers received advices from officials of state department of agriculture and university (Table 8).

E. Biotic stresses and their management: Overall incidence of rice diseases was low to moderate during the *Kharif*-2023. The details of incidences of different rice diseases are presented in Table 9. Low to moderate level of sheath blight was recorded on different rice and basmati rice varieties viz.,PR 113, PR 114, PR 121, PR 122, PR 126, PR 128, PR 131, Pusa 44, Pilli Pusa, Pusa Basmati 1121, Pusa Basmati 1509 and Pusa Basmati 1401 in the districts of Faridkot, Fatehgarh Sahib, Ferozepur, Malerkotla, Moga, Patiala, Hoshiarpur, Ludhiana, Pathankot, Gurdaspur, Sangrur, Jalandhar, Roopnagar, SAS Nagar, Amritsar and Barnala. Low to moderate incidence of false smut was observed on rice varieties viz., PR 121, PR126, PR 128, PR 131, Pusa Basmati 1509, Pilli Pusa and Pusa 44 in the districts of Faridkot, Patiala, Fatehgarh Sahib, Ludhiana, Pathankot, Sangrur, Gurdaspur, Moga, Barnala and Jalandhar. Low to moderate incidence of brown spot was recorded on varieties PR 113, PR 114, PR 121, PR 126, PR 128, PR 130, PR 131, Pusa 44 from districts of Faridkot, Fatehgarh Sahib, Ferozepur, Patiala, Hoshiarpur, Pathankot, Sangrur, Gurdaspur, Moga, Barnala, Roopnagar, Tarn Taran, Jalandhar and Ludhiana. Low to moderate

incidence of bakanae and foot rot was recorded from Patiala, SAS Nagar, Pathankot, Gurdaspur, Sangrur, Tarn Taran, Amritsar, Barnala, Moga, Fatehgarh Sahib, Ferozepur, Malerkotla, Jalandhar and Roopnagar districts on varieties Pusa Basmati 1121 and Pusa Basmati 1509. Low to moderate incidence of neck blast was recorded from Malerkotla, Pathankot, Muktsar, Sangrur, Tarn Taran and Amritsar districts on varieties Pusa Basmati 1401, Pusa Basmati 1121. Low incidence of leaf blast was recorded in Patiala, Tarn Taran, Ferozepur, Malerkotla, SAS Nagar, Roopnagar and Sangrur districts on varieties Pusa basmati 1401 and Pusa basmati 1121. Low incidence of grain discoloration was recorded on varieties PR 114, PR 121, PR 126, PB 5, Pusa 44 and Pusa Basmati 1121 from Pathankot, Gurdaspur, Taran Tarn, Barnala, Ferozepur and Malerkotla districts. Low to moderate (2-10%) intensity of Erwinia Rot was recorded in some fields of Pusa 44 in Sangrur and Tran Taran. Overall incidences of different insect pests were in low intensity. Insect pests like stem borer, leaf folder, BPH/WBPH and GLH were recorded in low intensity. However, damaged rice leaves by the leaf folder in the form of small patches were observed in villages Alamgir, Kup Kalan and Sankar in Ludhiana Distt. and village Bhasour in Sangrur Distt. Similarly, stem borer attack as dead hearts/white ears were also observed in some farmer's fields and at rice research area, PAU. Farmers applied different pesticides to manage the pests and diseases. Some farmers still applied 7.5 kg of cartap hydrochloride as prophylactic treatment.

Table 9: Prevalence of different diseases and insect pests in surveyed districts of Punjab in 2023

Districts	Diseases							
	Bl	**NBl**	**ShBl**	**BS**	**ShR**	**FS**	**Bak**	**GD**
Patiala	L (2-3%)		L-M (2-15%)	L-M (2-10%)	T	T-L (1-4%)	T-L (1-5%)	
Barnala, Malerkotla and Sangrur	L (2-4%)	L (2-5%)	L-M (2-20%)	L-M (2-20%)	T-L (1-5%)	L (2-5%)	L-M (2-20%)	T-L (1-5%)
Faridkot, Ferozepur and Muktsar Sahib	L (2-4%)	L-M (2-12%)	L-M (2-20%)	L-M (2-10%)	T	T	L-M (2-8%)	T-L (1-4%)
Jalandhar, Ludhiana and Moga			L-M (5-20%)	L-M (2-10%)	T	L-M (2-10%)	L-M (2-10%)	
SAS Nagar, Rupnagar and Fatehgarh Sahib	L (2-3%)		L-M (2-20%)	T-L (2-7%)		L (2-5%)	T-M (1-10%)	
Tran Taran, Amritsar, Hoshiarpur,Gurdaspur and Pathankot	L (5-7%)	L-M (2-10%)	L-M (5-15%)	L-M (2-12%)	T	T-M (1-10%)	L-M (2-12%)	T-L (1-5%)

Low to moderate (2-10%) intensity of Erwinia Rot was recorded in some fields of Pusa 44 in Sangrur and Tran Taran

Districts	Insect pests				
	SB	**LF**	**BPH**	**WBPH**	**GLH**
Patiala	T-L (1-3%)	T-L (1-4%)	T-L (1-5%)	T-L (1-5%)	
Barnala, Malerkotla and Sangrur	T-L (1-4%)	T-L (1-4%)	T-L (1-7%)	T-L (1-7%)	
Faridkot, Ferozepur and Muktsar Sahib		T-L (1-2%)		T-L (1-2%)	T (<1%)
Jalandhar, Ludhiana and Moga	T (<1%)	T-L (1-4%)	T-L (1-3%)	T-L (1-3%)	T-L (1-4%)

SAS Nagar, Rupnagar and Fatehgarh Sahib	T (<1%)	T-L (1-5%)	T-L (1-4%)	T-L (1-4%)	T-L (1-4%)
Tran Taran, Amritsar, Hoshiarpur,Gurdaspur and Pathankot	T-L (1-2%)	T-L (1-3%)	T-L (1-4%)	T-L (1-4%)	T-L (1-3%)

Table 10: Researchable issues

Parameters/Issues	**Districts**		
	Patiala	**Barnala, Malerkotla & Sangrur**	**Faridkot, Ferozepur & Muktsar Sahib**
Rice ecology in your area	Irrigated	Irrigated	Irrigated
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif	Kharif	Kharif
Number of years of experience in rice farming	>20 years	>20 years	>20 years
Main biotic constraints (diseases) in your area according to you	Sheath blight and false smut	Sheath blight and brown spot	Sheath blight, neck blast and false smut
Extent of disease damage	<10%	<10%	<10%
Main biotic constraints (Insect pests) in your area according to you	BPH/WBPH, and leaf folder	BPH/WBPH and leaf folder	WBPH, stem borer
Extent of insect pest damage	<10%	<10%	<10%
Main abiotic constrains in your area according to you	Alkalinity, Acid Sulphate	Drought/submergence, alkalinity	Drought/submergence, salinity
Production constraints in your area according to you	Unavailability of quality seeds, Scarcity of agricultural labours micronutrient deficiency		
Irrigation facilities in your area	Yes (100%); Canal, Bore well	Yes (100%); Canal, Bore well	Yes (100%); Canal, Bore well
Normally how many years it takes to change the rice variety	<20 years	<20 years	<20 years
Any other rice production issues in your area which the rice scientists need to address	-	-	-
What is urgently required in your area as far as rice varieties are concerned			
Duration	Varieties suitable for DSR, varieties with lodging resistance		
Biotic stress resistance	Varieties tolerant to BPH, sheath blight and false smut		
Abiotic stress resistance	Varieties resistant to submergence, salinity		
Preferred grain quality	MS grain quality rice varieties and aromatic short grain and Basmati varieties		
Nutritional quality	Rice varieties with high Zn, iron and high protein		

F. Researchable issues: Among the biotic stresses, major problems in the region are sheath blight, false smut, brown spot and blast among the diseases and BPH/WBPH, stem borer and leaf folder among insect pests. Among the abiotic problems, drought/submergence and salinity was the main problem in certain areas. Major problems faced by the farmers were scarcity of agricultural labours, micronutrient deficiency and non-availability of quality seeds in some areas. Farmers want varieties suitable for DSR and varieties with lodging resistance, varieties having tolerance to sheath blight, brown spot, blast, false smut, BPH/WBPH and stem borer. Farmers also expressed

the need of high yielding fine grain varieties, aromatic short grain rice varieties and basmati varieties and varieties with high zinc, high iron and protein.

Table 10 contd..: Researchable issues

Parameters/Issues	**Districts**		
	Jalandhar, Ludhiana & Moga	**SAS Nagar, Rupnagar & Fatehgarh Sahib**	**Tran Taran, Amritsar, Hoshiarpur, Gurdaspur & Pathankot**
Rice ecology in your area	Irrigated	Irrigated	Irrigated
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif	Kharif	Kharif
Number of years of experience in rice farming	>20 years	>20 years	>20 years
Main biotic constraints (diseases) in your area according to you	Sheath blight and brown spot	Sheath blight and false smut	Sheath blight, neck blast, brown spot and false smut
Extent of disease damage	<10%	<10%	<10%
Main biotic constraints (Insect pests) in your area according to you	BPH/WBPH, and leaf folder	BPH/WBPH, stem borer and leaf folder	stem borer and leaf folder
Extent of insect pest damage	<10%	<10%	<10%
Main abiotic constrains in your area according to you	Drought/submergence, salinity	Drought/submergence, salinity	Drought/submergence, alkalinity, acid sulphate soil
Production constraints in your area according to you	Unavailability of quality seeds, Scarcity of agricultural labours micronutrient deficiency		
Irrigation facilities in your area	Yes (100%); Canal, Bore well	Yes (100%); Canal, Bore well	Yes (100%); Canal, Bore well
Normally how many years it takes to change the rice variety	<20 years	<20 years	<20 years
Any other rice production issues in your area which the rice scientists need to address	-	-	-
What is urgently required in your area as far as rice varieties are concerned			
Duration	Varieties suitable for DSR, varieties with lodging resistance		
Biotic stress resistance	Varieties tolerant to BPH, blast, sheath blight and false smut		
Abiotic stress resistance	Varieties resistant to submergence, drought and salinity		
Preferred grain quality	MS grain quality rice varieties and aromatic short grain and Basmati varieties		
Nutritional quality	Rice varieties with high Zn, iron and high protein		

Tamil Nadu-Coimbatore (2023-2024)

Districts surveyed: *Thiruvannamalai, Salem, Karur, Erode, Coimbatore, Krishnagiri, Kallakurichi* and *Namakkal*

Particulars of survey

Districts	Villages
Thiruvanamalai	Puthalam, Pandavathoppu, Dhanipadi, Mettupalayam and Reddiarpalayam
Salem	Poolampatti, Checkkanoor, Kuppanoor, Thevoor and Kidayoor Pethanaickenpalayam
Karur	Vangal, Pudupettai, Pugaloor and Pettavathalai
Erode	Ammapettai, Arakkankottai, Kodiveri, Navapatti, Athani, Perunthalaiyoor, Kasipalayam, Kodumudi and Kanjikovil
Coimbatore	Devarayapuram, Narasipuram, Madampatti, Anaimalai, Thondamuthur, and Sethumadai
Krishnagiri	Moolachatiram, Puduvayal, Vaaraganoor and Tharanipattu
Kallakurichi	Kariyamangalam, Dhanagounden Pudur, Mazuvumpattu and Vadakkanoor
Namakkal	Veppampalayam, Kokkarayanpettai,Padiyoor and Mohanoor

Widely prevalent rice varieties

Districts	Varieties
Thiruvanamalai	**HYVs:** CO 51, ADT 37, ADT 43, NLR 3449, ASD 16 and Archana
Salem	**HYVs:** ADT 45, ADT 37, CO 51, BPT 5204, Sadana and Amman
Karur	**HYVs:** ADT 43, CO(R) 51, Amman, IR 20 and Dhanuska
Erode	**HYVs:** CO 51, BPT5204, ADT 45, ADT 43, ASD 16, IR 20, white ponni and Sadana
Coimbatore	**HYVs:** Co 51, ASD 16 and BPT 5204
Krishnagiri	**HYVs:** ADT 37, ADT 38, ADT 43, ADT 45, IR 20 and Amman
Kallakurichi	**HYVs:** Amman, ADT 37, ADT 45, CO 51 and Lakshmi
Namakkal	**HYVs:** ADT 37, Paiyur 1, Akshaya, ADT 39,Ponni, Archana, Amman, Sowbackya and Dhanista

Particulars of rice area

District	Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Total irrigated area (ha)	Area under paddy (ha)	Area under DSR (ha)
Thiruvanamalai	378365	184618	170315	163381	87415	2300
Salem	520530	220138	183256	68370	19826	48
Karur	266543	195730	181473	148675	13390	-
Erode	572264	199389	194760	158524	32386	3275
Coimbatore	445386	182306	163451	34719	4260	-
Krishnagiri	375623	123645	120015	40639	23568	1043
Kallakurichi	443758	112323	95963	63102	57249	465
Namakkal	234412	148584	112218	26562	11315	142

Details of weather data in the surveyed districts of Tamil Nadu in 2023

Weather parameters	Months							
	Jun	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**
Thiruvannamalai								
# of Rainy days	6	12	4	6	3	2	-	-
Total rainfall (mm)	54	128	115	181	59	66	-	-
Maximum temp (^{O}C)	35.6	33.2	34.3	34.1	34.3	30.8	30.7	29.6
Minimum temp (^{O}C)	24.7	23.2	23.1	21.8	22.3	22.3	20.7	21.5
Salem								
# of Rainy days	4	1	6	8	3	1	-	-
Total rainfall (mm)	163	48	277	214	70	38	-	-
Maximum temp (^{O}C)	34.6	33.8	32.1	32.4	33.0	31.8	32.0	33.2
Minimum temp (^{O}C)	22.4	21.9	21.5	22.4	22.1	21.3	21.1	22.9
Karur								
# of Rainy days	2	4	4	6	3	-	-	-
Total rainfall (mm)	134	227	180	348	114	-	-	-
Maximum temp (^{O}C)	34.8	33.5	33.7	31.2	31.6	32.9	31.4	32.7
Minimum temp (^{O}C)	24.7	23.3	23.9	21.4	21.2	22.8	21.5	21.6
Erode								
# of Rainy days	5	10	6	4	6	1	-	-
Total rainfall (mm)	268	396	120	142	63	132	-	-
Maximum temp (^{O}C)	36.2	35.1	34.6	32.8	32.7	33.0	31.9	32.7
Minimum temp (^{O}C)	25.3	23.8	23.5	21.4	22.9	21.1	21.3	22.7
Coimbatore								
# of Rainy days	2	2	-	5	7	3	-	-
Total rainfall (mm)	68	81	-	308	246	132	-	-
Maximum temp (^{O}C)	33.1	33.4	32.0	33.6	32.8	31.3	32.5	30.3
Minimum temp (^{O}C)	22.8	22.5	21.6	21.0	21.8	20.7	21.2	20.9
Krishnagiri								
# of Rainy days	4	7	5	-	3	3	-	-
Total rainfall (mm)	123	46.5	148	-	167	191	-	-
Maximum temp (^{O}C)	35.2	32.8	33.0	34.4	33.6	31.1	29.3	29.8
Minimum temp (^{O}C)	23.5	22.4	24.2	22.6	21.7	22.7	21.3	22.7
Kallakuruchi								
# of Rainy days	4	6	11	5	4	2	-	-
Total rainfall (mm)	153	219	431	170	194	88	-	-
Maximum temp (^{O}C)	35.9	35.3	34.4	33.6	32.8	31.5	31.8	31.2
Minimum temp (^{O}C)	26.4	26.1	24.9	22.9	21.2	22.3	22.0	22.6
Namakkal								
# of Rainy days	3	8	3	6	4	3	-	-
Total rainfall (mm)	81	256	114	208	120	173	-	-
Maximum temp (^{O}C)	35.2	34.6	32.7	33.5	33.2	31.8	32.5	32.6
Minimum temp (^{O}C)	23.4	23.1	24.8	23.0	22.2	22.8	21.4	21.2

General Question of Rice Cultivation In District (To Be Filled By The Cooperator In With The Officials From State Department of Agriculture

Parameters	**Districts**			
	Thiruvannamalai	**Salem**	**Karur**	**Erode**
Total Area under HYVs in the district (ha)	141700 ha	19000 ha	12800 ha	32000 ha
Most prevalent HYVs in the District	ASD 16	ADT 45	ADT 43	Sadana
Total area under rice hybrids in the district (ha.	Nil	Nil	Nil	Nil
Most prevalent rice hybrids in the district	Nil	Nil	Nil	Nil
Total area under ~~basmati~~/scented in the district	Nil	Nil	Nil	Nil
Most prevalent basmati varieties in the district	Nil	Nil	Nil	Nil
Seed replacement rate	NA	NA	NA	NA
Whether farmers are using any heavy equipments like transplanted/combine harvester	Yes, combine harvester	Yes, combine harvester	Yes, combine harvester	Yes, combine harvester
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	SRI	SRI	SRI	SRI
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Yes, Weedicide application	Yes, Weedicide application; zinc sulphate foliar spray	Management of stem borer, gall midge and false smut	Management of bacterial blight of rice
What are the general problems in rice cultivation in the district?	Labour shortage; procurement	Labour shortage	High cost of fertilizers	Labour shortage, high cost of cultivation
Please provide any farmers association in the district	Cheyyar Farmers Welfare Associa.	Metture Right canal Farmers Association	-	Lower Bhavani farmers Association
Whether availability of labors is sufficient?	No	No	No	No
Whether there is any marketing problem of the produce?	Yes; Public procurement is without rain shelter	No	No	No
Any major irrigation/power generation project in the district	Sathnur Dam	Mettur Dam	-	Lower Bhavani Project
Any soil testing program undertaken?	Yes	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Agriculture/ University	Yes	Yes	Yes	Yes

General Question of Rice Cultivation In District (To Be Filled By The Cooperator In With The Officials From State Department of Agriculture

Parameters	**Districts**			
	Coimbatore	**Krishnagiri**	**Kallakuruchi**	**Namakkal**
Total Area under HYVs in the district (ha)	1240 ha	23500 ha	56640 ha	11000 ha
Most prevalent HYVs in the District	BPT 5204	ADT 43	Amman	BPT 5204
Total area under rice hybrids in the district (ha.	Nil	Nil	Nil	Nil
Most prevalent rice hybrids in the district	Nil	Nil	Nil	Nil
Total area under ~~basmati~~/scented in the district	Nil	Nil	Nil	Nil
Most prevalent basmati varieties in the district	Nil	Nil	Nil	Nil
Seed replacement rate	NA	NA	NA	NA
Whether farmers are using any heavy equipments like transplanted/combine harvester	Yes, combine harvester	Nil	Yes, combine harvester	Yes, combine harvester
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	SRI	SRI	SRI	SRI
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Yes, Management of rice blast	Yes, Optimum plant populati-on & IPM	Yes, Stem borer and BB management	Yes, management of false smut
What are the general problems in rice cultivation in the district?	Water scarcity; procurement	Labour shortage; procurement	Labour shortage	Labour shortage
Please provide any farmers association in the district	Thondamettur Grapes Producer Association	-.	-	Mettur Anaikattu Farmers Welfare Association
Whether availability of labors is sufficient?	No	No	No	No
Whether there is any marketing problem of the produce?	No	Yes; # of proc-urement centre is les	No	No
Any major irrigation/power generation project in the district	Aliyar Dam	Krishnagiri Dam	-	No
Any soil testing program undertaken?	Yes	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Agriculture/ University	Yes	Periodical training program	Yes	Yes

Variety wise area coverage (ha) in different districts of Tamil Nadu during 2023

Variety/hybrid	Districts			
	Thiruvannamalai	**Salem**	**Karur**	**Erode**
CO 51	23400		3400	1830
NLR 34449	12750			
ADT 37	21367	3650		
ASD 16	42157			
Archana	34541			
ADT 45		4200		1760
BPT 5204		3400		2144
Sadana		3000		2410
Amman		3000	2500	
ADT 43			3400	855
IR 20			2000	
Bhavani				450

Variety/hybrid	Districts			
	Coimbatore	**Krishnagiri**	**Kallakuruchi**	**Namakkal**
CO 51	1175	2360	1740	
CO 55		1615		
ADT 37		4300	6140	1000
ADT 38		1850		
ASD 16	1146			1000
ADT 45		4280	4720	
BPT 5204	354			2750
Sadana				2200
Amman		5700	14600	
ADT 43		5730		
IR 20		3100		
Lakshmi			1550	

In the Production Oriented Survey (POS) program during the year 2023-24, eight districts were surveyed. These were Thiruvannamalai, Salem, Karur, Erode, Coimbatore, Krishnagiri, Kallakurichi and Namakkal. The fields surveyed were under irrigated ecosystem and were in different stages starting from tillering to maturity stage. In general, weather conditions were normal for rice cultivation. Timely release of water from Mettur dam ensured very good coverage in Kuruvai and samba seasons. Farmers solely depend on canal irrigation were able to cultivate rice during Kuruvai season. Most of the areas surveyed were cultivated with two season rice crop in the current year. As in the past, short and medium duration varieties were generally chosen by the farmers for cultivation. Predominant rice varieties cultivated by the farmers were CO 51, CO 55, ADT 37, ADT 38, ASD 16, ADT 45, BPT 5204, Sadana, Amman, ADT 43, IR 20 and Lakshmi. Very few farmers adopted organic rice cultivation. Most of the farmers contacted were in medium income group and majority of them told that their main meal consisted of only rice. Very few expressed that they included wheat or millets in their diet. Average seed rate was 35-60 kg/ha. The seeds were purchased by the farmers every year from the local retailers and Agricultural Department. Seed rate of 10 kg/ha was adopted by farmers wherever the SRI method of cultivation was practiced. In the surveyed districts major sources of irrigation were from canals and deep tube

well. Some farmers treated the seeds with fungicides like carbendazim or thiram. Some farmers adopted seed treatment with Bacillus subtilis @ 10 gm/kg. Seedling root dipping is also followed in few pockets.

In the nursery, the farmers applied DAP or mixture of urea and DAP. In the main field, fertilizers were applied @ 140-180 kg N/ha, 50-80 kg P_2O_5/ha and 40-75 kg K_2O/ha. Very few applied zinc sulphate. NPK was applied by the farmers along with DAP as basal fertilizers. Urea and potash along with neem cake 50kg/ha was also applied as top dressing in some of the rice growing areas. Random transplanting was the most widely adopted method. Line transplanting, SRI, and direct sowing were also adopted by some farmers. In general, weed intensity was low. Most of the farmers adopted hand weeding and some applied herbicide along with hand weeding. Herbicides butachlor (Pre-emergence) and Bispyribac sodium (Early post-emergence) were used by the farmers. Cono weeder was practiced by the farmers adopting SRI method of rice cultivation. Implements like power sprayer, tractor, power tiller and combined harvesters were used by the farmers. Harvesting is done by combine harvester in most places and the use of combine harvester is gaining momentum among the various categories of farmers and getting an average yield of 4500-5500kg/ha. Among the biotic stresses, stem borer, blast and BLB emerged as major biotic problems during this year. However, there was no major outbreak of any pest or disease during this year. Insecticides viz., imidachloprid, thiomethaxim, acephate, profenophos, melathion, and chlorpyriphos were used for the control of BPH, leaf folder and stem borer. In general, higher doses of chemicals were used for the control of stem borer and leaf folder. Many farmers have used two sprays of plant protection chemicals as prophylactic spray along with micronutrients. Labour scarcity was very high for rice cultivation. Most of the places farmers are advised by the pesticide dealers for the usage fertilizers, pesticides and seed.

District wise details:

Thiruvannamalai: Survey was conducted in five villages viz., Puthalam, Pandavathoppu, Dhanipadi, Mettupalayam and Thandarampet in this district when the crops were in milk to maturity stage. The fields surveyed were under irrigated ecosystem and in general, the weather conditions were normal for rice cultivation. Common crop rotation practices followed by the farmers were rice-rice, rice-sugarcane, rice banana, rice-maize and others. Widely cultivated rice varieties were Co 51, NLR 3449, ADT 37, ASD 16, Archana and Amman. Average rice yield among these varieties ranged from 4800-6000 kg/ha. Planting was done in the month of July and Rabi planting was done in the month of November. The farmers contacted were in medium income group. Regarding the food habit, the farmers told that they preferred only rice and average monthly per capita rice consumption was 12-15 kg. They told that they preferred polished and fine grain rice varieties. Average seed rate was 40-50 kg/ha and 66% of the farmers contacted told that they treated the seeds with carbendazim (4 g/kg) or thiram (5 g/kg). All the farmers applied DAP (15-25 kg/20 cents) in the nursery. In the main field, fertilizers were applied @ 150-180 kg N/ha, 50-75 kg P_2O_5/ha and 40-75 kg K_2O/ha through urea, DAP and MOP. Complex fertilizers were also used in some places. Very few applied zinc sulphate @ 10 kg/ha. Some applied FYM (3 t/ha) in the field. In general, intensity of weeds like *Echinochloa* spp., *Cyperus rotundus, Parthenium hysterophorus, Cynodon dactylon, Digitaria* spp. and others was low. Most of the farmers adopted hand weeding. Few applied herbicides like butachlor along with hand weeding. Some of the common needs of the farmers were subsidy on fertilizers and availability of implements.

Implements like tractor, power sprayed and combined harvesters were used by the farmers. Farmers purchased 70-80% of their seed requirement. Shallow tube wells and canal were the main sources of irrigation. Majority of the farmers told that private dealers advised them regarding pesticides use. Leaf blast and false smut infection and stem borer infestation was the most common. Farmers used insecticides like monocrotophos, dimethoate, thiomethoxam and funigicides like tebuconazole, carbendazim, azoxystrobin and copper oxychloride + streptomycin for management of different pests and diseases. Number of pestcides spray ranged from 1-2 and some farmers mixed 2 pesticides before application. Farmers told that major biotic constrainsts were leaf and neck blast, false smut and bacterial blight among the diseases and stem borer among the insect pests. Farmers need suitable varieties for direct seeded rice, MS grain quality HYVs and HYVs resistant to blast.

Salem: Production oriented survey was conducted in five villages viz., Poolampatti, Chekkanoor, Kuppanoor, Thevoor and Pethanaicken Palayam in this district when the crops were in tillering to dough stage. The fields surveyed were under irrigated ecosystem and in general the weather conditions were normal for rice cultivation. Common crop rotation practices followed by the farmers were rice-groundnut, rice-tapioca, rice banana, rice-sesame and others. Widely cultivated rice varieties were CO 51, BPT5204, ADT 37, ADT 45, Sadana and Amman. Average rice yield among these varieties ranged from 3250-5100 kg/ha. The farmers contacted were in medium or high income group. Regarding the food habit, 66% farmers told that they included wheat or millets like finger millet or pearl millet in their diet and average monthly per capita rice consumption was 8-10 kg. They told that they preferred polished and fine grain rice varieties. Average seed rate was 40-50 kg/ha and 33% of the farmers contacted told that they treated the seeds with carbendazim (4 g/kg). All the farmers applied DAP (15 kg/20 cents) or mixture of DAP (10 Kg/20 cents) + urea (10 kg/20 cents) in the nursery. In the main field, fertilizers were applied @ 140-150 kg N/ha, 50-80 kg P_2O_5/ha and 50 kg K_2O/ha through urea, DAP and MOP. Complex fertilizers were also used in some places. Very few applied zinc sulphate @ 10 kg/ha. Some applied FYM + vermicompost (10 t/ha) or green manure (2-10 t/ha) in the field. All the farmers adopted random transplanting. In general, intensity of weeds like *Echinochloa* spp., *Cyperus rotundus, Parthenium hysterophorus, Cynodon dactylon, Digitaria* spp., *Paspalum* spp. and others was low. Most of the farmers adopted hand weeding. Some of the common needs of the farmers were subsidy on fertilizers, timely availability of biocontrol agents and availability of labours. Implements like tractor, power sprayer and combined harvesters were used by the farmers. The source of irrigation is deep tube well and canal. Biotic constraints were observed in low to moderate intensity. Farmers used different pesticides like cypermethrin, profenophos, tebuconazole, copper hydroxide for management of different pests and diseases. Farmers who adopted organic cultivation applied 'Pancha Gabya' (3 times). Farmers told that major biotic constraints were leaf and neck blast, false smut and brown spot among the diseases and stem borer and leaf folder among the insect pests. Farmers need suitable varieties for direct seeded rice and HYVs resistant to blast, false smut and high temperature.

Karur: Five villages viz., Pudupettai, Vangal, Mayanoor, Pugalur and Pettavaithalai, were covered during the survey. The crops were in dough stage at the time of survey. The fields surveyed were under irrigated ecosystem and in general the weather conditions were normal for rice cultivation. Common crop rotation practices followed by the farmers were rice-rice, rice-sesame and others. Rice varieties viz., ADT 43, Co 51, Amman, and IR 20 were the most commonly used

rice varieties among the farmers. Average yield obtained by the farmers during the season was around 5000Kg/ha. The farmers contacted were in high income group. Regarding the food habit, farmers told that they included wheat in their diet and average monthly per capita rice consumption was 8-10 kg. They told that they preferred parboiled and fine grain rice varieties. Average seed rate was 40kg/ha. Seed treatment was not common among the farmers. Complex fertilizers, Urea, SSP, DAP, MOP were used by the farmers. Some farmers applied FYM and green manure in the main fields. Intensity of common weeds like *Cyperus rotundus, Digitaria* spp. and other was low. Farmers mostly adopted hand weeding for weed management. Common need of the farmers were availability of implements. Implements like tractor with puddler, power sprayer and combined harvesters were used by the farmers. The source of irrigation is canal. Biotic constraints were observed in low to moderate intensity. Leaf blast and false smut infection and stem borer infestation was most common. Farmers applied imidachlopid and monocrotophos to protect the crop from insect pests and carbendazim, propiconazole and copper hrdroxide against different diseases.

Erode: Survey was conducted in 9 villages viz., Ammapettai, Arakkankottai, Kodiveri, Navapatti, Athani, Perunthalaiyoor, Kasipalayam, Kodumudi and Kanjikovil in this district when the crops were in booting to heading stage. The fields surveyed were under irrigated ecosystem and in general the weather conditions were normal for rice cultivation. Common crop rotation practices followed by the farmers were rice-sugarcane-pulses, rice-pulses and others. Predominant rice varieties cultivated by the farmers were CO 51, BPT5204, ADT 45, ADT 43, ASD 16, IR 20, White Ponni and Sadana. Average rice yield ranged from 4800-5650 kg/ha. The farmers contacted were in medium or low income group. Regarding the food habit, 66% farmers told that they consumed only rice in their main meal and average monthly per capita rice consumption was 10-14 kg. They told that they preferred polished and fine grain rice varieties. Some farmers told that they included wheat in their main diet. Average seed rate was 30-40 kg/ha and 33% of the farmers contacted told that they treated the seeds with Bacillus subtilis formulation (10 g/kg). about 66% farmers told that they applied FYM and poultry manure in the nursery bed. About same percentage of farmers applied DAP (10-20 kg/20 cents) in the nursery. In the main field, fertilizers were applied @ 140-150 kg N/ha, 60-80 kg P_2O_5/ha and 60-80 kg K_2O/ha through urea, DAP, SSP and MOP. Complex fertilizers were also used in some places. Very few applied zinc sulphate @ 20 kg/ha. Very few applied green manure (5 t/ha) in the field. All the farmers adopted random transplanting. In general, intensity of weeds like *Echinochloa* spp., *Cyperus rotundus, Parthenium hysterophorus, Cynodon dactylon, Digitaria* spp., *Paspalum* spp. and others was low. Most of the farmers adopted hand weeding along with herbicide application. Some of the common needs of the farmers were subsidy in fertilizers and other inputs, proper supply of implements and better infrastructure of procuring agencies. Implements like tractor and combined harvesters were used by the farmers. All the farmers contacted told that they purchased major part of their seed requirement. The source of irrigation is canal. Farmers received advices from officials of state department of agriculture and private dealers. Biotic constraints were observed in low to moderate intensity. Farmers used different pesticides like dimethoate, thiamethoxam, acephate, carbendazim, azoxystrobin and tebuconazole for management of different pests and diseases. Farmers adopted 1-2 times pesticide application. Some common problems faced by the farmers were shortage of labours and high cost of fertilizers. Farmers told that major biotic constraints were leaf and neck blast, false smut and bacterial blight among the diseases and stem borer and

leaf folder among the insect pests. Farmers need suitable varieties for direct seeded rice and HYVs resistant to blast and stem borer, HYVs with MS grain quality having high zinc and low GI.

Coimbatore: Six villages viz., Devarayapuram, Narasipuram, Madampatti, Anaimalai, Thondamuthur, and Sethumadai were surveyed in this district when the crops were in milk stage. The fields surveyed were under irrigated ecosystem and in general the weather conditions were normal for rice cultivation. Commonly cultivated rice varieties in this district were ASD 16, CO 51 and BPT 5204. Crop rotation of either sugarcane or banana was observed among of the farmers. Average rice yield ranged from 4200-5300 kg/ha. The farmers contacted were in medium or low income group. Regarding the food habit, 50% farmers told that they consumed only rice in their main meal and average monthly per capita rice consumption was 10-16 kg. They told that they preferred polished and fine grain rice varieties. Some farmers told that they included wheat (weekly 3 times) in their main diet. Average seed rate was 40 kg/ha and 50% of the farmers contacted told that they treated the seeds with carbendazim (4 g/kg). All the farmers contacted applied DAP (15 kg/20 cents) or mixture of DAP (10 kg) + Urea (5 kg) per 20 cent of nursery area. In the main field, fertilizers were applied @ 160-200 kg N/ha, 50-75 kg P_2O_5/ha and 60 kg K_2O/ha through urea, DAP, SSP and MOP. Very few applied zinc sulphate @ 20 kg/ha. Farmers contacted applied FYM (4 t/ha) or green manure in the field. All the farmers adopted random transplanting. In general, intensity of weeds like *Echinochloa* spp., *Cyperus rotundus, Cynodon dactylon, Digitaria* spp., *Paspalum* spp. and others was low. Most of the farmers adopted hand weeding and some applied herbicide along with herbicide (butachlor) application. Some of the common needs of the farmers were subsidy in fertilizers and other inputs, proper supply of implements and better infrastructure of procuring agencies. Implements like tractor and combined harvesters were used by the farmers. All the farmers contacted told that they purchased major part of their seed requirement. The source of irrigation is canal. Farmers received advices from private dealers. Biotic constraints were observed in low intensity. Farmers used different pesticides like acephate, tricyclazole and propiconazole for management of different pests and diseases. Farmers adopted 1-2 times pesticide application and farmers told that they mixed 2 pesticides along with micronutrients before application. Some common problems faced by the farmers were shortage of labours and high cost of fertilizers. Farmers told that major biotic constraints were leaf blast, false smut and bacterial blight among the diseases and stem borer and leaf folder among the insect pests. Farmers need suitable varieties for direct seeded rice, varieties with lodging resistance and HYVs with MS grain quality.

Krishnangiri: Production oriented survey was conducted in 4 villages viz., Moolachatiram, Puduvayal, Vaaraganoor and Tharanipattu in this district when the crops were in tillering stage. The fields surveyed were under irrigated ecosystem and in general, weather conditions were normal for rice cultivation. Crop rotation with varied crops like, black gram, fodder crops, sugarcane, finger millet and small millets were practiced by the farmers. Commonly cultivated rice varieties were ADT 43, White Ponni, Archana, Sowbackya, BPT 5204 and Dhanista. Average yield obtained during Kharif season was around 4200 Kg/ha, whereas it was around 4500 Kg/ha during Rabi season. Planting was done during July to November. The farmers contacted were in medium income group. Regarding the food habit, farmers told that they consumed only rice in their main meal and average monthly per capita rice consumption was 10-12 kg. They told that they preferred polished and fine grain rice varieties. Average seed rate was 50 kg/ha and farmers contacted told that they treated the seeds with carbendazim (4 g/kg). All the farmers contacted applied green manure and applied DAP (15 kg/20 cents) in the nursery area. In the main field,

fertilizers were applied @ 140 kg N/ha, 50 kg P_2O_5/ha and 60 kg K_2O/ha through urea, DAP, SSP and MOP. Very few applied zinc sulphate @ 12 kg/ha. Farmers contacted applied green manure (2 t/ha) in the field. All the farmers adopted random transplanting. In general, intensity of weeds like *Echinochloa* spp., *Cyperus rotundus, Cynodon dactylon,* and others was low. Most of the farmers adopted hand weeding. Implements like tractor, leveller and combined harvesters were used by the farmers. All the farmers contacted told that they purchased major part of their seed requirement. The source of irrigation is canal. Farmers received advices from private dealers. Brown spot and blast infection followed by stem borer and leaf folder infestation were the most common. Farmers applied different pesticides like imidachloprid, quinalphos, tebuconazole and azoxystrobin protect the crop. Many farmers applied two rounds of pesticide during the crop season. Some common problems faced by the farmers were shortage of labours and high cost of fertilizers. Farmers told that major biotic constraints were leaf blast and sheath blight among the diseases and stem borer and leaf folder among the insect pests. Farmers need suitable varieties for direct seeded rice and HYVs with MS grain quality.

Kallakurichi: Production oriented survey was conducted in five villages viz., Kariamangalam, Dhanagounden Pudur, Mazuvampattu, and Vadakkanoor when the crops were in dough stage. The fields surveyed were under irrigated ecosystem and in general, weather conditions were normal for rice cultivation. Common crop rotation practices followed by the farmers were rice-rice, rice-tapioca, rice-maize and others. Predominant rice varieties cultivated by the farmers were ADT 37, Amman, ADT 45, CO(R) 51 and Dhanuska. Average rice yield ranged from 4500-5200 kg/ha. The farmers contacted were in medium or low income group. Regarding the food habit, all the farmers contacted told that they consumed only rice in their main meal and average monthly per capita rice consumption was 12-15 kg. They told that they preferred parboiled and fine grain rice varieties. Average seed rate was 40-50 kg/ha and none of the farmers contacted adopted seed treatment. All the farmers contacted applied DAP (15-20 kg/20 cents) in the nursery. In the main field, fertilizers were applied @ 140-150 kg N/ha, 50-75 kg P_2O_5/ha and 50-75 kg K_2O/ha through urea, DAP, SSP and MOP. Very few applied zinc sulphate. Farmers contacted applied FYM (4-5 t/ha) in the field. All the farmers adopted random transplanting. In general, intensity of weeds like *Echinochloa* spp., *Parthenium hysterophorus, Cyperus rotundus, Cynodon dactylon, Digitaria* spp., and others was low. Most of the farmers adopted hand weeding and some applied herbicide along with herbicide (butachlor) application. Some of the common needs of the farmers were labour and proper supply of implements and better infrastructure of procuring agencies. Implements like tractor, power sprayer and combined harvesters were used by the farmers. All the farmers contacted told that they purchased major part of their seed requirement. Many farmers were using seed from private seed companies. The source of irrigation is canal or shallow tube well. Farmers received advices from private dealers. Intensity of different biotic constraints was low to medium. Farmer applied different pesticides like acephate, imidacloprid, carbendazim, azoxystrobin and others for the management of different pests and diseases. Some common problems faced by the farmers were shortage of labours and high cost of fertilizers. Farmers told that major biotic constraints were neck blast and false smut among the diseases and stem borer and leaf folder among the insect pests. Farmers need suitable varieties for direct seeded rice and HYVs with MS grain quality.

Namakkal: Survey was conducted in 4 villages viz., Veppampalayam, Kokkarayanpettai, Padiyoor and Mohanoor when the crops were in booting stage. The fields surveyed were under irrigated ecosystem and in general, weather conditions were normal for rice cultivation. Common

crop rotations followed by the farmers were rice-rice, rice-sugarcane and others. Widely cultivated rice varieties in the district were ASD 16, ADT 37, CO 51, Sadana and BPT 5204. Average yield of these varieties were 4800 Kg/ha. The farmers contacted were in medium or low income group. Regarding the food habit, all the farmers contacted told that they consumed only rice in their main meal and average monthly per capita rice consumption was 10-12 kg. They told that they preferred polished and fine grain rice varieties. Average seed rate was 40 kg/ha and none of the farmers contacted adopted seed treatment. All the farmers contacted applied DAP (5 kg/20 cents) and urea (10 kg/20 cents) in the nursery. In the main field, fertilizers were applied @ 100-150 kg N/ha, 60 kg P_2O_5/ha and 60 kg K_2O/ha through urea, DAP, SSP and MOP. Very few applied zinc sulphate. Farmers contacted applied FYM (3 t/ha) in the field. All the farmers adopted random transplanting. In general, intensity of weeds like *Echinochloa* spp., *Parthenium hysterophorus, Cyperus rotundus, Cynodon dactylon,* and others was low. Most of the farmers adopted hand weeding for management of weeds. Farmers demanded subsidy in fertilizers and other inputs. Implements like tractor, leveller and combined harvesters were used by the farmers. The farmers contacted told that they purchased major part of their seed requirement. The source of irrigation is canal. Farmers received advices from private dealers. Intensity of different biotic constraints was low to medium. Farmer applied different pesticides like acephate, monocrotophos, carbendazim and others for the management of different pests and diseases. Some common problems faced by the farmers were shortage of labours and high cost of fertilizers. Farmers told that major biotic constraints were leaf and neck blast among the diseases and stem borer among the insect pests. Farmers need suitable varieties for direct seeded rice and HYVs resistant to rice blast disease.

Prevalence of diseases and insect pests in Tamil Nadu during *Kharif*' 2023

Districts	**Diseases**						
	Bl	**NBl**	**BS**	**ShBl**	**FS**	**ShR**	**BB**
Thiruvanamalai	L (3%)	L (5%)	L (4%	-	L (7-8%)	L	L
Salem	L (2-3%)	L-M (7-12%)	L (4%)	-	L	L	L (4-6%)
Karur	M	L (2%)	-	-	L	-	L
Erode	M	L-M (6-25%)	L	-	L (6%)	L	L-M (6-17%)
Coimbatore	L	L	M	L	L (4-6%)	L	L (6-7%)
Krishnangiri	L	M	L	L (3%)	M	-	L
Kallakurichi	L	L	L	L (5-6%)	M	-	M
Namakkal	L (2%)	L (3%)	L	-	L	L	L

Districts	**Insect pests**						
	SB (%)	**LF (%)**	**BPH**	**CW**	**GM**	**Thrips**	**L Mt**
Thiruvanamalai	M	M	-	-	-	L	-
Salem	L (2-6%)	L (3-4%)	-	-	L	-	-
Karur	L	M	-	L	-	L	-
Erode	M	M	L	-	-	-	-
Coimbatore	L (4-7%)	L	-	-	-	-	L
Krishnangiri	M	M	-	-	L	-	L
Kallakurichi	M	L (4-5%)	-	L	-	-	L
Namakkal	M	M	-	-	-	-	-

Telanagana-Rajendranagar (2023-2024)

Distrcts surveyed: *Nizamabad, Kamareddy, Warangal, Sangareddy, Khammam, Yadadri Bhuvanagiri, Rangareddy, Nagarkurnool, Narayanpet, Vikarabad* and *Nalgonda*

Particulars of surveyin Telangana state in 2023-2024

District	Mandal/Block	Villages
Nizamabad	Jankampally, Varni, Bodhan and Kotagiri	Nagireddypet, Varni, Chandur, Mosra, Bhavanipet, Bopparam, Eklaspur, Sadashiva Nagar, Kotagiri and Durki **(11)**
Kamareddy	Kamareddy and SS Nagar	Nizamsagar, Sultannagar, Hasanpally, Jankampally and SS Nagar **(5)**
Warangal	Warangal (R) and Aatmakur	Aarepally, Aagrampahad and Seetharampuram **(3)**
Sangareddy	Choutikur and Phulkal	Sivampet, Thadhanpally, Gungulur and Choutikur **(4)**
Khammam	Chitakani, Konijerla, Thallada and Wyra	Reddypally, Somavaram, Mansoor Thanda, Nuthankal, Dachapuram, Nagiligonda and Somavaram **(7)**
Yadadri Bhubhanagiri	Bhudan Pochampally	Anthammagudem, Dothigudem, Jiblakpally and Kanumukla, Pochampally **(5)**
Ranga Reddy	Manchala, Yacharam and Ibrahimpatnam	Manchala, Gungal, Khanapur, Rayaprole, Amangal, Hyathnagar, Ibrahimpatnam, Sajjanpally, Nakkalapally, Sajjanpally and Rainguda **(11)**
Nagarkurnool	Veldanda and Bijinepalle	Veldanda and Palem **(2)**
Vikarabad	Bomraspet, Bommarajpet and Kodangal	Motlakunta, Burhampur, Parsapur, Doultabad and Desaipally **(5)**
Narayanpet	Narayanpet and Kosgi	Kothapalle and Chandravancha **(2)**
Nalgonda	Nidamanuru, Miryalaguda and Anumala	Bankapuram, Japtiverappagudem and Annaram **(3)**
Total: 11	**Total: 28**	**Total: 58**

Rice continues to be the most important staple food crop in India and several other countries especially in Asia. Rice is considered as life for millions of Asians as it has immensely influenced their culture, diets and economic condition. About 60-65% of the Indian population depends on rice as the primary source of nutrition. With the unabated growth in population, the requirement of rice by 2050 is estimated to be around 136 million tones. Achieving this target has been threatened by accelerating loss of productive lands to industrialization and human settlement, scarcity of labour and water, diversion of rice lands to other less water requiring crops like vegetables and increased incidences of different biotic stresses. Intensive cultivation practices with heavy dependency on chemical fertilizers, changes in varietal profile with wide spread cultivation of few high yielding rice varieties resulting in narrow genetic base and apparent changes in climatic condition especially rainfall pattern and temperature have tremendously influenced the intensity and geographical distribution of different rice diseases. Many diseases hitherto considered as minor, have become serious in many rice growing areas

The Production Oriented Survey, 2023-24 (POS) was conducted in collaboration with KVKs, DAATTCs and Department of Agriculture in major rice growing districts of Telangana state. A total of 11 districts *viz.*, Nizamabad, Kamareddy of Northern Telangana Zone, Warangal, Sangareddy and Khammam of Central Telangana Zone, Yadadri Bhuvanagiri, Rangareddy, Nagarkurnool, Narayanpet, Vikarabad, Nalgonda of Southern Telangana Zone covering **58** villages were visited under POS during *vanakalam*, 2023 and *yasangi*, 2023-24. The information on various aspects of rice cultivation *viz*., seasonal conditions, crop area coverage and item wise package of practices, cost of cultivation, abiotic/ biotic constraints and their management were discussed with farmer during the interaction. The information on the aforesaid aspects were collected from the progressive farmers, seed producers, AEOs, MAOs, ADAs, DAOs and Input dealers of the respective villages / mandal / district through interaction and participatory approach.

A. General information

A.1: Seasonal Conditions

The rainfall received from South West monsoon and North East monsoon during the period from June, 2023 to March, 2024 along with district wise rainfall situation.

South West Monsoon-2023

During the South-west monsoon period, a total of 843.3 mm rainfall received in Telangana as against normal rainfall of 712.5 mm from 01.06.2023 to 27.09.2023 showing deviation +16% with over all status is being normal.

North-East Monsoon

Normally, in Telangana State, the average normal rainfall of North-East Monsoon is 113.20 mm and actual rainfall received is 52.70 mm showing the deviation of 53.45% with over all status is being deficit during NE monsoon. Overall, the average rainfall received in Telangana state from 01.06.2022 to 27.03.2024 is 920.3 mm as against the normal rainfall of 875.3 mm with deviation of 5.0 per cent.

Table. 2. Month wise rainfall received in Telangana from 01.6.2023 up to 27.03.2024

Month	Normal (mm)	Actual rainfall (mm)		% deviation to normal	Status
		2022-23	2023-24		
June, 2023	129.3	150.6	72.6	-44.0	Normal
July, 2023	229.1	539.9	490.0	114.0	Excess
August, 2023	217.4	186.2	79.9	-63.0	Normal
September, 2023	162.7	222.1	218.6	34.0	Excess
S W Monsoon	**738.6**	**1098.9**	**861.1**	**16.57**	**Excess**
October, 2023	89.2	114.3	6,5	-92.7	Scanty
November, 2023	19.8	1.2	20.6	4.04	Normal
December, 2023	4.2	7.60	25.6	509.5	Excess
N E Monsoon	**113.2**	**123.!**	**52.7**	**-53.4**	Deficit
January, 2024	7.1	0.60	0.0	-100.0	Scanty
February, 2024	4.9	0.20	1.1	-77.5	Scanty
March, 2024	11.3	40.0	5.4	-52.2	Deficit
Cumulative Total (01.06.2023 to 27.03.2024)	**875.1**	**1275.8**	**920.3**	**5.0**	**Normal**

Table 3. Status and deviation of Rainfall during the period from 01.06.2023 to 27.03.2024.

S. No.	Districts	No. of districts	Status and Deviation
1.	Nil	0	Large excess
2.	Nirmal, Nizambad, Rajanna Sircilla, Medak, Siddipet and Jayashanker Bhupalapally	6	Exess
3.	Adilabad, Komarambheem, Mancherial, Peddapally, Jagtial, Mulugu , Karimnagar, Mahabubabad, Kamareddy, Bhadradri Kothagudem,Khammam, Warangal, Hanmakonda, Jangoan, Sangareddy, Rangareddy, Medchal, Vikarabad Mahabubnagar, Narayanpet, Wanaparthy, Yadadri Suryapet and Hyderabad	24	Normal
4.	Nagarkurnool Jogulamba Gadwal and Nalgonda	3	Deficit
5.	Nil	0	Lege Deficit

A.2: Crop coverage

In Telangana, rice is mostly cultivated under wells, tanks and canals in an area of around 65.00 lakh acres against normal area of 49.86 lakh acres with 130.4% sown to season normal during *kharif*, 2023, whereas 51.32 lakh acres against normal area of 41.04 lakh acres with 126.7% sown to season normal during *rabi*, 2023-24 (www.agri.telangana.gov.in). Among the districts, Nalgonda is the the major rice grown area during *kharif*, 2023 (5,04,470 acres) and *rabi*, 2023-24 (4,20,570 acres).

Table 4. District wise normal and actual rice area covered during *Kharif,* 2023 and *Rabi*, 2023-24

S. No.	DISTRICT	Area in acres					
		Kharif, 2023			*Rabi*, 2023-24		
		Normal Area	Actual Area	% Cov. over NA	Normal Area	Actual Area	% Cov. over NA
Southern Telangana Zone							
1	Rangareddy	24475	130049	81.2	52984	90966	41.8
2	Medchal-Malkajgiri	3641	17861	79.6	10014	13763	27.2
3	Vikarabad	26748	130835	79.6	47558	82519	42.4
4	Mahabubnagar	40230	192723	79.1	88151	112049	21.3
5	Nagarkurnool	25519	147082	82.6	94645	115637	18.2
6	Wanaparthy	37548	186128	79.8	102991	94900	-8.5
7	Gadwal (Jogulamba)	17580	80675	78.2	44428	51253	13.3
8	Narayanpet	31989	163328	80.4	78918	115442	31.6
9	Nalgonda	99368	504470	80.3	403442	420570	4.1
10	Suryapet	94235	444068	78.8	387845	383175	-1.2

S. No.	DISTRICT	Area in acres					
		Kharif, 2023			*Rabi*, 2023-24		
		Normal Area	Actual Area	% Cov. over NA	Normal Area	Actual Area	% Cov. over NA
11	Yadadri Bhuvanagiri	60037	304939	80.3	195915	293250	33.2
	Total	**461370**	**2302158**	**-**	**1506891**	**1773524**	**-**
Northern Telangana Zone							
12	Nizamabad	83943	427877	80.4	320958	415162	22.7
13	Kamareddy	61060	310996	80.4	179845	243224	26.1
14	Karimnagar	59279	274125	78.4	222599	266824	16.6
15	Jagtiyal	61869	306717	79.8	231439	298949	22.6
16	Peddapalli	42552	204743	79.2	174203	197070	11.6
17	RajannaSiricilla	35568	180693	80.3	132410	174617	24.2
18	Adilabad	516	1992	74.1	308	423	27.2
19	Mancherial	31365	156553	80.0	84842	103029	17.7
20	Nirmal	35484	135970	73.9	80970	113037	28.4
21	Asifabad (K. Bheem)	12154	57321	78.8	12541	19072	34.2
	Total	**423790**	**2056987**	**-**	**1440115**	**1831407**	**-**
Central Telangana Zone							
22	Medak	59204	300016	80.3	146911	260933	43.7
23	Sangareddy	27690	151359	81.7	52511	103464	49.2
24	Siddipet	73414	376643	80.5	218947	343218	36.2
25	Warangal (Rural)	27718	134354	79.4	86857	111932	22.4
26	Warangal (Urban)	29328	146020	79.9	91919	120600	23.8
27	JayashankarBhupalpalli	21828	110900	80.3	64766	82058	21.1
28	Janagoan	42649	213761	80.0	134721	179285	24.9
29	Mehabubabad	45774	210270	78.2	115522	128978	10.4
30	Mulugu	20234	84910	76.2	35320	50175	29.6
31	Khammam	58823	270325	78.2	161181	104578	-54.1
32	Bhadradri Kothagudem	33653	143170	76.5	49033	51061	4.0
	Total	**440315**	**2141728**	**-**	**1157688**	**1536282**	**-**
	Grand Total	**1325475**	**6500873**	**-**	**4104694**	**5141213**	**-**

Source: www.tg.agrisinet.com, Directorate of Agriculture, Telangana state.

A.3: Crop stage at the time of survey

The roving survey was conducted in **11** major rice growing districts of Telangana State covering **55** villages in different districts, when the crop was between maximum tillering to maturity stage during *kharif*, 2023 whereas tillering stage during *rabi*, 2023-24.

A.4: Crop rotation practiced

Among the cropping systems, rice followed by rice was the predominant cropping system in all the surveyed districts. The other systems were rice–fallow, green manure-rice-rice, rice-pulses, rice-zero tillage sunflower, rice-rice–vegetables depending on the water availability and other factors. In Telangana state, majority of the farmers were cultivated the paddy crop during *kharif*, 2023 and the area was affected during *rabi*, 2023-24 due to non-availability of irrigated water.

A.5: Varietal Scenario during *Kharif*, 2023 and *Rabi*, 2023-24

The varietal scenario was influenced by several factors and varied in different districts. During *kharif*, 2023, the major fine varieties grown in the surveyed districts are Jai Sreeram grain type (Chintoo, Pooja, Sriram gold, Ankur Sona, Super Aman, Sowbhaya, Aman gold), Samba Mahsuri (BPT 5204), Telangana Sona (RNR 15048), HMT Sona, MTU 1061, MTU 1262, MTU 1224, MTU 1064, RNR 21278, MTU 1271 aibrand other fine varieties (Mahindra Sowbhagya), whereas coarse varieties are Kunaram Sannalu, MTU 1010, Jagtial Rice-1, IR 64, Tellahamsa, Bathukamma, MTU 1061, MTU 1153, MTU 1156, 7029 and MTU 1001. It was observed that, local variety Ganga Kaveri (fine and coarse) is popular in Nizamabad and Kamareddy districts during *kharif* and *rabi* seasons.

The major private hybrids grown particularly in Vikarabad, Yadadri Bhuvanagiri (Pochampally), Musi belt of Ranga Reddy and Nalgonda districts are Kaveri 272, Kaveri 175, VNR 22258, Rasi 113, Mahindra 303, Kaveri 468, 27P31, RX 100 and Bio 799 during *rabi* season. The POS team also visited the rice minikit demonstrations in farmer fields collaboration with DAATTCs and KVKs of the PJTSAU.

B. Crop Management

B.1: Seed rate and source of seed:

The DSR (wet and dry) is popular in Khammam, Suryapet and Nalgonda districts, but now it is becoming popular in entire state. The seed rate used for dry direct sowing is 15 kg for fine and 18-20 kg per acre for coarse grain varieties. In transplanting, the farmers are adopting the seed rate of 20-25 kg per acre. The seed rate for dry converted wet rice was ranged from 10-18 kg per acre for fine grain varieties, whereas, 12-25 kg of seed per acre for coarse grain varieties during *yasangi* season. The seed rate in DSR will play a pivotal role in weed population as per the farmers feedback. The majority of the farmers were purchased the seed from TSSDC, NSC, Research Stations of PJTSAU, DCMS or private input dealers. The farmers are using the seed rate of 6-8 kg/acre for research / hybrid paddy seed.

B.2: Seed treatment

The farmers are adopting wet seed treatment to an extent of 8-10% across the surveyed villages by using carbendazim @ 1.0 g or mancozeb + carbendazim @ 2.5 g per kg of seed per liter of water by soaking for 24 hours.

B.3: Sowing and Planting

The long duration varieties were sown during May last week to June and plantings were completed by second fortnight of July, 2023 especially in Nizamabad, Kamareddy and Rajanna Siricilla districts and delayed in NSP canal area (Khammam, Nalgonda and Suryapet districts). The sowings during *kharif*, 2023 was extended upto August, 2023 due to late receipt of canal water under irrigation projects. The paddy transplantings were delayed during *rabi*, 2023-24 due to cold injury, zinc deficiency at nursery stage. As like *rabi*, 2022-23, severe incidence of dead hearts was also notived during nursery stage across the state.

B.4: Organic manures and inorganic fertilizers applied

The majority of the farmers applied inorganic fertilizers @ 2-10 kg of N, 1-6 kg P and 2.0-3.0 kg K_2O in the farm of DAP or 20-20-0-13 or other complex fertilizers. It was observed that, application of sheep manure or poultry manure @ 600-850 kg per 3-4 cents of nursery area

especially during *rabi* season. The growth of nurseries was affected during *rabi* season due to cold injury, sulphide injury and salinity.

B.5: Fertilizer application

The majority of the farmers in the surveyed districtsts are applying NPK in the form of complex fertilizers *viz.,* 12-32-16, 20-20-0-13, DAP, 10-26-26, 16-20-0-13, 17-17-17, 19-19-19, 28-28-0 ranging from 1 to 3 bags per acre as a basal dose. Majority of the farmers are applying the complex fertilizers (50-150 kg/acre) as basal followed by top dressing of Urea (150-200 kg/acre) in 2-3 split doses at tillering stage, booting and just before panicle initiation depending on duration of the varieties. During the POS visit to farmer fields, majority of farmers are not applying potash fertilizer at PI to booting stage due to high cost of MOP and lack of awareness on importance of potash fertilizer.

B.6: Methods of planting

During the POS interactions with farmers at different villages, it was noticed that cost of transplating is one of the major key issue being faced by the farmers and cost incurred for transplanting is ranging from Rs. 4200-6500/-. Non-availability of labourers for transplanting is key problem noticed in the surveyed districts. The labourers from Bihar and UP are coming for transplanting of paddy in entire Telangana state (Bengal planting). The cost of transplanting per acre with Bengal method of planting is ranging from Rs. 4000-4500/- per acre. These labourers are belongs to UP, Bihar and Jharkhand states. Labour efficiency was ranged from 1-1.25 ha per day with a batch of 12 members (6.00 AM to 6.00 PM).

In Telangana state, direct seeding with drum seeder and wet-DSR under puddled conditions are gaining popularity among farming community during both *kharif* and *rabi* seasons, whereas direct seeding using seed cum ferti-drill is common practice in Sattupally division of Khammam district during *kharif* season. The plant population of 15-24 hills/m^2 was observed in majority of the farmer fields, irrespective of the variety and planting time. The plant population is more (30-60 hills/m^2) in dry converted wet rice.

The ranking of methods of planting as follows:

1. Normal transplanting is still hold goods where sufficient labour force is available.
2. Dry converted wet rice – Broadcasting of sprouted seed
3. Drum seeding
4. DSR using seed cum ferti drill
5. Machine planting

B.7: Intensity of weeds

The predominant weed flora includes *Echinocloa colanum, E. crusgalli, Cyandon dactylon, Cyprus rotundus, Leersia hexandra, Panicum repens, Euphorbia spp. and Parthenium spp*. In DSR either in drum seeding or wet direct seeding, the weeds *Ischaemum regosum* (Tonagi in local language) and Jungle rice are the major weeds observed in the farmer fields.

B.8: Weed management

Majority of the farmers in the surveyed districts applied the pre and post emergence herbicides in rice during *kharif* and *rabi* seasons. Very few farmers are adopting the manual weeding in rice due to scarcity of labourers. The most commonly used herbicide molecule for mixing with other weedicide is Bispyribac sodium 10% SC (Nomnee gold) @ 100 ml/acre as post emergence

herbicide. Majority of the farmers mixing the herbicide i.e. nominee gold with other herbicides such as vivaya or assert or council activ.

B.9: Inputs (Seed, fertilizers and farm implements)

In the surveyed districts, the farmers (90-95%) purchasing the seed from local dealers, private companies, TSSDC, HACA, PACs, Department of Agriculture and Research Stations. Very few farmers (5-10%) are using their own seed especially minikits cultivated farmers. The societies were strengthened in terms of financial capability and human resources and playing critical role in timely arranging the fertilizers, green manure seeds.

C. Insect-Pests & Diseases scenario observed during rice POS

During the rice POS, the pest scenario in rice has been assessed during *kharif,* 2023 and *rabi*, 2023-24 in response to adoption of new varieties, package of practices, pest managaement practices and cost of cultivation. The significant achievements of the POS, 2023-24 as detailed below.

- The insect-pests scenario across the surveyed districts revealed that, incidence of insect-pests is less during *kharif*, 2023 except gall midge and stem borer (white ears) incidence in isolated patches across the surveyed districts. Overall, the crop condition is good except sporadic incidence of gall midge and white ears was noticed in late planted crop in the surveyed districts.
- The severe incidence of rice trhips was noticed in Manchala village of Ibrahimpatnam division of Ranga Reddy district. Very clear cut symtopms were noticed during the rice POS visit to Ranga Reddy district.
- The data on the incidence of various diseases revealed that the incidence of BLB was severe in Nizamabad district (Bodhan division) and RARS, Warangal, whereas low incidence was noticed in Kamareddy district. Further, moderate to low incidence of sheath blight was noticed across the state due to heavy rainfall during the month of September, 2023. However, the farmers were sprayed the recommended fungicides as a prophylactic spray for control sheath blight. Overall, the crop condition was good except the sporadic incidence of rice diseases such as neck blast, sheath rot and grain discolouration during *kharif*, 2023 across the surveyed districts. Further, the incidence of brown spot was noticed in Nalgonda district during *rabi*, 2023-24 especially in direct seeded rice.
- BLB is a major problem in *kharif* crop especially in long duration varieties.
- Among the abiotic stresses, algal blume, Zn deficiency, salinity and suphide injury was observed during *rabi*, 2023-24 in the surveyed districts. In few places, the crop was completely dried due to algal blume, sulphide injury, stem rot and accumulation salts during *rabi* season in vikarabad district. The reason for severe occurrence of salinity is due to continuous paddy cultivation, ill drained conditions, not sufficient time or very less time for incorporation of *kharif* crop stubbles or puddling and majority of the farmers not growing the green manure crops during preceding *kharif* season.
- The low to moderate incidence of stem borer (dead hearts) was observed during *rabi*, 2023-24 in surveyed districts of Telangana state. The incidence of stem borer (DH) was less during *rabi*, 2023-24 compared to *rabi*, 2022-23. The main reason for outbreak of yellow stem borer (DH) in rice is due to lack of awareness among the farming community, machine harvesting, less time for incorporation of stubbles, spraying of bios and indiscriminate application of chlorpyriphos (10G) granules during *rabi* season.

- A total of **3 alert messages** and **8 YouTube Modules** were communicated to the DAATTC, KVK and departmental officers besides covering through print and electronic media from time to time.

Table 5. Occurrence of insect-pests in the surveyed districts during *Kharif*, 2023 & *Rabi*, 2023-24

Districts	Insect Pests					
	YSB (DH)	YSB WE)	GM	LF	WM	Thrips
Nizamabad	-	1-10	2-5	1-5	-	-
Kamareddy	-	1-5	-	1-5	-	-
Warangal	-	1-5	-	5-10	1-5	-
Sangareddy	1-20	-	-	-	-	-
Khammam	1-20	1-6	1-5	-	-	-
Yadadri Bhuvanagiri	1-10	-	-	-	-	-
Rangareddy	1-5	1-10	-	1-5	-	30-40
Vikarabad	1-20	-	-	-	-	-
Nagarkurnool	-	1-10	-	-	-	-
Narayanpet	1-10		-	-	-	-
Nalgonda	2-6		-	-	-	-

***Source: The data presented in the table is incidence of insect-pests and diseases in the surveyed farmer fields (isolated patches). The incidence of pests and diseases may vary from village to village in the respective districts also. The information also collected from concerned district ADAs, MAOs, AEOs and farmers interaction.* YSB: Yellow Stem Borer (DH: Dead hearts; WE: White ears); GM: Gall midge, LF: Leaf folder, WM: Whorl Maggot**

Table 6. Incidence of rice diseases in the surveyed districts during *Kharif*, 2023 & *Rabi*, 2023-24

District	NBl	ShBl	BS	GD	BLB
Nizamabad	-	1-5	-	-	5-50
Kamareddy	-	1-10	-	-	1-5
Warangal	1-8	5-10	-	5-8	5-25
Sangareddy	-	-	1-5	-	-
Khammam	2-10	5-15	-	-	5-15
Yadadri Bhuvanagiri	-	-	-	-	-
Rangareddy	-	-	-	-	-
Vikarabad	-	-	-	-	-
Nagarkurnool	-	-	-	-	-
Narayanpet	-	-	-	-	-
Nalgonda	-	-	1-10	-	-

***Source: The data presented in the table is incidence of insect-pests and diseases in the surveyed farmer fields (isolated patches). The incidence of pests and diseases may vary from village to village in the respective districts also. The information also collected from concerned district ADAs, MAOs, AEOs and farmers interaction.* Note: BLB: Bacterial Leaf Blight; NBl: Neck Blast; ShBl: Sheath Blight; BS: Brown Spot; GD: Grain discolouration.**

The perusal of data revealed that, yellow stem borer (dead hearts and white ear stage) during *kharif*, 2023 and *rabi*, 2023-24 and bacterial leaf blight during *Kharif*, 2023 are major problems were identified during rice production oriented survey, 2023-24. Overall, the crop condition is good except in sporadic incidence of insect-pess and diseases in isolated patches and realized good

yields during *kharif*, 2023. Whereas, incidence of stem borer (dead hearts stage) caused damage in *rabi*, 2023-24 beside abiotic stresses (algal blume, salinity, cold and sulphide injury).

C.1: Pesticide application equipment

The most commonly used plant protection equipements for spraying of pesticides are as follows

- Battery operated knapsack sprayer
- Taiwan sprayer
- Tractor mounted sprayer
- Drones (UAVs)

It was observed that, spraying of pesticides using drones were also practicing by farmers in all the surveyed districts on outsourcing basis due to labour scarcity for spraying of pesticides. The cost for spraying of pesticides using drones per acre was ranging from Rs. 500-600 per acre and spray fluid used per acre was 10-20 liter per acre.

C.2: Total no. of pesticides sprayed in the crop season

Majority of the farmers (80-85%) in the surveyed villages are not taken up the single spraying of pesticides during *kharif*, 2023. Overall, the pesticides sprayings are very less during *kharif*, 2023 in the surveyed districts except Nizamabad district. The application of granules (3G or 4 G or 0.4G) at tillering stage (15-25 DAP) is the common practice is being adopted by the farmers in majority of the surveyed districts.

Table 7: List of insecticides and fungicides used by the farmers

S. No.	Insect-pests /diseases	Chemicals used
1.	Gall midge	Fipronil 0.3 G and 0.6G, Carbofuran 3G, Carbosulfan 25% EC
2.	Stem borer, Hispa, whorl maggot and leaf folder	**Nursery to Tillering stage:** Carbofuran 3G, Cartap Hydro Chloride 4G, Chlorantraniliprole 0.4G, Fipronil 0.3%G, Flubendiamide 0.7%G Chlorpyriphos 50%EC + Sand **PI to Booting stage:** Chloranthraniliprole 18.5 SC (Coragen), Cartap Hydrochloride 50% WP, Chlorantraniliprole 9.6% + Lambda cyhalothrin 4.6% (Ampligo), Flubendiamide 39.35 SC, Acephate 75 SP. Chlorpyriphos 50%EC and 20%EC, Thiamethoxam + Chlorantraniliprole (Virtako), Tetraniliprole (Vayego)
3.	Leaf/panicle mite	Dicofol, Propargite and Spiromesfin
4.	Blast (Leaf and Neck blast)	Tricyclazole 18% + Mancozeb 64%WP (Merger/Trozole), Isoprothiolane 40%EC, Kasugamycin 3%L, Kresoxim methyl 44.3%SC, Picoxystrobin 6.78% + Tricyclozole 20.33% SC (Galileo Sensa/Salsa/Fanton/Kronos), Propiconazole 10.7% + Tricyclazole 34.2% SE (Filia/Slogan), Pyraclostrobin 100 g/L (Seltima), Azoxystrobin 12.5 + Difenoconazole 11.4% SC, Azoxystrobin 16.7% + Tricyclazole 33.3% SC (Azotrix).
5.	Sheath Blight	Hexaconazole 5%EC, Propiconazole 25%EC, Validamycin 3%L, Tebuconazole + Trifloxystrobin (Nativo). Azoxystrobin + Tebuconazole (Custodia), Picoxystrobin 7% + Propiconazole 12%SC (Galileo Way), Thifluzamide 24%SC (Pulsor),

S. No.	Insect-pests /diseases	Chemicals used
		Propiconazole 10.7% + Tricyclozole 34.2% SE (Filia), Captan 70%+Hexaconazole 5% WP (Taqat), Carbendazi, 25% + Flusilazole 12.5% (Lusture), Flupyroxad 62.5 g/L + Epoxiconazole 62.5 g/L EC
6.	BLB	Copper oxy chloride + Plantamycin or Paushamycin or Crocin or Agrimycin; Kasugamycin 5% + Copper Oxychloride 45% (Conika) Copper Sulphate 47.15% + Mancozeb 30% WDG (Devona)
7.	Stem rot	Validamycin 3%L, Propiconazole 25%EC, Hexaconazole 5%EC, Iprobenphos 48%EC, Carbendazim 25% + Mancozeb 50% WS (Sprint), Copper Sulphate 47.15% + Mancozeb 30% WDG (Cuprofix).
8.	Sheath rot and GD	Propiconozole 25%EC, Carbendazim 12% + Mancozeb 63% WP (Saaf),

Source: Interaction with farmers during POS visits, ADAs and MAOs

C.3: Mixing of different pesticides for the management of pests and diseases

Majority of the farmers in surveyed districts were mixing at least one insecticide and fungicide compulsorily while others are using cock-tail mixtures of various molecules in different proportions without knowing the compatibility of the molecules. The following are the common cocktail mixtures of insecticides and fungicides being used by the farmers:

1. Dinotefuran + (Carbendazim + Mancozeb)
2. Dinotefuran + (Trifloxystrobin + Tebuconazole)
3. Pymetrozine + (Trifloxystrobin + Tebuconazole)
4. Pymetrozine + Isoprothiolane
5. Chlorantraniliprole + Propiconazole
6. Pymetrozine + Propiconazole
7. Isoprothiolane + Chlorantraniliprole + Acephate
8. Chlorantraniliprole + Acephate + Propineb
9. Chlorpyriphos + Acephate + Saff (Carbendazim + Mancozeb)
10. Buprofezin + Acephate + Tricyclazole
11. Cartap hydrochloride + Tricyclazole
12. Cartap hydrochloride + Spiromesfin
13. Profenophos + Acephate + Saff
14. Lambda Cyhalothrin + Acephate
15. Propiconazole + Chlorantraniliprole
16. Cartap Hydrochloride + Isoprothiolane

D. Cost of cultivation

The cost of cultivation of paddy in all the surveyed districts ranging from 20,000 to 30,000/-. Among the districts, the highest cost of cultivation was recorded in Nizamabad district whereas lowest was recorded in Vikarabad district during 2023-24. The cost paddy (fine grain) was ranging from Rs. 2500 to 3500/- in local market during *kharif*, 2023. The cost of paddy was favoured the farmers with increased net profits during *kharif*, 2023. The major cost of cultivation is incurring

on labour cost for transplanting followed by harvesting. In this connection, university and department of agriculture is promoting direct seeded rice by conducting the demonstrations and awareness programmes. It was observed that, expenditure incurred on pesticides was drastically reduced due to less number of sprays during *kharif*, 2023.

E. Harvesting

The cost of harvesting per acre was ranging from 3000 to 3500 per acre depending on the crop condition and area / location. The cost of bale for paddy straw bale is Rs. 30/-. Overall, it was observed that, very good paddy yields were realized during *kharif*, 2023. Majority of the farmers in the surveyed districts were satisfied with yields obtained due to cost of paddy during *Kharif*, 2023.

F: Farmers outreach programmes

In order to forecast the incidence of pests and diseases in rice, Principal Scientist (Rice), PJTSAU, Institute of rice research, Rajendranagar, has given need based **alert messages (3 Nos.) and YouTube modules (8 Nos. - PJTSAU YouTube channel) / TV programmes** to farmers, Commissionerate, Dept. of Agriculture, DAATTCs, KVKs, NGOs and wide publicity was given through print and electronic media.

Assessm-ent year	Name of Knowledge material / publication	Title of content	Publisher / Producer	Publication No / Volume No
2023	Alert message (Need based)	Vaanakalam Vari Pantalo Samasyathmakamavuthunna Cheeda Pidalu – Nivarana Charyalu	PS (Rice) & Head, PJTSAU	*Vanakalam* Rice /01/2023-24 dated 05.09.2023
2023	Alert message (Need based)	Yasangi Varilo Udramavuthunna Kandam toliche purugu – Yajamanyam (Stem borer management in rice)	PS (Rice) & Head, PJTSAU	*Yasangi* Rice /01/2023-24 dated 27.01.2024
2023	Alert message (Need based)	Yasangi Varilo Udramavuthunna Kandam toliche purugu – Yajamanyam (Stem borer management in rice)	PS (Rice) & Head, PJTSAU	*Yasangi* Rice /02/2023-24 dated 23.03.2024

F. Researchable issues

- Development of package for weed management in DSR
- Development of package of practices for management of algal blume during *rabi* season.
- Characterization gall midge biotypes in Telangana State
- Identification new insecticide molecules for management of rice gall midge.
- Fine-tuning cold management techniques in *rabi* nurseries.
- Development of export quality and short slender grain varieties of rice.
- Diversification from *yasangi* rice to profitable alternative crops.

- Farmers seeking information on different methods of crop establishment in rice (Dry-DSR, Wet DSR, Dry converted wet rice, Drum seeder and MSRI).

SIGNIFICANT ACHIEVEMENTS OF RICE POS, 2023-24

- The Production Oriented Survey, 2023-24 (POS) was conducted in collaboration with KVKs, DAATTCs and Department of Agriculture in major rice growing districts of Telangana state. A total of 11 districts *viz.*, Nizamabad, Kamareddy of Northern Telangana Zone, Warangal, Sangareddy and Khammam of Central Telangana Zone, Yadadri Bhuvanagiri, Rangareddy, Nagarkurnool, Narayanpet, Vikarabad, Nalgonda of Southern Telangana Zone covering **55** villages were visited under POS during *kharif*, 2023 and *rabi*, 2023-24.
- The insect-pests scenario across the surveyed districts revealed that, incidence of insect-pests is less during *kharif*, 2023 except gall midge and stem borer (white ears) incidence in isolated patches across the surveyed districts. Overall, the crop condition is good except sporadic incidence of gall midge and white ears was noticed in late planted crop in the surveyed districts.
- The severe incidence of rice thrips was noticed in Manchala village of Ibrahimpatnam division of Ranga Reddy district during *kharif*, 2023. Very clear symtopms were noticed during the rice POS visit to Ranga Reddy district.
- The data on the incidence of various diseases revealed that the incidence of BLB was severe in Nizamabad district (Bodhan division) and RARS, Warangal, whereas low incidence was noticed in Kamareddy district. The incidence of BLB was nil in remaining surveyed districts. Further, moderate to low incidence of sheath blight was noticed across the state due to heavy rainfall during the month of September, 2023. Overall, the crop condition was good except the sporadic incidence of rice diseases such as neck blast, brown spot and grain discolouration during *kharif*, 2023 across the surveyed districts. Further, the incidence of low to moderate incidence of brown spot was noticed in Nalgonda district during *rabi*, 2023-24 especially in direct seeded rice.
- BLB is a major problem in *kharif* crop especially in long duration varieties at Nizamabad district.
- The low to moderate incidence of stem borer (dead hearts) was observed during *rabi*, 2023-24 in surveyed districts of Telangana state. The incidence of stem borer (DH) was less compared to *rabi*, 2022-23. The main reason for outbreak of yellow stem borer (DH) in rice is due to lack of awareness among the farming community, machine harvesting, less time for incorporation of stubbles, spraying of bios and indiscriminate application of chlorpyriphos (10G) granules during *rabi* season.
- Among the abiotic stresses, algal blume, Zn deficiency, salinity and suphide injury was observed during *rabi*, 2023-24 in the surveyed districts. In few places, the crop was completely dried due to algal blume, sulphide injury, stem rot and accumulation salts during *rabi* season in vikarabad district.
- A total of **3 alert messages** and **8 YouTube Modules** were communicated to the DAATTC, KVK and departmental officers besides covering through print and electronic media from time to time.

The perusal of data revealed that, yellow stem borer (dead hearts and white ear stage) during *kharif*, 2023 and *rabi*, 2023-24 and bacterial leaf blight during *kharif*, 2023 are major problems identified during rice production oriented survey, 2023-24 in Telangana state.

Overall, the crop condition is good except in sporadic incidence of insect-pess and diseases in isolated patches and realized good yields during *kharif*, 2023. Whereas, incidence of stem borer (dead hearts stage) caused damage in *rabi*, 2023-24 besides abiotic stresses (algal blume, salinity, cold and sulphide injury).

Brief Report on farmer's opinion on advancing the rice crop growing seasons (*Vanakalam* and *Yasangi*) in Vikarabad and Nagarkurnool district

As per the university memo. No. 23125/Res. IV/2023, dated 09.05.2023 of the Director of Research, PJTSAU, Hyderabad, a roving survey was conducted in Ranga Reddy and Nagarkurnool districts in collaboration with DAATTC, Vikarabad (Tandur) and KVK, Palem along with staff from Department of Agriculture, Rangareddy and Nagarkurnool districts. The main objective of the survey is to collect the farmer's opinion / feedback on growing the rice crop as per the university recommended sowing window for long, medium and short duration varieties during *kharif* (*vanakalam*) and short duration varieties during *rabi* (*Yasangi*) season. The team physically interacted with farmers and collected the feedback as per the prescribed proforma. In both the districts, the rice crop is grown under 2 main sources of irrigation *i.e.* canals or tanks and open wells or bore wells. The rice crop cultivation is totally depending on source of irrigation. Hence, the farmer's opinion delayed sowing / transplanting during vanakalam and yasangi seasons were also categorised into 2 sub heads *i.e.* rice cultivation under tanks/Canal/stream situation and open wells or bore wells situation.

Rice cultivation under tanks/canal situation

Reason for delay rice sowing, transplanting and harvesting during *vanakalam* season

A. Late onset of monsoons or late release of tanks/Canal water

B. Not only shortage of labour but also coincide with peak transplanting hired tractor cagewheel/rotavator and transplanting labour timings not matching/coincide due to this sometime wait upto 5 days to week.

C. Even timely sown nursery and transplanting and crop was attained maturity but due to lack of water regulatory/control system/authority. At the time of harvest excess moisture/inundation of paddy field, to difficult machine harvesting, farmers were waiting sometime upto 20 days for favorable condition.

D. Tailender cultivated farmers not having way for harvest machine movement, wait up to 15 days. Hence, farmers cultivated high yielding long duration rice varieties (MTU-1271/MTU-1262)

Uttar Pradesh-Masodha (2023-2024)

Districts surveyed: *Ayodhya, Ambedkar Nagar, Amethi, Barabanki, Sultanpur* and *Basti*

Table 1: Particulars of survey

Districts	Block/Taluka	Villages
Ayodhya	Sohawal, Masodha, Bikapur, Mawai and Milkipur	Hajipur, Mandhatapur, Deorakot, Aghiyari, Rampur, Jerua, Murchipur, Shirdaspur and Alipur Khajuri
Ambedkar Nagar	Akbarpur, Katehari, Bhiyaon and Jalalpur	Ratna, Mirza Beg Dubkhar, Kartora, Narayanpur, Yerki, Adampur Tindauli, Badepur and Bibipur Bhusauli
Amethi	Shukul Bazar and Jagdishpur	Bhatmau, Dhanapur (Katari), Sarai Alam, Rasulpur, Bhartha Ka Purwa and Siryari
Barabanki	Pure Dalai, Sirauli and Ram Sanehi Ghat	Baraisarai Tikait Nagar, Navipur Khetasarai, Mohadipur, Ganspur, Sukhipur and Asandra
Sultanpur	Dhanpatganj and Baldirai	Magarsand Kalan, Haliyapur, Jarai Kalan, Tikar, Kuwasi and Pipar Gaon
Basti	Chawani, Vikramjot and Harriya	Pachwas, Fatehpur and Shankarpur

Table 2: Widely prevalent rice varieties

Districts	Varieties
Ayodhya	**HYVs**: NDR 2064, NDR 2065, NDR 97, NDR 359, Samba Mahsuri, Swarna, Sambha Mahsuri-Sub 1, Narendra Lalmati, Sarjoo 52, Pusa Basmati 1 and Damini **Hybrids**: Gorakhnath 509, Arize 6444 Gold, 27P63 and 27P37
Ambedkar Nagar	**HYVs**: NDR 2065, NDR 359, Sarjoo 52, Samba Mahsuri, Swarna, Narendra Lalmati, Sambha Mahsuri-Sub 1, Swarna Sub-1, NDR 97, NDR 2064, Damini, Dhanrekha and Chintu; **Hybrids**: 27P31, 27P63, US 305, Arize 6444 Gold and Gorakhnath 509
Amethi	**HYVs**: NDR 2064, NDR 2065, NDR 97, NDR 359, NDR 3112-1, Narendra Lalmati, Samba Mahsuri, Swarna Sub 1, Moti Gold, Pusa Basmati 1 and Damini; **Hybrids**: 27P37, 27P63 Arize 6444 Gold, Gorakhnath 509 and Ganga Kaveri
Barabanki	**HYVs**: Narendra Lalmati, NDR 97, NDR 359, Sarjoo 52, NDR 2064, NDR 2065, Samba Mahsuri, Swarna and Dilpasand; **Hybrids**: Arize 6444 Gold, 27P37, 27P63, Kaveri, 27P63, Pusa RH 10, Dilkhush, 27P31 and 27P37
Sultanpur	**HYVs**: NDR 97, NDR 2064, NDR 359, NDR 3112-1, NDR 2065, Narendra Lalmati, Samba Mahsuri, Swarna Sub 1, Pusa Basmati 1, Damini and and Moti Gold; **Hybrids**: Gorakhnath 509, Arize 6444 Gold, Ganga Kaveri, 27P37 and 27P63
Basti	**HYVs**: NDR 2064, NDR 2065, NDR 97, NDR 359, Samba Mahsuri-Sub 1, Purva, Khusi 27, BPT 5204, Swarna, Pusa Basmati 1, Damini, KN-3,Chintu, Kalanamak, Sampoorna, Moti and Shahi Dawat; **Hybrids**: Gorakhnath 509, 27P31, Arize 6444 Gold, 27P63, Bayer 6633, 27P37 and Kaveri 668

Table 3: Area under rice cultivation of surveyed districts during *Kharif 2023*

Districts	Area (ha) under rice cultivation			
	Scented/ Basmati	**Hybrid**	**Other**	**Total**
Ayodhya	2500	42000	54668	99168
Ambedkar Nagar	1500	54000	61165	116665
Amethi	4000	25200	91940	121140
Barabanki	2712	58144	123506	184362
Sultanpur	1800	52000	41997	95797
Basti	4005	45007	61076	110088

Table 4: Rainfall distribution in surveyed districts during *Kharif* , 2023

Districts	**Rainfall (mm)**							
	June		**July**		**August**		**September**	
	Normal	Actual	Normal	Actual	Normal	Actual	Normal	Actual
Ayodhya	106.5	85.2	306.1	213.85	282.0	276.46	196.7	156.2
Ambedkar Nagar	106.5	39.97	306.1	264.70	282.0	210.0	196.7	196.7
Amethi	93.6	72.5	299.7	177.8	283.4	159.7	189.5	102.6
Barabanki	98.4	88.0	299.7	423.50	281.6	370.50	203.6	334.50
Sultanpur	87.3	68.80	307.1	244.8	289.5	166.8	202.8	79.2
Basti	126.3	53.36	279.4	154.66	368.0	194.2	141.2	88.0

Production oriented survey of rice growing areas was conducted in six districts of eastern Uttar Pradesh viz., Ayodhya, Ambedkar Nagar, Amethi, Barabanki, Sultanpur and Basti when the crops were in booting to dough stage in *Kharif* 2023. The details of survey are presented in Table 1. This year rice crop suffered with drought during whole season except in Barabanki district (Table 6). The details of rainfall pattern are presented in Table 4. The details of different varieties and hybrids cultivated in different surveyed districts are presented in Table 2. Commonly cultivated rice varieties were HYVs like NDR 97, NDR 359, NDR 2064, NDR 3112-1, NDR 2065, NDR 3112-1, Samba Mahsuri-Sub 1, BPT 5204, MTU 7029, Chintu, Narendra Lalmati, Pusa Basmati 1, Moti Gold, Swarna-Sub-1, Damini and hybrids like Arize 6444 Gold, Gorakhnath -509, 27P63, 27P37, 27P31, Bayer 6633, Kaveri 668, US 305, Kaveri, 27P65 and Pusa RH 10. The details of rice area occupied by different class of rice varieties are presented in Table 3.

Table 5: General question on rice cultivation in district (to be filled by the cooperator in consultation with the officials from state department of agriculture)

Parameters	Districts		
	Ayodhya	**Ambedkar Nagar**	**Amethi**
Total area under HYVs (ha)	54668 ha	61165 ha	91940 ha
Most prevalent HYVs in the district	NDR 2065, NDR 2064, NDR 97, NDR 359	NDR 2065, NDR 97, NDR 359	Sarjoo 52, NDR 97, NDR 359
Total area under rice hybrids	42000 ha	54000 ha	25200 ha
Most prevalent rice hybrids in the district	27P63, Arize 6444 Gold, Gorakh Nath 509.	27P63, Arize 6444 Gold, Gorakh Nath 510	27P63, Arize 6444 Gold, 27p37
Total area under basmati/scented in the district	2500 ha	1500 ha	4000 ha
Most prevalent basmati	Pusa Basmati 1, Lalmati	Pusa Basmati 1, Lalmati	Pusa Basmati 1, Lalmati
Seed replacement rate	70%	70%	65%
Whether farmers are using any heavy equipments like transplanter/combine harvester	Yes , Combine harvester, Super seeder	Yes , Combine harvester	Yes , Combine harvester
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	Yes, Laser levelling	Yes, DSR	Yes, DSR
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Yes, use of plant protection measures and weed control	Yes	Yes, use of plant protection measures
What are the general problems in rice cultivation in the district?	Shortage of labours	Shortage of labours and crop damage by stray animals	Shortage of labours
Please provide any farmers association in the district	-	Yes; FPO (Farmer Producer Organiztion)	Yes; FPO
Whether availability of agricultural labours is sufficient?	No	No	No
Whether there is any marketing problem of the produce?	No	No	No
Any major irrigation/power generation project in the district	Sharda Sahayak Canal	Sharda Sahayak Canal and NTPC Tanda	No
Any soil testing program undertaken?	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Agriculture/University	Yes, training program by Dept of Agriculture and KVK of Ag University.	Yes, training program by Dept of Agriculture and KVK of Ag University.	Yes, training program by Dept of Agriculture and KVK of Ag University.

Table 5 contd..: General question on rice cultivation in district (to be filled by the cooperator in consultation with the officials from state department of agriculture)

Parameters	Districts		
	Barabanki	**Sultanpur**	**Basti**
Total area under HYVs (ha)	123506 ha	41997 ha	61076 ha
Most prevalent HYVs in the district	NDR 2065, NDR 97, NDR 359	NDR 2065, NDR 97, NDR 359	NDR 2065, Sarjoo 52, NDR 359
Total area under rice hybrids	58144 ha	52000 ha	45000 ha
Most prevalent rice hybrids in the district	27P63, Arize 6444 Gold, 27p37	27P63, Arize 6444 Gold	27P63, Arize 6444 Gold, Gorakh Nath 509
Total area under basmati/scented in the district	2712 ha	1800 ha	4005 ha
Most prevalent basmati	Pusa Basmati 1, Lalmati	Pusa Basmati 1, Lalmati	Pusa Basmati 1, Kalanamak
Seed replacement rate	80%	75%	65%
Whether farmers are using any heavy equipments like transplanter/combine harvester	Yes , Combine harvester, Rotavator	Yes	Yes , Combine harvester
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	Yes, DSR	Yes, DSR by few farmers	Yes, DSR by few farmers
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Yes	Yes	Yes, use of plant protection measures
What are the general problems in rice cultivation in the district?	Shortage of agricultural labours	Damage by stray animanls	Non-availability of quality seeds
Please provide any farmers association in the district	Farmers' Club, FPO	Yes; FPO	Yes; Farmers' club
Whether availability of agricultural labours is sufficient?	No	No	No
Whether there is any marketing problem of the produce?	No	No	No
Any major irrigation/power generation project in the district	Sharda Sahayak Canal	Sharda Sahayak Irrigation Canal	Yes; Canal irrigation
Any soil testing program undertaken?	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Agriculture/University	Yes, training program by Dept of Agriculture and KVK of Ag University.	Yes, training program by Dept of Agriculture and KVK of Ag University.	Yes, training program by Dept of Agriculture and KVK of Ag University.

A. General information, cropping system and rice yield: The details of number of villages surveyed are presented in Table 6. A total of 52 farmers were contacted during the survey. Majority (>75%) of the rice fields surveyed were under irrigated ecosystem. The rice fields surveyed were under irrigated ecosystem. Major crop rotations followed by the farmers were rice-wheat (main), Rice-wheat-black gram, rice-mustard, rice-pulses, rice-potato, rice-sugarcane, rice-vegetables and others. Average rice yield among different HYVs ranged from 3000-4500 kg/ha while in case of hybrid varieties the yield ranged from 5000-5800 kg/ha (Table 7).

Table 6: General information

Parameters	Ayodhya	Ambedkar Nagar	Amethi
# of talukas/blocks covered	5	4	2
# of villages surveyed	9	8	6
# of farmers interviewed	9	8	8
Field ecosystem	Irrigated (100%)	Irrigated (100%)	Irrigated (100%)
Weather conditions during cropping season	Normal (50%); Drought like condition (50%)	Normal (37.5%); Drought like condition (62.5%)	Normal (25%); Drought like condition (75%)
Crop stage when survey was made	Heading to milk	Heading to milk	Booting to dough
Crop rotations	Rice-wheat (main), Rice-wheat-black gram, rice-mustard, rice-pulses, rice-potato, rice-sugarcane and others		

Table 6 contd..: General information

Parameters	Barabanki	Sultanpur	Basti
# of talukas/blocks covered	3	2	3
# of villages surveyed	6	6	3
# of farmers interviewed	8	7	10
Field ecosystem	Irrigated (100%)	Irrigated (100%)	Irrigated (100%)
Weather conditions during cropping season	Normal (100%)	Normal (28.6%); Drought like condition (71.4%)	Normal (50%); Drought like condition (50%)
Crop stage when survey was made	Booting to milk	Heading to milk	Heading to milk
Crop rotations	Rice-wheat (main), rice-mustard, rice-pulses, rice-potato, rice-rice, rice-mentha, rice-sugarcane and others		

Main rice-wheat followed by rice-mustard and rice-pulse

Table 7: Average yields of different rice varieties as reported by the cooperators/farmers

Variety/hybrids	Yield (kg/ha)					
	Ayodhya	Ambedkar Nagar	Amethi	Barabanki	Sultanpur	Basti
Samba Mahsuri	3800		3800	3800		3800-4000
Sarjoo 52						3500
Swarna		4500		5200		
N. Lalmati			3000			
NDR 2065	4500	4500			4200	4500
NDR 359	4000	4500			4000	
Arize 6444	5200-5500	5000-5500	5300-5400	5300-5800	5200-5600	5400-5800
Goraknath 509		5000-5200				
27p63			5200	5200		

Table 8: Details of rice consumption pattern in different districts of Uttar Pradesh

Parameters	Districts		
	Ayodhya	**Ambedkar Nagar**	**Amethi**
Status of farmers	Medium Income (100%)	Medium Income (83.3%); Rich (16.7%)	Medium Income (85.7%); Rich (14.3%)
Per capita monthly rice consumption (kg)	4-5 kg	4-5 kg	4-5 kg
Composition of main meal	Rice + Wheat (100%)	Rice + Wheat (100%)	Rice + Wheat (100%)
Preferred rice types	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)
Rice grain type preference	Fine grain (87.5%), coarse grain (12.5%)	Fine grain (100%)	Fine grain (100%)
Any changes in food habit in last 10 years	No (100%)	No (100%)	No (100%)

Table 8 contd..: Details of rice consumption pattern in different districts of Uttar Pradesh

Parameters	Districts		
	Barabanki	**Sultanpur**	**Basti**
Status of farmers	Medium Income (100%)	Medium Income (85.7%); Rich (14.3%)	Medium Income (100%)
Per capita monthly rice consumption (kg)	4-6 kg	4-5 kg	4-5 kg
Composition of main meal	Rice + Wheat (100%)	Rice + Wheat (100%)	Rice + Wheat (100%)
Preferred rice types	Polished rice (100%)	Polished rice (100%)	Polished rice (100%)
Rice grain type preference	Fine grain (83.3%); coarse grain (16.7%)	Fine grain (71.4%); coarse grain (85.7%)	Fine grain (90%); coarse grain (10%)
Any changes in food habit in last 10 years	No (100%)	No (100%)	No (100%)

B. Rice consumption pattern: Survey was conducted on consumption pattern of rice among the farmers in different surveyed districts of this part of eastern Uttar Pradesh. On an average about 92% of the farmers contacted were from medium income group and rest were from higher income group. Average per capita consumption of rice per month was 4-6 kg rice and 100% of the farmers contacted told that their main meal consisted of both rice and wheat. All the farmers contacted told that they preferred polished rice over parboiled rice. On an average about 88% of the farmers contacted told that they preferred fine grain rice. Many farmers from Sultanpur told that they also consumed coarse grain rice. In general, there was no change in the food habit.

C. Nursery and main field Management: Average seed rate used by the farmers ranged from 30-35 kg/ha for HYVs while in case of hybrids it was 15 kg/ha. Practice of treating the seeds before sowing was not very common among the farmers. About 12.5-22.2% farmers from Ayodhya, Ambedkarnagar and Basti treated the seeds with carbendazim (2 g/kg seeds). On an average 92% of the farmers contacted from different districts told that they applied organic manure like FYM in the nursery (Table 9). About 34% of the farmers contacted from different districts applied chemical fertilizers like urea and DAP in the nursery. Planting was done from 2nd week of June to

1st week of July. In the main fields, fertilizers were applied @ 80-130 kg N/ha, 40-60 kg P_2O_5/ha and 50-60 kg K_2O/ha (Table 10). While majority of the farmers (80-100%) applied nitrogen and phosphorus in the main fields, only about 30% of the farmers contacted from different districts applied potash in the main field. Zinc and Sulphur deficiency were observed in surveyed districts. On an average about 90% of the farmers contacted applied zinc sulphate (15-25 kg/ha). To supply essential nutrient to the crop farmers were using inorganic fertilizers viz. Urea, NPK, DAP, SSP, MOP, and Zinc sulphate. More than 50% of the farmers contacted applied FYM in the main field (5-8 t/ha). Some farmers applied green manure (dhaincha, urd bean, moong bean) to improve the soil health and yield potential of the crop. Plant growth promoters *viz.,* Biozyme and Microzyme are being used by some progressive farmers.

Table 9: Details of nursery management

Parameters	Ayodhya	Ambedkar Nagar	Amethi
Planting time	End of June to 1st week of July	2nd week to 4th week of June	End of June to 1st week of July
Seed rate	30-32 kg/ha (HYVs); 15 kg/ha (hybrids)	30-35 kg/ha (HYVs); 15 kg/ha (hybrids)	30 kg/ha (HYVs); 15 kg/ha (hybrids)
Seed treatment (% farmers adopted)	Yes (22.2%)	Yes (12.5%)	Nil
Chemicals used for seed treatment	Carbendazim (2 g/kg)		
Organic manure in nursery (% farmers adopted)	Yes (88.9%) FYM	Yes (100%) FYM	Yes (100%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (11.1%) DAP (80 kg/ha)	Yes (37.5%) DAP (70-80 kg/ha)	Yes (37.5%) DAP (70-80 kg/ha)

Table 9 contd..: Details of nursery management

Parameters	Barabanki	Sultanpur	Basti
Planting time	2nd week to 4th week of June	End of June to 1st week of July	2nd week to 4th week of June
Seed rate	30 kg/ha (HYVs); 15 kg/ha (hybrids)	30 kg/ha (HYVs); 15 kg/ha (hybrids)	30 kg/ha (HYVs); 15 kg/ha (hybrids)
Seed treatment (% farmers adopted)	Nil	Nil	Yes (20%)
Chemicals used for seed treatment	Carbendazim (2 g/kg)		
Organic manure in nursery (% farmers adopted)	Yes (62.5%) FYM	Yes (100%) FYM	Yes (100%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (25%) DAP (70-80 kg/ha)	Yes (42.8%) DAP (70-80 kg/ha)	Yes (50%) DAP (70-80 kg/ha)

Table 10: Details of main field management

Details	Districts		
	Ayodhya	**Ambedkar Nagar**	**Amethi**
Planting method	All the farmers in Ayodhya, Ambedkar Nagar and Amethi adopted random transplanting where plant population per unit area was not maintained		
Total N applied	100-120 kg/ha	100-120 kg/ha	80-120 kg/ha
Total P_2O_5 applied	Yes (100%) @ 50-60 kg/ha	Yes (100%) @ 50 kg/ha	Yes (100%) @ 40-50 kg/ha
Total K_2O applied	Yes (44.4%) @ 50-60 kg/ha	Yes (25%) @ 50 kg/ha	Yes (25%) @ 50 kg/ha
$ZnSO_4$ applied (21% or 33%)	Yes (88.9%) @ 15-25 kg/ha	Yes (62.5%) @ 20 kg/ha	Yes (100%) @ 15-20 kg/ha
Organic fertilizers applied	Yes (33%); FYM; 33% farmers applied growth factor zyme (8-10 kg/ha)	Yes (87.5%); FYM; 25% farmers applied growth factor zyme (10 kg/ha)	Yes (12.5%); FYM 12.5% farmers applied growth factor zyme (8 kg/ha)
Remarks	Nutrients were applied in the form of urea, DAP, SSP, MOP and zinc sulphate.		

Table 10 contd..: Details of main field management

Details	Districts		
	Barabanki	**Sultanpur**	**Basti**
Planting method	All the farmers in Barabanki, Sultanpur and Basti adopted random transplanting where plant population per unit area was not maintained		
Total N applied	100-120 kg/ha	100-120 kg/ha	100-120 kg/ha
Total P_2O_5 applied	Yes (87.5%) @ 50-60 kg/ha	Yes (100%) @ 50 kg/ha	Yes (80%) @ 50 kg/ha
Total K_2O applied	Yes (25%) @ 50 kg/ha	Yes (28.5%) @ 50 kg/ha	NA
$ZnSO_4$ applied (21% or 33%)	Yes (100%) @ 20 kg/ha	Yes (100%) @ 15-20 kg/ha	Yes (90%) @ 20 kg/ha
Organic fertilizers applied	Yes (75%); FYM (5 t/ha); 12.5% farmers applied green manure	Yes (28.5%); FYM (5 t/ha); 28.5% farmers applied growth factor zyme (10 kg/ha)	Yes (70%); FYM (5-8 t/ha); 12.5% farmers applied growth factor zyme (10 kg/ha) and 12.5% farmers applied green manure
Remarks	Nutrients were applied in the form of urea, DAP, SSP, MOP and zinc sulphate.		

D. Weeds and their Management: Overall intensity of weeds was low to medium. Commonly recorded weeds were *Echinochloa colona, E. crusgalli, Eclipta alba, Cyperus iria, Cyperus rotundus, Dactyloctenium aegyptium, Digitaria sanguinalis, Fimbristylis miliacea* and *Fimbristylis dichotoma*. About 66.7-87.5% farmers contacted adopted herbicide application. Commonly used herbicides were butachlor (2.5 l/ha), pretilachlor (1.5-3.3 l/ha), Nominee Gold (200 ml/ha) and others. All of them also adopted hand weeding for the management of weeds (Table 11). About 12.5-33.3% of the farmers contacted told that they adopted only hand weeding.

Table 11: Weeds and weed management

Details	Districts		
	Ayodhya	**Ambedkar Nagar**	**Amethi**
Weed intensity	Low	Low to medium	Low
Names of the weeds	Commonly recorded weeds were *Echinochloa colona, E. crusgalli, Eclipta alba, Cyperus iria, Cyperus rotundus, Dactyloctenium aegyptium, Digitaria sanguinalis* and *Fimbristylis dichotoma*		
Weedicides used	Butachlor (2.5 l/ha), pretilachlor (1.5 l/ha), Nominee Gold (200 ml/ha) and others		
%age of farmers applied herbicides	About 66.7-87.5% farmers adopted herbicide application. All of them also adopted hand weeding for the management of weeds. About 12.5-33.3% of the farmers contacted told that they adopted only hand weeding.		
Wild/weedy rice incidence	Nil	Nil	Nil

Table 11 contd..: Weeds and weed management

Details	Districts		
	Barabanki	**Sultanpur**	**Basti**
Weed intensity	Low-medium	Low to medium	Low-medium
Names of the weeds	Commonly recorded weeds were *Echinochloa colona, E. crusgalli, Eclipta alba, Cyperus iria, Cyperus rotundus, Dactyloctenium aegyptium, Fimbristylis miliacea* and *Fimbristylis dichotoma*		
Weedicides used	Butachlor (2.5 l/ha), pretilachlor (1.5-3.3 l/ha), Nominee Gold (200 ml/ha) and others		
%age of farmers applied herbicides	About 71.4-87.5% farmers adopted herbicide application. All of them also adopted hand weeding for the management of weeds. About 12.5-28.6% of the farmers contacted told that they adopted only hand weeding.		
Wild/weedy rice incidence	Nil	Nil	Nil

E. Common needs of the farmers: Some of the common needs of the farmers were timely availability of seeds HYVs of medium duration, availability of labours, timely availability of fertilizers and other inputs, marketing facility, disease and pest tolerant rice varieties, technical assistance, subsidy in seeds, agro-chemicals, plant protection inputs and farm machineries including solar pumps.

F. Input use: Implements like sprayer, cultivator, tractor, rotavator and combine harvester were used by the farmers. Progressive farmers had some of their own equipments and other farmers hired the implements. Use of combine harvester and paddy thresher was common practice among the rice farming community of the Eastern Uttar Pradesh. About 66.7-100% of the farmers in different districts told that they purchased part (60-80%) of their seed requirement. Majority of the farmers have small holding size and using farm machinery on hired basis in the surveyed districts. Soil testing programme is promoting by the govt. agencies and providing Soil Health Card to farmers. Few farmers are doing organic rice cultivations in small areas. Shallow tube wells, canal

and deep tube wells were the main sources of irrigation (Table 12). About 12.5-28.5% of the farmers contacted from Ambedkar Nagar, Barabanki and Sultanpur told that there was scarcity of irrigation water. In general, farmers told that inputs like fertilizers and pesticides were available in time and they were also happy with their quality. Training programmes, Kisan Mela and Kisan Gosthies were regularly organized by KVKs of Agriculture University and Department of Agriculture, Govt. of U.P. to promote new varieties/technologies to minimize the cost of cultivation and enhancing the overall income of the rice growing farmers. The main source of farmer's finance are own resources, Kisan Credit Card, P.M. Kisan Samman Nidhi and cooperative societies. In addition to their own decisions, farmers received advices from officials of state department of agriculture, university and private dealers. Availability of farm labourers coupled with higher labour wages are the major constraint in rice production in the surveyed districts.

Table 12: Details of inputs used

Details	**Districts**		
	Ayodhya	**Ambedkar Nagar**	**Amethi**
Implements used	Implements like sprayer, cultivator, tractor, rotavator and combine harvester were used by the farmers. Progressive farmers had some of their own equipments and other farmers hired the implements		
Source of seeds	About 66.7-100% of the farmers in different districts told that they purchased part (60-80%) of their seed requirement.		
Source of irrigation	Shallow tube well (88.9%); Canal (11.1%); Deep tube well (11.1%)	Deep tube well (12.5%); Canal (75%); Shallow tube well (25%)	Deep tube well (12.5%); Canal (25%); Shallow tube well (87.5%)
Scarcity of irrigation water	No (100%)	Yes (25%)	No (100%)
Availability of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)
Quality of fertilizers/pesticides	Satisfied (100%)	Satisfied (100%)	Satisfied (100%)
Advisors to the farmers	Own decisions (100%); State dept. (100%); Dealers (44.4%); Univ (66.7%)	Own decisions (62.5%); State Dept. (62.5%), Dealers (25%), Univ (75%)	Own decisions (87.5%); State Dept. (100%), Dealers (37.5%); Univ (62.5%)

Table 12 contd..: Details of inputs used

Details	**Districts**		
	Barabanki	**Sultanpur**	**Basti**
Implements used	Implements like sprayer, cultivator, tractor, rotavator and combine harvester were used by the farmers. Progressive farmers had some of their own equipments and other farmers hired the implements		
Source of seeds	About 70-100% of the farmers in different districts told that they purchased part (70-80%) of their seed requirement.		
Source of irrigation	Shallow tube well (100%); Canal (75%)	Deep tube well (42.8%); Canal	Deep tube well (10%); Canal (40%); Shallow tube well (40%)

Details	Districts		
	Barabanki	**Sultanpur**	**Basti**
		(42.8%); Shallow tube well (57.1%)	
Scarcity of irrigation water	Yes (12.5%)	Yes (28.5%)	No (100%)
Availability of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)
Quality of fertilizers/pesticides	Satisfied (100%)	Satisfied (100%)	Satisfied (100%)
Advisors to the farmers	Own decisions (87.5%); State dept. (75%); Dealers (50%); Univ (75%)	Own decisions (57.1%); State Dept. (85.6%), Dealers (57.1%), Univ (100%)	Own decisions (60%); State Dept. (80%), Dealers (80%); Univ (40%)

Table 13: Prevalence of diseases and Insects in Eastern Uttar Pradesh during *Kharif' 2023*

Districts	Diseases			
	BS	**ShBl**	**FS**	**BLB**
Ayodhya	L-M (5-15%)	M (10-15%)	L (1-3%)	L (5%)
Ambedkar Nagar	L-M	L-M (5-15%)	L (2%)	L-M (5-10%)
Amethi	L-M (5-10%)	L-M (5-20%)	L (2-3%)	L (5%)
Barabanki	L	L-M (5-15%)	M-S	L-M (5-10%)
Sultanpur	L-M (5-10%)	L-M (5-15%)	L (2-3%)	L (5%)
Basti	L-M (5-10%)	M (10-15%)	L	L-M (5-10%)

Districts	Insect pests				
	SB	**LF**	**GLH**	**GB**	**Termite**
Ayodhya	L-M	L	L	L-M	
Ambedkar Nagar	L-M (2-10%)	L-M (5-10%)	L	L-M	
Amethi	L (1-5%)	L (5%)	L (5%)	L-M	L (3%)
Barabanki	L-M	L-M	L	L-M	T (<2%)
Sultanpur	L	L (2-3%)	L	L-M	
Basti	L-M (2-10%)	L (5%)	L	L-M	

G. Biotic stresses and their management: The details of occurrence of different diseases and insect pests are presented in Table 13. Overall, the incidences of different diseases like brown spot, sheath blight, false smut and bacterial blight were low to moderate except false smut was recorded in moderate to high intensity in parts of Barabanki district. Among the insect pests, stem borer, leaf folder, gundhi bug, green leaf hoppers and termites were observed in low to moderate intensities. Though over all false smut incidence was low in Ayodhya, in Mawai block, false smut was notice from moderate to severe form. On an average 78% of the farmers contacted adopted plant protection measures. The details of different insecticides and fungicides used by the farmers are presented in Table 14. In most cases, farmers adopted one spraying and none of the farmers contacted mixed 2 or more pesticides before spraying. In many places, deficiency symptoms of zinc were observed. Some of the common problems were shortage of labours and their high wages,

damage by stray animals, difficulty in selling the produce, storage problem, unavailability of fertilizers and quality seeds in time and micronutrient deficiency

Table 14: Details of pest management

Details	**Districts**		
	Ayodhya	**Ambedkar Nagar**	**Amethi**
% age farmers adopting plant protection	77.8%`	75%	87.5%
Names of pesticides	**Insecticides**: cartap hydrochloride (10-12 kg/ha), chlorpyriphos (1.5 l/ha) and Folodol (20 kg/ha) for stem borer and leaf folder **Fungicides**: propiconazole (500 ml/ha), hexaconazole (1 l/ha), difenoconazole (250 ml/ha), Nativo (tebuconazole + trifloxystrobin) (200-300 g/ha), carbendazim (500 gm/ha) for sheath blight and copper oxychloride + streptomycin (500 g + 15 gm per ha) for bacterial blight		
# of pesticide sprays	1	1	1
Mixing of pesticides before application	No (100%)	No (100%)	No (100%)

Table 14 contd..: Details of pest management

Details	**Districts**		
	Barabanki	**Sultanpur**	**Basti**
% age farmers adopting plant protection	62.5%`	85.7%	80%
Names of pesticides	**Insecticides**: cartap hydrochloride (10-12 kg/ha), chlorpyriphos 20% EC (2.5 l/ha) and Folodol (20 kg/ha) for stem borer and leaf folder **Fungicides**: azoxystribin + tebuconazole (400 ml/ha), propiconazole (500 ml/ha), hexaconazole (1 l/ha), difenoconazole (250-300 ml/ha), Nativo (tebuconazole + trifloxystrobin) (200-300 g/ha), carbendazim (500 gm/ha) for sheath blight and copper oxychloride + streptomycin (500 g + 15 gm per ha) for bacterial blight		
# of pesticide sprays	1	1	1
Mixing of pesticides before application	No (100%)	No (100%)	No (100%)

H. Researchable issues: Among the biotic stresses, major problems in the region are sheath blight, bacterial blight, false smut and brown spot among the diseases and stem borer, leaf folder and gundhi bug among the insect pests (Table 15). Among the abiotic problems, Submergence/ drought (early drought), flash flood and salinity were the main problem. Scarcity of agricultural labours, lack of irrigation facilities, unavailability of quality seeds and other inputs, lack of mechanization and micronutrient deficiency. Farmers expressed the need for varieties suitable for DSR, varieties having resistance to sheath blight, false smut, bacterial blight and stem borer. Farmers also expressed the need for varieties having tolerance to submergence, drought and salinity. Farmers also expressed the need of high yielding varieties with medium slender grain and with high zinc.

Table 15: Researchable issues

Parameters/Issues	**Districts**		
	Ayodhya	**Ambedkar Nagar**	**Amethi**
Rice ecology in your area	Irrigated	Irrigated	Irrigated
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif	Kharif	Kharif
Number of years of experience in rice farming	10-20 years	5-10 years	10-20 years
Main biotic constraints (diseases) in your area according to you	Sheath blight, bacterial blight and False smut	False smut, bacterial blight and brown spot	Sheath blight, false smut and bacterial blight
Extent of disease damage	>10%	>10%	>10%
Main biotic constraints (Insect pests) in your area according to you	Stem borer and leaf folder	Stem borer, leaf folder and Gundhi bug	Stem borer and leaf folder
Extent of insect pest damage	>10%	>10%	>10%
Main abiotic constrains in your area according to you	Submergence/ drought	Submergence/ drought	Submergence/ drought
Production constraints in your area according to you	Scarcity of agricultural labours, lack of irrigation facilities, unavailability of quality seeds and other inputs and micronutrient deficiency		
Irrigation facilities in your area	Available; Bore well, open well	Available; Bore well, solar pumps	Available; Bore well
Normally how many years it takes to change the rice variety	5-10 years	5-10 years	5-10 years
Any other rice production issues in your area which the rice scientists need to address	Random transplanting where number of hills per unit area is not maintained and issues with plant protection measures		
What is urgently required in your area as far as rice varieties are concerned			
Duration	Varieties suitable for DSR and varieties with lodging resistance		
Biotic stress resistance	Varieties tolerant to bacterial blight, sheath blight, false smut and stem borer		
Abiotic stress resistance	Varieties with tolerance to submergence, drought and salinity		
Preferred grain quality	MS grain rice varieties and aromatic short grain		
Nutritional quality	Varieties with high iron, zinc and high protein		

Table 15 contd..: Researchable issues

Parameters/Issues	Districts		
	Barabanki	**Sultanpur**	**Basti**
Rice ecology in your area	Irrigated	Irrigated	Irrigated
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif	Kharif	Kharif
Number of years of experience in rice farming	5-10 years	10-20 years	5-10 years
Main biotic constraints (diseases) in your area according to you	Sheath blight, bacterial blight and false smut	Sheath blight, False smut, bacterial blight and brown spot	Sheath blight, false smut and bacterial blight
Extent of disease damage	>10%	>10%	>10%
Main biotic constraints (Insect pests) in your area according to you	Stem borer and leaf folder	Stem borer, leaf folder and Gundhi bug	Stem borer, leaf folder and gundhi bug
Extent of insect pest damage	>10%	>10%	>10%
Main abiotic constrains in your area according to you	Submergence/ drought and flash flood	Submergence/ drought and salinity	Submergence/ drought (early drought)
Production constraints in your area according to you	Scarcity of agricultural labours, unavailability of quality seeds and other inputs, micronutrient deficiency and lack of mechanization		
Irrigation facilities in your area	Available; Bore well	Available; Bore well	Available; Bore well, canal and open well
Normally how many years it takes to change the rice variety	5-10 years	5-10 years	5-10 years
Any other rice production issues in your area which the rice scientists need to address			
What is urgently required in your area as far as rice varieties are concerned			
Duration	Varieties suitable for DSR and varieties with lodging resistance		
Biotic stress resistance	Varieties tolerant to bacterial blight, sheath blight, false smut and stem borer		
Abiotic stress resistance	Varieties with tolerance to submergence, drought and salinity		
Preferred grain quality	MS grain rice varieties		
Nutritional quality	Varieties with high iron, zinc and high protein		

Uttarakhand-Pantnagar (2023-2024)

Districts surveyed: *Udham Singh Nagar* and *Nainital*

Table 1: Particulars of Survey

District	Blocks	Villages
Udham Singh Nagar	Jaspur, Kashipur, Bazpur, Gadarpur, Rudrapur, Sitarganj and Khatima	Jainagar, Bhagchuri, Arjunpur, Pratappur, Panchananpur, Jhankat, Dhansara, Uttamnagar, Dhaleid and another 44 villages
Nainital	Haldwani, Kotabagh and Ramnagar	Musabangar, Gintigaon, Damua Dunga, Lanachaur, Kamola, Bail Padao, Kaladhungi and another 4 villages

Table 2: Widely prevalent rice varieties

District	Prevalent varieties
Udham Singh Nagar	**HYVs:** PR 113, PR 121, PR 126, PR 127, PR 128, PR 129, PR 130, HKR 47 and Pant Dhan 23; **Basmati/Scented**: Pusa Basmati 1509, Pusa Basmati 1121, Pusa Basmati 1692 and Pant Sugandh Dhan 27
Nainital	**Bhabar area**: Pant Dhan 11, Govind, Pant Dhan 18 and PR 113; **Hilly area**: Govind, VL Dhan 210 and VL Dhan 2011

Table 3: Particulars of rice area

District	Total Geographical Area (ha.)	Total Cultivable Area (ha.)	Total Cultivated Area (ha.)	Net Irrigated Area (ha.)	Area sown Under Rice (ha.)	Production (tonnes)	Productivity (q/ha)
US Nagar	254200	151790	143333	137034	108100	388950	35.98
Nainital	425100	97662	45956	24927	10780	37112	34.43

Table 4: Weather conditions during Kharif 2023 at Pantnagar (Udham Singh Nagar)

Weather Data	Months							
	May	June	July	Aug	Sep	Oct	Nov	Dec
Rainy Days (No.)	6	6	14	15	7	1	3	0
Total Rain Fall (mm)	114.00	125.60	597.60	395.20	301.80	7.40	15.70	0
Temp. Maximum (^{o}C)	34.00	37.10	32.40	32.40	32.70	31.60	27.70	23.60
Temp. Minimum (^{o}C)	20.10	24.70	26.20	26.00	24.70	17.60	12.70	7.80
RH (%) Morning	70.10	72.10	85.30	90.90	89.60	85.50	88.30	91.00
RH (%) Evening	36.00	43.60	74.30	72.50	67.50	44.90	43.60	47.60

Production oriented survey was conducted in two rice growing districts of Uttarakhand viz., Udham Singh Nagar and Nainital at tillering to maturity stage of the crop. The details of the survey are presented in Table 1 & 6. The particulars of rice area, production and productivity are given in Table 3. Udham Singh Nagar falls under Tarai belt of the state. Production oriented survey was conducted in 53 villages of 7 blocks of district Udham Singh Nagar. Since, rice is the major crop in the *Kharif* season, most of the fields (50-55%) were occupied with rice. Entire area under the district is irrigated and except for few, most of the farmers followed recommended agronomic

package of practices. The farming system of Nainital district is an integration of food grains, vegetables, fruits and livestock production system. The district is comprised of 4 farming situations namely, Bhabar plain including foot hills, lower hills (rainfed and irrigated), mid hills (rainfed and irrigated) and high hills (rainfed). Only Bhabar area is irrigated and farmers follow recommended agronomic package of practices. Crops like rice, wheat, maize, soybean, ragi (finger millet), grain amaranth, ginger, pea, tomato, cole crops, brinjal, bhindi, guava, jackfruit etc. are mainly grown in bhabar and foot hills, while rice, wheat, soybean, maize, tomato, potato, cauliflower, french bean, mango, lime, peach and pear are mainly cultivated in lower hills. In Nainital, production oriented survey was conducted in 12 villages of 3 blocks of two farming situations namely Bhabar plain including foot hills, and lower hills (rainfed and irrigated) at crop maturity. Most of the farmers in these districts were marginal or sub-marginal. In general weather conditions were normal for rice cultivation (Table 4). Due to favourable weather conditions, there was good crop stand, in almost all the areas surveyed. In Nainital district, the area under rice cultivation was more in Bhabar as compared to hills. Good crop stand was noticed in Bhabar compared to hilly areas. Most predominant varieties in US Nagar were HYVs like PR 113, PR 121, PR 126, PR 127, PR 128, PR 129, PR 130 and HKR 47 and basmati varieties like Pusa Basmati 1509, Pusa Basmati 1121, Pusa Basmati 1692 and Pant Sugandh Dhan 27. In Nainital districts, varieties like Pant Dhan 11, Govind, Pant Dhan 18, PR 113, PR 121 and HKR 47 were grown by the farmers in Bhabar region, whereas, Govind, VL Dhan 210, VL Dhan 211 and VL Dhan 69 were mainly grown in foot and lower hills.

Table 5: General questions on rice cultivation in district (to be filled by the co-operator in consultation with the officials from state department of Agriculture)

Parameters	**Districts**	
	Udham Singh Nagar	**Nainital**
Total area under HYVs in the district	50-55%	25-30%
Most prevalent HYVs in the district	PR 113, PR 121, PR 126, PR 127, PR 128, PR 129, PR 130, HKR 47	**Bhabar area**: Pant Dhan 11, Govind, Pant Dhan 18 PR 113, PR 121, HKR 47 **Hilly area**: Govind, VL Dhan 210, VL Dhan 211, VL Dhan 69.
Total area under rice hybrids in the district	NA	NA
Most prevalent rice hybrids in the district	NA	NA
Total area under basmati in the district	Less than 1%	Less than 1%
Most prevalent basmati varieties in the district	Pusa Basmati 1509, Pusa Basmati 1121, Pusa Basmati 1692, Pant Sugandh Dhan 27.	NA
Whether farmers are using any heavy equipments like transplanter /combine harvester	Yes	No
Mention water saving technologies like SRI/laser levelling/DSR being used by the farmers	Yes (DSR on small scale)	Yes (DSR in hilly upland areas)

Parameters	Districts	
	Udham Singh Nagar	**Nainital**
Whether survey team gave any advice to the farmers during survey? If yes, then what are those?	Not to cultivate rice during summer. Apply only recommended doses of pesticides in consultation with the experts/scientists.	Use quality seeds of latest and recommended varieties, apply only the need based and recommended doses of fertilizers and pesticides.
What are the general problems in rice cultivation in the district?	Higher wages of labour, Insufficient rice counters where farmers can sell their produce	Non availability of agriculture labour and Insufficient rice counters where farmers can sell their produce
Please provide any farmers association in the district	Not known	Not known
Whether availability of agricultural labours is sufficient?	No	No
Whether there is any marketing problem of the produce?	Insufficient rice counters where farmers can sell their produce	Insufficient rice counters where farmers can sell their produce
Any major irrigation/power generation project in the district	Khatima hydro power Station, Lohiahead, Khatima	No
Any soil testing program undertaken	Yes	Yes
Any farmers training program was organized by the state department of agriculture/university	Trainings by State Agriculture department and university KVKs	Trainings by State Agriculture department and university KVKs

Table 6: General information

Parameters	Districts	
	Udham Singh Nagar	**Nainital**
# of talukas/blocks covered	7	3
# of villages surveyed	53	12
# of farmers interviewed	10	10
Field ecosystem	Irrigated	Irrigated (50%); Hill ecosystem (50%)
Weather conditions during cropping season	In general weather conditions were normal for rice cultivation.	
Crop stage when survey was made	Tillering to booting	Booting to dough
Crop rotations	Rice-wheat, rice-mustard, rice-pea, rice-sugarcane, rice-potato-ginger, rice-mustard/wheat/pea-pulses and rice-tomato	

Table 7: Average yields of different rice varieties as reported by the cooperators/farmers

Varieties	Yield (kg/ha) in different districts of Uttarakhand		Remarks
	Udham Singh Nagar	**Nainital**	
PR 121	5500-5700	5400-5700	IN US Nagar, due to favourable weather conditions, there was good crop stand, in almost all the areas surveyed. In Nainital
PR 113	5600-5700		
HKR 47	5500	5600	
PR 126	5600		
VL 312		4000	

Varieties	Yield (kg/ha) in different districts of Uttarakhand		Remarks
	Udham Singh Nagar	Nainital	
Govind		3900	district, good crop stand was noticed in Bhabar compared to hilly areas.
VL Dhan 85		3900	
VL Dhan 69		3800	

A. Cropping system and rice yield: The farmers adopted different cropping systems like rice-wheat, rice-mustard, rice-pea, rice-sugarcane, rice-potato-ginger, rice-mustard/wheat/pea-pulses and rice-tomato. Rice-wheat and rice-mustard were commonly followed by the farmers. Average rice yield among the high yielding varieties in plain area ranged from 5400-5700 kg/ha while in hilly area, the average yield among the varieties ranged from 3800-4000 kg/ha.

Table 8: Details of rice consumption pattern

Parameters	Districts	
	Udham Singh Nagar	Nainital
Status of farmers	Medium income (90%); Rich (10%)	Medium income (70%); Poor (30%)
Per capita monthly rice consumption (kg)	8-10 kg	8-10 kg
Composition of main meal	Rice + Wheat (100%)	Rice + Wheat (100%)
Preferred rice types	Polished rice (80%); Parboiled (20%)	Polished rice (40%) Parboiled (60%)
Rice grain type preference	Fine grain (100%)	Fine grain (80%); Coarse grain (20%)
Any changes in food habit in last 10 years	No (100%)	No (100%)

B. Rice consumption pattern: Survey was conducted on consumption pattern of rice among the farmers in two districts of Uttarakhand. Majority (70-90%) of the farmers contacted were in the medium income group. Average per capita consumption of rice per month was 8-10 kg rice (Table 8). All the farmers contacted told that their main meal consisted of both rice and wheat and about 40-80% of the farmers told that they used polished rice. About 80-100% farmers told that they preferred fine grain rice varieties. In general, there was no change in the food habit.

Table 9: Details of nursery management

Parameters	Districts	
	Udham Singh Nagar	Nainital
Planting time	1st to 4th week of July	1st to 4th week of July
Seed rate	20-25 kg/ha	20-25 kg/ha
Seed treatment (% farmers adopted)	Yes (100%)	Yes (70%); No (30%)
Chemicals used for seed treatment	Carbendazim 50% WP (2 g/kg seeds)	Carbendazim 50% WP (2 g/kg seeds)
Organic manure in nursery (% farmers adopted)	No (100 % only)	Yes (30%); FYM @ 10 kg/1000 m^2
Inorganic manure in nursery (% farmers adopted)	Yes (100% farmers); DAP @ 5-7 kg/1000 m^2 and/or urea (3-5 kg/1000 m^2)	Yes (80% farmers); DAP @ 5 kg/1000 m^2 and/or urea (3-5 kg/1000 m^2); some applied NPK fertilizer @ 5 kg 1000 m^2

C. Nursery and main field Management: Planting was done between 1st week to 4th week of July. Average seed rate was 20-25 kg/ha and farmers adopted random planting where plant population per unit area was not maintained. About 70-100% farmers contacted told that they adopted seed treatment with carbendazim before sowing. Application of organic manure in the nursery bed was not common among the farmers. However, about 80-100% of the farmers contacted told that they applied chemical fertilizers like DAP, urea and complex NPK fertilizers in the nursery (Table 9). In the main fields, farmers applied fertilizers @ 115-130 kg N/ha, 40-60 kg P_2O_5/ha and 40-60 kgK_2O/ha. Almost all the farmers contacted told that they applied zinc sulphate @ 25 kg/ha. Zinc deficiency is a common problem in this region. Some farmers sprayed the crop with 5 kg zinc sulphate + 20 kg urea/ha to manage Zinc deficiency/Khaira disease. Fertilizers like DAP, urea, MOP, Zinc sulphate and NPK (19:19:19) were commonly used by the farmers. Application of organic manure like FYM is not common among the farmers and inadequate (Table 10). In US Nagar district, few farmers also applied bio-fertilizer named biozyme.

Table 10: Details of main field management

Details	**Districts**	
	Udham Singh Nagar	**Nainital**
Planting method	Random planting (100%); Plant population per unit area was not maintained	
Total N applied	115-120 kg/ha (100% farmers applied)	120-130 kg/ha (100% farmers applied)
Total P_2O_5 applied	60 kg/ha (100% farmers applied)	40-60 kg/ha (100% farmers applied)
Total K_2O applied	40 kg/ha (100% farmers applied)	40-60 kg/ha (100% farmers applied)
$ZnSO_4$ applied	25 kg/ha (100% farmers applied)	25 kg/ha (100% farmers applied)
Organic fertilizers applied	Very less (only 10%) applied FYM @ 2 q/ha	Applied (60%); FYM @ 1-1.5 q/ha
Remarks	Fertilizers like DAP, urea, MOP, Zinc sulphate and NPK (19:19:19) were commonly used by the farmers. Zn deficiency is a common problem. Farmers in the district commonly applied zinc sulphate @ 25 Kg/ha or sprayed the crop with 5 kg zinc sulphate + 20 kg urea/ha to manage Zinc deficiency/Khaira disease.	

Table 11: Weeds and weed management

Details	**Districts**		**Remarks**
	Udham Singh Nagar	**Nainital**	
Weed intensity	Low	Low	Most of the farmers adopted hand weeding along with herbicide application
Names of the weeds	*Echinochloa colona, Echinochloa crusgalli, Monochoria vaginalis, Ischaemum rugosum, Cynodon dactylon, Eclipta prostrata, Paspalum scrobiculata, Cyanotis axillaris, Cyperus iria, Cyperus* spp. and others		
Weedicides used	Pre-emergence: pretilachlor 50% EC and butachlor 50% EC Post-emergence: bispyribac Sodium		
Percentage of farmers applied herbicides	Applied (100%) along with hand weeding	Applied (60%) along with hand weeding	
Wild/weedy rice incidence	Nil	Nil	

D. Weeds and their Management: Overall, intensity of weeds was low. The details of different weeds recorded in different districts are presented in Table 11. The details of different weedicides used by the farmers are presented in Table 11. About 60-100% farmers adopted herbicide application. Most of the farmers practiced hand weeding along with herbicide application.

Table 12: Details of inputs used

Details	Districts	
	Udham Singh Nagar	**Nainital**
Implements used	Implements like tractor, harrow, cultivator and combine harvester were used by the farmers. Combine harvested was hired by majority of the farmers in both districts. In US Ngar, about 70% farmers possessed their own implements like tractor, harrow and cultivator while in Nainital, only 20% farmers contacted had their own implements	
Seed replacement rate in 2022	Seed replacement rate is not available. However, 100% farmers in both the districts purchased 90-100% of their seed requirement	
Source of irrigation	Shallow tube wells (100%)	Canal (50%); Shallow tube well (50%)
Scarcity of irrigation water	No (100%)	No (70%)
Availability of fertilizers/pesticides	Available (100%)	Available (100%)
Quality of fertile-zers/pesticides	Happy with the quality (80%)	Happy with the quality (100%)
Advisors to the farmers	Own deci-sions (20%); State dept (80%); Dealers (20%); University (70%)	State dept (50%); University (90%)

E. Input use: Farmers used different equipments like tractor, harrow, cultivator and combine harvester were used by the farmers. Combine harvested was hired by majority of the farmers in both districts. In US Ngar, about 70% farmers possessed their own implements like tractor, harrow and cultivator while in Nainital, only 20% farmers contacted had their own implements. Seed replacement rate is not available. However, 100% farmers in both the districts purchased 90-100% of their seed requirement. Main sources of irrigation in US Nagar district are shallow tube wells whereas in Nainital district farmers used both canal water and shallow tube wells for irrigation. About 30% farmers in Nainital expressed scarcity of irrigation water. Majority of the farmers contacted told that fertilizers and pesticides are available in time and they were happy with their quality. In addition to their own decisions, farmers took advices from officials of state department of agriculture and university staffs. Some of the common problems expressed by the farmers were scarcity of labours, low MSP and improvement in marketing facility (more number of counters/points where the farmers can sell their produce).

Table 13. Prevalence of major diseases in Udham Singh Nagar

Districts	Diseases								
	Bl	**ShBl**	**BS**	**FS**	**ShR**	**GD**	**Kh**	**Bak**	**BLB**
US Nagar		L-M (5-25%)	L	L-M (5-20%)	L (1-5%)	L (1-5%)	L	L (1-5%)	M-S
Nainital	L-M (5-15%)	L-M (1-15%)	L-M (1-10%)	L-M (5-20%)		L (1-5%)			L (5%)

In US Nagar district, low to moderate (5-10%) intensity of rice tungro disease was notice in some fields in Kashipur block

Districts	Insect Pests						
	SB	**LF**	**BPH**	**WBPH**	**GB**	**RH**	**WM**
US Nagar	L-M; M (10-25%)	L (5-20%)	L-M (5-20%)	L (< 5%)	L	L (1-5%)	L-M (1-10%)
Nainital	L-M; M (10-25%)	L-M (5-20%)	L-M (10-15%)	L		L-M (1-10%)	L-M (1-10%)

Some fields in Nainital were infested with termite (2-10%)

F. Biotic stress and their management: District wise prevalence of different diseases and insect pests are presented in Table 13. Among the diseases, sheath blight, false smut, brown spot and grain discoloration were wide spread in low to moderate intensity. Bacterial blight was recorded in high intensity in some fields in Udham Singh Nagar district. Leaf blast was recorded in low to moderate intensity in parts of Nainital district. Other diseases like sheath rot and bakane were recorded in low intensity. In US Nagar district, low to moderate (5-10%) intensity of rice tungro disease was notice in some fields in Kashipur block. Among the insect pests, stem borer, leaf folder and stem borer were widespread in low to moderate intensity. Rice hispa and whorl maggot were also recorded in low to moderate intensity. All the farmers contacted told that they applied different pesticides and fungicides for management of different insect pests and diseases. The details of different pesticides used by the farmers are presented in Table 14. In general, farmers adopted 2-5 pesticide application. About 80-100% of the farmers contacted told that they mixed 2-3 pesticides before application. Zinc deficiency was commonly observed in most of the surveyed areas.

Table 14: Details of pest management

Details	Districts	
	Udham Singh Nagar	**Nainital**
% age farmers adopting plant protection	Adopted (100%)	Adopted (100%)
Names of pesticides	chlorantraniliprole 18.5 SC (150 ml/ha), acephate 75% WP (600 g/ha), chlorpyriphos 50% + cypermethrin 5% EC (400 ml/ha), cartap hydrochloride 50% SP (1000 g/ha), chlorantraniliprole 0.4% GR (10 kg/ha), fipronil 5% SC (1000 ml/ha) and cartap hydrochloride 4% GR (19 kg/ha) for leaf folder and stem borer; acephate 75% WP (600 g/ha), dinitofuron 20% SG (200 g/ha), pymetrozine 50% (300 g/ha) and buprofezin 25% SC (1000 ml/ha) for plant hoppers; tricyclazole 75WP (400 g/ha) for leaf blast; propiconazole 5% EC (1 ml/l) for sheath blight and false smut and hexaconazole 5% SC (1000 ml/ha) for sheath blight	
# of pesticide sprays	2-5	2-5
Mixing of pesticides before application	Yes (100%); mixed 2-3 pesticides	Yes (80%); mixed 2-3 pesticides
Zinc deficiency	Yes (800%)	Yes (100%)

G. Researchable issues: Among the biotic stresses, major problems are sheath blight, bacterial blight, false smut, brown spot, blst, BPH, stem borer and leaf folder and among abiotic stresses, drought and micronutrient deficiency are the major problems. Farmers want varieties suitable for DSR, varieties resistant/tolerant to above mentioned biotic constraints, varieties with lodging resistance and biofortified varieties and high yielding varieties for Bhabar areas.

Table 15: Researchable issues

Parameters/Issues	**Districts**	
	Udham Singh Nagar	**Nainital**
Rice ecology in your area	Irrigated	Irrigated; hill ecosystem
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif	Kharif
Number of years of experience in rice farming	5-10 Years (40%); more than 10 Years (60%)	5-10 Years (50%); more than 10 Years (50%)
Main biotic constraints (diseases) in your area according to you	Sheath blight, bacterial blight and false smut	Leaf blast, false smut and brown spot
Extent of disease damage	10-25%	10-25%
Main biotic constraints (Insect pests) in your area according to you	BPH, stem borer and leaf folder	BPH, stem borer and leaf folder
Extent of insect pest damage	10-25%	10-25%
Main abiotic constrains in your area according to you	-	Drought
Production constraints in your area according to you	Micronutrient deficiency especially Zinc	Lack of irrigation facility; Zinc deficiency
Irrigation facilities in your area	No	No
Normally how many years it takes to change the rice variety	5-10 years	5-10 years
Any other rice production issues in your area which the rice scientists need to address	-	-
What is urgently required in your area as far as rice varieties are concerned		
Duration	HYVs suitable for DSR and HYVs with lodging resistance	HYVs suitable for Bhabar area; HYVs suitable for DSR and HYVs with lodging resistance
Biotic stress resistance	HYVs with resistance to BLB, false smut, sheath blight, BPH and stem borer	HYVs with resistance to BLB, false smut, sheath blight, BPH and stem borer
Abiotic stress resistance	HYVs tolerant to zinc deficiency	HYVs tolerant to zinc deficiency
Preferred grain quality	Aromatic short grain	Aromatic short grain
Nutritional quality	HYVs with high zinc	HYVs with high zinc and high iron

West Bengal-1-Bankura (2023-2024)

Districts surveyed: *Jhargram, Bankura* and *Birbhum*

Table 1: Particulars of survey

Districts	Blocks	Villages (Latitude; Longitude)
Jhargram	Binpur and Harda	Bhandarpur (22.58; 86.94) and Batabani (22.61; 86.97)
Bankura	Bankura-1, Bankura II and Chhatna	Sanabandh West (23.24; 87.00), Manushmura (23.21; 87.04), Bhadul (mouza Shyamdaspur) and Chhatna
Birbhum	Bolpur (Shantiniketan)	Islampur (23.676546; 87.626822), Paschim Islampur (23.678231; 87.624778), Dakshin Harirampur (23.678394; 87.625029) and Chakpali (23.692517; 87.731251)

Table 2: Widely cultivated rice varieties

Districts	Varieties
Jhargram	**HYVs:** MTU 7029, BB 11, Lalat, GB 3, MTU 1017,
Bankura	**HYVs**: Swarna (MTU 7029), BB-11, Lalat, MTU 1010, IR 36, China, Super Shamali, and others; **Scented**: Gobindobhog, Badshabhog and others
Birbhum	**HYVs:** Swarna (MTU 7029), CS-1, BB-11, Kanak, MTU 1010, IET 4786 (Shatabdi), IET 4094 (Khitish), MTU 1153 (Chandra), IR 36, Dunkel, Super Shyamali, IR 64, MTU 1001, CR Dhan 800, Ranjit, Pratiksha and others; **Hybrids**: PAN 2430; **Local/Scented**: KhejurThori, Raghusal, Basmati Local, Gobindobhog, Badshabhog, Dudheswar and others

Table 3: Particulars of rice areas in the surveyed districts of West Bengal in 2023

District	Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Total irrigated area (ha)	Area under paddy (ha)
Jhargram	NA	NA	NA	NA	NA
Bankura	688100	420670	395841	211543	380142
Birbhum	454500	320610	290320 (field crops excluding horticultural crops)	207285	273130-kharif 88420-boro

Production oriented survey was conducted in three rice growing districts of this part of West Bengal viz., Jhargram, Bankura and Birbhum when the crops were in dough to maturity stage. Nine villages in 6 blocks were covered during the survey. A total of 51 farmers were contacted during the survey. The details of the survey are presented in Table 1. Most of the fields surveyed were under rainfed (upland or lowland) ecosystem. In general, weather conditions were not very favourable for rice cultivation except Birbhum. There were reports of reports of dry spell or drought like conditions in 75-86% of the locations visited in Jhargram and Bankura. The details of different rice varieties cultivated in different surveyed districts are presented in Table 2.

Predominant rice varieties cultivated were HYVs like Swarna (MTU 7029), CS-1, BB-11, Lalat, Kanak, MTU 1010, IET 4786 (Shatabdi), IET 4094 (Khitish), GB 3, MTU 1017, MTU 1153 (Chandra), IR 36, Dunkel, Super Shyamali, IR 64, MTU 1001, CR Dhan 800, Ranjit, Pratiksha and others and hybrids like PAN 2430. Many farmers cultivated local and aromatic short grain rice varieties like KhejurThori, Raghusal, Basmati Local, Gobindobhog, Badshabhog, Dudheswar and others. Common crop rotations followed by the farmers were rice-mustard-vegetables, rice-potato-sesame, rice-vegetables-fallow, rice-mustard-sesame, rice-vegetables-sesame, rice-mustard, rice-onion, rice-sesame, rice-rice, rice-mustard-fallow, rice-pulses, rice-potato and others. The details of rice yield of different varieties in different rice growing districts of West Bengal are presented in Table 8. Average rice in farmers' field ranged from 4500-6300 kg/ha in case of HYVs and about 2800-3900 kg/ha in case of aromatic short grain varieties.

Table 4: Details of weather data in the surveyed districts in 2023

Weather parameters	**Months**							
	Jun	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**
Bankura								
Rainy days	4	6	10	7	6	3	4	2
Total rainfall (mm)	58.4	66.8	254.5	75	325.7	1.02	77.98	42
Monthly Mean Temp (^{O}C)	33.56	31.49	30.96	30.82	31.20	27.15	22.65	18.64
Maximum temp (^{O}C)	39.20	35.29	33.87	35.06	35.75	30.2	25.8	24.12
Minimum temp (^{O}C)	27.93	27.70	28.06	26.58	26.65	24.1	19.5	13.16
Birbhum								
Rainy days	17	19	19	15	7	1	2	3
Total rainfall (mm)	234.2	324.5	295.7	258.2	105.4	17.5	9.4	9.7
Monthly Mean Temp (^{O}C)								
Maximum temp (^{O}C)	35.4	33.4	33.4	34.2	32.6	30	26.8	25.4
Minimum temp (^{O}C)	26	26	26	26.2	23	16.6	12.8	11

Table 5: General Question of Rice Cultivation in District (To Be Filled By The Cooperator In With The Officials From State Department of Agriculture)

Parameters	**Districts**	
	Bankura	**Birbhum**
Total Area under HYVs in the district (ha)	312205 ha	361550 ha (kharif + Boro)
Most prevalent HYVs in the District	MTU 7029	MTU-7029
Total area under rice hybrids in the district (ha.		122 ha
Most prevalent rice hybrids in the district		PAN-2430
Total area under basmati/scented in the district		1250 ha
Most prevalent basmati varieties in the district		Gobindabhog.
Seed replacement rate		40%
Whether farmers are using any heavy equipments like transplanted/combine harvester	Yes; combine harvester	Yes

Parameters	Districts	
	Bankura	**Birbhum**
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	DSR, limited scale	No such practices are followed by the formers. Demonstration on SRI & DSR by super seeder are in practiced in farmers field.
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Yes; line sowing	
What are the general problems in rice cultivation in the district?	High weeds, irrigation water problem and biotic constrains	Water scarcity / low rain fall during transplanting in kharif.
Please provide any farmers association in the district		FPO / FPC -51 number
Whether availability of labors is sufficient?	No	yes
Whether there is any marketing problem of the produce?	No	Farmer sale their produce through marketing dept at MSP.
Any major irrigation/power generation project in the district	Solar power irrigation	Tilpara barrage & Bakreswar Thermal power plant.
Any soil testing program undertaken?	Yes	Yes (through central govt scheme, NMSA)
Any farmers' training program was organized by the state department of Agriculture/ University	Yes	

Table 6: Variety wise area coverage (ha) in surveyed districts of West Bengal, Kh 23

Variety/hybrid	Districts	
	Bankura	**Birbhum**
MTU-7029	275620	234057
MTU-1010		70500
BB-11	40310	
Lalat	25420	
IET- 4786 (shatabdi)		14500
IET- 4094 (khitish)		12400
MTU-1153 (Chandra)		11000
IR-64		10500
MTU-1001,CR-Dhan-800, Ranjit, Pratiksha		5031
Local variety (Khejur thori, Raghushal, Basmati Local)		2190
Gobindabhog/Badshabhog	35235	1250
Hybrid (var.PAN-2430)		122

Table 7: General informations

Parameters	Districts		
	Jhargram	**Bankura**	**Birbhum**
# of talukas/blocks covered	2	3	1
# of villages surveyed	2	3	4
# of farmers interviewed	15	20	16
Field ecosystem	RL (100%)	IR (20%); UL(15%); RL (65%)	IR (50%); RL (75%)
Weather conditions during cropping season	In general, weather conditions were not very favourable for rice cultivation except Birbhum. There were reports of reports of dry spell or drought like conditions in 75-86% of the locations visited in Jhargram and Bankura.		
Crop stage when survey was made	Maturity	Dough to maturity	Dough to maturity
Crop rotations	Rice-mustard-vegetables, rice-potato-sesame, rice-vegetables-fallow, rice-mustard-sesame, rice-vegetables-sesame, rice-mustard, rice-onion, rice-sesame, rice-rice, rice-mustard-fallow, rice-pulses, rice-potato and others		

IR: Irrigated; RL: Rainfed lowland

Table 8: Average yields of different rice varieties as reported by the cooperators/ farmers

Varieties	Yield (kg/ha)			Remarks
	Jhargram	**Bankura**	**Birbhum**	In some places, yield was reduced due to weeding problem due to scarcity of labours, irrigation water scarcity and poor management of pests and diseases
Swarna	4500-5025	4550-5000	5500-6100	
BB-11	4800-5670	3000-5000	4900-5500	
Lalat	4100-4830	3375-4100		
MTU-1017	5318-5580			
Super Shamali		4000-5300	5400	
MTU-1010		4500		
GB-3	5615-5720			
China		2500		
Gobindobhog		2800-3000	2800-3300	
CS-1			5300-5700	
Gutka			6000	
Dudheswar			3900	
Kanak			6300	
Badshabhog			3600	
IR-36			4900-5400	
Dunkel			5200-5300	
IR 64			4700	

A. Rice consumption pattern: Survey was conducted on consumption pattern of rice among the farmers in different districts of West Bengal. On an average about 67% farmers contacted belonged

to medium income group and rest were from low income group. Average per capita consumption of rice per month was 7-20 kg rice (Table 9) and all the farmers contacted told that they consumed only rice. Majority of the farmers contacted told that they preferred parboiled and coarse grain rice (Table 9). In general, there was no change in the food habit except about 50% farmers from Birbhum told that they have included wheat in their diet.

Table 9: Details of rice consumption pattern

Parameters	Districts		
	Jhargram	**Bankura**	**Birbhum**
Status of farmers	Medium income (91.6%); Poor (8.3%)	Medium income (65%); Poor (35%)	Medium income (37.5%); Poor (62.5%)
Per capita monthly rice consumption (kg)	8-17 kg	7-20 kg	10-15 kg
Composition of main meal	Only rice (100%)	Only rice (100%)	Rice + wheat (100%)
Preferred rice types	Parboiled rice (100%)	Parboiled rice (75%); Polished rice (25%)	Parboiled rice (100%)
Rice grain type preference	Coarse/bold grain (100%)	Coarse/bold grain (100%); Fine grain (10%)	Coarse + fine grain (100%)
Any changes in food habit in last 10 years	No (100%)	No (95%): yes (5%); Wheat	Yes (52.5%); Wheat and maize

Table 10: Details of nursery management

Parameters	Districts		
	Jhargram	**Bankura**	**Birbhum**
Planting time	2nd week July to 1st week of August	2nd week July to 1st week of August	1st week July to last week of July
Seed rate	45-55 kg/ha	40-50 kg/ha	40-48 kg/ha
Seed treatment (% farmers adopted)	Yes (53.3% only)	Yes (70% only)	Yes (43.75% only)
Chemicals used for seed treatment	Carbendazim (1 g/kg) and mancozeb (2.5 g/kg); some treated the seeds with cow urine		
Organic manure in nursery (% farmers adopted)	Yes (100%) FYM, cowdung	Yes (90%) FYM (5 t/ha), poultry manure (3-4 t/ha), vermin-compost (5-6 t/ha)	Yes (50%) FYM (5-6 t/ha)
Inorganic manure in nursery (% farmers adopted)	46.7% adopted; Urea (24-27/acre) and 10:26:26 (42-54 kg/acre); Some applied FYM (4-5 t/ha)	31.25% adopted; Urea (6-12 kg/acre) and DAP; Some applied FYM	100% adopted; Urea (15-30 kg/acre) and DAP (15-18 kg/acre); Some applied MOP and 10:26:26

B. Nursery and main field Management: In general, planting was done from 1st week of July to 1st week of August. Average seed rate ranged from 40-55 kg/ha. On an average about 56% of the farmers contacted told that they adopted seed treatment with carbendazim (1 g/kg) and mancozeb (2.5 g/kg); some treated the seeds with cow urine. On an average about 80% of the farmers contacted told that thay applied organic manure like FYM, cow dung, vermicompost or poultry manure in the nursery. About 59% farmers contacted told that they applied chemical fertilizers like urea, DAP, 10:26:26 and MOP in the nursery (Table 10). Planting was random where proper plant population per unit area was not maintained. However, some farmers from Jhargram and Birbhum adopted line planting. In the main fields, fertilizers were applied @ 18-80 kg N/ha, 14-66 kg P_2O_5/ha and 10-45 kg K_2O/ha. Very few farmers contacted applied zinc sulphate as foliar application (Table 11). On an average about 68% farmers applied FYM in the main fields.

Table 11: Details of main field management

Details	Districts			Remarks
	Jhargram	Bankura	Birbhum	
Planting method	Random Transplanting (86.7%); Line planting (13.3%)	Random Transplanting (100%)	Random Transplanting (37.5%); line planting (62.5%)	Very few adopted line planting in P. Medinipur; Some farmers followed SARP technology in Birbhum. Fertilizers like Urea, DAP, 10:26:26, SSP, MOP, zinc sulphate were applied; Very few applied zinc sulphate
Total N applied	60-80 kg/ha (100% applied)	30-80 kg/ha (100% applied)	18-33 kg/ha (100% applied)	
Total P_2O_5 applied	30-40 kg/ha (100% applied)	14-66 kg/ha (100% applied)	14-66 kg/ha (100% applied)	
Total K_2O applied	30-40 kg/ha (100% applied)	10-40 kg/ha (100% applied)	18-45 kg/ha (100% applied)	
$ZnSO_4$ applied	10 kg/ha (only 6.7% applied)	5-10 kg/ha (only 15% applied)	20 kg/ha (only 18% applied)	
Organic fertilizers applied	Yes (46.7%); FYM	Yes (70%); FYM	Yes (87.5%); FYM 5-12 t/ha)	

Table 12: Weeds and weed management

Details	Districts			Remarks
	Jhargram	Bankura	Birbhum	
Weed intensity	Low to medium	Low to medium	Low	Hand weeding (1-2) was the main method of weed management
Names of the weeds	*Echinochloa crusgalli, Ludwigia* spp., *Cyperus rotundus* (Mutha), *Marsilea quadrifolia* (Shooshni), *Eclipta alba*, *Cynodon dactylon*, *Alternanthera philoxeroides* and some unidentified grassy and broad leaved weeds			
Weedicides used	Weedicide application was not common in the surveyed districts. Only 5% farmers contacted in Bankura applied herbicides like butachlor and bispyribac sodium			
Percentage of farmers applied herbicides	Nil (only hand weeding)	Only hand weeding (95%); 5% applied herbicides	Nil (only hand weeding)	
Wild rice incidence	Nil	Nil	Nil	

C. Weeds and their Management: Overall, intensity of weeds was low to medium. The details of different weeds recorded in different districts are presented in Table 12. Weeds were common in most of the fields surveyed. Very few farmers contacted from Bankura used herbicide like butachlor and bispyribac sodium. Most of the farmers practiced one to two hand weeding for managing weeds.

D. Needs of the farmers: Some of the common needs of the farmers were improvement in irrigation facilities, improvement in marketing facility and increase in rate of price of the produce, availability of implements on hire basis, timely availability of quality seeds, subsidy in fertilizers, high yielding varieties with drought resistance, coarse grain varieties suitable for puffed rice, short duration HYVs and pest and disease resistant rice varieties.

E. Input use: Farmers used different equipments like threshers, weeder, pump set, sprayers, tractor with cultivator, power tiller and harvesters were used by the farmers. Most of the farmers contacted used these implements on hire or rent basis (Table 13). Many (40-100%) of the farmers contacted purchased a part of their seed requirement in addition to use of their own seeds. Canal and shallow tube wells were the main sources of irrigation. Most of the farmers depended on rain for raising the crop. Almost all the farmers contacted in Jhargram and Bankura and about 50% farmers contacted in Birbhum expressed the scarcity of irrigation water. Majority of the farmers contacted expressed that fertilizers and pesticides were available and they were happy with their quality. In addition to their own decisions, farmers took advices from officials of state department of agriculture and private dealers.

Table 13: Details of inputs used

Details	**Districts**		
	Jhargram	**Bankura**	**Birbhum**
Implements used	Implements like threshers, weeder, pump set, sprayers, tractor with cultivator, power tiller and harvesters were used by the farmers. Most of the farmers contacted used these implements on hire or rent basis		
Source of seeds	Many (40-100%) of the farmers contacted purchased a part of their seed requirement in addition to use of their own seeds		
Source of irrigation	Canal and shallow tube wells were the main sources of irrigation. Most of the farmers depended on rain for raising the crop. Almost all the farmers contacted in Jhargram and Bankura and about 50% farmers contacted in Birbhum expressed the scarcity of irrigation water		
Availability of fertilizers/pesticides	Available (93.3%)	Available (90%)	Available (100%)
Quality of fertilizers/pesticides	Satisfied (100%)	Satisfied (100%)	Satisfied (100%)
Advisors to the farmers	State dept (100%)	Own decisions (20%); State dept (100%); Dealers (10%)	Own decisions (75%); State dept (87.5%); Dealers (68.7%)

F. Biotic stress and their management: District wise prevalence of different diseases and insect pests are presented in Table 14. Among the diseases, leaf blast was severe in some fields in Bankura on verities like BB-11. High intensity of brown spot and bacterial blight were recorded

in some fields in Bankura and Birbhum on varieties like BB-11, China, IR 36, Gobindobhog, Swarna, Kanak, IR-36 and others. Sheath blight was also recorded in higher intensity in some fields in Birbhum on varieties like Swarna. Among the insect pests stem borer, leaf folder, brown plant hopper, green leaf hopper, gall midge and termites were recorded in low to moderate intensity (Table 14). About 80-100% of the farmers contacted in different districts adopted plant protection measures. The details of different pesticides used are presented in Table 15. The number of pesticide application ranged from 1-3 and none of the farmers contacted mixed different pesticides before application.

Table 14: Prevalence of diseases and insect pests in West Bengal during *Kharif*' 2023

Districts	Diseases						
	Bl	**NBl**	**BS**	**ShBl**	**ShR**	**GD**	**BB**
Jhargram	M (10-25%)	M (19%)	M (15%)	M (15-25%)	-	-	M (15-20%)
Bankura	L-S (2-50%)	M (15-20%)	M-S (10-50%)	M (10-20%)	-	M (10-15%)	M-S (15-30%)
Birbhum	L-M (2-25%)	T (1-2%)	L-S (5-60%)	M-S (10-35%)	L (2-4%)	-	L-S (5-30%)

Districts	Insect pests						
	SB	**LF**	**BPH**	**GLH**	**GM**	**Rats**	**Termite**
Jhargram	M (10-20%)	M (10-20%)	M (10-25%)	M (11-15%)	-	L-M (5-10%)	-
Bankura	L-M (2-20%)	M (10-15%)	M (10-20%)	L (5-10%)	-	-	-
Birbhum	L-M (5-22%)	L-M (2-15%)	-	-	L-M %-12%)	-	L (5-6%)

Table 15: Details of pest Management

Details	Districts		
	Jhargram	**Bankura**	**Birbhum**
% age farmers adopting plant protection	100%	90%	81.25%
Names of pesticides	**Insecticides**: chlorpyriphos (2 ml/l), cypermethrin, furadan (8-9 kg/acre,fipronil (1 ml/l), Fertera (4.5 kg/acre), novaluron (2 ml/l) and lamda cyhalothrin (2 ml/l) for stem borer, leaf folder and GLH and acephate (1-2 g/l) and imidacloprid (0.5 ml/l) for brown plant hopper **Fungicides**: tricyclazole (0.6 g/l) for leaf blast, propiconazole (1 ml/l) and hexaconazole (2 ml/l), for sheath blight, brown spot and grain discoloration and Nativo (0.4 g/l), Amister (1 ml/l), carbendazim (1 g/l), flusilazole (1 ml/l) and hexaconazole (2ml/l) for all diseases		
# of pesticide sprays	1-2	1-3	1-3
Mixing of pesticides before application	Nil	Nil	Nil

G. Abiotic and other general problems: Zinc deficiency symptoms observed in some of the surveyed fields in Bankura and Birbhum. Common problems expressed by the farmers were scarcity of agricultural labours, lack of irrigation facilities, poor market price, high weed intensity and high intensity of different pests and diseases, lack of short duration high yielding rice varieties, high cost of fertilizers and lack of knowledge on improved method rice cultivation.

H. Researchable issues: Among the biotic stresses, major problems are brown spot, bacterial blight, sheath blight, leaf blast among the diseases, BPH and stem borer among the insect pests and drought and submergence among abiotic stresses are the major problems. Farmers want varieties suitable for DSR, short duration varieties, varieties resistant to lodging, varieties resistant/tolerant to above mentioned biotic constraints and bio-fortified varieties.

Table 16: Researchable issues

Parameters/Issues	**Jhargram**	**Bankura**	**Birbhum**
Rice ecology in your area	Rainfed lowland and upland	Rainfed upland and rainfed lowland	Irrigated and Rainfed upland
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif	Kharif/Kharif + Rabi (limited)	Kharif and Rabi
Number of years of experience in rice farming	10-20 years	>20 years	>20 years
Main biotic constraints (diseases) in your area according to you	Leaf blast, sheath blight	Leaf Blast, sheath blight and bacterial blight	Brown spot, bacterial blight, and sheath blight
Extent of disease damage	10-25%	10-25%	10-25%; >25%
Main biotic constraints (Insect pests) in your area according to you	BPH	BPH	Stem borer, BPH and leaf folder
Extent of insect pest damage	10-25%	10-25%	10-25%; >25%
Main abiotic constrains in your area according to you	Submergence/ drought	Submergence/ drought	Submergence/ drought/flash floods
Production constraints in your area according to you	**Lack of irrigation facilities**, **scarcity of agricultural labours, unavailability of good quality seeds**, fertilizers and facilities, poor drainage facilities and poor market price		
Irrigation facilities in your area	No (100%)	No (100%)	Yes; Canal, bore well
Normally how many years it takes to change the rice variety	10-20 years; > 20 years	5-10 years	5-10 years
Any other rice production issues in your area which the rice scientists need to address	-	-	As mentioned in text
What is urgently required in your area as far as rice varieties are concerned			
Duration	HYVs suitable for DSR and varieties having lodging resistance		
Biotic stress resistance	Varieties with tolerance to blast, bacterial blight, sheath blight and stem borer		
Abiotic stress resistance	Varieties resistant to drought		
Preferred grain quality	MS grain quality rice varieties and aromatic short grain varieites		
Nutritional quality	Rice varieties with high Zn and iron and low GI		

West Bengal-2-Chinsurah (2023-2024)

Districts surveyed*: Nadia, Howrah, Hooghly, Purba Bardhaman, North 24-Parganas* and *South 24-Parganas*

Table 1: Particulars of survey

Districts	Blocks	Villages (Lat; Long)
Nadia	Kalyani	Nanapatipara
Howrah	Panchla	Banharishpur (88.16571E; 22.55285N) and Subharara (88.14663E; 22.53917N)
Hooghly	Pandua	Dashpur, Bilsara, Tarazole, Bergram, Haral, Shilagari and Sonatikiri
Purba Bardhaman	Raina-II	Katnabil ($23^0$1'16"; $87^0$48'16")
North 24-Parganas	Habra-II	Beraberi (22.96N; 88.56E)
South 24-Parganas	Gosaba	Gosaba North West Para, Manmatha Nagar-Janagheri, Gosaba Uttar Paschim Para, Manmatha Nagar-Binda Gheri and Pakhiralaya

Table 2: Widely prevalent rice varieties

Districts	Varieties
Nadia	**HYVs**: Pratikshya, Lalat, IET 4786, Swarna, Swarna Sub-1, Kanak, MTU 1010, Bullet and others; **Hybrid**: PAN 802 and others
Howrah	**HYVs**: MTU 1010, Shamali, Khitsih, Shatabdi, Super Shyamali, Mali 4, N. Shankar, Santoshi, Ajit, Lal Minikit, IET 4094, Swarna, Lalat, Samba Mahsuri, Nilanjana, Ranjit, Sabita, Kesari Gold and others; **Hybrids**: KRH 2, Arize 6444 Gold and others
Hooghly	**HYVs**: Swarna, Bullet, IET 4786, Jamuna, Pratikshya, Rajendra Mahsuri, CR Dhan 800, IET 4094 and others; **Hybrids**: Arize 6201, KRH 2 and others; **Local**: Gobindobhog
Purba Bardhaman	**HYVs**: Shatabdi (IET 4786), Swarna, Ranjit, Khitish, IET 4094, IR 36, MTU 1010, IR 64 and others; **Local**: Gobindobhog, Kalma, Khas Dhan, Biharikhas, Kartikbhog and Badshabhog
North 24-Parganas	**HYVs**: Pratikshya, GB 3, Swarna, GS-1, Shatabdi (IET 4786), Swarna Sub-1, Rajendra Mahsuri and others; **Hybrids**: PAC 802 and others; **Local**: Gobindobhog
South 24-Parganas	**HYVs**: Jatayu, CR 1018, CR 1017, Bangabandhu, Pratikshya, Mali 4, Jamuna, Ajit, Gitanjali, Lalat, MTU1010 and others; **Hybrids**: PAN 802, Arize 6444 Gold, Bio 453, Arize 6129 Gold, PAC 8744 and others; **Local**: Dudheswar

Table 3: Particulars of rice areas in the surveyed districts of West Bengal during 2023

District	Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Total irrigated area (ha)	Area under paddy (ha)
Nadia	389920.35	272134	272102	239450	174159
Howrah	138676	83176	80200	56748	61110
Hooghly	314900	-	218870	169261	241545
Purba Bardhaman	522427	400037	391080	344510	380000
N 24-Parganas	409400	-	-	170450	224770
S 24-Parganas	948710	375120	360300	156896	99465

Table 4: Details of weather data in the surveyed districts of West Bengal in 2023

Weather parameters	Months							
	Jun	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**
Nadia								
# of Rainy days	10	17	16	10	13	0	0	1
Total rainfall (mm)	140.5	135.1	247.0	148.8	175.9	0	0	2.80
MMT (^{O}C)	30.06	29.8	29.07	28.99	27.03	22.06	18.88	16.42
Maximum temp (^{O}C)	34.25	33.01	32.45	32.55	30.55	28.90	26.01	22.75
Minimum temp (^{O}C)	25.88	26.59	25.70	25.44	23.51	15.22	11.75	10.10
Howrah								
# of Rainy days	17	26	21	22	7	2	0	1
Total rainfall (mm)	90.56	184.66	356.92	39.54	221.9	5.08	0	5.2
Maximum temp (^{O}C)	38.8	35	33	36	33	30.2	24.5	26.4
Minimum temp (^{O}C)	28	26	28	30	26	19.7	11.3	11.05
Sunshine hours	4.3	3.92	3.8	4.7	6.6	7.05	6.7	6.3
Hooghly								
# of Rainy days	16	16	17	18	6	0	2	2
Total rainfall (mm)	113.12	144.17	255.91	204.35	133.07	0	62.39	16.23
Purba Bardhaman								
# of Rainy days	21	27	25	28	10	3	2	NA
Total rainfall (mm)	169.2	170.1	250.3	196.9	117.8	1.4	82.0	NA
Maximum temp (^{O}C)	36.8	34.5	32.7	32.8	31.6	30.1	26.2	NA
Minimum temp (^{O}C)	27.1	26.9	26.7	26.7	23.7	19.0	15.1	NA
N 24-Parganas								
# of Rainy days	17	29	26	26	08	01	02	NA
Total rainfall (mm)	315.05	185.06	310.85	258.41	184.90	2.10	47.1	NA
S 24-Parganas								
# of Rainy days	18	28	27	25	10	3	2	3
Total rainfall (mm)	391.43	236.18	314.87	364.53	176.55	6.19	6.97	12.8

MMT: Monthly mean temperature; NA-Not available

Production oriented survey was conducted in six districts of this part of West Bengal viz. Nadia, Howrah, Hooghly, Purba Bardhaman, North 24-Parganas and South 24-Parganas when the crops were in dough to maturity stage. The details of survey are presented in Table 1. A total of 63 farmers were contacted during survey. Most of the fields surveyed were under irrigated ecosystem while some fields were under rainfed lowland ecosystem in Hooghly. In general, weather conditions were normal for rice cultivation except in Hooghly and south 24-Parganas where there were incidences of excess rainfall during later part of the season (Table 4 & 7). The details of different varieties cultivated in different districts are presented in Table 2. The particulars of rice area during 2023 in the surveyed districts are presented in Table 3. Commonly cultivated varieties were HYVs like Swarna (MTU 7029), Lalat, Khitish, Swarna Sub-1, GS-4, Bullet, Jamuna, CR 1017, CR 1018, Shatabdi (IET 4786), Pratiksha, Rajendra Mahsuri, IET 4096, MTU 1010, Shamali, Super Shyamali, Mali 4, N. Shankar, Santoshi, Ajit, Samba Mahsuri, Nilanjana, Ranjit, Sabita, Bangabandhu, Jatayu and others and some local scented varieties like Gobindobhog, Kalma, Khas Dhan, Biharikhas, Kartikbhog and Badshabhog. Some farmers cultivated hybrids like PAN 802, Arize 6444 Gold, Bio 453, Arize 6129 Gold, PAC 8744 and others. Variety wise area of selected rice varieties in different surveyed districts are presented in Table 6.

Table 5: General Question of Rice Cultivation In District (To Be Filled By The Cooperator In With The Officials From State Department of Agriculture

Parameters	Districts		
	Nadia	**Howrah**	**Hooghly**
Total Area under HYVs in the district (ha)	83289	60840	-
Most prevalent HYVs in the District	IET 4786, Pratikshya	MTU 7029, IET 4786	MTU 7029
Total area under rice hybrids in the district (ha.	76	270	1565
Most prevalent rice hybrids in the district	PAN 802	KRH 2, Arize 6444 Gold	KRH 2
Total area under ~~basmati~~/scented in the district	Nil	Nil	5775
Most prevalent basmati varieties in the district	Nil	Nil	Gobindobhog
Seed replacement rate	35%	10%	75%
Whether farmers are using any heavy equipments like transplanted/combine harvester	Combine harvester; but limited use	Combine harvester; but limited use	Combine harvester
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	SRI, DSR (But area is less)	SRI, DSR (But area is less)	SRI (But area is less)
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Fertilizer and herbicide application	-	Yes
What are the general problems in rice cultivation in the district?	Scarcity of labours and lack of agricultural implements	Use of uncertified seeds, lack of knowledge on improved cultivation practices, lack of field level functionaries	Erratic and uneven distribution of rainfall
Please provide any farmers association in the district	-	-	-
Whether availability of labors is sufficient?	No	Yes	No
Whether there is any marketing problem of the produce?	Low price of the produce	No	No
Any major irrigation/power generation project in the district	NA	No	NA
Any soil testing program undertaken?	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Agriculture/ University	Yes	Yes	Yes

Table 5: General Question of Rice Cultivation In District (To Be Filled By The Cooperator In With The Officials From State Department of Agriculture

Parameters	Districts		
	P. Bardhaman	**N 24-Parganas**	**S 24-Parganas**
Total Area under HYVs in the district (ha)	330000	90% area under rice	329635 (Kharif); 73815 (Boro)
Most prevalent HYVs in the District	MTU 7029	Pratikshya, MTU 7029, Swarna Sub-1	Ajit, IET 4786, MTU 1010, Lalat, Pratiksha, Gitanjali
Total area under rice hybrids in the district (ha.	30	< 5%	3445 (Kharif); 25650 (Boro)
Most prevalent rice hybrids in the district	-	PAC 802	PAN 802, Arize 6444 Gold, Bio 453, Arize 6129 Gold, PAC 8744
Total area under basmati/scented in the district	50,000	Nil	Nil
Most prevalent basmati varieties in the district	Gobindobhog	NA	Nil
Seed replacement rate	NA	NA	NA
Whether farmers are using any heavy equipments like transplanted/combine harvester	Yes; Combine harvester	Yes; Combine harvester	Yes, Combine harvester
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	SRI, Zero tilleage	DSR	Nil
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Yes	Yes; on farm mechanization and new HYVs and hybrids	-
What are the general problems in rice cultivation in the district?	Biotic stresses	Uncertain weather conditions; Drainage problems	Poor irrigation facilities; poor drainage
Please provide any farmers association in the district	Mukundaram FPC	Yes, FPO	Yes; FPO, FPC, SHG, FIG etc
Whether availability of labors is sufficient?	Moderate	No	Yes
Whether there is any marketing problem of the produce?	Yes	Yes	Problems related to fine rice marketing
Any major irrigation/power generation project in the district	DVC canal	No	No
Any soil testing program undertaken?	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Agriculture/ University	Yes	Yes	Yes

Table 6: Variety wise area coverage (ha) in different districts of West Bengal during *Kharif* 2023

Variety/hybrid	Districts			
	Nadia	**Howrah**	**Hooghly**	**P. Bardha-man**
IET 4786	70659	18000	50320	7500
Swarna		21800	75625	321100
Pratiksha	95731		9142	
Lalat		3400		
Samba Mahsuri		2980		
Nilanjana		2150		
Ranjit		3870		190
Sabita		3040		
Jamuna			27500	
CR Dhan 800			10310	
IR 36				100
MTU-1010				1500
IR 64				75
Gobindobhog			5775	46900
Badshabhog				40
IET 4094		5600	25475	50
KRH-2		120		
Kesari Gold		150		
Hybrids			1565	
Others			35978	

Table 7: General information

Parameters	**Districts**		
	Nadia	**Howrah**	**Hooghly**
# of talukas/blocks covered	1	1	1
# of villages surveyed	1	2	7
# of farmers interviewed	13	10	10
Field ecosystem	Irrigated	Irrigated	Irrigated, rainfed lowland
Weather conditions during cropping season	Normal	Normal	Abnormal (60%); Early drought, late excess rainfall
Crop stage when survey was made	Maturity	Maturity	Maturity
Crop rotations	Rice-rice, rice-mustard-rice, Rice-fallow-Jute, rice-lentil-rice, rice-rice-jute, rice-vegetables-rice, rice-potato, rice-potato-sesame and others		

A. Cropping system and rice yield: Farmers adopted different cropping systems. Common crop rotation practices followed by farmers were Rice-rice, rice-mustard-rice, Rice-fallow-Jute, rice-lentil-rice, rice-rice-jute, rice-vegetables-rice, rice-potato, rice-potato-sesame and others (Table 7). Average rice yield among different HYVs and hybrids ranged from 4000-5850 kg/ha while in case of aromatic short grains the yield was 2250-6000 kg/ha (Table 8).

Table 7 contd..: General information

Parameters	Districts		
	Purba Bardhaman	**N 24-Parganas**	**S 24-Parganas**
# of talukas/blocks covered	1	1	1
# of villages surveyed	1	1	5
# of farmers interviewed	10	10	10
Field ecosystem	Irrigated	Irrigated	Irrigated
Weather conditions during cropping season	Normal	Normal	Abnormal (100%); Excess rainfall
Crop stage when survey was made	Maturity, Dough	Maturity	Maturity
Crop rotations	Rice-rice, rice-potato, rice-potato-sesame, rice-pulse, rice-wheat-maize, rice-mustard-sesame, rice-vegetables, rice-lentil-jute and others		

Table 8: Average yields of different rice varieties as reported by the farmers

Varieteis	Nadia	Howrah	Hooghly	P. Bardha-man	N 24-Parganas	S 24-Parganas
Pratikshya	4000-5400				4700-4775	4500-4950
Lalat	4500-4800					
Shatabdi	4500-5850		3600-3700	5000-7000	5000-5110	
Swarna			4950-5850		4500-4600	
MTU-1010		4600-5000				
Khitish		4800-5000				
GB-3					5115	
GS-1					5010	
Jatayu						4125-4950
CR 1018						4500-4950
CR-1017						4125-4500
Bangabandhu						4500
Santoshi		4700-4750				
Shamali		4500-4700				
Super Shyamali		4500				
Mali-4		4700				4875
Ajit		4700				
N. Shankar		4800				
Bullet	4700-4800					
IET 4094			4500			
Gobindobhog				4000-6000		
Jamuna						4950
Khasadhan				5000-6500		
Badshabhog				3500		
Biharikhas				6000		
Dudheswar						2250

Table 9: Details of rice consumption pattern

Parameters	Districts		
	Nadia	**Howrah**	**Hooghly**
Status of farmers	Medium income (100%)	Medium income (40%); Poor (40%); Rich (20%)	Medium income (90%); Poor (10%)
Per capita monthly rice consumption (kg)	12-15 kg	4-15 kg	10-15 kg
Composition of main meal	Only rice (46.1%); Rice + Wheat (53.9%)	Only rice (20%); Rice + Wheat (80%)	Rice + Wheat (100%)
Preferred rice types	Polished rice (23.1%); parboiled rice (76.9%)	Polished rice (100%)	Polished rice (100%); parboiled rice (76.9%)
Rice grain type preference	Fine grain (23.1%); Coarse grain (76.9%)	Fine grain (100%)	Fine grain (60%); Coarse grain (40%)
Any changes in food habit in last 10 years	No (100%)	Yes (80%); No (20%); rice to rice+ wheat	No (100%)

Table 9 contd..: Details of rice consumption pattern

Parameters	Districts		
	P. Bardhaman	**N 24-Parganas**	**S 24-Parganas**
Status of farmers	Medium income (30%); Rich (70%)	Medium income (100%)	Medium income (100%)
Per capita monthly rice consumption (kg)	6-12 kg	12-15 kg	12-18 kg
Composition of main meal	Only rice (80%); Rice + Wheat (20%)	Only rice (100%)	Only rice (100%)
Preferred rice types	Polished rice (40%); parboiled rice (60%)	Parboiled rice (100%)	Parboiled rice (100%)
Rice grain type preference	Fine grain (60%)	Coarse grain (100%)	Coarse grain (100%)
Any changes in food habit in last 10 years	No (100%)	No (100%)	No (100%)

B. Rice consumption pattern: Survey was conducted on consumption pattern of rice among the farmers in different surveyed districts of this part of West Bengal. Majority (>80%) of the farmers contacted from Nadia, Hooghly and North and South 24-Parganas were in the medium income group while about 70% of the farmers from Howrah and 40 farmers from Purba Bardhaman were in the rich category. Average per capita consumption of rice per month was 4-15 kg rice. On an average about 42% farmers told that their main mean consisted of both rice and wheat. More than 80% farmers from Purba Bardhaman, South and North 24-parganas told that their main mean consisted of only rice. About 60-100% farmers from all the districts except Howrah told that they preferred parboiled rice (Table 9). Majority of the farmers from Nadia, North and South 24-

Parganas told that they preferred coarse grain rice. In general, food habit remained the same except in Howrah where more number of farmers included wheat in their diet.

Table 10: Details of nursery management

Parameters	Districts		
	Nadia	**Howrah**	**Hooghly**
Planting time	Mid July to 1st week of August	NA	NA
Seed rate	35-45 kg/ha	40-75 kg/ha	45-65 kg/ha
Seed treatment (% farmers adopted)	Yes (76.9 %)	Yes (20 %)	Yes (10 %)
Chemicals used for seed treatment	Carbendazim (2 g/kg)	Carbendazim (1-2 g/kg)	Diathane M-45 (2 g/kg)
Organic manure in nursery (% farmers adopted)	Yes (100%); FYM	Yes (10%); FYM	Yes (50%); FYM, mustard cake, cow dung manure
Inorganic manure in nursery (% farmers adopted)	100% adopted; Urea (8-25 g/m^2) and SSP (20 g/m^2) and MOP (5-10 g/m^2)	100% adopted; Urea (15-30 kg/acre) and DAP (6-60 kg/acre) and 18:18:18 (3 kg/ acre); Few applied MOP and SSP and granualar pesticide	90% adopted; 10:26:26 (60-150 kg/acre) or 20:20:0:13 (150 kg/acre); Few applied urea (120 kg/acre)

Table 10 contd..: Details of nursery management

Parameters	Districts		
	P. Bardhaman	**N 24-Parganas**	**S 24-Parganas**
Planting time	End of July	3rd week of July to 1st week of August	Last week of July to 2nd week of August
Seed rate	20-25 kg/ha	25-30 kg/ha	NA
Seed treatment (% farmers adopted)	Yes (40 %)	Yes (10 %)	NA
Chemicals used for seed treatment	Mancozeb (2.5 g/kg); Carbendazim (2 g/kg)	Carbendazim (2 g/kg)	NA
Organic manure in nursery (% farmers adopted)	Yes (100%); FYM, Poultry manure	Yes (10%); FYM,	NA
Inorganic manure in nursery (% farmers adopted)	100% adopted; Gromore (14:35:14) @ 30-60 kg/acre or 10:26:26 (60 kg/acre)	None adopted	100% adopted; Urea (9-18 kg/acre) + 10:26:26 (9-12 kg/acre); Some applied 10:26:26 (12-15 kg/acre) + 14:35:14 (12-15 kg/acre); Some applied urea and MOP

C. Nursery and main field Management: Average seed rate used by the farmers ranged from 20-75 kg/ha. On an average about 31% of the farmers contacted told that they adopted seed treatment with carbendazim (2 g/kg seeds) or mancozeb (2-2.5 g/kg). On an average 54% of the farmers contacted applied organic matter like FYM, oilseed cake, cow dung manure and poultry manure in the nursery. Very few (~10%) farmers from Howrah and North 24-Parganas applied FYM in

the nursery. More than 90% farmers from different districts except North 24-Parganas adopted chemical fertilizers like urea, DAP, SSP, MOP and different complex fertilizers like 10:26:26, 18:18:18, 20:20:0:13 and 14:35:14 (Table 10). Planting was done in between middle of July to middle of August. Many farmers from Howran, Purba Bardhaman and North 24-Parganas adopted line planting. Some farmers in Hooghly adopted double transplanting. In the main fields, fertilizers were applied @ 10-111.3 kg N/ha, 20-108 kg P_2O_5/ha and 30-112 kg K_2O/ha (Table 11). On an average 42% farmers applied organic manure like FYM, oilcake, cowdung manure, FYM + mill compost, vermicompost and Nimco organic fertilizer in the main field. Very few farmers from Howrah, Hooghly and North 24-Parganas applied organic manure in the main field.

Table 11: Details of main field management

Details	**Districts**		
	Nadia	**Howrah**	**Hooghly**
Planting method	Random Transplanting (100%)	Line transplanting (100%)	Random transplanting (100%); some double transplanting
Total N applied	50-80 kg/ha	10-102.75 kg/ha	18.5-111.3 kg/ha
Total P_2O_5 applied	20-40 kg/ha	27.6-103 kg/ha	39-108 kg/ha
Total K_2O applied	30-40 kg/ha	45-112 kg/ha	29.9-48.75 kg/ha
$ZnSO_4$ applied	-	-	-
Organic fertilizers applied	46% applied FYM (5-7 t/ha)	Nimco organic fertilizers ((only 10%)	Mustard cake (80%); Cow dung (10%)
Fertilizers applied	Fertilizers like urea, DAP, SSP, MOP. 10:26:26, 20:20:0:13 were applied by the farmers		

Table 11 contd..: Details of main field management

Details	**Districts**		
	P. Bardhaman	**N 24-Parganas**	**S 24-Parganas**
Planting method	Line Transplanting (90%)	Line Transplanting (90%)	NA
Total N applied	37-44 kg/ha	60-80 kg/ha	NA
Total P_2O_5 applied	19.5-35 kg/ha	25-40 kg/ha	NA
Total K_2O applied	56-64.5 kg/ha	30-45 kg/ha	NA
$ZnSO_4$ applied	-	-	
Organic fertilizers applied	80% applied FYM (15-20 t/ha); 20% applied FYM + mill compost (15 t/ha)	20% applied vermicompost (300 kg/acre)	90% applied FYM
Fertilizers applied	Fertilizers like urea, DAP, SSP, MOP. 10:26:26, 20:20:0:13, Gromore (14:35:14) were applied by the farmers		

D. Weeds and their Management: Overall intensity of weeds was low to medium except in Nadia and Howrah where weed intensity was recorded high in some places. Common weeds observed in and around rice fields were *Cyperus rotundus*, *Echinochloa colona, Echinochloa crusgalli*, *Cynodon dactylon, Monochoria hastata, Marsilia quadrifolia, Ruellia tuberose* (Potpoti), *Chenopodium album, Fimbristylis miliacea* and some unidentified grasses and sedges. Due to scarcity labours, use of herbicides has increased significantly. More tan 80% of the farmers contacted told that they applied different herbicides along with practicing hand weeding (Table 12). Different herbicides like pretilachlor, butachlor, pyrazosulfuron Ethyl, 2,4-D, Council Activ (triafamone 20% + ethoxysulfuron 10% WG), Topic (clodinafop Propargyl 15% WP) @ 1200 g/ha + Krizin (metribuzin 70% WP) and others were used by the farmers for the management of weeds (Table 12).

Table 12: Weeds and weed management

Details	**District**			**Remarks**
	Nadia	**Howrah**	**Hooghly**	Weed intensity was high in many fields surveyed. Almost all the farmers contacted told that they adopted hand weeding along with herbicide application
Weed intensity	Medium to high	High	Medium	
Names of the weeds	*Cyperus rotundus*, *Echinochloa colona, Echinochloa crusgalli*, *Cynodon dactylon, Monochoria hastata, Marsilia quadrifolia, Ruellia tuberose* (Potpoti), *Chenopodium album* and sedges			
Weedicides used	Prince (pretilachlor) @ 750 ml/ha, butachlor, Saathi (pyrazosulfuron Ethyl 10% WP), 2,4-D, Topic (clodinafop Propargyl 15% WP) @ 1200 g/ha + Krizin (metribuzin 70% WP) and others			
%age farmers applied herbicides	Applied (100%)	Applied (90%)	Applied (100%)	
Wild rice incidence	Nil	Nil	Nil	

Table 12 contd..: Weeds and weed management

Details	**District**			**Remarks**
	P. Bardhaman	**N 24-Parganas**	**S 24-Parganas**	Weed intensity in these districts was moderate. Most of the farmers practiced hand weeding along with herbicide application. All the farmers contacted in South 24-Parganas adopted only hand weeding
Weed intensity	Medium	Low to medium	Medium	
Names of the weeds	*Cyperus rotundus*, *Echinochloa colona, Echinochloa crusgalli*, *Marsilia quadrifolia, Fimbristylis miliacea* and sedges			
Weedicides used	Pretilachlor (300 ml/acre), Saathi (Pyrazosulfuron Ethyl 10% WP), Council Activ (triafamone 20% + ethoxysulfuron 10% WG) and others			
Percentage of farmers applied herbicides	Applied (100%)	Applied (40%)	Nil	
Wild rice incidence	Nil	Nil	Nil	

E. Specific needs of farmers: Some of the common needs of the farmers were subsidy in inputs like fertilizers, pesticides, seeds and minor equipments, proper availability of labours, supply of irrigation water and improvement in irrigation facilities, availability of organic manure, increase in minimum support price, availability of agricultural equipment like power tiller, tractor, combine harvester and others on hire basis, supply of proper plant protection chemicals and herbicides and disease and pest resistant rice varieties.

Table 13: Details of inputs used

Details	Districts		
	Nadia	**Howrah**	**Hooghly**
Implements used	Implements like tractor, leveller, pump, power tiller, thresher, power sprayer, sprayer and combine harvester were used by the farmers. Progressive farmers owned these instruments and others used these implements on hire basis. Combined harvester was used on hire basis		
Source of seeds	Farmers (20 % in Nadia, 100% in N-24-Parganas and 40% in S-24-Parganas) told that they purchased part of their seed requirement from private shops or CADC (Comprehensive Area Development Corporation)		
Source of irrigation	Shallow tube well (100%)	Canal (80%); Deep tube well (20%)	Canal (10%); Deep/mini deep tube well (40%); Shallow (80%)
Scarcity of irrigation water	No (100%)	Yes (60%)	No (100%)
Availability of fertilizers/pesticides	Available (100%)	Available (40%)	Available (80%)
Quality of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)
Advisors to the farmers	State dept (92.3%); Dealers (46.2%)	Own (30%), State dept (70%)	Own (50%), State dept (70%), Dealers (50%)

Table 13 contd..: Details of inputs used

Details	Districts		
	P. Bardhaman	**N 24-Parganas**	**S 24-Parganas**
Implements used	Implements like tractor, leveller, pump, power tiller, thresher, power sprayer, sprayer and combine harvester were used by the farmers. Most of the farmers contacted told that they used these implements on hire basis.		
Source of seeds	Almost all the farmers contacted told that they purchased part of their seed requirement from private dealers or other sources		
Source of irrigation	Canal (80%), Deep tube well (20%)	Shallow tube well (100%)	NA
Scarcity of irrigation water	Yes (100%)	No (100%)	NA
Availability of fertilizers/pesticides	Not Available (100%)	Available (100%)	Available (100%)
Quality of fertilizers/pesticides	Not happy (100%)	Yes (100%)	Yes (100%)
Advisors to the farmers	Own (100%), State dept (20%); Dealers (90%)	State dept (90%); Dealers (10%)	Dealers (100%)

F. Input use: Implements like tractor, leveller, pump, power tiller, thresher, power sprayer, sprayer and combine harvester were used by the farmers. Progressive farmers owned these instruments and others used these implements on hire basis. Combined harvester was used on hire basis. More than 75% of the farmers contacted from different districts expressed that they purchased part of their seed requirement from private dealers and other sources like CADC (Comprehensive Area Development Corporation) (Table 13). Shallow tube wells and canal were the major sources of irrigation. Some farmers Howrah, Hooghly and Purba Bardhaman also used mini deep or deep tube wells (Table 13). About 60-100% farmers from Howrah and Purba Bardhaman told that there was scarcity of irrigation water. About 40-100% farmers contacted from Howrah and Purba Bardhaman told that fertilizers and pesticides were not available in time and most of the farmers from Purba Bardhaman told that they were not happy with the quality of the fertilizers and pesticides. In addition to their own decisions, farmers received advices from officials of state department of agriculture and private dealers.

Table 14: Prevalence of diseases and insect pests in West Bengal during *Kharif*' 2023

Districts	**Diseases**						
	Bl	**NBl**	**ShBl**	**BS**	**ShR**	**FS**	**BLB**
Nadia	L-M (5-10%)		L-M (5-10%)	L-M (5-10%)	L-M (8-10%)		
Howrah	L-M (5-15%)	L-M (8-10%)	L-M (5-10%)			L-M (5-15%)	L-M (5-10%)
Hooghly	L (5%)	L-M (8-10%)	M-S (10-30%)	L (5%)	L-M (5-20%)		
P. Bardhaman	L-M (5-15%)	M (12-20%)	L-M (3-10%)	L (3-5%)		L (2-3%)	L-M (5-10%)
N 24-Parganas			M (12-20%)			M (15-17%)	
S 24-Parganas			M (15-20%)		M (12-15%)		

- L-M (5-10%) incidence of stem rot in Hooghly

Districts	**Insect pests**						
	SB	**LF**	**BPH**	**WBPH**	**MB**	**GM**	**RKN**
Nadia	L-M (5-15%)		L-M (5-10%)				
Howrah	L-M (5-25%)	L-M (5-15%)	L-M (5-15%)		L (4-5%)		
Hooghly	L-M (5-20%)	L-M (5-10%)	M (10-25%)	L-M (5-10%)		L-M (5-15%)	
P. Bardhaman	L (2-5%)		M (15-20%)		L (2-3%)		L (2-3%)
N 24-Parganas	M (20-23%)		M-S (10-39%)				
S 24-Parganas	M (15-25%)		M-S (20-30%)				

RKN: Root knot nematode; Low (2-3%) incidence of rat damage in Purba Bardhaman

G. Biotic stresses and their management: The details of occurrence of different diseases and insect pests are presented in Table 14. Overall, the incidences of different diseases were low to moderate except high incidence of sheath blight was recorded in some fields in Hooghly. Among insect pests stem borer and BPH were wide spread. Stem borer incidence of up to 25% was recorded in some fields of North and South 24-Parganas on varieties like GS3 and Pratiksha. Moderate to severe incidence (up to 39%) of BPH was recorded in some fields of North and South 24-Parganas on varieties like Swarna, Bangabandhu and Jatayu. All the farmers contacted told that they applied different pesticides to manage the biotic stresses. Different pesticides used by the farmers in different surveyed districts are presented in Table 15. The number of spraying/pesticide application ranged from 2-4 and very few of the farmers contacted in Nadia district mixed 2 different pesticides before application.

Table 15: Details of pest Management

Details	**Districts**		
	Nadia	**Howrah**	**Hooghly**
% age farmers adopting plant protection	100%	100%	100%
Names of pesticides	**Insecticides**: cartap hydrochloride 4% GR @ 5-9 kg/acre, Lamda cyhalothrin (1.5-2 ml/l), Ferterra (3.5-4 kg/acre), fipronil (1 ml/l) and chlorantraniliprole (3 ml/10 l) for leaf folder and stem borer and Imidacloprid (0.3-05 ml/l) for BPH **Fungicides:** validamycin (2 ml/l), hexaconazole (2-2.5 ml/l) and Contaf Plus (2 ml/l) for sheath blight and sheath rot, carbendazim (1 g/l) and carbendazim + mancozeb (1.5-2 g/l) for brown spot and Steel (propiconazole) @ 1 ml/l and Contaf Plus (2 ml/l) for stem rot		
# of pesticide sprays	2-3	2	2
Mixing of pesticides before application	Yes (23%); 2 pesticides	Nil	Nil

Table 15 contd..: Details of pest Management

Details	**Districts**		
	P. Bardhaman	**N 24-Parganas**	**S 24-Parganas**
% age farmers adopting plant protection	100%	100%	100%
Names of pesticides	**Insecticides**: cartap hydrochloride 4% GR @ 6 kg/acre, carbofuran (6 kg/acre), Ferterra (3.5-4.5 kg/acre) and Takumi (flubendiamide 20% WG) for stem borer and leaf folder and acephate (1.5 g/l) for BPH **Fungicides:** hexaconazole 5% (2 ml/l), carbendazim (1 g/l), Contaf Plus (2 ml/l) and propiconazole (1 ml/l) for sheath blight and tricyclazole (0.6-1 g/l) for blast		
# of pesticide sprays	3-4	2-3	2-3
Mixing of pesticides before application	Nil	Nil	Nil

Table 16: Researchable issues

Parameters/Issues	**Districts**		
	Nadia	**Howrah**	**Hooghly**
Rice ecology in your area	Irrigated	Irrigated	Irrigated and rainfed lowland
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif + rabi	Kharif + rabi	Kharif + rabi
Number of years of experience in rice farming	> 20 years (75%); 10-20 Years (25%)	10-20 Years	5-20 years (40%); more than 20% (60%)
Main biotic constraints (diseases) in your area according to you	Leaf blast and Brown spot	Leaf blast, sheath blight and false smut	Sheath blight
Extent of disease damage	Below 10% (46%); 10-25% (54%)	Below 10% (40%); 10-25% (60%)	10-25%
Main biotic constraints (Insect pests) in your area according to you	Stem borer BPH	Stem borer BPH	Stem borer BPH/WBPH
Extent of insect pest damage	Below 10% (60%); 10-25% (40%)	Below 10% (60%); 10-25% (40%)	Below 10% (60%); 10-25% (40%)
Main abiotic constrains in your area according to you			Submergence
Production constraints in your area according to you	Scarcity of agricultural labours, lack of mechanization, lack of irrigation facilities, unavailability of fertilizers and pesticides, micronutrient deficiency, unavailability of quality seeds		
Irrigation facilities in your area	Available; Bore well, river	Available; canal	Available; Bore well
Normally how many years it takes to change the rice variety	5-20 years	10-20 years	10-20 Years (50%); > 20% (50%)
Any other rice production issues in your area which the rice scientists need to address			
What is urgently required in your area as far as rice varieties are concerned			
Duration	Medium to long duration varieties with lodging resistance,		
Biotic stress resistance	HYVs resistant to biotic stresses like blast, sheath blight, BPH and stem borer		
Abiotic stress resistance	HYVs with tolerance to drought and submergence		
Preferred grain quality	HYVs with medium slender grain quality		
Nutritional quality	Varieties with high zinc		

H. Researchable issues: Among the biotic stresses, major problems in the region are sheath blight followed by neck blast, brown spot and false smut among the diseases and stem borer and BPH

among the insect pests. Among the abiotic problems, salinity and Submergence/ drought/flash flood was the main problem. Major problems faced by the farmers were scarcity of agricultural labours, lack of mechanization, lack of irrigation facilities, unavailability of fertilizers and pesticides, micronutrient deficiency and unavailability of quality seeds. Farmers want rice varieties suitable for DSR, medium to long duration varieties with lodging resistance, varieties having tolerance to sheath blight, neck blast, stem borer and BPH, varieties having tolerance to submergence and drought, MS grain varieties and varieties with high iron and protein.

Table 16 contd..: Researchable issues

Parameters/Issues	**Districts**		
	P. Bardhaman	**N 24-Parganas**	**S 24-Parganas**
Rice ecology in your area	Rainfed	Irrigated	Irrigated
Rice cultivation only in Kharif or both Kharif and Rabi	Kharif + rabi	Kharif + rabi	Kharif
Number of years of experience in rice farming	> 20 years	10-20Years (60%); > 20 years (40%)	> 20 years (100%)
Main biotic constraints (diseases) in your area according to you	Neck blast; bacterial blight	Sheath blight	Sheath blight
Extent of disease damage	10-25%	10-25%	10-25%
Main biotic constraints (Insect pests) in your area according to you	Stem borer BPH	BPH	BPH
Extent of insect pest damage	10-25%	10-25%	10-25%
Main abiotic constrains in your area according to you		Drought	Salinity, Flash flood
Production constraints in your area according to you	Lack of irrigation facilities, scarcity of agricultural labours, lack of mechanization		
Irrigation facilities in your area	Available; canal	Available; Bore wells	Yes; reservoirs
Normally how many years it takes to change the rice variety	>20 years	10-20 year (40%); > 20 years (60%)	5-10 Year (100%)
Any other rice production issues in your area which the rice scientists need to address			
What is urgently required in your area as far as rice varieties are concerned			
Duration	Medium to long duration rice varieties with lodging resistance, varieties suitable for DSR		
Biotic stress resistance	HYVs resistant to blast, bacterial blight, sheath blight, BPH, stem borer		
Abiotic stress resistance	HYVs with tolerance to drought and salinity		
Preferred grain quality	HYvs with medium slender grain, aromatic short grain varieites		
Nutritional quality	Varieties with high zinc and iron; HYVs with low GI		

Abbreviations:

Bl- Blast, NBl- Neck Blast, BS- Brown spot, ShBl- Sheath blight, ShR- Sheath rot, FS- False smut, LS- Leaf scald, StR- Stem rot, GD- Glume discoloration, NBLS- Narrow brown leaf spot, BaK- Bakanae, KSm- Kernel smut, UDB- Udbatta, KH- Khaira, BB- Bacterial leaf blight, BLS-Bacterial leaf streak, RTV- Rice tungro disease, SRBSDV-Southern rice black-streaked dwarf virus

BPH-Brown Plant Hopper, WBPH- White Backed Plant Hopper, GLH- Green Leaf Hopper, LF- Leaf Folder, SB- Stem Borer, GM- Gall Midge, RH- Rice Hispa, WM- Whorl Maggot, GH- Grass Hopper, CW- Case Worm, GB- Gundhi Bug, PM- Panicle Mite, MT- Mite, RB- Rice Bug, AW- Army Worm, WTN- White Tip Nematode, TERM- Termite, RT- Rice Thrips, HCP- Horned Caterpillar, MB- Mealy Bug, LH- Leaf Hopper, WG- White Grub, STB-Stink bugs

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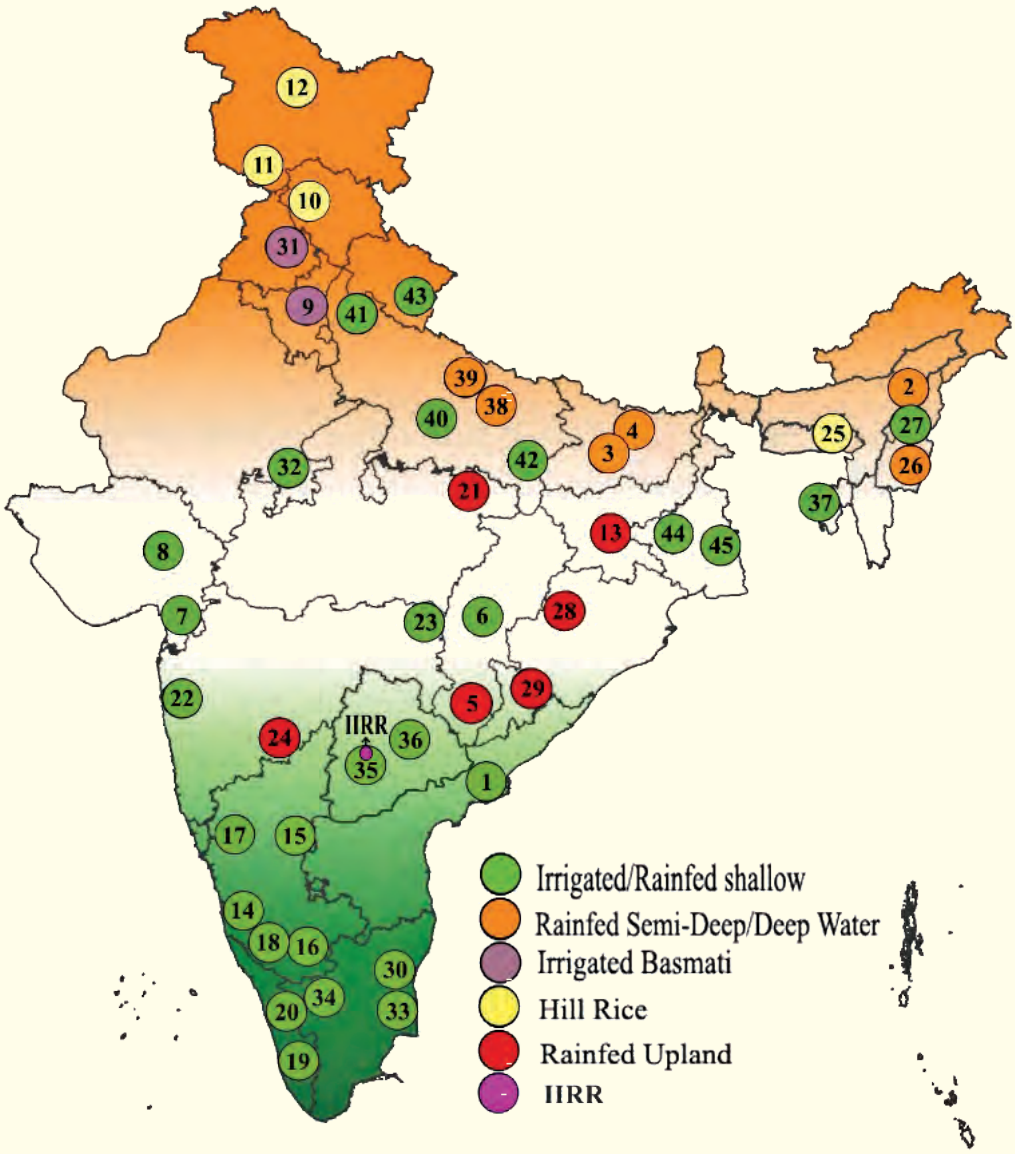

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