उत्पादनोन्मुखी सर्वेक्षण
Production Oriented Survey

सहयोगः राज्य कृषि विश्वविध्यालय एवं कृषि विभाग

In collaboration with:

State Agricultural Universities and Department of Agriculture

अखिल भारतीय समन्वित चावल सुधार परियोजना
All India Co-ordinated Rice Improvement Project

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ICAR - Indian Institute of Rice Research
Indian Council of Agricultural Research
Rajendranagar, Hyderabad - 500 030

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AGRICULTURAL UNIVERSITIES

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All India Coordinated Rice Improvement Programme (AICRIP)

ICAR-Indian Institute of Rice Research
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SUMMARY

Production oriented survey is conducted by a team of subject matter experts (from different state agricutltural universities and ICAR Insstitutes) 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, 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 2019, the survey was conducted in 16 states of India *viz.*, Andhra Pradesh, Bihar, Chhattishgarh, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Maharashtra, Odisha, Punjab, Tamil Nadu, Telangana, Uttar Pradesh, and West Bengal by 17 AICRIP centres. Scientific staffs from the different cooperating centres and officials from state department of agriculture surveyed 116 districts in 16 states.

The seasonal (June-September) rainfall over the country as a whole was 110% of its long period average (LPA). Seasonal rainfall over northwest India, central India, south Peninsula and northeast (NE) India were 98%, 129%, 116% and 88% of respective LPA. Out of the total 36 meteorological subdivisions, 19 subdivisions constituting 54% of the total area of the country received normal seasonal rainfall, 10 subdivisions received excess rainfall (22% of the total area), 5 divisions (15% of the total area) received deficient seasonal rainfall and 2 subdivisions (8% of the total area) received large excess rainfall. Monthly rainfall over the country as a whole was 67% of LPA in June, 105% of LPA in July, 115% of LPA in August and 152% of LPA in September. During the season, 2 cyclonic storms viz., 'Vayu' (during June, 2019) and 'Hikka' (during August, 2019) formed over the Arabian sea.

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, Gujarat and Bihar and its area is increasing in states like Himachal Pradesh, Karnataka, Maharashtra and West Bengal. The major problems faced by the farmers were shortage of agricultural labours and their high wages and irrigation water. Many farmers from different states also expressed problem of timely availability of seeds of different hybrids, availability of different inputs in time, farm mechanization (on hire basis/custom hiring), market facility and farm loan. Diseases like blast, neck blast, sheath blight, brown spot, sheath rot, false smut, grain discoloration and bacterial blight were very widespread almost throughout India. High incidence of bacterial blight and bacterial leaf streak were observed in some areas of Karnataka. Severe blast was reported from many districts of Telangana during Rabi season, 2020. The insect pests like stem borer, leaf folder and BPH were widespread throughout India. High incidence of BPH was recorded in parts of Kerala.

Andhra Pradesh: Production oriented survey was conducted in West Godavari and Krishna districts of Andhra Pradesh during milk to maturity stage of the crop. All mandals of West Godavari and Krishna has canal irrigation system from river Godavari and Krishna. General climatic conditions were normal for rice cultivation. Swarna was the leading variety in West Godavari district. The other varieties cultivated were MTU 1064, MTU 1061, PLA 1100, MTU 1010, MTU 1121, MTU 1229, MTU 1001, MTU 1071, MTU 1075, BPT 5204, Sampath, MTU 1156, MTU 1153 and MTU 3626 in West Godavari district. While MTU 1061 and BPT 5204 were the leading varieties in Krishna district. The other varieties were BPT 2231, MTU 7029, MTU 1075, Sampada, NLR 4001, MTU 1121, MTU 1224, MTU 1156, MTU 1239, NP 9558, MTU 1010, MTU 1153, MTU 1229, MTU 1064, BPT 1032, MCM -103, NLR 34449, IRR 93R, JGL, RNR 15028 and MTU 1226. Rice-rice and rice-pulses were the major cropping sequences observed in the region. Majority of the farmers have gone for manual random planting. In some areas, direct sowing and machine planting was observed. Most of the farmers are applying fertilizers as per the recommended dose in West Godavari district, However, few farmers are applying more than the recommended dose. Weed infestation is Low to High in many mandals of West Godavari and Krishna districts. Average seed rate for normal planting was 50-80 kg/ha and very less farmers adopted seed treatment. Commonly observed weeds were *Echinocloa colonum, Marsilia quadrifolia, E. crusgalli, Cyprus rotundus, C.iria, Cyanodon dactylon, Monochoria vaginalis, Pistia, Eclipta alba, E. prostrata, Eichhornia crassipes and Alternanthra sessalis, Commelina bengalensis, Ammamia baccifera, Bergia maanioides, Phyla nodulosa and Mullugo spp.* Farmers used different weedicides in addition to hand weeding. Intensity of most of the diseases and insect pests was low to moderate. Some of the common needs of the farmers were subsidy on small implements, timely availability of inputs, minimum support price and irrigation facilities. Farmers expressed the need of non-lodging varieties for better performance in submerged conditions.

Bihar-1: Production oriented survey was conducted in Rohtas district of Bihar when the crops were in grain filling to maturity stage. The fields surveyed were under irrigated ecosystem. The commonly grown varieties were high yielding varieties like Swarna (MTU 70290, Samba Mahsuri (BPT 5204), Rajendra Sweta, Rajendra Mahsuri and others and hybrids like Arize 6444. Some farmers cultivated local rice variety Sonachur for its taste. Common crop rotations followed by the farmers were rice-wheat, rice-potato and other vegetables, rice pulse and rice-toria. Most of the planting was done during the month of July. Average seed rate was 25-30 kg/ha and the cooperator reported that farmers followed seed treatment with carbendazim (2 g/kg). Most of the farmers applied FYM both in the nursery and in the main field (up to 5 t/ha). In the main fields, fertilizers were applied @ 100 kg N/ha, 50 kg P_2O_5/ha and 40 kg K_2O/ha. Some farmers also applied zinc sulphate @ 20 kg/ha. The intensity of common weeds like *Cyperus rotundus* and *Echinochloa colona* was medium. Hand weeding was common practice among the farmers though some farmers applied herbicides like butachlor or pretilachlor. Incidences of *Oryzae sativa* var. *fatua* was recorded in some fields. Some of the common needs of the farmers were proper irrigation facility and regular supply of electricity. Farmers used implements like tractor, power tiller, rotavator and combined harvester mainly on hire basis. Canal and shallow tube wells were the main source of irrigation and diesel was main source of power for different agricultural operations. Intensity of most of the pests and diseases was low except false smut and bacterial blight were recorded in higher intensity in some of the fields.

Bihar-2: Production oriented survey was conducted in three districts of Bihar viz., Samastipur, Muzaffarpur and Vaishali during the cropping season. In the early part of the season, rainfall was less. Commonly cultivated varieties were HYVs like Rajendra Bhagwati, Rajendra Sweta, Rajendra Mansuri, Sugandha, Swarna, Rajendra Nilam, Rajendra Kasturi, Rajshree, BPT 5204, MTU 7029, Rajendra Subhasini and Dhanalaxmi and hybrids like Hybrid-644, Hybrid-6201, Hybrid-27P37, Hybrid-2731, PHB-71, 27P-31, Arize-6444, Pusa RH-10, Arize-6129, JK-401, AZ-6453, AZ-8433DT and NK-147221. Common crop rotations followed by the farmers were rice-wheat, rice-mustard, rice-rabi maize, rice-potato etc. Average rice yield ranged from 3500-6000 kg/ha in case of hybrids and HYVs and about 3000 kg/ha in case of local varieties. Farmers are showing increasing interest on hybrid rice cultivation. Planting was mostly done during July. Average seed rate was 25-30 kg/ha. Most of the farmers applied FYM, vermicompost and other organic manure both in the nursery and in the main field in addition to chemical fertilizers. Planting was random and many farmers are showing interest in direct sowing due to drought or less rainfall during early part of the season. Intensity of common weeds like *Ipomoea* spp., *Cyperus rotundus* and *Cynodon dactylon* was low to medium. Hand weeding was common practice among the farmers and some progressive farmers applied weedicides like butachlor, 2,4-D, pendemethylene, Nominee Gold, Adora and others. Intensity of pests and diseases was low to medium. However, seed discoloration at the time of maturity was a big problem. Very few farmers applied different pesticides for the management of pests and diseases. Zinc deficiency was noticed in some fields in Muzzafarpur. Primary need of the farmers was timely availability of quality seeds, pesticides and fertilizers.

Chhattishgarh: Production oriented survey was conducted in 4 rice growing districts of Chhattisgarh viz., Raipur, Durg, Dhamtari and Bemetara during *Kharif* season of 2019 during the maturity stage of the crop. Five villages (in 4 districts) involving 50 farmers were covered during the survey. The general climatic conditions were normal. The fields surveyed were either under irrigated or rainfed lowland ecosystem. All the farmers contacted told that they used all their land for paddy cultivation. The commonly grown varieties in these districts were HYVs like Swarna, MTU1010, MTU1001, Mahamaya, Sonamasuri, Kaveri 371, PKV-HMT, IR64, Indira Sugadhit Dhan, HMT, Vijay, Devbhog, Chandrahasni, Bamleswari, IGKVV R1, IGKVVR2, Safri, Durgeswari, Karma Mahsuri, Indira Barani Dhan, Bisnubhog and Dubraj and hybrids like Arize 6444, VNR 2245, DRS 775, US 312, US 382, Arize Dhani, Arize Bold, Arize 6129, Dhanya 470, Arize Express and Arize 8433. Common crop rotations followed by the farmers were rice-gram, rice-wheat, rice-rice, rice-mustard, rice-Tiwara (*Lathyrus sativus*) and rice-safflower. Average rice yield among the HYVs ranged from 3600-4800 kg/ha. Planting was done mainly during mid June to mid July. The average seed rate ranged from 35-70 kg/ha. Seed treatment practices among the farmers were not common. Most the farmers contacted told that they applied FYM both in the nursery and in main fields. In the main field, fertilizers were applied @ 80-140 kg N/ha, 60-120 kg P_2O_5/ha and 40-90 kg K_2O/ha. Few farmers applied zinc sulphate. Intensity of common weeds was low to medium and many farmers in Raipur and Dhamtari applied different weedicides in addition to one hand weeding. Farmers commonly used implements like tractor, harvester, cultivator, rotavator and seed drill for different farming operations. Intensity of different diseases and insect pests was low to moderate in Raipur, Durg and Dhamtari. However, high intensities of neck blast, brown spot and sheath rot and stem borer were recorded in Mohabhatha village in Bemetara district. Farmers applied different pesticides for managing

different pests and diseases. Some of the common needs of the farmers were higher market price, Disease and insect resistant high yielding rice varieties and improvement in irrigation facilities.

Gujarat: Production oriented survey was conducted in the 15 major rice growing districts of Gujarat State *viz.*, Ahmedabad, Anand, Bharuch, Chotta Udaipur, Dang, Gandhinagar, Kheda, Mahisagar, Mehsana, Navsari, Panchmahals, Surat, Tapi, Vadodara and Valsad. This year the climatic conditions were favorable for rice crop cultivation. But the rainfall during the last week of October at the maturity stage causes losses to the crop in some districts. Varieties like Gurjari, GAR-13, GNR-3, GNR-6, GR-11, GR-101, Mahisagar, Masuri, Jaya, Moti-gold, Surya moti, Sonam, Nath Pauha, Krishna Kamod, US-312, US-807, US-834, MC-13, 25P25, Hyb. 5151, 2666, Omkar, JK-208, Hyb.745, 786, Reshma etc. were mainly cultivated in different districts of Gujarat. The prevailing crop rotations were rice-wheat-rice, rice-sugarcane, rice-chickpea, rice-banana, rice-wheat-vegetable, rice-rice, rice-wheat-maize, rice-bean-summer green gram etc. adopted in different districts of Gujarat. Majority of the fields surveyed were under irrigated ecosystem. Average rice yield in different districts ranged from 3000-5000 kg/ha. Average seed rate adopted by the farmers ranged from 20-35 kg/ha. Very few farmers (15-20%) adopted seed treatment practices and the common chemical used for seed treatment was thiram and carbendazim. Majority of the farmers applied FYM in the nursery and almost all the farmers contacted applied chemical fertilizers like Urea, ammonium sulfate, DAP, urea + ammonium sulfate, 20:20:0 and18:18:18. Planting was done mainly during 1st week of July to 1st week of August. Majority of the farmers adopted random planting. Fertilizers were applied @ 22-115 kg N/ha and 12-63 kg P_2O_5/ha. Application of potash was very less and few farmers applied potash. However, many farmers applied $ZnSO_4$. Almost all the farmers contacted applied organic manures like FYM and green manures like Sesbania. Fertilizers like urea, ammonium sulfate, DAP and MOP was applied by the farmers. Overall, intensity of weeds was low to medium. Majority of the farmers contacted followed 1-2 hand weeding for managing the weed problem. Only few progressive farmers applied herbicides. Some of the common needs of the farmers were high yielding pest and disease resistant rice variety, HYVs for Rabi season, suitable transplanter, high yielding bold rice varieties, varieties suitable direct sowing and drill sowing, short duration fine grain rice varieties, increase in the minimum support price, good crop insurance scheme, production technologies for organic rice and government support, salt tolerant rice varieties, aromatic rice varieties, brown and red rice varieties and fortified rice varieties and protection of traditional rice varieties. Different implements like tractor, puddler, rotavator, thresher, combine harvester, laser leveler (either own or on hire basis) were used by the farmers. Intensity of most of the biotic stresses was in low to moderate intensities. There were reports of zinc deficiency in different districts.

Himachal Pradesh: Production oriented survey was conducted in five districts viz., Kangra, Mandi, Una, Solan and Sirmour. This report is compilation of the information collected by the team in farmers' fields as well as the information provided by the individual farmer. In Himachal Pradesh, Kangra district remains leading in the area under rice cultivation followed by Mandi, Sirmour, Soaln and Una districts. Predominant rice varieties cultivated by the farmers were HYVs like Palam Lal Dhan-1, Him Palam Dhan-1, HPR 1156, HPR 2143, HPR 1068, Sharbati, PR121, PR 122, HKR 127, HKR 147 and PR 126; hybrids like Raja, Arize 6129, Arize 6444, PAC 807, Hybrid 834, Arize Swift Gold, Sri Ram Khushbu, Shahi Dawat, US 312, Raftaar, Hyb. 2266, Dhanya 834, Dhanya 748, NP 3030, Varsha Gold, Hybrid 57 and Hyb. 25P35 and Nirmal-

4 and basmati varieties like Palam Basmati-1, Kasturi, Pusa 1121, Pusa 1509 and Pusa Basmati 1. Prevailing crop rotations were rice-wheat, maize-wheat and rice- potato. Amongst the weeds *Digitaria sanguinalis, Echinochloa colona, E. crusgalli, Cyperus iria, Cyperus rotundus, Ageratum conyzoides* and wild rice were very common under direct sown conditions. The common weeds under transplanted conditions were *E. crusgalli, Monochoria vaginalis, Cyperus iria Commelina benghalensis, Bonnaya veronicaefolia, Alternanthera echinata* and *A. sessilis*. Weedicides like bispyribac sodium (Nominee Gold) and butachlor were commonly weedicide used by the farmers. Common fertilizers used include IFFCO 12:32:16 and urea while dose applied ranged between 0-70 kg N, 0-40 kg P_2O_5 and 0-40 kg K_2O. Fertilizers dosages were inadequate and imbalanced. Widespread incidence of false smut on inbred as well as hybrid varieties ranging between low to moderate and severe outbreak of neck blast on susceptible varieties like, Pusa 1121, Shahi Dawat, Sri Ram Khushbu etc. and local cultivars in some places. Moderate to severe incidence of rice hispa, BPH/WBPH, leaf folder, black beetle and stem borer during early phase of growth were recorded in some parts. Application of pesticides was not very common among the farmers. Rains during dough to maturation stage onwards resulted in delayed crop growth with high sheath rot infection and grain discoloration in some parts of the state.

Jammu and Kashmir: Production oriented survey was conducted in two districts viz., Kulgam and Anantnag (when the crop were mainly at dough/maturity stage. The general climatic conditions were normal as far as rice is concerned. About 50% farmers told that they used part of their land (10-25%) for other crops like vegetables, maize and pulses. 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 Jhelum, 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 1st 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 either 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, apply FYM (5-10 q/ha) in the main field. Random method of transplanting was common among the farmers. The intensity of common weeds like *Echinochloa* spp., *Potamogeton* spp., *Rotala indica*, *Cyprus* spp. and *Ammannia* spp. was moderate. All the farmers contacted adopted hand weeding and in addition applied herbicides like butachlor (1.5 kg a.i./acre) and Eros (10 kg/acre). Some of the common needs of the farmers were timely availability of certified seeds and quality fertilizers/pesticides, availability of organic manure, high yielding varieties and blast resistant rice varieties. Among the diseases, high intensity of leaf blast was observed on China 1039 in Khudwani in Kulgam and on BudjiChina in Bonigam in Anantanag. High intensity of neck blast was recorded in on BudjiChina in Bonigam in Anantanag. Intensity of most of the insect pests was low to moderate. Application of pesticides was not common among the farmers

Karnataka: Production oriented survey was conducted in five districts of Karnataka viz. Chikkamagluru, Hassan, Mandya, Mysuru and shivamogga during *Kharif* 2019. Survey was conducted in 19 taluks when the crops were in tillering to maturity stage. The fields surveyed were under irrigated ecosystem. Commonly cultivated rice varieties were HYVs like MTU1001, MTU 1010, IR64, IET13901, Intan, Jyothi, BPT5204, JGL1798, BR 2655, Thanu, Jaya,

MTU1010, RNR 15048, Super Amman, Jyothi JGL1798, Sunmadhu Research paddy, Sun Amman Research paddy and Research paddy Amulya and hybrids like KRH-4, VNR 2375, VNR 2233, DRH836, MC13, Meenakshi S913, Penna Super, PAC 837 and Mahyco 5409 Suruchi. The prevailing cropping pattern in the districts surveyed is rice-rice followed by rice-sugarcane, rice-vegetables, rice-maize, rice-pulses, rice-ragi and rice-fallow. Rice is grown in the state under irrigated, rainfed and tankfed conditions. The climate condition was not normal due to delay and inconsistent southwest monsoon followed by heavy northeast monsoon coupled with cyclonic conditions. In some areas due to excess rainfall paddy crop got affected by floods. Farmers purchased and cultivated private varieties / hybrids in larger area. Seed treatment practices were not very common among the farmers. Farmers applied FYM and chemical fertilizers in the nursery. N application was more than recommended in some of the places. Many farmers applied green manures like dhaincha and cowpea in the main field. Planting was random. Intensity of common weeds like *Echinochloa crusgalli*, *Echinochloa colona, Cyperus iria, Panicum repens* and *Monochoria vaginalis* was low to moderate. Farmers applied weedicides like butachlor, pretilachlor, Nominee Gold and Topstar. Some of the common needs of the farmers were high yielding varieties with fine grain quality, marketing centre for paddy, good red rice variety, mechanization for small area rice plots and irrigation facilities. Mechanization in all the districts was adopted mainly for harvesting by using combine harvesters and baler. Mechanical Rice transplanters are being promoted from state department by providing subsidies in shivamogga 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. Awareness among the farmers about alternate wetting and drying method during vegetative stage of crop growth has increased. Owing to delayed sowing the crop was damaged by outbreak of insects and diseases. In Cauvery command area farmers are facing bloodworm problem because of which the crop was showing stunted growth and leaves were turning light yellow. High intensity of leaf and neck blast was observed in some fields in Mysuru and Mandya. Sheath blight was common in many places and high intensity of sheath blight was recorded in some fields in Mandya, Mysuru and Shivamoga and Chikmagalur. Higher intensity of bacterial blight and bacterial leaf streak was recorded in some fields in Mandya and Mysuru. The insect pests viz., case worm damage was noticed in higher level in all the districts surveyed at tillering stage. The leaf folder and stem borer infestation was in low to moderate. In Mandya and Mysuru the high BPH infestation was recorded during dough and grain filling stage.

Kerala: Production oriented survey was conducted in Alappuzha and Kottayam districts during *Kharif* 2019 from booting stage to maturity stage of the rice crop. The rice area in Alappuzha District constituted 8.41 % of the total cropped area, while in Kottayam District it was 3.14%. The predominant cropping sequences were rice-fallow, rice-rice and fallow-rice. The predominant varieties in this district were Uma and Jyothi. The crop performance was poor during this year. The average rice yield was 4.5 to 6 t/ha. The ruling variety in this Kuttanad area is Uma (MO 16). The total rainfall during Kharif season was 2369.8 mm. Soil is acid sulphate with the pH ranging from 4.2 to 6.5. Lime was applied @ 100 kg/acre for ameliorating acidity problem at the time of land preparation or gap filling. The rice in Kuttanadu region is grown below mean sea level (MSL). Farmers used *Petti* and *Para* (locally devised axial flow pump) for draining out water. The population of weeds was moderate. The wild rice has become a major problem during the past ten years, most probably due to spread through seed transport from one

area to another. Use of combined harvester, avoiding stale seed bed technique and proper land preparation also has contributed to spread of wild rice. The farmers used weedicides such as Vivaya (cyhalofop-butyl 5.1% + penoxsulam 1.02% OD), Ricestar (Fenoxaprop-p-ethyl 6.9 EC), Affinity (carfentrazone ethyl 40% DF), Nominee gold, Almix (metsulfuron methyl 10% + chlorimuron ethyl 10% WP), 2,4 D for all broad leaf weeds *Cyprus rotundus* and *Echinochloa* spp. Two to three weedicides mix were used by Kuttanad farmers for the control of all types of weeds. Diseases like blast, brown spot, sheath blight, grain discoloration and false smut were recorded in low to moderate intensity while intensity of bacterial blight was comparatively more. Different insect pests like stem borer, leaf folder, gall midge, case worm, thrips and leaf miner were observed in low to moderate intensity while intensity of brown plant hopper was comparatively more. In addition to pesticides, farmers used biocontrol agents like Pseudomonas fluorescens for different diseases and Trichocard for managing insect pests.

Maharashtra: Production oriented survey was conducted in the Konkan region of Maharashtra (Thane, Palghar, Raigad, Ratnagiri and Sindhudurg). The total area under rice cultivation in *Kharif*' 2019 season in the region was 3,92,392 ha, out of these 89 % area were sown under rice during this year. Survey was conducted at dough and maturity stage of crop during the month of October-November' 2019. The weather conditions were good at growth stage of crop but during maturity period and harvesting stage abnormal because of late and heavy rainfall results in to heavy yield losses. Commonly grown varieties were HYVs like Jaya, YSR, Ankur Rupali, Karjat-7, Karjat-3, Karjat-2, Silky-277, Om 125, Daptari-100, Krushidhan Komal-101, Poonam, Shabari, MTU-1010, Jyotika, Om Shriram, Daptari 1008, Daptari 125, Trupti, Avani, Jordar, Vaishnavi, Soubhagya, Devaki, Shubhangi and Suprim Sona. Some farmers cultivated hybrids like Sahyadri, Sahyadri-1, Sahyadri-2, Sahyadri-3, Gorakhnath, Lokhnath 509, Arize 6444 and Ankur-7434. Some of the farmers are still cultivating local varieties like Bela, Walai, Somasal, Dongara, Sorti, Kolhyachi Shepti, Kothimbira/Ghansal, Turya, Yelkar, Kolam, Zinia and Mahadi for their taste. Rice is grown as a rain fed crop due to heavy rains in the region. The most common cropping pattern adopted by farmers in the region is Rice-fallow, rice-pulses and rice-vegetables. Pulses after *Kharif* rice on residual moisture is a common practice in Palghar, Raigad, Thane and Ratnagiri districts. The average seed replacement ratio in the region during *Kharif* 2019 was 46% (according to Maharashtra state agriculture department). Average rice yield was low in the region (2500-3500 kg/ha) in case of high yielding varieties while in case of hybrids 3500-4500 kg/ha. Average seed rate adopted by the farmers was 50-60 kg/ha. Percentage of farmers adopting seed treatment was less (0-44%). In Thane, farmers purchased already treated seeds. Commonly used chemicals for seed treatment was thiram. 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'. Farmers commonly adopted random planting where proper plant population was not maintained. Fertilizers were applied @ 23-114 kg N/ha, 7.5-72 kg P_2O_5/ha and 7.5-72 kg K_2O/ha. None of the farmers contacted applied zinc sulphate. Farmers used different complex fertilizers like suphala (15:15:15), 18:18:18, 19:19:19 and others. Overall, intensity of weeds was low to medium. 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. Majority of the farmers expressed the problem of irrigation water and irrigation facilities. Almost all the farmers told that fertilizers and pesticides were available

in time. In addition to their own decisions, farmers got advices from officials of state department of agriculture and university and also from private dealers. Overall, the incidence of diseases and insect pests was in low to moderate intensity. However, severe bacterial blight was recorded in some parts. Severe incidence of sheath rot was recorded in some parts of Raigad district. Similarly, high level of stem borer infestation was recorded in some villages of Raigad district on varieties like Kolam and Rupali. Adoption of plant protection measures was very rare among the farmers.

Odisha: Production oriented survey was conducted in 4 rice growing districts of Odisha state when the rice fields were at milk stage. Most of the rice fields were under irrigated ecosystem. Predominant rice varieties cultivated in the region were HYVs like Swarna, Pooja, Sowbhagya, Pratikhya and hybrids like Ajay. Common cropping sequences followed by the farmers were: rice-maize, rice-rice-vegetables, rice-rice-pulse, rice-vegetables-vegetables; rice-groundnut-vegetables; rice-rice-pulses; rice-groundnut-vegetables and rice-pulses-rice. Average seed rate in the region ranged from 15-20 kg/ha and majority of the farmers told that they treated the seeds with Bavistin. Application of organic matter either in the nursery or in the main fields was very less. farmers applied 50-100 kg N/ha, and 20-50 kg K_2O/h. The intensity of weeds was low to moderate. Hand weeding was common among the farmers and in addition very few farmers also applied weedicides like pendimethalin. Some of the common requirements of the farmers were equipment, irrigation facilities, proper electricity supply, storage facilities were the main requirements of farmers. Farmers are using their own seeds and seed replacement rate was 20-25%. The bore wells and tank are the main source of irrigation**.** Among different biotic constraints, blast and sheath blight were more in while BPH and stem borer was severe in many fields in all the 4 districts surveyed. . Farmers applied different pesticides for controlling different biotic stresses.

Punjab: Production oriented survey was conducted in 11 districts of Punjab viz., Ludhiana, Kapurthala, Bathinda, Sangrur, Patiala, Gurdaspur, Amritsar, Tarn Taran, Jallandhar, Moga and Barnala when the crops were in booting to heading stage. In general, the weather conditions were normal for rice cultivation. Non-Basmati and Basmati varieties occupied around 80 and 20 per cent area, respectively. Among the non-Basmati group, PR 121 was the most popular variety and to occupied 24 per cent area and PR 126, Pusa 44, PR 124, PR 122 and PR 114 were the other popular varieties. On the other hand, among the Basmati group, Pusa Basmati 1121 was the predominant variety followed by Pusa Basmati 1509. Rice was cultivated under irrigated conditions. Almost all the farmers followed rice-wheat cropping system. Some farmers also followed rice-potato crop rotation. Average rice yield in different high yielding varieties ranged from 7550-8600 kg/ha while in case of basmati varieties, it was 4300-5400 kg/ha. Some farmers cultivated rice hybrid Sava 127. Average seed rate was 10-20 kg/ha. The seed treatments practices were applied by majority of the farmers. Rice crop was transplanted between June 13 to June 30 and Basmati was transplanted during first week of July to 3rd 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, owing to higher status of these nutrients in their soils. Application of Zinc sulphate (either 21 or 33%) is practiced by farmers but they used under dose of zinc. Few farmers applied farm yard manure and green manure in the field. Overall, intensity of weeds was low throughout Punjab. Commonly recorded weeds were *Echnochloa crusgalli* and *Leptochloa chinensis*. Most of the farmers applied pretilachlor and butachlor. Some

of the farmers also used other herbicides like bispyribac sodium, Saathi and others for management of weeds. Many farmers also used hand weeding in addition to herbicides. Many progressive farmers used implements like Tractor, disc harrow, cultivator, planker, combined harvester. Seed replacement rate was also very high. Canal and deep tube wells were the main sources of irrigation. Among diseases, sheath blight was wide spread in low to moderate intensity throughout Punjab. Other diseases like neck blast, brown spot, sheath rot, false smut, grain discoloration, bakanae, stem rot and bacterial blight and insect pests like stem borer, leaf folder, BPH and WBPH were recorded in low to moderate intensities. Small patches of hopper burn due to BPH were observed in some fields in Patiala, Ludhiana and Gurdaspur. Different pesticides were applied by the farmers for management of different pests and diseases.

Tamil Nadu: In Tamil Nadu, Production Oriented Survey was conducted in 7 districts *viz*., Coimbatore, Dharmapuri, Dindigul, Erode, Karur, Ramanathapuram and Thiruvannamalai. During the survey, the stage of the rice crop was varied from tillering to maturity stage. Good amount of rainfall was received and farmers depend on the canal irrigation were able to grow the rice crop during kuruvai season. Delayed planting was done in Thaladi season in few districts. During 2019-20, farmers preferred short and medium duration varieties. Prevalent varieties grown by the farmers were ADT 38, ADT 39, ADT 43, ADT 45, ASD 16, ASD 18, BPT 5204, NLR, White Ponni, Improved white ponni, Akshaya, Amman and Dhanista. Average yield of the crop was varied from 5.0 Q to 6.5Q/ha. Crop rotations practiced by the farmers varied across the state. In case of three crops, common crop rotation was rice-rice followed by pulses/sugarcane/maize and in case of two crops rice was followed by banana/black gram/ groundnut/ turmeric/ sorghum/finger millet/ Tapioca. Most of the surveyed farmers applied FYM during land preparation @ 5-15t/ha. Majority of the farmers purchased seeds from local retailers and used seed rate of 50 to 80 kg/ha. Few farmers adopted SRI technique of cultivation with 10kg of seed. Seed treatment with carbendazim and *Pseudomonas fluorescens* 2 10g/kg was adopted by majority of the farmers. Random, line and direct method of transplanting was adopted. Machine method of planting was also observed in few places of the surveyed districts. With respect to fertilizer application, farmers applied complex fertilizer containing 17:17:17 NPK along with DAP as basal fertilizer. Few farmers applied micro nutrients and $ZnSO_4$ along with basal application. Urea and potash was applied as top dressing along with neem cake. Weed intensity was low to medium and herbicides like butachlor (pre emergence) and bispyribac sodium (early post emergence) were used along with one or two hand weeding for weed management. Most of the farmers depend on the canal irrigation and few had deep tube well irrigation facilities. Low incidence of sheath blight; low to moderate incidence of leaf and neck blast, brown spot, bacterial blight were recorded. Fungicides viz., tricyclazole, tebuconazole, propiconazole, azoxystrobin and carbendazim were used for disease management. Gall midge and false smut emerged as major biotic constraint during this year especially in Cauvery delta zone. Insecticides viz., imdiachlorprid, thiomethaxim, acephate, profenophos, chlorpyriphos and monocrotophos were used for the management of gall midge, BPH, leaf folder and stem borer. In gall midge infected areas, farmers used even four sprays. In general, higher dose of chemicals were used of the control of gall midge, stem borer and leaf folder. Farmers mix fungicides and insecticides and apply as prophylactic spray. Most of the farmers were not aware of the pesticide name and they were unable to distinguish pest and disease incidence in field. Farmers used implements viz., power tiller, tractor and machine harvester. Farmers depend on the private dealers for fertilizers, pesticides and seed. Most of the farmers used combine harvester due to

shortage of labourers. Their requirements were short duration premium varieties with high market price and non lodging type for machine harvest.

Telangana: Production Oriented Survey of rice growing areas was conducted in 18 districts covering major rice growing areas of Northern Telangana, Southern Telangana and Central Telangana zones of Telangana state during *Kharif*, 2019 and *Rabi*, 2019-20. Overall, the average rainfall received in Telangana state from 01.06.2019 to 18.02020 is 989.1 mm as against the normal rainfall of 861.8 mm with deviation of + 15 per cent with over all status being normal. The major varieties grown in the surveyed districts during *Kharif*, 2019 were Samba Mahsuri (BPT 5204), Telangana Sona (RNR 15048), Jai Sreeram, HMT Sona, Kunaram Sannalu, MTU 1010, Jagtial Rice-1 Siddi, Bathukamma, JGL 11470, IR 64, Ankur Pooja, Chintu, MTU 1061, MTU 1224, MTU 1153, MTU 1156, MTU 1001 and Tellahamsa. Rice-rice was the predominant cropping system in all the surveyed districts varying from 60-70% The other systems found were green manure-rice-rice, rice- maize, rice-groundnut, rice –fallow, rice-pulses, rice – sesame, rice-rice-vegetables depending on the water availability and other factors. The average rice productivity in the surveyed districts during *kharif*, 2018 was in the range of 4500 to 7000 kg/ha. Majority of the farmers using seed rate of 50-60 kg/ha for fine grain varieties, whereas 75 kg/ha for coarse grain varieties. It was observed that 80 – 90% of the farmers in the surveyed villages are aware of the importance of seed treatment for the management of diseases in paddy. But, majority of the farmers are sowing the paddy nurseries without any seed treatment in the surveyed districts. Majority of the farmers are applying NPK in the form of complex fertilizers *viz.*, 20-20-0-13, DAP, 10-26-26, 16-20-0-13, 17-17-17, 19-19-19, 28-28-0). Among the complex fertilizers, DAP or 20-20-0-13 are the most commonly used basal fertilizers across the districts surveyed. In general, farmers are applying excess dose of nitrogen.). In addition, the farmers are also applying zinc sulphate in the form of chelated zinc sulphate formulation (35%) and 25% as foliar application at the time of tillering stage (15-30 DAT). Weed intensity was in the range of low to medium in all the major rice growing areas and predominant weed flora includes *Echinocloa colanum, E. crusgalli, Cyandon dactylon, Cyprus rotundus, Leersia hexandra, Panicum ripens, Euphorbia spp. and Parthenium spp*. Most of the farmers applied herbicides for control of weeds. Majority of the farmers (90-95%) are purchasing the seed from local dealers, TSSDC, HACA, PACs, Department of Agriculture and Research Stations. Intensity of different insect pests like BPH, stem borer, panicle mite, gall midge, rice hispa and leaf folder was low to moderate. However, high BPH incidence was noticed in some fields in Khammam. Among the diseases, false smut was recorded in higher intensity in some fields in Khammam, Nalgonda and Nizamabad. Other diseases like bacterial blight, neck blast, sheath blight, bunt and grain discoloration were recorded in low to moderate intensity. During Rabi season of 2020, severe leaf and neck blast were recorded in Karimnagar, Peddapalli, Jagtial, Rajanna Sirisilla, Siddipet, Medak and Wanaparthy districts. Majority of the farmers applied different pesticides for the management of different biotic stresses.

Uttar Pradesh: The production oriented survey of rice growing areas was conducted in the Ambedkar Nagar, Barabanki, Sultanpur, Ayodhya, Basti, SantKabir Nagar and Sidharth Nagar districts of eastern Uttar Pradesh during tillering to maturity stage during *Kharif*' 2019. The total area of rice during this year was 58.99 lakh ha and production of 169.48 lakh tones as estimated by U.P. govt. Rice varieties like NDR 3112-1, Sambha Mahsuri-Sub 1, NDR 359, NDR 2064, NDR 2065, Sarjoo-52, NDR 97, Swarna,Swarna Sub-1, BPT 5204, Sonam, Komal, Dhanrekha,

Damini and Chintu and hybrids like Arize 6444 Gold, 27P63, Gorakhnath-510 were found very popular among the farmers of eastern U.P. Zinc deficiency was observed in surveyed districts. Prevailing crop rotation practices were rice-wheat, rice-mustard, rice-pulses, rice-potato and rice-sugarcane. Planting was done mainly during 3rd week of June to end of June. Average seed rate was 25-35 kg/ha in case of HYVs and 15-20 kg/ha in case of hybrids. Very few adopted seed treatment. Fertilizers were applied @100-120 kg N/ha, 50-60 kg P_2O_5/ha and 50 kg K_2O/ha. Most of the farmers also applied zinc sulfate. Majority of the farmers applied FYM both in the nursery and in the main fields. Some progressive farmers applied green manure (dhaincha, green gram and black gram) and growth regulators like Hizyme, Biozyme and Microzyme. Intensity of common weeds like *Echinochloa colona, Eclipta alba, Echinochloa crusgalli, Cyperus iria, C. rotundus, Cloeme viscosa, Fimbristylis dichotoma* and *Paspalum distichum* was low to medium. In addition to hand weeding, majority of the farmers also applied different weedicides like butachlor, pretilachlor, Nominee Gold and Topstar. Use of Rotavator and combine harvester were common practice among the farming community. Shallow tubewells/canals are the main source of irrigation. Technologies viz. SRI, DSR and laser leveler was also being promoted among farming community through NFSM and BGERI projects. Some of the common needs of the farmers were quality seeds of HYVs, seeds of green manure crops, proper supply of labours and storage and drying facilities. Shortage of farm labourers coupled with higher labour wages are the major constraint in rice production in the surveyed district. Govt. agencies are providing subsidized seeds, agro-chemicals, plant protection inputs and farm machineries including solar pumps to the farmers. Kisan Mela, Kisan Gosthies and training programmes were regularly organized by Agriculture universities and Department of Agriculture, Govt. of U.P. to promote new varieties/technologies to minimize the cost of cultivation for enhancing the productivity of rice growing areas. The main source of farmers finance are own resources, cooperative societies and kisan credit card. Government agencies are promoting soil testing program and providing soil health card. Majority of the farmers are small in holding size and using farm machinery on hired basis in the surveyed districts. Major diseases of rice viz. sheath blight and bacterial leaf blight were observed from low to moderate intensity. However, false smut was noticed in the late maturing/hybrids rice varieties in higher intensity. Incidence of most of the insect pests was low. Majority of the farmers were using plant protection measures to manage biotic stress problems.

West Bengal: Production oriented survey was conducted in 5 districts of West Bengal viz., Nadia, Hooghly, Alipurduar, Coochbehar and Purba Medinipur during Kharif season of 2019. Predominant rice varieties cultivated by the farmers were HYVs like Swarna, Swarna Sub-1, Pratikshya, Ranjit, Lalat, Super Shyamali, Shatabdi, Rani, Bullet, Kshitish, Niranjan, Jamuna, Shukumar, Asha, GS-1, MTU 1010, IET 4786, Ajit, BB-11, Gontra Bidhan 1, 2 & 3, IET 4094, Rajendra Bhagawati, Nilanjana and Varsha Dhan and hybrids like Arize 6444, Arize 6444 Gold, Mampi Gold and Suruchi. Some farmers also cultivated few local scented varieties like Gobindobhog, Bhadshabhog, Dudheswar and other for their own consumption. Common crop rotations practices followed by the farmers were Rice-rice, rice-pulses, rice-mustard, rice-vegetables, rice-mustard-rice, rice-vegetables-rice, rice-pulses-rice, rice-potato-sesame, rice-potato-moong/urd, rice-wheat, rice-mustard-vegetables and others. Average yield in these districts ranged from 4000-6000 kg/ha in case of HYVs. Average seed rate in the surveyed districts ranged from 40-60 kg/ha. On an average, about 68% farmers followed seed treatment with different chemicals like Diathane M-45, Bavistin, Sprint or their combinations. Few farmers treated their seeds with Trichoderma viride. Planting was mainly done end of June to end of July.

Dose of N ranged from as low as 9 kg/ha to 184 kg/ha. Fertilizers application was very low in rainfed lowland ecosystem. Other fertilizers were applied @ 14.4-103 kg P_2O_5/ha and 5-92 kg K_2O/ha. Few farmers applied zinc sulfate. Majority of the farmers except in Hooghly applied FYM or other organic manure in the fields. The intensity of common weeds in the surveyed districts was low to medium. Almost all the farmers contacted in these districts followed hand weeding and about 30-90% farmers additionally applied herbicides. Some of the common needs of the farmers were availability of equipments like tractor, power tiller, thresher shallow tube wells and other implements, availability of labours during peak time of transplanting and harvesting, improvement in marketing facility, reduction in the wages of labour, seeds of good HYVs, improvement in irrigation facilities, mini deep tube wells and financial help. Farmers used different implements like Power tiller, tractor, combined harvester, thresher, shallow pump, sprayer, weeder (either own or on hire basis). About 60-100% farmers in these districts told that they purchased 20-100% new seeds for sowing and main sources of seeds were cooperative society and private seed company. Shallow and deep tube wells were the main sources of irrigation and in general, there was not scarcity of irrigation water. Among the diseases sheath blight, sheath rot and brown spot were very common in most of the places. Higher intensity of sheath blight, sheath rot and bacterial was recorded in some fields of Hooghly and Purba Medinipur districts. High intensity of brown spot was also noticed in some fields in Purba Medinipur on varieties like Lalat and Santoshi. Intensity of most of the insect pests was recorded in low to moderate intensity. Many farmers (60-100%) adopted plant protection measures.

Uttar Pradesh (Ghagraghat: 2018-2019): Production oriented survey was conducted in six districts of eastern Uttar Pradesh viz., Barabanki, Baharaich, Gonda, Balrampur, Basti and Shravasti during *Kharif* season of 2018 when the crops were in tillering and maturity stage. Though climatic conditions were in general normal, but there were reports of excess rainfall in all the surveyed places. Widely prevalent varieties in these districts were HYVs like Pusa Basmati1, NDR 359, Samba Mahsuri and Sarjoo 52 and hybrids like Arize 6444 Gold and PHB 71. Commonly followed crop rotation practices were rice-wheat, rice-lentil, rice-potato, rice-potato-mentha, rice-vegetables, rice-lentil+mustard, rice sugarcane, rice-mustard, rice-wheat+mustard, rice-wheat-black gram, rice-wheat+lentil and rice-pea. Average rice yield in this region ranged from 4000-5000 kg/ha in case of HYVs and hybrids and about 2500-3800 kg/ha in case basmati varieties. Planting was done during last week of June to 2nd week of July. Seed treatment practice was very rare. Most of the farmers applied FYM and fertilizers like urea and DAP in the nursery. In the main field, fertilizers were applied @ 60-120 kg N/ha and 60-80 kg P_2O_5/ha. Application of potassic fertilizers and zinc sulphate was very less. About 60-85% farmers applied FYM in the main field (10-30 t/ha). Intensity of common weeds like *Echninochloa crusgalli, Echinochloa colona* and *Cyperus rotundus* was low to medium. None of the farmers contacted applied any weedicides and hand weeding was commonly followed by the farmers. Implements like tractor, cultivator and harrow were used by the farmers. Though they received advices from state department and university officials, their main advisors were private dealers. Among the diseases, brown spot was widespread in moderate to severe form in all the districts. High intensity of leaf blast was noticed in some fields of Gonda district. Other diseases like neck blast, sheath blight, sheath rot, false smut, grain discoloration, stem rot and narrow brown leaf spot and insect pests like stem borer, green leaf hopper, grasshoppers and gundhi bug were recorded in low to moderate intensity. Zinc deficiency symptoms were recorded in some of the fields surveyed.

Table 1: Production oriented survey, 2019-2020: Name of the state, districts surveyed, survey period and survey personnel

State/Region	District surveyed	Survey period	Survey Personnel
Andhra Pradesh	*West Godavari* and *Krishna*		**APPRI and R.A.R.S, Maruteru-534 122, Andhra Pradesh**
Bihar-1	*Rohtas*		**AICRIP Rice Centre, Botanical Research Unit, Dhangain, Rohtas-802212, Bihar**
Bihar-2	*Samastipur, Muzaffarpur* and *Vaishali*		**Dr. R. P. Central Agricultural Univ, Pusa, Bihar-848125**
Chhattishgarh	*Raipur, Durg, Dhamtari* and *Bemetara*		**IGKV, Raipur-492 012, Chhattishgarh**
Gujarat	*Ahmedabad, Anand, Bharuch, Chota Udaipur, Dang, Gandhinagar, Kheda, Mahisagar, Mehsana, Navsari, Panchmahal, Surat, Tapi, Vadodara* and *Valsad*		**Main Rice Research Station, AAU, Nawagam 387 540**
Haryana	*Kaithal, Kurukshetra, Karnal, Jind, Yamunanagar, Ambala, Panipat and Sonepat*		**CCS HAU, Rice Research Station, Kaul 136 021**
Himachal Pradesh	*Kangra, Mandi, Una, Solan* and *Sirmour*		**Rice and Wheat Research Centre, CSKHPKV, Malan 176047**
J and K	*Kulgam* and *Anantnag*		**Mountain Research Centre for Field Crops (MRCFC), SKUAST-K, Khudwani, Jammu & Kashmir-192102**
Karnataka	*Chikkamagaluru, Hassan, Mandya, Mysuru* and *Shivamogga*		**ZARS, VC Farm, Madya-571405, Karnataka**
Kerala	*Alappuzha* and *Kottayam*		**Rice Research Station, Moncompu-688503, Kerala**
Maharashtra	*Thane, Palghar, Raigad, Ratnagiri and Sindhudurg*		**RARS, Karjat 410 201, Raigad (Dr. B.S. Konkan Krishi Vidyapeeth)**
Odisha	*Kendrapara, Cuttack, Nayagarh* and		**ICAR-NRRI, Cuttack- 753006**

State/Region	District surveyed	Survey period	Survey Personnel
	Jagatsighpur		
Punjab	*Ludhiana, Kapurthala, Bathinda, Sangrur, Patiala, Gurdaspur, Amritsar, Tarn Taran, Jallandhar, Moga* and *Barnala*		**Punjab Agricultural University, Ludhiana-141 004**
Tamil Nadu	*Dharmapuri, Thiruvanamalai, Karur, Dindigul, Ramanathapuram, Erode* and *Coimbatore*		**Tamil Nadu Agricultural University, Coimbatore-641 003**
Telangana	*Nizamabad, Kamareddy, Karimnagar, Jagtial, Peddapalli, Rangareddy, Vikarabad, Mahabubnagar, Nagarkurnool, Narayanpet, Wanaparthy, Nalgonda, Suryapet, Khammam, Badradri-Kothagudem, Siddipet, Warangal* and *Medak*		**Rice Research Center, ARI, PJTSAU, Rajendranagar, Hyderabad-500 030**
Uttar Pradesh	*Ambedkar Nagar, Barabanki, Sultanpur, Ayodhya, Basti, St. Kabir Nagar* and *Siddharath Nagar*		**Crop Research Station, Masodha (NDUAT), Faizabad-224133**
West Bengal	*Nadia, Hooghly, Alipurduar, Coochbehar* and *Purba Medinipur*		**Rice Research Station, Chinsurah, West Bengal-712102**
UP-2(2018-2019)	*Barabanki, Baharaich, Gonda, Balrampur, Basti* and *Shravasti*		**Crop Research Station, Ghaghraghat, baharaich-271901, UP**

Table 2: Widely prevalent rice varieties cultivated in surveyed districts of India during 2019-20

District	Varieties
Andhra Pradesh	**HYVs:** Swarna (MTU 7029), MTU 1064, MTU 1061, PLA 1100, MTU 1010, MTU 1121, MTU 1229, MTU 1001, MTU 1071, MTU 1075, BPT 5204, BPT 2231, Sampath, MTU 1156, MTU 1153, MTU 3626, NLR 4001, MTU 1224, MTU 1239, NP 9558, BPT 1032, MCM-103, NLR 34449, JGL, RNR 15028 and MTU 1226
Bihar-1	**HYVs:** Swarna (MTU 70290, Samba Mahsuri (BPT 5204), Rajendra Sweta, Rajendra Mahsuri and others; **Hybrids:** Arize 6444; **Local:** Sonachur
Bihar-2	**HYVs/Improved**: Rajendra Bhagwati, Rajendra Sweta, Rajendra Mansuri, Sugandha, Swarna, Rajendra Nilam, Rajendra Kasturi, Rajshree, Satyam, BPT 5204, Parimal, Swarna sub-1, Rajendra Subhasini and Dhanalaxmi; **Hybrids**: Arize-6444, Hybrid-6201, Arize 6129, Hybrid-27P37, Hybrid-2731, PHB-71, 27P-31, Pusa RH-10, Arize-6129, JK-401, AZ-6453, AZ-8433DT and NK-147221
Chhattishgarh	**HYVs/Improved**: Swarna, MTU1010, MTU1001, Purnima, Swarna, Mahamaya, Rajeshwari, Sona Masuri, Kaveri 371, PKV-HMT, IR 64, Indira Sugadhit Dhan, Danteswari, HMT, Samleshwari, Safri 17, Vijay, Devbhog, ,Chandrahasni, Bamleswari, IGKVV R1, IGKVVR2, Safri, Durgeswari, Karma Mahsuri, Indira Barani Dhan, Bisnubhog, Dubraj, Tulsimajri and Javaphool; **Hybrids**: Arize 6444,Arize 8433, Arize Dhani, Dhanya 470, Dhanya 455, Arize Express, Arize Bold, VNR 2245, DRS 775, US 312 & 382
Gujarat	**HYVs:** Gurjari, GAR-13, Mahisagar, GR-101, GR-11, Jaya, Sonam, Surya Moti, Moti Gold, Nath Poha, Moti, Krishna Kamod, Masuri, GNR-3, GR-7, GNR-6, GR-17 and Punjab S; **Hybrids:** Daftri Om Sriram 125, MC 13, US-25 P 25, US-312, US-2111, 6129 Gold, US-807, Suruchi, Pro Agro-6444, Kabir-508, NAU-R1, S-316, Hyb. 5151, 2666, Omkar, JK-208, Hyb.745 and 786
Haryana	NA
Himachal Pradesh	**Improved varieties:** Palam Basmati-1, Palam Lal Dhan-1, Him Palam Dhan-1, HPR 1156, HPR 2143, HPR 1068, Kasturi, Sharbati, Pusa 1509, Pusa 1121, HKR 127, HKR 147, PR 121, PR 122 and PR 126; **Hybrids:** Raja, Arize 6129, Arize 6129 Gold, Arize 6444, PAC 807, Dhanya 834, Arize Swift Gold, Sri Ram Khushbu, Shahi Dawat, US 312, Arize 6444, Hybrid 57, Hyb. 25P35Raftaar, Hyb. 2266, Dhanya 748, NP 3030, 25P35, Varsha Gold and Nirmal-4; **Local:** Jhini
J and K	**HYVs/Improved:** Jhelum, SR-I, SR-3, SR-4 and SR-5; **Local: :** K-39, K-332China 1039, K-332, China-1007 and Mushkbudji and others
Karnataka	**HYVs:** MTU1001, IR64, Intan, BR 2655, Thanu, Jaya, Tunga, MTU 1010, MTU 1001, IET 13901, Super Amman, Jyothi JGL 1798, BPT 5204, KPR-1, Uma, Abhilasha, Wadakolam, Vikram, RNR 15048, IET 7191, Jaya, Sunmadhu Research paddy, Sun Amman Research paddy and Research paddy Amulya; **Hybrids:** KRH-4, VNR 2375, VNR 2233, MC13, DRH836, MC13, Meenakshi S913, Mahyco 5409 Suruchi, Penna Super, Kaveri Gold, Sonam and PAC 837

Kerala	**HYVs:** Uma and Jyothi
Maharashtra	**HYVs/Improved**: Jaya, YSR, Ankur Rupali, Karjat-7, Karjat – 3, Karjat – 2, Silky-277, Om 125, Daptari-100, Krushidhan Komal- 101, Poonam, Shabari, MTU-1010, Jyotika, Om Shriram, Daptari 1008, Daptari 125, Trupti, Avani, Jordar, Vaishnavi, Soubhagya, Devaki, Shubhangi, Suprim Sona, Masuri, Suvarna, Ratnagiri -5, Sonam, Vada kolam, Laxmi, Shatayu, Jyotika, Poonam, Suma, Sundar, Sonam, Harshita, Bangalya Chintu, Suprim Sona, Kanchan, Kuber, Radha, Prasanna, Karjat-5, Suvarna, Sonal, NPH 256, Suvarna, Kranti, Sagar Green gold Mohini and Shriram; **Hybrids:** Sahyadri-2, Sahyadri-3, Sahyadri, Arize 6444, Gorakhnath and Lokhnath 509 and Ankur-7434; **Local:** Kolam, Zinia, Mahadi Bela, Walai, Somasal, Dongara, Sorti, Kolhyachi Shepti, Kothimbira/Ghansal, Turya and Yelkar
Odisha	**HYVs**: Swarna, Pooja, Sowbhagya, Naveen, Swarna, Pratikhya, Kalathulari and others; **Hybrid**: Ajay; **Local**: Niranjan, Nali 1009
Punjab	**HYVs:** PR 114, Pusa 44, PR 121, **:** PR 126, PR 127, PAU 201and others; **Basmati:** Pusa Basmati 1121, Pusa Basmati1509, Pusa Basmati 1, Pusa Basmati 1637 and CSR 30; **Hybris:** Sava 127
Tamil Nadu	**HYVs:** CO 51, CO 52, ADT 38, ADT 39, ADT 43, ADT 45, ASD 16, ASD 18, Ponni, Kshaya, Amman BT, White Ponni, Archana, Sowbackya, BPT 5204, Dhanista, Improved White Ponni, NLR, Anna 4, ADT 39, ADT 51, TKM 13, Dhanuska and Tirupthi
Telangana	**HYVs:** Telangana Sona, Jai Sreeram, HMT Sona, Jagtial Rice-1, BPT 5204, MTU 1010, Bathukamma, Ganga Kaveri, MTU 1153, MTU 1156, Chintu, NLR 34449, KNM 18, MTU 1061, MTU 1224, WGL 44 and Ankur Pooja
Uttar Pradesh	**HYVs:** NDR 359, NDR 97, Shusk Samarat, Sarjoo 52 Sambha Mahsuri, Swarna, Narendra Lalmati, Dhanrekha, NDR 2064, NDR 2065, Sambha Mahsuri-Sub 1, Swarna Sub-1, NDR 3112-1, Narendra Usar Dhan-3, Sonam, Pusa Basmati 1, Jallahri, Purva, Chintu, Khusi 27, BPT 5204, NDR 8002 and Sampurna; **Hybrids:** 27P31, 27P63, Damini, Kaveri 9090, Dhanya 8655, US 305, Arize 6444 Gold and Gorakhnath 510, Ganga Kaveri, 27P63, Moti Gold, Biostat, Nandi 333, Dhanversa, Karishma, VNR 2233, Arize 6444, Bayer 6633, KN3, Gorakhnath-509 and Silki; **Locals:** Kala Jeera and Kalanamak
West Bengal	**HYVs**: Pratiksha, Ranjit, Ajit, IET 4786 (Boro), Ratna, Shatabdi, GB-3, Swarna Sub-1, DRR Dhan 42, Rajendra Bhagawati, Rani Dhan, Swarna, BB-2, Rani, Bullet, Kshitish, Niranjana, Jamuna, Shukumar, Asha, GS-1, MTU 1010, IET 4786, BB-11, Gontra Bidhan 1, 2 & 3, IET 4094, Nilanjana, Varsha, Dhan Paijam, Ranjit, Mala, Guti Swrna, Barsha Dhan, Sabita, Gitanjali, Malti 4, Santoshi, Lalat, Swarna, Jugal, Super Shyamali and IET 4786; **Hybrids**: Arize 6444, Arize 6444 Gold, Mahyco 5629 (Raftaar), Suruchi and Mampi Gold; **Locals:** Patnai, Malifore, Gobindobhog, Badshabhog, Bhutusal, Lal Badsha, Black rice and Dudheswar, Kalojeera, Kalonunia and Sadabhog
UP-2(2018-2019)	**HYVs:** NDR 359, Indrasan, Pusa Basmati 1, NDGR 201, Sarjoo 52, NDR 359 and Samba Mahsuri; **Hybrids:** Arize 6444 Gold and PHB 71; **Local:** Lalmati, Madhukar, Ram Javain and Sukhapankhi

Table 3: Biotic constraints (diseases) in different states of India during 2019

Sates	Bl	NBl	BS	ShBl	ShR	FS	GD	LS	StR	NBLS	BAK	Bunt	Khaira	UDB	BLB	BLS	RTV
Andhra Pradesh		L-M		L-M	L	L-M	L		L						L-M		
Bihar-1	L		L	L		M									M-S		
Bihar-2			L-M	L-M	L-M	L-M									L-M		
Chhattishgarh	L-M	L-M	L-M	L-M	L-M	L-M			L	L					L		
Gujarat	T-L	L			L	T-L	L-M								T-L		
Haryana	L-M	T-L		L-M		T-L	T-L		T-L		T-L		T-L		T-L		
Himachal Pradesh	L-M	L-M	L-M	L-M	L-M	L-M	L-M	L		L					T-L		
J and K	M-S	M	M				L-M										
Karnataka	M	L-M	L-M	L-S	L	L	L-M							L	M-S	L-M	
Kerala	L		M-S	M		L-M	M-S								M-S		
Maharashtra	T-L				L-M	T	L	T-L							M-S		
Odisha	L-M	L		L-M	L		L								L		
Punjab		L	L	M	L	T-L	T		L		L				L		
Tamil Nadu	L	L-M	L	L	L-M	L-M	T				T	L			L-M		
Telangana	M-S*	L-M		M		L-M	M								L-M		
Uttar Pradesh			T-L	L-M		L-M									L		
West Bengal	L-M	L	L-M	L-M	L-M	L	L				T-L				L-S		L
UP-2(2018-2019)	M	L	M-S	L-M	L-M	L-M	L	T-L	L-M								

*** In Rabi season**

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 2019

Sates	SB	LF	BPH	WBPH	GLH	GM	RH	WM	GH	CW	GB	MT/ PM	RT	LM	AW/ SC	Rats	Term	MB	BB
Andhra Pradesh	L-M	L-M	L-M		L	L	L					L-M				L-M			
Bihar-1	L	L					L												
Bihar-2	L-M	L-M									L-M					L-M			
Chhattishgarh	L-M	L-M	L-M			L-M													
Gujarat	L	L	T-L	L-M								T-L			L				
Haryana	T-L	T-L	L-M	L-M				T-L	T								L		
Himachal Pradesh	L-M	L-M					L-M	T-L	L-M										
J and K		T-L							L-M							L			
Karnataka	L-M	L-M	M							L-M									
Kerala	L	M	S			L				L-M			M	L-M					
Maharashtra	L-M	L								T-L	L-M				T-L				T-L
Odisha	L-M		L-M								L					L	L-M		
Punjab	T-L	T-L	L	T-L															
Tamil Nadu	T-L	T-L	L		T-L	L-M		L				L							
Telangana	L-M	L-M	L-M			L	L					L							
Uttar Pradesh	T	T	L								L								
West Bengal	L-M	L-M	L-M		L	L					L-M							L	
UP-2(2018-2019)	L				L				L		L								

- **Low intensity of rice skipper in J & K; Low incidence of horned caterpillar in 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 there 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 Rice Improvement Programme 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): 2019-2020

Districts surveyed: *West Godavari* and *Krishna*

Table 1: Details of survey

Districts	Mandals
West Godavari	Bhimavaram, Palakol, Undi, Achanta, Ganapavaram, Pentapadu and Tanuku
Krishna	Vuyyuru, Guduru, Movva, Kalidindi, Pedana, Gudlavalleru and Mudinepalli

Table 2: Widely prevalent varieties

Districts	Varieties
West Godavari	**HYVs:** Swarna (MTU 7029), MTU 1064, MTU 1061, PLA 1100, MTU 1010, MTU 1121, MTU 1229, MTU 1001, MTU 1071, MTU 1075, BPT 5204, Sampath, MTU 1156, MTU 1153 and MTU 3626
Krishna	**HYVs:** MTU 1061, BPT 5204, BPT 2231, MTU 7029, MTU 1075, Sampada, NLR 4001, MTU 1121, MTU 1224, MTU 1156, MTU 1239, NP 9558, MTU 1010, MTU 1153, MTU 1229, MTU 1064, BPT 1032, MCM-103, NLR 34449, JGL, RNR 15028 and MTU 1226

Survey was conducted in West Godavari and Krishna districts covering 7 mandals in West Godavari on 22.11.2019 and 7 mandals in Krishna district on 04.12.2019 during kharif 2019-20. Scientists from RARS, Maruteru, Assistant Director of Agriculture (ADA's), Mandal Agricultural Officers (MAO's) and Agricultural Extension Officers (AEO's) of the state Department of Agriculture have participated in the survey. The details of survey are given below.

1. GENERAL INFORMATION:

Survey was conducted from milky stage to harvesting stage of kharif paddy. Rice is grown mainly under canal irrigation in both districts surveyed. All mandals of West Godavari and Krishna has canal irrigation system from river Godavari and Krishna. Swarna was the leading variety in West Godavari district. The other varieties cultivated were MTU 1064, MTU 1061, PLA 1100, MTU 1010, MTU 1121, MTU 1229, MTU 1001, MTU 1071, MTU 1075, BPT 5204, Sampath, MTU 1156, MTU 1153 and MTU 3626 in West Godavari district. While MTU 1061 and BPT 5204 were the leading varieties in Krishna district. The other varieties were BPT 2231, MTU 7029, MTU 1075, Sampada, NLR 4001, MTU 1121, MTU 1224, MTU 1156, MTU 1239, NP 9558, MTU 1010, MTU 1153, MTU 1229, MTU 1064, BPT 1032, MCM -103, NLR 34449, IRR 93R, JGL, RNR 15028 and MTU 1226. Majority of the farmers have gone for manual random planting. Whereas, it was manual planting with local people or hired people from West Bengal is the common practice in West Godavari district. Kharif yields were good, on an average 30-35 bags/acre were recorded during kharif season in West Godavari and 32 bags/acre were obtained in Krishna district. The yields during previous 3-4 years were good, exemplary due to clear climate, favourable weather prevailed and bright sunshine hours during crop growth period. The same situation was continued this season also. Timely transplanting were taken up, transplantings were taken up from June first week to July last week and at some places August first week in all the mandals surveyed. Most of the farmers are applying fertilizers as per the

recommended dose in West Godavari district, However, few farmers are applying more than the recommended dose. Weed infestation is Low to High in many mandals of West Godavari and Krishna districts. Nearly 60% of kharif paddy was harvested with combine harvesters in West Godavari while it was more than 15-20% in Krishna district.

1.1 Weather conditions:

West Godavari: South West monsoon was set in the month of June and extended up to September 2019. Onset of South West monsoon took place in the month of June and as much as 42.0 and 205.4 mm rainfall was received during the June and July months favored sowings of paddy nurseries. Rainfall during the months of August and September months favoured and farmers could able to obtain good yields. The details of rainfall pattern are presented in Table 3.

Krishna: South West monsoon was set in the month of June and extended up to September 2019. As much as 46.7 and 183.6 mm rainfall was received during the June and July months favored sowings of paddy. Rainfall during the months of August and September months favoured and farmers could able to obtain good yields. The details of rainfall pattern and number of rainy days are presented in Table 3.

Table 3: Weather conditions in the surveyed districts

Weather parameters	**June**	**July**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Total**
West Godavari										
Rainfall (mm)	42.0	205.4	71.5	79.7	18.98	24.23	-	13.5	2.0	457.31
Krishna										
Rainfall (mm)	46.7	183.6	175.1	189.3	172.2	3.7	2.5	10.4	-	783.5
# Rainy days	15	28	23	18	20	1	1	2	-	108

1.2 Crop coverage

The crop covered under rice crop (actual area) in West Godavari district during Kharif 2019 is 221641 ha. The area which was not covered with rice has been converted to fish/prawn cultivation ponds. The crop covered under rice crop (actual area) in Krishna district during Kharif 2019 is 240234 ha (Table 4). The area under direct sowing was up to 5% in Kharif and 10% in Rabi in West Godavari district.

Table 4: Area under rice crop in the surveyed districts during *Kharif*' 2019

District	**Actual area (ha)**
West Godavari	221641
Krishna	240234

1.3 Varieties

The major varieties cultivated were Swarna, MTU 1064, MTU 1061, PLA 1100, MTU 1010, MTU 1121, MTU 1229, MTU 1001, MTU 1071, MTU 1075, BPT 5204, Sampath, MTU 1156, MTU 1153 and MTU 3626 in West Godavari during Kharif season. While, the major varieties grown were MTU 1061 followed by samba mahsuri, BPT 2231, MTU 7029, MTU 1075,

Sampada, NLR 4001, MTU 1121, MTU 1224, MTU 1156, MTU 1239, NP 9558, MTU 1010, MTU 1153, MTU 1229, MTU 1064, BPT 1032, MCM -103, NLR 34449, IRR 93R, JGL, RNR 15028 and MTU 1226 in Krishna district during kharif season. Most of the crop area was occupied by MTU 1121 during rabi in West Godavari district. MTU 1121 (Sridruthi) is the stable and consistent performer, blast resistant variety was occupying more than 85% area followed by MTU 1156 and MTU 1153, gained popularity among the farming community. The blast incidence during rabi season was low due to cultivation of blast tolerant varieties like MTU 1121, MTU 1156 and MTU 1153. The details of area occupied by different varieties are presented in Table 4.

Table 4: Variety wise area coverage (ha) in different districts of Andhra Pradesh during 2019

Districts		
	West Godavari	**Krishna**
MTU 1121	124969	4055
MTU 1156	10618	1255
MTU 1153	13511	426
MTU 1010	9147	465
MTU 3626	612	
MTU 7029	787	12238
MTU 1064	305	304
BPT 5204	276	89096
MTU1061	464	90505
MTU1075	100	7556
PLA1100	74	
Sampath Swarna	4028	788
BPT 2231		26277
NLR 4001		1442
NLR 34449		53
MTU 1229		326
MTU 1224		3217
MTU 1226		21
RNR 15028		42
NP 9558		705
JGL		45
MTU 1239		1012
MCM 103		59
BPT 1032		297
Total	**164891**	**240234**

1.4 Crop condition

Crop condition was satisfactory during *kharif* season due to bright sunlight during the crop growth period. Good yields were realized in *kharif* paddy. An average of 30-40 bags/acre was realized in the district. 30-35 bags per acre were obtained in bhimavaram, Palakol, Undi. Swarna recorded 40bags/acre in Ganapavaram mandal and sampath swarna also recorded 35bags/acre.

Pest incidence particularly BPH, leaf folder incidence was low to moderate and stem borer incidence was low in *kharif* paddy in West Godavari district and BPH, leaf folder were low to moderate in Krishna district. Gall midge incidence was noticed in MTU 1075 in Kalidindi mandal. Sheath blight incidence also low to moderate in both districts. False smut incidence was noticed in low level in both districts. Sheath rot and BLB incidence was low to moderate in west Godavari district. Grain discoloration was observed in Palakol mandal of West Godavari district. Neck blast problem was observed in MTU-1061 variety at some places in Krishna district. Neck blast, false smut was found in low to moderate levels. Sheath blight and sheath rot were noticed in low level in Krishna district.

1.5 Cropping pattern

Rice-Rice is the predominant cropping pattern in majority of the area in West Godavari district. In Krishna district, Rice-Pulses Cropping system is the predominant cropping system. In West Godavari, Rice-pulse system was noticed in Undi mandal. There was emphasis for taking up pulse crop, green manure crops during summer after *rabi* paddy in both the districts.

1.6 Direct seeding

Area under wet direct seeding through broadcasting in West Godavari is less than 5%. Machine planting was observed in 10% of the crop area as in Tanuku mandal (Duvva village). Bengal mode of transplanting was carried out during Kharif 2019 and has gained popularity among the farming community.

2. NURSERY MANAGEMENT

2.1 Seed rate

During survey, it was noticed that farmers have adopted a seed rate of 20-30 kg/acre under normal transplanted conditions in West Godavari district. However, for Bengal mode of planting, a seed rate of 10-15 kg/acre was seen used. In Krishna district, the seed rate is about 20-30 kg/acre. Dry-direct sowing was observed in Kalidindi and Pedana villages of Krishna district. Under normal conditions, 25-days-old seedlings were pulled and used for transplanting in both the surveyed districts.

2.2 Seed treatment

Only few farmers have seen adopting the practice of seed treatment. The farmers have used carbendazim as seed dresser following wet seed treatment method. In other areas of the WG district, no seed treatment is adopted. Farmers of Bhimavaram and Palakole only have been practicing seed treatment method. Majority of the rice farmers in Krishna district have not practiced seed treatment as observed in our survey.

2.3 Fertilizer application

Chemical fertilizers: Farmers in WG district are well aware of recommended dose of inorganic fertilizers for Kharif season i.e 36-24-24. For Krishna district, 32-36: 24:16-24 kg NPK/acre. In general, 20-20-0, urea and DAP were used in nursery. As much as 5 kg urea, 5 kg 20-20-0 or 5 kg DAP was used per 5 cents of nursery. Some farmers used 5 kg SSP also. Some farmers used 28-28-0.

Organic Manures: Farmers of West Godavari district used organic manures like FYM, Vermi compost in nursery area during land preparation. Green manure was also used in some mandals in WG district of Andhra Pradesh.

2.4 Pant Protection in the nursery

Farmers in both WG and Krishna districts were seen adopting timely plant protection measures. All the nurseries and main fields were properly maintained except in stray pockets and seen with the pests and diseases very much in the range of low to moderate levels. On the positive note, use of neem based pesticides is seen gaining momentum in WG district as observed in few mandals during our survey.

Farmers took plant protection measures for management of pest and diseases in nursery. Pesticides like carbofuran 3G, Fertera 4G, and chlorantriniliprole spray @ 0.3 ml/L and chlorpyriphos 20% EC were used for control of stem borer and leaf folder. The problem of diseases was very low and farmers did not use any fungicide in the nursery. In Krishna district of AP, gall midge incidence was noticed. More or less, same insecticides were used in Krishna district also. Hexaconazole, Tricyclazole and carbendazim are the popular fungicides used both in WG and Krishna districts.

3.0 MAIN FIELD

3.1 Organic manures

Organic manuring with FYM, Greenleaf manure, Diancha and vermin compost were seen used by some farmers in both WG and Krishna districts. Biofertilizers usage in both the districts is on the rise. The biofertilizer availability and with less costs in markets is one of the reasons for the increased use of biofertilizers. Ghanajeevamrutam and other natural cow based products were also sseen used by farmers in WG and Krishna districts under Natural farming.

3.2 Fertilizer application

Fertilizer dose followed in WG district is 35 kg N/ac, 25 kg P_2O_5/ac and 21 kg K_2O/ac, whereas in Krishna district, the dosage is 32-18-20 /acre. Commonly used complex fertilizers in WG district are DAP and 14-35-14. Whereas in Krishna district, the complex fertilizers are 19-19-19; DAP; 17-17-17 etc. Phosphatic fertilizers are applied mostly as complex fertilizers in split doses. Most of the farmers are applying lower doses of potassium fertilizers than the recommended dose in WG district. Major cause for increase in cost of cultivation due to fertilizers is use of complex fertilizers rather than straight fertilizers and this is true with both the districts thus resulting in escalated costs of production.

3.3 Transplanting

The main method of transplanting was random planting manually followed by wet direct sowing through broadcasting particularly in West Godavari. Machine planting was also observed in some of the farmer's fields in the survey area. The'Bengal transplanting" has been popularized among the farming community in West Godavari district which is a prime cause for obtaining higher yields. In this method, the labour migrated from West Bengal and Bihar was carrying transplanting by 4-6 workers/acre @ Rs. 3000-3200/acre, by adopting wider spacing,

transplanting of 15-20 days aged seedlings. This method reduced the labour problem in the district. However, in Krishna district, dry direct seeding is being practiced in some places like Kalidindi.

3.4 Plant Population

Wider spacing was adopted both in *kharif* season wherever normal planting was practiced. Hired labour migrated from Bihar and West Bengal has been engaged for transplanting. There were hardly 15-21 hills/sq.m in *kharif*. Optimum plant population or even more plant population was maintained in direct sowing condition.

3.5 Weed management

In all the rice areas of both WG and Krishna districts of AP, as observed in the surveyed areas, weed menace is noticed from moderate to severe levels. In certain pockets, the situation is alarming due to negligence of farmers in weed management, labor problem and poor affordability towards weed management costs. Weeds such as *Echinocloa colonum, Marsilia quadrifolia, E. crusgalli, Cyprus rotundus, C.iria, Cyanodon dactylon, Monochoria vaginalis, Pistia, Eclipta alba, E. prostrata, Eichhornia crassipes and Alternanthra sessalis, Commelina bengalensis, Ammamia baccifera, Bergia maanioides, Phyla nodulosa and Mullugo spp.* Herbicides, Topstar (oxadiargyl), Rifit (pretilachlor), Sofit (pretilachlor with safener), Londax power (Bensulfuron methyl 0.8% + pretilachlor 6%) Sathi (pyrazosulfuran ethyl), Nominee gold (bispyribac sodium), Almix (Metsulfuran methyl + Chlorimuran ethyl) and 2-4 D sodium salt for weed control. Weedicides, Topstar, Rifit, Sofit, Sathi (Pyrazosulfuron ethyl 10% WP) and Londax power were used as pre emergence herbicides within 3-5 days of planting. Sathi, Naminigold, Almix and 2-4 D were used as post emergence herbicides. Farmers could reduce the cost incurred on manual weeding with used of latest herbicides both under transplanted as well as direct sown condition.

4. PRODUCTION CONSTRAINTS

4.1 Abiotic constraints

Intermittent rains have indirectly contributed to moderate levels of BLB and Sheath Blight incidences in majority of areas in WG district. In Krishna districts, it was observed that the impact of abiotic stresses is at minimum during the surveyed season.

4.2 Biotic constraints

Among pests, BPH, leaf folder, stem borer in West Godavari are problematic from low to moderate levels. Whereas in Krishna district, BPH, leaf folder, stem borer and scarce incidence of gall midge incidence was noticed (Table 5). Rodent problem is noticed in many of the areas in both the districts surveyed. Regarding rice diseases, sheath blight, BLB, false smut and sheath rot are seen from low to moderate levels in WG district. In Krishna district, neck blast, sheath blight, false smut are the major diseases observed along with sheath rot. Neck blast incidence is on higher note in Krishna district was observed in MTU1061 and coupled with poor management of timely protection measures. The intermittent rainfall in the WG district particularly favored the BLB and Sheath blight incidence. The rainfall received during flowering season contributed heavily to the development of false smut incidence in both the surveyed districts.

Table 5: Prevalence of diseases and pests in coastal Andhra Pradesh during *Kharif*' 2019

Districts	Diseases						
	ShBl	**NBl**	**StR**	**ShR**	**FS**	**GD**	**BLB**
West Godavari	L-M	L	L	L	L-M	L	L-M
Krishna	L-M	L-M	L	L	L-M	L	L-M

District	Insect pests							
	SB	**LF**	**BPH**	**GLH**	**GM**	**RH**	**Mite**	**Rats**
West Godavari	L-M	L-M	L-M	L	L	L	L-M	L-M
Krishna	L-M	L-M	L-M	L	L	L	L-M	L-M

4.3 Other constraints

As perceived by farmers, subsidy on small implements, timely availability of inputs, minimum support price and irrigation water scarcity are the important constraints besides increase in cost of cultivation. In certain areas, labor shortage, poor drainage facilities are the important constraints. Farmers expressed the need of non-lodging varieties for better performance in submerged conditions. Some farmers have opined that salinity problem in rice fields is a major concern due to cultivation of prawn in adjacent fields. Other constraints include the need of subsidies for tractors and high yielding varieties for cultivation IN West Godavari district. Farmers expressed the need of high yielding new varieties, inputs seed, oil engines and power tillers on subsidy in Krishna district.

5. MECHANIZATION

Approximately, 75% of the famers in WG district and 15-20% of farmers in Krishna district have used Combine Harvester in rice. Since, MTU1121 is widely used during *Kharif* in WG district, which is highly suitable for combine harvesting owing to optimum dryling level that matches with effective use of combine harvester, the use of combine harvesters was made feasible. Popularly used combine harvesters are Claas, Kubota and Yanmar. The approximate per acre charge for machine planting on hired basis is 2,500/- .

6. PLANT PROTECTION

Majority of the farmers used plant protection chemicals for control of weeds, pest and diseases.

7. MARKETTING

With taking up MTU1121 that dries completely up to 14% moisture content at field itself, coupled with its suitability for combine harvesting, farmers of WG district have expressed their fullest satisfaction with the variety. Some farmers in WG district have reported lodging problem in "Sampath Swarna" variety and subsequently had to face marketing problems with it. The problem of insurance with regard to tenant farming still persists in both WG and Krishna districts.

8. YIELDS

Satisfactory yields were realized by farmers in both WG and Krishna districts in Kharif season owing to satisfactory climatic conditions that favored crop growth. The "Swarna" on an average in WG district has recorded a yield of 32-40 bags/acre (75 kg is bag capacity). Except during

Kharif 2018, which experienced Pethai cyclone at fag end, the crop yields are consistent for the past four years in WG district. In Krishna district, the major rice growing variety is MTU1061 and has recorded 35-38 bags/acre.

9. COST OF CULTIVATION

Compared to previous year, there is a marginal increase in cost of cultivation for both manually and machine planted rice. An escalated cost in cultivation is majorly attributed to indiscriminate use of pesticides, fungicides and other agro-chemicals. On an average, the pesticide costs incurred on Kharif crop is approximately 6000/- , whereas in Rabi, 8000 to 9,000/- is the consumption expenses. The total cost of cultivation in Kharif season is Rs. 26,000/- and in Rabi season it is 31,000/-.

10. NEEDS OF THE FARMERS

As perceived by farmers, subsidy on small implements, timely availability of inputs, minimum support price and irrigation water scarcity are the important constraints besides increase in cost of cultivation. Farmers expressed the need of non-lodging varieties for better performance in submerged conditions. Some farmers have opined that salinity problem in rice fields is a major concern due to cultivation of prawn in adjacent fields. Other constraints include the need of subsidies for tractors and high yielding varieties for cultivation IN West Godavari district. Farmers expressed the need of high yielding new varieties, inputs seed, oil engines and power tillers on subsidy in Krishna district.

Table 6: Reasons for deviation in the practices:

S. No.	Practice	Reasons for non adoption/ deviation by farmers
1	Seed treatment not adopted	Not clearly aware of its benefits. Some could not adopt due to lack of awareness.
2	Indiscriminate mixing of plant protection chemicals	Farmers directly approach to the dealers and other fellow farmers instead of contacting State Agriculture Dept. Officials. Application of pesticides and fungicides even when the pest population is far below ETL levels is another reason for indiscriminate application and escalated costs of cultivation. No idea on exact ETLs for pests and diseases.
3	Top dressing with complex fertilizers	Farmers were not aware of the impact of non-availability of NPK in time when supplied as top dressing in complex form. Some of the farmers are of false opinion that top dressing with complex fertilizers will enhance yield when compared to use of straight fertilizers.

S. No.	Practice	Reasons for non adoption/ deviation by farmers
4	Herbicide mixed with urea and applied to the field at 4-5 (pre-emergence) or 12-15 (post Emergence) days after transplanting	Labor shortage coupled with intention of saving costs of labor for application of weedicides and fertilizers separately is the main reason. .
6	Mixing of Zn with chlorpyriphos and spraying at 15-20 DAT	This will save time and cost of labour engaged and useful in control of stem borer as well as rectification of Zn deficiency.
7	Use of resurgence chemicals like synthetic pyrethroids, adulterated bio-pesticides, bios, phorate 10 G, chlorpyriphos 50 EC, and profenophos for control of BPH	They may give quick control/knock down effect of BPH and are however not aware of pest resurgence.
8	Immediate sale of the produce after threshing	Lack of proper storage facilities and need to clear the hand loans for Kharif cultivation in time are the main reasons for immediate sale of produce.

Seasonal conditions, crop coverage and varietal spread statistical data was provided by the Department of Agriculture Officials of West Godavari and Krishna districts.

Bihar-1 (Patna): 2019-2020

Districts surveyed: *Rohtas*

Details of survey

District	Block	Villages
Rohtas	Nokha	Kujhi, Bhaluwahi and Ghosia Khurd

Widely prevalent varieties

District	Varieties
Rohtas	**HYVs:** Swarna (MTU 70290, Samba Mahsuri (BPT 5204), Rajendra Sweta, Rajendra Mahsuri and others; **Hybrids:** Arize 6444; **Local:** Sonachur

Particulars of rice area in the district (in hectares)

Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Total irrigated area (ha)	Area under rice (ha)
390722	235061	329725	311401	170192

Weather data for the district surveyed:

Month	Jun	July	Aug	Sep	Oct	Nov	Dec
Rainy days	5.9	14.3	14.3	8.9	2.8	0.5	0.8
Total rainfall (mm)	120.9	297.5	326.2	181.5	50.9	10.2	3.6
Monthly mean temp (^{O}C)	32.8	29.2	28.4	26.2	25.9	20.7	16.5
Max Temp (^{O}C)	38.5	33.2	32.0	32.4	31.8	28.1	24.1
Min Temp (^{O}C)	27.0	25.3	24.8	23.9	20.0	13.3	8.9

Source: Department of statistics, Govt. of Bihar

Variety wise area coverage in Rohtas district of Bihar

Name of the variety	Area (ha) under the variety
MTU 7029	97395
BPT 5204	43000
Rajendra Mahsuri	10000
Rajendra Sweta	12500
Arize 6444	7000
Sonachur	297

Source of Statistical data: DAO Office, Rohtas (Govt. of Bihar)

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

Total area under HYVs in the	162895
Most prevalent HYVs in the	MTU 7029
Total area under rice hybrids in	7000 Ha
Most prevalent rice hybrids in the	AARIZE 6464
Total area under basmati in the	Nil
Most prevalent basmati varieties	Nil
Whether farmers are using any heavy equipments like	Combined harvester
Mention water saving technologies like SRI/ laser	DSR on small scale
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	1. Soil testing must be done before fertilizer application. 2. Cultivation of HYVs should be adopted on large scale 3. Seed treatment practice should be made 4. Preventive measures against diseases and pests should be under taken 5. Crop rotation in the rice cultivation field should be adopted
What are the general problems in rice cultivation in the district?	1. Govt. tube well borings were reported out of order 2. There is erratic supply problem of electricity 3. Irrigation water is not supplied in canals, at the time of beginning of the kharif crop season, hence the seedling raising activities are affected.
Please provide any farmers association in the district	1. One FPO "Sasaram Farmers producer company limited", is functional in the district. 2. Several other FPOs ae under process of formation.
Whether availability of agricultural labours is	No, there is agricultural labour problem
Whether there is any marketing problem of the	Yes, it is the major problem
Any major irrigation/power generation project in the	There is only old canal irrigation facility in the district which is functioning well.
Any soil testing program	Yes, by IRS, Bikramganj, Rohtas.
Any farmers' training program was organized by the state department of Agriculture/University	Training programme at certain intervals are organized by the KVK, Bikramganj, Rohtas (BAU, Sabour). Simultaneously, district department of agriculture also organize some training camps.

Production Oriented Survey-2019
Department of Plant Pathology, ICAR-IIRR

Production oriented survey was conducted in three villages of Nokha block of Rohtas district of Bihar when the crops were in grain filling to maturity stage. A total of 10 farmers were contacted during the survey. The fields surveyed were under irrigated ecosystem. The farmers told that overall, rainfall was less. The commonly grown varieties were high yielding varieties like Swarna (MTU 70290, Samba Mahsuri (BPT 5204), Rajendra Sweta, Rajendra Mahsuri and others and hybrids like Arize 6444. Some farmers cultivated local rice variety Sonachur for its taste. Common crop rotations followed by the farmers were rice-wheat, rice-potato and other vegetables, rice pulse and rice-toria. Rice yield in Swarna was reported to be up to 6 t/ha. Most of the planting was done during the month of July. Average seed rate was 25-30 kg/ha and the cooperator reported that farmers followed seed treatment with carbendazim (2 g/kg). Most of the farmers applied FYM both in the nursery and in the main field (up to 5 t/ha). In the main fields, fertilizers were applied @ 100 kg N/ha, 50 kg P_2O_5/ha and 40 kg K_2O/ha. Some farmers also applied zinc sulphate @ 20 kg/ha. Commonly used fertilizers were urea, DAP and MOP. Planting was random and plant population was not maintained. The intensity of common weeds like *Cyperus rotundus* and *Echinochloa colona* was medium. Hand weeding was common practice among the farmers though some farmers applied herbicides like butachlor or pretilachlor. Incidences of *Oryzae sativa* var. *fatua* was recorded in some fields. Some of the common needs of the farmers were proper irrigation facility and regular supply of electricity. Farmers used implements like tractor, power tiller, rotavator and combined harvester mainly on hire basis. Many farmers purchased new seeds for sowing. Canal and shallow tube wells were the main source of irrigation and diesel was main source of power for different agricultural operations. In addition to their own decisions, university staff advised the farmers regarding input use and pest and disease management. Intensity of most of the pests and diseases was low except false smut and bacterial blight were recorded in higher intensity in some of the fields. Farmers applied pesticides like propiconazole (1 l/ha), carbendazim (1 kg/ha) and streptocycline (50 g/ha) + copper oxychloride (2.5 kg/ha) for management of different diseases.

Prevalence of different diseases and insect pests in Rohtas district of Bihar-1 during 2019

District	**Diseases**					**Insect pests**		
	Bl	**BS**	**ShBl**	**FS**	**BLB**	**LF**	**SB**	**RH**
Rohtas	L (5-6%)	L (6%)	L (10%)	M (25%)	M-S (30-35%)	L (5%)	L (10%)	L (2%)

Bihar-2 (Pusa): 2019-2020

Districts surveyed: *Samastipur*, *Muzaffarpur* and *Vaishali*

Details of survey

Districts	Villages surveyed
Samstipur	Kalyanpur, Malinagar, Saidpur, Deopar, Harpur, Dighra, Tajpur, Godaipatti, Dubauli, Bangra, Bisa farm,
Muzaffarpur	Dholi, Bakhri, Dholi Farm, Sakra, Sabha, Mirapur, Muroual, Pilkhi, Pakri, Sujawalpur, Navsari, Bagipur, Mahmadpur Bochaha, Sura Dih, Jarang, Bochaha, Mankee, Bandra, Mutlupur, Rahua, Basntpur Bakhri.
Vaishali	Patepur, Mahua, Bajitpur, Hajipur, Goraul, Raghopur, Bidupur, Nawachak, Mohmadpur, Harpurhari, Bishunpur, Jandaha, Maricha, Dayalpur, Hariharpur, Bhagwanpur

Widely prevalent varieties

Districts	Varieties
Samastipur	**HYVs/Improved**: Rajendra Bhagwati, Rajendra Sweta, Rajendra Mansuri, Sugandha, Swarna, Rajendra Nilam, Rajendra Kasturi, Rajshree, BPT 5204, MTU 7029, Rajendra Subhasini and Dhanalaxmi; **Hybrids**: Hybrid-644, Hybrid-6201, Hybrid-27P37, Hybrid-2731, PHB-71, 27P-31, Arize-6444, Pusa RH-10, Arize-6129, JK-401, AZ-6453, AZ-8433DT and NK-147221
Muzaffarpur	**HYVs/Improved**: Rajendra Bhagwati, MTU-7029, Rajendra Nilam, Rajshree, Satyam, Rajendra Subhasini, Dhanalaxmi, Parimal, Swarna sub-1 and BPT 5204; **Hybrids**: PHB 71, Arize 6129 and Arize 6444
Vaishali	**HYVs/Improved**: Rajendra Bhagwati, Rajendra Subhasini, MTU-7029, Rajshree and Rajendra Sweta; **Hybrids**: Arize-6444, PHB-71, Pusa RH-10, Arize-6129 and JK-401

Particulars of rice area in the districts (in hectares)

Districts	Total geographical area (ha)	Total cultivable land (ha)	Total cultivated area (ha)	Total irrigated area (ha)	Area under Rice (ha)
Samastipur	262390	172873	162500	108176	97110
Vaishali	201449	125924	119700	66183	42030
Muzaffarpur	315351	218850	191100	96908	162920

Weather data for the district surveyed: 2019

Month	Jun	Jul	Aug	sep	Oct	Nov
Rainy days	4.0	13.0	7.0	12.0	1.0	0
Total rainfall (mm)	35.0	354	171.7	403	6.6	0
Monthly mean temperature	32.0	28.1	30.5	28.3	25.7	23.8
Maximum	37.5	33.2	34.3	31.4	29.3	26.3
minimum	26.5	26.1	26.8	28.2	22.2	20.1

Varieties recommended for cultivation in different ecosystems in Bihar during Kharif season

Ecosystem/Type of land	Recommended varieties
Upland	**HYVs:** Sahbhagi, Prabhat, Dhanalaxmi, Richhariya, Saket-4 and Rajendra Bhagwati
Aerobic	**HYVs:** Rajendra Neelam, Vandana and Rajendra Bhagwati
Middle land	**HYVs:** Santhosh, Sita, Saroj, Sahabhagi and Rajendra Sweta; **Aromatic Varieties**: Rajendra Subasini, Rajendra Kasturi, Rajendra Bhagwati, Kamini and Sugandha
Lowland	**HYVs:** Rajshree, Rajendra Mahsuri, Swarna, Swarna Sub-1, BPT 5204, Satyam and Kishori
Deep water land	**HYVs/Improved:** Sudha, Vaidehi, Jalmagna and Jallahari

Rice Varieties released Dr. Rajendra Prasad Central Agricultural University, Pusa, Bihar, Samastipur

Varieties	Potential yield (q/ha)	Varieties	Potential yield (q/ha)
Rajendra Bhagwati	50	Kamini	30
Rajendra Mahsuri	50	Turanta	30
Rajendra Subasini	45	Sita	50
Rajendra Kasturi	45	Gautam (Boro Dhan)	80
Rajendra Sweta	45	Dhanlaxmi	45
Rajshree	50	Santhosh	50
Sudha	30	Saroj	50
Janki	25	Rajendra Nilam	45

Production oriented survey was conducted in three districts of Bihar viz., Samastipur, Muzaffarpur and Vaishali during the cropping season. In the early part of the season, rainfall was less. Commonly cultivated varieties were HYVs like Rajendra Bhagwati, Rajendra Sweta, Rajendra Mansuri, Sugandha, Swarna, Rajendra Nilam, Rajendra Kasturi, Rajshree, BPT 5204, MTU 7029, Rajendra Subhasini and Dhanalaxmi and hybrids like Hybrid-644, Hybrid-6201, Hybrid-27P37, Hybrid-2731, PHB-71, 27P-31, Arize-6444, Pusa RH-10, Arize-6129, JK-401, AZ-6453, AZ-8433DT and NK-147221. Common crop rotations followed by the farmers were rice-wheat, rice-mustard, rice-rabi maize, rice-potato etc. Average rice yield ranged from 3500-6000 kg/ha in case of hybrids and HYVs and about 3000 kg/ha in case of local varieties. Farmers are showing increasing interest on hybrid rice cultivation. Planting was mostly done during July. Average seed rate was 25-30 kg/ha. Most of the farmers applied FYM, vermicompost and other organic manure both in the nursery and in the main field in addition to chemical fertilizers. Planting was random and many farmers are showing interest in direct sowing due to drought or less rainfall during early part of the season. Intensity of common weeds like *Ipomoea* spp., *Cyperus rotundus* and *Cynodon dactylon* was low to medium. Hand weeding was common practice among the farmers and some progressive farmers applied weedicides like butachlor, 2,4-D, pendemethylene, Nominee Gold, Adora and others. Intensity of pests and diseases was low to medium. However, seed discoloration at the time of maturity was a big problem. Very few

farmers applied different pesticides for the management of pests and diseases. Zinc deficiency was noticed in some fields in Muzzafarpur. Primary need of the farmers was timely availability of quality seeds, pesticides and fertilizers.

Samastipur: The production oriented survey was conducted from seedlings to maturity stage in 11 villages of Samastipur district of Bihar during *Kharif*, 2019. In early stage rice crop was affected by drought condition later on from month of September, 2019 very good rainfall in Samastipur district. This year the production of rice was very good. The main crop rotation practices were Rice-Wheat, Rice-Mustard and Rice-*Rabi* Maize. Mostly farmers were interested in cultivation of Hybrid rice due to high yield in less land but the farmers also accepted that severity/incidence of various diseases/ insects were more in Hybrid rice. The average yield of hybrid rice of various varieties was 3500-6000kg/ha. In high yielding and local varieties of rice the average yield was 3000-5000kg/ha. The normal time of sowing of rice seeds was June and transplanting in month of July. The average seed rate was 25-30 kg/ha of high yielding varieties of rice. Many farmers of Samastipur district were applied FYM, vermicompost and chemical fertilizers in rice field. Progressive farmers also applied neem oil cake and caster cake. The common weeds were *Ipomoea* spp, *Cyprus rotundus* and *Cynodonn dactylon*. Hand weeding by *khurpi* is local practice for removal of weeds from rice field within 1.5 month after transplanting. Direct seeding of rice also become popular among farmers due to drought condition prevailing in month June-July in Bihar. Pendimethelene (Stamp and Pendsta), 2,4-D, Nominee gold and Adora were used by farmers in management of weeds. Brown leaf spot, Sheath rot, Bacterial leaf blight, Stem borer, Gandhibug, Leaf folder and rats were major diseases and pests in rice field. Fungicides like propiconazole (2 ml/litre of water), Saaf (2 gm/lit of water), hexaconazole (2ml/lit of water), mancozeb (2gm/lit of water) and Bavistin (2gm/lit of water) were used in said diseases. However, the rate of adoption of plant protection measures against pest/diseases/weeds among farmers was very limited up to 3-5% only. Rice grain storage is major problem 8-10% losses during harvesting, threshing, cleaning and storage of rice grains. Discoloration of rice grains at the maturity time is major problem. Now a day's very few farmers are burning the rice straw in field, however, Bihar Govt. is very strict on this matter.

Muzaffarpur: The production oriented survey was conducted in 22 villages from tillering to maturity /harvesting stage of rice crop. Few farmers were reported False smut in hybrid rice. The general climatic condition (rainfall) was good during *Kharif*, 2019. The common crop rotation was Rice-Wheat, rice-Potato and maize and Rice-Mustard. Most of farmers applied Nitrogen (Urea) in rice crop and chemical fertilizers like urea (100-150 kg/ha), SSP (30-50 kg/ha) and MoP (15-20 kg/ha). The normal date of sowing is June and transplanting is in July. Most of farmers were below poverty line so sowing is depending on rainfall. Bihar Govt. also supplied treated seeds to farmers but mostly farmers were interested in hybrid rice cultivation. Zn and Fe deficiency were also constraint in rice crop after transplanting in field. Generally poor rice crop stand having inadequate plant population and transplanting was done by random method. Though weed flora was major constraints among the rice field. Hand weeding by khurpi was common method for removal of weeds from field. Generally only one weeding was uesd by farmers within 1.5 month. Only progressive farmers were using weedicides in direct seeded rice after sowing butachlor, 2, 4-D, Nominee gold and Adora are popular weedicides among farmers. Good quality seeds and fertilizers were major constraints among the farmers. Electricity was the

main source of power. Now days, Bihar Govt. was giving subsidy on seeds, fertilizers, diesel, electricity and other machine for farmers. Threshing floor and storage of rice grains is major problem among farmers. Bore well and canal were sources of irrigation, most of farmers were below poverty line dependent upon rainfall. Rice yield was also very good but use of use was problem among farmers. The yield of rice ranged from 3000-5000 kg/ha in case of HYVs and about 3000 kg/ha in case of local varieties. Hybrid rice yield was up to 5500-6000 kg/ha. Fungicides like Bavistin, Saaf, mancozeb, hexaconazole and propiconazole were used as pesticides by farmers. Majority of farmers expressed that source finance from their own. The source of obtaining spray machine and other equipments were inadequate. Blue bull (Nilgai) is the major problem in field. Rats damaged 5-10% rice crop from field to threshing.

Vaishali: 16 villages of Vaishali districts were surveyed during *Kharif*, 2019 under production oriented survey of rice. Seeding of rice was early in few villages. Farmers were done transplanting by their own source of irrigation. In early stage of rice crop, there was not rainfall. The cropping system being followed was Rice-wheat, rice-Potato, Rice-Mustard and rice-maize. Most of the farmers only used their own source like seeds, irrigation, fertilizers, chemicals and equipments. Few farmers of BPL groups only supported by govt. few poor farmers obtain loan from bank. Most of farmers adopt random method of planting. Now a days due to drought in June, direct seeding of rice als become popular among farmers. Most of farmers used higher doses of nitrogen (Urea). Only few farmers applied recommended dose of fertilizers. For pesticides most of farmers were taking advice from local shops of insecticides/fungicides. A few farmers applied FYM, neem cake and vermicompost in rice field. Hand weeding was commonly used by farmers for removal of weeds in field. Generally sowing of rice seeds were done in the month of June and transplanting in July-august. Bacterial leaf blight, sheath rot, sheath blight, brown spot, false smut, Zn deficiency, leaf folder, stem borer and rats were major problem in rice field. Different fungicides like Bavistin, Saaf, mancozeb, hexaconazole and propiconazole were used by 5-10% farmers. Farmers were interested in high yielding seeds, good quality chemical and pesticides at time. Electricity was also major constraints. Lack of threshing floor and storage facilities. Marketing facility is also a major constraint among rice growers.

Chhattisgarh (Raipur): 2019-2020

Districts surveyed: *Raipur, Durg, Dhamtari* and *Bemetara*

Table 1: Particulars of survey

Districts	Blocks	Villages
Raipur	Tilda and Arang	Bhujgahan and Barchha
Durg	Patan	Belouri
Dhamtari	Sihawa	Ratawa
Bemetara	Saja	Mohabhatha

Table 2: Widely Prevalent varieties

Districts	varieties
Raipur	**HYVs/improved**: Swarna, MTU1010, MTU1001, Mahamaya, Sonamasuri, Kaveri 371, PKV-HMT, IR64, Indira Sugadhit Dhan, HMT, Vijay, Devbhog, ,Chandrahasni, Bamleswari, IGKVV R1, IGKVVR2, Safri, Durgeswari, Karma Mahsuri, Indira Barani Dhan, Bisnubhog, Dubraj, Tulsimajri and Javaphool; **Hybrids**: Arize 6444, VNR 2245, DRS 775, US 312 & 382
Durg	**HYVs/Improved:** Purnima, Swarna, Mahamaya, Sonamasuri, MTU1010, MTU1001, Chhattisgarh Devbhog, Dubraj, Kaveri 828, Indira Barani Dhan, IR 64, IGKVR1 and IGKVR2; **Hybrids:** Arize 6444, Arize 8433 and Arize Dhani
Dhamtari	**HYVs/Improved:** Swarna, Mahamaya, Rajeshwari, IR 64, Indira Barani Dhan, Swarna Mahsuri, Desi Dubraj, Samleshwari and Safri 17; **Hybrids**: Arize 6444, Arize 8433, Arize Dhani and Arize bold
Bemetara	**HYVs/improved**: Swarna, MTU1010, MTU1001, Karma Mahsuri, Danteswari, Bamleshwari, Mahamaya, Devbhog and HMT; **Hybrids**: Arize 6444, Arize 6129, Dhanya 470, 455, Arize Express and others

Table 3: Particulars of rice areas in the surveyed districts of Chhattisgarh during 2019

District	Total Rainfall (mm)	Total geographical area (000ha.)	Total cultivable area (000ha.)	Total cultivated area (000ha.)	Total irrigated area (000ha.)	Area under paddy (000ha)
Raipur	1197 mm	1344.624	160.622	213.089	300.494	494.00
Durg	1085mm	231.999	196.504	192.259	108.329	129.784
Dhamtari	1197mm	408.193	144.077	210.079	120.026	138.194
Bemetara	1027mm	285.50	342.40	168.239	125.921	154.400

Production oriented survey was conducted in 4 rice growing districts of Chhattisgarh viz., Raipur, Durg, Dhamtari and Bemetara during *Kharif* season of 2019 during the maturity stage of the crop. Five villages (in 4 districts) involving 50 farmers were covered during the survey (Table 1). The general climatic conditions were normal. The fields surveyed were either under irrigated or rainfed lowland ecosystem. All the farmers contacted told that they used all their land for paddy cultivation. The commonly grown varieties in these districts were HYVs like Swarna, MTU1010, MTU1001, Mahamaya, Sonamasuri, Kaveri 371, PKV-HMT, IR64, Indira Sugadhit Dhan, HMT, Vijay, Devbhog, ,Chandrahasni, Bamleswari, IGKVV R1, IGKVVR2, Safri, Durgeswari, Karma Mahsuri, Indira Barani Dhan, Bisnubhog and Dubraj and hybrids like Arize 6444, VNR 2245, DRS 775, US 312, US 382, Arize Dhani, Arize Bold, Arize 6129, Dhanya 470, Arize Express and Arize 8433. Common crop rotations followed by the farmers were rice-gram, rice-wheat, rice-rice, rice-mustard, rice-Tiwara (*Lathyrus sativus*) and rice-safflower.

Table 4: Production Oriented survey- 2019General Question of Rice Cultivation In District (To Be Filled By The Cooperator In With The Officials From State Department of Agriculture

Parameters	Districts			
	Raipur	Durg	Dhamtari	Bemetara
Total Area under HYVs in the district (ha)	N/A	N/A	N/A	N/A
Most prevalent HYVs in the District	Swarna, MTU 1010, MTU1001	Swarna, Mahamaya	Swarna, MTU 1010	Swarna, MTU 1010, MTU1001, Maheswari
Total area under rice hybrids in the district (ha.	N/A	N/A	N/A	N/A
Most prevalent rice hybrids in the district	Arize 6444	Arize 6444	Arize 6444	Kaveri 9090, Arize 6444
Total area under basmati in the district	NIL	NIL	NIL	NIL
Most prevalent basmati varieties in the district	NIL	NIL	NIL	NIL
Whether farmers are using any heavy equipments like transplanted/combine harvester	Paddy Transplanter, Combine harvester	Combine harvester	Combine Harvester, Paddy Transplanter	Paddy Transplanter, Combine harvester
Mention water saving technologies like SRI/laser leveling/DSR	SRI, DSR	SRI, DSR	SRI, DSR	SRI, DSR
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	INM, IDM , Not to mix 2-3 pesticides without knowing their compatibility	INM, IDM, Land leveling, Application of balanced dose of fertilizers	INM, IDM , Not to mix 2-3 pesticides	INM& IDM Not to mix 2-3 pesticides without knowing their compatibility
What are the general problems in rice cultivation in the district?	Labor shortage, BPH, stem borer, BLB, blast, neck blast, weed, sheath blight, Gall midge grain discoloration, Brown spot	Timely supply of inputs, weeds, BPH, stem borer, neck blast, leaf blast	Labor shortage, BPH, stem borer, BLB, blast, neck, blast, sheath blight, leaf folder, leaf blast	Remuneration price, BPH, stem borer, sheath blight, blast, Brown spot, Leaf folder, Sheath rot
Please provide any farmers association in the district	Agrocrates society Kisansangh, RKVY, Agricon, Green revaluation extension project, National mission for sustainable agriculture, Soil health cards	Kisan sangh, Agricon RKVY, Agricon, extension project, National mission for sustainable agriculture (NMSA), Soil health cards	Agrocrates society, Kisan sangh, Agricon RKVY, Green revaluation extension project, NMSA, Soil health cards	Kisan sangh, Agricon RKVY, Green revaluation extention project, National mission for sustainable agriculture, Soil health cards
Whether availability of labors is sufficient?	Yes	Yes	No	No
Whether there is any marketing problem of the produce?	get expected support price	get expected support price	get expected support price	get expected support price
Any major irrigation/power generation project in the district	Samoda Baraj Gughwa , substation project	-	Mahanadi reservoir, dudhawa reservoir project	-
Any soil testing program undertaken?	-	-	-	-
Any farmers' training program was organized by the state department of Agriculture/ University	Samiti, Raipur	RKVY , Project	Bio control Project	RKVY, Project

Average rice yield among the HYVs ranged from 3600-4800 kg/ha. Planting was done mainly during mid June to mid July. The average seed rate ranged from 35-70 kg/ha. Seed treatment practices among the farmers were not common. Most the farmers contacted told that they applied FYM both in the nursery and in main fields. In the main field, fertilizers were applied @ 80-140 kg N/ha, 60-120 kg P_2O_5/ha and 40-90 kg K_2O/ha. Few farmers applied zinc sulphate. Intensity of common weeds was low to medium and many farmers in Raipur and Dhamtari applied different weedicides in addition to one hand weeding (Table 8). Farmers commonly used implements like tractor, harvester, cultivator, rotavator and seed drill for different farming operations (Table 9). Intensity of different diseases and insect pests was low to moderate in Raipur, Durg and Dhamtari. However, high intensities of neck blast (up to 40%), brown spot (up to 55%) and sheath rot (up to 35%) and stem borer (up to 30%) were recorded in Mohabhatha village in Bemetara district on varieties like Devbhog and Rajeshwari (Table 10). Farmers applied different pesticides for managing different pests and diseases (Table 11).

Table 5: Average yields of different rice varieties as reported by the cooperators/farmers

Varieties	**Yield (kg/ha)**				**Remarks**
	Raipur	**Durg**	**Dhamtari**	**Bemetara**	
Swarna	3600-4200	3800-4400	3800-4800	3600-3800	Some of the farmers are still growing local varieties for taste and low maintenance
IR 64, IR 36	4200-4400		4500-4600		
MTU 1010, MTU 1001	3800-4500		3800-4500		
Mahamaya	3700				
Rajeswari	4500			4000-4800	
Devbhog		4000-5200		4200	
Kaveri #		4600			
Desi Dubraj			4200		

Table 6: Details of nursery management

Parameters	**Raipur**	**Durg**	**Dhamtari**	**Bemetara**
Planting time	15 June -10 July	Mid June to 3rd week of July	Mid June to 1st week of July	Mid June to mid July
Seed rate	35-70 kg/ha	35-60 kg/ha	40-75 kg/ha	40-45 kg/ha
Seed treatment (% farmers adopted)	Yes (15% only)	Nil	Yes (60%)	Nil
Chemicals used for seed treatment	NA	-	No chemicals; only salt water	-
Organic manure in nursery (% farmers adopted)	100% (FYM)	100% (FYM)	100% (FYM)	100% (FYM)
Inorganic manure in nursery (% farmers adopted)	100% adopted DAP: 60-110 kg/ha MOP: 60-90 kg/ha	100% adopted DAP: 90-110 kg/ha MOP: 70-90 kg/ha	100% adopted DAP: 80-90 kg/ha MOP: 60-70 kg/ha	100% adopted DAP: 80-120 kg/ha MOP: 60-90 kg/ha

Table 7: Details of main field management

Details	Districts				Remarks
	Raipur	**Durg**	**Dhamtari**	**Bemetara**	
Planting method	Direct sowing (Mainly)				
Total N applied	80-140 kg/ha	120-130 kg/ha	80-130 kg/ha	110-140 kg/ha	Urea
Total P_2O_5 applied	60-110 kg/ha	90-110 kg/ha	60-90 kg/ha	80-120 kg/ha	DAP
Total K_2O applied	40-80 kg/ha	70-90 kg/ha	40-70 kg/ha	60-90 kg/ha	MPO
$ZnSO_4$ applied	25-45 kg/ha	30 kg/ha	25-30 kg/ha	30 kg/ha	10-35% farmers
Organic fertilizers applied	All the farmers contacted applied FYM in the main field				

Table 8: Weeds and weed management

Details	Districts				Remarks
	Raipur	**Durg**	**Dhamtari**	**Bemetara**	
Weed intensity	Low to medium	Low to medium	Low to medium	Medium	
Names of the weeds	*Solanum nigram* (Ban Makoy), *Echinochloa* spp. (Bansawan), *Leucces aspera* (Gumma), *Cyperus rotundus* (Motha), *Euphorbia hirta* (Badi dudhi), *Eleusine indica* (Bankado), *Dactyloctenium aegypyium* (Makra), *Medicago denticulata* (Chinori), *Melilotus alba* (Safed Senji), *Cynodon dactylon* (Doob grass), *Echinochloa colona* (Sanwa) and some unidentified narrow and broad leaved weeds				Weeds were common in most of the fields surveyed
Weedicides used	Anilophos (1.5 kg a.i./ha), butachlor (1-1.5 kg a.i./ha), Nominee Gold, Saathi (pyrazo sulfuron), pretilachlor (1 kg/ha), bentazone (2 kg/ha), Whip Super (fenoxaprop-p-ethyl 9 EC) and others				
Percentage of farmers applied herbicides	75%	20%	90%	40%	Most of these farmers also followed one hand weeding additionally
Wild rice incidence	80-90% of the rice fields visited were infested with wild rice				

Needs of the farmers: Higher market price, Disease and insect resistant high yielding rice varieties and improvement in irrigation facilities

Table 9: Details of inputs used

Details	Districts			
	Raipur	**Durg**	**Dhamtari**	**Bemetara**
Implements used	Harvester (hire basis), tractor (own or hire), cultivator (own or hire), rotavator (own or hire), seed drill (own or hire) and harrow (hire basis)			
Source of seeds	Mostly previous years seeds	Previous years seeds (70%)	Previous years seeds (50%)	Previous years seeds (20%)
Source of irrigation	Canal (40%) Deep tube well (70%)	Deep tube well (70%) Shallow well (10%)	Canal (70%) Deep tube well (50%) Shallow well (20%)	Shallow well (80%) Deep tube well (10%)
Availability of fertilizers/pesticides	Available (90%)	Available (100%)	Available (100%)	Available (100%)
Quality of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Advisors to the farmers	Own decisions (75%) Dealers (30%) State dept (15%)	Own decisions (100%) Dealers (10%) State dept (30%) University (30%)	Own decisions (90%) State dept (10%)	Own decisions (100%) State dept (90%)

Table 10: Prevalence of diseases and insect pests in Chhattisgarh during *Kharif*' 2019

Districts	Diseases								
	Bl	**NBl**	**BS**	**ShBl**	**ShR**	**FS**	**StR**	**NBLS**	**BB**
Raipur	L-M (2-20%)	L-M (3-20%)	L (5-10%)	L-M (5-15%)	L (3-5%)	L-M (3-15%)	L (8-10%)	-	L (8-10%)
Durg	L-M (10-20%)	L (5-10%)		L (3-5%)	L (3-8%)	L-M (3-20%)			
Dhamtari	L-M (3-15%)	L (10-10%)	L (5-10%)	L (5-10%)		L-M (5-12%)		L (8-10%)	L (8-10%)
Bemetara	L (4-5%)	L-S (5-40%)	L-S (5-55%)	L (3-8%)	L-S (5-35%)	L (5-10%)			

Districts	Insect pests			
	LF	**SB**	**BPH**	**GM**
Raipur	L-M (5-15%)	L-M (3-20%)	L-M (2-15%)	L-M (5-15%)
Durg	L-M (2-20%)	L (3-10%)	L (4-5%)	L (8-10%)
Dhamtari		L-M (5-15%)	L-M (5-15%)	L-M (5-15%)
Bemetara	L (4-5%)	L-S (3-30%)	L (5-10%)	L (5-10%)

Table 11: Details of pest Management

Details	Districts				Remarks
	Raipur	**Durg**	**Dhamtari**	**Bemetara**	
% age farmers adopting plant protection	100%	100%	100%	100%	
Names of pesticides	**Insect pests :** Quinaphos (1600 ml/ha), fipronil (25 kg/ha), chlorpyriphos (2000 ml/ha) and phorate (10 kg/ha) for stem borer, leaf folder and gall midge; ethofenprox (500 ml/ha) and carbaryl (900 g/ha) for BPH and gall midge; lamda cyhalothrin (2 ml/l) and cypermethrin (250 ml/acre) for stem borer **Diseases:** chlorothalonil (2 ml/l) for false smut; carpopramid (1 ml/l), kasugamycin (2.5 ml/l), tricyclazole (0.6 g/l) and carbendazim (1 g/l) for leaf and neck blast; propiconazole (1 ml/l), validamycin (2.5 ml/l) and hexaconazole (2 ml/l) for sheath blight and sheath rot; Nativo (4 gm/10 l) and mancozeb (2 g/l) for brow spot; thiophenate methyl (1 g/l) for sheath rot				
# of pesticide sprays	2-4	2-3	3-4	2-3	
Mixing of pesticides before application	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)	

Some farmers in Dhamtari, sprayed the crop with cow urine. In addition to different biotic problems, farmers also reported different deficiency symptoms. However, most of the farmers expressed that they want to continue rice cultivation.

Gujart (Nawagam): 2019-2020

Districts surveyed: *Ahmedabad, Anand, Bharuch, Chota Udaipur, Dang, Gandhinagar, Kheda, Mahisagar, Mehsana, Navsari, Panchmahal, Surat, Tapi, Vadodara* and *Valsad*

Table 1: Particulars of survey

District	Taluka	Villages
Ahmedabad	Daskroi and Sanand	Motidevti, Modasar, Bhawanpur, Jetalpur, Bhoipura, Badodara, Ramol, Chausamiya, Bhuwadi and Gatrad (10)
Anand	Anand and Borsad	Samarkha, Ravadapura, Kansari and Napa (4)
Bharuch	Hansot	Valner and Sisodara (2)
Chhota Udaipur	Chhota Udaipur and Bodeli	Chhota Udaipur, Shihoj, Zoz, Vaghva, Puniyabad, Devaliya, Sushkaal and Nalej (8)
Dang	Waghai and Ahwa	Ambaman, Bhowadi, Sodmal, Kaliwel, Kukadnakhi, Pipri and Hanwat Chond (7)
Gandhinagar	Kalol and Dehgam	Mulsana, Bhawanpur, Radhanpur, Nawa Narayanpura and Vashna Rathod (5)
Kheda	Kheda, Galteshwar, Thasra and Maudaha	Nawagam, Kathwada, Mahij, Goblej, Bhadarpura, Pilol, Boradi, Badoti, Sihunj, Maudaha, Sarnal and Sukhi Ni Muvadi (12)
Mahisagar	Balasinor and Lunawada	Badarpura, Gadhawada, Meghaliya, Jorapura, Dakhariya, Khantna Bhesanwada and Viraniya (7)
Mehsana	Kadi	Thol, Mida Adaraj and Jetpura (3)
Navsari	Jalalpur, Navsari, Gandevi, Chikhli, Vashda and Khergam	Mogar, Abrama, Nawagam, Sadlab, Gandeva, Dhanori, Ajhrai, Colva, Nogama, Ranveri Kalla, Kangwai, Mahubas and Bad (13)
Panchmahal	Sehra and Godhara	Demali, Varyadi, Bamroli, Velvad, Reench Rota and Idea (5)
Surat	Bardoli	Khanjroli, Bamroli and Bajeepura (3)
Tapi	Dolvan and Vyara	Maipur, Kolli, Tichakpura and Halmudi (4)
Vadodara	Savli and Desar	Dungripura, Rasawadi, Rasulpur, Desar and Varasada (5)
Valsad	Kaprada, Dharam-pur and Pardi	Rajpur Talat, Bhesdara, Fulwadi, Vadkhambha, Arnala, Chiwal and Nevri (7)

Table 2: Widely Prevalent varieties

District	Varieties
Ahmedabad	Gurjari, GAR-13, Mahisagar, GR-101, GR-11, Jaya, Sonam, Surya Moti, Moti Gold, Nath Poha etc.
Anand	GAR-13, Moti, Krishna Kamod, Gurjari, Daftri Om Sriram 125, Jaya, Masuri etc.
Bharuch	Gurjari, Jaya, GAR-13, GNR-3, GR-11, Nath Pawan, 6444 etc.
Chhota Udaipur	Gurjari, GAR-13, Hybrid MC 13, Nath Poha etc.
Dang	GR-7, GR-11, GNR-6, Mahisagar, Masuri, US-25 P 25, US-312, US-2111, 6129 Gold, US-807, Suruchi, Pro Agro-6444 etc.
Gandhinagar	Gurjari, GAR – 13, GR-11, Jaya, GR-17 and Sonam

District	Varieties
Kheda	Gurjari, GAR-13, Mahisagar, GR-11, Masuri, Punjab S, Surya Moti, Nath Poha, Moti Gold and Sonam
Mahisagar	Gurjari, GAR-13, GR-11 and Nath Poha
Mehsana	GAR-13 and GR-11
Navsari	Gurjari, Jaya, Masuri, GNR-3, Nath Poha, MC-13, GNR-7, US-312, 6444 etc
Panchmahal	Gurjari, GAR-13, GNR-3, Mahisagar, Jaya, Masuri, Sonam and Moti Gold
Surat	Gurjari, GAR-13, Jaya, GR-11, GNR-3, US-312, Kabir-508, Nath Poha etc.
Tapi	Gurjari, Masuri, NAU-R1, GAR-13, Jaya, US-312, US-25P25, US-2111 etc.
Vadodara	GAR-13, Jaya, Gurjari, US-312, US-25 P 25 and Nath Poha
Valsad	GNR-3, GAR-13, GR-11, Gurjari, Masuri, Jaya, US-316, Arise-6201, Hyb. 5151, 2666, Omkar, JK-208, Hyb.745, 786, Reshma etc.

Table 3: Particulars of rice area in the district

Districts	Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Total irrigated area (ha)	Area under rice (ha)
Ahmedabad	7,98,727	4,75,784	3,95,283	-	1,33,051
Anand	2,94,751	2,11,265	1,66,364	1,96,700	1,12,839
Bharuch	5,24,683	3,30,302	2,49,977	1,09,777	5,515
Ch. Udaipur	3,43,606	2,14,164	2,08,866	74,499	16,271
Dang	1,76,000	57,843	56,724	-	26,750
Gandhinagar	2,15,838	1,58,479	1,34,681	1,02,100	12,126
Kheda	3,39,271	2,80,665	2,50,460	1,72,007	1,15,129
Mahisagar	2,00,411	1,57,245	1,26,080	-	38,026
Mehsana	2,11,772	1,87,862	1,81536	1,72,720	4,030
Navsari	2,20,077	1,46,966	59,071	1,11,518	53,094
Panchmahal	3,16,433	1,95,000	1,71,152	88,120	55,572
Surat	4,32,697	2,36,528	1,11,458	1,62,171	40,767
Tapi	3,43,474	1,60,401	1,15,778	63,496	65,160
Vadodara	4,11,891	3,32,186	2,71,795	1,76,533	31,302
Valsad	2,94,412	1,52,115	1,02,383	61,751	72,850

Production oriented survey was conducted in the 15 major rice growing districts of Gujarat State *viz.*, Ahmedabad, Anand, Bharuch, Chotta Udaipur, Dang, Gandhinagar, Kheda, Mahisagar, Mehsana, Navsari, Panchmahals, Surat, Tapi, Vadodara and Valsad. A total of 34 talukas and 95 villages were covered during this survey. The details of the places surveyed are presented in Table 1. The *Kharif* 2019 witnessed the timely monsoon (third week of June) with 935 mm rainfall in 41 days at the rice research station at Nawagam. The highest rainfall (4264 mm) was recorded in the Dang district. The rain was sufficient and well distributed during the season. Different weather parameters in different rice growing districts of Gujarat are given in Table 4.This year the climatic conditions were favorable for rice crop cultivation. But the rainfall during the last week of October at the maturity stage causes losses to the crop in some districts. Varieties like Gurjari, GAR-13, GNR-3, GNR-6, GR-11, GR-101, Mahisagar, Masuri, Jaya, Moti-gold, Surya moti, Sonam, Nath Pauha, Krishna Kamod, US-312, US-807, US-834, MC-13, 25P25, Hyb. 5151, 2666, Omkar, JK-208, Hyb.745, 786, Reshma etc. were mainly cultivated in different districts of Gujarat (Table 2).

Table 4: Weather data for different districts of Mahararahtra during 2019

District/ Parameters	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ahmedabad							
RD	5	4	24	13	2	1	0
TR (mm)	53	43	353	307	33	2	0
T. Max (^{0}C)	38.7	35.9	31.6	32.6	33.5	31.5	26.9
T. Min (^{0}C)	27.5	26.1	24.9	24.8	20.8	19.5	12.8
SH	6.56	5.44	6.45	4.62	7.25	5.44	5.67
Anand							
RD	5	10	13	18	2	1	0
TR (mm)	Total rainfall (June to Dec) = 1051 mm						
T. Max (^{0}C)	32.2	30.1	27.8	28.6	28.1	26.1	22.1
T. Min (^{0}C)	26.9	26.1	24.8	25.5	22.9	20.4	16.1
Bharuch							
RD	6	12	12	10	3	1	0
TR (mm)	243.2	296.6	324.8	279.6	49.9	9.5	0
T. Max (^{0}C)	23.2	39.0	30.4	31.4	33.7	33.0	30.0
T. Min (^{0}C)	18.0	26.3	25.4	25.6	23.9	23.5	17.1
SH	3.8	4.2	3.2	2.4	6.3	6.8	7.0
Chhota Udaipur							
TR (mm)	Total rainfall (June to Dec) = 1795 mm						
Dang							
RD	8	21	21	23	5	1	-
TR (mm)	320	1384	1480	924	119	37	-
T. Max (^{0}C)	36.3	30.2	29.0	30.2	32.2	32.2	-
T. Min (^{0}C)	26.7	24.9	24.3	24.3	22.1	18.7	-
Gandhinagar							
TR (mm)	Total rainfall (June to Dec) = 856 mm						
MMT (^{0}C)	31.49	29.6	29.16	26.0	25.96	24.10	
Kheda							
RD	4	5	15	15	2	0	0
TR (mm)	103.4	1202	458.2	207.2	46	0	0
MMT (^{0}C)							
T. Max (^{0}C)	38.8	34.8	31.1	31.6	33.4	32.0	27.5
T. Min (^{0}C)	26.1	26.5	25.4	25.2	21.9	20.2	14.4
SH	7.1	3.9	5.6	5.0	8.8	7.05	6.08
Mahisagar							
TR (mm)	Total rainfall = 845 mm						
Mehsana							
RD	6	6	15	17	2	0	1
TR (mm)	153.2	92.4	499.5	260	27	0	4
MMT (^{0}C)							
T. Max (^{0}C)	37.98	34.32	30.29	32.35	31.35	31.23	26.47
T. Min (^{0}C)	28.42	27.08	25.62	25.75	25.75	22.52	19.48
SH							
Navsari							
RD	7	15	17	20	4	3	0

District/ Parameters	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TR (mm)	262	491	535	750	95	37	0
T. Max (^{0}C)	33.5	31.4	29.3	30.9	33.4	33.	31.0
T. Min (^{0}C)	25.4	24.2	23.5	22.9	22.5	29.1	25.8
SH	6.1	2.3	2.7	2.8	5.9	7	5.7
Panchmahal							
RD	5	9	17	24	3	1	1
TR (mm)	64.6	145.0	698.4	208.8	39.8	21.4	12.2
T. Max (^{0}C)	38.4	33.8	30.0	31.2	32.2	32.4	28.1
T. Min (^{0}C)	27.3	26.0	25.2	24.5	20.6	17.2	14.7
SH	6.7	4.0	2.4	2.3	6.8	6.5	7.2
Surat							
RD	11	14	17	23	3	4	0
TR (mm)	219	273	614	470	30	37	0
T. Max (^{0}C)	32.25	32.07	30.2	23.6	32.8	33.2	27.2
T. Min (^{0}C)	27.55	28.0	26.8	25.3	24.9	22.6	18.6
SH	6.32	5.12	1.6	2.0	5.2	5.5	3.6
Tapi							
RD	11	25	24	20	3	2	0
TR (mm)	72.9	585.7	848.0	413.0	38.0	41.0	0
T. Max (^{0}C)	38.7	33.3	32.2	32.5	34.4	34.2	32.2
T. Min (^{0}C)	27.7	25.5	24.6	24.6	23.4	20.8	17.7
SH	5.9	3.0	3.3	4.5	7.1	7.5	7.2
Vadodora							
RD	5	12	17	12	2	1	0
TR (mm)	123.8	268.4	730.1	257.6	43.6	17.2	0
T. Max (^{0}C)	37.26	30.72	30.88	31.66	32.65	32.64	29.12
T. Min (^{0}C)	25.97	25.83	25.01	25.15	23.69	20.11	15.47
SH	4.54	2.92	0.88	2.46	6.58	4.97	3.93
Valsad							
RD	6	15	15	18	4	2	0
TR (mm)	371.7	1025.5	675.3	838.3	43.8	82.4	0
T. Max (^{0}C)	34.87	31.5	29.93	31.03	33.55	34.0	32.42
T. Min (^{0}C)	28.06	26.40	25.75	25.58	25.23	22.73	19.23
SH	5.6	1.78	2.17	2.38	5.05	6.59	7.76

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

A. Cropping system and rice yield: The prevailing crop rotations were rice-wheat-rice, rice-sugarcane, rice-chickpea, rice-banana, rice-wheat-vegetable, rice-rice, rice-wheat-maize, rice-bean-summer green gram etc. adopted in different districts of Gujarat. Majority of the fields surveyed were under irrigated ecosystem. Average rice yield in different districts ranged from 3000-5000 kg/ha. Some farmers are cultivating local varieties in Mahisagar, Navsari, Panchmahal and other places because of their excellent taste and local preference. Yield in some fields in Keda was reduced due to BPH infestation and in Mahisagar due to salt affected land.

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			
	Ahmedabad	**Anand**	**Bharuch**	**Chota Udaipur**
Total Area under HYVs in the district (ha)	1,33,051	74,639	5515	16,271
Most prevalent HYVs in the District	GAR 13, Gurjari, Sonam, Nath Poha	GAR 13	Nath Poha, GR 11	Gurjari, GAR 13
Total area under rice hybrids in the district (ha.	Not available	38,200	613	NA
Most prevalent rice hybrids in the district	Sahyadri	Arize 6444, PAC 801, Arize 6129	Arize 6444, US 312, Kaveri 888, Mahyco Shahi Dawat	Hybrid MC 13
Total area under basmati in the district	-	-	10	-
Most prevalent basmati varieties in the district	-	-	-	-
Seed replacement rate (%)	25-50%	NA	NA	50-100%
Whether farmers are using any heavy equipments like transplanted/combine harvester	Yes	Yes	No	Yes
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	Laser leveling	Yes	Laser leveling	Yes
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Plant protection measures and cultivation of HYVs	Plant protection measures	-	New HYVs and water management
What are the general problems in rice cultivation in the district?	-	Timely Irrigation water	-	-
Please provide any farmers association in the district	-	-	Nil	-
Whether availability of labors is sufficient?	Yes	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	Narmada Irrigation project	No	Nil	Yes
Any soil testing program undertaken?	PMMSY	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Agriculture/ University	Yes	Yes	-	Yes; by Agriculture department under ATMA

Table 5 contdd…: General Question of Rice Cultivation in District

Parameters	Districts			
	Dang	**Gandhinagar**	**Kheda**	**Mahisagar**
Total Area under HYVs in the district (ha)	2530	12126	115129	38026
Most prevalent HYVs in the District	GR 11, GR 7	Gurjari	Gurjari, GAR 13, Mahisagar	Gurjari, GAR 13, GR 11
Total area under rice hybrids in the district (ha.	24220	-	-	-
Most prevalent rice hybrids in the district	US 312, Suruchi, 25p25	-	-	-
Total area under basmati in the district	-	-	-	-
Most prevalent basmati varieties in the district	-	-	-	-
Seed replacement rate (%)	NA	20-50%	25-60%	20-30%
Whether farmers are using any heavy equipments like transplanted/combine harvester	No	Yes, very few farmers; tractors, combined harvestor	Combine harvester	Combine harvester
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	Nil	By some farmers	Laser leveling	-
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Cultivation practices of HYVs	-	New HYVs, nutrient, pest and disease managment	Use of newly released rice varieties
What are the general problems in rice cultivation in the district?	Incidence of stem borer and army worm	-	-	Timely availability of seeds of HYVs
Please provide any farmers association in the district	-	-	-	-
Whether availability of labors is sufficient?	Yes	-	Yes	Yes
Whether there is any marketing problem of the produce?	Only local markets	No	No	No
Any major irrigation/power generation project in the district	Nil	Yes	No	Yes
Any soil testing program undertaken?	Yes	Soil health card	Yes	Yes
Any farmers' training program was organized by the state department of Agriculture/ University	Yes; Farmers' training and Krishi mela	Yes	Yes	Yes

Table 5 contdd…: General Question of Rice Cultivation in District

Parameters	Districts		
	Mehsana	**Navsari**	**Panchmahal**
Total Area under HYVs in the district (ha)	4030	35894	20717
Most prevalent HYVs in the District	GR 11, GAR 13, Mahisagar	Gurjari, Jaya, Mahsuri, Nath Poha	GAR 13, Gurjari, Jaya
Total area under rice hybrids in the district (ha.	-	17200	34855
Most prevalent rice hybrids in the district	-	Gorakhnath, US 312	PAC 837, Gangamani, Rasi RHR 333, Dhanya hybrids
Total area under basmati in the district	-	-	-
Most prevalent basmati varieties in the district	-	-	-
Seed replacement rate (%)	NA	30-100%	20-30%
Whether farmers are using any heavy equipments like transplanted/combine harvester	Combine harvester	-	Transplanter, power tiller, tractor
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	SRI demonstration	-	Yes
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	-	HYVs and plant protection measures	Package of practices for HYVs and pest management
What are the general problems in rice cultivation in the district?	Shortage of labour, irregular rainfall	-	Biotic stresses like false smut, stem borer and BPH
Please provide any farmers association in the district	Bharatiy Krishi Sangh	-	FIG group and SHG group
Whether availability of labors is sufficient?	No	Yes	No
Whether there is any marketing problem of the produce?	Low market price	No	No
Any major irrigation/power generation project in the district	Narmada project	No	No
Any soil testing program undertaken?	No	Yes	Soil health card
Any farmers' training program was organized by the state department of Agriculture/ University	No	Farmers' training	NFSM training

Table 5 contdd…: General Question of Rice Cultivation in District

Parameters	Districts			
	Surat	Tapi	Vadodara	Valsad
Total Area under HYVs in the district (ha)	32092	9774	31302	9741
Most prevalent HYVs in the District	Gurjari, Jaya, GR 11	NAU-R1, Jaya, Gurjari, Mahsuri	GAR 13, Gurjari, Nath Poha	Gujarat 3, GR 11, Jaya
Total area under rice hybrids in the district (ha.	8675	55386	NA	63109
Most prevalent rice hybrids in the district	US 312, Gorakhnath 509	US 312, MC 13, Raja, Arize 6444, PAC 807	US 312	Gorakhnath, VNR 2233
Total area under basmati in the district	-	-	NA	-
Most prevalent basmati varieties in the district	-	-	NA	-
Seed replacement rate (%)	20-100%	30-100%	20-70%	75-100%
Whether farmers are using any heavy equipments like transplanted/combine harvester	Combine harvester	Yes	Laser leveling and combine harvester	Nil
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	Yes; SRI and laser leveling	Yes	Yes; laser leveling	Nil
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Timely planting and nutrient and pest and disease managmenet	Nutrients and pests and disease management	Use of new HYVs and pests and disease management	Nutrient management and pests and disease management
What are the general problems in rice cultivation in the district?	Biotic problem like army worm	-	NA	-
Please provide any farmers association in the district	Seva Sahkari Mandal, Dudh manadali, FIG	-	-	-
Whether availability of labors is sufficient?	No, problem of labour shortage	Yes	Yes	No; because of GIDC (Gujarat Industrial Develop-ment Corporation)
Whether there is any marketing problem of the produce?	No	No	No	No
Any major irrigation/power generation project in the district	Kakurapur project, Ukai Project, Utran Project, GIPCL project	Thermal power station, Songadh, NPCIL	Vadhvana Irrigation project	No
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

Table 6: Variety/hybrid wise area coverage (ha) in different districts of Maharashtra during 2019

Variety/hybrids	Districts/area (ha)				
	Anand	**Dang**	**Gandhinagar**	**Mehsana**	**Navsari**
HYVs					
GR 11	17509	1265	3790	1692	1720
Gurjari	7530		7170		12541
GAR 13	43300		90	2232	
Mahsuri	3500				7067
Krishna Kamod	2800				
GR 7		1265			1900
Gujarat 3					1795
Jaya			860		10871
GR 17			216		
Mahisagar				106	
Nath Poha					3667
Sona					1202
Others					9413
Hybrids					
US 312		8073			2918
Suruchi		8073			
Arize 6444		8073			

Variety/hybrids	Districts/area (ha)			
	Panchmahal	**Surat**	**Tapi**	**Valsad**
HYVs				
GAR 4	6100			
Gurjari	23000	14123	2264	2294
GAR 13	18000			
GR 11		349		877
Mahsuri			2152	1111
Gujarat 3				975
Gujarat 4				636
Jaya	6000	7522	2565	2928
Nath Poha		3069		
NAU-R1			2590	
IR 28			203	920
Others	8500	4733	39631	53936
Hybrids				
US 312		3357	5010	3753
MC 13		2548	4600	
Kabil 508		1895		
Gorakhnath		1302		
PAC 801		1779		
25p25			4460	
Raj			1685	
JK 402				5290

Table 7: General informations

Parameters	Districts				
	Ahmedabad	**Anand**	**Bharuch**	**Ch. Udaipur**	**Dang**
# of talukas/blocks covered	2	2	1	3	2
# of villages surveyed	10	4	2	8	7
# of farmers interviewed	14	6	6	9	11
Field ecosystem	Irrigated	Irrigated	Irrigated	Irrigated	Irrigated
Weather conditions during cropping season	Normal	Normal	Normal	Normal	Normal
Crop stage when survey was made	Heading to dough	Dough	Milk	Dough	Dough
Crop rotations	Rice-wheat, rice-rice, rice-fodder, rice-vegetables, rice-mustard, rice-tobacco, rice-pearl millet, rice-wheat-tobacco, rice-rice-tobacco, rice-rice-green gram, rice-vegetables-tobacco, rice-pigeon pea, rice-sugarcane, rice-chickpea, Rice-rabi maize/ peanut, rice-potato-maize, rice-maize-cotton, rice-chickpea-groundnut, rice-niger				

Parameters	Districts				
	Gandhinagar	**Kheda**	**Mahisagar**	**Mehasana**	**Navsari**
# of talukas/blocks covered	2	4	2	1	6
# of villages surveyed	5	12	7	3	13
# of farmers interviewed	8	21	11	10	17
Field ecosystem	Irrigated	Irrigated	Irrigated	Irrigated	Irrigated
Weather conditions during cropping season	Normal	Normal	Normal; 2 places flood	Normal	Normal
Crop stage when survey was made	Heading to milk	Heading to milk	Milk to dough	Booting to heading	Milk to dough
Crop rotations	Rice-wheat, rice-rice, rice-mustard, rice-potato, rice-vegetables, rice-groundnut, rice-wheat-groundnut, rice-vegetables-groundnut, rice-bengal gram, rice-castor, rice-tobacco, rice-wheat-vegetables, rice-wheat-maize, rice-spices				

Parameters	Districts				
	Panchmahal	**Surat**	**Tapi**	**Vadodara**	**Valsad**
# of talukas/blocks covered	2	1	2	2	3
# of villages surveyed	5	3	4	5	7
# of farmers interviewed	8	5	7	9	12
Field ecosystem	Irrigated	Irrigated	Irrigated	Irrigated	Irrigated
Weather conditions during cropping season	Normal	Normal	Normal	Normal	Normal
Crop stage when survey was made	Milk to dough	Milk to dough	Milk to dough	Milk to dough	Milk to dough
Crop rotations	Rice-maize, rice-wheat, rice-rice, rice-maize-vegetables, rice-mustard, rice-vegetables, rice-chickpea, rice-wheat-maize, rice-maize-green gram, rice-sugarcane, rice-chickpea-black gram, rice-vegetables-pigeon pea, rice-barley-vegetables, rice-niger, rice-vegetables-sunnhemp, rice-chickpea-sunnhemp				

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

Varieties	Yield (kg/ha)						
	Ahmedabad	Anand	Bharuch	Ch. Udaipur	Dang	Gandhinagar	Kheda
Gurjari	4250-6400	5200-5600	4600-5700	4800-5650		4250-5700	4600-5700
Sonam	4000-4200						3600-4750
Surya Moti	4500						
Nath Poha	3750					3850	4000-4950
Jaya	5100		3900-5200		4000	4500	
GAR-13		5600		5000-5500		4700-5600	5300-5800
GR-11		3250-3500	3500-3800				
Mahsuri				4100			
GNR 6					4000-5000		
GNR-3						4250	
GR 101							6000
Moti Gold							2700-4300
P-203						2800	
MC-13		5100					
25p25					4900		
US-312					3400-5100		
Hyb 6350					4400		
VNR 2111					4750		

Varieties	Yield (kg/ha)						
	Mahisagar	Mehasana	Navsari	Panchmahal	Surat & Tapi	Vadodara	Valsad
Gurjari	3200-5350			4500-5600	5200	5600	4800
Sonam				4100			
Nath Poha	3200-5000		3950-5500	4800	4200-4500	4750	
Jaya	4400		3950-4700		3800-4500		
GAR-13	5500-5600	4500-6000	5600			5200-5350	
GAR 3	5500						
GR-11		3950		2950			
Mahsuri			3950-4500				
Sona Mah		4300					
Omkar							4900
GNR-3					4300		
SR 125						4000	4500
Moti Gold						4500-5000	
Lachkori	2600-2700						
Vijali				4500			
Reshma							5000-5300
25p25					5100-5800	5500	4500-5000
Arize 6444	5200-5700						
US 312			5250-5750		5250-5650		
PAC 837			5150				
Hyb 5151							4700

Table 9: Details of nursery management

Parameters	Ahmedabad	Anand	Bharuch	Ch. Udaipur	Dang
Planting time	1st wk June to 1st wk July	1st-3rd wk of July	3rd to 4th wk of July	1st-2nd wk of July	1st to 3rd wk of July
Seed rate	25-32 kg/ha	25-30 kg/ha	26-30 kg/ha	25-30 kg/ha	20-30 kg/ha
Seed treatment (% farmers adopted)	Yes (21%); but used certified seeds	Nil	Yes (33%)	Nil	Nil
Chemicals used for seed treatment	Thiram (2.5-4 g/kg); carbendazim (1.5g/kg)	NA	Thiram (3g/kg); carbendazim (3 g/kg)	NA	NA
Organic manure in nursery (% farmers adopted)	Yes (100%) FYM (mostly); some GM	Yes (100%) FYM	Yes (100%) FYM	Yes (100%) FYM	Yes (100%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (100%); Urea/DAP/SSP/Ammonium Sulfate or urea + Ammonium sulfate				Yes (63%); Fertilizers as mentioned earlier

Parameters	Gandhinagar	Kheda	Mahisagar	Mehasana	Navsari
Planting time	3rd to 4th week of July	1st wk of July to 1st wk of Aug	3rd wk of July to 1st wk of Aug	1st to 4th wk of July	1st-4th wk of July
Seed rate	25-30 kg/ha	20-32 kg/ha	25-30 kg/ha	25-35 kg/ha	20-30 kg/ha
Seed treatment (% farmers adopted)	Nil	Yes (~20%)	Yes (only 9%)	Yes (~ 20%)	Yes (~ 18%)
Chemicals used for seed treatment	NA	Thiram (3g/kg); carbendazim (2.5 g/kg); chlorothalonil (2 g/kg)	Thiram (3g/kg)	Thiram (4 g/kg); carbendazim (2 g/kg)	Thiram (4 g/kg); carbendazim (2 g/kg)
Organic manure in nursery (% farmers adopted)	Yes (100%) FYM	Yes (100%) FYM (mostly); some p. manure and GM	Yes (100%) FYM	Yes (100%) FYM	Yes (100%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (100%); Urea/ammonium sulfate/DAP/urea + ammonium sulfate/20:20:20				

Parameters	Panchmahal	Surat & Tapi	Vadodara	Valsad
Planting time	2nd wk of July to 1st wk of Aug	1st to 3rd wk of July	2nd wk of July to 1st wk of Aug	1st to 2nd wk of July
Seed rate	25-30 kg/ha	20-30 kg/ha	25-30 kg/ha	20-30 kg/ha
Seed treatment (% farmers adopted)	Yes (~12%)	Yes (~ 17%)	Yes (~ 11%)	Yes (~ 8%)
Chemicals used for seed treatment	Thiram (4 g/kg)	Carbendazim (2 g/kg)	Carbendazim (2 g/kg)	Thiram (3 g/kg)
Organic manure in nursery (% farmers adopted)	Yes (100%) FYM	Yes (100%) FYM; GM	Yes (100%) FYM, GM	Yes (100%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (100%); Urea/ammonium sulfate/DAP/urea + ammonium sulfate/20:20:0/18:18:18			

B. Nursery and main field Management: Average seed rate adopted by the farmers ranged from 20-35 kg/ha. Very few farmers (15-20%) adopted seed treatment practices and the common

chemical used for seed treatment was thiram and carbendazim. Majority of the farmers applied FYM in the nursery and almost all the farmers contacted applied chemical fertilizers like Urea, ammonium sulfate, DAP, urea + ammonium sulfate, 20:20:0 and18:18:18. Planting was done mainly during 1st week of July to 1st week of August. Majority of the farmers adopted random planting. Fertilizers were applied @ 22-115 kg N/ha and 12-63 kg P_2O_5/ha. Application of potash was very less and few farmers applied potash. However, many farmers applied $ZnSO_4$. Almost all the farmers contacted applied organic manures like FYM and green manures like Sesbania. Fertilizers like urea, ammonium sulfate, DAP and MOP was applied by the farmers.

Table 10: Details of main field management

Details	**Districts**				
	Ahmedabad	**Anand**	**Bharuch**	**Ch. Udaipur**	**Dang**
Planting method	Random planting (most of the farmers) and plant population was not maintained. Very few followed line transplanting				
Total N applied	60-95 kg/ha	53-115 kg/ha	80-100 kg/ha	75-95 kg/ha	22-75 kg/ha
Total P_2O_5 applied	11.5-46 kg/ha	16-24 kg/ha	32-78 kg/ha	16-63 kg/ha	16-26 kg/ha
Total K_2O applied	-	-	30-60 kg/ha	15 kg/ha	-
$ZnSO_4$ applied	5-20 kg/ha	20 kg/ha	20 kg/ha	20-23 kg/ha	15-20 kg/ha
Organic fertilizers applied	Yes (100%) FYM (12-25 t/ha)	Yes (100%) FYM (15-20 t/ha)	Yes (100%) 20-30 t/ha	Yes (100%) 15-30 t/ha	Yes (100%) FYM (20-30 t/ha); few GM

Details	**Districts**				
	Gandhinagar	**Kheda**	**Mahisagar**	**Mehasana**	**Navsari**
Planting method	Random planting (most of the farmers) and plant population was not maintained. Very few followed line transplanting				
Total N applied	65-105 kg/ha	30-106 kg/ha	25-115 kg/ha	70-115 kg/ha	42-110 kg/ha
Total P_2O_5 applied	13-46 kg/ha	23-46 kg/ha	12-46 kg/ha	12-80 kg/ha	23-46 kg/ha
Total K_2O applied	-	-	-	-	20-60 kg/ha
$ZnSO_4$ applied	15-25 kg/ha	10-25 kg/ha	20 kg/ha	20-30 kg/ha	10-25 kg/ha
Organic fertilizers applied	Yes (100%) FYM (12-20 t/ha)	Yes (100%) FYM (8-20 t/ha); ~10% applied GM (Sesbania);	Yes (100%) FYM (12-40 t/ha); ~10% applied GM	Yes (90%) FYM (10-20 t/ha); about 10% applied GM	Yes (100%) FYM (17-40 t/ha); ~18% applied GM

In Kheda district, about 10% farmers also applied poultry manure and ~14% farmers applied plant growth promoters

Details	**Districts**			
	Panchmahal	**Surat & Tapi**	**Vadodara**	**Valsad**
Planting method	Random planting (most of the farmers) and plant population was not maintained.			
Total N applied	60-100 kg/ha	32-100 kg/ha	80-105 kg/ha	63-120 kg/ha
Total P_2O_5 applied	10-60 kg/ha	23-56 kg/ha	20-46 kg/ha	16-50 kg/ha
Total K_2O applied	-	20-30 kg/ha	-	-
$ZnSO_4$ applied	20 kg/ha	20 kg/ha	20 kg/ha	20-25 kg/ha
Organic fertilizers applied	Yes (100%) FYM (17-21 t/ha)	Yes (100%) FYM (10-30 t/ha)	Yes (100%) FYM (12-40 t/ha)/ P. manure (10 trolley/ ha); ~ 22% GM	Yes (100%) FYM (12-28 t/ha) ~ 10% applied GM

* Potash was applied by very few farmers. Majority of the farmers applied zinc sulfate.

Table 11: Weeds and weed management

Details	Districts				
	Ahmedabad	**Anand**	**Bharuch**	**Ch. Udaipur**	**Dang**
Weed intensity	Low to medium	Low	Low to medium	Low	Low
Names of the weeds	*Echinochloa colona*, *E. crusgalli*, *Parthenium hysterophorus*, *Cynodon dactylon*, *Cyperus rotundus*, *Phyllanthus* spp., *Eclipta alba* and *Saccharum spontaneum*				
Weedicides used	Pretilachlor (1 l/ha), pendimethalin 30EC (1.25 l/ha) and bispyribac sodium 10 SC (200 m l/ha)				
Percentage of farmers applied herbicides	Yes (~21%)	Yes (50%)	Yes (50%)	Yes (33%)	Nil
Wild/weedy rice incidence	Nil	Nil	Nil	Nil	Yes (in Hanwat Chond village)

Details	Districts				
	Gandhinagar	**Kheda**	**Mahisagar**	**Mehasana**	**Navsari**
Weed intensity	Low to medium	Low to medium	Low to medium	Low to medium	Low
Names of the weeds	*Echinochloa colona*, *E. crusgalli*, *Cyperus rotundus*, *Cynodon dactylon*, *Phyllanthus* spp., *Parthenium hysterophorus* and *Saccharum spontaneum*				
Weedicides used	bispyribac sodium 10 SC (4 ml/10 litre) and pendimethalin 30EC (1.25 l/ha)				
Percentage of farmers applied herbicides	Yes (~12%)	Yes (~43%)	Yes (~45%)	Yes (30%)	Yes (~18%)
Wild/weedy rice incidence	Nil	Nil	Nil	Nil	Nil

Details	Districts			
	Panchmahal	**Surat & Tapi**	**Vadodara**	**Valsad**
Weed intensity	Low to medium	Low	Low to medium	Low to medium
Names of the weeds	*Echinochloa colona*, *E. crusgalli*, *Cyperus rotundus*, *Saccharum spontaneum*, *Eclipta alba*, *Cynodon dactylon* and *Parthenium hysterophorus*			
Weedicides used	Bispyribac sodium 10 SC (200 ml/ha) and pendimethalin 30EC (1.25 l/ha)			
Percentage of farmers applied herbicides	Yes (~12%)	Yes (50%)	Yes (~11%)	Yes (25%)
Wild/weedy rice incidence	Nil	Nil	Nil	Yes

Most of the farmers followed 1-2 hand weeding and only few progressive farmers used weedicides in addition to hand weeding

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 11. Majority of the farmers contacted followed 1-2 hand weeding for managing the weed problem. Only few progressive farmers applied herbicides (Table 11).

D. Needs of the farmers: Some of the common needs of the farmers were High yielding pest and disease resistant rice variety, HYVs for Rabi season, Suitable transplanter, High yielding

bold rice varieties, Varieties suitable direct sowing and drill sowing, short duration fine grain rice varieties, increase in the minimum support price, good crop insurance scheme, production technologies for organic rice and government support, salt tolerant rice varieties, aromatic rice varieties, brown and red rice varieties and fortified rice varieties and protection of traditional rice varieties.

Table 12: Details of inputs used

Details	**Districts**				
	Ahmedabad	**Anand**	**Bharuch**	**Ch. Udaipur**	**Dang**
Implements used	Tractor, puddler, rotavator, thresher, combine harvester, laser leveler (either own or on hire basis)				
Seed replacement rate in 2019	All the farmers contacted in Ahmedabad, Anand, Baruch and Chhota Udaipur told that they purchased 10-50% of their seed requirement while in Dang all the farmers told that they purchased 100% of their seed requirement				
Source of irrigation	Canal (~71%); Shallow tube well (~71%)	Canal (~83%); Shallow tube well (100%)	Canal (100%); Shallow tube well (100%)	Canal (~33%); Shallow tube well (100%)	Shallow tube well (100%); Canal (~9%)
Scarcity of irrigation water	No	No	No	No	No
Availability of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Quality of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Advisors to the farmers	Own decision (100%); Pvt dealers (71%); Univ. (50%) State dept (50%)	Own decision (100%); Pvt dealers (100%); Univ. (100%)	Own decision (100%); Pvt dealers (100%); Univ. (50%) State dept (50%)	Own decision (100%); Pvt dealers (100%); Univ. (~88%)	Own decision (100%); Pvt dealers (100%); Univ. (~9%) State dept (18%)

Details	**Districts**				
	Gandhinagar	**Kheda**	**Mahisagar**	**Mehasana**	**Navsari**
Implements used	Tractor, puddler, cultivator, thresher, Disc harrow, combined harvester and rotavator (either own or on hire basis)				
Seed replacement rate in 2019	All the farmers contacted in these districts told that they purchased 20-100% of their seed requirement				
Source of irrigation	Canal (50%); shallow tube well (75%)	Canal (100%); shallow tube well (~60%) Deep tube well (~10%)	Canal (63%); shallow tube well (~90%)	Canal (100%); shallow tube well (70%)	Canal (~47%); shallow tube well (~94%)
Scarcity of irrigation water	No	No	No	No	No
Availability of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Quality of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Advisors to the farmers	Own decision (100%); Pvt dealers (~87%); Univ. (~37%) State dept (~37%)	Own decision (100%); Pvt dealers (~75%); Univ. (~66%) State dept (~33%)	Own decision (100%); Pvt dealers (100%); Univ. (~27%) State dept (~63%)	Own decision (90%); Pvt dealers (50%); Univ. (40%) State dept (20%)	Own decision (100%); Pvt dealers (100%); Univ. (11%) State dept (~35%)

Details	Districts			
	Panchmahal	**Surat & Tapi**	**Vadodara**	**Valsad**
Implements used	Puddler, tractor, cultivator, harrow, rotavator, thresher, combined harvester and disc plough			
Seed replacement rate in 2019	About 50-100 farmers contacted in these districts told that they purchased 20-100% of their seed requirement			
Source of irrigation	Canal (75%); shallow tube well (100%)	Canal (~83%); shallow tube well (100%)	Canal (~22%); shallow tube well (100%)	Canal (~33%); shallow tube well (100%)
Scarcity of irrigation water	No	No	No	No
Availability of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Quality of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Advisors to the farmers	Own decision (100%); Pvt dealers (~87%); Univ. (~25%) State dept (~87%)	Own decision (100%); Pvt dealers (100%); Univ. (~75%) State dept (~16%)	Own decision (100%); Pvt dealers (~77%); Univ. (~25%) State dept (~58%)	Own decision (100%); Pvt dealers (100%); Univ. (~16%) State dept (~33%)

E. Input Use: Different implements like tractor, puddler, rotavator, thresher, combine harvester, laser leveler (either own or on hire basis) were used by the farmers (Table 12). Majority of the farmers told that they purchased part of their seeds. Canal and shallow tube wells were the main sources of irrigation. In general, farmers were happy with the supply of fertilizers and pesticides and their quality. In addition to their own decisions, farmers took advices from private dealers and officials from state department of agriculture and university.

Table 13: Prevalence of diseases and insect pests in Gujarat during *Kharif*' 2019

Districts	Diseases					
	Bl	**NBl**	**ShR**	**FS**	**GD**	**BB**
Ahmedabad	L (5%)		L-M (5-20%)	L (5-7%)	L-S (5-30%)	
Anand		T (1-2%)	L (2-5%)	T (1-2%)	L (2-5%)	T (1-2%)
Bharuch			L (2-5%)		L (2-5%)	L (5-7%)
Ch. Udaipur		T (1%)	T-L (1-5%)	L (2-5%)	L (2-10%)	
Dang		L (2-5%)	L (2-5%)	T-L (1-5%)	L (2-5%)	
Gandhinagar	L (5%)		L-M (5-20%)	T (<2%)	L-M (10-15%)	
Kheda	L (2-5%)	T (1-2%)	L (2-5%)	L (5-10%)	L-M (2-20%)	L (5%)
Mahisagar	L (<5%)	L-S (2-50%)	L (2-10%)	L (1-6%)	L (5-10%)	
Mehsana	L (2-10%)					
Navsari		L (1-5%)	L (3-10%)	T-M (1-15%)	L-M (5-15%)	T (1-2%)
Panchmahal		T-L (1-5%)	L (2-10%)	L (5-10%)	L-M (2-15%)	L (5%)
Surat & Tapi	T(1-2%)	T (<1%)	L (3-7%)	L (2-3%)	L (5-10%)	T (2%)
Vadodara		L (2-10%)	L (2-5%)		L-M (5-20%)	L (5-10%)
Valsad	T (2%)	T (<1%)	L (2-5%)	T (1%)	L (3-7%)	T (<1%)

There was low incidence (4-5%) of sheath blight in Bharuch

Districts	Insect pests					
	SB	**LF**	**BPH**	**WBPH**	**Mt**	**AW**
Ahmedabad	L (2-5%)	L (2-5%)		L-S (3-30%)		
Anand	L (2-5%)	L (2-5%)				
Bharuch	L (2-5%)	L (3-7%)				
Ch. Udaipur	L (2-3%)	L (2-5%)		L (2-3%)	T (1%)	
Dang	T (1-2%)	L (2-5%)			T (1-2%)	
Gandhinagar	L (2-5%)	L (2-5%)		L (<7%)	T (1-2%)	
Kheda	L (2-10%)	L (2-10%)		L-M (5-20%)		
Mahisagar	L (2-5%)	L (2-8%)			L (<5%)	
Mehsana	L (2-7%)	L (5-10%)	L (5%)	L (5%)		
Navsari	L (2-5%)	L (2-10%)		T (1-2%)	L (2-3%)	
Panchmahal	L (2-5%)	L (2-5%)		L (5%)		L (5%)
Surat & Tapi	T (1-2%)	L (2-5%)		T (<1%)	T-L (1-5%)	
Vadodara	L (2-5%)	L (2-5%)		L-M (2-20%)	T (2%)	
Valsad	T (1-2%)	L (2-5%)			T (<1%)	L (5%)

Table 14: Details of pest management

Details	**Districts**				
	Ahmedabad	**Anand**	**Bharuch**	**Ch. Udaipur**	**Dang**
% age farmers adopting plant protection	78%	10%	100%	88%	18%
Names of pesticides	Cartap hydrochloride 4G (20 kg/ha) at 30 DAT, chlorantraniliprole 0.4G (10 kg/ha) and carobofuran (20 kg/ha) for stem borer and leaf folder; thiamethoxam (250 g/ha) and imidacloprid (200 ml/ha) for WBPH; propiconazole (750 ml/ha), chlorothalonil (1 kg/ha) and thiophenate methyl (750 g/ha) for sheath rot, false smut and grain discoloration and carbandazim (12%) + mancozeb (63%) (1 kg/ha) for sheath rot, grain discoloration and neck blast				
# of pesticide sprays	1-3	2	2	3	NA
Mixing of pesticides before application	No (100%)	No (100%)	No (100%)	No (100%)	No (100%)

Details	**Districts**				
	Gandhinagar	**Kheda**	**Mahisagar**	**Mehasana**	**Navsari**
% age farmers adopting plant protection	100%	95%	63%	100%	82%
Names of pesticides	Cartap hydrochloride 4G (10-25 kg/ha) at 25-30 & 45 DAT, chlorpyriphos 55% + cypermethrin 5% (800 ml/ha), carobofuran (20 kg/ha), chlorantraniliprole (10 kg/ha) and quinalphos (1.5 l/ha) for stem borer and leaf folder; thiamethoxam (250 g/ha) and imidacloprid (200-250 ml/ha) for WBPH; carbandazim (12%) + mancozeb (63%) (1 kg/ha), propiconazole (750 ml/ha), chlorothalonil (1 kg/ha) and manncozeb (1.25 kg/ha) for sheath rot, false smut and grain discoloration and tricyclaole (400 g/ha) and thiphenate methyl (1 kg/ha)for leaf blast				
# of pesticide sprays	1-2	1-2	1	1	1-2
Mixing of pesticides before application	Yes (12%)	Yes (~10%)	No (100%)	No (100%)	No (100%)

Details	**Districts**			
	Panchmahal	**Surat & Tapi**	**Vadodara**	**Valsad**
% age farmers adopting plant protection	87.5%	75%	100%	50%
Names of pesticides	Cartap hydrochloride 4G (20-25 kg/ha), chlorantraniliprole (10 kg/ha), carobofuran (20 kg/ha), carbofuran 25EC (1.5 l/ha) and carbosulfan 25 EC (1 l/ha) for stem borer and leaf folder; thiamethoxam (250 g/ha) and imidacloprid (200-250 ml/ha) for WBPH; carbandazim (12%) + mancozeb (63%) (1 kg/ha), propiconazole (700-750 ml/ha) and chlorothalonil (1 kg/ha) for false smut, sheath rot and grain discoloration			
# of pesticide sprays	1-3	1	1-2	1-2
Mixing of pesticides before application	No (100%)	No (100%)	No (100%)	No (100%)

F. Biotic stresses and their management: This year the climatic conditions were not favorable for biotic stresses in the rice crop. Hence the diseases like sheath rot, grain discoloration, false smut, leaf blast, neck blast and bacterial leaf blight were appeared from negligible to low or medium intensity in almost all the districts (Table 13). Among the infestation of insect-pests like leaf folder, stem borer and WBPH were recorded in low to medium intensity. Negligible incidence of army worm was also recorded from Kheda and Ahmedabad districts. The yellow leaf mite incidence was observed from almost all the districts. Farmers used different pesticides for managing different pests and diseases. (Table 14). There were reports of zinc deficiency in different districts. Though, farmers expressed that rice cultivation is less profitable, but they want to continue rice cultivation.

Haryana (Kaul): 2019-2020

Table 1: Prevalence and severity of rice diseases recorded in different districts of Haryana during *kharif* 2019

District	Sheath blight	Leaf blast	Neck blast	Bakanae	False smut	Grain Discoloration	Bacterial leaf blight	Khaira
Kaithal (20 %) [C]	50 % L-M[b] Bas. CSR 30, PB 1121	40 % L-M[b] Bas. CSR 30, PB 1121	20 % Tr. –L[a] Bas. CSR 30, PB 1121	60 % L –M[a] Bas. CSR 30, PB 1121	-	-	10 % Tr. -L[b] Bas. CSR 30, PB 1121	10 % Tr. –L PB 1121
Kuruks-hetra (30 %)	60 % L-M[b] PB 1121, PB 1509, PR 114, Sava 127, PR 126, PR 201, PB 1	20 % L-M[b] PB 1121, Sava 127, PR 114, PR 126	10 % Tr. -L[a] PB 1	10 % Tr. -L[a] PB 1, PB 1121, PB 1509, Sava 127	30 % Tr. –L [a] PB 1121, PR 114, PR 126, Sava 127	-	20 % Tr. -L[b] PB 1121, PB 1509, PR 114, Sava 127, PR 126, PB 1	-
Karnal (20 %)	60 % L-M[b] PB 1121, RH 27P31, PB 1728, PR 114	20 % L-M[b] RH 27P31, PB 1728	20 % Tr. -L[a] PB 1121	40 % Tr. –L[a] PB 1121, RH 27P31, PB 1728	20 % Tr. –L [a] PR 126	-	-	-
Jind (10 %)	70 % L-M[b] PB 1509, PB 1121, PB 1, PR 126, PB 1728, Bayer 1727	50 % L-M[b] PB 1121, PB 1509, PB 1, PB 1728	30 % Tr. -L[a] PR 126, PB 1121, PB 1509, PB 1728, Bayer 1727	60 % Tr. –L [a] PB 1121, PB 1, PB 1509, Bas. CSR 30, PB 1728, Hybrid 6129	10 % Tr. –L [a] PB 1121, PB 1509, PB 1728	50 % Tr. -L PB 1121, PB 1509, PB 1728, PB 1, Bayer 1727, PR 126	-	-
Yamuna Nagar (30 %)	70 % L-M[b] PB 1, PB 1509, Sava 134, 2244	20 % L-M[b] PB 1, 2244	20 % Tr. -L[a] PB 1, PB 1509	20 % Tr. –L [a] PB 1, Sava 134	20 % Tr. –L [a] PB 1, Sava 134	20 % Tr. –L PB 1, PB 1509	-	10 % Tr. –L PB 1
Ambala (20 %)	80 % L-M[b] Sava 127, PB 1121, 6444, 28P67, Sudha, Varsha Gold, PR 126, 3545, 67, PR 359, 25P35, PB 1509	30 % L-M[b] PR 359, Sudha, Varsha Gold, PR 126, 3545, 67, PB 1509	10 % Tr. -L[a] Sawa 127	30 % Tr. –L [a] Sava 127, PB 1121, PR 359, Sudha, 25P35	50 % Tr. –L [a] Sava 127, PR 359, 28P67, Sudha, Varsha Gold, PR 126, 3545, 67, PB 1509	10 % Tr. –L PR 359, Varsha Gold, PR 126, PB 1509	**Stem Rot** 10 % Tr. –L 25P35, PR 359	-
Panipat (10 %)	70 % L-M[b] PB 1121, PB 1509, PB 1728	10 % L-M[b] PB 1121	30 % Tr. -L[a] PB 1121, PB 1509, PB 1728	40 % Tr. –L [a] PB 1121, PB 1509	-	30 % Tr. –L PB 1121, PB 1509, PB 1728	-	30 % Tr. –L PB 1121, PB 2511, CSR 30
Sonepat (30 %)	60 % L-M[b] PB 1121, PB 1509, PB 1728	40 % L-M[b] PB 1121, PB 1728, PB 1509	-	60 % Tr. –L [a] PB 1121, PB 1728, PB 1509	-	30 % Tr. –L PB 1121, PB 1728	-	10 % Tr. –L PB 1121

[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 2: Occurrence and severity of rice insect- pests recorded in different districts of Haryana during *kharif*, 2019

District	Stem borer	Planthoppers (WBPH /BPH)	Leaf folder	Whorl maggot	Grass hopper	Termite	Insect-pests free locations (%)
Kaithal	40 % Tr[b] (0.2-0.6 % dead heart/WE) PR 126, PB 1121, P 1509 & PB 1	60 % L- M[b] (1-15 nymphs/hill) PB 1121, P 1509& PB 1	90 % Tr-L[b] (0.5-2.0% damaged leaves) PR 126, PB 1121, P 1509, PR 114 & PB 1	-	10 % Tr[b] CSR 30& PR 114	-	-
Kurukshetra	50 % Tr-L[b] (0.5-2.0% dead heart/WE)[a] PR 126, PR 102, PB 1121, Sava 127& Pusa 44	60% M[b] (10-12 nymphs/hill)[a] PR 126,PB 1121&PB 1	60% Tr-L[b] (0.5-2.0% damaged leaves)[a] PR 126, PR 102, PB 1121, Sava 127, Pusa 44& PB 1	-	-	-	-
Karnal	20 % Tr-L[b] (0.5.-1.5 % dead heart/WE)[a] 27P31, PB 1718, PB 1121& PR 126	50% L- M[b] (4-15 nymphs/hill)[a] PB 1718, PB 1121& PB 1509	70 % Tr-L[b] (0.5-4.0 % damaged leaves)[a] PB 1121, CSR 30, PB 1509 &PB 1718	-	-	-	10 %
Jind	40 % L[b] (1.0-1.5 % dead heart/WE)[a] PB 1718, PB 1121, PB 1509, CSR 30, PB 1& PR 126	40 % L- M[b] (2-14 nymphs/hill)[a] PB 1718, PB 1121, CSR 30& PB 1	80 % L[b] (1.5-3.0 % damaged leaves)[a] PB 1718, PB 1121, PB 1509, Hybrid 6129, CSR 30, PB 1, PR 126 &Hybrid 1727	20 % L[b] (1-2% damaged leaves)[a] PB 1121& PB 1718	10 % Tr[b] PB 1718	10 % Tr[b] (0.5 % infested plants)[a] CSR 30	-
Yamuna Nagar	30 % Tr[b] (0.5-1.0% dead heart/WE)[a] Sava 127, Arize 6444, PB 1,Sava 134 & PB 1509	40 % L- M[b] (5-12 nymphs/hill)[a] Arize 6444, PR 359, PB 1, Sava 134 & PB 1509	70 % Tr-L[b] (0.5-3.0 % damaged leaves)[a] Sava 127, Arize 6444, Hybrid 359, PB 1, Hybrid 2244, Sava 134 & PB 1509	-	10 % Tr[b] PB 1509	-	10 %
Ambala	30 % L[b] (1.5-2.0% dead heart/WE)[a] Hybrid 30, Hybrid 6129, Hybrid 34, Arize 6444, PB 1121,Sava	30 % L-M[b] (5-15 nymphs/hill)[a] PB 1121,Sava 127&Hybrid 359	70 % Tr-L[b] (l-3% damaged leaves)[a] Hybrid 30, Hybrid 6129, Hybrid 34, , Hybrid 6444, PB 1121,Sava 127,28P67, PR 126,Hybrid 359 & PB 1	20 % Tr[b] (1-2% damaged leaves)[a] 28P67, PR 126, Hybrid 359& PB 1	-	-	-

District	Stem borer	Planthoppers (WBPH /BPH)	Leaf folder	Whorl maggot	Grass hopper	Termite	Insect-pests free locations (%)
	127,Hybrid 359 & PB 1						
Panipat	40 % L[b] (1.5-3.0% dead heart/WE)[a] PB 1121, PB 1718, PB 1509 & CSR 30	50 % L-S[b] (4-28nymphs/hill)[a] PB 1121 & PB 1509	80% Tr-L[b] (0.5-2.0 % damaged leaves)[a] PB 1121& PB 1509	-	-	20 % L[b] (2.0 % infested plants)[a] PB 1121& PB 1718	-
Sonepat	30% Tr-L[b] (1-2 % dead heart/WE)[a] PB 1121, PB 1718, & PB 1509	40 % L-M[b] (4-12 nymphs/hill)[a] PB 1121, PB 1718& PB 1509	50 % Tr-L[b] (0.5-3 % damaged leaves)[a] PB 1121, PB 1718, & PB 1509	-	-	10 % L[b] 2.0 % infested plants)[a] PB 1718	10 %

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

For **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 while for **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 and for **termites** :Traces: <1.0 % infested plants; Low : 1.0 -5.0 infested plants; Moderate: 5.1-10.0% infested plants; Severe: >10% infested plants

Himachal Pradesh (Malan): 2019-2020

Districts surveyed: *Kangra, Mandi, Una, Solan* and *Sirmour*

Details of survey

District	Blocks	Villages
Kangra	Nagrota Bagwan, Kangra, Rait, Baijnath, Bhawarna, Panchrukhi, Dharamshala and Fatehpur	Malan, Bandi, Rait, Shahpur, Bagru, Rehlu haar, Tang, Jadrangal, Gharthouli, Mahakaal, Panchrukhi, Jia, Dadh, Pathiar, Bagora, Bhagotla, Chimbalhaar, Mainjha, Nagri, Gopalpur, Bhawarna, Fatehpur, Basa wazira, Indora, Chanaur
Mandi	Balh	Harabagh, Nalsar, Bheora, Kummi, Chatraur, Goda Gagal
Una	Una and Haroli	Takarla, Thathal, Santokhgarh, Nangalkalan, Basal
Solan	Nalagarh	Nalagarh
Sirmour	Paonta Sahib	Shambhuwala, Bhedewala, Sainwala, Kolar, Chark Majri, Kiratpur, Puruwala, Dhaulakuan

Widely Prevalent Varieties

Kangra	**Improved varieties:** Palam Basmati-1, Palam Lal Dhan-1, Him Palam Dhan-1, HPR 1156, HPR 2143, HPR 1068, Kasturi, Sharbati, Pusa 1509, Pusa 1121, PR121, PR 122 and PR 126; **Hybrids:** Raja, Arize 6129, Arize 6444, PAC 807, Hybrid 834, Arize Swift Gold, Sri Ram Khushbu, Shahi Dawat, US 312, Raftaar, Hyb. 2266 and Nirmal-4; **Local:** Jhini
Mandi	**Improved varieties:** Pusa 1121, Pusa 1509, Palam Basmati-1, HPR 2143, HPR 1068 and HPR 1156; **Hybrids:** US 312, Raja, Sri Ram Khushbu, Arize 6129; **US 312 was the most predominant hybrid.**
Una	**Improved varieties:** PR 121, PR 126, HKR 127, HKR 147 and Pusa 1121; **Hybrids:** Arize 6129 Gold, Arize 6444, Hybrid 57 and Hyb. 25P35
Solan	**Hybrid**: Arize 6444
Sirmour	**Improved varieties:** Pusa Basmati 1121, Pusa Basmati 1509 and Sharbati, **Hybrids:** Arize 6444, Dhanya 834, Dhanya 748, NP 3030, 25P35, Varsha Gold and others

Present Scenario of Area under Rice Crop in Districts Surveyed

District	Area under Rice (ha)
Kangra	33511
Mandi	18950
Una	1600
Solan	3901
Sirmour	5367
Total Area under rice in HP	**71613**

Source: Statistical Outline 2017-18, HP

Production oriented survey was conducted in five districts viz., Kangra, Mandi, Una, Solan and Sirmour. This report is compilation of the information collected by the team in farmers' fields as well as the information provided by the individual farmer. In Himachal Pradesh, Kangra district remains leading in the area under rice cultivation followed by Mandi, Sirmour, Soaln and Una districts. Predominant rice varieties cultivated by the farmers were

HYVs like Palam Lal Dhan-1, Him Palam Dhan-1, HPR 1156, HPR 2143, HPR 1068, Sharbati, PR121, PR 122, HKR 127, HKR 147 and PR 126; hybrids like Raja, Arize 6129, Arize 6444, PAC 807, Hybrid 834, Arize Swift Gold, Sri Ram Khushbu, Shahi Dawat, US 312, Raftaar, Hyb. 2266, Dhanya 834, Dhanya 748, NP 3030, Varsha Gold, Hybrid 57 and Hyb. 25P35 and Nirmal-4 and basmati varieties like Palam Basmati-1, Kasturi, Pusa 1121, Pusa 1509 and Pusa Basmati 1. Prevailing crop rotations were rice-wheat, maize-wheat and rice- potato. Amongst the weeds *Digitaria sanguinalis, Echinochloa colona, E. crusgalli, Cyperus iria, Cyperus rotundus, Ageratum conyzoides* and wild rice were very common under direct sown conditions. The common weeds under transplanted conditions were *E. crusgalli, Monochoria vaginalis, Cyperus iria Commelina benghalensis, Bonnaya veronicaefolia, Alternanthera echinata* and *A. sessilis*. Weedicides like bispyribac sodium (Nominee Gold) and butachlor were commonly weedicide used by the farmers. Common fertilizers used include IFFCO 12:32:16 and urea while dose applied ranged between 0-70 kg N, 0-40 kg P_2O_5 and 0-40 kg K_2O. Fertilizers dosages were inadequate and imbalanced. Widespread incidence of false smut on inbred as well as hybrid varieties ranging between low to moderate and severe outbreak of neck blast on susceptible varieties like, Pusa 1121, Shahi Dawat, Sri Ram Khushbu etc. and local cultivars in some places. Moderate to severe incidence of rice hispa, BPH/WBPH, leaf folder, black beetle and stem borer during early phase of growth were recorded in some parts. Application of pesticides was not very common among the farmers. Rains during dough to maturation stage onwards resulted in delayed crop growth with high sheath rot infection and grain discoloration in some parts of the state.

District-wise observations

Kangra: Thirty three villages from eight blocks of district Kangra were covered under production oriented survey during *kharif* 2019 at different crop stages. However, information in respect of rice cultivation was collected from the farmers from Nagrota Bagwan, Kangra, Rait, Bhawarna, Panchrukhi, Dharamshala and Fatehpur blocks. Rice-wheat, maize-wheat and rice- potato were the prevailing crop rotations. As per the statistical outline of Himachal Pradesh (2017-18), the area under rice cultivation in Kangra district comes around 33,511 hectares. Three methods of rice cultivation viz., dry seeding, sowing of sprouted seeds in puddled fields and transplanting were practiced in this district. System of rice intensification (SRI) was also observed with slight modifications by random planting of younger seedlings. The varieties grown under irrigated conditions were Palam Basmati-1, Palam Lal Dhan-1, HPR 2143, HPR 1068, Kasturi, Sharbati, Pusa 1509, Pusa 1121, PR121, PR122, PR126. Besides these, hybrids like Raja, Arize 6129, Arize 6129 Gold, Arize 6444, PAC 807, Hybrid 834, Arize Swift Gold, Sri Ram Khushbu, Shahi Dawat, US 312, Nirmal-4 etc. were also grown over larger acreage in potential areas of Kangra. Under rain fed conditions, the most prominent cultivars were HPR 1156 and HPR 2656 (Him Palam Dhan-1). Cultivation of local cultivars like Jhini and Ramjawain etc. are still being grown by the farmers though in declining pattern in some parts of Bhawarna and other blocks but information is lacking. Seed replacement rate in this district has been found to increase than previous *kharif* seasons. Amongst the weeds *Digitaria sanguinalis, Echinochloa colona, E. crusgalli, Cyperus iria, Cyperus rotundus, Ageratum conyzoides* and wild rice were very common under direct sown conditions. The common weeds under transplanted conditions were *E. crusgalli, Monochoria vaginalis, Cyperus iria Commelina benghalensis, Bonnaya veronicaefolia, Alternanthera echinata* and *A. sessilis*. Bispyribac sodium (Nominee Gold) was the most common weedicide used by the farmers to check weeds under direct sown and transplanted conditions, respectively. Common fertilizers used include IFFCO 12:32:16 and urea while dose applied

ranged between 0-70 kg N, 0-40 kg P_2O_5 and 0-40 kg K_2O. Diseases such as leaf and neck blast and false smut were observed as moderate while sheath rot and grain discolouration were observed as low to moderate whereas brown spot, sheath blight and narrow brown leaf spot were recorded as low. However, incidence of sheath rot in certain parts was higher. Some farmers used Bavistin 50 WP and Tilt 25 EC as foliar application (1g/ L) against blast and brown spot. Farmers also used chlorpyriphos (2.5 ml/l) against hispa/ leaf folder. The incidence of rice hispa was moderate while incidence of black beetles was quite higher in Tikri Duhki and Gharthouli areas of Panchrukhi and Dharamshala blocks, respectively. Incidence of stem borer, chaffer beetle and leaf folder was low to moderate while other pests like grasshoppers and whorl maggot were observed in many places. Severe rice hispa damage was noticed from Jia in Bhawarna Block and Basa Bajira from Nurpur Block. Slug caterpillars were also observed from some pockets of Bhawarna Block.

Mandi: Farmers from rice bowl of Mandi i.e. Balh block were contacted for production oriented survey in this district. Survey was conducted during dough to maturity stage of the rice crop. The farmers contacted were marginal to sub-marginal. The area under rice cultivation in Mandi district is around 18,950 hectares. Rice-wheat and maize-wheat were the prevailing crop rotations. The predominant high yielding varieties in the district were Pusa 1121, Pusa 1509, Palam Basmati-1, HPR 2143, HPR 1068, HPR 1156 and Kasturi. However, hybrids grown in Balh valley included US 312, PAC 807, Arize 6129 of which US 312 was the predominant one. Local germplasm seemed to be replaced by hybrids in this block. Seed replacement rate in this district is quite high especially in Balh valley where maximum area is under hybrids. The farmers in the district mostly use FYM and NPK fertilizer in wheat crop during *rabi* season and apply urea @ 20-60 kg N/ha in 2 splits as top dressing to rice crop. IFFCO 12:32:16 was the most commonly used fertilizer. The most common weeds found in the district were *Cyperus iria, Echinochloa colonum, E. crusgalli Monochoria vaginalis, Paspalum* spp., *Eragrostis japonica, Alternanthera echinata, A. sessilis, Digitaria sanguinalis, Ageratum conyzoides* and wild rice. Butachlor was used by almost all the farmers. Farmers had adopted a modified system of rice intensification. Among diseases, neck blast, sheath rot, grain discolouration and false smut appeared as low to moderate while leaf blast, sheath blight and brown spot appeared as low. Stem borer was observed as low to moderate while leaf folder incidence ranged between moderate to severe. Very few farmers adopted the control measures for diseases and pests.

Una: Survey was conducted in lower hills of Una distirct comprising Jankor, Takarla, Thathal, Basal, Santokhgarh and Nangalkalan (Tahliwal) areas where the farmers contacted for collecting information in respect of rice cultivation were marginal to sub-marginal. The high yielding varieties grown by the farmers included HPR 2143, HPR 1068, HPR 1156, PR 121, PR 126, Pusa 1121, Arize 6129 Gold, Arize 6444, Hybrid 57, HKR 127, HKR 147, Hyb. 25P35. The farmers used recommended doses of fertilizers and applied zinc sulhate in some areas. The top dressing of urea at tillering and heading stages was also done. Some farmers also applied zinc sulphate in the field. The common weeds were *Cyperus iria, Echinochloa colonum* and *E. crusgalli*. Farmers used Bispyribac sodium (Nominee Gold) for the control of weeds. Diseases like false smut, narrow brown leaf spot, neck blast, brown sppot and sheath rot were low to moderate while leaf blast, grain discolouration and sheath blight were recorded as low. Leaf folder damage was also moderate. Pesticides like Tilt 25 EC against false smut and insecticide like chlorpyriphos for leaf folder were used by some farmers.

Solan: The survey was conducted in Nalagarh area of Solan district at crop maturity stage. The predominant variety was Arize 6444. The farmers used diamino phosphate and urea fertilizers. The main crop rotation was rice-wheat. The weeds like *Echinochloa spp.* and *Cyperus* spp. were in low to medium intensity. Diseases like false smut and brown spot were moderate while leaf blast, neck blast, grain discolouration, sheath blight and sheath rot were low to moderate. Leaf folder and stem borer were observed in low to moderate intensity.

Sirmour: The survey was conducted at maturity stage of the crop. The farmers of this district unlike the farmers of other parts of Himachal Pradesh grow long duration varieties as this district is adjoining Punjab, Haryana and Uttarakhand and is situated in low-hills. Eight villages from Paonta block which accounts for more than 60 per cent of the total area under rice alone were surveyed. Majority of the farmers were marginal to submarginal while some of the farmers contacted were progressive. Rice was cultivated under irrigated conditions and the source of irrigation was mostly tube wells. The varieties cultivated were Pusa Basmati 1121, Pusa Basmati 1509, Sharbati, Arize 6444, Dhanya 834, Dhanya 748, NP 3030, 25P35, Varsha Gold etc. About 70 per cent area was covered by hybrids. The progressive farmers used recommended doses of fertilizers viz., IFFCO (12:32:16) as basal dose and top dressing of urea was done at tillering. Butachlor and Machete granules were used for the control of weeds. Besides this, farmers also used bispyribac sodium (Nominee Gold). The common weeds were *Cyperus iria*, *Echinochloa* sp., *Panicum* sp., *Paspalum* sp. Very serious incidence of BPH/ WBPH (hopper burn) was observed in areas like Bhedewala and Sainwala near Paonta Sahib while incidence by leaf folder was low to moderate and that of stem borer was low. Diseases, such as leaf blast, neck blast, brown spot, false smut, sheath blight and sheath rot were low to moderate while grain discolouration, narrow brown leaf spot and bacterial leaf blight were recorded as low. However, false smut appeared in moderate to severe form in some varieties like Mahindra 3030 etc. The farmers used Blitox 50WP, Bavistin 50WP and Indofil M-45 against diseases and endosulfan and chlorpyriphos against stem borer and leaf folder. The yields ranged between 4-6 t/ha.

Prevalence of diseases and insect pests of rice in Himachal Pradesh during *Kharif*' 2019

District	Diseases									
	Bl	**NBl**	**BS**	**GD**	**FS**	**LS**	**NBLS**	**ShBl**	**ShR**	**BLB**
Kangra	M	M	L	L-M	L-M	L	L	L	L-M	-
Mandi	L-M	L-M	L	L-M	L-M	L	L	L	L-M	-
Una	L	L-M	L-M	L	L-M	L	L-M	L	L-M	-
Solan	L	L-M	M	L-M	M	L	L	L-M	L-M	-
Sirmour	L-M	L-M	L-M	L	M	L	L	L-M	L-M	L

District	Insect pests				
	LF	**SB**	**RH**	**GH**	**WM**
Kangra	L-M	M	M-S	L-M	L
Mandi	M	L-M	-	L-M	-
Una	L	L	-	L	T
Solan	L-M	L-M	-	L	T
Sirmour	L-M	L	-	L	T

Jammu and Kashmir (Khudwani): 2019-2020

Districts surveyed: *Kulgam* and *Anantnag*

Table 1: Particulars of survey

Districts	Blocks	Villages
Kulgam	Qaimoh, Devsar and Noorabad	Keilam, Redwani, Khudwani, Qaimoh, Brazuloo, Kaladrengh, Wanpoh and Khul
Anantnag	Bijbehara, Qazigund, Pahalgam and Vessu	Bonigam, Ganiepora, Kandipora, Salar and Palpora

Table 2: Widely prevalent varieties

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

Table 3: Particulars of rice area

District	Total geogra-phical area (ha)	Total Cultiva-ble area (ha)	Total Cultiva-ted area (ha)	Total irriga-ted area (ha)	Area under rice (ha)
Kulgam	47,642	35,605	27,397	20,046	16,748
Anantnag	72,149	48,123	47,861	31,127	24,000

Table 4: General Questions on rice cultivation in district (Filled by the cooperator in consultation with the officials from state department of Agriculture)

Parameters	Kulgam	Anantnag
Total area under HYVs in the district (ha)	12400	17400
Most prevalent HYVs in the district	Jhelum	Jhelum
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	75%	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	Nil	Mushk Budji Growers' Association Sagam
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	Irrigation canals: Maw, Sonman	Nil

Parameters	Kulgam	Anantnag
Any soil testing program undertaken?	Yes	Yes
Any farmers training programme was organized by the state department of Agriculture/University	Yes	Yes

Table 5: Variety wise area coverage (ha) in different districts of Jammu and Kashmir-1 during *Kharif*- 2019

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

Table 6: Details of weather data during the cropping season

Districts	Weather parameters	Months					
		Jun	Jul	Aug	Sept	Oct	Nov
Kulgam & Anantanag	Rainy days	9	8	6	0	4	13
	Total rainfall (mm)	104.0	104.8	117.8	0	32.6	30.9
	Maximum temp (^{O}C)	26.3	30.46	29.36	30.75	21.93	8.95
	Minimum temp (^{O}C)	10.72	16.46	16.2	12.2	5.95	2.21
	Sunshine hours	7.49	7.58	6.97	7.96	5.47	1.27

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., Kulgam (8 villages involving 10 farmers) and Anantnag (five villages involving 10 farmers) when the crop were mainly at dough/maturity stage (Table 1). The general climatic conditions were normal as far as rice is concerned. About 50% farmers told that they used part of their land (10-25%) for other crops like vegetables, maize and pulses. 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 Jhelum, SR -4 and SR -3 and some local varieties like Budjichina and China 1039 (Table 2). 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 either 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, apply 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., *Rotala indica*, *Cyprus* spp. and *Ammannia* spp. was moderate. All the farmers contacted adopted hand weeding and in addition applied herbicides like Butachlor (1.5 kg a.i./acre) and Eros (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.

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

Varieties	**Yield (kg/ha)**		**Reasons for low/high yield**
	Kulgam	**Anantanag**	
SR-4	7130-7200	-	High yield: Use of HYVs and POP by SKUAST
SR-3	6000-6950	6500	
China 1039, Jheelum, SR-5	4500-5800	4700-6500	
Budji China		4900-5600	

Table 8: Details of nursery management

Parameters	**Kulgam**	**Anantanag**
Planting time	1st week of June	1st week of June
Seed rate	80 kg/ha	80 kg/ha
Seed treatment (% farmers adopted)	Yes (80%)	Yes (60%)
Chemicals used for seed treatment	carbendazim (2 g/kg), mancozeb (2 g/kg)	carbendazim (2 g/kg)
Organic manure in nursery (% farmers adopted)	100% (FYM: 100%) @1 kg/25 m^2	100% (FYM: 100%) @1 kg/25 m^2
Inorganic manure in nursery (% farmers adopted)	100% farmers Urea:500-1000 g/25m^2 DAP:550 g/25m^2 MOP: 200 g/25m^2	100% farmers Urea:800-1000 g/25m^2 DAP:550 g/25m^2 MOP: 200 g/25m^2

Table 9: Details of main field management

Details	**Districts**		**Remarks**
	Kulgam	**Anantanag**	
Planting method	Random transplanting		
Total N applied	80-120 kg/ha	100-120 kg/ha	Urea
Total P2O5 applied	45-60 kg/ha	60 kg/ha	DAP
Total K2O applied	30 kg/ha	30 kg/ha	MOP
$ZnSO_4$ applied	15-20 kg/ha	15-20 kg/ha	40-60% farmers
Organic fertilizers applied	FYM (100%) @ 5-7 t/ha		100% farmers applied

Table 10: Weeds and weed management

Details	Districts		Remarks
	Kulgam	**Anantanag**	
Weed intensity	Medium	medium	
Names of the weeds	*Echionochloa colona, E. crusgalli, Amania bacifera, Potamogaton distinctus, Rotala indica, Cyperus iria, Cyperus difformis*		Weeds were common in most of the fields
Weedicides used	Eros (10 kg/ha) Butachlor (1.5 kg/ha)		Most of the farmers practiced one hand weeding along with weedicides
Weedy rice	Nil	Nil	

Needs of the farmers: Some of the common needs of the farmers were timely availability of certified seeds and quality fertilizers/pesticides, availability of organic manure, high yielding varieties and blast resistant rice varieties

Table 11: Details of inputs used

Details	Districts	
	Kulgam	**Anantanag**
Implements (hire basis)	Tractors (100%)	Tractors (100%)
Source of seeds	Purchased (70%) Previous year's (20%)	Purchased (80%) Previous year's (20%)
Source of irrigation	Canal (100%); No scarcity of irrigation water	
Availability of fertilizers/pesticides	Not available in time	Not available in time
Quality of fertilizers/pesticides	Not satisfactory (100%)	Not satisfactory (90%)
Advisors to the farmers	University (100%) State Dept (100%)	University (100%) State Dept (100%) Own decisions (10%)

Among the diseases, high intensity of leaf blast was observed on China 1039 in Khudwani (up to 42%) in Kulgam and on BudjiChina in Bonigam (up to 38%) in Anantanag. High intensity of neck blast (up to 36%) was recorded in on BudjiChina in Bonigam in Anantanag. Intensity of most of the insect pests was low to moderate (Table 12). Application of pesticides was not common among the farmers (Table 13).

Table 12: Prevalence of diseases and insect pests in Jammu and Kashmir-1 during Kharif- 2019

Districts	Diseases			
	BI	**NBI**	**BS**	**GD**
Kulgam	M-S (10-42%)	L-M (10-15%)	L-M (10%)	L-M (10-20%)
Anantnag	M-S (10-38%)	M-S (10-36%)	M-S (12-35%)	-

Districts	Insect pests			
	LF	**GH**	**RS**	**Rats**
Kulgam	T-L (1-2%)	L-M (10-20%)	L (1-3%)	L (1-3%)
Anantnag	T-L (1-2%)	L-M (10-20%)	L (1-3%)	L (1-3%)

Table 13: Details of pest Management

Details	**Districts**		**Remarks**
	Kulgam	**Anantanag**	
% age farmers adopting plant protection	Nil	Nil	
Names of pesticides	NA	NA	
# of pesticide sprays	NA	NA	
Mixing of pesticides before application	NA	NA	

The major problems faced by the farmers were timely availability of quality seeds and inputs. However most of the farmers expressed that they want to continue rice cultivation

Karnataka (Mandya): 2019-2020

Districts surveyed: *Chikkamagaluru, Hassan, Mandya, Mysuru* and *Shivamogga*

Particulars of survey

Districts	Taluks	Villages
Chikkama-galuru	Koppa, Narasimharajapura, Tarikere, Sringeri and Lakkavalli	Kesarukoppa, Alsur, Sidlipura, Hariharapura, Mudugod, Duglapura, N. R. Puran and Bhavikere
Hassan	Holenarsipura	Mavanur, Ankavalli, Elechakavahalli and Chikkavahalli
Mandya	Srirangapatna, Mandya, Pandavapura, Malavalli and Maddur	Kirganduru, Mottanahalli, Guttalu, Sampalli, Goravale, Gavadalu and Nagarakere
Mysuru	KR Nagara, HD kote, Tirumakudalu Narsipura, Hunusur and Nanjanagud	Kukkuru, Talakadu, Nanjanagudu, Cholavahalli, Mosaagrahara, Hebbegundi, Chikka Lakshmipura and Muguru
Shivamogga	Bhadravathi, Shikaripura and Anwatti	Chakkanahalli, Amatekoppa, Ambarikoppa, Kadanighatta, Barundur, Hiriyur and Hosanagar

Widely prevalent rice varieties

Districts	Varieties
Chikkamagaluru	**HYVs:** IR64, Intan, MTU1001, IET13901, BR2655, Jyothi, BPT5204, JGL1798 and Jaya
Hassan	**HYVs:** IR-64, Thanu, BR2655,Tunga, MTU1001, Intan, Jaya, JGL1798, KPR-1, RNR 15048 and IET 7191
Mandya	**HYVs:** MTU1001, IR64, BR 2655, Thanu, Jaya, MTU1010, Super Amman, Jyothi JGL1798, Sunmadhu Research paddy, Sun Amman Research paddy and Research paddy Amulya; **Hybrids:** KRH-4, VNR 2375, VNR 2233, DRH836, MC13, Meenakshi S913, and Mahyco 5409 Suruchi
Mysuru	**HYVs:** Jyothi, IR64, MTU 1001, MTU 1010, Jaya, Thanu, JGL 1798, BR 2655, BPT5204, Wadakolam and Vikram; **Hybrids**: KRH-4, DRH836, MC13, Penna Super, Kaveri Gold, Sonam and PAC 837 plus
Shivamogga	**HYVs:** Jaya CS, JGL1798, Jyothi CS, MTU 1001, MTU 1010, RNR 15048, Uma, Abhilasha, Intan and IR 64; **Hybrids:** KRH-4 and VNR2233

Particulars of Rice area (2019)

Districts	Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Total irrigated area (ha)	Area under rice (ha)
Chikkamagaluru	722075	313377	313000	25000	19277
Hassan	662602	260105	249246	105785	42991
Mandya	498244	330504	160990	79146	52978
Mysuru	676382	106919	370790	154117	98989
Shivamogga	847784	230214	230214	128281	97357

Weather data in different surveyed districts of Karnataka during 2019

Months/Weather parameters	Districts				
	Chikkamagaluru	**Hassan**	**Mandya**	**Mysore**	**Shivamogga**
June 2019					
Rainfall (mm)	186.0	125.64	54.48	58.38	264.08
Total Rainy days	20	15	5	4	18
July 2019					
Rainfall (mm)	364.1	204.35	43.67	79.73	652.44
Total Rainy days	29	26	6	11	29
August 2019					
Rainfall (mm)	768.3	498.93	160.73	302.37	1011.28
Total Rainy days	30	26	14	18	30
September 2019					
Rainfall (mm)	321.1	219.05	130.2	119.57	395.15
Total Rainy days	23	21	9	15	25
October 2019					
Rainfall (mm)	366.6	248.26	238	187	343
Total Rainy days	29	27	19	22	25
November 2019					
Rainfall (mm)	35.7	27.11	42.24	52.2	24.05
Total Rainy days	3	4	4	4	3
December 2019					
Rainfall (mm)	35.7	30.72	9.73	13.63	10.05
Total Rainy days	3	2	1	1	1

Production oriented survey was conducted in five districts of Karnataka viz. Chikkamagluru, Hassan, Mandya, Mysuru and shivamogga during *Kharif* 2019. Survey was conducted in 19 taluks when the crops were in tillering to maturity stage. The fields surveyed were under irrigated ecosystem. Commonly cultivated rice varieties were HYVs like MTU1001, MTU 1010, IR64, IET13901, Intan, Jyothi, BPT5204, JGL1798, BR 2655, Thanu, Jaya, MTU1010, RNR 15048, Super Amman, Jyothi JGL1798, Sunmadhu Research paddy, Sun Amman Research paddy and Research paddy Amulya and hybrids like KRH-4, VNR 2375, VNR 2233, DRH836, MC13, Meenakshi S913, Penna Super, PAC 837 and Mahyco 5409 Suruchi. The prevailing cropping pattern in the districts surveyed is rice-rice followed by rice-sugarcane, rice-vegetables, rice-maize, rice-pulses, rice-ragi and rice-fallow. Rice is grown in the state under irrigated, rainfed and tankfed conditions. The onset of monsoon was delayed in the districts surveyed by 10-15 days. The onset of south west monsoon occurred in the entire state on 22nd June. In *Kharif'* 2019 paddy sowing was delayed by 15 days to one month in all the districts. The climate condition was not normal due to delay and inconsistent southwest monsoon followed by heavy northeast monsoon coupled with cyclonic conditions. In some areas due to excess rainfall paddy crop got affected by floods. Farmers purchased and cultivated private varieties / hybrids in larger area. During 2019 the area under private hybrid VNR2233 has covered 10,000 ha in the state. Seed treatment practices were not very common among the farmers. Farmers applied FYM and chemical fertilizers in the nursery. N application was more than recommended in some of the places. Many farmers applied green manures like dhaincha and cowpea in the main field. Planting was random. Intensity of common weeds like *Echinochloa crusgalli, Echinochloa colona, Cyperus iria, Panicum repens* and *Monochoria vaginalis* was low to moderate. Farmers applied weedicides like butachlor, pretilachlor, Nominee Gold and Topstar.

General questions on rice cultivation in the different surveyed districts of Karnataka

Parameters	**Districts**		
	Chikkamagaluru	**Hassan**	**Mandya**
Total area under HYVs in the district (Ha)	1969	10196	8912
Most prevalent HYVs in the district	IET13901, IR64, Jyothi, Intan	IR64, IET13901, Thanu and BR 2655	MTU-1001, IR64, Jyothi
Most prevalent rice hybrids in the district	-	VNR2233	KRH 4, VNR2233, DRH836, MC13
Whether farmers are using any heavy equipments like transplanter/combine harvester	Combine harvester and Baler	Combine harvester and baler	Combine harvester and baler
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	Direct seeded Rice	Direct seeded Rice	Direct seeded Rice
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	water saving technologies, Plant protection measures to be followed.	water saving technologies and plant protection measures.	water saving technologies ,application of Zn, pest and disease control, crop insurance, SRI Method.
What are the general problems in rice cultivation in the district?	Labour	Water, electricity, support price, seed quality	Labour and marketing
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
Whether there is any marketing problem of the produce?	Yes	Yes	Yes
Any major irrigation/power generation project in the district	Bhadra river project	Hemavathi irrigation project	Krishna Raja Sagara
Any soil testing program undertaken?	Soil health card	Soil health card mission by central government	Soil health card mission by central government
Any farmers training program was organized by the state department of Agriculture/University	Deasi Training programme for dealers	Deasi Training programme for dealers	Deasi Training programme for dealers

General questions on rice cultivation in the different surveyed districts of Karnataka

Parameters	Districts	
	Mysuru	**Shivamogga**
Total area under HYVs in the district (Ha)	16791	3884
Most prevalent HYVs in the district	Jyothi, IR64, MTU-1001	Jyothi, JGL1798, Uma, MTU1001, RNR15048
Most prevalent rice hybrids in the district	VNR2233, KRH-4, Arize gold	VNR2233
Whether farmers are using any heavy equipments like transplanter/combine harvester	Transplanter ,harvester and baler	Mechanical transplanter and Combine harvester and baler
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	Direct seeded Rice	Direct seeded Rice
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	water saving technologies and plant protection measures	water saving technologies
What are the general problems in rice cultivation in the district?	Water problem due to deficit rainfall and Cauvery river issue, Support price	Labour, Water problem due to deficit rainfall
Please provide any farmers association in the district	Karnataka Farmers association	Karnataka Farmers association
Whether availability of agricultural labours is the sufficient?	No	No
Whether there is any marketing problem of the produce?	Yes	Yes
Any major irrigation/power generation project in the district	Krishna Raja sagara	Linganamakki and Gajanur dam
Any soil testing program undertaken?	Soil health card mission by central government	Soil health card
Any farmers training program was organized by the state department of Agriculture/University	Deasi Training programme for dealers	Deasi Training programme for dealers

Some of the common needs of the farmers were high yielding varieties with fine grain quality, marketing centre for paddy, good red rice variety, mechanization for small area rice plots and irrigation facilities. Mechanization in all the districts was adopted mainly for harvesting by using combine harvesters and baler. Mechanical Rice transplanters are being promoted from state department by providing subsidies in shivamogga 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. Awareness among the farmers about alternate wetting and drying method during vegetative stage of crop growth has increased.

Variety wise area coverage in different district of Karnataka (Ha) during *Kharif* '2019

Variety/hybrid	Districts				
	Chikkamagluru	**Hassan**	**Mandya**	**Mysuru**	**Shivamogga**
IR64	192.4	2832.8	4879.6	4871	0.8
MTU-1001	122	150.8	2474	300	633.2
MTU-1010				2193.6	74
BR2655	207.2	1722.4	165	394	
Jyothi	431.2		771	7447	1921.2
Tanu		1640.4	477	68.8	
JGL 1798	196	44	24	80	453.2
Abhilash					142
IET 13901 (Tunga)	542.8	2908.8			
Jaya	94.4	2.4	2106.4	9.2	146.4
Intan	138.8	390.4			11.6
Uma					138.24
BPT5204	44.8				
KRH-4			160		10.6
RNR 15048		504.8		1427	353.2
VNR2233			90	400	23
MC13			328.65		
Gangavathi Sona			266		
Sunmadhu Research paddy			157.5		
Sun Aman Research paddy			83.5		
Research Paddy Amulya			112.5		
Meenakshi S 913			244		
G.K. Chethan			245.5		
Mahyco 5409 Suruchi			7.8		
IET7191		48			
KPR1		135.6			

Owing to delayed sowing the crop was damaged by outbreak of insects and diseases. In Cauvery command area farmers are facing bloodworm problem because of which the crop was showing stunted growth and leaves were turning light yellow. High intensity of leaf and neck blast was observed in some fields in Mysuru and Mandya. Sheath blight was common in many places and high intensity of sheath blight was recorded in some fields in Mandya, Mysuru and Shivamoga and Chikmagalur. Higher intensity of bacterial blight and bacterial leaf streak was recorded in some fields in Mandya and Mysuru. The insect pests viz., case worm damage was noticed in higher level in all the districts surveyed at tillering stage. The leaf folder and stem borer infestation was in low to moderate. In Mandya and Mysuru the high BPH infestation was recorded during dough and grain filling stage.

District wise observations

Chikkamagaluru: Chikkamagaluru belongs to Zone 7 and 9 (Malnad zone) comprising of seven taluks. The area under paddy in the district was 19,277 ha during Kharif'2019. The district received annual rainfall of 2278 mm as against normal rainfall of 1757 mm. Paddy is grown in 5 taluks of the district i.e. Mudigere, Narasimharajapura, Koppa, Sringeri and Tarikere. Onset of south-west monsoon was timely and normal rainfall received from June to September. The survey was conducted at maximum tillering and during maturity stage of the crop. A total of 8 farmers were

contacted during the survey. The major varieties grown during *Kharif* 2019 were HYVs like IR64, Intan, MTU1001, IET13901, BR2655, Jyothi, BPT5204, JGL1798, BPT 5204 and Jaya. Rice followed by rice is the only crop rotation practice in this district. Farmers usually grow green manure crop for one month and incorporate to the soil. Very few farmers took pulses after rice. Average rice yield in the district ranged from 4500-5000 in varieties like Jyothi and Gandasala and 5000-6250 kg/ha in varieties like IR 64, JGL 1798, BR 2655 and MTU 1001. Nursery sowing and transplanting depends on the release of water from Bhadra dam. Planting in this area was done during 2nd week to 3rd week of August. Average seed rate was 60-62.5 kg/ha. Seed treatment was not common among the farmers. About 87% of the farmers applied organic manure like FYM in the nursery. All of them also applied chemical fertilizers like urea (2 kg/300 m^2 nursery). Most of the farmers also applied different complex fertilizers like 17:17:17 (9 kg/300 m^2) or 20:20:20 (7.5 kg/300 m^2) or 19:19:19 (8 kg/300 m^2) or 10:26:26 (6 kg/300 m^2) along with urea. In the main fields, fertilizers were applied @ 65-150 kg N/ha, 42-92 kg P_2O_5/ha and 42-87.5 kg K_2O/ha. Fertilizer usage is as per recommended but slightly more application of nitrogenous fertilizers and farmers using micronutrients (Zinc and Boron) compulsorily. Fertilizers like urea, 17:17:17, 20:20:0:13 and MOP were used by the farmers. All the farmers contacted applied green manures like dhaincha or cowpea in the field. Common method of planting was random transplanting. Intensity of common weeds like *Echinochloa* spp, *Cyperus* spp was medium. Weedicides like Nominee Gold (0.08 litre/acre), butachlor and pretilachlor were used by the farmers. Some of the common needs of the farmers were pest resistant high yielding fine grain rice variety, marketing centre for paddy, good red rice variety, mechanization for small area rice plots and irrigation facilities. Implements like tractor were commonly used by the farmers. All the farmers contacted told that they purchased seeds for sowing. Canal was the main source of irrigation. Officials from state department of agriculture advised the farmers during rice cultivation. Intensity of common diseases like blast, neck blast, brown spot, sheath rot, grain discoloration, false smut, udbatta and BB/BLS was in low to moderate intensity. However, sheath blight was recorded in high intensity (30-35%) on rice variety Jyothi in N. R. Pura village. Insect pests like stem borer, leaf folder, case worm and BPH were recorded in low to moderate intensity. Pesticides like quinalphos (2 ml/l), Regent (1 ml/l) and chlorpyriphos (2 ml/l) for different insect pests and hexaconazole (2 ml/l), propiconazole (1 ml/l) and carbendazim (1 g/l) for different diseases were applied by the farmers. About 75% of the farmers contacted told that they mixed 2 different pesticides at the time of application.

Hassan: Hassan belongs to Zone 7 comprising of eight taluks. Paddy is cultivated in southern dry zone covering six taluks viz., Holenarsipura, Sakleshpura, Channarayapattatna, Alur, Arakalgud and Hassan rural. During 2019 the district received an annual rainfall of 1464 mm as against normal rainfall of 1075 mm with excess of 389 mm. The predominant rice varieties in the district were HYVs like Tunga, IR-64, BR2655, IET7191, Intan, MTU 1001, Jaya, KPR1, JGL1798, Thanu, RNR 15048. The traditional local varieties grown were Rajamudy, Ratnachudi and Rajabhoga. These local varieties were grown due to the preference of the local people for its taste. They mainly use, the local varieties for eating purposes. The seeds of the local varieties of Rajamudy are multiplied by farmers themselves. Farmers are demanding geographical indication for Rajamudy variety. Rice-Rice, Rice-pulses, rice-sugarcane and rice-fallow were the prevailing crop rotation practiced by the farmers. Average rice yield in the district ranged from 5500-6250 kg/ha in HYVs and 3750-4250 kg/ha in Rajmudy. Planting was done during August 1st week to August 2nd week. Average seed rate was 60-62.5 kg/ha and farmers did not follow seed treatment. About 30% farmers contacted applied FYM in the nursery. All of them applied chemical fertilzers like 17:17:17 (10 kg/300 m^2). In the main fields, fertilizers were applied @ 81.5-125.4 kg N/ha, 63-84 kg P_2O_5/ha and 43-64 kg K_2O/ha. Farmers used fertilizers like urea and different complex

fertilizers like 10:26:26, 17:17:17, 19:19:19 and 20:20:0:13. About 30% farmers applied FYM (1-2 t/ha) and rest applied green manure like sunhemp and Diancha. Planting was random and proper plant population per unit area was not maintained. Intensity of common weeds like *Echinochloa colona*, *Cyperus iria*, *Cyperus difformis* and others was low to medium. Most of the farmers applied weedicides like butachlor and butachlor. Some of the common needs of the farmers were mechanization for small fields, marketing centre for paddy, irrigation facilities and pest and disease resistant high yielding fine grain varieties. All the farmers contacted told that they purchased seeds for sowing. Canal was the main source of irrigation. Officials from state department of agriculture advised the farmers during rice cultivation. Intensity of different pests and diseases was low to moderate. Farmers applied carbendazim (1g/l), propiconazole (1 ml/l), tricyclazole (0.6 g/l), quinalphos (2 ml/l) and chloropyriphos for managing different pests and diseases. Farmers apply two chemicals and two sprays per cropping season. Zn application is followed by many farmers. About 40% of the farmers contacted told that they mixed 2 different pesticides at the time of application.

Mandya: Mandya belongs to Zone 6 (Agricultural zone 6) comprising of seven taluks. Paddy is grown mainly in five taluks viz., Krishna Rajpet, Mandya, Srirangapatna, Maddur, Malavalli and Pandavapura. The district received annual rainfall of 818 mm as against 749 mm normal rainfall with excess of 69 mm. Overall the rainfall received was normal except in the month of October in Kharif 2019. Sowing was delayed in the district by 15 days and was initiated from 15th July. Survey was conducted in 7 villages in this district involving 9 farmers when the crop was in tillering to milk stage. The fields surveyed were under irrigated ecosystem. farmers reported excess rainfall in some of the places. Commonly grown varieties were HYVs like MTU1001, IR64, BR 2655, Thanu, Jaya, MTU1010, Super Amman, Jyothi JGL1798, Sunmadhu Research paddy, Sun Amman Research paddy and Research paddy Amulya and hybrids like KRH-4, VNR 2375, VNR 2233, DRH836, MC13, Meenakshi S913, and Mahyco 5409 Suruchi. Cropping pattern like rice-rice, rice-sugarcane and rice-fallow were adopted by the farmers. Average rice yield in the district ranged from 6250-6750 kg/ha in different HYVs. Average seed rate was 60-62 kg/ha in case of HYVs and about 15 kg/ha in case of hybrids. None of the farmers adopted seed treatment. All the farmers applied FYM in the nursery and all of them applied chemical fertilizers like urea (2-9 kg/300 m^2) and complex fertilizers like 17:17:17 (2.5-9 kg/300 m^2), 10:26:26 (6 kg/300 m^2), 19:19:19 (8 kg/300 m^2). Very few applied SSP along with urea in the nursery. In the main fields, fertilizers were applied @ 77-172 kg N/ha, 49-52 kg P_2O_5/ha and 49-57 kg K_2O/ha. Few farmers applied zinc sulfate (20-25 kg/ha). Farmers used fertilizers like urea and different complex fertilizers like 10:26:26, 17:17:17, 19:19:19 and 20:20:0:13. All the farmers contacted applied green manures in the main field. Planting was random and proper plant population per unit area was not maintained. Intensity of common weeds like *Echinochloa crusgalli*, *Echinochloa colona, Cyperus iria, Panicum repens, Cyperus difformis* and *Monochoria vaginalis* and others was low to medium. Most of the farmers applied weedicides like Londax Power (10 kg/ha), butachlor (, Nominee Gold (0.08 litre/acre), Topstar (125 g/ha) and butachlor (1 kg/acre) for managing the weeds. Hand weeding was not very common among the farmers.

Seeds from the state department were not distributed timely due to delay in filling of reservoirs and there was late release of water for Krishna Raja Sagar dam. Most of the farmers have grown private paddy varieties in the district. Availability of equipment, fertilizers, pesticides and storage facility was adequate. In many fields zinc deficiency was observed due to which growth was affected. The state department of Agriculture is supplying the zinc fertilizer through subsidy, but the farmers are neglecting due to lack of knowledge about problem of zinc deficiency. In un-puddled dry nursery, iron deficiency is noticed during summer season. Some of the common needs of the farmers were

high yielding fine grain rice varieties, marketing centre for paddy and irrigation facilities. Officials from state department of agriculture advised the farmers during rice cultivation. In general the leaf blast severity was less, however 20-25% was observed in patches in the fields supplied with high doses of urea. However, high intensity of leaf blast (40-50%) was recorded in Goravale village on rice variety MC-13. Overall the neck blast disease incidence was less due less to rainfall during flowering and dough stage in November and December. High incidence of sheath blight (30-40%) was recorded on Gangavathi Sona and MRH 8666 in Goravale and Mottahalli village. Higher intensity of bacterial blight (40-50%) was recorded on varieties like Super Amman and IR 5222 in Gavadalu and Nagarakere village. Bacterial leaf streak was widespread in many rice fields in this district and high intensity of BLS (up to 50%) was recorded in varieties like MC-13, VNR 2223, in Goravale and Guttalu and Kirganduru villages. Grain discoloration ranged from 20-25% was observed in Jyothi, MTU1001and Private Varieties. Due to delayed sowing the infestation of caseworm and leaf folder was recorded. During dough and grain filling stage brown plant hopper damage was observed in patches in some private varieties/hybrids. Different pesticides like Nativo (0.4 g/l), thiafluzamide (1 g/l), hexaconazole (2 ml/l), carbendazim (1 g/l), propiconazole (1 ml/l), Saaf (2 g/l), copper oxychloride (2 g/l) and streptocycline (0.2 g/l) for different diseases and chloropyriphos or fipronil for different insect pests. The number of pesticide application was 2 in the season and all the farmers told that they mixed 2 different pesticides during application. During tillering stage stunted growth and yellowing of leaves was observed. In the affected crop the roots were blackened and 2-3 blood worms were noticed in saline soils. Farmers were asked to apply Fipronil 3G @8 kg per acre for its management.

Mysuru: Mysuru belongs to Zone (6 and 7) comprising of seven taluks. The district received annual rainfall of 977 mm as against 815 mm normal rainfall with exess of 162 mm rainfall. The Survey was conducted in five taluks viz., Hunusur, HD Kote, T Narasipura, Nanjangud and K R Nagara. Seed supply from the state department was not distributed timely due to not expected filling of reservoirs and delay in the release of water for Krishna Raja Sagar dam. Thus due to unavailability of seeds from the agriculture department most of the farmers have grown private paddy varieties in the district. Survey was conducted in 9 villages involving 10 farmers when the fields were in tillering to maturity stage. The fields surveyed were under irrigated ecosystem. The important varieties grown are IR64, MTU 1001, Jaya, Jyothi and BR 2655. Other varieties cultivated by the farmers were Penna super, Jyothi, Pavitra, Meenakshi, Vasundhara, RNR-15048, Sun Madhu, MTU-1010, KPH-471, Ankur-50, Ankur-55, Siri, Vikram, Padmavati, MC-13, Wada Kolam and Vikram. In recent years area under hybrid rice are picking up. The hybrids like VNR 2233 and Arize Gold has covered a larger area in the district. Commonly observed crop rotation practices were rice-rice, rice-vegetables, rice-pulses, rice-ragi, rice-sugarcane and rice-fallow. Average rice yield in the district was 6250-6700 kg/ha in different HYVs.

Planting was done during 2nd to 3rd week of August. None of the farmers followed seed treatment. All the farmers contacted applied FYM in the nursery and all of them applied chemical fertilizers like urea (2-10 kg/300 m^2) and one of the different complex fertilizers like 17:17:17 (9-13 kg/300 m^2), 10:26:26 (6 kg/300 m^2), DAP (3.25 kg/300 m^2) and 19:19:19 (8 kg/300 m^2). Very few applied MOP (10 kg/300 m^2) along with urea. In the main fields, fertilizers were applied @ 75-136 kg N/ha, 48-52 kg P_2O_5/ha and 49-52 kg K_2O/ha. Few farmers (~10%) applied zinc sulfate (20 kg/ha). Farmers used fertilizers like urea and different complex fertilizers like ammonium sulfate, 10:26:26, 17:17:17, 19:19:19 and 20:20:0:13. All the farmers applied green manures in the field. Planting was random. Intensity of common weeds like *Echinochloa crusgalli*, *Echinochloa colona* and *Cyperus iria* was low to moderate. Hand weeding was not common among the farmers and most of them applied different herbicides like Nominee Gold (0.08 litre/acre), Topstar (125 g/ha),

Londax Power (4 kg/ha) and butachlor (1 kg/acre). Some of the common needs of the farmers were irrigation facilities, high yielding fine grain rice varieties, mechanization for small are rice plots, good red rice variety and marketing centre for paddy. Canal water from Kabini, Cauvery River and open wells are the main source of irrigation. High intensity of leaf blast (up to 70%) was recorded in varieties like Vikram, MTU 1001 and Jyothi in Muguru, Ch. Lakshmipua, Mosa Agrahara and Manjunagudu villages. High intensity of neck blast (up to 70%) was recorded in KRH 4 and Vikram in Cholanahalli and Manjunagudu village. High intensity of sheath blight (up to 55%) was recorded in varieties like Vikram, IR 64 and Kaveri Gold in Muguru, Ch. Lakshmipua, T. Narshipura and Manjunagudu villages. High intensity of BB was recorded in variety Jyothi in Talakadu village. Udbatta disease incidence was less in Jyothi variety in all the field. False smut incidence ranging 5-10% was observed in hybrids. Insects pests viz., case worm, leaf folder and stem borer were low to moderate. Outbreak of Brown Plant Hopper was observed in T. Narasipura, Nanjungud and Bannur block of the district at dough and grain filling stage affecting to the range of 10-80%. At tillering stage stunted growth and yellowing was observed. In the affected plants the roots were blackened and 2-3 blood worms were noticed water logged/ marshy lands with saline soils. Farmers applied different pesticides like copper oxychloride (2 g/l), Avatar (2 g/l), Nativo (0.4 g/l), carbendazim (1 g/l), propiconazole (1 ml/l), tricyclazole (0.6 g/l), hexaconazole (2 ml/l) and streptocycline (0.2 g/l) for different diseases and imidacloprid (0.5 ml/l), Regent (1.5 ml/l), quinalphos (2 ml/l) and buprofezin (1.4 ml/l) for different insect pests. The number of sprays was 2. Some of the farmers mixed different pesticides before application.

Shivamogga: Shivamogga is located in the center of Karnataka is called as rice bowl of the state. The district received annual rainfall of 2721 mm as against 2237 mm normal rainfall with exess of 162 mm rainfall. It consists of 7 taluks coming under two different agroclimatic Zones viz., Zone-7 (southern transitional zone) consists of Shimogga, Shikaripura and Bhadravathi taluks and zone-9 (Hilly zone also called as malnad zone) comprise of Soraba, Hosanagara, Sagara and Thirthahalli. Survey was conducted 7 villages in this district when the fields were in tillering to maturity stage. All the fields surveyed were under irrigated condition. Commonly cultivated rice varieties were HYVs like Jaya CS, JGL1798, Jyothi CS, MTU 1001, MTU 1010, RNR 15048, Uma, Abhilasha, Intan and IR 64 and bybrids like KRH-4 and VNR 2233. Cropping systems like rice-rice, rice-pulses, rice-maize and rice-fallow were followed by the farmers. The area under paddy cultivation has drastically reduced and is being replaced by Arecanut, ginger and other plantation crops. In the hilly region of the district in taluks sagar, Thirthahalli and Sorab farmers are cultivating local rice varieties under raised ecosystem. Average rice yield in the district ranged from 5500-7750 kg/ha. Sowing was taken from June last week to July 2nd week and transplanting in July last week and August 1st week. Due to heavy rains in the month of August and October the crop was affected by floods in theerthahalli, Sagar, Hosanagar and Sorab. Average seed rate was 62.5 kg/ha and none of the farmers adopted any seed treatment. All the farmers applied FYM in the nursery and all of them applied chemical fertilizers like urea (2-10 kg/300 m^2) and one of the different complex fertilizers like 17:17:17 (9 kg/300 m^2) and 19:19:19 (8 kg/300 m^2). Very few applied SSP (2.5 kg/300 m^2) along with urea. In the main fields, fertilizers were applied @ 48-192 kg N/ha, 50-121 kg P_2O_5/ha and 23-71 kg K_2O/ha. Farmers used fertilizers like urea and different complex fertilizers like ammonium sulfate, 10:26:26, 17:17:17, 19:19:19 and 20:20:0:13. All the farmers applied green manure like sunhemp and sheep manure (making the sheep to stay in the field for about 1 month before taking the crop) in the main field. Planting was random. Mechanized rice transplanting is picking up in taluks viz., Bhadravathi, Hosanagar, Theerthahalli and Sagar. The weed infestation was medium to low in all the places of survey areas. The major weeds observed were *Echinochloa* spp and *Cyperus* spp. Herbicides like pretilachlor, butachlor and Topstar were applied by the farmers. Most of the biotic stresses were recorded in low to moderate intensities. Only sheath

blight was recorded in higher intensity (up to 40%) on Jyothi variety in Hiniyur village. Brown plant hopper was noticed in moderate to severe form in milky and dough stage Bhadravathi and Shikaripura taluk on variety Jyothi. Farmers applied different pesticides like copper oxychloride (2 g/l), carbendazim (1 g/l), propiconazole (1 ml/l), thiafluzamide (1 g/l), hexaconazole (2 ml/l) and streptocycline (0.2 g/l) for different diseases and chlorpyriphos (2 ml/l), Regent (1.5 ml/l), quinalphos (2 ml/l), imidacloprid (0.5 ml/l) and buprofezin (1.4 ml/l) for different insect pests. The number of sprays was 2. Some of the farmers mixed 2 different pesticides before application. Farmers expressed the need of scientific market price and need for high yielding resistant varieties.

Prevalence of disease and pests in Southern Karnataka during *Kharif* 2019

Districts	**Diseases**									
	Bl	**NBl**	**BS**	**ShBl**	**ShR**	**GD**	**FS**	**UD**	**BLB**	**BLS**
Chikkamagaluru	L-M (10-15%)	L-M (5-15%)	L-M (10-15%)	M-S (10-35%)	L	L-M (5-15%)	L (5-10%)	L	L	L
Hassan	L	L-M (2-25%)	L	L-M (5-25%)	L	L-M (2-15%)	-	-	-	-
Mandya	M-S (40-50%)*	M (20-25%)	M-S (30-40%)	L-S (10-40%)	L	L-M (10-20%)	L (5-10%)	L	M-S (40-50%)	M-S (20-45%)
Mysuru	L-S (20-70%)	L-S (10-70%)	L	L-S (10-55%)	L	L-M (10-25%)	L-M (10-15%)	L	M-S (15-35%)	L
Shivamogga	L	L-M (5-25%)	L	L-S (5-45%)	L	L-M (5-20%)	L (1-5%)	L	L-M (10-15%)	L

* Blast was localized and was observed only in some fields in Goravale village on MC 13 in Mandya

Districts	**Insect pests**			
	SB	**LF**	**BPH**	**CW**
Chikkamagaluru	L-M (5-20%)	L-M (10-25%)	L (5-10%)	L-M (10-25%)
Hassan	L-M (5-15%)	L-M (10-15%)	-	L-M (5-20%)
Mandya	L-M (10-20%)	L-M (5-15%)	L-M (5-20%)	M (10-25%)
Mysuru	L-M (10-20%)	L-M (10-15%)	M-S (20-80%)	L-M (5-20%)
Shivamogga	L-M (5-15%)	L (5-10%)	M-S (30-40%)	L-M

Kerala (Moncompu): 2019-2020

Districts surveyed: *Alappuzha* and *Kottayam*

Particulars of survey

District	Taluk	Blocks	Villages/Panchayath
Alappuzha	Ambalapuzha	Ambalapuzha and Alappuzha	Ambalappuzha North, Purakkadu, Karuvatta, Punnapra and Mannamcherry
	Kuttanad	Champakulam and Ramankary	Champakkulam, Nedumudi, Edathua, Kanakary, Pulinkunnu, Ramankary, Veliyanadu and Kavalam
	Karthikapally	Haripad	Veeyapuram, Cheruthana and Cheppad
Kottayam	Kottayam	Ettumanoor and Kottayam	Ettumanoor, Aymanam, Nattakam, Kumarakom, Arpookara and Thiruvarppu
	Vaikom	Vaikom	Vechoor, Kallara, Thalyazham, Manjoor

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

Details of Weather data in the surveyed districts

Weather data	Months							
	May	June	July	Aug	Sept	Oct	Nov	Dec
Alappuzha								
RD	3	19	19	22	21	23	14	2
TR (mm)	11.4	470.8	324.3	587.8	282	693.5	98.7	160
T. Max (^{0}C)	33.8	32.6	31.1	30.2	29.3	32.6	33.1	34
T. Min (^{0}C)	24.3	24.0	23.6	23.4	23.8	22.3	22.2	22.3
RH-M (%)	78.9	83.7	84.3	92.1	91.8	89.1	90.9	87.3
RH-E (%)	70.3	84.4	85.4	87.3	87.4	85.6	84.4	80.1
Kottayam								
RD	11	27	29	26	24	10	10	1
TR (mm)	46.2	452.1	588	411.1	466.5	91.8	54.3	0.2
T. Max (^{0}C)	24.4	23.2	22.7	22.9	22.7	23.0	22.8	20.9
T. Min (^{0}C)	34.5	30.9	30.1	30.6	31.8	33.1	32.9	32.4
RH-M (%)	91.1	92.2	92.3	90.7	90.8	91.6	90.7	91.5
RH-E (%)	67.2	81	79.7	79.1	76.7	71.9	73.7	75.3

RD: Rainy days; TR: Total rainfall; T. Max: Maximum temperature; T. Min: Minimum temperature; RH-M (%): Relative humidity (%)-Morning; RH-E (%): Relative humidity (%)-Evening

Rice Research Station, Moncompu conducted the Production oriented survey in Alappuzha and Kottayam districts during Kharif 2019 from booting stage to maturity stage of the rice crop. The rice area in Alappuzha District constituted 8.41 % of the total cropped area, while in Kottayam District it was 3.14%. The details of the rice area in these districts are furnished above. The survey covered three taluks in Alappuzha District, viz., Ambalapuzha, Kuttanad and Karthikapally while in Kottayam district two taluks could be surveyed. The details of the area surveyed are given in the above table. The predominant cropping sequences were rice-fallow, rice-rice and fallow-rice. The predominant varieties in this district were Uma and Jyothi. The crop performance was poor during this year. The average rice yield was 4.5 to 6 t/ha. The ruling variety in this Kuttanad area is Uma (MO 16). The total rainfall during Kharif season was 2369.8 mm. Soil is acid sulphate with the pH ranging from 4.2 to 6.5. Lime was applied @ 100 kg/acre for ameliorating acidity problem at the time of land preparation or gap filling. The rice in Kuttanadu region is grown below mean sea level (MSL). Farmers used *Petti* and *Para* (locally devised axial flow pump) for draining out water. One *Petti* and *Para* was used for an area of 50-75 acre land. Irrigation is through gravitational flow of water from rivers into the fields. Kuttanad farmers are normally using 40-50 HP *Petti* and *Para* for dewatering of land. Now it is slowly replaced by introducing 20 HP vertical turbine pump/submergible pump due to shortage of technician for maintenance of the traditional *Petti* and *Para*.

A very unique pre-sowing weed control method termed **"Stale seed bed preparation"** is practiced by the Kuttanad farmers. The technique involves providing ideal conditions for the germination of weed seeds on the soil surface of fields prepared to a 'ready to sow' condition by draining the fields. The fields are kept in this condition for 10-15 days for emergence of weeds. The emerged weeds are then submerged by flooding the fields to more than 1.0 m depth for a period of 2-3 weeks, which results in total decomposition of the weeds. All these weeds will be killed by this practice. The fields are again drained and germinated paddy seeds are sown in soil surface with minimum disturbance. The practice is most useful to control the grasses especially *Echinochloa* spp.

District-wise observations:

Alappuzha: Total area under rice was 10,509 hectares at Alappuzha district during *Kharif* 2019. In Alappuzha District, three Taluks were surveyed *viz.*, Ambalapuzha, Kuttanad and Karthikapally. Survey was conducted during booting and maturity stage of the crop. Mostly high yielding varieties are cultivated in this district. The predominant varieties of the area were Uma and Jyothi. The crop rotation followed by the farmers is rice-rice in certain areas of Kuttanad, fallow-rice in majority of Kuttanad and rice-fallow-sesame in Karthikapally taluk. The average yield is 4.5-6 t/ha. In Alleppey District, Paddy was cultivated in 10,509 hectares from 193 padasekharams during Kharif 2019 season. Of this, crop in 1,051 ha was destroyed in August following a series of bund breaches. Paddy in another 2,172 ha was washed away in the same period.

The harvest of the Kharif crop had begun late on the first week of November. But with crops flattened and because of submerged condition, it could not possible to deploy combined harvester. The paddy production has declined by around 80% compared to 2017 *Kharif* crop season. A dip in yield was caused by heavy downpour and floods that lashed the Kuttanad region in August and October. The second major reason for yield loss was severe attack of Brown plant hopper in about 20 % of the area. The population of weeds was moderate. The

wild rice has become a major problem during the past ten years, most probably due to spread through seed transport from one area to another. Use of combined harvester, avoiding stale seed bed technique and proper land preparation also has contributed to spread of wild rice. The farmers used weedicides such as Vivaya (cyhalofop-butyl 5.1% + penoxsulam 1.02% OD) (1000 ml/acre), Ricestar (Fenoxaprop-p-ethyl 6.9 EC) (400 ml/acre), Affinity (carfentrazone ethyl 40% DF) (16g/ acre), Nominee gold (120 ml/acre), Almix (metsulfuron methyl 10% + chlorimuron ethyl 10% WP) (8 g/acre), 2,4 D (500 g/acre) for all broad leaf weeds *Cyprus rotundus* and *Echinochloa* spp. Two to three weedicides mix were used by Kuttanad farmers for the control of all types of weeds. Hand operated knapsack sprayers were used for spraying weedicides, insecticides and fungicides.

Moderate incidence of the biotic constraints like sheath blight, bacterial leaf blight, leaf folder, BPH, Thrips, leaf miner, Case worm, Gall midge and Stem borer were observed. Moderate incidence of bacterial leaf blight was observed in Ambalapuzha block. The false smut become serious issue during Kharif season in some parts of Ambalapuzha, Haripad, Champakulam and Alappuzha due to intermittent rainfall and severe wind during booting stage. Blast and Brown leaf spot disease were noticed in Ambalapuzha Taluk like Thakazhy, Ambalapuzha and Edathua. Pests like leaf miner, thrips, leaf folder and BPH were serious problems in delayed crop area of Kuttanad region. About 1482 ha area was severely affected by Brown plant hopper in Champakulam, Ambalapuzha, Ramankary and Alappuzha at flowering stage. Fungicides like Nativo (160 g/acre), Contaf (250 ml/acre), Taqat (250 g/acre), Folicure (250 ml/acre) were sprayed against sheath blight and other foliar diseases like brown leaf spot and grain discoloraton. The bacteriocide namely streptocycline 12g/acre and Kocide 77 WP(400 g/acre) were used against bacterial leaf blight. Pesticides like Feterra (4 kg/acre), Azataf (250 g/acre), Takumi (50 g/acre), Fame (20 ml/acre) and Regent (5kg/acre) were applied against leaf folder and stem borer. Tatamida(60 ml/acre), Appalud(400 ml/acre) and Actara (10 g/acre) were sprayed against thrips and brown plant hopper. Bio-control agent *Psuedomonas fluorescens* was produced at R.R.S, Moncompu and distributed to the farmers for encouraging the ecofriendly management of plant diseases. Seed treatment of *Pseudomonas fluorescens* was done by many farmers to control the seed borne diseases of rice. Trichocards were supplied to the Kuttanad farmers by State Biocontrol lab, Department of Agriculture for ecofriendly management of stem borer and leaf folder. The major problem in Alappuzha District is shortage of labour for weeding, spraying and other farm operations.

Kottayam: A total of 5801 ha area was cultivated rice during *Kharif* '2019 in Kottayam District. The predominant cropping sequences were rice-fallow, rice-rice and fallow-rice. The predominant varieties in this district were Uma and Jyothi. The total rainfall during *Kharif*' 2019 was 2110.2 mm. Severe rainfall followed by flash floods affected rice cultivation in many parts of Kottayam District. About 886 ha rice area was vitiated due to flood. Moderate weed infestation was noticed in almost all the fields during the visit. *Cyperus difformis, C.iria Echinochloa crusgalli, Sacolepis interrupta* etc were the major weeds observed. *Echinochloa* spp was the major weed found in Kottayam districts along with wild rice. The farmers used weedicides were Nominee gold (120 ml/acre), Almix (8 g/acre), 2,4 D (500 g/acre), Sathi (Pyrazosulfuron Ethyl 10% WP) (80 g/acre) for all broad leaf weeds and selective weedicide Clincher (320 ml/acre) against *Echinochloa spp.* The yield loss due to lodging in most part of the area. Average yield 1.75 ton/acre.

Moderate incidence of the biotic constraints like sheath blight, leaf blast, brown spot, leaf folder, and stem borer were observed in many padasekharams of Thalayazham village. The severe brown plant hopper and bacterial leaf blight attack in Vaikom and Thalayalaparambu area. Moderate incidence of thrips, leaf miner, case worm and gall midge. Fungicides like Bavistin (200 g/acre), Contaf (250 ml/acre), Taqat (250 g/acre) and Folicure (250 ml/acre) were commonly sprayed against sheath blight and other foliar diseases like brown leaf spot and sheath rot. Tilt and Kocide were used as foliar spray at the time of panicle emergence stage against glume discoloration and false smut diseases. The bacterocide streptocycline @12 g/acre and bacterianashak @ 20 g/acre were used against bacterial leaf blight. The systemic insecticides Feterra (4 kg/acre), Azataf (250 g/acre), Takumi (flubendiamide 20% WDG) (50 ml/acre), Fame [Flubendiamide 480SC (39.35% w/w] (20 ml/acre), Regent (5 kg/acre), Starthene (acephate) (350 ml/acre) and Indane (5 kg/acre) were sprayed against leaf folder and stem borer. Tatamida (60ml/acre), Actara (20g/acre) and Applaud (400ml/acre) were sprayed against Brown plant hopper and synthetic pyrethroid Karate (lamda cyhalothrin cyhalothrin) (250 ml/acre) was used against rice bug. Some farmers were found to use the bio-fertilizer namely Ralli gold (5 Kg/acre) and PGPR mix 1. The insecticide and fungicide combination molecule Origin 8.5 WG (flubendiamide +hexaconazole) @ 400 g/acre was prophylactically sprayed by most of the Kuttanad farmers at the time of booting stage. Trichogramma egg cards were used by few farmers for the management of stem borer and leaf folder. In many cases application methods and dosage of pesticides, weedicides, fertilizer and lime were chosen by the farmer's own decision and over doses has lead to environmental pollution and residual toxicity in many areas.

Prevalence of diseases and insect pests in Kerala during 2019

Districts	**Diseases**					
	Bl	**BS**	**ShBl**	**GD**	**FS**	**BLB**
Alappuzha	L	M-S	M	S	L-M	M-S
Kottayam	L	M	M	M	L	M-S

Districts	**Insect pests**						
	SB	**LF**	**BPH**	**GM**	**CW**	**RT**	**LM**
Alappuzha	L	M	S	L	M	M	M
Kottayam	L	M	S	-	L	M	L

LM= Leaf miner

Maharashtra (Karjat): 2019-2020

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

Table 1: Details of survey

Districts	Taluka/Block	Villages
Thane	Kalyan, Bhiwandi, Murbad, Shahapur and Ambarnath	Titwala, Lapkhurd, Zidake, Kaman, Mhasa, Nowdichapada, Dhasai, Saralgaon, Balegaon, Umbare, Narayangaon, Shelvali, Aatgaon, Nevare, Mulgaon and Yewe
Palghar	Vasai, Palghar, Dahanu, Wada, Vikramgad and Jawhar	Majiwali, Dahisar, Bahadoli, Dhuktan, Vandivali, Gargaon, Pasmad, Savarkhand, Vanai, Barapada, Dhakpada, Savarkhand, Shirishpada, Vasuri, Shil, Dheherje, Medhi, Dengyachimet and Balkhapra
Raigad	Karjat, Panvel, Uran, Pen, Alibag, Sudhagad Pali, Roha, Mangaon and Mahad	Sapele, Vengaon, Takave, Naladhe, Pingalewadi, Pohi, Bekare, Vadavali, Garpoli, Sai, Dighati, Punade, Vasheni, Sarade, Aarav, Antore, Javali, Govirle, Shahabaj, Pezari, Jambhulpada, Palap, Vajroli, Patansai, Ratwad, Vighawali and Dabhil
Ratnagiri	Mandangad, Dapoli, Khed, Chiplun, Sangemeshwar, Ratnagiri and Lanja	Shenale, Mugij, Kumbhave, Talsure, Gimhavane, Asudpul, Vetalwadi, Boraj, Walope, Kalambaste, Kapsale, Sawarde, Tural, Galwali, Dhamani, Bhavnadi, Nivali, Velvan, Zaped, Kuva and Waked
Sindhudurg	Kankavali, Kudal, Vengurla, Sawantwadi, Malvan and Dodamarg	Harkul, Ghonsari, Phondaghat, Kasal, Osargaon, Wagade, Kudal, Padave, Pavashi, Vetalbambarde, Humarmala, Tarsebambarde, Aadeli, Ansur, Hodawade, Vajrat, Vetore, Bhendmala, Talwada, Niroda, Maangaon, Kariwade, Aamboli, Sukhalwad, Katta, Guramwadi, Pendur, Ghodage, Zarebambar and Netarde

Production oriented survey was conducted in the Konkan region of Maharashtra which is predominant rice growing belt with an average productivity of 33.5 q/ha. The regions comprise five districts *viz.* Thane, Palghar, Raigad, Ratnagiri and Sindhudurg. The total area under rice cultivation in *Kharif*' 2019 season in the region was 3,92,392 ha, out of these 89 % area were sown under rice during this year. The farmers of this region cannot grow any crop other than rice during *Kharif* season because of high rainfall and geographically low land. Survey was conducted at dough and maturity stage of crop during the month of October-November' 2019. The details of the survey are presented in Table 1. The onset of monsoon was early by 1week in South Konkan Costal Zone whereas, it was in time in North Konkan Costal Zone of the region. Very high rain fall was received in almost all districts of Konkan region except Palghar and Thane (Table 4). The weather conditions were good at growth stage of crop but during maturity period and harvesting stage abnormal because of late and heavy rainfall results in to heavy yield losses. The details of the varieties cultivated by different farmers are given in Table 2. Commonly grown varieties were HYVs like Jaya, YSR, Ankur Rupali, Karjat-7, Karjat-3, Karjat-2, Silky-277, Om 125, Daptari-100, Krushidhan Komal-101, Poonam, Shabari, MTU-1010, Jyotika, Om Shriram, Daptari 1008, Daptari 125, Trupti, Avani, Jordar, Vaishnavi, Soubhagya, Devaki, Shubhangi and Suprim

Sona. Some farmers cultivated hybrids like Sahyadri, Sahyadri-1, Sahyadri-2, Sahyadri-3, Gorakhnath, Lokhnath 509, Arize 6444 and Ankur-7434. Some of the farmers are still cultivating local varieties like Bela, Walai, Somasal, Dongara, Sorti, Kolhyachi Shepti, Kothimbira/Ghansal, Turya, Yelkar, Kolam, Zinia and Mahadi for their taste. The details of area under rice and area under different rice varieties are given in Table 3. The details of area under different rice varieties in different districts of Konkan region of Maharashtra is given in Table 6.

Table 2: Widely prevalent rice varieties

Districts	Varieties
Thane	**HYVs/Improved**: Jaya, YSR, Ankur Rupali, Karjat - 7, Karjat – 3, Karjat – 2, Silky-277, Om 125, Daptari-100, Krushidhan Komal- 101, Poonam, Shabari, MTU-1010, Jyotika, Om Shriram, Daptari 1008, Daptari 125, Trupti, Avani, Jordar, Vaishnavi, Soubhagya, Devaki, Shubhangi and Suprim Sona. **Local:** Kolam, Zinia and Mahadi
Palghar	**HYVs/Improved**: Jaya, Masuri, Suvarna, Karjat 3, Ratnagiri -5, MTU-1010, Ankur , Sonam, Rupali, Komal 101, Vada kolam, Laxmi, Silky 277, Shatayu, YSR, Daptari 100, Jyotika, Poonam, Suma, Sundar, Sonam, Jordar, Harshita and Bangalya for their fine quality, taste, special purpose and home consumption. MTU- 1010, Rupali, Komal-101, Silky-277, Mohini and YSR
Raigad	**HYVs/Improved**: Trupti, Rupali, Jyotika, Chintu, Suprim Sona, Kanchan, Kuber, Radha, Jaya, Prasanna, Komal 101, Karjat-2, Karjat -3, Karjat -5, Karjat -7, MTU 1010, Suvarna, Vaishnavi, Jordar, Sonal, NPH 256, YSR, Awani, Kranti and Sagar **Hybrids:** Sahyadri-2, Sahyadri-3, Gorakhnath and Lokhnath 509
Ratnagiri	**HYVs/Improved**: Jaya, Suvarna, Karjat-2, Sonam, Pooja, Komal 101, Green gold mohini, Shriram and Trupti; **Hybrids:** Sahyadri, Arize 6444, Arize 522
Sindhudurg	**HYVs/Improved**: Jaya, Masuri, Suvarna, Karjat – 3, Karjat-5, Sonam, Rupali, Komal – 101, Silky – 277, Suprim sona, Jai Shriram, Janaki and Green gold Mohini; **Hybrids:** Sahyadri-1, Arize 6444, Ankur-7434 and Loknath-509 **Locals:** Bela, Walai, Somasal, Dongara, Sorti, Kolhyachi Shepti, Kothimbira/Ghansal, Turya and Yelkar

Table 3: Particulars of rice area in different districts of Konkan region of maharashtra (*Kharif* 2019)

District	Total geographical area (ha.)	Total cultivable area (ha.)	Total cultivated area (ha.)	Net irrigated area (ha.)	Area under rice (ha.)
Thane	933700	210825	170656	2494	57200
Palghar	469699	263707	217338	15727	75580
Raigad	687000	141200	217400	9000	117173
Ratnagiri	816000	388000	260400	5900	72932
Sindhudurg	503950	465307	159200	3630	68587

Table 4: Weather data for different districts of Mahararahtra during 2019

District/Parameters	Jun	Jul	Aug	Sep	Oct	Nov
Thane						
RD	12	27	26	26	9	2
TR	504.4	1008.8	1190.2	864	104	31.6
MMT (^{0}C)	30.1	27.5	27.5	27.0	28.2	27.8
T. Max (^{0}C)	33.9	30.0	29.9	29.5	32.5	33.4
T. Min (^{0}C)	26.4	25.0	25.1	24.5	23.9	22.1
SH	4.12	1.575	2.625	2.3	4.36	7.28
Palghar						
RD	13	26	26	26	5	3
TR	657.8	1145	639.2	1531.6	20	61.2
MMT (^{0}C)	29.9	28.1	27.9	27.6	28.9	28.3
T. Max (^{0}C)	33	30.4	30.1	29.8	32.7	33.2
T. Min (^{0}C)	26.8	25.7	25.7	25.4	25.2	23.3
SH	4.76	1.66	2.42	2.6	4.2	7.8
Raigad						
RD	11	27	25	25	13	1
TR	536.8	1901.8	1075.5	1267.4	289.3	2.6
MMT (^{0}C)	30.35	26.94	27.02	26.35	27.45	27.27
T. Max (^{0}C)	34.79	29.65	29.60	29.10	32.29	33.61
T. Min (^{0}C)	25.91	24.22	24.43	23.61	22.61	20.94
SH	3.48	1.49	2.83	2.00	4.52	6.76
Ratnagiri						
RD	17	31	26	20	11	0
TR	674.1	1281.3	1174.9	875.9	269.9	1.2
MMT (^{0}C)	29.2	27.4	27.4	27.05	27.65	28.2
T. Max (^{0}C)	32.7	30.8	30.3	30.2	32.1	34.1
T. Min (^{0}C)	25.7	24.0	24.5	23.9	23.2	22.3
SH	4.7	1.5	0.2	2.9	5.7	8.2
Sindhudurg						
RD	17	28	25	22	12	2
TR	893.2	1254	1085.8	542.3	331.2	35.6
MMT (^{0}C)	27.85	26.6	26.6	27	28.1	28.4
T. Max (^{0}C)	31.9	29.7	29.9	30.4	33.1	34.9
T. Min (^{0}C)	23.8	23.5	23.3	23.6	23.1	21.9
SH	3.8	1.7	2.8	3.1	5.3	8.3

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	Districts		
	Thane	**Palghar**	**Raigad**
Total area under HYVs (ha)	53798	74784.75	94408.42
Most prevalent HYVs in the district	Jaya, YSR, Ankur Rupali, Karjat 7, Daptari 100, Komal-101, MTU-1010, Trupti, Suprim Sona	MTU- 1010, Rupali, Komal-101, Silky-277, Mohini and YSR	Jaya, Suvarna, Karjat -2, Ratna, MTU 1001/ 1010, Rupali, and YSR
Total area under rice hybrids	1437.0	795.25	1470.58
Most prevalent rice hybrids in the district	Arize 6444, Mahyco 5491, Dhandev, Ankur 7434, Mahyco 6129, Gorakhnath	Ankur 7042, Suruchi, Arize 6129, Upaj	Sahyadri 2, Sahyadri 3, Gorakhnath, Lokhnath 509.
Total area under basmati in the district	Nil	Nil	Nil
Most prevalent basmati	Nil	Nil	Nil
Whether farmers are using any heavy equipments like transplanter/combine harvester	Yes	Used Power tiller opareated harvester. Small Thresher.	Yes, use transplanter and power tiller operated Harvester.
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	No	Nil	No
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Different methods of rice cultivation, IPM, INM and mechanization in rice cultivation.	Methods of Rice cultivation, IPDM, INM and mechanization in rice cultivation.	Methods of rice cultivation, INM in rice IPM in rice and mechanization in rice cultivation
What are the general problems in rice cultivation in the district?	Non availability and High wages of the labour. Lack of irrigation facilities.	Due to small land holding, farmers needs low cost mechanization.	Non availability and High weges of the labour
Please provide any farmers association in the district	Farmer's groups registered under ATMA and "Agricultural Tools Bank" Association.	Farmer's groups registered under ATMA.	Co-Operative Rice Seed Production Society, Vadap, Karjat Shetkari Vikas Sanstha, Mahad
Whether availability of agricultural labours is sufficient?	No.	Non availability and High wages of labour.	No
Whether there is any marketing problem of the produce?	Yes	Lack of marketing facilities.	Yes.
Any major irrigation/power generation project in the district	Small Irrigation projects-16	Bhatsa, Surya and Wandri irrigation projects in the district.	Pathas, Kal, Rajnala , Hetawane irrigation projets
Any soil testing program undertaken?	Yes. Soil Health Improvement Programme.	Yes. Soil Health Improvement Programme.	Yes. Soil Health Improvement Programme.
Any farmers' training program was organized by the state department of Agriculture/University	Integrated Rice Improvement Programme and demonstrations.	Integrated Rice Improvement Programme and demonstrations.	Integrated Rice Improvement Programme and demonstrations.

Table 5 Contdd.: 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**	
	Ratnagiri	**Sindhudurg**
Total area under HYVs in the district (ha)	67755	53209.06
Most prevalent HYVs in the district	Jaya, Ankur Sonam, Karjat-2, Sarthi, Green Gold Mohini, Suvarna, Trupti and Ankur Rupali	Jaya, Masuri, Suvarna, Karjat 3, Karjat-5, Sonam, Rupali, Komal 101, Silky 277, Suprimsona, Jai Shriram, and Green gold mohini
Total area under rice hybrids in the district	88	1028.94
Most prevalent rice hybrids in the district	Sahyadri, Arize 6444, Arize 522	Sahyadri-1, Buyer – 6444, Ankur- 7434, Loknath – 509.
Total area under basmati in the district	Nil	Nil
Most prevalent basmati varieties in the district	Nil	Nil
Whether farmers are using any heavy equipments like transplanter/combine harvester	Nil	No
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	Nil	No
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, drumseeding and INM, IPDM in rice cultivation.
What are the 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	No
Whether there is any marketing problem of the produce?	Yes	Yes
Any major irrigation/power generation project in the district	Natu nagar Irrigation Project and Ratnagiri Power Company	Talamba, Aruna Tilari, Sarmala and Mahmmad wadi Irrigation projects
Any soil testing program undertaken?	Yes. Soil Health Improvement Programme.	Yes. Soil Health Improvement Programme.
Any farmers' training program was organized by the state department of Agriculture/University	Integrated Rice Improvement Programme and field demostations.	Integrated Rice Improvement Programme and demostations.

Table 6: Variety/hybrid wise area coverage (ha) in different districts of Maharashtra during 2019

Variety/hybrids	Districts/area (ha)				
	Thane	**Palghar**	**Raigad**	**Ratnagiri**	**Sindhudurg**
HYVs/Improved					
Jaya	2004.5	231.13	13350		1425.88
Mahsuri		886.25			1301.78
Suvarna		733.63	4000		414.38
YSR	3035.0	731.5	750		
Ankur Rupali	831.58	2979.2	1200	411.57	261.35
Karjat - 7	871.0		1750		
Karjat 3	714.13	1076.25	837		289.85
Karjat 5			920		234.18
Ratnagiri 5		227.5			
Karjat – 2	283.5		575		224.45
Silky-277	429.88	311.75			250.98
Om 125	465.0				
Daptari-100	291.5	539.75			
K. Komal- 101	406.75	568.75	1375	674.5	678.65
Poonam	182.05	7443.2		207.65	
Suma		4140.75			
Sundar		668.75			
Shabari	1168.75				
MTU-1010	1058.75	1282.5	1175		
Ankur Sona		411.0		609.8	845.55
Jyotika	317.5	833.75	525		
Chintu			626		
Om Shriram	1403.75				
Daptari 1008	234.5				
Daptari 125	1249.75				
Trupti	607.5		1125	365.22	
Jai Shreeram					567.85
Sonal			500		
Avani	468.25				
Devaki	310.25				
Janaki					415.70
Shubhangi	310.7				
Suprim Sona	290.25		415		299.40
Jordar	1612.0	556.5	1625		
Vaishnavi	333.50		375		
Soubhagya	469.25				
Vada Kolam		2092.75			
Laxmi		676.75			
Shatayu		749.75			
Sonam		766.5		226.95	
Harshita		402.25			
Kanchan			750		
Kuber			300		
Radha			375		
Prasanna			300	355.3	
NPH 256			500		

Variety/hybrids	Districts/area (ha)				
	Thane	**Palghar**	**Raigad**	**Ratnagiri**	**Sindhudurg**
Awani			750		
Sagar			300		
Kranti			300		
Sarathi				428.52	
Mohini				420.25	352.85
Ankur Sadhana				324.58	
Pooja				206.62	
Others	4331.68	6370.57	11627	2153.25	2578.22
Hybrids					
Sahyadri				32.75	
Sahyadri-1					173.29
Sahyadri 2			5.88		
Sahyadri 3			7.35		
Arize 6444	322.94			42.5	325.06
Mahyco 5491	317.64				
Upaj	252.58	21.76			
Dhandev	58.82				
Mahyco Suruchi	62.30	64.11			
Ankur 7434	124.05				79.47
Ankur 7042		44.11			
Arize 6129	51.29	8.82			
Gorakhnath	43.05		588.24		
Loknath 509			529.41		123.11
Others	204.29	656.45	339.69	12.75	328

A. Cropping system and rice yield: Rice is grown as a rain fed crop due to heavy rains in the region. The most common cropping pattern adopted by farmers in the region is Rice-fallow, rice-pulses and rice-vegetables (Table 7). The farming systems of *Konkan* was also including 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 and Ratnagiri districts. The average seed replacement ratio in the region during *Kharif* 2019 was 46% (according to Maharashtra state agriculture department). Some farmers use 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 etc. Most of the farmers purchase seed every season, from private agro service centers and private seed companies. Average rice yield was low in the region (2500-3500 kg/ha) in case of high yielding varieties while in case of hybrids 3500-4500 kg/ha (Table 8).

Table 7: General informations

Parameters	Thane	Palghar	Raigad	Ratnagiri	Sindhudurg
# of talukas/blocks covered	5	6	9	7	6
# of villages surveyed	16	19	27	21	30
# of farmers interviewed	18	25	33	25	33
Field ecosystem	RL (100%)	RL (100%)	RL (100%)	RL (100%)	RL (100%)
Weather conditions during cropping season	Excess rainfall in all the places surveyed especially at the maturity/harvesting stage				
Crop stage when survey was made	Maturity	Maturity	Maturity	Maturity	Maturity
Crop rotations	Rice-fallow, rice pulses, rice-vegetables, rice-oilseeds, rice-rice, rice-Nachani (finger millet; *Eleusine coracana*), rice-kulith (horse gram; *Macrotyloma uniflorum*)				

RL: Rainfed lowland

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

Varieties	Yield (kg/ha)					Remarks
	Thane	Palghar	Raigad	Ratnagiri	Sindhudurg	
YSR	1900-2700	2000	2200			Rice yield in many places was significantly low due to sub-normal dose of fertilizers, uneven rainfall and heavy rainfall during maturity /harvesting stage Some of the farmers are still growing local rice varieties for local preference
S-911	1900					
Komal	2200	2100		3200		
Jaya	2100-2200	2200	2800-3000	2500-3000	3000-3700	
Mahsuri					2300-3000	
Chintu					1800-2500	
Karjat-2				2000-2900		
Karjat-4				3000		
KJT-3, KJT-5	2800-3000	2000-2900	2800		3000	
KJT-7		27002800				
Rupali	1900-2000	2000-2200	2200	2800	1500-3200	
Sonali				2900-3000		
Daptari	1600-2100				2200	
Ratna		2000	1800-2200		2800	
Sonam, Sairam					2700-3000	
Poonam		2000-2100				
Suvarna		1900-2200	2200	3000-3500	2400-3000	
Suprim Sona		1700-2100	1900-2200			
Jordar		1800				
Avani			2100			
Soubhagya			1900			
Trupti			2000-2100		3200	
Mahaswari				2700-3000		
Gujarat-11				3200		
Puja				3100-3200		
Ratnagiri-24				3000		

Varieties	Yield (kg/ha)					Remarks
	Thane	Palghar	Raigad	Ratnagiri	Sindhudurg	
Shubhangi					2400-4050	
Jyothi					3000	
Sahyadri		2500		3500	4000	
Arize 6444					4500	
Vada Kolam			1900			
Sundari		1900				
Zinnia	1700					
Kolam	1900-2000	1800	1500-2000	2500		
Dangi		1400				
Bela					2000	
Walai					1800-2200	

B. Nursery Management: Average seed rate adopted by the farmers was 50-60 kg/ha. Percentage of farmers adopting seed treatment was less (0-44%). In Thane, farmers purchased already treated seeds. Commonly used chemicals for seed treatment was thiram (Table 9). Very few farmers (6-22%) applied organic manure in the nursery in Thane, Palghar and Raigad. About 20-72% farmers applied urea (1-1.5 kg/R) in the nursery (Table 9). 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'.

Table 9: Details of nursery management

Parameters	Thane	Palghar	Raigad	Ratnagiri	Sindhudurg
Planting time	2^{nd}-4^{th} Week of July	2^{nd}-4^{th} Week of July	2^{nd}-4^{th} Week of July; few in Aug 1^{st} Week	2^{nd}-4^{th} Week of July	1^{st}-4^{th} Week of July
Seed rate	40-70 kg/ha	50-65 kg/ha	45-70 kg/ha	35-70 kg/ha	35-70 kg/ha
Seed treatment (% farmers adopted)	Yes (72%); few purchased treated seeds	Yes (44% only)	Yes (30% only)	Nil	Yes (18% only)
Chemicals used for seed treatment	Thiram (2.5 g/kg seeds)	Thiram (2.5 g/kg seeds)	Thiram (2.5-3 g/kg seeds)	-	Thiram (2.5-3 g/kg); carben-dazim (2 g/kg)
Organic manure in nursery (% farmers adopted)	Yes (22% only); FYM	Yes (12% only); FYM	Yes (6% only); FYM	Yes (92 %); FYM	Yes (64%); FYM; very few Poultry manure
Inorganic manure in nursery (% farmers adopted)	Yes (72% farmers); Urea @ 1 kg/R 1R=1000 sq. ft	Yes (36% farmers); Urea @ 1-1.5 kg/R 1R=1000 sq. ft	Yes (24% farmers); Urea @ 1 kg/R 1R=1000 sq. ft	Yes (20% farmers); urea @ 1 kg/100 m^2	Yes (24% farmers); urea @ 0.5-1.67 kg//100 m^2; Suphala @ 1 kg//100 m^2

C. Main field Management: Farmers commonly adopted random planting where proper plant population was not maintained. Fertilizers were applied @ 23-114 kg N/ha, 7.5-72 kg P_2O_5/ha and 7.5-72 kg K_2O/ha. None of the farmers contacted applied zinc sulphate. About 30-76% farmers applied FYM (Table 10) depending on the availability. Farmers used different complex fertilizers like suphala (15:15:15), 18:18:18, 19:19:19 and others.

Table 10: Details of main field management

Details	Districts					Remarks
	Thane	**Palghar**	**Raigad**	**Ratnagiri**	**Sindhudurg**	
Planting method	Random transplanting of 30-35 days old seedlings; average plant population was 30-35 hills/m^2. In saline soils of Raigad, farmers uniformly scatter the seedlings in puddle fields, a method locally called as 'Awatni'					
Total N applied	38-105 kg/ha	30-107 kg/ha	38-114 kg/ha	23-129 kg/ha	18-76.1 kg/ha	Urea; 15:15:15 18:18:18 19:19:19 Few (5-12%) farmers applied only urea; FYM app-lication by progressive farmers
Total P_2O_5 applied	15-45 kg/ha	15-72 kg/ha	7.5-45 kg/ha	9-37.5 kg/ha	7.5-30 kg/ha	
Total K_2O applied	15-45 kg/ha	15-72 kg/ha	7.5-45 kg/ha	9-37.5 kg/ha	7.5-30 kg/ha	
$ZnSO_4$ applied	Nil	Nil	Nil	Nil	Nil	
Organic fertilizers applied	Yes (50%) FYM (1-10 t/ha)	Yes (48%) FYM (2-10 t/ha)	Yes (30%) FYM (2-11 t/ha)	Yes (76%) FYM (1-10 t/ha)	Yes (52%) FYM (1-2 t/ha)	

Table 11: Weeds and weed management

Details	Districts					Remarks
	Thane	**Palghar**	**Raigad**	**Ratnagiri**	**Sindhudurg**	
Weed intensity	Medium	Medium to high	Low to medium	Low	Low	
Names of the weeds	*Cyperus rotundus, Cyperus iria, Digitaria arvensis, Alternanthera sessilis, Saccharum spp., Ischaemum rugosum, Echinochloa colana, Eragrostis major, Themeda ciliate, Digitaria sanguinalis, Cynodon dactylon, Ludwigia octovalis, Celosia argentina, Marsilea quadrifolia, Panicum repens* and *Mimosa pudica*					Weeds were common in most of the fields surveyed
Weedicides used	Nil; All the farmers contacted practiced only hand weeding (1-2); none of them used any herbicides; 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*'					
Percentage of farmers applied herbicides	Nil	Nil	Nil	Nil	Nil	
Wild/weedy rice incidence	Nil	Nil	Nil	Nil	Nil	

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 11. For managing weeds in the nursery, farmers followed a local method, called *Rab* (Table 11). None of the farmers contacted applied any herbicides and all of them followed 1-2 hand weeding for managing the weed problem.

E. Needs of the 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 training on integrated crop management.
- Farmers need low cost mechanization suitable for Konkan region to overcome labour problem.

Table 12: Details of inputs used

Details	**Districts**				
	Thane	**Palghar**	**Raigad**	**Ratnagiri**	**Sindhudurg**
Implements used	Most of the farmers prepared their land by own plough or hired Power Tiller, Tractor, harvester. 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 labour problem in the district with support of Zilla-parishad.				
Seed replacement rate in 2019	46%	47%	45%	47%	47%
Source of seeds	Some farmers use their own seed especially of local varieties. Seeds of improved varieties are supplied by Government agencies viz. Panchayat Samittee, ZillaParishad, Agricultural Department, Agricultural University, Research Stations etc. Many farmers purchase seed every season, from private agro service centers and private seed companies.				
Source of irrigation	River water	River water Canal	River water Canal	Shallow tube wells, canal	Shallow tube wells, canal
Scarcity of irrigation water	Yes (60% farmers)	Yes (88% farmers)	Yes (55% farmers)	Yes (72% farmers)	Yes (18% farmers)
Availability of fertilizers/pesticides	Available (100%)	Available (100%)	Available (100%)	Not available (96%)	Not available (82%)
Quality of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	No (96%)	No (82%)
Advisors to the farmers	Own decisions (100%) Dealers (67%) State dept (78%) University (22%)	Own decisions (100%) Dealers (24%) State dept (80%) University (8%)	Own decisions (100%) Dealers (6%) State dept (94%) University (61%)	Own decisions (100%) Dealers (12%) State dept (40%) University (28%)	Own decisions (91%) Dealers (15%) State dept (61%) University (49%)

F. Input use: Most of the farmers prepared their land by own plough or hired Power Tiller, Tractor, harvester. 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 labour problem in the district with support of Zilla-parishad. Seed replacement rate ranged from 45-47% in different districts. River water and in some cases, canal and shallow tube wells were the sources of irrigation. Majority of the farmers expressed the problem of irrigation water and irrigation facilities. Almost all the farmers told that fertilizers and pesticides were available in time. In addition to their own decisions, farmers got advices from officials of state department of agriculture and university and also from private dealers.

G. Biotic stress and their management: Overall, the incidence of diseases and insect pests was in low to moderate intensity (Table 13). However, severe bacterial blight (up to 50% incidence) was recorded in Balegaon village on varieties like Jordar and YSR. In some cases, whole field was infected severely. High intensity of bacterial blight was also noticed in some fields in Antore village in Raigad where variety, Ankur Rupali was severely affected resulting in significant loss. Severe incidence of sheath rot was recorded (30-40%) on varieties like Kolam and Rupali in villages like Vengaon and Antore of Raigad district. Similarly, high level of stem borer infestation (25-40%) was recorded in Vengaon and Antore villages of Raigad district on varieties like Kolam and Rupali. Adoption of plant protection measures was very rare among the farmers (Table 14). Farmers of Thane and Raigad district usually use 'phorate' in nursery and main field for control of crabs.

Table 13: Prevalence of diseases and insect pests in Konkan region of Maharashtra during *Kharif*' 2019

Districts	**Diseases**					
	Bl	**ShR**	**FS**	**LS**	**GD**	**BB**
Thane		T-M (1-17%)	T (1-2%)	-	L (2-5%)	M-S (10-50%)
Palghar		L (1-10%)	T (1%)	L (3-5%)	L (5-7%)	
Raigad		L-S (5-40%)	T (1%)		L (5%)	M-S
Ratnagiri	T (1-2%)	T-L (1-5%)	T (1-2%)			
Sindhudurg	T-L (1-5%)	T (1-2%)		T (1-2%)		

Districts	**Insect pests**					
	LF	**SB**	**AW**	**CW**	**GB**	**Blue Beetle**
Thane	L (2-10%)	L-M (4-17%)	-		L-M (3-4 adults/Panicle)	
Palghar	L (5%)	L-M (2-17%)	-		L-M (2-7 adults/Panicle)	
Raigad	L (5%)	L-S (3-40%)				L-M (3-5/hill)
Ratnagiri		L (5%)	T (1-2%)			
Sindhudurg	T (<2%)	L (2-5%)	T-L (1-5%)	L (2-5%)		

Table 14: Details of pest management

Details	Districts				
	Thane	**Palghar**	**Raigad**	**Ratnagiri**	**Sindhudurg**
% age farmers adopting plant protection	Nil	Nil	Very few (~3-5%) farmers	Nil	Very few (~3-5%) farmers
Names of pesticides	Nil	Nil	Carbofuran 3G (20 kg/ha) for SB	Nil	Lamda cyhalothrin (1 ml/l) for AW
# of pesticide sprays	Nil	Nil	1	Nil	1
Mixing of pesticides before application	NA	NA	NA	NA	NA

Some of the common problems faced by the farmers were labour shortage and high wages of labour, lack of proper marketing facility, non-availability of implements, erratic rainfall, lack of irrigation facilities, damage by wild animals and heavy rain at the time of maturity and harvesting.

Odisha (Cuttack): 2019-2020

Districts surveyed: *Kendrapara, Cuttack, Nayagarh* and *Jagatsighpur*

Particulars of Survey

District	Blocks	Villages
Kendrapara	Derabis	Chandol, Badasalar, Ganeshpur, Banamalipur
Cuttack	Cuttack-Sadar, Narasingpur and 42-Mouza	Tulasipur, Kosida, Narasingapur and Kulasarchua
Nayagarh	Kandapada, Nayagarh and Khandapada	Anlamada, Koska, Balikudia, Gopalipada and Biridi
Jagatsinghpur	Biridi	Manatira

Predominant rice varieties

District	Varieties
Kendrapara	**HYVs**: Swarna, Pooja; **Hybrid**: Ajay; **Local**: Niranjan
Cuttack	**HYVs**: Swarna, Sowbhagya, Naveen ; **Local**: Nali 1009
Nayagarh	**HYVs**: Swarna, Pratikhya, Kalathulari
Jagatsinghpur	**HYVs**: Swarna, Pooja

Production oriented survey was conducted in 4 rice growing districts of Odisha state when the rice fields were at milk stage. Most of the rice fields were under irrigated ecosystem. Predominant rice varieties cultivated in the region were HYVs like Swarna, Pooja, Sowbhagya, Pratikhya and hybrids like Ajay. Common cropping sequences followed by the farmers were: rice-maize, rice-rice-vegetables, rice-rice-pulse, rice-vegetables-vegetables; rice-groundnut-vegetables; rice-rice-pulses; rice-groundnut-vegetables and rice-pulses-rice. Average seed rate in the region ranged from 15-20 kg/ha and majority of the farmers told that they treated the seeds with Bavistin. Application of organic matter either in the nursery or in the main fields was very less. farmers applied 50-100 kg N/ha, and 20-50 kg K_2O/h. The intensity of weeds was low to moderate. Hand weeding was common among the farmers and in addition very few farmers also applied weedicides like pendimethalin. Some of the common requirements of the farmers were equipment, irrigation facilities, proper electricity supply, storage facilities were the main requirements of farmers. Farmers are using their own seeds and seed replacement rate was 20-25%. The bore wells and tank are the main source of irrigation**.** Among different biotic constraints, blast and sheath blight were more in while BPH and stem borer was severe in many fields in all the 4 districts surveyed. Farmers applied different pesticides for controlling different biotic stresses.

District wise details:

Kendrapara: Production oriented survey was conducted in four villages in Derabis block involving five farmers when the rice fields were mostly in milk stage. The rice fields surveyed were under irrigated conditions and in general the weather conditions were normal for rice cultivation. Farmers expressed that they used 70% of their land for rice, 30% for pulses and 20% for vegetables. Predominant rice varieties cultivated in the district were Swarna, Pooja, Ajay and Niranjan. Common crop rotation practices followed by the farmers were rice-maize, rice-rice-vegetables, rice-rice-pulse, rice-groundnut-vegetables and rice-pulse-rice. Average rice yield in varieties like Pooja and Swarna ranged from 4000-5000

kg/ha. Last year, yield was reduced due to water scarcity and poor water management and weed management. In some areas yield was reduced due to reduced doses fertilizer application. Average seed rate ranged from 10-20 kg/ha. Few farmers treated the seeds with fungicides. None of the farmers applied any organic manure in the nursery. In the main fields, farmers applied 50-60 kg N/ha, and 12-20 kg K_2O/ha. And 4 to 5 tons of FYM. None of the farmers applied zinc sulphate. The intensity of weeds was found to be low to medium and hand weeding was common among the farmers. Some of the common needs of the farmers were proper irrigation systems, marketing facilities labour, financial support for tractor, weeders and other small equipments. Farmers used implements like tractors and weeders mainly on hire basis. Majority of the farmers told that they used their own seed from previous year. Main irrigation source was from canals. However, majority of the farmers reported scarcity of irrigation water. Electricity and diesel were the main power source and all the farmers expressed scarcity of electricity. In addition to their own decision, farmers got advices from ICAR-NRRI scientists and staff of state department of agriculture and private dealers. The intensity of different pest and diseases was low this year. Farmers applied different pesticides like chloripyriphos (1.5 l/ha), BPH and WBPH; hexaconazole and propiconazole, Bavistin 2g/kg for sheath blight and seed borne fungi. Farmers made at least 2 times pesticide application during the cropping season.

Cuttack: Four villages in 3 blocks involving 4 farmers were surveyed when the rice crops were in milk stage. The rice fields surveyed were under irrigated ecosystem. In general, the weather conditions were normal for rice cultivation. Predominant rice varieties in the district were Swarna, Soubhagya, Naveen and Nali 1009. Common cropping sequences were rice-vegetables-vegetables; rice-groundnut-vegetables; rice-rice-pulse; rice-pulse-vegetables; rice-pulse-vegetables; rice-rice-vegetables. Planting was done during mid -June to mid -July. Average seed rate in the district was 15 kg/ha for broad casting and 20kg/ha for line sowing. None of the farmers applied organic manure in the nursery. In the main fields, fertilizers were applied @ 40-100 kg N/ha and 40-50 kg K_2O/ha. None of the farmers applied zinc sulphate. Application of FYM in the main fields was common and farmers applied 3-5t/ha. None of the farmers applied green manure. Farmers practiced either line sowing or broadcasting method of sowing. The intensity of weeds was medium to high. Hand weeding was the main method of controlling the weeds and none of the farmers applied weedicides. Some of the common needs of the farmers were irrigation facilities, proper supply of labours, proper market price and electricity. Most of the farmers expressed that rice cultivation is not economical due to high cost of labour. Implements like tractors, power tillers, weeders and threshers were used by the farmers Canals, and shallow tube wells were used for irrigation and all the farmers contacted expressed scarcity of irrigation water. Electricity and diesel were the main power source and all the farmers expressed scarcity of electricity. Farmers got advices from staffs of state department of agriculture and private dealers in addition to their own decisions about the rice cultivation. Among the diseases, sheath blight, brown spot and blast was recorded in severe form in some fields in Tulasipur village. Other diseases like grain discolouration, BLB and bakanae were recorded in low to moderate intensities. Among insect pests, BPH and stem borer were observed in moderate form in some fields in Tulasipur, Narsingpur and Kosida villages on Swarna variety. Farmers applied insecticides like thiamethoxam for BPH and stem borer. Farmers applied fungicides like Hexaconazole, Propiconazole, Bavistin and tricyclazole for control of sheath blight, brown spot, sheath rot and grain discolouration and streptocycline for BLB. Farmers used mainly hand sprayer and sometimes power sprayer. The number of pesticide application ranged from 1-2. All the farmers expressed that they want to continue rice cultivation.

Nayagarh: Production oriented survey was conducted in 5 villages (in 4 blocks) involving 5 farmers when the crops were in milk stage. The rice fields surveyed were under irrigated, upland rainfed lowland conditions and in general the weather conditions were normal for rice cultivation. All the farmers told that they used 80% of their land for rice cultivation and 20% foe sugarcane and rice fallow ragi. Different varieties cultivated by the farmers were HYVs like Swarna, Pratikhya, Pooja and Kalathulari. Leaving the fields fallow after rice was common in the area. However, some farmers followed crop sequences like rice-rice, rice-pulse-vegetables, rice-vegetables-vegetables, rice-ragi millet and others. Rice yields in different varieties ranged from 3500-4500 kg/ha. Major reasons for low yield in the district were poor irrigation facilities, poor and imbalance dose of fertilizers. Average seed rate for line sowing was 15 kg/ha. And for broadcasting 20kg/ha. None of them applied either organic or inorganic fertilizers in the nursery. In the main field, fertilizers were applied 60-100 kg N/ha, and 50 kg K_2O/ha. All the farmers applied FYM in the main fields. ecosystem. Method of planting was direct sowing, line transplanting and random transplanting. Weed infestation was noted to be very low in transplanting. Hand weeding was commonly practiced in the district and very few applied weedicides like Pretilachlor 50% EC (400g/ acre) and Pendimethalin @1l/acre. Some of the common requirements of the farmers were equipment, irrigation facilities, proper electricity supply, storage facilities were the main requirements of farmers. Farmers are using their own seeds and seed replacement rate was 20-25%. The bore wells and tank are the main source of irrigation**.** Among the diseases, leaf blast, neck blast, brown spot, sheath rot, grain discolouration and BLB were observed in moderate form in varieties like kalatulasi and Swarna. Insect pests like BPH, Stem borer, gundhi bug and termites were observed in moderate incidences. Proper plant protection measures were adopted by farmers. Farmers were applied chloropyriphos, thiomethoxam, vitavax powder, Bavistin, validamycin and tricyclazole, for the management of different insect pests and diseases.

Jagatsinghpur: One village in one block involving one farmer was interacted during production-oriented survey when the rice fields were in milk stage. The rice fields surveyed were under irrigated condition and in general the weather conditions were normal for rice cultivation. All the farmers told that they used 100% of their land for rice cultivation. Predominant rice varieties in the district were Swarna, Pooja. Common cropping sequences followed by the farmers were rice-vegetables and rice-pulse. Optimum time of planting was 15^{th} June to 30^{th} June. None of the farmers contacted applied any organic matter in the nursery. In the main fields, fertilizers were applied @ 90 kg N/ha, and 50 kg K_2O/ha. However, and none of the farmers contacted were applied potash. Similarly, no farmer zinc sulphate. Application of FYM in the main fields was not common among the farmers. Very few applied green manures in the main fields. Method of planting was random. The intensity was low to medium. Hand weeding was the main method of weed management. Some of the common needs of the farmers were regular supply of electricity, sufficient canal water, improvement in irrigation facilities and proper market price. Common implements used by the farmers were tractor and power tiller (mainly on hire basis). Farmers told that they purchased fresh seeds for sowing and some farmers used their own seed from the previous crop. Canal and shallow tube wells were the main sources of irrigation and all the farmers expressed that there was severe scarcity of irrigation water. Electricity and diesel were the main power source and all the farmers expressed scarcity of electricity. In addition to their own decision, farmers got advices from staffs of state department of agriculture, scientists from ICAR-NRRI and private dealers. Most of the diseases were recorded in low to moderate intensities except Leaf blast which was recorded in moderate to severe form in Swarna and

Pooja varieties. Among different insect pests, BPH and stem borer were in moderate intensity. Farmers applied different pesticides like thiomethoxam (for stem borer and BPH) and Bavistin and validamycin for sheath blight and leaf blast. Major problem faced by the farmers was shortage of labour, marketing facilities and processing units. Farmers expressed their happiness with the rice cultivation, and they wanted to continue the rice cultivation.

Prevalence of disease and pests in Odisha during *Kharif*' 2019

District	**Diseases**					
	Bl	**NBl**	**ShBl**	**GD**	**BLB**	**ShR**
Kendrapara	L-M (2-10%)	L (2%)	L-M (2.5-10%)	L (5%)	L (5%)	-
Cuttack	L-M (10-12%)	-	L-M (10-15%)	L (2-5%)	L (2-5%)	L (5%)
Nayagarh	L-M (10-15%)	L (5%)	L-M (10-12%)	L (5-7%)	L (2-5%)	L (5%)
Jagatsinghpur	M (20-25%)	L (5%)	L-M (10-12%)	L (5%)	L-M (10-12%)	-

District	**Insect Pests**				
	BPH	**SB**	**Termites**	**Rats**	**GB**
Kendrapara	L-M (5-15%)	L-M (5-15%)	L (2-5%)	L (%%)	-
Cuttack	L (2-10%)	L-M (2-12%)	-	L (2%)	-
Nayagarh	L-M (10-15%)	L-M (10-12%)	L-M (2-10%)	L (2-5%)	L-M (10-12%)
Jagatsinghpur	M (12%)	L-M (5-12%)	-	-	-

Punjab (Ludhiana): 2019-2020

Districts surveyed: *Ludhiana, Kapurthala, Bathinda, Sangrur, Patiala, Gurdaspur, Amritsar, Tarn Taran, Jallandhar, Moga* and *Barnala*

Table 1: Details of survey

Districts	Villages
Ludhiana	Mehandipur, Burj Littan, Jagsoan, Raikot, Baddowal, Jangpur, Halwara, Balewal, Falewal, Noorpur, Shaku Kalan, Boparai Kalan, Parjian, Hambran, Talwara and Bhogiwal
Kapurthala	Dadwindi, Bhaur, Manila, Naseirewal, Thalwandipai, Sandhowal, Barindpur, Rampur Jagir, Toti, Bhaur and Tashpur
Bathinda	Kararwala, Mehrajphool, Rampuraphod, Sidhana, Phool, Harnarsinghwala, Raike Kalan, Jaitulee, Jainwind and Kanarwala
Sangrur	Bhelwan 2, Pasor, Dhuri, Bhalwan, Bhojewal, Lehra Mohabat, Rohira, Kup Kalan, Bhogiwal, Maler Kotla and Galwatti
Patiala	Kaler Bhani, Dalanpur and Galwatti
Gurdaspur	Kalanaur, Braich and Dhariwal
Amritsar	Balliah, Bhoorshi Rajputana, Wadala Khurd and Bhai Ladhu
Tarn Taran	Rampur, Kasel and Kot Mohammad Khan
Jallandhar	Billi Braich, Budhanwal and Pulana
Moga	Saffu Wala, Gill and Nidhan Wala
Barnala	Sanghera, Nazim ke Kalan, Nihal Singh Wala and Handia

Table 2: Widely prevalent rice varieties

Districts	Varieties
Ludhiana	**HYVs:** Pusa 44, PR 121, PR 127 and others; **Basmati:** Pusa Basmati1121 and Pusa Basmati1509
Kapurthala	**HYVs:** Pusa 44, PR 126 and PR 121
Bathinda	**HYVs:** PR 126, Pusa 44, PR 122 and PR 121; **Basmati:** Pusa Basmati 1121, Pusa Basmati 1509 and Pusa Basmati 1; **Hybris:** Sava 127
Sangrur	**HYVs:** Pusa 44, PR 121, PAU 201 and PR 122; **Basmati:** Pusa Basmati 1509 and Pusa Basmati 1121
Patiala	**HYVs:** PR 121 and Pusa 44; **Basmati:** Pusa Basmati 1637, Pusa Basmati 1121 and Pusa Basmati 1509
Gurdaspur	**HYVs:** PR 121, PR 122, PR 127 and PR 126; **Basmati:** Pusa Basmati 1121 and Pusa Basmati 1509
Amritsar	**HYVs:** PR 126, PR 121 and PR 114; **Basmati:** Pusa Basmati 1121, Pusa Basmati 1509 and CSR 30
Tarn Taran	**HYVs:** PR 114, PR 121 and Pusa 44; **Basmati:** Pusa Basmati 1121, CSR 30 and Pusa Basmati 1509
Jallandhar	**HYVs:** PR 126, PR 121 and Pusa 44; **Basmati:** Pusa Basmati 1121
Moga	**HYVs:** PR 121 and Pusa 44; **Basmati:** Pusa Basmati 1121
Barnala	**HYVs:** Pusa 44; **Basmati:** Pusa Basmati 1121

Production oriented survey was conducted in 11 districts of Punjab viz., Ludhiana, Kapurthala, Bathinda, Sangrur, Patiala, Gurdaspur, Amritsar, Tarn Taran, Jallandhar, Moga and Barnala when the crops were in booting to heading stage. In general, the weather conditions were normal for rice cultivation. During *Kharif* 2019 in Punjab, paddy was grown on an area of around 29.5 lakh hectares. Non-Basmati and Basmati varieties occupied around 80 and 20 per cent area, respectively. Among the non-Basmati group, PR 121 was the most popular variety and to occupied 24 per cent area and PR 126, Pusa 44, PR 124, PR 122 and PR 114 were the other popular varieties. On the other hand, among the Basmati group, Pusa Basmati 1121 was the predominant variety followed by Pusa Basmati 1509. The details of the varieties cultivated by different farmers are presented in Table 2.

Table 3: General informations

Parameters	**Districts**		
	Ludhiana	**Kapurthala**	**Bathinda**
# of villages surveyed	16	11	10
# of farmers interviewed	19	16	14
Field ecosystem	Irrigated	Irrigated	Irrigated
Weather conditions during cropping season	Normal	Normal	Normal
Crop stage when survey was made	Booting to heading	Heading	Booting to heading
Main Crop rotations	Rice-wheat (main) Rice-potato	Rice-potato	Rice-wheat, rice-potato

Parameters	**Districts**		
	Sangrur & Patiala	**Gurdaspur, Amritsar & Tarn Taran**	**Jallandhar, Moga & Barnala**
# of villages surveyed	14	10	10
# of farmers interviewed	18	10	10
Field ecosystem	Irrigated	Irrigated	Irrigated
Weather conditions during cropping season	Normal	Normal	Normal
Crop stage when survey was made	Booting to heading	Booting to heading	Booting to heading
Crop rotations	Rice-wheat (Main) Rice-potato (few)	Rice-wheat	Rice-wheat (main) Rice-potato (some)

A. Cropping system and rice yield: Rice was cultivated under irrigated conditions. Almost all the farmers followed rice-wheat cropping system. Some farmers also followed rice-potato crop rotation (Table 3). Average rice yield in different high yielding varieties ranged from 7550-8600 kg/ha while in case of basmati varieties, it was 4300-5400 kg/ha (Table 4). Some farmers cultivated rice hybrid Sava 127.

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

Varieties	Yield (kg/ha)			
	Ludhiana	**Bathinda**	**Sangrur & Patiala**	**Jallandhar, Moga & Barnala**
PR 121	7850-8250		8100-8300	
Pusa 44	7550-8150	8000-8600	7900-8500	8100
PR 126		8100		
Pusa Bas 1		5400		
Pusa Bas 1509		4650-4800	4950	
Pusa Bas 1121			4300-4800	
Sava 127 (Hybrid)		6500-6800		

Table 5: Details of nursery management

Parameters	Districts		
	Ludhiana	**Kapurthala**	**Bathinda**
Planting time	HYVs: June 2nd week Basmati: 1st week to 3rd week of July	NA	2nd – 4th week of June
Seed rate	10-20 kg/ha	NA	10-20 kg/ha
Seed treatment (% farmers adopted)	Yes (50%)	NA	Yes (~ 65%)
Chemicals used for seed treatment	Carbendazim	NA	Carbendazim, streptocycline
Organic manure in nursery (% farmers adopted)	Yes (52%) FYM	NA	Yes (70%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (100%) Urea (50-60 kg/acre) DAP (20-24 kg/acre) ZnSO4 (5-20 kg/acre)- about 30% farmers	Yes (100%) Urea (40-65 kg/acre) DAP (20 kg/acre) ZnSO4 (5 kg/acre)- about 12% farmers	Yes (100%) Urea (40-70 kg/acre); DAP (15-24 kg/acre); ZnSO4 (33% Zn) (20-25 kg/ acre)- ~57% farmers

Parameters	Districts		
	Sangrur & Patiala	**Gurdaspur, Amritsar & Tarn Taran**	**Jallandhar, Moga & Barnala**
Planting time	HYVs: 2nd-3rd week of June; Basmati: 1st week of July	NA	June 3rd week
Seed rate	12-15 kg/ha	NA	12-15 kg/ha
Seed treatment (% farmers adopted)	Yes (~85%)	NA	Yes
Chemicals used for seed treatment	Carbendazim, streptocycline	NA	Carbendazim
Organic manure in nursery (% farmers adopted)	Yes (100%) FYM, Green manure	NA	Yes FYM
Inorganic manure in nursery (% farmers adopted)	Yes (100%) Urea (48-65 kg/acre) DAP (20-25 kg/acre) ZnSO4 (33% Zn) (15-25 kg/ acre)- about 40% farmers	Yes (100%) Urea (60-65 kg/acre) DAP (20 kg/acre)	Yes (100%) Urea (40-65 kg/acre) DAP (20 kg/acre) ZnSO4 (21% Zn) (20 kg/ acre)- about 10% farmers

NA: Not available

B. Nursery and main field Management: Average seed rate was 10-20 kg/ha. The seed treatments practices were applied by majority of the farmers. Rice crop was transplanted between June 13 to June 30 and Basmati was transplanted during first week of July to 3rd week of July at farmer's field. Planting was random and proper plant population was not maintained. In most of the cases, planting density was inadequate i.e. it varied from 18-22 plants/ m^2 as against recommended density of 33 plants/ m^2. Mostly farmers transplanted 30-40 days old nursery. 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, owing to higher status of these nutrients in their soils (Table 6). Application of Zinc sulphate (either 21 or 33%) is practiced by farmers but they used under dose of zinc. Few farmers applied farm yard manure and green manure in the field.

Table 6: Details of main field management

Details	**Districts**			**Remarks**
	Ludhiana	**Kapurthala**	**Bathinda**	
Planting method	Random transplanting			
Total N applied (Kg/ha)	40-150	60-150	90-145	Urea
Total P_2O_5 applied (Kg/ha)	12-30	30	12-30	
Total K_2O applied (Kg/ha)	18-20 (~10% farmers)	30 (~6% farmers)	12-30 (~21% farmers)	
$ZnSO_4$ applied (Kg/ha)	15-20 (33% Zn) ~ 26% farmers	15 (33% Zn) ~ 26% farmers	15-20 (33% Zn) ~ 57% farmers	
Organic fertilizers applied	FYM (16% farmers) GM (10% farmers)	NA	GM (36% farmers)	

Details	**Districts**			**Remarks**
	Sangrur & Patiala	**Gurdaspur, Amritsar & Taran Tarn**	**Jallandhar, Moga & Barnala**	
Planting method	Random transplanting			
Total N applied (Kg/ha)	30-145	150	70-130	Urea
Total P_2O_5 applied (Kg/ha)	12-30	NA	NA	
Total K_2O applied (Kg/ha)	30 (~10% farmers)	NA	NA	
$ZnSO_4$ applied (Kg/ha)	12.5-20 (33% or 21% Zn); 50% farmers	NA	NA	
Organic fertilizers applied	NA	NA	NA	

NA: Not available

C. Weeds and their Management: Overall, intensity of weeds was low throughout Punjab. Commonly recorded weeds were *Echnochloa crusgalli* and *Leptochloa chinensis*. Most of the farmers applied pretilachlor and butachlor. Some of the farmers also used other herbicides like bispyribac sodium, Saathi and others for management of weeds (Table 7). Many farmers also used hand weeding in addition to herbicides. A small fraction of farmers did not use any weedicide but they adopted cultural method of weed control i.e. ponding of water for the first 15 days of crop cycle.

Table 7: Weeds and weed management

Details	Districts			Remarks
	Ludhiana	**Kapurthala**	**Bathinda**	
Weed intensity	Low	Low	Low	About 30-78% farmers also practiced hand weeding in addition to herbicides
Names of the weeds	*Echnochloa crusgalli* and *Leptochloa chinensis*			
Weedicides used	Bispyribac Sodium (250 ml/ha), pretilachlor (1.5 l/ha), Saathi (pyrazosulfuron ethyl) (120-150 g/ha), butachlor (2.5 l/ha) and anilophos (500 ml/ha)			
Percentage of farmers applied herbicides	Yes (85-90%)	Yes (100%)	Yes (100%)	
Wild rice incidence	Nil	Nil	Nil	

Details	Districts			Remarks
	Sangrur & Patiala	**Gurdaspur, Amritsar & Tarn Taran**	**Jallandhar, Moga & Barnala**	
Weed intensity	Low	Low	Low	About 30-83% farmers also practiced hand weeding in addition to herbicides
Names of the weeds	*Echnochloa crusgalli* and *Leptochloa chinensis*			
Weedicides used	Bispyribac Sodium (250 ml/ha), pretilachlor (1.5 l/ha), Saathi (pyrazosulfuron ethyl) (120-150 g/ha), butachlor (2.5 l/ha) and anilophos (500 ml/ha)			
Percentage of farmers applied herbicides	Yes (83%)	Yes (~80%)	Yes (75-80%)	
Wild rice incidence	Nil	Nil	Nil	

D. Input use: Many progressive farmers used implements like Tractor, disc harrow, cultivator, planker, combined harvester. Seed replacement rate was also very high. Canal and deep tube wells were the main sources of irrigation. However, majority of the farmers expressed scarcity of irrigation water. Fertilizers and pesticides were readily available and farmers were also happy with the quality of fertilizers and pesticides. In addition to their own decisions, farmers received advices from officials of state department of agriculture, university and private dealers.

Table 8: Details of inputs used

Details	Districts		
	Ludhiana	**Kapurthala**	**Bathinda**
Implements used	Tractor, disc harrow, cultivator, planker, combined harvester		
Seed replacement rate	80-100%	NA	NA
Source of irrigation	Canal (100%) Deep tube well (100%)	Canal (100%) Deep tube well (100%)	Canal (100%) Deep tube well (100%)
Scarcity of irrigation water	Yes (100%)	Yes (100%)	Yes (100%)
Availability of fertilizers/ pesticides	Available (100%)	Available (100%)	Available (100%)
Quality of fertilizers/ pesticides	Yes (100%)	Yes (100%)	Yes (100%)
Advisors to the farmers	State Dept (100%) Pvt Dealers (100%) Univ Staff (100%)	State Dept (100%) Pvt Dealers (100%) Univ Staff (100%)	State Dept (100%) Pvt Dealers (100%) Univ Staff (100%)

Details	Districts		
	Sangrur & Patiala	**Gurdaspur, Amritsar & Tarn Taran**	**Jallandhar, Moga & Barnala**
Implements used	Tractor, disc harrow, cultivator, planker, combined harvester		
Seed replacement rate	80-100%	NA	NA
Source of irrigation	Canal (100%) Deep tube well (100%)	Canal (100%) Deep tube well (100%)	Canal (100%) Deep tube well (100%)
Scarcity of irrigation water	Yes (100%)	Yes (100%)	Yes (100%)
Availability of fertilizers/ pesticides	Available (100%)	Available (100%)	Available (100%)
Quality of fertilizers/ pesticides	Yes (100%)	Yes (100%)	Yes (100%)
Advisors to the farmers	State Dept (100%) Pvt Dealers (100%) Univ Staff (100%)	State Dept (100%) Pvt Dealers (100%) Univ Staff (100%)	State Dept (100%) Pvt Dealers (100%) Univ Staff (100%)

E. Biotic stress and their management: Among diseases, sheath blight was wide spread in low to moderate intensity throughout Punjab. Very high incidence of sheath blight (up to 100%) was recorded on Pusa 44 in Rampur Jagir viallge of Kapurthala. Similarly high incidence of sheath blight (40-50%) was recorded on PR 126 in Billi Braich village of Jallandharn (Table 9). Other diseases like neck blast, brown spot, sheath rot, false smut, grain discoloration, bakanae, stem rot and bacterial blight and insect pests like stem borer, leaf folder, BPH and WBPH were recorded in low to moderate intensities. Low incidence was recorded from few fields in district Ludhiana, Moga and Sangrur districts on varieties Pusa 44 and PR 121. Small patches of hopper burn due to BPH were observed in villages Fagan Majra, Bhagwan Pura, JaboMajra, Jahlan in Dist. Patiala; Mehandipur in Districts Ludhiana on variety Pusa 44; and at RRS, Gurdaspur. Different pesticides were applied by the farmers for management of different pests and diseases (Table 10).

Table 9: Prevalence of diseases and insect pests in Punjab during *Kharif*' 2019

Districts	Diseases								
	NBl	**BS**	**ShBl**	**ShR**	**FS**	**GD**	**Bak**	**StR**	**BB**
Ludhiana		L (2-7%)	L-M (5-20%)	L (5-10%)	T (1-2%)	T (1-2%)	L (2-5%)		
Kapurthala			L-S (5-100%)	L-M (5-20%)	T (1-2%)	T (1-2%)			
Bathinda	L (2-3%)	L (4-5%)	L (2-10%)		T-L (1-5%)	T (1-2%)	L (2-3%)	L (10%)	L (5%)
Sangrur & Patiala	L (2-3%)	L (2-10%)	L-M (2-15%)		T-L (1-4%)		T-L (1-3%)	L (2-10%)	
Gurdaspur, Amritsar & Tarn Taran	L (2-3%)	L-M (8-16%)	T-M (1-20%)		T-L (1-3%)	L (2-7%)	L (2-4%)		
Jallandhar, Moga & Barnala	T-L (1-5%)		L-S (5-50%)	L (4-5%)	T (1-2%)	T (1-2%)	T-L (1-3%)	L (2-3%)	L (5-7%)

Low incidence (1-3%) of Erwinia rot in Ludhiana, Sangrur and Moga

Districts	**Insect pests**			
	LF	**SB**	**BPH**	**WBPH**
Ludhiana	T-L (1-5%)	T-L (1-4%)	L (3-7%)	L (2-3%)
Kapurthala	L (2-5%)	T-L (1-5%)	L (3-7%)	T (1-2%)
Bathinda	T-L (1-4%)	T-L (1-3%)	L (3-10%)	L (2-3%)
Sangrur & Patiala	L (2-5%)	T-L (1-4%)	L (4-10%)	L (2-3%)
Gurdaspur, Amritsar & Tarn Taran	L (3-5%)	T-L (1-3%)	L (7-10%)	T-L (1-4%)
Jallandhar, Moga & Barnala	T-L (1-3%)	T-L (1-4%)	L (2-7%)	T-L (1-3%)

Table 10: Details of pest Management

Details	**Districts**					
	Ludhiana	**Kapurthala**	**Bathinda**	**Sangrur & Patiala**	**Gurdaspur, Amritsar & Tarn Taran**	**Jallandhar, Moga & Barnala**
% age farmers adopting plant protection	NA	NA	NA	NA	NA	NA
Names of pesticides	**Insect pests:** Chess (pymetrozine) @ 120 g/acre, dinitofuran (Oshin), DDVP, thiomethoxam (100 ml/acre), Pexalon (triflumezopyrim) and Confidor (40 ml/acre) for BPH; Padan (7 kg/acre), Fame (flubendamide) (30 g/acre), Coragen (60 g/acre), thimet, Regent (5 kg/acre) and Plethora (Novaluron + Indoxacarb) (200 ml/acre), for leaf folder and stem borer and Chlorpyriphos 20 EC (1 litre/acre) for termites **Diseases:** Tilt (200 ml/acre), Nativo (100 g/acre), monceren (200 ml/acre), Custodia (200 ml/acre) for sheath blight and false smut					
# of pesticide sprays	NA	NA	NA	NA	NA	NA
Mixing of pesticides before application	NA	NA	NA	NA	NA	NA

Tamil Nadu (Coimbatore): 2019-2020

Districts surveyed: *Dharmapuri, Thiruvanamalai, Karur, Dindigul, Ramanathapuram, Erode* and *Coimbatore*

Details of survey

Districts	Blocks	Villages
Coimbatore	Thodamuthur, Anamalai and Pollaci	K.G. Pudur, Vedapatti, Narasipuram, Thaneer-panthall palayam, Singampatti, Vadakkipalayam, Maniampalayam and Rajagoundanoor
Dharmapuri,	Dharmapuri, Harur, Morappur, Kariappatti and Pappireddypatty	Kulathoor, Sandhaipatty, Pasarapati, Soolakottai, Melmangalam pudur, Navapatty, Kaveripalayam, Naduppatty and Maniyampadi
Thiruvannamalai	Chengam and Thandarampet	Peranampet, Chengam, Melsiruvalur, Moongil-thuraipattu and Thandarampet
Erode	Perundurai, Gobichetti-palayam, Anthiyoor, Sathyamangalam, Bhavani, T. N. Palayam and Gobi	Pethampalayam, Karatadipalayam, Ennaman-galam, Kangampalayam, Kodiveri, Ealoor, Ammapettai, Arakkankottai, Vellalapalayam and Nallampatty
Dindigul,	Nilakottai, Vadipatty and Batlagondu	Vilampatty, Myleripatti, Ammapalayam and Sendhampatti,
Ramanathapuram	Paramakkudi, Bogalur and Ramanathapuram	Melaperungarai, Keelaperungarai, Illanthaikulam, Keelakottai and Achunthanvayal
Karur	Karur, Mayanoor, Theerthamalai, Pettavai-thalai and Thogaimalai	Cheranoor, Nadupatty, Ponmalaipatty, Nattar mangalam, Aandiyoor, Melavalasa, Ariyapatty and Nichampalayam

Widely prevalent rice varieties

Districts	Varieties
Coimbatore	**HYVs:** CO 51, CO 52, ADT 43, ADT 45, ASD 18, Ponni and Akshaya
Dharmapuri and Thiruvannamalai	**HYVs:** Amman BT, ADT 43, White Ponni, Archana, Sowbackya, BPT 5204 and Dhanista
Erode	**HYVs:** Akshaya, BPT 5204, Improved White Ponni, CO 51
Dindigul and Ramanathapuram	**HYVs:** NLR, Anna 4, ADT 39, ADT 43, ADT 45, ADT 51, CO 51, CO(R)51, TKM 13, Improved white ponni, BPT 5204, Dhanuska and Tirupthi
Karur	**HYVs:** ADT 38, ADT 39, ADT 43, ADT 45, ASD 16, BPT 5204, Improved white ponni, Akshaya, Amman and NLR

In Tamil Nadu, Production Oriented Survey was conducted in 7 districts *viz*., Coimbatore, Dharmapuri, Dindigul, Erode, Karur, Ramanathapuram and Thiruvannamalai. During the survey, the stage of the rice crop was varied from tillering to maturity stage. Good amount of rainfall was received and farmers depend on the canal irrigation were able to grow the rice crop during kuruvai season. Delayed planting was done in Thaladi season in few districts. During 2019-20, farmers preferred short and medium duration varieties. Prevalent varieties

grown by the farmers were ADT 38, ADT 39, ADT 43, ADT 45, ASD 16, ASD 18, BPT 5204, NLR, White Ponni, Improved white ponni, Akshaya, Amman and Dhanista. Average yield of the crop was varied from 5 to 6.5 t/ha. Crop rotations practiced by the farmers varied across the state. n case of three crops, common crop rotation was rice-rice followed by pulses/ ugarcane/ aize and in case of two crops rice was followed by banana/black gram/ groundnut/ turmeric/ sorghum/ finger millet/ Tapioca. Most of the surveyed farmers applied FYM during land preparation @ 5-15t/ha. Majority of the farmers purchased seeds from local retailers and used seed rate of 50 to 80 kg/ha. Few farmers adopted SRI technique of cultivation with 10kg of seed. Seed treatment with carbendazim and *Pseudomonas fluorescens* 2 10g/kg was adopted by majority of the farmers. Random, line and direct method of transplanting was adopted. Machine method of planting was also observed in few places of the surveyed districts. With respect to fertilizer application, farmers applied complex fertilizer containing 17:17:17 NPK along with DAP as basal fertilizer. Few farmers applied micro nutrients and $ZnSO_4$ along with basal application. Urea and potash was applied as top dressing along with neem cake. Weed intensity was low to medium and herbicides like butachlor (pre emergence) and bispyribac sodium (early post emergence) were used along with one or two hand weeding for weed management. Most of the farmers depend on the canal irrigation and few had deep tube well irrigation facilities. Low incidence of sheath blight; low to moderate incidence of leaf and neck blast, brown spot, bacterial blight were recorded. Fungicides viz., tricyclazole, tebuconazole, propiconazole, azoxystrobin and carbendazim were used for disease management. Gall midge and false smut emerged as major biotic constraint during this year especially in Cauvery delta zone. Insecticides viz., imdiachlorprid, thiomethaxim, acephate, profenophos, chlorpyriphos and monocrotophos were used for the management of gall midge, BPH, leaf folder and stem borer. In gall midge infected areas, farmers used even four sprays. In general, higher dose of chemicals were used of the control of gall midge, stem borer and leaf folder. Farmers mix fungicides and insecticides and apply as prophylactic spray. Most of the farmers were not aware of the pesticide name and they were unable to distinguish pest and disease incidence in field. Farmers used implements viz., power tiller, tractor and machine harvester. Farmers depend on the private dealers for fertilizers, pesticides and seed. Most of the farmers used combine harvester due to shortage of labourers. Their requirements were short duration premium varieties with high market price and non lodging type for machine harvest.

District wise observations

Coimbatore: In this district the crop was grown under irrigated ecosystem and the survey was conducted during booting, heading, milking stage of the rice crop. Farmers were used 25-100% of their area for rice cultivation and most of them preferred to grow sugarcane, banana and coconut. Most commonly practiced crop rotations were rice followed by rice/sugarcane/banana/turmeric and rice-rice-pulses. The commonly grown varieties are CO 51, CO 52, ADT 43, ADT 45, ASD 18, Ponni and Akshaya. Yield of the crop varies between 5.6 to 7.5 Q/ha. Survey report reveals that the reason for high yield in this district may be due to adoption of practices viz., IPM, INM and optimum spacing and growing of green manure crops. About 25-30 kg seed was used per hectare and eighty percent of the farmers adopted seed treatment with carbendazim 50 WP @ 2 g/kg along with *Pseudomonas flourescens* @10 g/kg. and few farmers did not practice seed treatment. In nursery most of the farmers applied FYM and vermicompost. In addition they applied 25-40 kg of urea; 30-50kg of DAP/20 cents. In case of main field 120-200 kg of N was applied as urea, DAP; 20-75 kg of P as SSP, complex, DAP; 20 to 75 kg of K_2O as MOP, complex per hectare. In addition, some farmers

applied $ZnSO_4$. As organic supplement FYM @ 6-15 Q/ha was also applied. Few farmers applied 10 tonnes of green manure along with FYM. Majority of the famers adopted random method of planting and few farmers adopted SRI and line planting method. Major weed species were *Cyperus* sp. Hand weeding is used a common practice for weed management and few farmers applied Butachlor and Pretilachlor. Farmers hired implements like *viz*., harvester and thresher. Seed replacement ratio was 100%. Farmers were happy with canal and deep tube well irrigation facility, electricity, timely availability of fertilizers. Few farmers expressed shortage of fertilizers. They depend on state department, dealers and University officials. With respect to diseases low incidence of leaf and neck blast, brown spot, sheath rot, false smut, sheath blight and bacterial blight (8%). With respect to pest, green leaf hopper, leaf folder and stem borer infestation was very low. In case of gall midge about 6-10% incidence reported with BPT 5204 and CO-52 varieties. Farmers expressed peacock damage as problem in rice cultivation. Farmers used power sprayers and number of application of pesticide was varied from 1 to 2 and most of the farmers mix 2 pesticides. Most of the farmers are not happy with the profit in rice cultivation.

Dharmapuri and Thiruvannamalai: In Dharmapuri district Arathanapatti, Periyapanamuttu, Kalveli blocks were surveyed. Survey was conducted at Heading, Booting, milking and maturity stages of the crop and the district belongs to irrigated ecosystem. The farmers utilized 100% of their lands for rice cultivation and second crop was Rice/Tapioca/Sugar cane/Groundnut/finger millet/sorghum/Pulses. In the surveyed blocks Amman BT, ADT 43, White Ponni, Archana, Sowbackya, BPT 5204 and Dhanista were the major rice varieties cultivated. The average yield reported by the farmers is varied between 5.4 to 7.2 Q/ha. Planting was done between September 2^{nd} week to December 3^{rd} week. Farmers used an average seed rate of 20-35 Kg/ha. About 75% percent of the surveyed farmers adopted seed treatment either with carbendazim @2- 4g/Kg or Tricyclazole 2-3 g/Kg along with *Pseudomonas fluorescens* @ 10 g/Kg of Seed. Most of the farmers applied inorganic fertilizers and in addition, forty percent of the farmers applied vermicompost during raising of the nursery crop. In nursery 15 to 30 Kg of DAP, 10-20 Kg of Urea, 10 Kg of Super Phosphate per acre was applied. In the main fields, farmers applied fertilizers in the form of N @ 120 - 175 Kg N/ha as Urea or DAP, Complex; P @ 40 – 60 Kg /ha as Complex or DAP or Super Phosphate and K @ 40- 70 Kg/ha as MOP. Few farmers applied 20 Kg of $ZnSO_4$ /ha. Most of the farmers applied organic amendments as FYM @ 4 – 12 t/ha. Mostly random method of transplanting was adopted followed by SRI planting method and few farmers adopted line method of planting. In general weed infestation was medium to low and hand weeding was adopted. Common weed species were *Cyperus* sp, *Echinochloa colona* and *Eclipta alba*. Farmers applied weedicide *viz*., Butachlor and Pretilachlor. Implements viz., sprayer and power weeder were owned by them and they hired the implements viz., thresher, transplanter, puddler, harvester and tractor. In this district, majority of the farmers preferred to use fresh seeds except few farmers wherein they use their own seed. No scarcity of irrigation water and electricity was reported except few farmers. Most of the farmers reported the non availability of fertilizers especially shortage of Urea. They discuss with state government, private dealers, and university officials for clarification about cultivation practices. With respect to biotic constraints, low incidence of leaf and neck blast, false smut, brown spot, sheath rot and bacterial leaf blight; very low incidence of grain discolouration and bakanae was reported. Among the pests, low intensity of leaf folder, stem borer and brown plant hopper; moderate intensity of gall midge (10% to 12%) was reported. In few places rat problem was also recorded. Zinc deficiency was reported by seventy percent of the farmers. With respect to pesticides they used dimethoate, and carbendazim. Most of the

farmers applied 2 to 4 number of pesticide application per season and mostly they mix 2 to 3 pesticides. Few farmers expressed wild boar and peacock menace; irregular marketing facility and unavailability of fertilizers as a problem for rice cultivation. Majority of the farmers are happy to continue rice cultivation except few farmers.

Erode: In this district rice is cultivated under irrigated ecosystem. Survey was conducted during heading, booting, milky and dough stage of the rice crop. Weather conditions were normal during crop season. Most of the surveyed farmers utilized 40% - 100% of their land for rice cultivation. Prevailing varieties in the district were Akshaya, BPT 5204, Improved White Ponni, CO 51 and yield varied between 5500 to 7500 kg/ha. Reason for low yield was high incidence of blast and stem borer. Adoption of INM and SRI techniques, optimum plant population, timely application of fertilizers, plant protection measures were considered as important factors for high yield. Planting was done during August 4th week to 1st week of December. Seed rate was varied from 10 to 30 kg/ha and majority of the farmers adopted seed treatment with carbendazim @ 2 - 4 g/kg and *P. flourescens* @10g/kg. About forty percent of the farmers were applied organic amendment as FYM and vermi compost. All the farmers applied inorganic fertilizers viz., urea @ 15-30 kg/ha and DAP @ 15-30 kg/ha. In main field N was applied @ 125 – 175 kg/ha as Urea, DAP, Complex; P was applied @ 40-75 kg/ha as DAP, Complex, SSP and K was applied @ 40-65 kg/ha as MOP. Few farmers applied $ZnSO_4$ @ 20 kg/ha. Most of the farmers applied organic supplement as FYM @ 5-15 t/ha. All the surveyed farmers adopted random method of transplanting and few farmers adopted line and SRI method planting. Weed intensity was low and the common weed spp were *Echinochloa colona, Cyperus sp* and *Eclipta* sp. Seventy percent of the farmers adopted hand weeding and forty percent of the farmers applied weedicides viz., Butachlor and Pretilachlor. Implements viz., power sprayer was owned by farmers whereas harvester, transplanter, thresher and powder weeder were hired during harvesting. All the surveyed farmers used purchased seeds and seed replacement ratio was 100%. Source of irrigation was canal and a source of power was electricity. Most of the farmers reported shortage of urea and few were not satisfied with the quality of the fertilizers. Mostly they depend on their own decision, state government officials, dealers, university officials for the advice with respect to cultivation. Diseases viz., leaf and neck blast, brown spot, sheath blight, bacterial blight and false smut were recorded in low incidence. Similarly pests viz., leaf folder, stem borer, green leaf hopper, whorl maggot and mite intensity was low. Farmers expressed peacock damage and labour shortage as problem in rice cultivation. Farmers used power sprayers and number of application of pesticide was varied from 1 to 3 and most of the farmers mix 2 to 3 pesticides. Fifty percent of the farmers felt happy and 50% of the farmers are not happy with the profit in rice cultivation.

Dindigul and Ramanathapuram: Survey was conducted during the tillering, booting, heading, and dough stage of the rice crop. Weather conditions were normal and 50-100% of the land was utilized for rice cultivation. Common crop rotation was rice-rice-pulses; rice-rice-sugarcane; rice followed by banana/black gram/groundnut. Commonly grown varieties were NLR, Anna 4, ADT 39, ADT 43, ADT 45, ADT 51, CO 51, CO(R)51, TKM 13, Improved white ponni, BPT 5204, Dhanuska and Tirupthi and the yield varied from 5.6 Q to 8 Q/ha. Planting was completed between second week of August to 3rd week of December. Majority of the farmers adopted seed treatment with canbendazim @ 2-4/kg along with *Pseudomonas fluorescens* @ 10g/kg and few were applied Azospirillum. Few farmers applied organic fertilizers (FYM, Vermicompost and Poultry manure). In nursery, majority of the farmers applied inorganic fertilizers (Urea @ 120-200 kg/ha; DAP @200-250 Kg/acre

and K_2O @ 75 kg/acre) application. In main field N @ 140-200 kg/ha as Urea, DAP; P @ 40-75 kg/ha as DAP, Super Phospahte and K @ 30-70 kg/ha as MOP was applied. About fifty percent of the farmers applied $ZnSO_4$ @ 20- 25 kg/ha. Organic amendments like FYM were also applied @ 5 – 15 t/ha. Majority of the farmers adopted random method of planting and in addition line transplanting and SRI were also adopted by few farmers. Weed intensity was low to medium and hand weeding was practiced for weed management. Herbicides viz., Pretilachlor and Fenclorim were also used for weed management. Implements viz., sprayer, harvester, cultivator, tractor, conoweeder, and thresher were hired for cultivation practices and few farmers owned sprayers. Seed replacement ratio was 100%. They depend on canal irrigation and satisfied with inputs like irrigation and electricity. Few farmers expressed unavailability of urea during crop season. They depend on state department officials, dealers and University officials for clarifications. With respect to diseases, low incidence of leaf and neck blast, brown spot and sheath blight was recorded. Moderate incidence of false smut and sheath rot was reported in few places. Low intensity of BPH, GLH, leaf folder, stem borer and moderate intensity of gall midge was observed. To manage diseases, tricyclazole, carbendazim were sprayed and for insects imdidachloprid, thiomethoxam and dimethoate were used. Most of the farmers applied 2 – 3 sprayings of pesticide and most of the time they mix 2 to 3 pesticides together. During the survey, sixty percent of the farmers reported Zinc deficiency. Peacock menace, wild boar, shortage of farm labours and water pollution were reported as problem for rice cultivation. Even though problems are there in rice cultivation, farmers felt happy with rice cultivation.

Karur: Survey was conducted during the heading, booting and dough stage of the rice crop. Farmers utilized 100% of their land for rice cultivation and prevalent crop rotation practice was rice-rice-pulses; rice-rice-maize, rice-maize-rice, rice-sugarcane and rice-rice. Commonly grown varieties were ADT 38, ADT 39, ADT 43, ADT 45, ASD 16, BPT 5204, Improved white ponni, Akshaya, Amman and NLR. Average yield was varied between 4500 – 7300 kg/ha. Practices viz., adoption of INM, IPM practices, application of organic and inorganic fertilizers, SRI method of cultivation and timely application of plant protection practices will lead to high yield. Neck blast was an issue for getting low yield in the variety white ponni. Planting was completed in the 3rd week of December, 2019. Average seed rate was 20 – 25 kg/ha and 8 kg was used in SRI method of cultivation. Seed treatment was a common practice (carbendazim @ 2-4 g/kg along with *P. fluorescens* @10g/kg) and majority of the farmers applied organic manure in terms of either FYM or poultry manure or vermicompost. Inorganic manures were also applied as urea @ 75-150kg/acre and DAP @ 50-100 kg/acre and 50-100 kg/acre of super phosphate. In the main field N was applied @ 125-180 kg as Urea/complex, 50-60 kg of P as SSP, 50-60 kg of K as MOP and 20 kg of $ZnSO_4$/ha. In addition all the farmers applied organic fertilizers as FYM 4-15t/ha and few applied vermicompost. Random method of transplanting was adopted and thirty percent of the farmers adopted SRI technique. In general weed infestation was low to medium and the major weed species are *Echinochloa* sp, *Eclipta alba* and *Cyperus* sp. About sixty percent of the farmers adopted hand weeding and forty percent of the farmers applied herbicides viz., Pretilachlor and Butachlor. Farmers owned or hired implements *viz.*, tractor, knapsack sprayer, thresher, planter and cultivator for various cultural operations. Seed replacement ratio was 100%. Source of irrigation was canal and there was no scarcity of water. Farmers depend on electricity as a source of power and they reported shortage of urea. Mostly they depend on the state department officials, dealers, university officials for advice/suggestion with respect to cultivation. Among the diseases low incidence of leaf blast, brown spot, sheath rot, false smut and moderate incidence of neck blast (12%), and bacterial blight (15%)

was observed. Low intensity of GLH, leaf folder, stem borer, whorl maggot and moderate intensity of gall midge (18%) was recorded. Farmers applied pesticides viz., imidachlorpid and monocrotophos. All the farmers used power sprayer for application of pesticides and maximum of 3 rounds of pesticides were given in a crop season. Most of the farmers mix 2 or 3 pesticides together. Farmers reported water pollution because of textile units. About seventy percent of the farmers reported zinc deficiency and only fifty percent of the farmers were happy with rice cultivation.

Prevalence of diseases and insect pests in Tamil Nadu

Districts	Diseases						
	Bl	**NBl**	**BS**	**SHBl**	**SHR**	**FS**	**BLB**
Dharmapuri	L	-	L	L	-	L	L
Thiruvannamalai	L	M	L	-	L	L	L
Karur	L	L	L	-	L	M	M
Dindigul	M	L	-	L	L	M	M
Ramanathapuram	L	-	M	L	L	L	L
Erode	L	L	L	-	-	L	L
Coimbatore	L	L	M	-	L	L	L

Districts	Insect Pests						
	SB	**LF**	**BPH**	**Thrips**	**GM**	**GLH**	**WM**
Dharmapuri	L	L	-	-	L	-	L
Thiruvannamalai	M	L	L	L	M	-	-
Karur	L	L	L	-	M	L	L
Dindigul	L	L	-	-	S	L	M
Ramanathapuram	L	L	-	L	M	-	-
Erode	L	L	-	L	M	-	L
Coimbatore	L	L	-	-	M	L	-

Telangana (Rajendranagar): 2019-2020

Districts surveyed: *Nizamabad, Kamareddy, Karimnagar, Jagtial, Peddapalli, Rangareddy, Vikarabad, Mahabubnagar, Nagarkurnool, Narayanpet, Wanaparthy, Nalgonda, Suryapet, Khammam, Badradri-Kothagudem, Siddipet, Warangal* and *Medak*

Details of survey

District	Villages/mandals
Rangareddy	Burjugadda Thanda, Shamsabad, Sheriguda Badrayapalli, Kotthur, Ibrahimpatnam and Sheriguda Badrayapalli
Vikarabad	Angadi Chittempalli, Chengalula, Medipalli Kalan, Kankal, Pedda Umthula and Pudur
Medak	Peddashetpally, Rampur, Kulcharam, Perur, Kurtiwada and Mantur
Nizamabad & Kamareddy	Dharmaram, Dichpally, Nizamabad, Kulaspur, Mopal, Mosra, Adlur Yellareddy, SS Nagar, Kamareddy, RS&RRS-Rudrur, Medipally, Gandhari, Jakkadani Thanda, Banswada, Ibrahimpet and Banswada
Karimnagar & Peddpalli	Mugdampur, Karimnagar (Rural), Karimnagar(d), Bonthakuntapalli, Sultanabad, Netaganipalli, Eligedu, Peddapalli, Sultanpur, Eligedu, Peddapalli, Rampur, Peddapalli and Kunaram
Jagtial	Polasa, Jagtial, Hanmajipet, Chelgal, Polasa, Ayodhya and Raikal
Mahboobnagar	Gopulapur, Devarakadra, Bhandarupalli, CC Kunta and Nellkondi
Narayanpet	Pusalpadu, Marikal, Kondronpalle, Dhanwada, Maganoor, Magnoor, Gudeballur and Krishna
Warangal, Karimnagar and Siddipet	RARS-Warangal, Shanthinagar, Elkathurthi, Kothulanaduma, Elkathurthi, Mulkanoor, Bhemdevarapally, Chinnapapaiahpally, HZBR, Peddapapaiahpally, Shelapally, Huzurabad, Chelpur, Pandilla, Husnabad and Siddipet
Suryapet	Yadlapalli, Suryapet, Ramaram, Ramachandrapuram, Madhavaram, Munagala, Vijayaraghavapuram, Dwarakunta, Kodad, Thripuram, Anthagiri and Chilkoor
Khammam	KVK-Wyra, Billupadu, Thallada, Kotha Venkatagiri, Mittapalli, Bayyannagudem, Penuballi, Lankapalli, Kistaram, Sattupalli, Thallamada, Buggapadu, Sadasivunipalem, Bhimaram, Vemsoor and Marlapdu
Badradri-Kothagudem	Nacharam, Dammapet, Nagulapalli and Aasannagudem
Nalgonda	ARS-Kampasagar, Peddadevulapally, Thripuraram, Babusaipet, Kodad Road, Miryalaguda and Miryalaguda
Wanaparthy & Nagarkurnool	Balijepalli, Mojerla, Kanimetta, Kothakota, Rayanipet, Ramanpadu, Madanapuram, Buddaram, Pothireddypally and Thimmajipet

Introduction

Telangana is the 29th newly formed state on 2ndJune 2014, in Indian sub-continent. The total cropped area of the state is 4.6 m. ha with an annual rainfall around 900 to 1100 mm. Seventy-five per cent of the rainfall is received from South West monsoon. Rice is the principal food crop cultivated throughout the state during *Kharif* and *Rabi* season providing food for its growing population, fodder to the cattle and employment to the rural masses. Any set back to the rice crop will have a perceptible impact on the state's economy and food security. In Telangana, rice is mostly cultivated under wells, tanks and canals in an area of

around 28.3 lakh ha during *kharif*, 2019 and *rabi*, 2019-20. The crop is grown in an area of 12.59 lakh ha against normal of area of 9.64 lakh ha with 131% increase over the normal area in Telangana State during *kharif*, 2019 (www.agri.telangana.gov.in). During rabi, 2019-20, the crop is grown in area of 15.69 lakh ha against normal rice area of 6.83 lakh ha with an increase of 228.7% over normal area. Surprisingly, the area during *rabi* season has increased by more than double the normal rice area due to enhanced irrigation facilities created by the Govt. of Telangana. Among the rice growing farmers, 70% are small and marginal farmers with land holdings of less than 1 ha. Production oriented survey (POS, 2019-20) is conducted every year for collecting the information on production and protection constraints being faced by the farmers, issues related to Department of Agriculture, rice millers and seed producers in different rice growing districts of Telangana State during the *kharif* and *rabi* seasons (August to February). Roving survey was conducted in farmers' fields at 20-25 km distance in different districts covering three Agro-climatic zones. The survey was conducted twice a crop season; once during tillering to maximum tillering stage and again during grain filling to maturity / harvesting stage.

The Production Oriented Survey (POS) of rice growing areas was conducted in 18 districts *viz.*, Nizamabad, Kamareddy, Karimnagar, Jagtial, Peddapalli, Rangareddy, Vikarabad, Mahabubnagar, Nagarkurnool, Narayanpet, Wanaparthy, Nalgonda, Suryapet, Khammam, Badradri-Kothagudem, Siddipet, Warangal and Medak covering major rice growing areas of Northern Telangana, Southern Telangana and Central Telangana zones of Telangana state during *kharif*, 2019 and *rabi*, 2019-20. The details of the POS visits containing the names of the districts, mandals and villages covered during survey along with the list of the team members participated in POS are furnished in Table (1). The information on various aspects of rice cultivation *viz.*, seasonal conditions, crop area coverage and item wise package of practices, abiotic/ biotic constraints and their management are discussed in the following headings. The information on the aforesaid aspects was collected from the progressive farmers, millers, seed producers, AEOs, MAOs, ADAs, DAOs and Input dealers of the respective areas through interaction and participatory approach.

General question on Rice cultivation in District during *Kharif*, 2019 & *Rabi*, 2019-20 (To be filled by the Cooperator in consultation with the State Department of Agriculture)

Parameters	**Districts**				
	Nizamabad	**Kamareddy**	**Karimnagar**	**Peddapalli**	**Jagtial**
Total area under HYV in the district (ha)	256076	143132	155058	137192	160302
Most preferred HYV in the district	KNM 118, MTU 1010, Jagtial Rice-1, BPT 5204, Jai Sreeram, HMT Sona, Bathukamma and Ganga Kaveri	KNM 118, MTU 1010, Jagtial Rice-1, BPT 5204, Jai Sreeram, HMT Sona, MTU 1153 and MTU 1156	KNM 118, BPT 5204, MTU 1010, Jai sreeram, MTU 1156 and 1153, Jagtial rice - 1	BPT 5204, KNM 118, Jagtial Rice-1, MTU 1010, MTU 153, MTU 1156, Jai sreeram and Chintu	Jagtial ric-1, KNM 118, MTU 1153 and MTU 1156, Telangana sona Jai sreeram, and MTU 1010
Total area under rice hybrids in the district	-	-	-	-	-
Major prevalent rice hybrids in the district	-	-	-	-	-
Total area under basmati in the	Nil	Nil	Nil	Nil	Nil

Parameters	**Districts**				
	Nizamabad	**Kamareddy**	**Karimnagar**	**Peddapalli**	**Jagtial**
district					
Most prevalent basmati varieties in the district	Nil	Nil	Nil	Nil	Nil
Whether farmers are using any heavy equipments	Yes, Transplanters, Rotovator and combine harvester	Yes, Rotovator, machine planter and combine harvester	Yes, Rotovator, machine planter and combine harvester	Yes, Rotovator, Drum seeder, machine planter and combine harvester	Yes, Rotovator, machine planter and combine harvester
Mention water technologies like SRI/laser leveling/DSR	AWD, Drum seeder and MSRI	Drum seeder and MSRI	AWD, Drum seeder and MSRI	Drum seeder and MSRI	Drum seeder and MSRI
Whether survey team gave any advice to the farmers during the survey?	Yes, regarding varieties, crop production and protection technologies	Yes, regarding varieties, water saving technologies and pest and disease management	Yes, varieties, MSRI, fertilizers, management of pests and diseases.	Yes, varieties, MSRI, fertilizers, management of pests and diseases.	Yes, varieties and management of pests and diseases
What are the general problems in rice cultivation in the district	Hispa, leaf folder, whorl maggot, Panicle mite and YSB, BLB, False smut, Blast (*rabi*)	Panicle mite and stem borer, False smut and neck blast (Kharif and Rabi)	Stem borer and panicle mite and False smut, Bunt, NB and GD Blast (*rabi*)	YSB and panicle mite, Sheath Blight, False smut, Bunt and GD, Blast	Panicle mite, False smut, Bunt, GD and Blast (K & R)
Please provide any farmers association in the district	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level
Whether availability of labour is sufficient	No	No	No	No	No
Whether there is any marketing problem of the produce	Yes, grade problem with KNM 118, Bathukamma and Jagtial rice-1	Yes	Yes	Yes	Yes
Any major irrigation power generation project in the district	Yes, SRSP	Nizamsagar and Kalyani project	Mid and lower manair reservoirs	Kaleshwaram project ad Yellampalli	-
Any soil testing programme undertaken	Yes, by department of Agriculture, Govt. of Telangana and KVKs	Yes, by department of Agriculture, Govt. of Telangana	Yes, by department of Agriculture, Govt. of Telangana	Yes, by department of Agriculture, Govt. of Telangana	Yes, by department of Agriculture, Govt. of Telangana
Any farmers training program was organized by the state department of Agriculture / University	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DAATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DAATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.

General question on Rice cultivation in District during *Kharif*, 2019 and *Rabi*, 2019-20 (To be filled by the Cooperator in consultation with State Department of Agriculture)

Parameters	Districts				
	Warangal (R)	**Siddipet**	**Medak**	**Bhadradri**	**Khammam**
Total area under HYV in the district (ha)	69240	94590	63659	73075	151794
Most preferred HYV in the district	BPT 5204, NLR 34449, KNM 118, Jagtial Rice-1, HMT Sona, MTU 1156 and MTU 1153	KNM 118, Telangana Sona, MTU 1010, MTU 1153 and MTU 1156	KNM 18, MTU 1010 and MTU 1153	BPT 5204, MTU 1061, MTU 1153, MTU 1156 and KNM 118	KNM 118, BPT 5204, WGL 44, MTU 1061, MTU 1224, MTU 1153 and MTU 1156
Total area under rice hybrids in the district (ha)	-	-	-	-	-
Major prevalent rice hybrids in the district	-	-	-	-	-
Total area under basmati in the district	Nil	Nil	Nil	Nil	Nil
Most prevalent basmati varieties in the district	Nil	Nil	Nil	Nil	Nil
Whether farmers are using any heavy equipment's like transplanter / combine harvester	Yes, Rotovator, and combine harvester	Yes, Rotovator, and combine harvester	Yes, Rotovator, machine planter and combine harvester	Yes, Rotovator, machine planter and combine harvester	Yes, Rotovator, machine planter and combine harvester
Mention water technologies like SRI/laser leveling/DSR being used by the farmers	Drum seeder and MSRI	Drum seeder and MSRI	Machine planting	AWD, Dry converted wet rice, Drum seeder	AWD, Dry converted wet rice and Drum seeder
Whether survey team gave any advice to the farmers during the survey? If yes. Then what are those	Yes, regarding the improved package and practices of rice	Yes, Varieties, water saving technologies and pest and diseases	Yes, varieties, MSRI, fertilizers, management of pests and diseases.	Yes, varieties, MSRI, fertilizers, management of pests and diseases.	Yes, varieties and management of pests and diseases
What are the general problems in rice cultivation in the district	Panicle mite, False smut, NB and Sheath Blight **Blast (K & R)**	Panicle mite and stem borer, False smut, salinity and labour shortage. **Blast (K & R)**	Leaf folder and stem borer and **Blast (K & R),** Labour shortage	BPH, False smut and GD Blast (K & R)	BPH and panicle mite False smut, GD and Bunt, **Gall Midge (*Rabi*) Blast (K & R)**
Please provide any farmers association in the district	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level
Whether availability of labour is sufficient	No	No	No	No	No
Whether there is any marketing problem of the produce	Yes,	Yes	Yes	Yes	Yes
Any major irrigation power generation project in the district	-	-	Manjeera and Singur project	NSP ayacut (partially)	Palair and Wyra Reservoirs (NSP ayacut)
Any soil testing	Yes, by	Yes, by	Yes, by	Yes, by	Yes, by

Parameters	Districts				
	Warangal (R)	**Siddipet**	**Medak**	**Bhadradri**	**Khammam**
programme undertaken	department of Agriculture, Telangana	department of Agriculture, Telangana	department of Agriculture, Telangana	department of Agriculture, Telangana	department of Agriculture, Govt. of Telangana
Any farmers training program was organized by the state department of Agriculture / University	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.

General question on Rice cultivation in District during *Kharif*, 2019 and *Rabi*, 2019-20 (To be filled by the Cooperator in consultation with State Department of Agriculture)

Parameters	Districts				
	Rangareddy	**Vikarabad**	**Nagarkurnool**	**Mahabubnagar**	**Narayanpet**
Total area under HYV in the district (ha)	24686	18691	53928	25570	59006
Most preferred HYV in the district	Telangana Sona, BPT 5204, KNM 118 and MTU 1010	Telangana Sona, BPT 5204, KNM 118 and MTU 1010	Telangana Sona, KNM 118 and MTU 1010	Telangana Sona, KNM 118 and MTU 1010 and HMT Sona	Telangana Sona, KNM 118 and MTU 1010, MTU 1153 and MTU 1156
Total area under rice hybrids in the district (ha)	-	-	-	-	-
Major prevalent rice hybrids in the district	-	-	-	-	-
Total area under basmati in the district	Nil	Nil	Nil	Nil	Nil
Most prevalent basmati varieties in the district	Nil	Nil	Nil	Nil	Nil
Whether farmers are using any heavy equipment's like transplanter / combine harvester	Yes, Rotovator, and combine harvester	Yes, Rotovator, and combine harvester	Yes, Rotovator, machine planter and combine harvester	Yes, Rotovator, machine planter and combine harvester	Yes, Rotovator, machine planter and combine harvester
Mention water technologies like SRI/laser leveling/DSR being used by the farmers	No	No	MSRI	MRSI and Drum seeder	MSRI
Whether survey team gave any advice to the farmers during the survey? If yes. Then what are those	Yes, regarding the improved package and practices of rice	Yes, regarding varieties, water saving technologies and pest and disease management	Yes, varieties, MSRI, fertilizers, management of pests and diseases.	Yes, varieties, MSRI, fertilizers, management of pests and diseases.	Yes, varieties and management of pests and diseases
What are the general problems in	Labour shortage and	Whorl maggot, Hispa and stem	Stem borer and Whorl maggot,	BPH and YSB, False smut and	BPH, Stem borer and panicle mite, False

Parameters	Districts				
	Rangareddy	**Vikarabad**	**Nagarkurnool**	**Mahabubnagar**	**Narayanpet**
rice cultivation in the district	water scarcity, Leaf folder, Whorl maggot, and YSB, ShB	borer and Blast (Rabi)	False smut and **Blast (K & R)**	GD, **Blast (*rabi*) Lodging**	smut, bunt and GD, **Lodging. Blast** (*Rabi*)
Please provide any farmers association in the district	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level
Whether availability of labour is sufficient	No	No	No	No	No
Whether there is any marketing problem of the produce	Yes,	Yes	Yes	Yes	Yes
Any major irrigation power generation project in the district	-	-	Kalvakurthi Lift irrigation	Jurala project	Koyal sagar project
Any soil testing programme undertaken	Yes, by department of Agriculture, Telangana	Yes, by department of Agriculture, Telangana	Yes, by department of Agriculture, Telangana	Yes, by department of Agriculture, Telangana	Yes, by department of Agriculture, Govt. of Telangana
Any farmers training program was organized by the state department of Agriculture / University	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.

General question on Rice cultivation in District during *Kharif*, 2019 and *Rabi*, 2019-20 (To be filled by the Cooperator in consultation with State Department of Agriculture)

Parameters	Districts		
	Wanaparthy	**Nalgonda**	**Suryapet**
Total area under HYV in the district (ha)	93366	233037	244804
Most preferred HYV in the district	Telangana Sona, BPT 5204 and KNM 118	Ankur Pooja, BPT 5204, HMT Sona and KNM 118	Ankur Pooja, BPT 5204, HMT Sona, KNM 118 and MTU 1010
Total area under rice hybrids in the district (ha)	-	-	-
Major prevalent rice hybrids in the district	-	-	-
Total area under basmati in the district	Nil	Nil	Nil
Most prevalent basmati varieties in the district	Nil	Nil	Nil
Whether farmers are using any heavy equipment's like transplanter / combine harvester	Yes, Rotovator, transplanters and combine harvester	Yes, Rotovator, and combine harvester	Yes, Rotovator, machine planter and combine harvester

Parameters	Districts		
	Wanaparthy	**Nalgonda**	**Suryapet**
Mention water technologies like SRI/laser leveling/DSR being used by the farmers	No	No	Drum seeder and MSRI
Whether survey team gave any advice to the farmers during the survey? If yes. Then what are those	Yes, regarding the improved package and practices of rice	Yes, regarding varieties, water saving technologies and pest and disease management	Yes, varieties, MSRI, fertilizers, management of pests and diseases.
What are the general problems in rice cultivation in the district	Labour shortage, Whorl maggot and stem borer **Blast (K & R)**	BPH, panicle mite, False smut, GD, Bunt and labour shortage	Timely availability of canal water, Leaf folder, leaf folder and panicle mite BPH, False smut, Bunt and sheath blight
Please provide any farmers association in the district	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level	Rythu Samanvaya Samithi at village, mandal and district level
Whether availability of labour is sufficient	No	No	No
Whether there is any marketing problem of the produce	Yes,	Yes	Yes
Any major irrigation power generation project in the district	Priyadarshini Jurala Project and Gattu lift irrigation project	Nagarjuna Sagar irrigation (left canal)	Nagarjuna Sagar irrigation (left canal)
Any soil testing programme undertaken	Yes, by department of Agriculture, Govt. of Telangana	Yes, by department of Agriculture, Govt. of Telangana	Yes, by department of Agriculture, Govt. of Telangana
Any farmers training program was organized by the state department of Agriculture / University	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.	Regular training programmes organized by Dept. of Agriculture, ATMA, KVK and DATTCs of the University.

A: General information

A1: Seasonal Conditions

The rainfall received from South West monsoon and North East monsoon during the period from June, 2019 to December, 2019 along with district wise rainfall situation is furnished in table 1a and 1b.

South West Monsoon (01.06.2019 – 30.09.2019)

During the South-west monsoon period, a total of 746.4 mm rainfall received in Telangana as against normal rainfall of 719.3 mm showing deviation 10% with over all status is being normal.

North-East Monsoon (01.10.2019 to 31.12.2019)

Normally, in Telangana State, only 14% of annual rainfall is received from North-East Monsoon. The average normal rainfall of North-East Monsoon is 125 mm and actual rainfall received is 173 mm showing the deviation of + 40% with over all status is being excess during NE monsoon.

Overall, the average rainfall received in Telangana state from 01.06.2019 to 18.02020 is 989.1 mm as against the normal rainfall of 861.8 mm with deviation of + 15 per cent with

over all status being normal. Among the districts, newly formed district Mulugu received the highest rainfall of 1613 mm while, Jogulamba Gadwal District received the lowest rainfall of 521.2 mm. Overall, the weather conditions are highly favorable for growth of paddy crop. However, excess rainfall in September and October months posed the several biotic constraints in paddy. Among the biotic constraints, diseases such as false smut, grain discoloration and bunt caused yield losses in Telangana state. But, the incidence of diseases is less where the farmers sprayed fungicides at the time of flowering. The district wise rainfall, status and deviation of rainfall during the period from 01.06.2019 to 18.03.2020 was presented in Table 2.

Table 1a. Month wise rainfall received in Telangana State from 01-06-2019 upto 18.03.2020

Month	Normal (mm)	Actual rainfall (mm)		% deviation to normal	Status
		2018-19	2019-20		
June, 2019	129.9	150.3	87.1	-33	Deficit
July, 2019	242.7	172.9	245.2	-12	Normal
August, 2019	219.2	262.7	243.6	11	Normal
September, 2019	127.8	82.5	245.5	92	Excess
S W Monsoon	**720.4**	**668.4**	**791.4**	**10**	**Normal**
October, 2019	95.5	16.5	162	70	Excess
November, 2019	23.9	1.2	7.7	-68	Deficit
December, 2019	5.5	19.9	3.3	-40	Deficit
N E Monsoon	**124.9**	**37.6**	**173.0**	**40**	**Excess**
January, 2020	6.9	22.5	6.2	-9	Normal
February, 2020	4.6	1.0	9.2	98	Excess
March, 2020	5.0	0.9	9.3	133	-
Cumulative Total (01-06-2018 to 18-03-2020)	**861.8**	**730.4**	**989.1**	**15**	**Normal**

Table 1b. District wise average rainfall for the period from 01.06.2019 to 18.03.2020

S. No.	District	Annual normal rainfall	Cumulative total from 01.06.2019 to 18.03.2020			Corr. Period of previous year		% Dev. of current actual over previous	Status
			Normal	Actual	% Dev.	Actual	% Dev.		
1.	Adilabad	1199.0	1158.8	1071.1	-8	1294.3	12	-17	Normal
2.	Komaram Bheem	1195.5	1156.1	1396.1	21	1192.4	3	17	Excess
3.	Mancherial	1145.3	1116.2	1202.4	8	1041.2	-7	15	Normal
4.	Nirmal	1127.6	1098.0	1018.4	-7	881.9	-20	15	Normal
5.	Nizamabad	1042.4	1009.9	1321.0	31	858.9	-15	54	Excess
6.	Jagtial	1034.6	996.9	1144.7	15	1012.7	2	13	Normal
7.	Peddapally	1055.4	1022.5	1267.4	24	1195.6	17	6	Excess
8.	Jayashankar	1088.0	1048.1	1401.9	34	1171.3	12	20	Excess
9.	Bhadradri Kottagudem	1132.6	1046.7	1158.1	11	1118.7	7	4	Normal
10.	Mahabubabad	1007.7	946.5	987.4	4	815.7	-14	21	Normal
11.	Warangal (R)	1039.5	984.9	1150.4	17	738.4	-25	56	Normal
12.	Warangal (U)	889.5	845.6	1227.0	45	745.4	-12	65	Excess

13.	Karimnagar	898.3	856.0	1231.4	44	828.1	-3	49	Excess
14.	Rajanna	915.3	870.6	1247.6	43	704.0	-19	77	Excess
15.	Kamareddy	1029.0	992.5	1238.1	25	741.0	-25	67	Excess
16.	Sangareddy	895.4	844.7	771.7	-9	462.7	-45	67	Normal
17.	Medak	916.9	873.5	965.2	10	523.7	-40	84	Normal
18.	Siddipet	785.1	739.3	1021.2	38	529.6	-28	93	Excess
19	Jangoan	874.3	818.7	950.2	16	619.5	-24	53	Normal
20.	Yadadri	743.7	708.1	753.6	6	400.1	-43	88	Normal
21.	Medchal	763.2	718.5	820.8	14	513.1	-29	60	Normal
22.	Hyderabad	779.1	732.4	850.7	16	504.4	-31	69	Normal
23.	Rangareddy	694.6	648.8	689.1	6	448.0	-31	54	Normal
24.	Vikarabad	814.3	763.9	713.9	-7	478.9	-37	49	Normal
25.	Mahabubnagar	626.9	594.1	760.7	28	463.2	-22	64	Excess
26.	Jogulamba Gadwal	533.0	505.5	521.2	3	355.1	-30	47	Normal
27.	Wanaparthy	579.6	549.8	667.8	21	396.0	-28	69	Excess
28.	Nagarkurnool	642.3	608.4	570.0	-6	388.5	-36	47	Normal
29.	Nalgonda	704.2	666.3	621.8	-7	412.6	-38	51	Normal
30.	Suryapet	836.8	790.8	695.0	-12	604.6	-24	15	Normal
31.	Khammam	1036.0	959.1	870.7	-9	961.5	0	-9	Normal
32.	Mulugu	1292.7	1229.9	1613.0	31	1229.0	0	31	Excess
33.	Narayanpet	561.8	538.2	720.0	34	472.7	-12	52	Excess
Telangana Average		**905.4**	**861.8**	**989.1**	**15**	**730.4**	**-15**	**35**	**Normal**

Source: Directorate of Economics & Statistics, Govt. of Telangana, Hyderabad

Date is provisional & Limits for deviation from Normal

Excess = (+20% & above), Normal=(+19% to -19%), Deficit= (-20% to -59%), Scanty==(-60% to -99%), No rain=(-100%)

Table 2. Status and deviation of rainfall during the period from 01.06.2019 to 18.03.2020

S. No.	Districts	No. of districts	Status & deviation
1	Komaram Bheem, Nizamabad, Peddapalli, Jayashankar, Warangal (Urban), Karimnagar, Rajanna Siricilla, Kamareddy, Siddipet, Mahabubnagar, Wanaparthy, Mulugu and Narayanpet	13	Excess (20% & above)
2	Adilabad, Mancherial, Nirmal, Jagtial, Badradri Kotthagudem, Mahabubabad, Warangal (Rural), Sangareddy, Medak, Jangaon, Yadadri Bhuvanagiri, Medchal, Hyderabad, Rangareddy, Vikarabad, Jogulamba Gadwal, Nagarkurnool, Nalgonda, Suryapet and Khammam	20	Normal (+ 19% to -19%)
3	Nil	0	Deficit (-20% to -59%)
4.	Nil	0	Scanty (-60% to -99%)
5.	Nil	0	No rain (-100%)

A2: Crop coverage

In Telangana state, paddy is cultivated in an area of around 28.3 lakh ha during *Kharif*, 2019 and *Rabi*, 2019-20. As against the normal area of 9.64 lakh ha, the actual rice area covered during *Kharif* 2019 was 12.59 lakh ha (131% increase over the NA) compared to 9.64 lakh ha

during *Kharif*, 2018. During *Rabi*, 2019-20, the crop is grown in area of 15.69 lakh ha against normal rice area of 6.83 lakh ha with an increase of 228.7% over normal area.

Table 3: District wise normal and actual rice area (ha) covered during *kharif*, 2019 and *rabi*, 2019-20

S. No.	DISTRICT	*Kharif, 2019*			*Rabi, 2019-20*		
		Normal Area	Actual Area	% Coverage over NA	Normal Area	Actual Area	% Cov. over NA
Southern Telangana Zone							
1	**Rangareddy**	13615	9289	68.2	8158	15397	188.7
2	Medchal-Malkajgiri	3216	2541	79.0	3028	3796	125.4
3	Vikarabad	10959	6178	56.4	7228	12513	173.1
4	**Mahabubnagar**	14793	8408	56.8	10171	17162	168.7
5	Nagarkurnool	11089	18375	165.7	12181	35553	291.9
6	Wanaparthy	29326	46792	159.6	14245	46574	326.9
7	Gadwal (Jogulamba)	16749	22003	131.4	5957	16721	280.7
8	Narayanpet	16228	33126	204.1	9880	25880	261.9
9	**Nalgonda**	66436	80076	120.5	72974	152961	209.6
10	Suryapet	72306	93032	128.7	62210	151772	244.0
11	Yadadri Bhuvanagiri	38091	41725	109.5	36939	79007	213.9
	Total	**292808**	**361545**	**123.5**	**242971**	**557336**	**229.4**
Northern Telangana Zone							
12	**Nizamabad**	83409	127208	152.5	60369	128868	213.5
13	Kamareddy	40078	70070	174.8	25535	73062	286.1
14	**Karimnagar**	41118	66422	161.5	39864	88636	222.3
15	Jagtiyal	44254	62314	140.8	41330	97988	237.1
16	Peddapalli	44230	59145	133.7	34739	78047	224.7
17	Rajanna Siricilla	21235	37819	178.1	24463	53843	220.1
18	**Adilabad**	924	309	33.4	21	197	938.1
19	Mancherial	27483	58025	211.1	13733	39322	286.3
20	Nirmal	21159	32343	152.9	13289	40784	306.9
21	Asifabad (K. Bheem)	9494	14966	157.6	2399	4883	203.5
	Total	**333384**	**528621**	**158.6**	**255742**	**605630**	**236.8**
Central Telangana Zone							
22	**Medak**	34895	31675	90.8	22543	31984	141.9
23	Sangareddy	16062	20843	129.8	7842	9128	116.4
24	Siddipet	29993	31620	105.4	33676	62970	187.0
25	**Warangal (Rural)**	31465	34124	108.5	15772	35116	222.6
26	Warangal (Urban)	12502	16557	132.4	12790	29728	232.4
27	Jayashankar Bhupalpalli	24716	27675	112.0	10768	26459	245.7
28	Janagoan	20127	17765	88.3	21499	46002	214.0
29	Mehabubabad	31889	36114	113.2	12689	41886	330.1
30	Mulugu	34012	35566	104.6	10703	14937	139.6
31	**Khammam**	59361	69663	117.4	30220	82131	271.8
32	Bhadradri Kothagudem	43334	47320	109.2	6143	25755	419.3
	Total	**338356**	**368922**	**109.0**	**184645**	**406096**	**219.9**

Source: www.tg.agrisinet.com, Directorate of Agriculture, Telangana state and concerned districts ADAs and MAOs.

The area during *rabi* season has increased by more than double the normal rice area in Telangana State due to enhancement of irrigation potential. For instance, the increase in rice area over normal area was more evident in the districts of STZ *i.e.* Wanaparthy in *Kharif* and *Rabi* (159.6 and 326.9%, respectively), Narayanpet (204.1 and 261.9%, respectively), Nagarkurnool (165.7 and 291.9%, respectively), Suryapet (128.7 and 244%, respectively), Nalgonda (120.5 and 209.6%, respectively) and Yadadri Bhuvagiri (109.5 and 213.9%, respectively).

A3: Crop stage at the time of survey

First of its kind, the POS on rice was conducted both during *kharif* and *rabi* seasons in Telangana State. Further, the team also visited the seed processing plants, rice mills and irrigation projects, which are the backbone for rice cultivation in Telangana State. The roving survey was conducted in all the major rice growing districts of Telangana State, when the crop was between maximum tillering and booting to maturity stage.

A4: Crop rotation practiced

Rice-rice was the predominant cropping system in all the surveyed districts varying from 60-70% The other systems found were green manure-rice-rice, rice- maize, rice-groundnut, rice –fallow, rice-pulses, rice – sesame, rice-rice –vegetables depending on the water availability and other factors.

A5: Varietal profile

The major varieties grown in the surveyed districts during *Kharif*, 2019 were Samba Mahsuri (BPT 5204), Telangana Sona (RNR 15048), Jai Sreeram, HMT Sona, Kunaram Sannalu, MTU 1010, Jagtial Rice-1 Siddi, Bathukamma, JGL 11470, IR 64, Ankur Pooja, Chintu, MTU 1061, MTU 1224, MTU 1153, MTU 1156, MTU 1001 and Tellahamsa *etc*., whereas the private hybrids grown particularly in Karimnagar districts were Arize 6444 gold, Tej (Bayer crop science Ltd.), KPH 412, KPH 272 (Kaveri seeds Pvt., Ltd.,), Champion (Nujiveedu Pvt. Ltd.,), 27P31, 27P25, 27P63, 27P38 (Pioneer Ltd.,). But, the area under hybrids during *kharif* season is very less compared to *Rabi* season. The newly released rice variety JGL 24423 (Jagtial Rice-1) was also gaining popularity among the farming community in Telangana State. Very good feedback was received on JGL 24423 (Jagtial Rice–1) in terms of yield and non-lodging nature at Jagtial, Nizamabad, Kamareddy, Karimnagar, Peddapalli, Suryapet and Khammam. However, few farmers claimed that if crop is not properly dried in field, 10% grains are left over with panicles using harvester.

Majority of the farmers are preferring the coarse grain varieties (KNM 118, Jagtial Rice-1, Bathukamma, MTU 1010, MTU 1153 and MTU 1156) during *kharif* and *rabi* seasons owing to higher grain yield, less market price difference between fine and coarse grain varieties and severe incidence of insect-pests and diseases in fine grain varieties. A shift from fine to coarse grain varieties was observed across the districts surveyed in Telangana state except Suryapet and Nalgonda districts. Further, it is also due to procurement of coarse grain varieties by IKP centers. **As per the POS, 2018 data, shift in fine grain varieties to coarse grain varieties was evident in Medak district to an extent of 30-40%. During *kharif*, 2019, the majority of area (70-85%) was shifted to coarse grain varieties (KNM 118, Jagtial Rice-1, MTU 1010, MTU 1153 and MTU 1156).** The farmers are growing the fine grain varieties to an extent of 1-2 acres for meeting their household purposes.

Telangana Sona, a short duration (125 days) fine grain variety has replaced the BPT 5204 and occupying considerable area approximately 3.5 to 4.0 lakh ha in Wanaparthy, Mahabubnagar, Jogulambha Gadwal, Narayanpet, Nagarkurnool, Vikarabad, Rangareddy, Karimnagar, Warangal (R) and Siddipet. Majority of the farmers preferred the Telangana Sona because of its short duration, super fine grain and blast resistance and suitability to late planted situations and relatively requires less water. Lodging was observed in RNR 15048 in surveyed villages of Mahabubnagar and Narayanpet districts. Although, the farmers are aware of fertilizer recommendation for RNR 15048. This may be due to heavy rains during PI to booting stage. Lodging of the crop was also observed. Among the varieties, lodging was severe in MTU 1010 in Warangal, Siddipet, Karimnagar and Peddapalli districts.

During *Rabi*, 2019-20, severe incidence of blast was observed in entire Telangana State during January to March, 2019. All the fine and coarse grain varieties from public and private sector were found susceptible to blast during *rabi*, 2019-20 except Telangana Sona. The POS team visited the blast affected fields at Wanaparthy district and observed the consistent resistant reaction of RNR 15048 against blast. During the visit, it was also observed that, some of the private firms are selling released varieties of PJTSAU (RNR 15048) in the name of research paddy, which needs to be curbed through development of efficient seed monitoring mechanisms.

Table 4: Popular varieties of paddy in the surveyed districts

S. No.	district	Popular varieties
1.	Nizamabad	KNM 118, Jai Sreeram, HMT Sona, Jagtial Rice-1, BPT 5204, MTU 1010, Bathukamma and Ganga Kaveri
2.	Kamareddy	KNM 118, Jagtial Rice-1, MTU 1153 and MTU 1156, BPT 5204, Jai Sreeram and MTU 1010,
3.	Karimnagar	KNM 118, BPT 5204, MTU 1010, Jai sreeram, MTU 1156 and 1153, Jagtial rice – 1
4.	Peddapalli	BPT 5204, KNM 118, Jagtial Rice-1, MTU 1010, MTU 153, MTU 1156, Jai sreeram and Chintu
5.	Jagtial	Jagtial Rice-1, KNM 118, MTU 1153 and MTU 1156, BPT 5204 and Jai Sreeram
6.	Warangal (R)	BPT 5204, NLR 34449, KNM 118, Jagtial Rice-1, HMT Sona, MTU 1156 and MTU 1153
7.	Siddipet	KNM 118, MTU 1010, MTU 1153, MTU 1156 and Telangana Sona
8.	Medak	KNM 18, MTU 1010, MTU 1153 and MTU 1156
9.	Badradri-Kothagudem	BPT 5204, MTU 1061, MTU 1224, MTU 1153, MTU 1156 and KNM 118
10.	Khammam	BPT 5204, WGL 44, KNM 118, MTU 1061, MTU 1224, MTU 1153, MTU 1156 and Ankur Pooja
11.	Rangareddy	Telangana Sona, BPT 5204, KNM 118 and MTU 1010
12.	Vikarabad	Telangana Sona, BPT 5204, KNM 118 and MTU 1010
13.	Nagarkurnool	Telangana Sona, KNM 118 and MTU 1010
14.	Mahabubnagar	Telangana Sona, KNM 118 and MTU 1010 and HMT Sona
15.	Narayanpet	Telangana Sona, KNM 118 and MTU 1010, MTU 1153 and MTU 1156
16.	Wanaparthy	Telangana Sona, KNM 118 and BPT 5204
17.	Nalgonda	Ankur Pooja, BPT 5204, HMT Sona and KNM 118
18.	Suryapet	Ankur Pooja, BPT 5204, HMT Sona, KNM 118 and MTU 1010

A6: Minikit visit:

The POS team visited the PJTSAU paddy minikits being conducted by DAATTCs and KVKs in farmers fields at different districts of Telangana State. Overall, all the rice minikilt cultures fared well in farmer's fields compared to respective local checks. However, the feedback of farmers on minikits especially plant type, reaction to insect-pests and diseases, grain type and quality characters *etc*. were recorded. The following minikit fields were visited by the POS team.

Table 5: Paddy minikit fields visited by the POS team at farmer fields

S. No.	Date of visit	Place	Name of the Minikilts	Organized by
1.	30.09.2019	Kulaspur (v), Mopal (m), Nizamabad (d)	WGL 962, JGL 28545, KNM 1638, RNR 15435, RNR 15459, RNR 21278 and KPS 2874	DAATTC, Nizamabad
2.	30.10.2019	Mugdampur, Bonthakuntapalle, Karimnagar and Sultanpur & Rampur (m), Peddapalli (d)	KNM 1638, RNR 15459 and RNR 21278	DAATTC, Karimnagar and ARS, Kunaram
3.	01.11.2019	Nellikondi (v), CC Kunta (m) of Mahabubnagar Gudeballur (v), Krishna (m), Narayanpet (d)	WGL 962, JGL 28545, KNM 1638, RNR 15435, RNR 15459, RNR 21278 and KPS 2874	DAATTC, Mahabubnagar
4.	05.11.2019	Shanthinagar and Kothulanaduma (v) of Elkathurthi (m), Warangal (Urban)	WGL 962, JGL 28545, KNM 1638, RNR 15435, RNR 15459, RNR 21278 and KPS 2874	KVK, Jammikunta
5.	14.11.2019	Buggapadu (v), Sathupally (m), Khammam (d)	RNR 21278	Farmers

A7: Farmer's scientist's interaction programme

The POS team also participated in the "farmer and scientist's interaction programme" on rice cultivation organized by DAATTC, Medak at Perur village of Medak rural (M). A total of 62 farmers (50 woman and 10 men) participated in the programme.

The following points emerged during the interaction with farmers:

- Severe rodent problem in paddy.
- Severe BPH problem during *kharif*, 2017 and 2018 but low incidence during 2019.
- Despite of severe BPH incidence in previous *kharif*, it was observed that majority of the farmers are not making provision for alley ways.
- Farmers are requesting for information on recommended fertilizer dosages and high yielding coarse grain paddy varieties other than KNM 118.
- None of the farmers are using their own seed.
- Cost of cultivation of paddy per acre is ranging around Rs. 15000 – 30000.
- Fertilizer dose: 2-3 bags of Complex (DAP / 20-20-0-15) + 2 bags Urea + ½ bag of Potash.

A8: Rice yields recorded during previous year (*Kharif*, 2018)

The average rice productivity in the surveyed districts during *Kharif*, 2018 was in the range of 4500 to 7000 kg/ha. Wide range of variation in productivity was observed across the districts surveyed. The reason for variation in productivity is due to soil type, variety, deficit rainfall, depletion of ground water in wells/ bore wells and late or non- release of canal water, weather conditions, occurrence of insect-pests and diseases and involved several other unforeseen factors. The state of Telangana has created a record in paddy production in *Kharif*, 2018 season. The paddy production has reached 61 lakh metric tonnes, as against the 42.81 lakh metric tons during 2014 *(Source: Dept. of Agriculture, Govt. of Telangana).*

B: Crop Management

B1: Seed rate and source:

Majority of the farmers using seed rate of 50-60 kg/ha for fine grain varieties, whereas 75 kg/ha for coarse grain varieties. In dry converted wet rice establishment system, farmers are sowing @ 30-62.5 kg per hectare at Wyra and Sathupalli divisions of Khammam district. The majority of the farmers purchased the seed from TSSDC, DCMS or private input dealers. During the POS, it was observed that, the farmers are using the 10 kg/acre research paddy seed purchased from private companies.

B2: Seed treatment

It was observed that 80 – 90% of the farmers in the surveyed villages are aware of the importance of seed treatment for the management of diseases in paddy. But, majority of the farmers are sowing the paddy nurseries without any seed treatment in the surveyed districts. However, small portion of the farmers are adopting wet seed treatment to an extent of 10-15 % by using Carbendazim @ 1.0 g per kg of seed per liter of water by soaking for 24 hours.

B3: Sowing and Planting

In Telangana State, the sowing and planting time varied from district to district depending on variety, monsoons and canal water. In case of long duration varieties, majority of sowings were taken up in June and plantings were completed by second fortnight of July, 2019 except Khammam and part of Nalgonda district where the sowing and plantings were delayed for long duration varieties due to late receipt of canal water. The team concluded that, majority of sowings were taken up during July and plantings were completed by August with medium and short duration varieties.

B4: Organic manures and inorganic fertilizers applied

In raising of the rice nurseries, 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/ complex fertilizers. Few farmers used FYM or sheep manure or poultry manure @ 600-850 kg per 3-4 cents of nursery area.

B5: Fertilizer application

Information on application of fertilizers in the surveyed districts varied to a greater extent. Majority of the farmers are applying NPK in the form of complex fertilizers *viz.*, 20-20-0-13, DAP, 10-26-26, 16-20-0-13, 17-17-17, 19-19-19, 28-28-0). Among the complex fertilizers, DAP or 20-20-0-13 are the most commonly used basal fertilizers across the districts surveyed. Majority of the farmers are applying DAP or other complex fertilizers (50-150 kg/acre) as basal followed by top dressing of nitrogen in the form of Urea (150-200 kg/acre)

in 2-3 split doses coinciding with initiation of tillers, maximum tillering, booting and just before panicle initiation depending on duration of the varieties cultivated, while potash is being used in the form of MOP (25-50 kg/acre). In addition, the farmers are also applying zinc sulphate in the form of chelated zinc sulphate formulation (35%) and 25% as foliar application at the time of tillering stage (15-30 DAT).

During the survey, the team has made an attempt to collect the information on application of fertilizers in paddy by farmers. The details are as follows.

Table 6: Application of fertilizer in paddy by farmers during *Kharif*, 2019

Nutrient (kg/ha)	Nizamabad/ Kamareddy	Karimnagar/ Peddapalli/ Jagtial	Medak / Siddipet	Warangal (Rural)	Khammam / Badradri
N	217.5 - 260	180 – 217.5	200 – 220	137.5 - 160	150 – 165
P_2O_5	100 – 115	100 – 115	100 – 110	57.5 – 80	40 – 60
K_2O	30 – 45	90 – 112.5	30 – 45	50 – 75	35 – 40

Nutrient (kg/ha)	Nalgonda / Suryapet	Mahabubnagar/ Wanaparthy/ Nagarkurnool	Narayanpet	Rangareddy / Vikarabad
N	165 – 200	260 – 350	250 – 265	120-150
P_2O_5	50 – 60	87.5 – 112.5	200 – 230	50-75
K_2O	15 – 20	15 – 22.5	90 – 102.5	25-40

The data collected from randomly selected farmers in the surveyed villages.

B6: Manures and organic amendments

Majority of the farmers (40-50%) were growing the green manure crops *viz*., *Crotalaria* and Sunhemp preceding to rice in the surveyed villages. Majority of the farmers opined that, the timely availability of green manure seed is the major issue being faced by them. Usage of poultry manure in Rangareddy, Nizamabad, Kamareddy, Khammam, Peddapally and Karimnagar was in the range of 5-25% and application of FYM or Sheep manure was minimum (5-30%). Sheep penning in paddy fields at least once in two years is also being practiced by the farmers in Nalgonda, Suryapet, Mahabubnagar, Wanaparthy and Nagarkurnool districts. Across the districts surveyed, sulphide injury, nutrient deficiency, salinity or alkalinity was found to be the major abiotic problems noticed and their intensity is increasing several folds due to mono-cropping of rice, improper drainage system and excess usage of inorganic fertilizers.

B7: Methods of planting

In all the surveyed districts, majority of the farmers adopted random or zig-zag planting method, which was found to be the common practice. Direct seeding with drum seeder under puddled conditions or direct seeding using seed cum ferti drill or broadcasting and machine planting are gaining popularity among the progressive farmers in Khammam, Jagtial, Karimnagar, Nizamabad, Suryapet, Nalgonda and Peddapalli, in view of shortage of labour. The machine planting is not picking up in all the districts of Telangana State due to higher prices of the machines, untimely availability of machine and difficulty in raising of nursery *etc*., Further the cost of machine and manual planting were almost equal (Rs. 3000 – 3500). However, in view of untimely rains and labour shortage for transplanting during peak season, the machine planting is the only option to finish the transplantings within a short time. In this

connection, the PJTSAU in collaboration with Dept. of Agriculture, Govt. of Telangana has conducted several demonstrations to farmers on machine planting and raising of mat nursery using polythene sheet, to create awareness among the farming community. The main aim of this programme was to encourage the farmers towards the machine transplanting as well as to establish the custom hiring centers for giving the employment to rural youth in the villages.

Dry converted wet rice:
The POS team also visited the crop cultivated under dry converted wet rice in Wyra and Sathupalli divisions of Khammam district. Dry converted wet rice cultivation is an alternative method to the conventional method of transplanted rice which could avoid late transplantings in view of delayed monsoon rains and availability of water in tanks/ canals commands.

Advantages of the technology:

- No need to wait for monsoon for the water availability in tanks and canals.
- Two months' time can be saved with sowing of seed in dry soil in anticipation of rains during the month of June.
- The nursery raising and transplanting cost may be saved in dry converted wet rice.
- The crop matures 7-10 days earlier to that of transplanted wet land rice.
- Timely sowing and 25-30% saving in water requirement can be achieved with this system without much loss in yield compared to that of transplanted wet land rice.
- However, this system is feasible in areas where rain fall in July and August is > 200mm.

Farmers practices in dry converted wet rice:

- Majority of the farmers are growing Indra (MTU 1061) and BPT 5204 for dry converted wet rice.
- Land preparation is done by ploughing twice with cultivator, followed by rotavator to ensure proper levelling for better water management and sowing. Sowing can be done either by broadcasting or line sowing with locally available bullock operated gorru or tractor operated seed cum ferti drill with a seed rate of 14 – 25 kg/acre depending on the grain size.
- In view of untimely rains and labour shortage for transplanting during peak season farmers in both the divisions of Khammam district opted for dry convert wet rice system. As per the estimates of the Department of Agriculture, Khammam, almost 7000 ha of area is under dry converted wet rice. With the initiative of KVK, Wyra and consistent support and cooperation from Department of Agriculture, ATMA and other allied departments, farmers were given awareness and motivated through extension activities, which has resulted in adoption of technology by about 5800 farmers (***Source: KVK, Wyra*****).**
- Most of the sowings were done during last week of July and this year rains were received 10 days after sowing. Majority of the farmers are broadcasting the seed and very few farmers at Bayyannagudem are using the ferti cum seed drill (15 acres/day). The cost of the implement was Rs. 40,000/-. Good germination and plant population was observed across the locations.
- The crop was converted into flooded rice condition after 25-30 days of sowing or when water bodies like canals, tanks, reservoirs are filled with water. The method has the advantage of saving time without any delay in rice cultivation.
- Weed population was more in dry converted wet rice compared to normal transplanted crop. Most commonly used herbicide in this system is pre emergence herbicide Pendimethalin @ 1.0 lit/acre after sowing followed by post emergence herbicide

Bispyribac sodium @ 100-120 ml/acre or Penoxulam 1.02% + Cyhalofop-butyl 5.1 w/w OD **(Repivox)** @ 1000 ml + Almix @ 8 g per acre at 18-20 days after sowing.

- **Fertilizers:** 50 kg of 20-20-0-13 / 28-28 + Urea 25 kg as basal; 50 kg of 28-28 / Urea at 20 DAS, 25 kg urea + 25 kg Potash at 40-50 DAS.
- As per the farmers feedback, the cost of cultivation for transplanted rice is around Rs. 15,000 to 16,000/- per acre, whereas in dry converted wet rice it is around 12,000 to 13,000/-. The farmers could save an amount of Rs. 2,000 to 3,000/- per acre and 25-30% saving in irrigation water can be achieved with this method compared to that of transplanted wet land irrigated rice.
- As per the farmer's data, there is no difference in yield between the transplanted and dry converted wet rice. The yield ranged from 28-30 quintals per acre in both the systems.
- The incidence of BPH was also observed in dry converted wet rice and transplanting method. There was no evidence on less incidence of BPH in dry converted wet rice. Majority of the farmers in the surveyed villages sprayed the Triflumezopyrim (Pexalon) or Pymetrozine (Chess) for management of BPH.
- It was observed that, few villages in Vemsoor mandal are growing the paddy only in *Kharif* season.
- The team observed that, some of the farmers in surveyed villages are practicing both dry converted wet rice and normal transplanting. The feedback of such farmers is choice of adoption of both methods depends on water and labour availability. The other farmers who are not adopting are willing to raise the crop (DWR) during next year.
- Finally, the team concluded that dry converted wet rice is age old situation based climate resilient technology, being practiced by the farmers. With the availability of new and effective weedicides this system can also be promoted in other parts of Telangana only in black soils having good water holding capacity and receiving good amount of rainfall in July and August.

B8: Planting density

A plant population of 18-22 hills/m^2 is generally maintained in majority of the fields, irrespective of the variety and planting time. Overall, it was observed that, less plant population was observed across the districts surveyed. The reasons attributed by farmers on low plant population is, transplanting activity was given to team of laborer's for one acre as bulk *(guttha)* and they will target to finish the transplanting as early as possible. The plant population of >25 hills/m^2 was observed in dry converted wet rice cultivation. This situation is inevitable and therefore there is a need to identify varieties with high tillering ability to compensate to low plant population density in farmers fields.

B9: Intensity of weeds

Weed intensity was in the range of low to medium in all the major rice growing areas and predominant weed flora includes *Echinocloa colanum, E. crusgalli, Cyandon dactylon, Cyprus rotundus, Leersia hexandra, Panicum ripens, Euphorbia spp. and Parthenium spp*.

B10: Method of weed control:

The farmers in the surveyed districts are using various pre and post-emergence herbicide molecules depending upon the availability in the districts. Non-availability of labourer's for manual weeding enforced the farmers to use herbicide molecules for management of weeds in rice. In few districts, farmers are taking up manual weeding at 25-35 DAT in all the surveyed districts. Under problematic soils, the farmers are taking up inter-cultivation to create aeration at root zone around 30-45 DAT along with application of Urea + combination

fungicide Carbendazim + Mancozeb (Sprint). This practice is helping in enhancing the nutrition of the plants.

The most commonly used herbicides in nursery and main field are listed below:

Pre / Post Emergence	**Herbicides used by the farmers**
Pre-emergence	Benthiocarb@ 75 ml or Pretilachlor + safener@ 40 ml or Butachlor @ 50 ml or Pyrazosulfuron ethyl @ 5 g in 10 liters of water for five cents nursery
	Butachlor @ 1.25 litres /acre (or) Anilophos @ 500 ml/acre (or) Pretilachlor @ 600 ml /acre (or) Oxadiargyl @ 35 grams (mixed with 500 ml of water) within 3 to 5 days of transplanting. **Dry converted wet rice:** Pendimethalin @ 1.0 lit/acre after sowing.
Post-Emergence	Pyrazosulfuran ethyl @ 80-100 g/ acre at 8-12 DAT or Bensulfuron methyl + Pretilachlor @ 4 kg /acre at 3-5 DAT. 2,4- D SS@ 400 g / acre at 20-25 DAT to control broad leaved weeds or Bispyribac sodium @ 100 ml/acre at 20 DAT to control both grassy and broad-leaved weeds. **Dry converted wet rice:** Bispyribac sodium @ 100-120 ml/acre or Penoxsulam 1.02% + Cyhalofop-butyl 5.1 w/w OD **(Repivox)** @ 1000 ml + Almix @ 8 g per acre at 18-20 days after sowing.

B9: Inputs (Seed, fertilizers and farm implements)

Majority of the farmers (90-95%) are purchasing the seed from local dealers, TSSDC, HACA, PACs, Department of Agriculture and Research Stations. In this connection, the PJTSAU is organizing the "Seed Mela" on 24th May of every year at PJTSAU Campus, RARSs and ARSs in collaboration with Department of Agriculture, Govt. of Telangana state for creating awareness on newly released varieties and creating platform towards the purchase of seed by farmers. Only few farmers (5-10%) in the surveyed villages are using their own seed. As far as the source of irrigation water is concerned, the construction of new irrigation projects and extension of canals of existing projects has paved the way for increased area of rice crop in both the seasons. For instance, paddy is grown in area of 15.69 lakh ha against normal rice area of 6.83 lakh ha with an increase of 228.7% over normal area during *rabi*, 2019-20 in Telangana State.

In the surveyed districts, the rice crop is grown under wells / bore wells (60%) and remaining are through canal water and tanks (40%). Electric motors were being used by all the farmers (98%) in the surveyed districts. During the survey farmers have expressed that there was no scarcity of power in the villages due to the intervention of Govt. of Telangana in providing 24 hours continuous power supply. Majority of the farmers have expressed their satisfaction that sufficient quantities of fertilizers and pesticides were made available timely through local input dealers, PACs and other agencies under the supervision of MAOs at mandal / ADAs at divisional level. Sufficient quantities of farm implements (Tractors, Rotovators and Harvesters) were available in all the surveyed villages. The POS team also visited the service center of Paddy combined harvester (M/s. Telangana Enterprises, Mambojipally, Medak) and feedback was recorded. A total of 150-160 paddy combined harvesters are available in Medak district. The price of latest model combined harvester (M/s. Kubota – 65 HP) ranged from 17-18 lakhs.

M/s. Ganapathi seeds, Peddapapaiahpalli, Huzurabad:

The POS team visited the M/s. Ganapathi Seeds for collection of information related to seed production on 05.11.2019. The company is procuring the seed of released varieties produced by the farmers. As per their information, RNR 15048 variety (CS) was grown in 700 acres for

seed production in nearby villages of Huzurabad during this *kharif* season. A total of 15-20 seed processing plants were located in Huzurabad (m). Large scale hybrid seed production activity will be taken up by private companies during *rabi* season in farmer fields at Huzurabad division. The average yield of hybrid seed production is around 6 – 8 quintals per acre.

Visit to Musi project:
During the POS visits, the team also visited the Musi Project at Solipet (v), Suryapet (d) on 13.11.2019. The project was designed with live storage of 4.5 TMC to provide the irrigation facility to 16,000 to 18,000 ha in erstwhile Nalgonda district.

C: Biotic stresses

C1: Insect pests

The pest scenario in rice cultivation has been assessed during *Kharif*, 2019 and *Rabi*, 2019-20 in response to adoption of new varieties, cultivation practices and pest control methods being followed. The district wise insect pest scenario has been presented in Table 7. Among the major insect pests of rice, BPH was severe in Khammam (5-35%), Mahabubnagar (5-18%) and Medak (5-15%). Overall, BPH incidence was low across the districts surveyed compared to previous years. As a prophylactic spray few farmers had sprayed the Pexalon (80 g per acre @ Rs. 1450/-) or Dinotefuron 20% SG for control of BPH in paddy. Incidence of rice yellow stem borer ranged from 3-12% across the districts with maximum incidence reported from Nizamabad (5-12%) and Medak (5-10%). Stem borer incidence was less in all the districts surveyed. Overall, the gall midge incidence was minimal except in late planted situations of Peddapalli, Jagtial, Karimnagar and Nizamabad districts. However, the incidence of gall midge was reported during *rabi* season in Khammam, Mancherial and Karimnagar districts.

Among the minor insect pests, the incidence of leaf folder was severe in Kamareddy (10-12%) at reproductive stage followed by Medak (5-10%). The incidence of rice hispa was severe in early stage of crop growth at Karimnagar (3-55%) followed by Nizamabad (5-10%) and later, the pest incidence was reduced. The majority of the farmers sprayed Profenophos @ 2 ml per litre for control of rice hispa during early stage of crop growth (25-40 DAT). The panicle mite incidence ranged from 2-10% across the districts and was severe in Mahabubnagar (5-10%).

Table 7. District wise insect pest damage recorded during *Kharif*, 2019

District	BPH	YSB	Panicle mite	Gall midge	Rice hispa	Leaf folder
Nizamabad	3-5	5-12	3-5	2-5	5-10	5-10
Kamareddy	3-6	3-8	5-6	3-5	2-10	10-12
Karimnagar	3-8	3-8	3-5	2-5	3-15	3-8
Jagtial	2-6	3-8	3-8	5-6	3-5	3-10
Peddapalli	3-6	5-9	3-8	5-10	3-10	3-10
Nalgonda	3-10	3-9	3-5	-	5-8	5-7
Suryapet	3-15	5-8	2-6	-	3-8	2-5
Khammam	5-35	3-7	5-8	2-5	2-5	3-8
Medak	5-15	5-10	5-8	2-5	4-10	5-10
Mahabubnagar	3-18	3-8	5-10	2-5	2-5	5-9
Jogulamba Gadwal	5-10	3-9	5-8	3-5	2-5	1-5

Source: Concerned district ADAs, MAOs, AEOs and Farmers Interaction

C2: Diseases

Perusal of the data on the incidence of various diseases (Table 8) revealed that the incidence of False smut was severe during *kharif*, 2019 ranged from 5-70% mainly in Khammam district followed by Nalgonda (10-40%) and Nizamabad (5-30%). The data revealed that, the incidence of false smut was severe in long duration or medium duration fine grain varieties grown by the farmers. Very few (5-10%) farmers have sprayed the fungicides at the time of flowering. Further, majority of the farmers are aware of the disease and its favourable conditions. Weather conditions especially rainfall during the flowering stage (September and October) favoured the incidence of false smut. In Khammam**,** moderate to severe incidence of false smut was observed across the villages surveyed. The incidence of false smut was observed in all the varieties grown by the farmers. Among the varieties, BPT 5204 and MTU 1061 are highly succumb to false smut. It was observed that, none of the farmers sprayed the fungicides at the time of flowering stage.

Severe incidence of false smut and grain discoloration was observed in experiments as well as in seed production plots at ARS, Kampasagar and also incidence of bunt (5-20%) was noticed. The incidence of false smut was severe in early planted crop (DOP: 01.08.2019) than late planted crops (DOP: 27.08.2019) in BPT 5204 at ARS, Kampasagar. All the varieties were found to be susceptible to false smut during *kharif*, 2019. As per the farmer's feedback, the reduction in yield due to false smut ranged from 3 – 5 quintal per acre. The reason for severe incidence of false smut has been coincidence of heavy rains with flowering stage of the crop.

Table 8. District wise diseases (%) recorded in paddy during *Kharif*, 2019

S. No.	District	BLB	NBl	ShBl	FS	Bunt	GD
1.	Nizamabad	5-20	5-15	10-15	5-30	-	-
2.	Kamareddy	-	1-5	5-15	5-25	-	-
3.	Karimnagar	-	1-5	5-10	5-20	1-5	5-10
4.	Peddapalli	-	1-5	10-25	5-10	1-5	5-10
5.	Jagtial	-	10-25	15-30	2-15	1-10	15-40
6.	Warangal (R)	15-20	10-15	10-20	1-10	-	5-10
7.	Siddipet	-	-	5-10	5-10	-	5-10
8.	Medak	1-5	5-8	-	5-10	1-5	-
9.	Badradri-Kothagudem	-	-	-	5-15	-	-
10.	Khammam	-	10-20	-	5-70	1-10	10-15
11.	Rangareddy	-	-	5-10	5-10	-	-
12.	Vikarabad	-	1-5	-	1-5	-	-
13.	Nagarkurnool	-	5-10	5-15	5-15	-	-
14.	Mahabubnagar	-	-	1-5	10-15	-	5-20
15.	Narayanpet	-	-	-	15-20	2-6	1-10
16.	Wanaparthy	-	-	-	5-15	-	-
17.	Nalgonda	-	-	5-10	10-40	5-20	20-25
18.	Suryapet	-	5-10	1-10	5-25	1-5	5-10

Source: *Concerned district ADAs, MAOs, Scientists from Research Stations, DAATTCs, KVKs and farmers interaction. The data recorded in seed production plots and experiments at Research stations also included.*

Note: *BLB: Bacterial Leaf Blight; NB: Neck Blast; ShB: Sheath Blight; FS: False smut; GD: Grain discolouration.*

While travelling to RS & RRS, Rudrur, the POS team also observed the harvest paddy being dried on road side and found severe incidence of false smut in all the villages surveyed. False smut incidence in different villages is presented below (Table 9).

Table 9: Observation on false smut incidence in some selected villages during K'2019

S. No.	Village	Mandal	False smut incidence (%)
1.	Durki	Banswada	30-40%
2.	Varni	Varni	10-15%
3.	Kamisettipalli	Nusrullabad	20-25%
4.	Nemli	Nusrullabad	5-10%
5.	Busvaipally	Banswada	10-15%
6.	Sarvapur	Gandhari	10-15%
7.	Thimmapur	Gandhari	15-25%

The incidence of bacterial leaf blight in rice was observed in BPT 5204 variety at Mosra (V&M), Nizamabad district and ranged from 5-20%. In Nizamabad, the BLB infection was started during second fortnight of August, 2019 in BPT 5204. At Mosra, the BLB incidence was severe in early planted crop, which is at panicle emergence stage as compared to late crop. The farmers have already sprayed (3-4 times) antibiotics (plantamycin or crocin or speedomycin or Conika) for control of BLB. However, the incidence was confined to that village only. The incidence of BLB was not observed on other varieties such as JGL 24423, MTU 1153 and KNM 118 at Mosra of Nizamabad. Severe incidence of BLB was also observed at RARS, Warangal under artificial inoculation conditions. Among all the varieties examined, BPT 5204 has succumbed to severe BLB infection with disease score ranging from 5-7 on 0-9 scale.

Neck blast incidence ranged from 1-25% across the districts surveyed during *kharif*, 2019. Maximum neck blast (10-25%) was recorded at Jagtial followed by Khammam (10-20%). In Khammam, neck blast was observed in BPT 5204 and MTU 1061 at Kotha Venkatagiri village of Thallada (m). The incidence of sheath blight ranged from 1-30% across the districts surveyed, whereas severe incidence of sheath blight was noticed at Jagtial (15-30%) followed by Peddapalli (10-25%).

Surprisingly, the POS team also observed the low to moderate incidence of bunt or kernel smut (1-20%) in BPT 5204, MTU 1010 and KNM 118. The bunt incidence was severe in Nalgonda (5-20%) followed by Jagtial and Khammam (1-10%). The bunt incidence was observed during *kharif*, 2016 but, it was very less or meager. Bunt incidence was noticed in 8 out of 18 districts surveyed during *kharif*, 2019 and *rabi*, 2019-20. Severe incidence of brown spot (25-30%) was observed in minikit RNR 15459 at Bonthakuntapalle (v), Sultanabad (m) of Peddapalli district. The incidence of grain discolouration ranged from 1-40% across the districts surveyed. Among the districts, the grain discolouration was severe at Jagtial (15-40%) followed by Nalgonda (20-25%) and Mahabubnagar (5-20%).

C3: Special observations on rice blast duing Rabi' 2019 in different parts of Telangana state

Based on the information received from DAATTCs, KVKs, Department of Agriculture, Govt. of Telangana, Scientists from Research Stations, severe incidence of leaf and neck blast was reported in Telangana state. All the coarse and fine grain varieties were found susceptible to blast during *Rabi*, 2019-20 except RNR 15048 (Telangana Sona). Overall, the

incidence was severe in Karimnagar, Peddapalli, Jagtial, Rajanna Sirisilla, Siddipet, Medak and Wanaparthy districts. The farmers sprayed the fungicides 3-4 times for control of blast. The incidence was reported from January, 2020 onwards and was severe during February and March, 2020. The POS team visited the Wanaparthy and Nagarkurnool districts on 04.02.2020 and 05.03.2020 to assess the blast incidence in farmers' fields.

At Mojerla village of Wanaparthy districts, the predominant varieties cultivated were KNM 118, MTU 1010, MTU 1156 and RNR 15048. In few fields, severe incidence of rice leaf blast was observed mainly due to congenial weather and application of high doses of nitrogenous fertilizers. The disease incidence was more in KNM 118 and MTU 1010 and no incidence was noticed in RNR 15048. Most of the farmers have already taken up remedial measures and sprayed different fungicides *viz.*, Tricyclazole, Isoprothiolane, Trifloxystrobin + Tebuconazole *etc*., against leaf blast and the spread was under check. However, few farmers have not taken up any control measures for leaf blast. The team observed disease initiation in some more fields and the following recommendations were given.

- Spraying of Tricyclazole @ 0.6 g or Kasugamycin @ 2.5ml or Isoprothiolane @ 1.5ml or tricylazole + mancozeb @ 2.5 g /l of water twice at one-week interval alternating the chemicals.
- Apply nitrogenous fertilizers after controlling the spread of the disease.
- Apply MOP @ 15kg/acre for crop at P.I stage.

At **Ramapadu** village of Madanapuram (m), Wanaparthy district, very severe incidence of leaf blast was observed in MTU 1010 and KNM 118 at only one farmer field. He observed the incidence of blast from nursery stage onwards. He has sprayed the chemical (Nativo) at nursery stage followed by Tricyclazole and Isoprothiolane in main field. The weather conditions were highly favourable during the month of January to February, 2020. As per the farmer's feedback, the incidence of blast was not noticed in RNR 15048. Further, it was observed that, the incidence of panicle blast was also observed in Finger millet at Ramanpadu village. At present, the incidence of rice blast decreased and there is no further spread of the blast to adjacent fields. While travelling to different mandals, the team also observed the paddy fields randomly on road side and found low incidence of leaf blast in both the districts.

C4: Details of village wise observations on different insect pests and diseases during survey

Village wise data collected on occurrence of insect-pests and diseases along with GPS co-ordinates was mentioned below.

Table 10a: Occurrence of insect-pests and diseases in Nizamabad visited on 30.09.2019

S. No	Name of the village	Insect-pest or Disease	% incidence
1.	Dharmaram (B)	Neck blast	5%
		Flower thrips	1-5%
		Leaf folder	5-10%
2.	Mopal	Hispa	2-5%
		Whorl maggot	5-10%
3.	Mosra	Bacterial leaf blight	5-20%
4.	Adlur Yellareddy of Kamareddy district	-	-

Table 10b: Occurrence of insect-pests and diseases during *Kharif*, 2019 in Jagtial

S. No.	Village / Station	Mandal	GPS points	Varieties grown in the village	Insect-pests / diseases / abiotic stress observed	% incidence / severity
1.	RARS, Polasa	Jagtial	N18 50 352 E078 56 900 250 m	-	Neck Blast, Sheath Blight False smut Grain Discolouration Bunt Panicle mite	15-25% 15-30% 2-10% 15-40% 5-10% 3-5%
2.	Polasa	Jagtial	N18 50 352 E078 56 900 252 m	Jai sreeram, JGL 24423, KNM 118 BPT 5204	Neck Blast, Sheath Blight False smut	10-15% 15-20% 2-10%
3.	Hanmajipet	Jagtial	N18 49 417 E078 54 665	JGL 24424 Jai Sreeram	-	-
4.	Chelgal	Jagtial	N18 48 282 E079 53 046 284 m	KNM 118, JGL 24423 MTU 1153, Sintoo, Siri	False Smut Bunt	10-15% 1-5%

Table 10c: Occurrence of insect-pests and diseases in Karimnagar and Peddapalli visited on 30.10.2019

S. No.	Village	Mandal	GPS points	Varieties grown in the village	Insect-pests / diseases / abiotic stress observed	% incidence / severity
Karimnagar						
1.	Mugdampur **(Field No. 1)**	Karimnagar (Rural)	N18 29 056 E079 12 662 252 m	BPT 5204, KNM 118 Jaisreeram, MTU 1010 and JGL 24423	Neck Blast, Bunt GD Stem borer, Panicle mite **Crop Lodging**	1-5% 1-5% 5-10% 5-10% 5-10
2.	Mugdampur **(Field No. 2)**	Karimnagar (Rural)	N18 28 611 E079 12 964 253 m	JGL 24423, MTU 1010	Stem borer **Crop Lodging**	3-8%
	Peddapalli					
3	Bonthakuntapalli	Sultanabad	N18 30 057 E079 16 215 241 m	KNM 118, BPT 5204, JGL 24423, MTU 1156 and IR 64	Brown spot (RNR 15459-minikit) Stem borer Sheath blight **Crop Lodging**	25-30% 3-8% 10-25%
4.	Nethaganipalle	Eligedu	N18 34 801 E079 15 559 259 m	BPT 5204, MTU 1010, JaisreeramMTU 1153,	Sheath Blight Panicle mite GD **Crop Lodging**	25-30% 10-20% 5-10%
5	Sultanpur	Eligedu	N18 32 362 E079 13 239 274 m	KNM 118, BPT 5204 **(Seed Production)**	False smut Bunt Sheath rot GD Stem borer **Crop Lodging**	5-10% 1-5% 5-8% 5-10% 5-10%
6	Rampur	Peddapalli	N18 36 907 E079 14 845 279 m	BPT 5204 & Minikit fields visited	Neck blast Stem borer **Crop Lodging**	1-5% 2-5%

Table 10d: Occurrence of insect-pests and diseases in Mahabubnagar and Narayanpet visited on 01.11.2019

S. No.	Village	Mandal	Cost of cultivation	GPS points	Varieties grown	Insect-pests / diseases / abiotic stress observed	% incidence / severity
Mahabubnagar district							
1.	Gopulapur	Devarakadra	15,000-20,000	N16 36 596 E077 48773 419 m	RNR 15048 JGL 24423	False smut GD	10-15% 15-20%
2.	Bhandarupalli	CC Kunta	18,000-20,000	N16 36 814 E077 47906 391 m	RNR 15048	GD Sheath Blight BPH False Smut	15-20% 1-5% 3-18% 10-15%
3.	Nellkondi	CC Kunta	15,000-20,000	N16 31 221 E077 47 556 362 m	RNR 15048 Minikits	GD BPH	5-10% 1-3%
Narayanpet district							
4.	Pusalpadu	Marikal	18,000-20,000	N16 38 864 E077 45 874 408 m	RNR 15048 BPT 5204	Stem borer Panicle mite BPH GD	5-10% 5-15% 1-5% 1-5%
5.	Kondronpalle	Dhanwada	15,000-18,000	N16 38 752 E077 45 657 407 m	RNR 15048 BPT 5204	Stem borer Panicle mite GD	5-10% 5-8% 1-5%
6.	Maganoor	Magnoor	15,000-20,000	N16 23 536 E077 21 460 360 m m	RNR 15048 BPT 5204	GD Stem borer	5-10% 5-10%
7.	Gudeballur	Krishna	25,000-30,000	N16 23 353 E077 21 407 370 m	Kaveri Sona BPT 5204	False Smut Stem Borer Bunt	15-20% 5-10% 2-6%

Table 10e: Occurrence of insect-pests and diseases in Warangal, Karimnagar and Siddipet districts during *Kharif*, 2019 (05.11.2019)

S. No.	Village / Station	Mandal	Cost of Cultivation (Rs.)	GPS points	Varieties	Insect-pests / diseases / abiotic stress observed	% incidence / severity
1.	RARS, Warangal	Warangal	-	N18 50 380 E079 36 116	-	Neck Blast Sheath Blight False Smut BLB GD BPH Panicle mite	10-15% 10-20% 1-5% 15-20% 5-10% 1-5% 5-15%
	Warangal (Urban)						
2.	Shanthinagar	Elkathurthi	20,000/-	N16 23 209 E077 21 409 260 m	JLG 24423 NLR 34449	False Smut	5-10%
3.	Kothulanaduma	Elkathurthi	18,000 to 20,000/-	N18 09 358 E079 26 194 266 m	Jai sree ram KNM 118 NLR 34449	False smut	5-10%
4.	Mulkanoor	Bheemdeva-Rapally	15,000-20,000/-	-	KNM 118 JGL 24423 HMT Sona	False smut	5-10%
	Karimnagar district						
5.	Chinnapapaiahpally	Huzurabad	20,000/-	N18 10 668 E079 25 413	HMT Sona Ankur Sona	False smut	10-15%

S. No.	Village / Station	Mandal	Cost of Cultivation (Rs.)	GPS points	Varieties	Insect-pests / diseases / abiotic stress observed	% incidence / severity
				270 m			
6.	Peddapapaiahpally	Huzurabad	20,000/-	-	HMT Sona MTU 1156 JGL 24423	False smut	15-20%
7.	Shelapally	Huzurabad	15,000 to 20,000	-	JGL 24423 HMT Sona	False smut	5-10%
8.	Chelpur	Huzurabad	20,000/-	-	JGL 24423 Jai Sreeram	False smut	5-10%
	Siddipet district						
9.	Pandilla	Husnabad	15,000 to 18,000/-	N18 07 658 E079 10 945 340 m	MTU 1010 Pvt. Coarse varieties	False smut Panicle mite GD Stem Borer	5-10% 5-10% 5-10% 1-5%

Table 10f: Occurrence of insect-pests and diseases in rice at different villages of Suryapet district during *kharif*, 2019 (13.11.2019)

S. No.	Village	GPS points	Varieties grown	Insect-pests / diseases / abiotic stress observed	% incidence / severity
1.	Yandlapalli	N17 11 737 E079 32 178	MTU 1010 BPT 5204	Stem borer Salinity	5-10% -
2.	Ramraram	N17 13 717 E079 32 850 189 m	MTU 1010 BPT 5204 KNM 118	Stem borer	5-10%
3.	Ramachandrapuram	N17 15 529 E079 32 360 206 m	MTU 1010 KNM 118	Leaf folder Stem borer	1-5% 1-5%
4.	Madhavaram	N17 04 050 E079 42 560 180 m	BPT 5204 MTU 1010 Ankur Pooja	Stem borer	3-7%
5.	Vijayaraghavapuram	N17 05 060 E079 48 482 152 m	MTU 1010 MTU 1153	Sheath blight False smut Bunt	1-5% 5-10% 1-5%
6.	Munagala	N17 03 123 E079 49 550 149 m	Ankur Pooja HMT Sona BPT 5204	False smut Bunt Sheath blight	15-20% 1-5% 5-10%
7.	Dwarakunta	N16 58 157 E080 00 154 111 m	Ankur Pooja BPT 5204 KNM 118	False Smut Panicle mite GD	15-20% 5-10% 5-10%
8.	Thripuraram	N17 06 127 E079 56 205 130 m	Pooja BPT 5204 KNM 118 Co-52 MTU 1224 MTU 1153	BPH Leaf Folder False smut Neck blast	3-15% 2-5% 20-25% 5-10%

Table 10g: Occurrence of insect-pests and diseases in rice at different villages of Kamareddy and Nizamabad districts during *kharif*, 2019 (25.11.2019)

S. No.	Village / Research Station	GPS points	Varieties grown	Insect-pests / diseases / abiotic stress observed	Per cent incidence
1.	RS&RRS, Rudrur	N 18 34 063 E077 52 630 393 m	-	False smut Neck blast Panicle mite	25-30% 10-15% 15-20%

S. No.	Village / Research Station	GPS points	Varieties grown	Insect-pests / diseases / abiotic stress observed	Per cent incidence
2.	Medipally	N 17 21 456 E077 25 069	JGL 24423 Jai Sreeram	Stem borer	1-5%
3.	Jakkadani Thanda	N 18 23 243 E077 55 274 392 m	MTU 1153 MTU 1156	False smut Sheath blight	25-30% 10-15%
4.	Ibrahimpet	N 18 24 178 E077 54 663 392 m	MTU 1153 MTU 1156	False smut	5-10%

Table 10h: Occurrence of insect-pests and diseases in Khammam and Bhadradri-Kothagudem districts (14.11.2019)

S. No.	Village	GPS points	Varieties grown	Insect-pests / diseases / abiotic stress observed	% incidence / severity
	Khammam				
1.	KVK, Wyra	N17 10 929 E 080 22 305 114 m	KNM 118 Siddi	Panicle mite Bunt GD	5-10% 5-10% 10-15%
2.	Wyra (Farmer fields)	N17 11 545 E 080 20 204 111 m	KNM 118 BPT 5204 MTU 1010	Panicle mite Bunt GD	5-8% 1-5% 10-15%
3.	Billupadu	N17 14 310 E 080 27 791	BPT 5204 KNM 118	BPH	15-20%
4.	Kotha Venkatagiri **Field No. 1**	N17 15 336 E 080 28 056 122 m	BPT 5204 MTU 1061 MTU 1010	BPH	5-35%
5.	Kotha Venkatagiri **Field No. 2**	N17 15 566 E 080 28 270	BPT 5204 MTU 1061	BPH	5-10%
6.	Kotha Venkatagiri **Field No. 3**	N17 15 209 E 080 28 010 106 m	MTU 1061 BPT 5204	Neck Blast BPH	15-20% 5-10%
6.	Mittapally	N17 12 077 E 080 28 625 105 m	BPT 5204 MTU 1061	BPH False Smut	1-5% 1-5%
7.	Bayyannagudem	N17 11 992 E 080 39 886	MTU 1061	BPH	5-10%
8.	Lankapalli	N17 11 992 E 080 39 886 142 m	BPT 5204	BPH	10-15%
9.	Kistram	N17 13 061 E 080 46 828 120 m	MTU 1061 MTU 1224 MTU 1001 MTU 1075	False Smut	10-15%
10.	Thallamada	N17 11 919 E 080 51 953	JGL 24423	-	-
11.	Buggapadu	N17 15 812 E 080 51 786	MTU 1061 RNR 11718	False smut	15-20%
12.	Sadasivunipalem	N17 09 126 E 080 50 038	BPT 5204	False smut	60-70%
13	Bhimaram	N17 08 494 E 080 49 570	BPT 5204 MTU 1061	False smut	40-50%
14.	Marlapadu	N17 07 068 E 080 49 122 142 m	MTU 1061 BPT 5204 WGL 44	False smut Neck blast	30-40% 10-15%

S. No.	Village	GPS points	Varieties grown	Insect-pests / diseases / abiotic stress observed	% incidence / severity
15.	Birapalli	-	MTU 1061 BPT 5204	False smut	30-40%
16.	Adsarlapadu	-	MTU 1061 BPT 5204	False smut	25-30%
Badradri-Kothagudem					
17.	Nacharam	-	BPT 5204	False smut	5-10%
18.	Nagupalli	N17 16 971 E 080 52 031	MTU 1061 BPT 5204	False smut	10-15%
19.	Aasannaagudem	-	BPT 5204	False smut	5-10%

Table 10i: Occurrence of insect-pests and diseases in rice at different villages of Wanaparthy and Nagarkurnool dring *Rabi,* 2019-20 (05.03.2020)

S. No.	Village	Mandal	GPS points	Varieties grown	Insect-pests / diseases / abiotic stress observed	% incidence / severity
Wanaparthy district						
1.	Kanimetta	Kothakota	N16 21 105 E77 52 221 314 m	MTU 1010, KNM 118 and RNR 15048	Whorl maggot and stem borer	10-15 % 5-10%
2.	Ramanpadu **(Field No. 1)**	Madanapuram	N16 21 164 E77 52 009	KNM 118, RNR 15048, MTU 1153 and MTU 1010	Leaf Blast	20-25%
3.	Ramanpadu **(Field No. 2)**	Madanapuram	N17 04 766 E78 21 315		No Pests and Diseases	-
4	Ramanpadu **(Field No. 3)**	Madanapuram	N16 21 404 E077 52 137		Stem borer (organic)	1-2%
5.	Rayanipadu	Kothakota	N16 19 688 E77 57 020 326 m	MTU 1010 KNM 118 RNR 15048	Whorl maggot Sulphide injury Zinc difiecincy	5-10%
5.	Buddaram	Gopal Pet	N16 38 907 E078 15 845 491 m	MTU 1010 and KNM 118	Crop is good and no pests and diseases	-
Nagarkurnool district						
6.	Pothireddypally	Thimmajipet	N16 36 907 E078 15 842	KNM 118	Salinity and poor drainage	-

C5: Usage of plant Protection Chemicals

The data on usage of plant protection chemicals in rice was found to be maximum (accounting for 95%) in Karimnagar, Warangal followed by Khammam (93%), Nalgonda (92%), Nizamabad (92%) and Ranga Reddy (50-54%). Majority of the farmers in the surveyed districts are depending on the input dealers and AEOs for pesticide recommendations. On interaction with input dealers and farmers, it was evident that pesticides sales reduced drastically in Khammam and Suryapet districts due to more usage of bio's and unknown chemicals purchased from Guntur district of Andhra Pradesh for control of pests and diseases in paddy. In Medak district, marigold was taken up on the field bunds of paddy (traditional practice).

C6: Pesticide application equipment

Hand sprayer was most commonly used pesticide spraying equipment in all the surveyed districts up to maximum tillering stage. Taiwan sprayer or Power sprayer was used during the

flowering to maturity stage of the crop. Tractor mounted sprayers were used for spraying of pesticides in paddy especially at Jagtial, Karimnagar, Nizamabad, Kamareddy and Warangal. The farmers are maintaining the Power or Taiwan sprayers and also procured on hire basis during the crop season @ Rs 30 – 40 per tank. Majority of the farmers are spraying the 80-100 litre of spray fluid per acre. It was observed that, farmers are not spraying the pesticides, keeping in mind the wind direction. A few farmers are now using battery operated sprayers also in the surveyed districts.

C7: Total no. of pesticides sprayed in the crop season

During the visit, the POS team raised the common question to farmers on number of sprays during this season. Surprisingly, majority of the farmers sprayed 1-2 times during *Kharif*, 2019 in all surveyed districts. However, this was the scenario up to the flowering stage of the crop because the incidence of insect-pests and diseases are less. Later, when the crop attained milky to maturity stage, the severe incidence of false smut was observed especially during last week of October to November in entire Telangana State. Overall, the cost incurred on spraying of pesticides during *Kharif*, 2019 was less compared to *Kharif*, 2017 and 2018. The team clearly observed that, majority of the farmers have not sprayed fungicides at flowering stage even though rainfall occurred during flowering to milky stage. The farmers said that due to continuous rains farmers were unable to takeup spraying of fungicides at flowering to milky stage. During *Rabi*, 2019-20, the severe incidence of leaf blast enforced the farmers to spray the fungicides for 3-4 times. It was observed that, majority of farmers (90-95%) are mixing the insecticide + fungicide or two insecticides at a time.

Table 11: List of insecticides and fungicides used by the farmers

S. No.	Insect pests/diseases	Chemicals used
1.	Gall midge	Carbofuran 3G,
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 Chlorphyriphos 50%EC + Sand, Profenophos **PI to Booting stage:** Chloranthraniliprole 18.5 SC, Cartap Hydrochloride 50% WP, Chlorantraniliprole 9.6% + Lambda cyhalothrin 4.6% (Ampligo), Flubendiamide 39.35 SC, Acephate 75 SP
3.	BPH	Acephate 75 SP and 95SG, Phenthoate, Ethofenprox, Dinotefuran 20% SG (Token, Osheen), Imidacloprid + Ethiprole 80WG, Pymetrozine (Chess), Triflumezopyrim 10% SC (Pexalon).
4.	Leaf mite / panicle mite	Dicofol, Propargite and Spiromesfin
5.	Blast (Leaf and Neck blast)	Tricyclazole 18% + Mancozeb 64%WP, Isoprothiolane 40%EC, Kasugamycin 3%L, Kresoxim methyl 44.3%SC, Picoxystrobin 6.78% + Tricyclozole 20.33% SC (Galileo Sensa), Propiconozole 10.7% + Tricyclozole 34.2% SE (Filia)
6.	Sheath Blight	Hexaconazole 5%EC, Propiconozole 25%EC, Validamycin 3%L, Tebuconazole + Trifloxystrobin (Nativo). Azoxystrobin + Tebuconazole (Custodia), Picoxystrobin 7% + Propiconozole 12%SC (Galileo Way), Thifluzamide 24%SC (Pulsor), Propiconozole 10.7% + Tricyclozole 34.2% SE (Filia), Captan

S. No.	Insect pests/diseases	Chemicals used
		70% Hexaconazole 5% WP (Taqat)
7.	BLB	Copper oxy chloride + Plantamycin or Paushamycin or Crocin or Agrimycin; Kasugamycin 5% + Copper Oxychloride 45% (Conika)
8.	Stem rot	Validamycin 3%L, Propiconazole 25%EC, Hexaconazole 5%EC, Iprobenphos 48%EC, Carbendazim 25% + Mancozeb 50% WS (Sprint)
9.	Sheath rot and Grain discoloration	Propiconozole 25%EC, Carbendazim 12% + Mancozeb 63% WP (Saaf),
10.	False smut	Propiconazole 25%EC, Carbendazim 12% + Mancozeb 63% WP (Saaf),

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

C8: Mixing of different pesticides and spraying of Bio's for the management of pests and diseases

During *kharif*, 2019, it was observed that, the 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 majority of the farmers were mixing one or two insecticides + one fungicide / antibiotics and bio's or any other nutrient formulations. It was also observed that, the input dealers are giving the nutrients / poshak formulations along with pesticides. It is a regular practice observed in all the districts surveyed. In Khammam, the use of bios for control of BPH was also observed. The cost of the bios was very less compared to the insecticides and the contents were not dsiplayed in these bio's.

The POS team identified the compatibility of pesticides as knowledge gap among the farmers and input dealers. In order to create awareness among the farming community and input dealers, the POS team highlighted the most commonly used compatible pesticides in paddy during the POS visits and also separate chapter on **"Nuthana Sasyarakshana Mandulu, misramala vadukamlo melukuvalu"** was included in ***Telangana Vyavasaya – Dikschuchi*** with latest molecules and recommendations published by PJTSAU every year.

The following are the common cocktail mixtures pesticides and bios being used by the farmers

1. Chlorantraniliprole + Acephate + Propineb
2. Chlorpyriphos + Acephate + Saff (Carbendazim + Mancozeb)
3. Buprofezin + Acephate + Tricyclozole
4. Cartap hydrochloride + Tricyclozole + Spiromesfin
5. Cartap hydrochloride + Spiromesfin
6. Profenophos + Acephate + Saff
7. Lambda Cyhalothrin + Acephate
8. Propiconazole + Chlorantraniliprole
9. Isoprothiolane + Chlorantraniliprole + Acephate
10. Pymetrozine + Isoprothiolane

D: Rice Production during *Kharif*, 2019 in Telangana state:

The rice productivity in the surveyed districts during *kharif*, 2019 was in the range of 4500 - 6000 kg/ha. The state of Telangana has created a record in paddy production with 78.68 lakh metric tonnes of paddy were procured during *kharif* 2019 *(Source: Provisional estimates by Dept. of Agriculture, Govt. of Telangana)*.

The reasons for highest production are as follows:

- Varietal replacement with high yielding, short duration fine and coarse grain varieties like Telangana Sona, Kunaram Sannalu, Jagtial Rice-1 and Bathukamma.
- Congenial weather conditions, timely rainfall, good management practices like timely sowing, efficient water management, effective nitrogen utilization by neem-coated urea *etc*., helped the state to achieve record paddy production.
- Implementation of investment support scheme (Rythu Bandhu), execution of irrigation projects, restoration of minor irrigation tanks, free supply of 24x7 power to agriculture and other steps also helped in increase of paddy production.

The farmers were getting only half the price being paid by consumers. The intermediary margins were on the higher side. Due to marginal difference (Rs. 50/-) between minimum support price of fine and coarse grain varieties farmers preferred to grow short duration and high yielding coarse grain varieties rather than fine grain varieties, which marked significant shift in varietal preference among the farmers, except in Mahabubnagar wherein fine grain variety Telangana Sona was cultivated over large areas. The farmers said that owner of a rice farm is getting on an average a net profit of Rs. 6000 - 8000/acre. This amount is insufficient to meet the family needs of small and marginal farmers. Almost all the farmers were of the opinion that the present minimum support price provided by the Government is insufficient and needs to be increased to 2000 – 2200 per quintal.

Changes observed among the farming community compared to the previous years

- The farmers are showing interest on cultivation of short duration, high yielding and multiple resistant coarse grain varieties.
- A clear-cut shift (30-40%) from fine (BPT 5204) to coarse grain varieties (KNM 118, MTU 1010 and Jagtial Rice-1, MTU 1156) was observed in major rice growing districts of Telangana State *i.e.* Nizamabad, Karimnagar and Peddapalli districts. Similarly, the farmers in Nalgonda district are growing fine grain varieties (Ankur Pooja, Jai Sreeram, HMT Sona and BPT 5204) due to high demand of fine grain varieties in rice mills at Miryanguda. The rice millers are procuring the paddy at 20-23% moisture @ Rs. 1850 – 1900/- per quintal.
- The area under dry converted wet rice cultivation is spreading to adjacent districts of Khammam because of labour scarcity during peak period, delay in monsoon and late receipt of canal water.

E. Points emerged during the POS, *Kharif*, 2019, which needs immediate attention:

- BLB, BPH and Blast are the common problems in Telangana state causing substantial yield losses in paddy every year. Majority of the farmers are asking for development of BLB, Blast and BPH tolerant fine grain varieties with Jai Sreeram grain type.
- Grading system: Most of the farmers opined that, only "A' grade was given for MTU 1010 and "B" grade for other similar remaining coarse grain varieties (KNM 118, Jagtial rice- 1, Bathukamma, MTU 1153 and MTU 1156).
- Farmers have also sought information on compatibility of insecticides and fungicides and chemicals for control of false smut.

F. Needs of the stakeholders:

- Development of high yielding multiple resistant varieties having BPT 5204 and Jai Sreeram quality and duration.
- BPH tolerant fine grain varieties with 130-135 days duration.
- Improvement of Telangana Sona for lodging tolerance and BLB resistance.
- Development of multiple resistant hybrids particularly for BPH/ YSB / blast /BLB / sheath rot / grain discoloration.
- Standardization of protocols for use of drones in agriculture for plant protection.
- Supply of leveling machinery, transplanters, power weeders suitable for mechanized planting / direct seeding through custom hiring centers.
- Farmers are asking for post-harvest mechanization especially for drying of paddy immediately after harvest (broilers / dryers). They are not getting the space and time for drying of the *kharif* harvest.
- Enhancing of minimum support price (Rs. 2200/- to 2300/- per quintal) in view of the increased cost of cultivation.
- **Seed Producers:** Notification of newly released rice variety (Jagtial Rice-1) through Govt. of India (Public domain).
- **Millers:** super fine grain (Jai sreeram type), non-sticky nature, less chalkiness, elongation after cooking and high head rice recovery.

G. Problems faced by the farmers (Other than biotic & abiotic)

- Labour scarcity during pear time of field operations
- **Paddy transplanters:** As per the farmers feedback, the labour wages for manual planting per acre was ranged from Rs. 3000 to 4000/-.
- Marketing problem for KNM 118, Bathukamma and Jagtial Rice-1 varieties.
- Drum seeder with different spacing's, fertilizer applicator, machine planting, power weeders, drones for spraying of pesticides, reapers, threshers, combine harvesters and bagging machines are essentially needed on subsidized rates.

H. Cost of Cultivation

The cost incurred for cultivation of paddy / acre was computed by using sampled farmers in the surveyed districts was ranged from Rs. 15,000 to 30,000/-. More expenditure was incurred on a long duration and susceptible variety like BPT 5204 and less on medium / short duration resistant variety like Telangana Sona, KNM 118 and Jagtial rice-1. Due to lodging of the crop in Karimnagar, Jagtial, Medak, Warangal, Siddipet, Mahabubnagar and Narayanpet, a clear-cut increase in harvesting costs was observed. For instance, due to lodging, chain harvester price was increased to Rs. 3000 per hour (Rs. 2000 for normal field) in Jagtial and Karimnagar districts. Harvesting time per acre increased due to lodging of the field and It took one to one and half an hour extra time for harvesting an acre.

Table 12: The cost of cultivation of paddy in different districts of Telangana state

S. No.	Name of the district	Cost of cultivation (per acre)
1.	Nizamabad and Kamareddy	18,000 – 25,000
2.	Karimnagar and Peddapalli	20,000 – 22,000
3.	Jagtial	20,000 – 22,000
4.	Mahabubnagar and Narayanpet	15,000 – 20,000
5.	Suryapet	15,000 – 20,000
6.	Khammam and Badradri-Kothagudem	15,000 – 16,000
7.	Wanaparthy	15,000 – 20,000
8.	Medak	20,000 – 28,000

Visit to rice parboiled mills at Miryalaguda

As a part of POS visit, the team also visited two parboiled rice mills at Miryalaguda division of Nalgonda district. A total of 110 rice mills are located in nearby villages in Miryalaguda (Aallagadapa, Avanthipuram and Yadgharpally). Among these, 82 rice mills were modified with sophisticated equipment suitable for stream milling and remaining are normal old mills. The entire team visited the whole process milling starting from hoppers for collection of produce to optical sorting machine for removal of unwanted colours, seed defects and diseased grains and finally packing and bagging of rice. The processing capacity of the mills was 50 t per 9 hours. As per the information from millers, the demand for pooja variety was high as compared to others. The incidence of false smut was more severe during this season and further 90-95% false smut infected paddy grains will be removed in different stages of milling.

The following points emerged out from the discussion with millers

- Most preferable varieties by the millers are Jai Sreeram (Chintoo), Ankur Pooja, HMT Sona and BPT 5204. The rice millers will procure the fine grain paddy during *kharif* season and pre-clean the produce to remove the straw, weed seeds, soil and other inert material prior to hulling. The pre-cleaned produce will be stored for longer period.
- The millers are procuring the paddy at 23-25% moisture for an amount of Rs. 1870/- per quintal of paddy. The farmers will get an additional amount of Rs. 100-200/- per quintal than normal market price when they harvest the crop above 20% moisture without drying and storing of the produce.
- As per the miller feedback, the HRR was more (63-64%) in BPT 5204 when the paddy procured from Kurnool and surrounding districts under Tungabhadra river as compared to Krishna rice (58-60%).
- The millers have idea on export of rice to other countries like South Africa (length grain 6.8 mm and non-scented), USA and UAE (Pooja and Chintoo). But none of the millers are exporting the rice to other countries due to sufficient business and demand for rice in local market, especially in Hyderabad.
- As per the miller feedback, a total of 300 lorries (100 quintal each) of steamed rice is supplied to Hyderabad from different mills at Miryalaguda every day for use by local retail shops. The cost of premier quality rice (Jai Sreeram type and HMT type) per quintal ranged from Rs. 4000- 4200 including transport to Hyderabad. The millers and buyers will conduct the panel test for checking the cooking quality before packing and delivery to retailers.
- The demand for half boiled rice especially BPT 5204 grain type was more for hotels and PDS. The cost of half boiled rice ranged from Rs. 3400-3500/- per quintal.
- The cost of rice bran ranged from Rs. 2200 – 2500/- per quintal. The bran will be used in solvent extraction as well as animal feed. The husk will be used in rice mills itself for running the broiler and husk-based power generation.
- Approximately 80-100 workers / laborer's required to run the rice mill with a capacity of 4-5 t/hr. 40-50 crores investment is required for establishment of one mill.
- Millers preferences for development of new rice varieties: super fine grain (Jai Sreeram type), non-sticky nature, less chalkiness, elongation after cooking and high head rice recovery.

I: Farmers feedback

During the visit to Medak district on 24.09.2019, the POS team recorded feedback on adoption of different management practices recommended in paddy. The farmers were selected randomly in different villages and per cent farmers adoption was computed.

Table 13: As per the feedback recorded from farmers, the following per cent adoption of management practices was computed.

S. No.	Management practice	% of farmers adopted in the surveyed villages
1.	Seed treatment	0
2.	Application of FYM / Sheep manure / others	35-40%
3.	Application of Zinc as basal	20-25%
4.	Growing of green manure crops	35-40%
5.	Application of complex fertilizers (DAP / 20-20-0-15)	100% (Avg. 2-3 bags/acre)
6.	Application of herbicides (Rifit at 3-4 DAT)	60-70%
7.	Application of granules (3G / 4G / 0.4 G)	60-70%
8.	Provision of Alleyways	5-10%

Note: provisional estimates collected from randomly selected farmers presented above

J: Farmers Outreach Programmes

In order to forecast the incidence of pests and diseases in rice, Principal Scientist (Rice), PJTSAU, Rice Research Centre, Rajendranagar, has given **11 alert messages** to farmers, Commissionerate, Dept. of Agriculture, DAATTCs, KVKs, NGOs and wide publicity was given through print and electronic media. During the POS team visit to different districts, PS (Rice) & Head, RRC, ARI, Rajendranagar addressed the print and electronic media, to alert the farmers encountering similar problems in the respective district. Based on the alert messages, district Agricultural Officers also prepared pamphlets on “insect pest and diseases management in *rabi* rice” and distributed to the farmers during the diagnostic field visit.

The farmers were receiving advices on fertilizer and pesticide recommendations through concerned AEOs, MAOs, Scientists of DAATTCs, KVKs and Research Scientists and input dealers. However, the progressive farmers are managing the crop based on self-experience by timely application of fertilizers / pesticides or following the recommendations of university vyavasaya panchangam / Annadata and other publications. Now a days, farmers are uploading the photographs of pest or disease infected field / plants to the scientists / MAOs through Whatsapp for suitable control measures and remedial measures are being suggested by scientists.

Uttar Pradesh (Faizabad): 2019-2020

Districts surveyed: *Ambedkar Nagar, Barabanki, Sultanpur, Ayodhya, Basti, St. Kabir Nagar* and *Siddharath Nagar*

Details of survey

Districts	Block/Taluka	Villages
Ambedkar Nagar	Katehari, Akberpur, Ramnagar, Tanda and Jalalpur	Ainwa, Kodra, Golpur, Kajri, Barganna, Ausanpur, Pura Bishram, Manwalpur, Batalipur, Mahmoodpur and Tajnapur
Barabanki	Haidargarh, Ramnagar, Ramsanehi Ghat, Pure Dalai and Sirauli	Ujiddinpur, Chandramanika Purha, Sukhipur, Gaushpur, Mohadipur and Markaman
Sultanpur	Kurebhar, Baldirai and Dhanpatganj	Bagwanpur, Ramanpur, Kanowa, Sarai Bharti, Pepergaon, Bishnya
Ayodhya	Maya, Bikapur, Masodha, Pura, Sohawal, Harringtongani and Tarun	Parakhan, Behta, Mohitpur, Pure Bajaj, Kola, Khandpikera, Ballipur, Pichuti, Kamposwa Nansa, Sariyawa, Chauba ka Purwa and Palialoha
Basti	Vikramjot, Harriya, Sadar, Saughat and Kaptanganj	Ram Hatia, Shankarpur, Majhau, Tenwa, Gaura Saughat, Purlia, Bharatpur Saughat and Paigapur
St. Kabir Nagar	Khalilabad, Mehdawal and Pauli	Misraulia, Ranipur, Bairani, Shamchara Bazar, Bishrapur, Paraspur and Rampur
Siddharath Nagar	Birdpur, Naugharh, Jogiya Uadaipur and Meethwal	Semari, Nadav, Tilani, Saha, Berva, Tingaura, Devra, Parsauna and Asnar

Widely prevalent rice varieties

Districts	Varieties
Ambedkar Nagar	**HYVs:** NDR 359, NDR 97, Shusk Samarat, Sarjoo 52 Sambha Mahsuri, Swarna, Narendra Lalmati, Dhanrekha, NDR 2064, NDR 2065, Sambha Mahsuri-Sub 1 Swarna Sub-1 and Basmati; **Hybrids:** 27P31, 27P63, Damini, Kaveri 9090, Dhanya 8655, US 305, Arize 6444 Gold and Gorakhnath 510
Barabanki	**HYVs:** NDR-97, Sambha Mahsuri, Swarna, Shusk Samrat, Sarjoo 52, NDR 359, Basmati, NDR 2064, NDR 2065 and Narendra Lalmati; **Hybrids:** US-305, 27 P 31, Arize 6444 Gold, 27P63, Kaveri and Dhanya 8655; **Locals:** Kala Jeera
Sultanpur	**HYVs:** NDR 3112-1, NDR 2065, NDR 359, Shusk Samarat, Narendra Lalmati, Narendra Usar Dhan-3, Sonam, Sambha Mahsuri, Swarna Sub1 and Pusa Basmati 1; **Hybrids:** Damini, Gorakhnath 510, Arize 6444 Gold,GangaKaveri, 27 P 31, 27P63, NDR 97, NDR 2064, Sarjoo 52, Moti Gold, Biostat, Nandi 333 and Dhanversa
Ayodhya	**HYVs:** NDR 97, NDR 2064, NDR 2065, NDR 359, Shusk Samarat, Narendra Lalmati, Sarjoo 52, Jallahri, Narendra Usar Dhan-3, Sambha Mahsuri, Sambha Mahsuri-Sub 1, Swarna and Pusa Basmati 1; **Hybrids:** Karishma, Damini, Gorakhnath 510,Damini Arize 6444 Gold, US 305,Kaveri 9090 and VNR 2233
Basti	**HYVs:** Sambha Mahsuri-Sub 1, Purva, Chintu, Khusi 27, BPT 5204, NDR 359, NDR 2064, NDR 2065, NDR 97, Swarna, Swarna-Sub 1 and Basmati; **Hybrids:**

Districts	Varieties
	Gorakhnath 510, 27P31, Arize 6444 Gold, Arize 6444, 27P63, Damini, Dhanya 8655, Bayer 6633 and KN3; **Locals:** Kalanamak
Sant Kabir Nagar	**HYVs:** Sabha Mahsuri-Sub 1, BPT 5204, NDR 3112-1, NDR 8002, Swarna,Swarna Sub 1, NDR 359, NDR 97, Sampurna and Chintu; **Hybrids:** Gorakhnath-510, Gorakhnath-509, US -305, Arize 6444 Gold, 27P31, 27P63, Damini, Dhanya 8655, VNR 2233, KN3, Karishma, Bayer 6633, Dhanvarsha and Khusi 27; **Locals:** Kalanamak
Sidharath Nagar	**HYVs:** Chintu, Dhanversha, NDR 3112-1, Sambha Mahsuri-Sub 1, NDR 97, Sabha Mahsuri, Swarna, Swarna Sub 1, NDR 359, Sona Mahsuri and Pusa Basmati 1; **Hybrids:** 27P63, Arize 6444 Gold, Dhanya 8655, Gorakhnath-510, Gorakhnath-509, Arize 6444 Gold, KN3, Silki, Damini, Krishna Kaveri and Bayer 6633; **Locals:** Kalanamak

Area under rice cultivation in surveyed districts during Kharif' 2019

Districts	Area (ha) under rice cultivation			
	Scented/ Basmati	Hybrid	Other	Total
Ambedkar Nagar	1200	80003	39127	120330
Barabanki	2201	54414	130495	187110
Sultanpur	1500	48000	46669	96169
Ayodhya	1900	38100	58998	98998
Basti	2800	40000	66110	108910
St. Kabir Nagar	2700	30000	61120	93820
Sidharath Nagar	2701	68003	106531	177235

Rainfall distribution in surveyed districts during *Kharif* 2019

Districts	Rainfall (mm)							
	June		July		August		September	
	Normal	Actual	Normal	Actual	Normal	Actual	Normal	Actual
Ambedkar Nagar	106.50	34.00	295.89	643.00	282.00	169.00	196.70	385.40
Barabanki	9.40	29.80	299.70	456.60	281.60	285.60	203.60	432.70
Sultanpur	87.30	68.40	307.10	373.60	289.50	167.30	202.80	277.10
Ayodhya	106.50	76.70	306.10	409.50	282.00	209.00	196.70	302.20
Basti	126.28	14.35	279.44	352.70	368.00	111.25	141.20	194.05
St. Kabir Nagar	183.20	48.00	349.76	637.00	312.76	136.60	199.70	244.67
Sidharath Nagar	163.00	30.82	380.10	306.39	325.30	85.42	231.30	249.08

Table: 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**			
	Ambedkar Nagar	**Barabanki**	**Sultanpur**	**Ayodhya**
Total area under HYVs in the district (ha)	39127 ha	130495 ha	46668 ha	58998 ha
Most prevalent HYVs in the district	NDR 359, NDR 97, NDR 2065	NDR 359, NDR 97, NDR 2065	NDR 359, NDR 2065	NDR 359, NDR 97, NDR 2065
Total area under rice hybrids in the district	80003 ha	54414 ha	4800 ha	38100 ha
Most prevalent rice hybrids in the district	G.Nath 510, A6444G, Damini, 27p63	27p63, A6444G	G.Nath 510, A6444G, Damini, 27p63	G.Nath 510, A6444G, Damini, 27p63
Total area under basmati in the district	1200 ha	2201 ha	1500 ha	1900 ha
Most prevalent basmati varieties in the district	Lalmati, PB 1	Lalmati, PB 1	Lalmati, PB 1	Lalmati, PB 1
Seed replacement rate	70%	70%	70%	70%
Whether farmers are using any heavy equipments like transplanter/combine harvester	Combine harvester	Combine harvester	Combine harvester	Combine harvester & rotavator
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	SRI, Laser leveling	SRI and DSR by some progressive farmers	Only by few farmers	SRI by few farmers
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Seed treatment and other plant protection measures	Plant Protection measures	Use of quality seeds and plant protection measures	Seed treatment, pest management and weed management
What are the general problems in rice cultivation in the district?	Shortage of labour	Shortage of labour	Shortage of labours	High labour wages
Please provide any farmers association in the district	Kisan club	Kisan Club	Kisan Club	Kisan club
Whether availability of agricultural labours is sufficient?	No	No	No	No
Whether there is any marketing problem of the produce?	No	No	No	No
Any major irrigation/power generation project in the district	Canals and NTPC	Sharda Sahay canal	Sharda Sahay canal	Sharda Sahay canal
Any soil testing program undertaken?	Yes	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Agriculture/University	Kisan Gosthi & mela by KVK and Dept of Agriculture	Kisan Gosthi & mela by KVK and Dept of Agriculture	Regular training of farmers by KVK and Dept of Agriculture	Kisan Gosthi & mela by KVK, Univ and Dept of Agriculture

Table: 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**		
	Basti	**Sant Kabir Nagar**	**Siddhart Nagar**
Total area under HYVs in the district (ha)	66110 ha	61120 ha	106531 ha
Most prevalent HYVs in the district	NDR 359, NDR 97, NDR 2065	NDR 359, NDR 97, NDR 2065	NDR 359, NDR 97, NDR 2065
Total area under rice hybrids in the district	40000 ha	30000 ha	68003 ha
Most prevalent rice hybrids in the district	G.Nath 510, A6444G, 27p63	G.Nath 510, A6444G, Damini, 27p63	G.Nath 510, A6444G, Damini, 27p63
Total area under basmati in the district	2800 ha	2700 ha	2701 ha
Most prevalent basmati varieties in the district	Kala Namak, PB 1	Kala Namak, PB 1, KN 3	Kala Namak, PB 1, KN 3
Seed replacement rate	80%	80%	80%
Whether farmers are using any heavy equipments like transplanter/combine harvester	Rotavator, combine harvester	Rotavator, combine harvester	Combine harvester
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	SRI; only progressive farmers	SRI; only progressive farmers	Use of plant protection measures
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	Use of plant protection measures	Use of plant prot-ection measures & quality seeds	Shortage of labour
What are the general problems in rice cultivation in the district?	High labour wages	High labour wages	Shortage of labours and grazing of crops by wild animals
Please provide any farmers association in the district	Kisan Club	Kisan Club	NA
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	Canal	Canal	Canal
Any soil testing program undertaken?	Yes	Yes	Yes
Any farmers' training program was organized by the state department of Agriculture/University	Regular training of farmers by KVK and Dept of Agriculture	Training and Kisan mela organized by KVK & state dept. of Agriculture	Regular training of farmers by KVK and Dept of Agriculture

The production oriented survey of rice growing areas was conducted in the Ambedkar Nagar, Barabanki, Sultanpur, Ayodhya, Basti, SantKabir Nagar and Sidharth Nagar districts of eastern Uttar Pradesh during tillering to maturity stage during *Kharif*' 2019. The total area of rice during this year was 58.99 lakh ha and production of 169.48 lakh tones as estimated by U.P. govt. Rice varieties like NDR 3112-1, Sambha Mahsuri-Sub 1, NDR 359, NDR 2064, NDR 2065, Sarjoo-52, NDR 97, Swarna,Swarna Sub-1, BPT 5204, Sonam, Komal, Dhanrekha, Damini and Chintu and hybrids like Arize 6444 Gold, 27P63, Gorakhnath-510 were found very popular among the farmers of eastern U.P. Zinc deficiency was observed in surveyed districts. Prevailing crop rotation practices were rice-wheat, rice-mustard, rice-pulses, rice-potato and rice-sugarcane. Planting was done mainly during 3rd week of June to end of June. Average seed rate was 25-35 kg/ha in case of HYVs and 15-20 kg/ha in case of hybrids. Very few adopted seed treatment. Fertilizers were applied @100-120 kg N/ha, 50-60 kg P_2O_5/ha and 50 kg K_2O/ha. Most of the farmers also applied zinc sulfate. Majority of the farmers applied FYM both in the nursery and in the main fields. Some progressive farmers applied green manure (dhaincha, green gram and black gram) and growth regulators like Hizyme, Biozyme and Microzyme. Intensity of common weeds like *Echinochloa colona, Eclipta alba, Echinochloa crusgalli, Cyperus iria, C. rotundus, Cloeme viscosa, Fimbristylis dichotoma* and *Paspalum distichum* was low to medium. In addition to hand weeding, majority of the farmers also applied different weedicides like butachlor, pretilachlor, Nominee Gold and Topstar. Use of Rotavator and combine harvester were common practice among the farming community. Shallow tubewells/canals are the main source of irrigation. Technologies viz. SRI, DSR and laser leveler was also being promoted among farming community through NFSM and BGERI projects. Some of the common needs of the farmers were quality seeds of HYVs, seeds of green manure crops, proper supply of labours and storage and drying facilities. Shortage of farm labourers coupled with higher labour wages are the major constraint in rice production in the surveyed district. Govt. agencies are providing subsidized seeds, agro-chemicals, plant protection inputs and farm machineries including solar pumps to the farmers. Kisan Mela, Kisan Gosthies and training programmes were regularly organized by Agriculture universities and Department of Agriculture, Govt. of U.P. to promote new varieties/technologies to minimize the cost of cultivation for enhancing the productivity of rice growing areas. The main source of farmers finance are own resources, cooperative societies and kisan credit card. Government agencies are promoting soil testing program and providing soil health card. Majority of the farmers are small in holding size and using farm machinery on hired basis in the surveyed districts. Major diseases of rice viz. sheath blight and bacterial leaf blight were observed from low to moderate intensity. However, false smut was noticed in the late maturing/hybrids rice varieties in higher intensity. Incidence of most of the insect pests was low. Majority of the farmers were using plant protection measures to manage biotic stress problems.

Ambedkar Nagar: Production oriented survey was conducted in 11 villages (in 5 taluks/blocks) in this district involving 12 farmers. The survey was carried out when the crops were in booting to milk stage. The fields surveyed were under irrigated ecosystem and in general, weather conditions were normal for rice cultivation. commonly cultivated varieties in the district were HYVs like NDR 359, NDR 97, Shusk Samarat, Sarjoo 52 Sambha Mahsuri, Swarna, Narendra Lalmati, Dhanrekha, Sambha Mahsuri-Sub 1, NDR 2064, NDR 2065, Swarna Sub-1 and Basmati and hybrids like 27P31, 27P63, Damini, Kaveri 9090, Dhanya 8655, US 305, Arize 6444 Gold and Gorakhnath 510. The prevailing crop rotation systems in the district were rice-wheat, rice-sugarcane, rice-mustard and rice-pulses. Average yield among the HYVs was 3800-4000 kg/ha while in case of hybrids it was 5300-

5500 kg/ha. Planting was done during 3rd week of June to end of June. Average seed rate was 30-35 kg/ha in case of HYVs while in case of hybrids, it was 15-20 kg/ha. None of the farmers contacted adopted seed treatment. All the farmers contacted applied FYM in the nursery. About 60% farmers contacted applied chemical fertilizers like DAP in the nursery. In the main field, fertilizers were applied @ 100-120 kg N/ha, 50-60 kg P_2O_5/ha and 50 kg K_2O/ha. Majority of the farmers (~83%) applied zinc sulfate (15-20 kg/ha). All the farmers applied FYM or green manure in the main field. Planting was random. Intensity of common weeds like *Echinochloa colona, Echinochloa crusgalli, C. rotundus* and *Fimbristylis dichotoma* was low to medium. Hand weeding was commonly followed by the farmers. In addition, weedicides butachlor (2.5 l/ha), pretilachlor and Nominee Gold were used to control the rice weeds by majority of the farmers. Some of the common needs of the farmers were good quality seeds of HYVs and proper availability of labours. Use of rotavator for field preparation and combine machine for harvesting is popular among the farming community. Most of the farmers are using seeds of high yielding varieties and hybrids obtained from private and Govt. agencies. Canal and shallow tube wells were the main sources of irrigation. In addition to their own decisions, officials from state department of agriculture and university were the advisors to the farmers. Biotic stresses such as diseases (Sheath blight and BLB) and insects (stem borer, hoppers and Gundhi bug) were observed in low intensity. False smut was noticed in moderate form in the district. Farmers used different pesticides like propiconazole (500 ml/ha), carbendazim (500 g/ha) and hexaconazole (2 ml/l) for different diseases and cartap hydrochloride, Coragen and Folidol for different insect pests.

Barabanki: Six villages (in 5 taluks/blocks) involving 11 farmers were covered for production oriented survey when the crop was in tillering to dough stage. The fields surveyed were under irrigated ecosystem and in general, the climatic conditions were normal for rice cultivation. Commonly cultivated rice varieties were HYVs like NDR-97, Sambha Mahsuri, Swarna, Shusk Samrat, Sarjoo 52, NDR 359, Basmati, NDR 2064, NDR 2065 and Narendra Lalmati and hybrids like US-305, 27 P 31, Arize 6444 Gold, 27P63, Kaveri and Dhanya 8655. Few farmers cultivated local scented variety Kala Jeera. Major crop rotation practices adopted by the farmers of this District were rice-wheat, rice-mentha, rice-mustard/potato and rice-sugarcane. Average yield in different HYVs ranged from 3800-5800 kg/ha while in case of hybrids, it ranged from 5500-6000 kg/ha. Planting was done during last week of June. Average seed rate was 25-30 kg/ha in case of HYVs while in case of hybrids, it was 15-20 kg/ha. None of the farmers contacted adopted seed treatment. All the farmers contacted applied FYM in the nursery. Only 20% farmers contacted applied chemical fertilizers like urea and DAP in the nursery. In the main field, fertilizers were applied @ 100-120 kg N/ha, 50 kg P_2O_5/ha and 50 kg K_2O/ha. Majority of the farmers (~63%) applied zinc sulfate (15-20 kg/ha). About 80% of the farmers contacted applied FYM or green manure in the main field. Some farmers applied micronutrient mixture (Zyme @ 10 kg/ha). Planting was random and intensity of common weeds like *Cyperus rotundus, Cyperus iria, Digiteria sanguinalis, Echinochloa crusgalli, E. colona, Paspalum distichum* and *Fimbristylis dichotoma* was low. Hand weeding was commonly practiced by the farmers. In addition, some of the farmers also applied herbicides like Nominee Gold and butachlor. Some of the common needs of the farmers were good quality seeds of HYVs and proper supply of agricultural labours. Implements like tractor, rotavator, sprayers and combined harvester were used by the farmers (either own or on hire basis). Most of the farmers were using certified seeds provided by Govt. agencies. Major sources of irrigation are Tube well and canal. In addition to their own decisions, officials from state department of agriculture and university were the advisors to the farmers. Sheath Blight and Bacterial Leaf Blight are the major diseases of rice and they

were observed in low to moderate intensity. False mut was found in moderate intensities in some places. Infestation of stem borer, hopper & leaf folder were observed in low intensity. Farmers used different pesticides like propiconazole (500 ml/ha), carbendazim (500 g/ha) and hexaconazole (2 ml/l) for different diseases and carbofuran (20 kg/ha), cartap hydrochloride (20 kg/ha), Coragen and Folidol for different insect pests.

Sultanpur: Survey was conducted in 6 villages (in 3 taluks/blocks) involving 8 farmers when the crops were in tillering to milk stage. All the fields surveyed were under irrigated ecosystem and in general, the climatic conditions were normal for rice cultivation. Popular varieties were HYVs like NDR 3112-1, NDR 2065, NDR 359, Shusk Samarat, Narendra Lalmati, Narendra Usar Dhan-3, Sonam, Sambha Mahsuri, Swarna Sub1 and Pusa Basmati 1 and hybrids like Damini, Gorakhnath 510, Arize 6444 Gold,GangaKaveri, 27 P 31, 27P63, NDR 97, NDR 2064, Sarjoo 52, Moti Gold, Biostat and Nandi 333. Common crop rotation practices were rice-wheat, rice-pulses, rice-mustard, rice-sugarcane and rice-potato. Most of the planting operations were done during last week of June. Average yield in different HYVs ranged from 3800-4000 kg/ha while in case of hybrids, it ranged from 5200-5800 kg/ha. Average seed rate was 25-30 kg/ha in case of HYVs while in case of hybrids, it was 15-20 kg/ha. None of the farmers contacted adopted seed treatment. All the farmers contacted applied FYM in the nursery. Only 20% farmers contacted applied chemical fertilizers like urea and DAP in the nursery. In the main field, fertilizers were applied @ 100 kg N/ha and 50 kg P_2O_5/ha. More than 80% farmers contacted applied zinc sulfate (20 kg/ha). About 50% farmers applied FYM in the main field. Some of the farmers applied grown regulators (Zyme @ 10 kg/ha). Planting was random and plant population was not maintained. Intensity of common weeds like *Echinochloa crusgalli, E. colona, Cyperus rotundus, C. iria, Paspalum distichum and Fimbristylis dichotoma* was low to medium. All the farmers contacted followed hand weeding and all of them applied herbicides like butachlor (2.5 l/ha), pretilachlor, Nominee Gold (200 ml/ha) and Topstar. Some of the common needs of the farmers were quality seeds of HYVs, seeds of green manure crops, proper supply of labours and storage and drying facilities. Implements like tractors, rotavators, sprayers and combine harvesters were used by the farmers. Harvesting by combine harvester was common practice in the district. Shallow tube wells and canals were the main sources of irrigation. In addition to their own decisions, officials from state department of agriculture and university were the advisors to the farmers. Biotic stresses viz. sheath blight, bacterial leaf blight, stem borer, gundhi bug and Leaf folder were observed in low intensity. False smut was observed is moderate form especially on hybrids. Farmers applied different pesticides like propiconazole (500 ml/ha), carbendazim, Indofil M 45, streptocycline + copper oxychloride and hexaconazole for different diseases. Few farmers applied Folidol and cartap hydrochloride for managing insect pests. Zinc deficiency was also observed in surveyed aeras of the district.

Ayodhya: Twelve villages (in 7 taluks/blocks) were surveyed in this district when the crops were in booting to milk stage. A total of 13 farmers were contacted during the survey. All the fields surveyed were under irrigated ecosystem. The climatic conditions were favourable for rice cultivation. Prevailing varieties in the district were HYVs like NDR 97, NDR 2064, NDR 2065, NDR 359, Shusk Samarat, Narendra Lalmati, Sarjoo 52, Jallahri, Narendra Usar Dhan-3, Sambha Mahsuri, Sambha Mahsuri-Sub 1, Swarna and Pusa Basmati 1 and hybrids like Karishma, Damini, Gorakhnath 510,Damini Arize 6444 Gold, US 305,Kaveri 9090 and VNR 2233. The major cropping systems adopted by the farmers were rice-wheat, rice-sugarcane and rice-pulses. Planting was done during 3rd week of June to end of June. Average rice yield in the district was 3800-4500 kg/ha in case of HYVs and 4800-6200 kg/ha in case

of hybrids. Average seed rate was 25-30 kg/ha in case of HYVs and 15-20 kg/ha in case of hybrids. Out of 13 farmers contacted, only one farmer told that he treated the seeds with carbendazim (2 g/kg). Almost all the farmers contacted applied FYM in the nursery and many of them also applied chemical fertilizers like DAP in the nursery. In the main field, fertilizers were applied @ 100-120 kg N/ha, 50 kg P_2O_5/ha and 50 kg K_2O/ha. Majority of the farmers (~77%) applied zinc sulfate (18-20 kg/ha). Majority of the farmers are using nitrogenous and phosphatic fertilizers while potash was used by only some farmers. About 70% of the farmers contacted told that they applied FYM in the main fields. Moong bean and Dhaincha (*Sesbaina* spp.) is use by the formers. Planting was random and the intensity of common weeds like *Echinochloa crusgalli, E. colona, Dactyloctenium aegyptium, Digiteria sanguinalis, Cyperus rotundus, Paspalum distichum and Fimbristylis dichotoma* was low to medium. In addition to hand weeding, most of the farmers also applied weedicides like Nominee gold, petlachlor, butachlor and 2,4-D. implements. SRI technology was adopted by the few progressive farmers only. Some of the common needs of the farmers were quality seeds of HYVs, medium duration rice varieties, storage and druying facilities and proper supply of agricultural labours. Implements like tractor, rotavator, combine harvester and sprayers were commonly used by the farmers. Seed replacement rate in the district is more than 70%. The main source of irrigation is tubewell/pumping sets and canal. In addition to their own decisions, officials from state department of agriculture and university were the advisors to the farmers. Biotic stresses such as diseases (Sheath blight and Bacterial leaf blight) and insects (stem borer, leaf folder, Gundhi bug and hoppers) were observed in low to moderate intensity. High incidence of false smut was recorded during this year in many hybrids and in some inbreeds verities. Pesticides like carbendazim, propiconazole, copper oxychloride + streptocycline and hexaconazole for different diseases and Coragen, cartap hydrochloride, acephate, carbofuron and Folidol against different insects pests were used by the farmers. Farmers were facing shortage of farm laborers. Zinc deficiency was also noticed.

Basti: Production oriented survey was conducted in 8 villages (in 5 taluks/blocks) involving 9 farmers when the rice fields were in tillering to heading stage. The fields surveyed were under irrigated ecosystem and the general climatic conditions were normal for rice cultivation. Prominent varieties cultivated in the district were HYVs like Sambha Mahsuri-Sub 1, Purva, Chintu, Khusi 27, BPT 5204, NDR 359, NDR 2064, NDR 2065, NDR 97, Swarna, Swarna-Sub 1 and Basmati and hybrids like Gorakhnath 510, 27P31, Arize 6444 Gold, Arize 6444, 27P63, Damini, Dhanya 8655, Bayer 6633 and KN3. Few farmers also cultivated local scented rice variety Kala Namak. Major crop rotation practices adopted by the farmers were rice-wheat, rice-sugarcane, rice-mustard and rice-pulses. Average rice yield in hybrids like Arize 6444 was 5500-6000 kg/ha. Planting was done during June end. Average seed rate was 25-30 kg/ha in case of HYVs and 15-20 kg/ha in case of hybrids. Seed treatment was not common among the farmers. Most of the farmers applied FYM both in the nursery and in the main fields. Most of the farmers also applied chemical fertilizers like DAP and urea in the nursery. In the main fields, fertilizers were applied @ 100-120 kg N/ha, 50-60 kg P_2O_5/ha and 50 kg K_2O/ha. All the farmers contacted told that they applied zinc sulfate (20-25 kg/ha) in the main field. Some of the farmers applied growth regulator (Zyme @ 10 kg/ha). Planting was random. Intensity of common weeds like *Echinochloa crusgalli, E. colona, Cyperus* spp. and *Fimbristylis dichotoma* was low to medium. In addition to hand weeding, all the farmers applied herbicides like butachlor, (2.5 l/ha), Nominee Gold (200 ml/ha) and pretilachlor for managing the weeds. Some of the common needs of the farmers were good quality seeds of HYVs, seeds of green manure crops and drying and storage facilities. Implements like tractor, rotavators, cultivator and combine harvester were used by

the farmers. Majority of the rice growing farmers used Rotavator and Combine harvester in rice cultivation. Major source of irrigation are tubewell/pumping sets and canal. In addition to their own decisions, officials from state department of agriculture and university were the advisors to the farmers. Most of the diseases and insect pests were observed in low to moderate intensities. Pesticides like carbendazim (500 g/ha), hexaconazole (1 l/ha), mancozeb (2 kg/ha) for different diseases and chlorpyriphos, cartap hydrochloride and Folidol for different inset pests were used by the farmers.

Sant Kabir Nagar: Survey was conducted in 7 villages (in 3 taluks/blocks) involving 10 farmers when the crops were in booting to heading stage. The fields surveyed were under irrigated ecosystem and the climatic conditions were favourable for rice cultivation. Commonly cultivated varieties were HYVs like Sabha Mahsuri-Sub 1, BPT 5204, NDR 3112-1, NDR 8002, Swarna,Swarna Sub 1, NDR 359, NDR 97, Sampurna and Chintu and hybrids like Gorakhnath-510, Gorakhnath-509, US -305, Arize 6444 Gold, 27P31, 27P63, Damini, Dhanya 8655, VNR 2233, KN3, Karishma, Bayer 6633, Dhanvarsha and Khusi 27. Few also cultivated local scented rice variety, Kala Namak. Common crop rotation practices were rice-wheat, rice-vegetables, rice-pulses, rice-potato, rice-mustard and rice-sugarcane. Average rice yield varied from 3900-4700 kg/ha in case of HYVs and 5200-5500 kg/ha in case of hybrids. Planting was done during 3rd week of June to last week of June. Average seed rate was 25-30 kg/ha in case of HYVs and 15-20 kg/ha in case of hybrids. Seed treatment was not common among the farmers and only 10% of the farmers contacted adopted seed treatment with carbendazim (2 g/kg). All the farmers applied FYM in the nursery and about 50% of them also applied chemical fertilizers like DAP. In the main fields, fertilizers were applied @ 100-120 kg N/ha, 50-60 kg P_2O_5/ha and 50-60 kg K_2O/ha. Majority of the farmers also applied zinc sulfate (~20 kg/ha). Planting was random and proper plant population per unit area was not maintained. Intensity of common weeds like *Echinochloa crusgalli, E. colona, Cyperus rotundus, C. iria, Cleome viscosa* and *Fimbristylis dichotoma* was low to medium. In addition to hand weeding, all the farmers also applied weedicides like butachlor (2.5 l/ha), pretilachlor and Nominee Gold (200 ml/ha) were used by the farmers. Some of the common needs of the farmers were seeds of green manure crops, proper availability of labours, good quality seeds of HYVs and storage and drying facility. Implements like tractor, rotavators and combine harvesters are used by the farmers. Shallow well tubew ells are major source of irrigation. Officials from state department of agriculture and university were the main advisors to the farmers. Diseases sheath blight and bacterial blight and insect pests like stem borer, hopper and gandhi bug were observed from low intensity. However, false smut was very wide spread in low to severe intensity. High incidence of false smut (up to 30%) was recorded on rice hybrid Goraknath in Shamchara Bazar. Fungicides like carbendazim, propiconazole and Nativo and insecticides like chloropyriphos, Folidol and cartap hydrochloride were used by the farmers.

Siddharath Nagar: Nine villages (in 4 taluks/blocks) involving 10 farmers were surveyed in this district when the crops were in heading to milk stage. The fields surveyed were under irrigated ecosystem and the climatic conditions were favourable for rice cultivation. Prevailing rice varieties were HYVs like Chintu, Dhanversha, NDR 3112-1, Sambha Mahsuri-Sub 1, NDR 97, Sabha Mahsuri, Swarna, Swarna Sub 1, NDR 359, Sona Mahsuri and Pusa Basmati 1 and hybrids like 27P63, Arize 6444 Gold, Dhanya 8655, Gorakhnath-510, Gorakhnath-509, Arize 6444 Gold, KN3, Silki, Damini, Krishna Kaveri and Bayer 6633. Few also cultivated local scented rice variety, Kala Namak. The most common crop rotation practices adopted by the farmers of the district were rice-wheat, rice-sugarcane, rice-mustard

and rice-pulses. Most of the farmers preferred hybrids due to its higher yield. Average yield in hybrids like Arize 6444 and 27P63 was about 5500 kg/ha. Planting was done during June end. Average seed rate for HYVs was 25-30 kg/ha while for hybrids it was 15-20 kg/ha. Only 20% farmers contacted followed seed treatment with carbendazim (2 g/kg). About 80% farmers told that they applied FYM both in the nursery and main fields. In the nursery, about 50% farmers contacted also applied chemical fertilizers like DAP. In the main fields, fertilizers were applied @ 100-120 kg N/ha, 50-60 kg P_2O_5/ha and 50 kg K_2O/ha. Majority (90%) of the farmers also applied zinc sulfate (15-20 kg/ha). Few farmers applied green manures and growth regulators like Zyme (10 kg/ha) in the main fields. Farmers followed random planting. Intensity of common weeds like *Echinochloa crusgalli, E. colona, Cyperus rotundus, Cyperus iria* and *Fimbristylis dichotoma* was low to medium. In addition to hand weeding, the farmers applied weedicides like butachlor (2.5 l/ha) and Nominee Gold (200 ml/ha) for managing the weeds. Some of the common needs of the farmers were quality seeds of HYVs and drying and storage facilities. Implements like tractor, rotavator, sprayer and combine harvester were used by the farmers. Most of the farmers used combine harvester. Shallow tube wells and canal were the main sources of irrigation. Officials from state department of agriculture and university were the main advisors to the farmers. Intensity of most of the biotic stresses was low to moderate. However, false smut was very wide spread. Fungicides like carbendazim, propiconazole and hexaconazole for different diseases and insecticides like chlorpyriphos, cartap hydrochloride and folidal for different insect pests were used by the farmers.

Prevalence of diseases and Insects in Eastern Uttar Pradesh during *Kharif* ' 2019

Districts	Diseases				Insect Pests			
	ShBl	FS	BLB	BS	SB	LF	BPH	GB
Ambedkar Nagar	L-M (5-20%)	L-M (5-25%)	L (5%)		T (<2%)	T	L	L
Barabanki	L-M (5-15%)	L-M (5-15%)	L (5%)	L (5%)	T (<2%)	T	L	L
Sultanpur	L (5-10%)	L-M (5-25%)	L (5%)	-	T (<2%)	T (<2%)	L	L
Ayodhya	L-M (10-15%)	L-M (5-20%)	L		T (<2%)	T (<2%)	T	T
Basti	L-M (5-15%)	L (10%)	L		T (<2%)	T (<2%)	L	L
St. Kabir Nagar	L (5-10%)	L-S (5-30%)	L		T (<2%)	T (<2%)	L	L
Sidharath Nagar	L (5-10%)	L-M (5-20%)	L		T (<2%)	T	L	L

West Bengal (Chinsurah): 2019-2020

Districts surveyed: *Nadia, Hooghly, Alipurduar, Coochbehar* and *Purba Medinipur*

Table 1: Details of survey

Districts	Block	Villages
Nadia	Ranaghat II,	Muragachha, Pukkhala (W), Ghola, Begopara, Patuli and Harinah
Hooghly	Chinsurah-Mogra, Haripal and Dhaniakhali	Digsui, Khalsa, Gobati, Belmuri, Sarbanandapur and Janakibati
Alipurduar	Kumargram and Alipurduar I	Tapsikhata and Changmari
Coochbehar	Coochbehar I	Chatrachakadora
Purba Medinipur	Sahid Matangini and Tamluk,	Saira, Gothora, Akandi, Alinan, Kulberia and Bhandarberia,

Table 2: Widely prevalent rice varieties

Districts	Varieties
Nadia	**HYVs**: Pratiksha, Ranjit, Ajit, IET 4786 (Boro), Ratna, Shatabdi, GB-3, Swarna Sub-1, DRR Dhan 42, Rajendra Bhagawati and Rani Dhan
Hooghly	**HYVs**: Swarna, Swarna Sub-1, BB-2, Shatabdi, Rani, Bullet, Kshitish, Niranjan, Jamuna, Shukumar, Asha, GS-1, MTU 1010, IET 4786, Ajit, BB-11, Gontra Bidhan 1, 2 & 3, IET 4094, Rajendra Bhagawati, Nilanjana and Varsha Dhan; **Hybrids**: Arize 6444, Arize 6444 Gold,
Alipurduar	**HYVs**: Nilanjana, Paijam, Jamuna, Ranjit, Rajemdra Bhagawati, MTU 1010, Swarna, Swarna Sub-1 and Pratiksha, Mala; **Hybrids**: Arize 6444 and Mahyco 5629 (Raftaar); **Locals**: Kalojeera and Kalonunia
Coochbehar	**HYVs**: Swarna, Gontra Bidhan 2, Jamuna, MTU 1010 and Guti Swrna; **Hybrids**: Arize 6444 and Suruchi; **Locals:** Kalonunia, Kalojeera and Sadabhog
Purba Medinipur	**HYVs**: Barsha Dhan, Sabita, Gitanjali, Malti 4, Santoshi, Lalat, Swarna, Jugal, Super Shyamali, Pratiksha, MTU 1010, IET 4786 and Swarna Sub-1; **Hybrids**: Mampi Gold; **Locals:** Patnai, Malifore, Gobindobhog, Badshabhog, Bhutusal, Lal Badsha, Black rice and Dudheswar

Table 3: Particulars of rice area in different districts of West Bengal during 2019

Districts	Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Total irrigated area (ha)	Area under rice (ha)
Nadia	137963	94130	94130	90000	74140
Hooghly	313379	213611	210887	170381	242250
Alipurduar	283202	137623	134619	-	96775
Coochbehar	338700	266265	250611	136056	211000
Purba Medinipur	395954.85	301951.17	291617.67	184891.09	254690

Production oriented survey was conducted in 5 districts of West Bengal viz., Nadia, Hooghly, Alipurduar, Coochbehar and Purba Medinipur during Kharif season of 2019. The details of the villages surveyed are presented in Table 1. Predominant rice varieties cultivated by the farmers were HYVs like Swarna, Swarna Sub-1, Pratikshya, Ranjit, Lalat, Super Shyamali, Shatabdi, Rani, Bullet, Kshitish, Niranjan, Jamuna, Shukumar, Asha, GS-1, MTU 1010, IET 4786, Ajit, BB-11, Gontra Bidhan 1, 2 & 3, IET 4094, Rajendra Bhagawati, Nilanjana and Varsha Dhan and hybrids like Arize 6444, Arize 6444 Gold, Mampi Gold and Suruchi. Some farmers also cultivated few local scented varieties like Gobindobhog, Bhadshabhog, Dudheswar and other for their own consumption.

Table 4: Weather data for different districts of Mahararahtra during 2019

District/ Parameters	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Nadia								
RD	7	12	11	12	8	2	0	2
TR (mm)	59.10	83.73	140.00	120.00	86.32	10.52	0	9.56
Hooghly								
RD	13	21	20	17	8	2	2	1
TR (mm)	209.68	294.62	264.92	243.62	117.2	24.26	5.51	11.42
Alipuduar								
RD	15	24	15	20	12	NA	NA	NA
TR (mm)	611.84	1269.3	304.8	582.05	76.54	NA	NA	NA
Coochbehar								
RD	17	19	10	16	3	NA	NA	NA
TR (mm)	577.7	1119.8	175.2	444.1	54.2	NA	NA	NA
T. Max (^{0}C)	32.78	32.13	33.23	31.98	30.71	NA	NA	NA
T. Min (^{0}C)	25.23	25.83	25.35	24.94	22.14	NA	NA	NA
Purba Medinipur								
RD	17	23	23	23	18	2	2	7
TR (mm)	142.1	132.8	367.5	400.9	246.7	110.4	10.3	53.3
MMT (^{0}C)	30.1	29.4	28.1	28.6	27.6	24.0	20.1	18.9
T. Max (^{0}C)	33.6	32.3	32.0	31.4	31.2	28.9	25.4	24.4
T. Min (^{0}C)	26.6	26.5	26.2	25.8	24.0	1.1	14.8	13.3
SH	146.4	150.0	127.8	131.9	159.5	167.7	159.7	157.3

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	Districts			
	Hooghly	**Alipurduar**	**Coochbehar**	**Purba Medinipur**
Total area under HYVs (ha)	240500 (all season)	85680 (with Aus)	211000	250540
Most prevalent HYVs in the district	Swarna, MTU 1010, IET 4786, Rani, Ajit, BB 11	SS-1, Jamuna, Nilanjana, Ranjit	Swarna	Swarna, Super Shyamali, Sabita, Barsha
Total area under rice hybrids	50	-	21000	22000
Most prevalent rice hybrids in the district	Arize 6444, Arize 6444 Gold	Arize 6444, Mahyco 5629	Arize 6444, Suruchi	Mumpy Gold
Total area under aromatic rice in the district	1350	-	-	-
Most prevalent basmati	-	-	-	-
Seed Replacement rate			60%	
Whether farmers are using any heavy equipments like transplanter/combine harvester	Yes	Yes, Tractor, combined harvester	Yes; tractor, Combined Harvester	Combined harv-ester (common); transplanter in some places
Mention water saving technologies like SRI/laser leveling/DSR being used by the farmers	SRI, SARP, dry tillage, zero tillage	Yes (~10%)	Yes; DSR is besing used by some farmers	In limited scale
Whether survey team gave any advice to the farmers during survey? If yes, then what are those	-	-	Yes	-
What are the general problems in rice cultivation in the district?	Erratic distribution of rainfall	-	Non-availability of certified seeds of HYVs and training on pest and nutrient management	Algal weeds and drainage problems
Please provide any farmers association in the district	14 FPCs (farmers' association)	-	Farmer Producer companies (28 Nos) & Custom Hiring centres (>40 Nos)	Panskura Vegetable Growers Organization
Whether availability of agricultural labours is sufficient?	No	No	No	Yes; but sometimes scarcity during peak time
Whether there is any marketing problem of the produce?	No	Yes; Support price be increased	No; Due to enactment of MSP	Yes
Any major irrigation/power generation project in the district	No	No	Nil	Kolaghat Thermal Power Project Ltd
Any soil testing program undertaken?	Yes; By state laboratories	Yes	Yes	Yes; Under NMSA*
Any farmers' training program was organized by the state department of Agriculture/University	Yes; BGREI and ATMA	Yes; exposure visit to UBKV, Pundibari	Yes	Many; by ATMA, NFSM, NMSA etc

* NMSA-National Mission on Sustainable Agriculture

Table 6: Variety wise area coverage in different district of Karnataka (ha) during kharif 2019

Variety/hybrid	Districts		
	Nadia	Hooghly	Purba Medinipur
Raj. Bhagawati	7000	4000	
DRR Dhan 42	15000		
Rani Dhan	7000	14000	
Pratiksha	15140	4000	38000
Ajit	10000	5500	
Swarna Sub 1	20000	1000	10000
Swarna		127500	65000
IET 4786		41500	12000
IET 4094		13500	
MTU 1010		4500	42000
Ranjana		3000	
Nilanjana		5000	
GB 1,2 & 3		7000	
Varsha Dhan		3000	
BB 11		7000	
Super Shyamali			35000
Sabita			12000
Gitanjali			3000
Hybrids		50	22000
Local varieties		1700	
Dudheswar			10000

Table 7: General informations

Parameters	Districts				
	Nadia	Hooghly	Alipurduar	Coochbehar	Purba Medinipur
# of talukas/blocks covered	1	3	2	1	2
# of villages surveyed	6	6	2	1	6
# of farmers interviewed	15	17	10	10	15
Field ecosystem	Irrigated, Upland and Rainfed lowland	Rainfed lowland, irrigated and upland	Irrigated	Irrigated	Rainfed lowland
Weather conditions during cropping season	Normal; but in some places early drought	Normal; but low rainfall during transplanting	Normal	Normal	Normal
Crop stage when survey was made	Maturity stage	Tillering to booting; some heading to dough	Maturity	Maturity	Booting and tillering
Crop rotations	Rice-rice, rice-pulses, rice-mustard, rice-vegetables, rice-mustard-rice, rice-vegetables-rice, rice-pulses-rice, rice-potato-sesame, rice-potato-moong/urd, rice-wheat, rice-mustard-vegetables and others				

A. Cropping system and rice yield: Majority of the fields surveyed were Nadia, Hooghly and Purba Medinipur were under rainfed lowland ecosystem. Many farmers in Nadia and some in Hooghly cultivated other crops like pulses and vegetables in part of their land during Kharif season for more profit, better market and due to less labour requirement. Common

crop rotations practices followed by the farmers were Rice-rice, rice-pulses, rice-mustard, rice-vegetables, rice-mustard-rice, rice-vegetables-rice, rice-pulses-rice, rice-potato-sesame, rice-potato-moong/urd, rice-wheat, rice-mustard-vegetables and others. Average yield in these districts ranged from 4000-6000 kg/ha in case of HYVs. Yield in some fields in most of the districts was drastically reduced due to drought like situations in the early stage, erratic rainfall, inadequate plant population, subnormal fertilizer dose, lowland ecosystem and incidence of pests and diseases. Some farmers are growing local varieties for their own consumption

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

Varieties	Yield (kg/ha)				
	Nadia	Hooghly	Alipurduar	Coochbehar	Purba Medinipur
Pratikshya	4700-5000				
Ranjit	4800		4500		
IET 4786	4500-6000				
Ratna	4500				
Shatabdi	4600	3600-4700			
Gontra Bidhan 3	4500-4800				
Ajit	4500-4800				
Swarna Sub 1	4200-4800	5000-5600			
Swarna		4000-6000	4200-4500		5200
BB-2		5600			
Rani Dhan		4500-5600			
Bullet		4700			
Kshitish		4100-5200			
Jamuna		5000-6100	3600-4500	4800-5500	
Niranjan		6000			
Asha		4000			
GS-1		4200			
Sukumar		5000			
Nilanjana			3900		
Paijam			4200		
R. Bhagawati			3900		
MTU 1010			4200-4500	6000-6200	
Gontra-2				5700	
Barsha Dhan					3000-6200
Sabita					4000-5800
Patnai					3600
Gitanjali					3200-4800
Santoshi					5500-5700
Lalat					4900-5000
Arize 6444				6500	
Mumpy Gold					5800
Malifore					3500
G. Bhog, Badsa Bhog, Lal Badsa					2500-3000
Bhutusal					3000-3500

Table 9: Details of nursery management

Parameters	Nadia	Hooghly	Alipurduar	Coochbehar	Purba Medinipur
Planting time	End of June to end of July	Mid June to end of July	1st week of July to 1st week of August	1st week of July to middle of July	End of June to end of July
Seed rate	40-60 kg/ha	30-90 kg/ha	40-50 kg/ha	25-50 kg/ha	35-70 kg/ha
Seed treatment (% farmers adopted)	Yes (~66%)	Yes (~58%)	Yes (70%)	Yes (100%)	Yes (~46%)
Chemicals used for seed treatment	Diathane M 45 (2-3 g/kg); Bavistin (1 g/ kg), T. viride (10 g/kg)	Bavistin(2g/kg); Sprint (2.5 g/kg) or Bavistin + mancozeb (2 g/kg)	Bavistin (2 g/kg)	Carbendazim (2 g/kg)	Mancozeb (2.5 g/kg), Bavistin (2-3 g/kg), Sprint (2 g/kg)
Organic manure in nursery (% farmers adopted)	Yes (80%) FYM, mustard cake	Yes (~82%) FYM, Vermi compost, mustard cake	Yes (90%) FYM	Yes (100%) FYM	Yes (~66%) FYM
Inorganic manure in nursery (% farmers adopted)	Yes (60%) Suphala /DAP (1-2 kg/33m^2), urea+SSP+MOP	Yes (~65%) 10:26:26 (150-170 kg/1333 m^2) or urea (6-16 kg/ 1333 m^2) or both*	Yes (20%) 10:26:26	Yes (30%) 19:19:19 (as spray in the nursery)	Yes (~73%) Urea (0.3-2.5 kg/82m^2) and/or DAP (0.5 kg/82 m^2); Gromor (0.5 kg/82 m^2)

Few in Hooghly district applied zinc sulfate, boron and SSP

B. Nursery and main field Management: Average seed rate in the surveyed districts ranged from 40-60 kg/ha. On an average, about 68% farmers followed seed treatment with different chemicals like Diathane M-45, Bavistin, Sprint or their combinations. Few farmers treated their seeds with *Trichoderma viride*. About 60-100% farmers applied organic manure like FYM or vermicompost or mustard cake in the nursery. Many farmers (20-73%) also applied chemical fertilizers in the nursery. Planting was mainly done end of June to end of July. Our cooperators reported that some farmers in Nadia, Alipurduar and Coochbehar followed line planting. The details of fertilizers applied by the farmers are given in Table 10. Dose of N ranged from as low as 9 kg/ha to 184 kg/ha. Fertilizers application was very low in rainfed lowland ecosystem. Other fertilizers were applied @ 14.4-103 kg P_2O_5/ha and 5-92 kg K_2O/ha. Few farmers applied zinc sulfate. Majority of the farmers except in Hooghly applied FYM or other organic manure in the fields.

C. Weeds and their Management: The intensity of common weeds in the surveyed districts was low to medium (Table 11). Almost all the farmers contacted in these districts followed hand weeding and about 30-90% farmers additionally applied herbicides. Herbicides like butachlor, pretilachlor, glyphosate (Round Up), bispyribac Sodium and Saathi (pyrazosulfuron ethyl) were used by the farmers.

Table 10: Details of main field management

Details	Districts					Remarks
	Nadia	Hooghly	Alipurduar	Coochbehar	Purba Medinipur	
Planting method	Random & line planting	Random planting; Few line	Line planting; few random	Line planting; few random	Random planting	Fertilizers like urea, DAP, Suphala, 10.26:26, Gromor (20:20:0:13), SSP, MOP etc were used by the farmers. In rainfed lowland ecosystem, fertilizer application was very low
Total N applied	27.5-184 kg/ha	24-69 kg/ha	40-60 kg/ha	50-60 kg/ha	9-140 kg/ha	
Total P_2O_5 applied	22.5-103 kg/ha	14.4-51.8 kg/ha	20-40 kg/ha	34-40 kg/ha	15-23 kg/ha	
Total K_2O applied	27.5-92 kg/ha	5-77 kg/ha	30-40 kg/ha	30-40 kg/ha	10-55 kg/ha	
$ZnSO_4$ applied	Yes (20%) 15-20 kg/ha	Yes (~24%) 15-20 kg/ha	-	-	Very few applied	
Organic fertilizers applied	Yes (80%); FYM (60%); V.compost (20%)	Yes (~30%) FYM, Neem cake and/ mustard cake	Yes (90%) FYM (2.2 t/ha)	Yes (100%) FYM (1-2.2 t/ha)	Yes (86%) FYM (2-30 t/ha); M. cake (0.5-2 q/ha) or neem+M. cake	

Few farmers in Hooghly district applied micronutrient mixture called Zoom (containing zinc, copper and boron)

Table 11: Weeds and weed management

Details	Districts					Remarks
	Nadia	Hooghly	Alipurduar	Coochbehar	Purba Medinipur	
Weed intensity	Low to medium					
Names of the weeds	*Cynodon dactylon, Cyperus rotundus, Echinochloa colona, Echinochloa crusgalli, Digitaria sanguinalis, Marsilea quadrifolia, Eichhornia crassipes, Physalis minima, Ludwigia parviflora* and few other broad leaved weeds					Almost all the farmers contacted in these districts followed hand weeding and about 30-90% farmers additionally applied herbicides
Weedicides used	Butachlor (700 ml/ha), pretilachlor (800-1200 ml/ ha), glyphosate (Round Up), bispyribac Sodium (300 ml/ha), Saathi (pyrazosulfuron ethyl) (150 g/ha)				Nil	
Percentage of farmers applied herbicides	Yes (~93%)	Yes (~41%)	Yes (30%)	Yes (40%)	Nil	
Wild/weedy rice incidence	Nil	Nil	Nil	Nil	Nil	

D. Needs of the farmers: Some of the common needs of the farmers were availability of equipments like tractor, power tiller, thresher shallow tube wells and other implements, availability of labours during peak time of transplanting and harvesting, improvement in marketing facility, reduction in the wages of labour, seeds of good HYVs, improvement in irrigation facilities, mini deep tube wells and financial help

E. Input Use: Farmers used different implements like Power tiller, tractor, combined harvester, thresher, shallow pump, sprayer, weeder (either own or on hire basis) (Table 12). About 60-100% farmers in these districts told that they purchased 20-100% new seeds for sowing and main sources of seeds were cooperative society and private seed company. Shallow and deep tube wells were the main sources of irrigation and in general, there was not scarcity of irrigation water. The main advisors to the farmers were officials from state department of agriculture and private dealers.

Table 12: Details of inputs used

Details	Districts				
	Nadia	**Hooghly**	**Alipurduar**	**Coochbehar**	**Purba Medinipur**
Implements used	Power tiller, tractor, combined harvester, thresher, shallow pump, sprayer, weeder (either own or on hire basis)				
Seed replacement rate in 2019	About 60-100% farmers in these districts told that they purchased 20-100% of their seed requirement				
Source of seeds	Cooperative society, private seed companies				
Source of irrigation	Shallow tube wells (100%)	Deep tube well (~70%); canal (53%); shallow tube well (~18%)	Canal (50%); shallow tube well (50%)	Shallow tube well (100%)	Deep tube wells (100%)
Scarcity of irrigation water	No (100%)	Yes (~70%)	Yes (20%)	No (100%)	No (~93%)
Availability of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Quality of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Advisors to the farmers	State dept (80%); Univ (40%); Own (~73%); pvt delaers (~13%)	State dept (100%); Own (~70%); pvt delaers (~24%) and some by coop. society	State dept (90%)	State dept (100%)	State dept (~66%); Own (~73%); pvt delaers (~60%)

F. Biotic stresses and their management: The details of different diseases and insect pests in different surveyed districts are presented in Table 13. Among the diseases sheath blight, sheath rot and brown spot were very common in most of the places. Higher intensity of sheath blight (up to 40%) was recorded on varieties like Swarna and Jamuna in villages like Khalsa and Gobati in Hooghly district. High incidence of sheath rot (up to 30%) was recorded on varieties like Swarna and Jamuna in villages like Khalsa and Gobati in Hooghly district. Similarly, bacterial blight was recorded in higher intensity (up to 40%) on varieties like Kshitish and Shatabdi in Khalsa village in Hooghly and on Swarna and Gitanjali in Saira and Kulberia in Purba Medinipur. High intensity of brown spot was also noticed in some fields in Purba Medinipur on varieties like Lalat and Santoshi. Intensity of most of the insect pests was recorded in low to moderate intensity. Many farmers (60-100%) adopted plant protection measures (Table 14). Mixing of pesticides was not common among the farmers.

Table 13: Prevalence of diseases and insect pests in different districts of West Bengal during *Kharif*' 2019

Districts	Diseases				
	Bl	**NBl**	**ShBl**	**BS**	**ShR**
Nadia	L-M (7-20%)	L-M (10-20%)	L-M (5-15%)	L (5-7%)	L (5%)
Hooghly	L (3-10%)	-	L-S (2-40%)	L-M (5-25%)	L-S (5-30%)
Alipurduar	-	-	L-M (5-20%)	L-M (5-20%)	L-M (5-20%)
Coochbehar	-	-	L (5-10%)	L (5-10%)	L (5-10%)
Purba Medinipur	L-M (5-20%)	-	L-M (5-15%)	L-S (5-30%)	L (5-10%)

Districts	Diseases				
	FS	**GD**	**Bak**	**BB**	**RTD**
Nadia	L (2-10%)	-	-	-	-
Hooghly	L-M (5-20%)	L-M (10-15%)	L (8-10%)	L-S (10-32%)	L (5%)
Alipurduar	L (5-10%)	-	-	-	-
Coochbehar	-	-	-	-	-
Purba Medinipur	-	-	-	L-S (10-40%)	L (5%)

Districts	Insect pests						
	SB	**LF**	**BPH**	**GB**	**GLH**	**HCP**	**MB**
Nadia	L-M (5-15%)		L-M (5-15%)		L (2-3%)		
Hooghly	L-M (2-20%)	L-M (2-15%)	L-M (2-20%)		L (5-10%)		L (5-10%)
Alipurduar	L-M (10-20%)	L (2-10%)		L-M (5-20%)		L (5-10%)	L (5%)
Coochbehar	L-M (5-15%)	L-M (2-10%)		L (2-10%)		L (5%)	
Purba Medinipur	L-M (2-15%)	L (2-5%)	L (2-15%)				

There was low incidence (5-10%) of mite, gall midge and whorl maggot in some fields in Hooghly

Table 14: Details of pest management

Details	**Districts**				
	Nadia	**Hooghly**	**Alipurduar**	**Coochbehar**	**Purba Medinipur**
% age farmers adopting plant protection	Yes (~86%)	Yes (~82%)	Yes (100%)	Yes (100%)	Yes (60%)
Names of pesticides	**Insect pests**: Chlorpyriphos (2.5 ml/l), monocrotophos (2 ml/l), Ferterra (10 kg/ha), triazophos (2 ml/l), Coragen (1 ml/l), fipronil (15 kg/ha or 1-2 ml/l)), phorate 10G (30 kg/ha), Lancer Gold (acephate + imidacloprid), cartap hydrochloride (10-12 kg/ha or 2 ml/l), indoxacarb (0.5 g/l) for stem borer, leaf folder and other insect pests **Diseases**: Tilt (1 ml/l), Nativo (0.4 g/l), mancozeb (2.g g/l), validamycin (2 ml/l), hexaconazole (2 ml/l), Bavistin (1 g/l), Avatar (zineb + hexaconazole) for sheath blight, sheath rot, false smut, grain discoloration and other diseases; Taspa (propiconazole 13.9% + difenoconazole 13.9% EC) for blast and Bacteriomycin for bacterial blight				
# of pesticide sprays	1-3	1-4	1-2	1-2	1-3
Mixing of pesticides before application	Nil	Nil	Nil	Nil	Nil

Uttar Pradesh (Ghaghraghat): 2018-2019 (for 2019-20 report)

Districts surveyed: *Barabanki, Baharaich, Gonda, Balrampur, Basti* and *Shravasti*

Table 1: Details of survey

Districts	Blocks	Villages
Barabanki	Ramnagar	Ramnagar, Ganeshpur (Bahramghat), Marnaya, Sirolee and Durgapur
Baharaich	Kaisarganj, Pakharpur, Huzoorpur, Jarwal and Jarwal Kasba	Bhadrouli, Kohli Museypur, Murka, Singhpur, Musepur, Tappe Sipah, Atwoa, Jhukiya, Murki, Pakauri, Maina (Bhadrouli) and Kundas Para.
Gonda	Jhanjhari, Katara, Mankapur and Wazirganj	Banghusra, Chital Pandepurwa (Laxmi Nagar), Dutnagar, Bandhra, Nababganj and Bandraha
Balrampur	Balrampur, Rehera Bazaar and Tulsipur	Balrampur, Rehera and Tulsipur
Basti	Saltaua Gopal Pur	Kashiparsha
Shravasti	Ekona and Bhingha	Ekona, Bhingha, Rajgarh Gulahriya, Jaychandpur (Kathghara) and Bankata

Table 2: Widely prevalent varieties

Districts	Varieties
Barabanki	**HYVs:** NDR 359; **Hybrids:** Arize 6444 Gold; **Local:** Lalmati, Madhukar and Sukhapankhi
Baharaich	**HYVs:** Indrasan, Pusa Basmati 1, NDGR 201, Sarjoo 52, NDR 359 and Samba Mahsuri; **Hybrids:** Arize 6444 Gold and PHB 71; **Local:** Ram Javain
Gonda	**HYVs:** Pusa Basmati1, NDR 359, Samba Mahsuri and Sarjoo 52; **Hybrids:** Arize 6444 Gold
Balrampur	**HYVs:** Pusa Basmati 1, NDR 359 and Sarjoo 52; **Hybrids:** Arize 6444 Gold
Basti and Shravasti	**HYVs:** Pusa Basmati 1, NDR 359 and Samba Mahsuri; **Hybrids:** Arize 6444 Gold

Production oriented survey was conducted in six districts of eastern Uttar Pradesh viz., Barabanki, Baharaich, Gonda, Balrampur, Basti and Shravasti during *Kharif* season of 2018 when the crops were in tillering and maturity stage. The details of the villages surveyed are presented in Table 1. The fields surveyed were under rainfed lowland ecosystem in all the surveyed districts except some upland fields in Gonda district. Though climatic conditions were in general normal, but there were reports of excess rainfall in all the surveyed places. Widely prevalent varieties in these districts were HYVs like Pusa Basmati1, NDR 359, Samba Mahsuri and Sarjoo 52 and hybrids like Arize 6444 Gold and PHB 71 (Table 2). Commonly followed crop rotation practices were rice-wheat, rice-lentil, rice-potato, rice-potato-mentha, rice-vegetables, rice-lentil+mustard, rice sugarcane, rice-mustard, rice-wheat+mustard, rice-wheat-black gram, rice-wheat+lentil and rice-pea. Average rice yield in this region ranged from 4000-5000 kg/ha in case of HYVs and hybrids and about 2500-3800 kg/ha in case basmati varieties (Table 3). Planting was done during last week of June to 2nd week of July. Seed treatment practice was very rare. Most of the farmers applied FYM and fertilizers like urea and DAP in the nursery.

Table 3: Average yields of different rice varieties as reported by the cooperators/ farmers

Varieties	Yield (kg/ha)				
	Barabanki	**Baharaich**	**Gonda**	**Balrampur**	**Basti and Shravasti**
Sarjoo 52	-	4800	5000	4500	-
NDR 359	4500	4200-4800	4500-4800	4800-5000	4500
Indrasan	-	4000-4800		-	-
Samba Mahsuri	-	4000-4500	4500-5000	-	4800-5000
Pusa Basmati 1	-	3000-3500	2500-3800	3200-3800	3500
Arize 6444 Gold	4500	4000-4800	-	4800	4800-5000
PHB 71	-	4000-4800	-	-	-
Ram Javain	-	4600	-	-	-
Lalmati	2500-3000	-	-	-	-
Madhukar	3600	-	-	-	-
Sukhapankhi	2500	-	-		

Table 4: Details of nursery management

Parameters	**Barabanki**	**Baharaich**	**Gonda**	**Balrampur**	**Basti and Shravasti**
Planting time	Last week of June to 2nd week of July				
Seed rate	30-50 kg/ha	30-50 kg/ha	37-45 kg/ha	37.5-45 kg/ha	37.5-45 kg/ha
Seed treatment (% farmers adopted)	Yes (12.5% only)	Yes (12.5% only)	Nil	Nil	Nil
Chemicals used for seed treatment	carbendazim (1 g/kg)	carbendazim (1 g/kg)	-	-	-
Organic manure in nursery (% farmers adopted)	Yes (100%): FYM	Yes (100%): FYM (95%) Poultry manure (5%)	Yes (100%): FYM	Yes (100%): FYM	Yes (100%): FYM
Inorganic manure in nursery (% farmers adopted)	Yes (85%) Urea: 20-40 kg/ha DAP: 40-60 kg/ha	Yes (75%) Urea: 40-80 kg/ha DAP: 40-80 kg/ha	Yes (89%) Urea: 40-80 kg/ha DAP: 40-60 kg/ha	Yes (83%) Urea: 40-80 kg/ha DAP: 50-60 kg/ha	Yes (83%) Urea: 40-60 kg/ha DAP: 40-60 kg/ha

In the main field, fertilizers were applied @ 60-120 kg N/ha and 60-80 kg P_2O_5/ha. Application of potassic fertilizers and zinc sulphate was very less (Table 5). About 60-85% farmers applied FYM in the main field (10-30 t/ha). Intensity of common weeds like *Echninochloa crusgalli, Echinochloa colona* and *Cyperus rotundus* was low to medium. None of the farmers contacted applied any weedicides and hand weeding was commonly followed by the farmers. Implements like tractor, cultivator and harrow were used by the farmers. Though they received advices from state department and university officials, their main advisors were private dealers.

Table 5: Details of main field management

Details	Districts					Remarks
	Barabanki	**Baharaich**	**Gonda**	**Balrampur**	**Basti and Shravasti**	
Planting method	Majority followed Random transplanting; Few farmers in Barabanki followed direct sowing also					
Total N applied (Kg/ha)	60-100	60-120	80-120	60-80	60-80	Urea, DAP
Total P_2O_5 applied (Kg/ha)	60-80	60-80	60-80	60-80	60	DAP
Total K_2O applied (Kg/ha)	40 (25% farmers)	-	-	40 (50% farmers)	40 (29% farmers)	MOP
$ZnSO_4$ applied (Kg/ha)	Nil	20-25 (25% farmers)	20-25 (45% farmers)	25 (16% farmers)	25 (15% farmers)	
Organic fertilizers applied	FYM (20-25 t/ha) (62.5% farmers)	FYM (10-30 t/ha) (80% farmers)	FYM (10-30 t/ha) (78% farmers)	FYM (18-30 t/ha) (83 farmers)	FYM (18-25 t/ha) (85% farmers)	

Table 6: Weeds and weed management

Details	Districts					Remarks
	Barabanki	**Baharaich**	**Gonda**	**Balrampur**	**Basti and Shravasti**	
Weed intensity	Medium	Low to medium	Low to medium	Low to medium	Low to medium	Weeds were common in most of the fields surveyed
Names of the weeds	*Echninochloa crusgalli*, *Echinochloa colona* and *Cyperus rotundus*					
Weedicides used	All the farmers followed hand weeding only					
Percentage of farmers applied herbicides	Nil	Nil	Nil	Nil	Nil	
Wild rice incidence	No incidence of wild rice or weedy rice was recorded					

Table 7: Details of inputs used

Details	Districts				
	Barabanki	**Baharaich**	**Gonda**	**Balrampur**	**Basti and Shravasti**
Implements used	Tractor, cultivator, Disc harrow				
Source of irrigation	Deep tube well (50%) Shallow tube well (50%)	Shallow tube well (95%) Canal (5%)	Deep Tube well (55%) Shallow tube well (44%) Canal (11%)	Deep Tube well (50%) Shallow tube well (50%)	Shallow tube well (100%)
Availability of fertilizers/pesticides	Available (100%)	Available (100%)	Available (100%)	Available (100%)	Available (100%)
Quality of fertilizers/pesticides	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)	Yes (100%)
Advisors to the farmers	State Dept (37%) Pvt Dealers (50%) Univ Staff (62%)	State Dept (10%) Pvt Dealers (100%) Univ Staff (50%)	State Dept (22%) Pvt Dealers (78%) Univ Staff (11%)	Pvt Dealers (100%) Univ Staff (83%)	Pvt Dealers (100%) Univ Staff (28%)

Table 8: Prevalence of diseases and insect pests in eastern Uttar Pradesh during *Kharif*' 2018

Districts	Diseases								
	Bl	**NBl**	**BS**	**ShBl**	**ShR**	**FS**	**GD**	**StR**	**NBLS**
Barabanki	M (12-22%)	L (5%)	M-S (30%)	L-M (5-12%)	L-M (5-15%)	T-M (1-25%)	L (2%)	-	-
Baharaich	L-M (4-12%)	L (2-5%)	M-S (20-27%)	L-M (5-16%)	L-M (2-20%)	T-M (1-20%)	L-M (2-20%)	L-M (8-20%)	-
Gonda	L-S (8-60%)	L (2-9%)	M-S (20-28%)	L-M (8-18%)	L (2-10%)	L-M (2-15%)	L(5%)	L-M (2-15%)	L (10%)
Balrampur	L (5-10%)	L (2%)	M-S (15-35%)	L-M (6-13%)	L (2-10%)	T-M (1-20%)		L (10%)	-
Basti and Shravasti	L (6-10%)	L (2-5%)	M-S (10-50%)	L-M (5-18%)	L (2%)	L-M (2-20%)	L (2-8%)	L (10%)	-

Districts	Insect pests			
	SB	**GLH**	**GH**	**GB**
Barabanki	L-M (4-12%)	L (2%)	L (2%)	-
Baharaich	L (2-10%)	L (2-5%)	L (2%)	L (4-10%)
Gonda	L (2-10%)	-	L (2%)	L (5%)
Balrampur	L (2-8%)	-	-	L (2%)
Basti and Shravasti	L (2-8%)	-	-	L (2-5%)

Among the diseases, brown spot was widespread in moderate to severe form in all the districts. High intensity of brown spot (up to 35%) was recorded on NDR 359 in Durgapur village in Barabanki, Pakauri and inghpur village in Baharaich, Bndha, Nababganj and Dutnagar village in Gonda, Balrampur village in Balrmpur and Bankata village in Shravasti. High incidence of brown spot (up to 50%) was also noticed on Indrasan variety in Raigarh Gulariya village of Shravasti. High intensity of leaf blast was noticed on Pusa Basmati 1 in Chital Pandepurwa village of Gonda district. Other diseases like neck blast, sheath blight, sheath rot, false smut, grain discoloration, stem rot and narrow brown leaf spot and insect pests like stem borer, green leaf hopper, grasshoppers and gundhi bug were recorded in low to moderate intensity. Zinc deficiency symptoms were recorded in some of the fields surveyed.

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

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

Production Oriented Survey-2019 reports were compiled by the following scientists of Department of Plant Pathology, ICAR-IIRR

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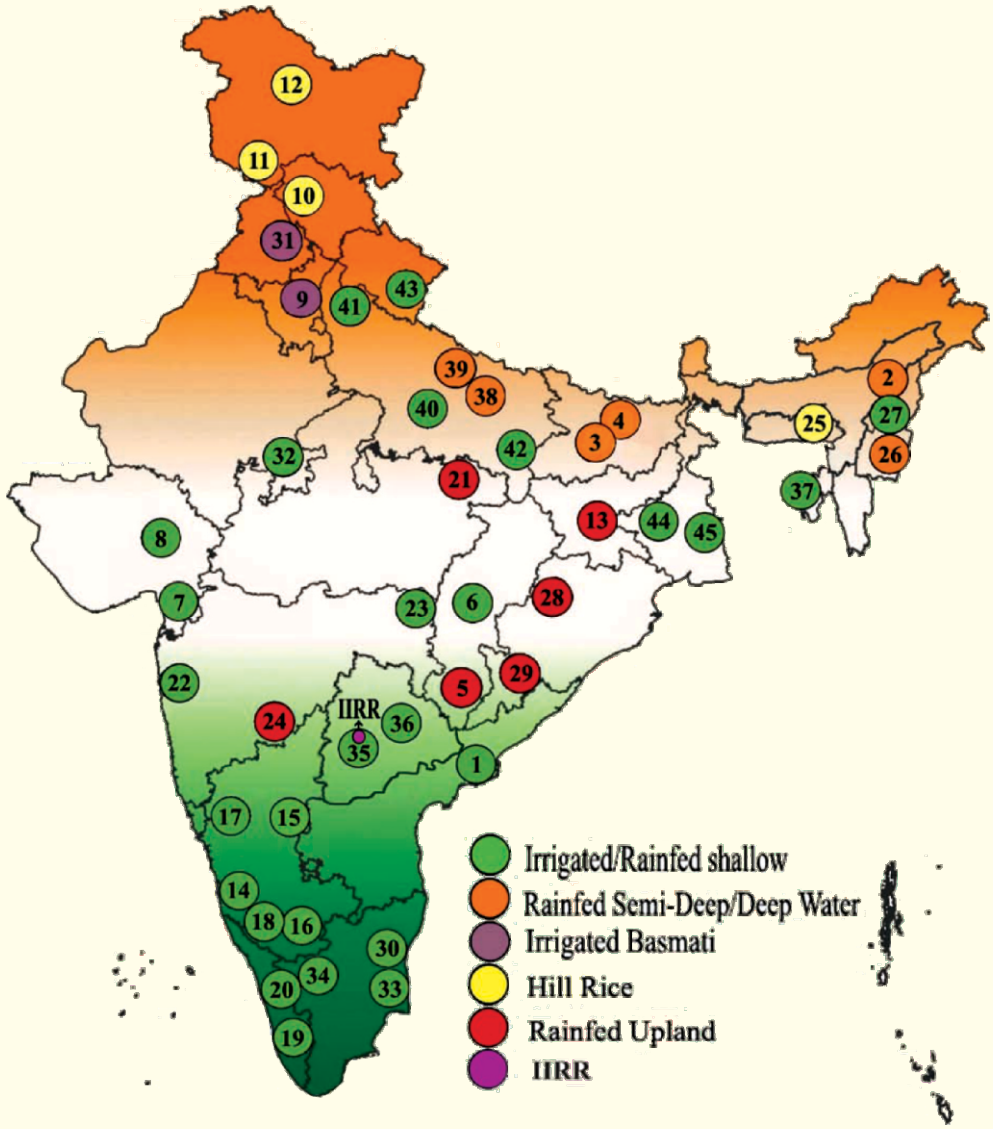

भाकृअनुप - भारतीय चावल अनुसंधान संस्थान

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