

PRODUCTION ORIENTED SURVEY 2011

**In collaboration with
AGRICULTURAL UNIVERSITIES**

and

STATE DEPARTMENTS OF AGRICULTURE

All India Coordinated Rice Improvement (AICRIP) Programme

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PRODUCTION ORIENTED SURVEY-2011

SUMMARY

Production oriented survey (POS) on different aspects of rice cultivation and farmers practices was conducted during crop season of 2010 by 26 AICRIP centres in 19 states *viz* Andaman and Nicobar Islands, Andhra Pradesh, Bihar, Chhattishgarh, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Puducherry, Punjab, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. The survey was conducted by the scientists of Directorate of Rice Research and its cooperating centers located in different states belonging to different State Agricultural Universities and department of Agriculture (Table 1 and 2). A total of 139 scientific staff and 97 officials from the different States Department of Agriculture surveyed 156 Districts in 19 States.

Due to a large rain dependent area in the country, monsoon plays a critical role in determining agricultural production in the country. There are two Indian monsoon seasons - (I) rainy South-West monsoon (June-September) and (II) post-monsoon also known as North-East monsoon (October-December). The success or failure of the crops is more closely associated with the spatial and temporal distribution of rainfall during the South-West monsoon as it brings most of the rainfall (about 80 per cent of the total) during a year in the country. For the country as a whole, the rainfall for the season (June-September) was 101% of its long period average (LPA). Seasonal rainfall was 107% of its LPA over Northwest India, 110% of its LPA over Central India, 100% of its LPA over south Peninsula and 86% of its LPA over Northeast (NE) India. Out of the total 36 meteorological subdivisions, 33 subdivisions constituting 92% of the total area of the country received excess/normal season rainfall and the remaining 3 subdivisions (Arunachal Pradesh, Assam & Meghalaya, and NMMT constituting 8% of the total area of the country) received deficient season rainfall. Out of 603 meteorological districts for which data are available, 453 districts (76%) received excess/normal rainfall and the remaining 150 districts (24%) received deficient/scanty rainfall during the season. Monthly rainfall over the country as a whole was 112% of LPA in June, 85% of LPA in July, 110% of LPA in August and 106% of LPA in September. Advance of Southwest monsoon over the Andaman Sea was delayed by about 10 days. The monsoon set in over Kerala on 29th May, three days before its normal date of 1st June and covered the entire country by 9th July, 6 days earlier than its normal date of 15th July. The withdrawal of monsoon from west Rajasthan was delayed and it commenced only on 23rd September. Four depressions formed during 2011 monsoon season as against the normal of 4-6 monsoon depressions per season. The forecast for monsoon onset over Kerala for this year was correct, which is the seventh consecutive correct forecast for this event. Most of the operational long range forecasts issued for the 2011 southwest monsoon rainfall were underestimating the actual rainfall and therefore were not very accurate.

Predominant rice varieties cultivated by the farmers in different states are presented in Table 3. The prevalence of different diseases and insect pests in different rice growing regions of India is presented in Table 4 and Table 5. The diseases like leaf blast, neck blast, brown spot, sheath blight, sheath rot, false smut, grain discoloration and bacterial blight were widely prevalent throughout the country. Neck blast has become a major problem in many areas. Bakane disease of rice has become a major problem in Punjab and Haryana especially on basmati rice varieties. Among the insect pests, stem borer, leaf folder, brown plant hopper were most widely prevalent throughout the country.

Andamans and Nicobar islands: Production oriented survey was conducted in two districts viz., North and middle Andamans and Nicobar. Though the climatic conditions were normal in North and Middle Andamans, there were reports of excess rainfall in Nicobar district. Some of the widely cultivated varieties were HYVs like Jagannath, Jaya, Bhawani, Khusboo, Black Burma, Swarna, CSR-36, CARI-5, Ranjeet, Gayatri, JGL, C-14-8, CARI Dhan, Silver, Topu Jaya, Swarna Jaya and hybrids like US-312. The common crop rotation practice followed by the farmers were rice-urd bean, rice-vegetables, rice-mungbean/black gram/lobia /lady's finger/cowpea. The average rice yield in the district ranged from 3000-6000 kg/ha among HYVs and 2000-3900 kg/ha among the local rice varieties. The intensity of common weeds like *Echinochloa colona*, *E. crusgalli*, *Cynodon dactylon*, *Imperstus cylindrical*, *Paspalum* spp., *Cyperus javanicus*, jalkambhi, pubgrass, kakori grass moderate to high. Farmers did not apply any weedicides and hand weeding was the main practice for weed management. Among different biotic constraints, blast, grain discoloration, stem borer, leaf folder, rice bugs, gundhi bugs were recorded in moderate to severe intensity while grass hopper and rats were observed in low to moderate intensities.

Andhra Pradesh-1: The production oriented survey was conducted during *kharif* 2011 in Ranga Reddy, Mahbubnagar, Karimnagar, Nalgonda, Khammam and Warangal districts covering Telangana Region of Andhra Pradesh. A total of 107% of the normal rice area was covered in Telangana region taking advantage of the good rainfall received during June and July months of 2011. In the year 2011 the total cropped area covered was 3.44% higher (103.44%). However, long dry spell from September affected the productivity of crops. The commonly grown rice varieties were includes BPT 5204, HMT Sona, JGL 384, JGL 1798, MTU 1010, Tellahamsa and WGL varieties (preferred category) ; IR 64, MTU 1001, MTU 7029, MTU 1061, MTU 1075. Rice-Rice was the major prevailing cropping system followed by dhaincha-rice-rice, green gram-rice-rice, rice-maize/jowar, rice-groundnut, rice-rice-vegetable, rice-vegetables and rice-fallow in the surveyed districts. Due to untimely rainfall and lack of water resources in tanks/ wells and labour shortage for transplanting prompted the farmers of Ranga Reddy, Khammam, Warangal to try direct seeding of rice using drum seeder during *kharif* , 2011. The average yields realized was in the range of 4.5 - 5.5 t/ha. However, the farmers expressed that there was severe incidence of leaf mite and panicle mite in direct seeded rice as compared to normal method of transplanting. The survey revealed that due to moderate and high responsiveness of high yielding varieties to applied NPK, the farmers are going in for various dosages in the ratio of 100-190 N, 40-60 P, 20-40 K in the form of complex fertilizers viz., 18-46-0, 28-28-0, 17-17-17, 19-19-19/ 20-20-0 and 16-16-16. The common weeds like *Echinochloa colanum*, *E.crusgalli*, *Cyandon dactylon*, *Cyprus rotandus*, *Leersia hexandra*, *Panicum ripens*, *Brachiria mutica*, *Arudo donux*, *Stenotaphrum secundatum*, *Dinedra retrofolea*, *Isache elegans*, *Ergostris tenuifolia*, *Plantago* spp., *Paspalam dictuem*, *Glyceria acutifolia*, *Euphorbia* spp. and *Parthenium* spp. was in moderate intensities. Among different biotic constraints, BPH, yellow stem borer, rice hispa, leaf folder, whorl maggot, panicle mite, rats, blast, neck blast, sheath blight, false smut, bacterial blight, brown spot and grain discoloration were observed in low to moderate intensities.

Andhra Pradesh-2: Production Oriented Survey (POS) was conducted in East Godavari and West Godavari districts of Andhra Pradesh. Canals were the main source of irrigation water. Other sources of irrigation water were the bore wells, tanks and filter points. Bore well irrigation was common in upland mandals of East and West Godavari districts. Canal water comes from River, Godavari which divides into two major irrigation channels at Dhavaleswaram anicut. Nearly 90% of the cultivable land was occupied by rice crop in these districts. Rice-rice was the predominant cropping system in Godavari delta. The major rice

varieties in these districts were Swarna (MTU-7029), MTU-3626, BPT-5204, MTU-1061, MTU-1064, PLA-1100, MTU-1001 and IR-64. (MTU-7029), Amara (MTU-1064), Indra (MTU-1061), Samba mahsuri (BPT-5204), Badava mahsuri (PLA-1100), Cottondora Sannalu (MTU-1010), Prabhat (MTU-3626), Vijetha (MTU-1001), MTU-2716 and IR 64 and of which Swarna (MTU-7029) occupied nearly 75 per cent of the paddy area in these two districts. Short duration rice varieties like MTU-1010, MTU-3626 and IR-64 were sown for seed purpose to be sown in rabi season. MTU-1001 was majorly grown in upland mandals like Nalljerla, Buttaigudem, Jangareddigudem, guravaigudem mandals of West Godavari district.

The common crop rotations were paddy-paddy; paddy-paddy-pulse; paddy-pulse; paddy-sugarcane; paddy-paddy-maize; paddy-maize, paddy-fodder and paddy single crop. The inputs like seeds, pesticides and fertilizers were adequate. Seed is obtained from Co-operative societies, APSSDC, farmer to farmer and Research Stations. Pesticides and fertilizers were purchased from the local pesticide dealers. Machinery like combined harvester, transplanter and drum seeder were used for direct sowing in upland as well as irrigated mandals. Combine harvester was used in almost all the mandals surveyed. Puddling operation was taken up by using power tillers and tractor mounted cage wheels. Farmers used different types of paddy transplanters (manually operated, Kubota, Yanji sakthi and Yanmar type). Private companies introduced the transplanters as well as combine harvesters during peak season whereas, drum seeder was supplied by the Department of Agriculture. Drying and storage facilities were inadequate. Very few farmers applied farmyard manure. Most of the farmers applied complex fertilizers as top dressing. The use of phosphatic and potassium fertilizers was satisfactory but some farmers applied excess nitrogenous fertilizers. The fertilizers like DAP, 20-20, 28-28, 14-35-14 and 10-26-26 were used by majority of farmers. Among diseases, sheath blight was low to moderate and other diseases neck blast, false smut were found in low level. Among insect pests, stem borer, leaf folder, panicle mite and brown plant hopper were observed in low to moderate level. Rat damage was severe in almost all the areas and on all the varieties sown. Farmers took protective measures like burrow fumigation, butta trapping, bromadiolone baiting, and passing electricity around the field against rodents. Crop was dried due to non availability of water in the bore wells in upland mandals. In delta mandals higher yields were realized as the incidence of pest and diseases was low and prevalence of bright sunshine hours. Crop holiday was declared in East Godavari in different parts of East Godavari district in an extent of 30,000ha.

Andhra Pradesh-3: During *kharif* 2011-12, a total of 65 locations were surveyed in 26 mandals of north coastal zone (NCZ) of Andhra Pradesh. Majority of the area under cultivation is canal fed, followed by tank fed and rain fed conditions. The widely grown varieties were Swarna (MTU 7029), Vijeta (MTU 1001), Samba mashuri (BPT 5204), Sona mashuri (BPT 3291) and Srikakulam sannalu (RGL 2537). Less than 80% of normal rainfall was received during September end, October, November and December I fortnight resulting in severe moisture stress at panicle emergence and milking stage which resulted in yield loss. In NCZ, rice is generally grown as a *kharif* crop followed by pulses, sesamum, maize, jowar or sunflower during *rabi*. However, rice- mesta cropping system was also practiced in some areas of Srikakulam district. Random transplantation is the most preferred system of cultivation, however, direct sown drum seeded rice is gaining popularity in the zone, particularly in Srikakulam district where, more than 2000 acres was drum seeded. Fertilizers were applied as nitrogen (11.5-78 kg/ac range), phosphorus (0-58kg/ac) and potassium (0-36 kg/ac) fertilizer application have been recorded. Potassium deficiency symptoms have been observed on the crop in most of the locations surveyed. Some of the farmers gave foliar

application of 13-0-45 (KNO₃). Farm yard manure in the range of 2-20 cartloads per acre has been applied by more than 69% of the farmers surveyed. The practice of sheep penning was practiced by 20% of the farmers surveyed. Weed infestation was found to be moderate. *Cyperus rotundus*, *Cynodon dactylon*, *Echinochloa crusgalli*, *Cyrtotis* spp., *Ipomea* spp., *Sida* spp., *Trianthema* spp., *Buerinia hispida*, *Eclipta alba*, *Gomphrena* spp. and *Cardiospermum* spp. were the common weeds observed in farmers fields. In NCZ, Sheath rot on rice was found to be a predominant and emerging disease problem followed by sheath blight, grain discoloration and leaf spots. Among insect pests, leaf folder, panicle mite and gallmidge were major problems. Moderate to high infestation of gallmidge has been recorded in Srikakulam district of NCZ. However, the disease and insect pest scenario varied with the district. It has been noticed that extreme dry weather during the crop season, resulted in the infestation of the occasional mealy bug at a few locations. Based on the recommendation of local pesticide dealers, majority of farmers in Vizianagaram district used synthetic pyrethroids (Lambda cyhalothrin) for the management of leaf folder. Whereas, some farmers of Srikakulam district used DDT against stem borer and phorate for the management of rats in problematic areas. It has been observed that the disease and insect pest problems during *kharif* 2011-12 was comparatively lower in comparison to the previous year with the exception of sheath rot incidence and gallmidge infestation.

Bihar: Production oriented survey was conducted in 4 districts of Bihar when most of the rice fields were in dough to maturity stage. There were incidences of draught or draught like situations in most of the places surveyed. Most of the farmers took one rice crop in a year and the common crop rotations were rice-wheat, rice-mustard, rice-potato and rice-maize. The commonly grown varieties Rajendra Bhagwati, Prabhat, Swarna Sub-1, Nata Mahsuri, Sita, Rajendra Subhasini, Pusa Basmati 1, Pankaj, Saroj, Dhanlaxmi, Subhash, Jaya, Rajendra Kasturi, Kishori and Sudha among HYVs and Goldi, RH 10 and Arize 6444 among hybrids. The intensity of common weeds like *Cyperus rotundus*, *Cynodon dactylon* and *Echinochloa* spp. were low to medium. Most of the farmers used hand weeding and only some farmers used herbicides like butachlor and 2,4-D. Most of the inputs were either inadequate or not available in most of the places. Among the diseases, brown spot was recorded in moderate to high intensity. Other diseases like sheath blight, sheath rot, bacterial blight, false smut, grain discoloration were recorded in low to moderate intensities. Among the insect pests, stem borer, leaf folder, BPH, WBPH, gall midge and grass hoppers were recorded in low to moderate intensities. Low intensity of rat damage was also recorded in some places.

Chhattishgarh: Production oriented survey was conducted in 4 districts of this state viz., Bastar, Dantewada, Bijapur and Narayanpur. Most of the crops were in milk to dough stage at the time of survey. The general climatic conditions were not very favourable for rice cultivation as there were incidences of drought in many places surveyed. Most of the farmers contacted were marginal or sub-marginal. The common grown rice varieties in this area were MTU 1010, MTU 1001, IR-64, Swarna, HMT and Poornima among HYVs; PA 6444, PA 6144 and KRH-2 among hybrids; Limchudi, Gadaguta, Satka, Asamchudi, Safari, Masuri, Bhatamkodo, Bhatacotia, Huldigutti, Luluha, Lalhar, Sambalpuri, Gurmudia, Sindhur, Shrinagar, Tendu, Mudi, Meharden, Para, Chitari, Daverdhan and Loctimajhi and Badsahbhag, Dubraj and Javaful among scented varieties. The average rice yield in these district were very less in the range of 1000-2500 kg/ha. Majority of the farmers adopted direct sowing. The intensity of different weeds was moderate to high. Among different biotic constraints, neck blast and brown spot were widespread in low to severe intensities while blast, sheath blight, false smut and bacterial blight were in low to moderate intensities. Stem

borer and leaf folder were very widespread in low to severe intensities while other like rice bugs, gall midge, mealy bugs and termites were recorded in low intensities in some places.

Gujarat: Production Oriented Survey in rice growing areas of Thirteen districts viz, Ahmedabad, Anand, Dang, Gandhinagar, Kheda, Mehsana, Navsari, Panchmahals, Sabarkantha, Surat, Tapi, Vadodara and Valsad was conducted. Thirty two taluqus and Seventy two villages were covered under survey. The Kharif 2011 witnessed little late (First week of July) but well distributed normal monsoon (29days) with the total rain 591.2 mm i.e. less than the average of last 30 years. Predominant varieties cultivated were Gurjari, GR-11, GR-4, Masuri, Jaya, GR-7, GR-12, GR-101, GR-103, GAR-13, NAUR-1, Narmada, Moti-gold, Sonam, Surekha, Sonali, Arize-6444, 786, 2525, 801, Nath Poha, Gorakhnath, PA-6201, Rashi Annam, Poonam Rashi, Komal, Krishna Kamod, Sathi, Suruchi, US-312, US-178, Swarna, Nirmal Hybrid-617. Prevailing crop rotations were rice-wheat-rice, rice-sugarcane, rice-gram, rice-banana, rice-vegetables, rice-rice, rice-tobacco, rice-pearl millet, rice-wheat-Summer Green gram, rice-Castor, etc. In general the rice crop condition was good all over the state. The productivity trend is maintained. There was no rain after second week of September i.e. flowering and maturity stage. Therefore among the biotic constraints the infestation of insect pest like leaf folder, stem borer, WBPH, BPH, army worm, GH, Mite, WTN and GLH were recorded in negligible to low intensity. Among diseases bacterial blight appeared negligible and moderate in two fields in Baroda district under water logged condition. Blast, Grain discoloration, sheath rot, false smut were low Other common diseases did not appear.

Haryana: Survey was conducted in 10 districts of Haryana viz., Kaithal, Kurukshetra, Karnal, Jind, Ambala, Yamunanagar, Panipat, Sonapat, Fatehabad and Sirsa. The commonly grown varieties were Pusa Basmati-4 (Pusa 1121), Pusa Basmati-1, CSR-30, PR 114, Arize 6129, Arize 6444, Pusa 44, HKR 47, HKR 127, PR 118, Sabnam, Royal Bhog (Pepsi), Sarbati and var. 220. In addition, Hybrid Super Kalpana, Dhanlaxmi, Marble 999, Marble 90, Hybrid 2355, Anmol Paddy Cure, Improved Pusa Basmati-1, PHB 71, Hybrid Swift, PR 120, Hybrid Sudha, Taraori Basmati, Modi 1101, Hybrid 4042, Hybrid Bisham, Hybrid 232 and Hybrid 721 were also grown at few locations. Application of weedicide, random planting, inadequate plant population, raising of nursery in unpuddled fields and rice-wheat sequence were common in all the districts. Mixed application of fungicides with insecticides for foliar application and that of granular insecticides with urea as broadcast application was commonly followed. Weedicides like Sofit, Nominee gold and insecticides cartap hydrochloride and chlorpyrifos were also applied by some farmers in nursery. Paddy seed used for raising the nursery of one acre of high yielding and Basmati varieties was quite low (4-5 kg) as against recommended 10-12 kg/acre. The seed treatment was followed by 50, 60, 80, 60, 40, 40, 80, 60, 60 & 80% farmers in Kaithal, Kurukshetra, Karnal, Jind, Yamunanagar, Ambala, Panipat, Sonapat, Fatehabad and Sirsa districts, respectively. The rainfall depression was observed in all the districts surveyed except Ambala (+8.4%) and Sirsa (+9.2%), which ranged from -12.4% in Jind to -47.9% in Panipat. The market price for common (Jaya, PR 113) and superfine (HKR 47, HKR 127, PR 114, PR 116, PR 118) was Rs. 1050-1070 and 1080-1150/q, respectively. The semi dwarf Basmati (Pusa Basmati-1, Pusa Basmati-4) fetched slightly lower market price of 1600-2000/q while traditional tall Basmati (CSR 30, Taraori Basmati) fetched significantly lower market price of Rs. 1500-1800/q respectively compared to previous year. The lower market price particularly of traditional tall Basmati rice will lead to a drastic reduction in area under their cultivation in succeeding year.

The main constraints identified in increasing rice production in Haryana were depletion of water table, depression in precipitation, limited water resources, inadequate and intermittent power and canal water supply, poor quality of underground water, erratic monsoon, deterioration in soil health, sub-optimal plant population, salinity & alkalinity and

continuous follow up of rice-wheat cropping system in addition to biotic constraints particularly WBPH, BPH, sheath blight and foot rot and bakanae. Bacterial leaf blight was recorded in severe form at one location each in the districts of Kurukshetra and Sirsa in PR 118, CSR 30 and Pusa Basmati-1, respectively. False smut was recorded in traces to moderate intensity in 10, 20, 20, 20 and 10% sites in Kaithal, Kurukshetra, Ambala, Yamunanagar and Sonapat districts in PR 114, PR 118, Arize 6129, HKR 47, Pusa Basmati-1, Hybrid Bisham, Super Kalpana and Anmol Paddy Cure. Leaf blast appeared in traces to severe form while neck blast incidence remained low ranging from traces to 5% in CSR 30, Pusa Basmati-4 and Pusa Basmati-1. Foot rot & bakanae ranged from traces to 50% at 90, 70, 70, 90, 40, 20, 80, 80, 70 and 40% locations in the districts of Kaithal, Kurukshetra, Karnal, Jind, Ambala, Yamunanagar, Panipat, Sonapat, Fatehabad and Sirsa, respectively. Maximum disease incidence of 50% was recorded in Pusa Basmati-4 in district Kaithal. Sheath blight was observed in traces to severe form at 50, 60, 30, 10, 10, 10, 20 and 10% locations in the districts of Kaithal, Kurukshetra, Karnal, Yamunanagar, Panipat, Sonapat, Fatehabad and Sirsa, respectively. The disease intensity was moderate in Yamunanagar and Panipat in Pusa Basmati-1 and Pusa Basmati-4 while it was severe in the districts of Kaithal Kurukshetra, Karnal, Fatehabad and Sirsa in Pusa Basmati-1, Pusa Basmati-4 and PAU 201. Stem rot incidence was observed in moderate to severe form at one location each in the district of Kurukshetra and Ambala where its incidence ranged from 8-10% in Arize 6444 and Pusa Basmati-1, respectively. Other diseases namely, grain discolouration, brown spot and narrow brown leaf spot were recorded in low to moderate intensity at few locations. However, *Khaira* (zinc deficiency) was recorded in low to severe form at 30, 10, 60 and 10% locations in Pusa Basmati-1, CSR 30, HKR 47, Pusa Basmati-4 and PAU 201 in district Kaithal, Karnal, Jind and Panipat.

Himachal Pradesh: The production oriented survey was conducted in four rice growing districts viz., Kangra, Mandi, Una and Sirmour. Kangra and Mandi are the major rice growing districts contributing about two-third of total production in the state. Kangra district is leading in the area under rice cultivation followed by Mandi, Sirmour and Una districts. Prevalent rice varieties in the state were HPR 2143, HPR 1068, RP 2421, China 988, Norin 18, Sabarmati, Nagrota purple, T-23, Palam Dhan 957, PR 108,114,116, Pakistani Basmati, Pusa Sugandh-5, Kasturi. Himalaya-799, Himalaya 741, Himalaya 2216, Sharbati, Hasansarai under irrigated conditions. Under rain fed conditions, the most prominent cultivars were VL Dhan 221, HPR 1156 and China 988. Some common hybrids grown by the farmers were PA6129, PAC807, US 312, US 315. Arize 6129, PA 6444 and Hybrid 47, 257 and 832. The common crop rotations were rice-wheat, maize-wheat and rice-potato. Amongst the weeds *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* and *Bonnaya veronicaefolia*. Diseases like leaf blast, neck blast, bacterial blight, false smut, leaf scald, sheath rot and narrow brown leaf spot and insect pests like leaf folder, stem borer, grasshoppers, whorl maggot, chaffer beetle and case worm were recorded in low to moderate intensities. White tip nematode was recorded in low to moderate intensity in Balh valley of Mandi district.

Jammu and Kashmir-1: Production oriented survey was conducted in six districts of Jammu and Kashmir. The survey was done when rice crops were in maturity stage. In general, the climatic conditions were normal for rice cultivation in most of the places visited. Most of the farmers took one rice crop in a year and the common crop rotation practices were rice-brown mustard, rice-oats, rice-fodder and rice-fallow. The common rice varieties cultivated by the

farmers were Jhelum, China 1007, K 448, K-39, China 1039 and SR-2. Sowing was completed by 1st week of May and transplanting was completed by 1st week of June. Most of the farmers applied FYM/organic manure in the nursery. In the main fields, fertilizers were applied as 40-70 kg N/ha, 30-60 kg P₂O₅/ha and 10-30 kg K₂O/ha as basal and 10-30 kg N/ha as top dressing. The common weeds were *Echinochloa* spp., *Marsilia* spp., *Panicum* spp., *Potamogeton* spp. etc. Farmers applied butachlor @ 1.5 kg a.i. per ha for the management of weeds. Except water, most of the inputs were inadequate in most of the places. Among the different biotic constraints, blast, neck blast, grain discoloration and GLH were observed in low intensities. Fungicides like tricyclazole (6 g/10 litre) for the control of leaf blast.

Jammu and Kashmir-2: An extensive Production Oriented Survey on rice crop was conducted in the entire three sub-divisions of district Poonch whereas only a few hotspots of rice grown areas were surveyed in another hilly district Rajouri and the subtropical plains of Jammu and Samba districts of J&K State in Kharif 2011. At the time of survey, majority of the crop stood either at Dough or Maturity stage except Basmati which was at milking stage. Farmers in the state practice only one crop of rice in a year. Most of the farmers surveyed were having small land holdings and have poor socio-economic status. The general climate conditions in kharif season remained normal with the well distributed timely rains in irrigated as well as rainfed areas of Samba district. Overall yield of paddy crop was by and far remained excellent in all the regions. Maize was the only crop grown in the entire hilly terrains of Pooch and Rajouri districts followed by the paddy crop that was adopted merely at around the banks of local rivers. Traditional coarse varieties still forms the major seed input of paddy in the temperate districts whereas other plain subtropical districts are experiencing a boom with the sort of hybrids. The non-availability of weedicides, fertilizers and pesticides at proper time also played an important role in the fluctuation of yield in the entire surveyed area. In fact, non availability of seeds of improved cultivars at the time of sowing pressurized the farmers to grow seeds from there previous crop that was a mixture of number of local and improved cultivars. As in the past many years, farmers have almost left putting potash in their fields because of its non-availability. Nor they were interested in any plant protection measures despite of the deficiency symptoms visible clearly in the regions. Biotic constraints in the ensuing season remained at low ebb except with a few hybrids that was badly infected with the cancerous disease of false smut.

Jharkhand: Production Oriented Survey (POS) in rice growing areas of four districts (Ranchi, Khunti, East Singhbhum and Saraikela kharsawan) was conducted during Kharif, 2011. Rice was rainfed crop in all the surveyed districts. The general climatic condition was good and rainfall in the above districts was more than actual rainfall with reference to paddy cultivation except July. The monsoon came in time but due to less rainfall in the month of July, transplanting was done up to the September. About eight per cent area of surveyed districts of Jharkhand where irrigation facility was there. The main source of irrigation was well, ponds etc. The prevailing crop rotation in the district was rice-fallow and about 10 % farmers in the state followed rice-wheat, rice gram, rice- mustard, rice-vegetable. Few farmers also reported that lack of irrigation and animal grazing are major problem for cultivation of 2nd crop after rice (Kharif). Some farmers followed SRI method of paddy cultivation, promoted by Birsa Agricultural University, Ranchi and State Agriculture Department and they reported that they got good yields from this method of paddy cultivation. Fertilizers were applied @ 30-80 kg N/ha, 10-30 kg P₂O₅/ha and 0-30 kg K₂O/ha. Majority of farmers (about 80%) in the state did not use potassic fertilizer in rice crop. No chemical fertilizers were applied in traditional varieties of rice in almost all the above surveyed districts of Jharkhand. The weed population was low to medium in medium land

and lowland paddy whereas, weed population was high in upland rice. The common weeds were *Cyperus rotundus*, *Cyperus iria*, *Leersia hexandra*, *Paspalum dictuem*, *Echinochloa colonum*, *E. crusgalli*, *Fimbristylis Spp.*, *Eclipta alba*, *Ageratum conyzoides*, *Amaranthus spp.*, and *Cynodon dactylon*. Some progressive farmers used weedicides like butachlor/pretilachlor @ 1.5 to 2.0 kg a.i./ha as a post emergence. In general, one to two hand weeding was common practice for management of weeds in most of the area of the state. Among diseases, brown spot was most serious disease particularly local tradition varieties or upland rice whereas, blast and false smut was also recorded in medium to severe intensities in HYVs and Hybrids. IR 64 was susceptible to blast (medium to severe intensity) in experiment plots of BAU, Kanke and farmers field. The most common insect pests were stem borer, case worm, gall midge, Gundhi bug, BPH and leaf folder etc. were recorded in low/medium/severe intensity.

Karnataka: The production oriented survey was conducted in Karnataka, especially in rice growing areas coming under jurisdiction of University of Agricultural Sciences, Dharwad during kharif -2011. The survey was done with multi disciplinary team consisting of Pathologist, Breeder, Economist and Drainage engineer. The survey was conducted in districts of Dharwad, Uttar Kannada, Belgaum and Haveri where in rice is grown under drill sown condition. The crops were heading to maturity stage. The entire area surveyed is typical rained grown rice. Major cropping pattern of this areas were rice-pulses, rice-vegetables, rice-rice and rice-maize. The varieties grown in this region were usually local varieties (50%) like, Dodiga, Antarsali, Kumud, Belgaum Basmati Hakkalasali etc. besides, HYV like Abhilash, Jaya, Intan, MTU-1001, MTU-1010, MGD-101 and SIRI-1253. Weed infestation was medium to high commonly observed weeds were *Cyprus spp*, *Echnochlora colona* and *Cynodon spp*. Zinc deficiency was observed some places. Among the biotic stresses leaf blast, neck blast, sheath rot, and sheath blight were in moderate form while udubatta and false smut were observed in traces. Among the insects stem borer and leaf folder were in moderate form while BPH was observed in moderate form in few places more emphasis is given for mechanization for the use of weedicides and harvesting to overcome labor shortage.

Kerala: The Production oriented survey was conducted in Palakkad, Thrissur and Malappuram districts of Kerala. The survey was conducted at tillering to maturity stage of the crop. Uma, Jyothi, Kanchana, Ponmani Aishwarya,, Aathira, and Matta Triveni were the predominantly cultivated varieties of these area. Seed rate adopted by the farmers was ranging from 75-100 kg/ ha. The fertilizer application ranged from 0 to 150 kg N/ha, 0 - 75 kg P₂O₅/ha and 0 - 150 kg K₂O/ha as basal. Many of the farmers applied fertilizer in two splits as basal and one top dressing. While some of them applied fertilizer as basal and in two top dressings. The first top dressing ranged from 10 - 110 kg N/ha, 0 - 75 kg P₂O₅/ha and 15 - 150 kg K₂O/ha. Second top dressing ranged from 0-70 kg N/ha, and 10-45 kg K₂O/ha. Use of organic manure was less. Some farmers applied farmyard manure (1ton/ha) and neem cake (250kg/ha) basally. Most of the farmers followed random method of transplanting. Direct sowing and SRI were also followed in some places. Trnsplanting using transplanters were also practiced. The common weeds observed were *Isachne miliacea*, *Saciolepis* , *Eichornia*, *Echinochloa colona*, *Cyperus spp.*, *Marsilia quadrifolia*, *Fimbristylis* and weedy rice. Hand weeding was followed in most of the places. But in some area herbicides such as Refit, 2,4-D, Nominee Gold etc were used. Diseases such as bacterial leaf blight, blast, brown spot, sheath blight and false smut were commonly observed from low to moderate intensities. In many places kresek symptom of bacterial blight was observed. Bacterial leaf bight was observed in kharif crop in Palakkad district in severe forms in certain pockets. The major pests were leaf

folder, stem borer, gall midge, case worm and rice bug in low to moderate intensities.. Farmers applied Quinalphos, Acephate, Hostathion, Flubendiamide, Lamda cyhalothrin, Fenval, Phosalone, and Coragen (Rynaxypyr) were used for controlling insect pests. Trichogramma egg cards were used by a few farmers for the management of stem borer and leaf folder. The use of fungicides were negligible. *Pseudomonas fluorescens* was used for seed treatment by few farmers. For the management of bacterial leaf blight, Streptocycline was used by the farmers. Lack of sufficient labours and high labour cost were the two problems generally raised by the farmers.

Madhya Pradesh: Production Oriented Survey of rice was conducted in eight districts viz. Rewa, Satna, Sidhi, Shahdol, Umaria, Anoopur, Katni and Panna districts. The weather conditions during crop growth period were normal. The distribution of rainfall was good in the state therefore, sowing of direct seeded rice [either un-sprouted broadcasting or lehi (Sprouted seeds)] was carried out timely in rain fed ecosystem in the state. There was good rains in the month of June and July therefore farmers have sown the seeds in the nursery in the month of June and transplanting was completed timely in the month of July. It was observed that due to continuous rains in the month of July soybean, urid moong and sesamum area was replaced by rice or unsown. The predominant varieties in the state were PRH 10, IR-36, IR-64, IR 50, Govinda, Vandana, Pusa Sugandha 3, Kranti, HMT, Pusa Sugandha 5, PA6201, PA 6444, PHB71, PAC 801, Basmati, Lochai, Sonam, JR-75, JR 201, Sabnam, Loknath, Winner and Champion. It was noted that rice hybrids are being popularized by the private sectors and government agencies in the state and therefore, the farmers are taking keen interest to grow hybrid rice. In regard to hybrid rice adoption Rewa, Satna and Sidhi districts covered maximum area (approximate 25-35 %) by the progressive and medium farmers under irrigated ecosystem where as, Shahdol, Panna, Katni and Anoopur districts have less adoption of hybrid rice ranging from 10 to 15 %. It was also noted that farmers are taking keen interest to replace the local varieties with hybrid rice and improved high yielding varieties and strengthening the economic status. The predominant cropping system in the state was rice-wheat, rice-gram and rice-pea, rice-lentil, rice-berseem, rice-fallow and rice-barley. The rice productivity in the state was very low (1.7 to 2.3 t/ha) due to dominance of local extra early and medium poor yielder varieties, low fertilizer application, poor irrigation resources, poor plant protection measures and poor socio-economics status of the farmers. However, it was noted that the progressive, medium and marginal farmers having irrigation facilities have adopted the cultivation of hybrids and obtaining the grain yield ranging from 60 to 75 q/ha. Some of the needs of the farmers were availability of seeds of improved variety time, paddy thresher, sprayers, duster, cono weeder and rotavator and paddy transplanter. It was observed that weed infestation was very high in rain fed ecosystem and causing heavy economic yield losses as compared to transplanting system. Zinc deficiency was commonly noticed in Rewa, Satna, Sidhi, Shahdol and Panna as compared to Katni, Umaria and Anoopur districts. Among the different biotic constraints, leaf blast, brown spot, Khaira, false smut, sheath blight, seed discoloration, case worm, WBPH, leaf folder, army worm, gundhi bug and termite infestation were commonly noticed in the surveyed area. Leaf blast, false smut and WBPH leaf folder appeared this year in moderate severity and caused considerable yield losses.

Maharashtra: Production oriented survey was conducted during Kharif 2011, when the rice crop was at dough to maturity stage in Thane, Raigad, Ratnagiri and Sindhudurga districts of the Konkan region of Maharashtra. The regular monsoon was commenced on last week of May 2011. In general the weather conditions were ideal for the growth of rice crop. Rice is grown in rainfed condition as a main crop in the region due to heavy rainfall during the Kharif season. The prevailing crop rotation in the region were Rice-pulses, Rice-fallow, Rice-

Groundnut, Rice-Rice, Rice-Vegetables, were the most common cropping pattern adopted by the farmers of the region. Most of the farmers in the region grow high yielding varieties viz. Karjat-3, Karjat-2, Karjat-184, Karjat-5, Karjat-7, Jaya, Ratnagiri, Ratnagiri711, IR 64, Palghar1, Gujrath-4 Gujrath 11, Gujarath-17, Sonam, Sairam, Rupali, Swarna, HTM Sona. The varieties viz. Panvel-2, Panvel-3 & Jaya in saline soil. The farmers also grow local cultivar viz. Ek-70, Zinnia, Bhadas, Patani, Valai, Kothimbira, Bela, Wada kolam, Mokhada kolam, Shahapur kolam etc. mainly for their home consumption. The maximum area of hybrid rice crop under the Sindhudurga district. The hybrid varieties grown in the region were Sahyadri, Sahyadry-3, Sahyadri 4, Sahyadri-2, PA 6444, P 6201 and hybrid from Ankur Company. Most of the farmers in the Konkan region are having small land holding. As per the report of Maharashtra State Agril department (2010-2011) the seed replacement ratio is 30 per cent. Generally farmers use higher seed rate for their local cultivar (80 kg/ha), 40 kg/ha seeds for high yielding varieties and 20 kg/ha for hybrid varieties. Farmers are aware of importance of organic manure and FYM. But it is not available in adequate quantity. The cost of FYM is also high therefore many farmers avoid to use it on large and recommended quantity. Many farmers use FYM only at the time of nursery bed preparation. Most of the farmers were using mixture fertilizer Suphala (15: 15:15) and some of them use Godavari (14:35:14) none of them uses soil amendments. Some farmers also using the urea + DAP briquette.

Weeds in nursery are a problem faced by the farmers everywhere in the region. In South Konkan especially in Ratnagiri and Sindhudurg district. There is practice of 'Rabø' followed by most of the farmers. 'Rabø' is the burning of nursery area with organic waste and thin layer of soil before sowing in the month of May. In most of the area in Raigad and Thane farmers sow germinated seed on puddle soil to manage low weed in main field. Some common weeds observed in the region are *Echinochloa crusgallis*, *E. colonum*, *Cynalon dactilon*, *Cyperus rofendus*, *C. irria*, *Isailema globusa*, *Digitearea arvensis*, *Alternatra triandra*, *Cylosia argentina*. Only few progressive farmers use selective weedicide for weed management. Few farmers in the region demands for the training about the use of weedicides for weed management in directly sown rice by seed drill. There were heavy incidence of bacterial leaf blight at maximum tillering stage in Thane and Raigad district resulted in the losses in grain yield in this area. The nursery was burn due to leaf blast was reported in some area in Chiplun taluka of Ratnagiri district on varieties Swarna, Gujarath4, Gujarath-11, Gujaarat -17 and Rupali. Heavy incidence of yellow stem borer was observed in Murbad and Shahapur taluka of Thane district (up to 30%) on late variety Sairam.

Puducherry-1: Production Oriented Survey was conducted in three regions of the Union Territory of Puducherry viz., Puducherry and Yanam and Mahe Regions. Puducherry region is situated about 160 km south of Chennai. Yanam region is situated on the East Coast of Andhra Pradesh bounded on all sides by the East Godavari District at a distance of 870 kms from Puducherry. Mahe region is situated on the Malabar Coast at a distance of about 8 km from Tellicherry, bounded on the west by the Arabian Sea, on the other sides by a stretch of calcareous hills of medium height and at a distance of 626 kms from Puducherry. The Popular rice varieties in Puducherry Region are CR 1009, I.White Ponni, ADT 39 and ADT 43. In Yanam Region, Swarna, Cotton dora Sannalu, Samba Mahsuri and Bondalu are the rice varieties grown while at Mahe rice varieties like Uma, Thampuran Kaima, Jothi and Athira are popular. The main cropping sequences in these regions were rice-rice-rice, rice-rice-pulses and rice (Single crop) respectively. Canals, wells, tanks and filter points were the main sources of irrigation. Among the inputs, seeds, pesticides and fertilisers were adequate. Machineries like combine harvester and transplanter were in use in Puducherry region while the same were not in use in Yanam and Mahe regions. But, the same shall be put into use if

awareness is created among the farmers by means of demonstrations and machinery availability at Yanam Region. Drying and storage facilities were also inadequate. The use of phosphatic and potassic fertilisers was satisfactory but some farmers applied excess nitrogenous fertilisers. Straight fertilisers, DAP, 17:17:17, 18:18, 20:20 and 28:28 were used by majority of farmers. Among diseases, sheath rot, sheath blight and BLB were low to moderate and other diseases were found in low intensities. Among insect pests, leaf folder and stem borer were observed in low to moderate in these Regions. Plant protection measures were not carried out in Mahe region.

Puducherry-2: Survey was conducted in 38 villages in Karaikal district. The high yielding varieties like ADT 43, and ADT 37 during Kuruvai and High yielding varieties like BPT 5204, SAVITRI, ADT 38, CO46, KKL-1 and Improved White Ponni were grown in more area during *Samba (Rabi)* season utilising cauvery water. Heavy incidence of Bacterial leaf blight (30-40%) was noticed on cultivars ADT 43, TKM 9, BPT 5204, CR 1009, ADT 38 and ADT 39 in most of the villages due to excess application of N as top dose and the conducive environmental condition noticed during the cropping season. Use of bio-control agents like *Pseudomonas fluorescens* as soil application and as foliar spray (0.5%) is getting importance in some of the villages surveyed. Use of mechanised transplanter is gaining momentum in most of the villages surveyed due to acute labour shortage. In some of the places visited, contract was made with M/S Tegra of Syngenta Pvt Ltd for Mechanical transplanting. Use of harvester-cum-thresher is gaining momentum among the various categories of farmers since the above facility was extended by the Department of Agriculture on hire basis. The use of various natural products like fresh cowdung extract (20%) and Neem products like Neem oil (3%), NSKE@ 5% and Neem cake are being adopted by most of the farmers who are interested in organic farming. Drainage Problem is noticed due to conversion of cultivable land for non Agricultural purposes viz., real estate business.

Punjab: The production oriented survey was conducted in 17 districts in the Punjab state during the crop season of 2011. The districts surveyed were Barnala, Bathinda, Faridkot, Faridkot, Fatehgarh Sahib, Ferozepur, Hoshiarpur, Jalandhar, Ludhiana, Mansa, Moga, Muktsar, Nawan Shahr, Patiala, Ropar, Sangrur and SBS Nagar. The climatic conditions in this state were normal. The prevalent varieties grown in this region were Pusa 44, PR 116, Pusa Basmati 1, PR 114, PR 118, HKR 47, PR 111 and Pusa 1121. Predominant weeds observed were *Echinochloa* sp., and *Cyperus* sp the usage of weedicides like Machete and Rift was a common practice for the management of weeds. Among the inputs, there was adequate availability of water, power, seeds and equipments. The basal dose of the fertilizer consisted of 120 Kg N/ha and 25 kg P₂O₅. Top dressing was done with 125 Kg of N in three split applications. The transplanting method followed was random method. The common diseases observed were brown spot, sheath blight, sheath rot and false smut at low to moderate intensities on Pusa 44 and Pusa 1121. Among the insect pests BPH, WBPH, leaf folder and stem borer were recorded in low intensity to moderate intensities. The farmers used Confider and chloripyriphos as insecticides to control plant hoppers, stem borer and leaf folder. District wise details of survey are presented below.

Tamil Nadu-1: Production oriented survey was conducted in eight districts of eastern and northern part of Tamil Nadu. In general rice crop condition was good both in *kharif* (Kuruvai) and *rabi* (Samba/ Thaladi) seasons of the year 2011 with normal rainfall. About 95 % of normal rice area was planted during this year. The cyclone named as “**Thane**” which hit at a wind speed of 135 to 145km damaged the rice crop in an area of 16,432 hectares in

Cuddalore and Vilupuram districts. Rice crop at flowering, milky and maturity stages (*rabi* crop) were severely affected by the cyclone. The wind injury was witnessed as sterile, chaffy and discoloured panicles due to the absence of pollination / fertilization. The crop affected at milky stage later exhibited ill filled and discoloured grains. The matured crop which was completely lodged due to heavy wind was submerged in subsequent rains and majority of the grains showed in-situ germination. In *kharif* season, rice varieties ADT 36, ADT 43, ADT (R) 45 and in *rabi* season ADT 38, ADT 39, ADT (R) 46, CO 43, CR 1009, White Ponni, BPT 5204 were predominantly grown in this region. SRI method of cultivation with young seedlings, one seedling/hill, wider spacing of 22.5 x 22.5 cm and conoweeder operation was adopted by many farmers. Combine Harvesters were used in a big way in this region. Some farmers used Transplanters also. In general, pest and disease pressure was low during the year. However, widespread occurrence of bacterial diseases viz., bacterial leaf blight and bacterial leaf streak was recorded in rice varieties ADT 38, BPT 5204, CR 1009 and ADT 46. False smut incidence was relatively low during this year. Unusual prevalence of yellow leaf mite was noticed in this region during rainy season. Low to medium incidence of leaf folder and stem borer was noticed both in *kharif* and *rabi* seasons.

Tamil Nadu-2: Production Oriented survey was conducted in 14 districts mostly bordering the western ghat regions of Tamil Nadu both during Kuruvai (Kharif) and Samba (Rabi) seasons. The rainfall and other weather factors were favorable for rice. High yielding varieties and hybrids were popular in all the districts. The State Department has popularized the SRI cultivation in all the districts surveyed. Approximately 5% area has been planted under SRI. In all the districts mechanization has been achieved to the tune of 50 percent (Transplanter, Combined harvester etc.). In two districts viz., Ramanathapuram and Sivagangai, the irrigation water has become saline (8.4 pH, EC14.2) (after effect of Tsunami) and it has affected about 1.5 lakh Hectares. In general, the plant hopper populations is in increasing trend especially in southern districts. There was an outbreak in BPH in RS Mangalam and Thiruvadana blocks of Ramanathapuram and Karaikudi block of Sivagangai districts which was observed mainly due to indiscriminate usage of synthetic pyrethroids like lambda cyhalothrin and due to sublethal dose of Dadece (combination of Buprofezin + Deltamethrin. Stem borer was found to be predominant in Kanyakumari district. The monsoon was near normal to excess in all the districts surveyed. As a result of good monsoon, farmers have raised the high yielding fine grain varieties like ADT 43, ADT 45, BPT 5204, ADT 36, ADT 39 and private varieties and hybrids resulting in wide spread incidence leaf blast in the early stages of crop growth, neck blast during Samba season. The occurrence of Tungro was once again confirmed in Thirunelveli, Thoothukudi and Kanyakumari districts. Bacterial blight and Brown spot were common in all the districts. These two diseases varied in intensity from district to district.

Tripura: Production Oriented Survey for the year 2011-12 was conducted at Matabari Agri. Sub-Division of District, Tripura South. The general climatic condition of the area during the cropping period was normal. During the survey, the crop was mostly at maturity stage. Maximum numbers of farmers are following System of Rice Intensification (SRI) method of paddy cultivation. As per survey the predominant high yielding variety for the 2nd Kharif season was found to be MTU-7029 (Swarna) and NDR-97. Farmers have adopted transplanting in line instead of random transplanting. Numbers of plant density was found to be 16 hills / m² in case of S.R.I. while in conventional method of paddy cultivation it varies from 30 to 36 hills/m². Availability of irrigation facility is the prime need of the farmers along with availability of inputs like fertilizer, bio-fertilizers, and bio-pesticides at proper time. The weed population was medium. Among weeds, *Cyperus rotandus*, *C. irria*,

Echinochloa crusgalli, *E. colonum* *C. globosus*, were found to be in majority. Farmers prefer manual weeding and use of weeder in case of S.R.I. Only few farmers applied chemical weedicides. Among insect pests infestation of stem borer and leaf folder was significant while among plant diseases incidence of sheath blight, blast and false smut disease were observed. Infestation of brown plant hopper was recorded in an alarming proportion in the concerned Agri. Sub Division as a new pest. On an average 2 (two) times plant protection chemicals were sprayed in a cropping season. In respect to pesticide application insecticides (namely, monocrotophos 36 %, triazophos 40%, chlorpyriphos 50% + cypermethrin 5%) were more popular. Few progressive farmers were found to prefer new insecticides like flubendiamide 39.35% SC, kresoxim methyl 44.3%SC etc. Among the fungicides carbendazim 50%, Saaf (carbendazim 12 % + mancozeb 63 %), propiconazole 25%EC, validamycin 3L were commonly used against rice diseases. No instance of mixing up of fungicides with insecticides / weedicides / fertilizers was recorded.

Uttar Pradesh-1: Production Oriented Survey of rice was undertaken in 8 districts of eastern Uttar Pradesh namely; Faizabad, Sultanpur, Ambedkar Nagar, Barabanki, Basti, Sant Kabir Nagar, Maharajganj and Gorakhpur from tillering to maturity stage of rice crop during WS 2011. This year average rainfall was 786.4 mm. In U.P. targeted area of rice was 59.00 lac hectares while 59.53 lac hectare were planted. Last year total planted area of rice was 57.53 lac hectare. Due to timely onset of the monsoon during kharif 2011 targeted area of rice could be easily achieved. In this year diseases like sheath blight, bacterial leaf blight and false smut, and insects including stem borer, hoppers, grass hoppers, gundhi bug and leaf folder were observed in surveyed districts in low to moderate intensity. The most popular varieties like BPT 5204 and MTU 7029 were infected with sheath blight, bacterial leaf blight while false smut in some hybrids. In some areas zinc and sulphur deficiency was also observed. The varieties NDR 359, Sarjoo-52, NDR 2064, NDR 97, Shusk Samrat, Shambha Mahsuri, Swarna and hybrids Arize 6444, NDRH-2, PHB 71, Gorakhnath-509, Gorakhnath-510, SAI-6698 were found very popular among the farmers of eastern U.P. In the certain pockets, short grain aromatic rices including Kalajeera, Shakkarchin, and Lalmati in Barabanki, Bengal Juhi, Kalanamak in St. Kabir Nagar, Maharajganj and Gorakhpur were also grown in limited area due to the preference and liking of these varieties by the farmers. Short duration local varieties viz. Saraiya and Sonkhar in St. Kabir Nagar, Ari and Lohtan in Barabanki, were also cultivated. Most of the farmers used DAP, NPK as basal dose during transplanting while urea in topdressing. Some progressive farmers used green manuring before transplanting. Use of rotavator in preparation of main field became popular among farming community. Poor availability of the farm laborers were also noticed during survey. Majority of the farmers are small in holding size and adopting mainly rice-wheat cropping system followed by rice-sugarcane, rice-mustard, rice-pulses and rice-vegetables. The major weeds were *Echinochloa crusgalli*, *E. colonum*, *Cyperus iria*, *C. rotundus*, *Cloeme viscosa*, *Eclipta alba* and *Fimbristylis dichotoma*. Use of combine harvester in the Maharajganj, Gorakhpur, St. Kabir Nagar, Basti and Ambedkarnagar districts is common.

Uttar Pradesh-2: This year production oriented survey of rice was conducted in eight district of Eastern Uttar Pradesh viz., Varanasi, Chandauli, Sonebhadra, Jaunpur, Ghazipur, Azamgarh, Mau, and Ballia. Most of the areas was under transplanted rice except in some of the areas of Sonebahdra districts were direct seeded rice were also in practiced. This year also climatic conditions in this region were very conducive for the rice. The predominant cropping system followed by farmers in the surveyed districts of eastern Uttar Pradesh was rice- wheat cropping system. The other cropping system was rice- pulses, rice- mustard, rice- sugarcane, rice- vegetables etc. The common varieties were Sarjoo-52, NDR-359, MTU 7029, BPT 5204

In some of the surveyed districts this year Swarna sub-1 varieties was also promoted but there was some hiccups in their adoption among the farmers about their yield and quality parameter. In this region the specific needs of the farmers were irrigation facility, timely availability of good quality seeds and fertilizers. The basic constraints in adopting new rice technology among farmers were small holdings and financial problems. Non availability of laboures during critical period of time of agricultural operation is also a basic constraint. Hand weeding was a common practice adopted in the region for removal of weed in rice nursery as well as in the main field. Only few progressive farmers use selective weedicides like Butachlor and 2,4-D for weed management. Commonly observed weeds in the fields were viz., *Echinochloa crusgalli*, *E. colomum*, *Cynodon dactylon*, *Cyeprus rotundus*, *C. irria*, *Commelena bengalensis*, *Ecilipta alba*. In this year due to good monsoon the disease and insect pressure was quiet low. Although disease like sheath blight, bacterial leaf blight, false smut and symptoms of brown spots and leaf blast or neck blast were quiet often observed at low to moderate intensity. Among insects, stem borer, leaf folder, gundhi bug were observed commonly in the surveyed field but their intensity was also quiet low. In some of the field at Institute farm and in some of the surveyed districts root galls were also observed at nursery stage showing stunted plant growth and yellowing of leaves.

Uttar Pradesh-3: Production oriented survey was conducted in 5 districts of this part of Uttar Pradesh when the crops were in tillering or stem elongation or maturity stage. Overall, the climatic conditions were normal for rice cultivation. The commonly grown varieties were HYVs like NDR-359, Sarjoo-52, NDR-97 and Pusa Basmati 1; hybrids like Nidhi-99 and PA 6444 and some local varieties like Pajpriya, Lalmati, Madhukar and Indrasan. Most common crop rotation was rice-wheat. Most of the farmers applied in the main fields, 40-60 kg N/ha, 40-50 kg P₂O₅/ha and about 30-40 kg K₂O/ha as basal and 10-30 kg N/ha as top dressing. Many farmers adopted direct sowing. Among the diseases, brown spot was wide spread in moderate to severe intensity in many places. Other diseases like blast, neck blast, sheath rot, sheath blight, false smut and bacterial blight were recorded in low to moderate intensities. Among different insect pests, stem borer, grass hoppers and rats were observed in low intensities.

West Bengal: In west bengal production oriented survey (pos) was conducted in 9 districts viz., Purba Medinpur, Hooghly, South 24-Parganas, North 24-Parganas, Malda, Dakshin Dinajpur, Uttar Dinajpur, Mushirabad and Nadia. The weather condition during the crop growth period was normal, though; excess rainfall, flood and drought were reported as major problem in some of the districts surveyed. The survey was conducted mainly during dough and maturity stages of the crop in most of the districts. The commonly grown varieties and hybrids were Afgan, Arize 6444, Barsha, BR 11, Chini, CR 1001, CR 1009, CR 1010, Dayal madina, Dhanraj, Dudeswar, Durga, Ganga, Geetanjali, Gobbindabhog, Gotra Bidham, Gotra selection, GS 1, GS 1, IET 4029, IET 4786, IET 5656, Jareva, Kalma, Kataribhog, Kshitish, Lal sankar, Lalat, MTU 1010, MTU7029, Nayanmoni, Niranjana, PAC 835 (hybrid), PAC 836, Pankaj, Parijat, Pataai 23, Pooja, Pratiksha, Purnima, Ranjan, Ranjana, Ranjit, Sabita ratnai, Samba mahsuri, Sarala, Satabdi, Sonamukhi, Swarna Dhan, Swarna manjari, Swarna Sub 1 (flood resistant), Swarna, Triguna and Tulaipanji. Most commonly practiced crop rotations were Rice óvegetables (tomato/cabbage/chilli) ó rice, aman rice- boro rice, rice ó potato/rice, vegetables (beans/ cabbage) ó rice- jute, rice- rice- rice, vegetable- rice-vegetable, aman rice-lentil-jute, aman rice-mustard-boro rice, aman rice ó yellow sarson-boro rice, rice- rai- boro rice/jute, rice ó mustard/lentil/onion- boro rice and rice ó peas/rai. The farmers used 35 ó 100% of their land for rice cultivation. Most of the famers applied organic and inorganic manures and used weedicide for reducing the weed infestation. Major

biotic stresses like blast, neck blast, brown spot, sheath blight, sheath rot, false smut and grain discoloration were recorded in low to high intensities. In some of the areas severe crop damage caused by sheath blight and browns pot was recorded. Common insect pest problems were stem borer, leaf folder, brown plant hopper, mite, green leaf hopper, whorl maggot, rice bug, cutworm and rats etc. Some of the common needs of the farmers were power tiller, availability of labor, irrigation facility, quality seeds, storage and drying facility.

Table 1: Scientists who had taken lead in implementing and conducting the Production Oriented Survey, Kharif 2011.

DRR HQrts, Hyderabad: Dr. G. S. Laha, Dr. D. Krishnaveni, Dr. M. Srinivas Prasad, Dr. D. Ladhakshmi and Dr. V. Prakasam

Sl. No.	States	Locations	Scientists
1	A&N Islands	Port Blair	Dr. Krishna Kumar
2	Andhra Pradesh	Rajendranagar Maruteru Ragolu	Dr. R. Jagadeeshwar Dr. S. Krishnamraju Dr. M. Rama Bhadra Raju
3	Bihar	Pusa	Dr. (Mrs.) Bimla Rai
4	Chhattishgarh	Jagadapur	Mr. Rajaram Bhanwar
5	Gujarat	Nawagam	D. K. S. Prajapati
6	Haryana	Kaul	Dr. Ram Singh
7	Himachal Pradesh	Malan	Dr. Sachin Upmanyu
8	Jammu & Kashmir	Khudwani Chatha	Dr. M. Ashraf Ahangar Dr. Anil Gupta
9	Jharkhand	Ranchi	Dr. M. K. Barnwal
10	Karnataka	Mugad	Dr. S V Hiremath
11	Kerala	Pattambi	Dr. P.Raji
12	Madhya Pradesh	Rewa	Dr. S. K. Tripathi
13	Maharashtra	Karjat	Dr. V. S. Pande
14	Puducherry	Kurumbapet Karaikal	Dr. R. Ragavan /Dr. M. A. Savary Dr. C. Rattinasababady
15	Punjab	Ludhiana	Dr. Jagjeet Singh Lore
16	Tamil Nadu-1	Aduthurai	Dr. A. Karthikeyan
	Tamil Nadu-2	Coimbatore	Dr. R. Rabindran
17	Tripura	Arundhatinagar	JDA, Research
18	Uttar Pradesh	Faizabad Varanasi Ghagraghat	Dr. Vindeswari Prasad Dr. R. K. Singh Sh. A. L. Upadhyay
19	West Bengal	Chinsurah	Dr. D. K. Naik

Table 2: Production oriented survey, 2011-2012: Name of the state, district survey period and survey personnel.

State/ Region	District surveyed	Survey period	Survey Personnel
Andamans and Nicobar islands	<i>North and Middle Andamans and Nicobar</i>	Nov 3-4, 9, 14, 2011	CARI, Port Blair Dr. Krishna Kumar, Plant Pathologist Dr. Ajanta Birah, Entomologist Dr. P. K. Singh, Plant Breeder Mr. Sanjay Kumar Pandey, SMS, KVK, Nicobar Islands
Andhra Pradesh-1	<i>Ranga Reddy, Mahbubnagar, Nalgonda, Karimnagar, Khammam and Warangal</i>	Oct to Dec 2011	Agricultural Research Station, Rajandranagar Dr. R. Jagadeeshwar, Senior Scientist (Pl. Path) Dr. N. Rama Gopala Varma, Scientist (Ento) Dr. Ch. Surendar Raju, Senior Scientist (G & PB) Dr. T. Srinivas, Coordinator & Head DAATTC, Ranga Reddy Sri. N. Mohan Reddy, ADA, Rajendranagar Sri. B. Krishanaiah, ADA, Pargi Sri. S. Bikksham, ADA, Chevella Smt. P. V Padma, MAO, Chevella Sri. Chandra sheker Reddy, ADA, Gadwal Sri. John Sudhakar, ADA, Kodangal Sri. Rampahal, MAO, Kodanagal A. Os of, Atmakur Sri. Sreedhar Reddy, ADA Miryalaguda MAO, Huzurabad ADA, Jagtial MAO, Jagtial J. Tirupati, Agricultural officer, Gollapally Ch. Ramchandra, Agricultural officer, Medipally P. Ram Mohan, Agricultural officer, Dhramapuri B. Gopal Reddy, Agricultural officer, Jammikunta Thirupati, AEO, Jammikunta Dr. J. Hemanth Kumar, Coordi. & Head, DAATTC, Khammam Sri. N. B. K. Chaudhari, ADA, Khammam, (Rural) Concerned farmers of the villages Sri. S. Ravi Kumar, MAO, Maripeda Sri. M. Yadagiri, MAO, Narsampet Smt. Krishaveni, MAO, Chennaraopet Kum. K. Shreya, MAO, Mulug Sri. Ganesh, MAO, Bhumapally Concerned farmers of the villages
Andhra Pradesh -2	<i>East Godavari and West Godavari</i>	June to Dec. 2011	AP Rice Research Institute and RARS, Maruteru Dr. S. Krishnam Raju, Sr. Scientist, Pl. Pathology Dr. T. V. P. Rajendra Prasad, Sr. Scientist, Agronomy Dr. Ch. V. Narasimha Rao, Sr. Scientist, Entomology Dr. N. Mallikharjuna Rao, Scientist, Entomology Dr. B. N. V. S. R. Ravi Kumar, Scientist, Plant Breeding Dr. V. Bhuvaneshwari, Scientist, Plant Pathology
Andhra Pradesh -3	<i>Srikakulam, Vizianagaram, Visakhapatnam</i>	Sep-Nov 2011	Agricultural Research Station, Ragolu Dr. M. Rama Bhadra Raju, Scientist (Plant Pathology) Dr. K. V. Ramana Murthy Sr. Scientist (Agronomy) Dr. V. Visalakshmi, Scientist (Entomology) Dr. J. Dayal Prasad Babu, Scientist (Plant Breeding) Dr. P. Rama Rao, Coordinator, DAATTC, Visakhapatnam Dr. D. Chinnam Naidu, Coordinator, DAATTC, Srikakulam Dr. P. Guru Murthy, Coordinator, DAATTC, Vizianagaram Dr. M. Srinivasa Rao, Scientist (Agro.), DAATTC, Visakhapatnam Dr. P. Venkata Rao, Scientist (Ag. Extn.), DAATTC, Vizianagaram

Production Oriented Survey - 2011

State/ Region	District surveyed	Survey period	Survey Personnel
Bihar	<i>Samastipur, Muzaffarpur, East champan, west champan,</i>	Sep-Nov 2011	RAU, Pusa Dr Bimala Rai, Plant Pathologist Dr N K Singh, Pl. Breeder Dr. Rajesh Kumar, Rice Breeder Dr A K Mishra, Entomologist Dr. S. K. Chaudhury, Agronomist Dr. Rajesh Raujan, Plant pathology
Chhattishgarh	<i>Bastar, Dantewada, Narayanpur Bijapur,</i>	20.10.2011- 15.11.2011	SG College of Agriculture and Research Station, Jagdalpur (IGAU) , Chhattishgarh Dr.Raja Ram Banwar, Scientist, Plant Pathology Dr.Avinash Gupta Scientist Entomology
Gujarat	<i>Ahmedabad, Anand, Dang, Gandhinagar, Kheda, Mehsana, Navsari, Panchmahals, Sabarkantha, Surat, Tapi, Vadodara and Valsad</i>	Oct-Dec 2011	Main Rice Research Station, AAU, Nawagam Dr. K. S. Prajapati, Research Sci (Pathology) Dr. N. P. Chauhan, Asso. Res. Sci. (Agronomy) Dr. M. G. Makwana (Asso. Res. Sci. (Pl. Breeding) Prof. J. F. Dodia (Asstt. Res. Sci. (Entomology) Prof. R. C. Patel, Asst. Res. Sci. (Pl. Pathology) Dr. M. R. Saiyad. Pl. Breeding Dr. V. J. Patel (Asso. Res. Sci (Entomology)
Haryana	<i>Kaithal, Kurukshetra, Karnal, Jind, Ambala, Yamunanagar, Panipat, Sonapat, Fatehabad and Sirsa.</i>	August 19, 20, 24, 25; September 18, 19; October 4, 5, 10, 20, 25; 2011	CCS HAU, Rice Research Station, Kaul Dr. Ram Singh, Sr. Scientist, Plant Pathology Dr. Lakhi Ram, Sr. Entomologist Dr. Mangat Ram, Sr. Agronomist
Himachal Pradesh	<i>Kangra, Mandi, Una and Sirmour.</i>	08/09/11, 09/09/11, 26-28/09/11, 12-14/10/11	Rice and Wheat Research Centre, CSKHPKV, Malan Dr. Sachin Upmanyu, Asstt. Pathologist Dr. Ajai Srivastava, Sr. Entomologist Dr. Dharendra Singh, Plant Breeder Dr. S. K. Rana, Sr. Pathologist
Jammu & Kashmir-1	<i>Pulwana, Anantnag , Bandipora, Baramulla, Shopian and Kulgam</i>	23-29 Oct. 2011	Mountain Research Centre for field crops, Khudwani Dr. G. M. Mushki, Soil science Dr. M. Ashraf Ahangar, Pl. Pathology Dr. Ab. Rouf, Entomology Dr. M. A. Bhatt, Agronomy
Jammu & Kashmir-2	<i>Poonch, Rajouri, Jammu and Samba</i>	Oct-2011	SKUAST, Chatha Jammu, Dr. Anil Gupta, Asso. Prof. (Plant Pathology) Dr. Satish Sudan, Asso. Prof. (Plant Breeding) Dr. Gurdev Chand, Asst. Prof. (Pl. Physiology), Dr. Anil Kumar, Asst. Prof (Soil), DLRSS, SKUAST Dr. Parveen Singh, Asst. Prof (PBG) Dr. Amit K. Singh, Asst. prof. (Ento) Sh. Jitender Sharma, Chief agricultural officers, DOA, Poonch
Jharkhand	<i>Ranchi, Khunti, East Singhbhum and Saraikela Kharsawan</i>	October to November, 2011	Birsa Agricultural University, Ranchi Dr M. K. Barnwal, Jr. Scientist-cum-Asstt. Prof. (Rice Pathology) Dr D. N. Singh, Chief Scientist-cum-Univ. Prof. (Rice Breeder) Dr K. Prasad, Junior Scientist-cum-Asstt. Prof. (Rice Breeder) Dr Rabindra Pd., Sr. Scientist-cum-Assoc. Prof. (Rice Entomology) Sri Birendra Kr., Junior Scientist-cum-Asstt. Prof. (Agronomy)

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State/ Region	District surveyed	Survey period	Survey Personnel
			Sri Pradeep Pd., Junior Scientist- cum -Asstt. Prof. (Agronomy) Sri Binod Kr., Technical Officer, (Agromet Advisory Services)
Karnataka	<i>Dharwad, Belgaum, Haveri and Uttar Kannada</i>	-	A.R.S, Mugad-580 007, Dharwad, Karnataka Dr.S V Hiremath, Associate Professor, Plant Pathology
Kerala	<i>Palakkad Malappuram Thrissur</i>	Oct.13-14,18-21, 24; Nov. 3 Dec. 19, 27, 29-31, 2011 Jan 2, 9, 2012	Dr. I.Johnkutty , Asso. Director of Research, Dr. P.Raji, Assoc. Professor (Plant Pathology) Dr. Sumiya K.V, Asstt. Professor (Plant Pathology) Dr. Karthikeyan.K, Assoc. Professor (Entomology), Dr. Beena.R, Asstt. Professor (Plant Physiology) Dr. Veena Vighneswaran, Asstt. Prof. (Pl. breeding & Genetics) Dr. P. Sindhumole, Asstt. Professor (Pl.breeding & Genetics) Dr. Deepa Thomas, Asstt. Professor (Agronomy) Sri. Johny K. Varghese, Technical Officer Sri. Abdussaboor, Technical Officer Ms. Divya P, Senior Research Fellow Ms. Vidhya K, Senior Research Fellow Ms. Sandhya O.P, Senior Research Fellow Ms Sreepriya T.P, Research Associate Ms Smitha S G (RA,Entomology), Ms Ajish P G (SRF Entomology), Ms Sindhu G (SRF, Entomology) Ms. Vimala, Junior Research Fellow Sri. Praveen Kumar V.P., Project Fellow Ms. Sheena V, Skilled Assistant; Mrs. Dhanya, Skilled Assistant; Ms. Krishna Priya N.P., Skilled Assistant, Ms. Renu Harinarayanan, Skilled Assistant; Ms. Nafeeda P.K, Skilled Assistant; Ms. Sowmya M.V, Skilled Assistant; Ms. Remya C, Skilled Assistant Sri. M. Muhammed Shaji, Lab Assistant
Madhya Pradesh	<i>Rewa, Satna, Sidhi, Shahdol, Panna, Katni, Anoopur and Umari</i>	-	JNKVV College of Agriculture Rewa Dr. S. K. Rao Dean Dr.S.K. Tripathi Prin. Scientist, PI-AICRIP & POS Coordinator Dr. C. M. Mishra Principal Scientist (Agronomy) Dr. M. R. Dhingra (Entomologist) Dr. I. M. Khan Plant Physiologist Dr. S. N .Shrivastava Professor Dr. M. A. Alam Entomologist Dr S, K. Pandey Professor Dr. Namdev Hadau DDA Rewa Shri Rajeev Nigam ASCO Amarpatan Shri P.D. Dwivedi ADO Ram Nagar Shri U. K. Bagri ADA Rewa Shri M. S.Baghel PC KVK Shahdol Shri Narendra Dwivedi Agric Engineer Shahadol Nitin Singhai SMS KVKShahdol Dr Ajay Khare SMS KVK Panna Dr K S Baghel SMS KVK Rewa Shri Subhash Shrivastava SADO Satna Shri Mahendra Singh PC KVK Sidhi Shri Akhilesh Patel KVK Sidhi Shri K K Pandey ADA Sidhi Shri C. K. Mishra SDO Satna Shri S. K. Singh Chauhan SMS Satna Dr M S Baghel PC KVK Shahdol

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State/ Region	District surveyed	Survey period	Survey Personnel
			Dr Brajesh Tiwari SMS KVK Umaria
Maharashtra	<i>Thane, Raigad, Ratnagiri and Sindhudurga</i>	8/11/2011 to 10/11/ 2011, 2/11/2011 to 6/11/211	RARS, Karjat, Raigad (Dr. B.S. Konkani Krishi Vidyapeeth) Dr. V.S. Pande, Plant Pathologist Dr. A.S. Patil, Entomologist Shri. V.M. Jadhav, SMS, Agronomy Dr. R.L. Kunkerkar, Rice breeder
Puducherry-1	<i>Puducherry Yanam and Mahe</i>	13 th -15 th December 2011, 12 th and 13 th October 2011	P. K. Krishi Vigyan Kendra, Kurmbapet, Puducherry Thiru A. Ramamouarti, Principal, KVK, Kurumbapet Dr. Mohan A. Savery, Rice Breeder Mr. J. Krishna Kumar, Jr. Entomologist Dr. R. Ragavan, Jr. plant Pathologist Mr. S.Ravi Jr. Agronomist
Puducherry-2	<i>Karaikal</i>	Aug 2010 to December 2011	Pandit Jawaharlal Nehru College of Agriculture & Research Institute, Karaikal 609 603 Dr. C. Rettinassababady, Plant Pathology Dr. V. Krishnan, Plant breeding Dr. A.L. Narayanan, Agronomy Dr. M. Kandibane, Agr. Entomology
Punjab	<i>Barnala, Bathinda, Faridkot, Faridkot, Fatehgarh Sahib, Ferozepur, Hoshiarpur, Jalandhar, Ludhiana, Mansa, Moga, Muktsar, Nawan Shahr, Patiala, Ropar, Sangrur and SBS Nagar</i>	-	Punjab Agricultural University, Ludhiana Dr. G.S. Mangat, Sr. Rice Breeder, Dr. Jagjeet Singh Lore, Plant Pathologist, Dr. Gulshan Mahajan, Agronomist, Dr. P.S. Sarao, Entomologist, Dr. Harminder Kaur Asst. Entomologist and Dr. Rupinder Kaur, Asst. Plant Breeder
Tamil Nadu-1	<i>Thanjavur, Tiruvarur, Nagappattinam, Tiruchirappalli, Pudukkottai, Cuddalore, Perambalur and Vilupuram</i>	Dec 2011	Tamil Nadu Rice Research Institute, Aduthurai Dr. A. Karthikeyan, Professor (Plant Pathology) Dr. D. Sassi kumar, Asst. Professor (Plant Breeding) Dr. V. Ravi, Professor (Agronomy) Dr. G.V. Ramasubramanian, Professor (Entomology)
Tamil Nadu-2	<i>Coimbatore, Erode, Krishnagiri, Kanyakumari, Madurai, Namakkal, Ramanathapuram, Sivagangai, Theni, Tirunelveli, Thiruvananthapuram, Thoothukudi, Vellore and Virudhunagar</i>		Tamil Nadu Agricultural University, Coimbatore-641 003 Dr. S. Robin, Professor and Head Dr. R. Rabindran, Professor (Plant Pathology) Dr. S. Suresh, Professor (Agr. Entomology) Dr. S. Manonmani, Associate Professor (PB&G) Dr. S. Rajeswari, Associate Professor (PB&G) Dr. P. Jeyaprakash, Associate Professor (PB&G) Dr. V. Ravichandran, Assistant Professor (Crop Physiology) Dr. S. Radhamani, Assistant Professor (Agronomy)
Tripura	<i>South Tripura</i>	-	State Agricultural Research Station, Arundhatinagar, Tripura Joint Director of Agriculture (Research) Sri B. I. Majumder, Senior Agronomist, SARS

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State/ Region	District surveyed	Survey period	Survey Personnel
Uttar Pradesh - 1	<i>Faizabad, Sultanpur, Ambedkar Nagar, Barabanki, Basti, Sant Kabir Nagar, Maharajganj and Gorakhpur</i>	Aug-oct. 2011	Crop Research Station, Masodha (NDUAT), Faizabad (U.P.) Dr. J. L. Dwivedi, Professor/Sr. Rice Breeder and Officer Incharge Dr. V. Prasad, Junior Pathologist Sri D.P. Singh, Asstt. Prof. Plant Pathology Sri A.W. Khan, Jr. Research Assoc. Dr. R.B. Singh, Entomologist Dr. S.P. Giri, Assoc. Prof., Plant Breeding Dr. Saurabh Dixit, Jr. Rice Breeder Dr. R.M. Tripathi, SRA Sri Alok Pandey, Technical Asstt.
Uttar Pradesh ó 2	<i>Ghazipur, Azamgarh, Varanasi, Jaunpur, Sonebhadra, Chandauli, Mau, Ballia</i>	Oct-Nov 2011	Institute of agricultural sciences.BHU, Varanasi, UP Dr. R.K. Singh, Plant Pathologist, BHU Dr. M.K. Singh, Agronomist, BHU Dr. Ram Keval, Entomologist, BHU Dr. R.K. Singh SMS Agronomy, KVK, Azamgarh Dr. Dharmendra Singh, SMS, soil science, KVK, Ghazipur Dr. R.P. Singh SMS, Pl. Protection, KVK, Ghazipur. Dr. Satyavrat Dwivedi, Horticulture, KVK, Sonebhadra Dr. Ajeet Vats SMS Plant. Protec. KVK, Sonebhadra Dr. N.K. Singh SMS Plant Protection KVK, Mau Dr. S.K.Singh SMS Animal Husbandry KVK, Ballia
Uttar Pradesh ó 3	<i>Balrampur, Bahraich, Gonda, saravasti</i>	Oct-Dec. 2011	Crop Research Station, Ghagrahat, Baharaich, UP Sh. A. L. Upadhyay, Plant pathology Dr. P. K. Gupta, Entomology Sh. S. B. Singh, Agronomy
West Bengal - 1 (Chinsurah)	<i>Utter Dinajpur, Purba Medinipur, South 24- Paraganas, North 24-Paraganas, Murshidahad, Malda & Nadia, Dakshin Dinajpur, Hooghly</i>	Nov-Dec 2011	Rice Research Station, Chinsurah, West Bengal Dr. Dipak K. Nayak, Plant Pathologist Dr. Shantanu S Aich, Plant Breeder Mr. Uttam Roy Chowshury Asst. Plant pathologist Dr. Indrani dana, (Team Leader) Asstt. Botanist, RRS, Chinsurah Dr. Dilip Patra, Asstt. Plant Pathologist, RRS, Chinsurah Dr. Rajib Das, Asstt. Botanist, RRS, Chinsurah Dr. Sitesh Chatterjee, Asstt. Endomologist, RRS, Chinsurah Dr. Anita Aich, Asstt. Botanist, RRS, Chinsurah Dr. Tamal Kanti Jana, Jr. Soil Scientist Mr. Madhab Chandra Dhara, agronomist, RRS, Chinsurah, Mr. Uttam Roy Choudhary, Asstt. Pl Path, SARI, Tollygunj. Mr. Sakti Pada mangal, Asstt. DA. (Farm), Raigunj. Mr. Rajib nandy, assstt. D. A (Seed Certification), Raigunj. Dr. Samimul Islam, Entomology Dr. Chirashree Gangopadhyay, Entomology Mr. Utpal Mandal, asstt. Director of Agri. (Admin.), Balurghat. Mr. Anirban Lahari, Asstt. Director of Agri. (S.M), Balurghat Mr. Diju Chaki (KPS), Balurghat Mr. B.S. Das, (KPS), Balurghat Mr. Anup Kumar Samanta, Asstt. Director Agri. Kusuned Mr. Pulak kumar Dey, Asstt. Director Agri. Basuihari Dr. Pinaki Banyopadyay, Plant pathology Dr. Kinkar Saha, Entomolgy Mr. Susanta Mandal, asstt. D.A. (Block)

State/ Region	District surveyed	Survey period	Survey Personnel
			Dr. Santhosh Kumar Roy, Entomologist Mr. Malay Kumar Bhowmick, Asstt. Agronomist Dr. Saroj Singha, Botany Mr. Subhas Satiar, K.P.S, SARF, Malda Mr. Subarta Das, research Officer, SARI, Tollygunj Dr. T. K. Jana, Jr. soil Scientist, RRS, Chinsurah Dr. Chand Kumar santra, Asstt. Botanist, RRS, Chinsurah Dr. Raghunath Mondal, Plant pathology Mr. Parsh Chandra Bera, Asstt. Director, Agri(Admin.) Mr. Subhankar Choudhury, Asstt. D.A (Block) Mr. Biplab Kr. Das, K.P.S

Table 3: Most prevalent rice varieties cultivated in the surveyed districts of India during 2011

State	Predominant rice varieties
Andaman and Nicobar Islands	HYVs: Jagannath, Jaya, Bhawani, Khusboo, Black Burma, Swarna, CSR-23, CSR-36, CARI Dhan 5, Ranjeet, Gayatri, JGL, C-14-8, CARI Dhan, Silver, Topu Jaya, Swarna Jaya Local: Pankher, Gol Dhan; Hybrids: US-312; Local: Triguni
Andhra Pradesh-1	HYVs: NLR-3041, Tellahamsa, MTU-1010, IR-64, HMT Sona, JGL3855, JGL1798, WGL32100, WGL347, RNR2458, RNR 2465, RNR2354, Motigold, JGL384, Tellahamsa, BPT-5204, NLR34449, JGL11118, JGL11727, NLR34449, MTU1061 RSR-22, JGL3844, Sampada and MTU-1001; Hybrids: Harsha Hybrid, Kaveri909 and Loknath
Andhra Pradesh-2	HYVs: MTU-7029, MTU-1010, MTU-3626, PLA-1100, BPT-5204, MTU-1061, MTU-1064, PLA-1100, MTU-1001, IR-64 and MTU-1075
Andhra Pradesh-3	HYVs: MTU 1001, Swarna (MTU 7029), Samba mashuri (BPT 5204), Sona mashuri (BPT 3291), Srikakulam Sannalu (RGL 2537), Vasundhara (RGL 2538), Cotton dora sannalu (MTU 1010), NLR 34449, Pushyami (MTU 1075), Indra (MTU 1061), Jagityala Sannalu (JGL 1798), Jaya, super Jaya, Pooja, Sabasta, NLR 3041 and Ravi; Hybrids: KRH 2
Bihar	Improved: Prabhat, Rajendra Sweta, Rajendra Bhagwati, Rajshree, BPT 5204, MTU-1001, MTU-1010, Gautam, Swarna Sub-1, Nata Mahsuri, Sita, Rajendra Subhasini, Pusa Basmati 1, Pankaj, Saroj, Dhanlaxmi, Subhash, Rajshree, Jaya, Sarju 52, Resma, Rajendra Kasturi, Kishori, Kasturi, Sudha CSR 36 and Sona Mahsuri; Hybrid: Arize-6444, Goldi, RH 10, Arize 6444 and JK hybrids
Chhattishgarh	Improved: MTU 1010, MTU 1001, IR 64, Swarna, HMT and Poornima; Hybrids: PA 6444, PA 6144 and KRH-2; Local: Limchudi, Gadaguta, Satka, Asamchudi, Safari, Masuri, Bhatamkodo, Bhatacotia, Huldigutti, Lалуha, Lalhar, Sambalpuri, Gurmutia, Sindhur, Shrinagar, Tendu, Mudi, Mehardhan, Para, Chitari, Daverdhan and Loctimajhi; Scented: Badsahbhag, Dubraj and Javaful
Gujarat	HYVs: Gurjari, Nath poha, GR-103, Rashi Ananam, Sonam, Moti Gold, GR-11, GR-4, Rupalee, GAR-13, Swarna, Sathi, Poonam Rasi, Surya Moti, Sugam, Surekha, Krishna Kamod, Masuri, GR-101, Roja-342, Dandi, IR-28, Pankhali-203, TN-1, Jaya, GR-7, NAUR-1, Sita, Nawabi colam, Sonali and Surya Moti; Hybrids: Arize-6444, US-312, Arize-786, US-178, PA-6201, 786, Suruchi, Gorakhnath-509, Arize-786, Nirmal Hybrid-617,

	Komal Hybrid, Arize-786, 2525, 801 and Arize Tej
Haryana	HYVs: PR 113, PR 114, PR 118, PR 120, PAU 201, PB-4, Var. 220, Pusa 44, HKR 47, PB-1, HKR 127, PAU 201 and Dhanlaxmi; Hybrids: Hybrid 4042, Arize 6444, Hybrid 721, Hybrid 232, Hyb. Royal Bhog (Pepsi), Arize 6129, PHB 6444, Hybrid Super Kalpana, Hybrid 3325, Hybrid Sudha, Hybrid 2355, Marble 999, Anmol Paddy Cure, Arize 6129, Hybrid Swift, Modi 1101, Marble 90 and Hybrid Bisham; Scented: PB-1, PB-4, CSR 30, , Improved PB-1 and Taraori Basmati; Local: Sabnam and Sarbati
Himachal Pradesh	Improved: HPR 2143, HPR 1068, HPR 1156, RP 2421, PR-106, PR-108, PR 112, PR-113, PR-114, PR-116, Naggar Dhan, China 988, Norin 18, Sabarmati, Nagrota purple, T-23, Jaya, Palam Dhan 957, Himalaya-799, HKR 126, Pusa Basmati -1, Himalaya 741, Himalaya 2216, Sharbati and Hasansarai; Hybrids: Arize 6129, PAC 807, PA 6129, PAC 807, US 312, PA 6444, US 315 Hybrid- 47, RH 257, RH 748 and Hybrid 832; Scented: Lal Quila, Taraori basmati, Pusa 1121, Pakistani Basmati, and Pusa Sugandh-5, Pakistani Basmati, Kasturi; Locals: Achhoo, Zheeni, Jeeri, Ram Jawain, Cheenu, Tapta, Kali Jheeni, Jheeni and Begmi
Jammu and Kashmir-1	Improved: Jhelum, China 1007, China 1039, China-9988, SR-1, SR-2, IC-39, K 448 and K-39
Jammu and Kashmir-2	Improved: K 39, K 343, 332 and 448, Sharbati, Poonam, Ratna, China and Giza 14; Hybrids: Hybrids ó 6444 and PHB-71 Scented: Basmati local Basmati 370, Pusa-1121, CSR30 and Ranbir Basmati
Jharkhand	HYVs - Swarna, MTU 1001, IR-64, Lalat, MTU 1010, BVD 110, Naveen, Birsa Vikas Dhan-110, Birsamati and IR-36, Rajshree, Sita and Jaya; Hybrids- PA 6444, PHB-71, 25P25, US 312, US 316, PAC-801, Front line RH-257, Suruchi-5629, Dhania, Arize Tej, K 5152, K 3325, 25P25, Champion and KRH 2; Local/unreleased- Kalamdani, Karhaini and Kalajeera, Dhoosari, Laldhan Balagora, Arababa, Pundibaba, Jhatisal, chandrakanta, Lakhansal, Diptisal, Balibhojna, Malti, Koya, Malot, Supasal, Dhoosari, Lakhansal, Kakri, Kalamkhari, Gayawali, Asanloa, and Sitasal
Karnataka	HYVs: Intan, Abhilash, SIRI-1253, Dodiga, Doddabhatta, Jaya, MTU1001, MGD-101, Mugad Sugandha, Hybrids: Private Hybrids; Locals: Dodiga, Navali, Kagisali. Belgaum Basmati, Alur sanna, Padmarekha and Adnen kelte
Kerala	HYVs- Jyothi, Uma,, Kanchana, Aiswarya, Ponmani, Jaya, Neeraja, Aathira, ASD and Matta Triveni; Locals: Sujatha, Sulochana, PC1, Kодиyan and Chitteni
Madhya Pradesh	HYVs: BS158, BS6129, Sonali, Reshma, Basanti, Sita, Samrat, BH-21, Poonam, Khusboo, Jagtial sanali , MR219 Shabnam, MTU 1010, JR-75 , Pusa Sugandha 5, JR201, Govinda, IR-36, IR-50, Vandana, Champion, Subeej Sugandha, Dhanteswari, IR 64, Madhuri, Pusa Sugandha 3, Kapoorshah, Rasi, NH5, NH96 and China Rice; Hybrids: JRH 4, JRH 5, PAC 801, Loknath, Goraknath, PRH10, Pro-Agro 6201, US312, Ganga Kaveri, US316, US-10 777, 786, PAC-832, PAC-807, Arize Tej, Suruchi, PA6111 and PA 6444; Locals: Biranj, Lohandi Bhejari, Jiledar, Mansooriya, Nanhi, Samasar, Dehula, Newari, Azan, Badalphool, Jalkeshar, Baksha, Bhadaili, Bohita, Badalphool, Dubraj, Rambhog, Sonachoor, Lonagi, Geeta, Nokhi, Lochai, Bhantaphool, Sonkharchi, Dilbaksha, Karanphool, Jiledar, Pardeshi, Gulab Champa and Yashoda Bhog

Maharashtra	HYVs: IR 64, G 17, Swarna, Karjat-2, KJT-3, , Karjat-4, Karjat-5, Karjat-6, KJT-7, MTU-1010, KJT-184, Jaya, Panvel-1, Ratnagiri-24, Palghar-1, Palghar-2, Panvel-3, G-4, Rupali, HMT Sona, Neelam, Samba Mahsuri, Mahsuri, Komal, Jaishri Ram, Ratna, Pusa Basmati 1, Punam, Rupali, Gujarat-17, Ratnagiri-5, Sairam, Sonam, Meghraj, Mohini, Ankur Sonam, PKV Shriram, Minakshi, RPR-14, and G-11; Hybrids: Sahyadri, Sahyadri-2, Sahyadri-3, Sahyadri 4, Komal, PA-6444 and Ankur-46; Local: Kalamb, EK-70, Patni, Mhadi , Valai, Bela, Kothimbira, Shahapur Local, Wada Kolam, Mokhada Zinni and Surti Kolam
Puducherry-1	HYVs: CR 1009, I.White Ponni, PY-7, TRY-1, ADT-39, ASD-18, ASD 19, ADT 43, ADT 45, TRY-2, BPT 5204 Swarna (MTU-7029), Samba Mahsuri (BPT 5204), Cotton dora Sannalu (MTU-1010), Vijetha (MTU 1001), Bondalu (MTU 3626), Uma (MO-16), Thampuran Kaima, Rangoon Kaima, Jothi and Athira
Puducherry-2	HYVs: TKM 9, ADT 37, ADT 43, Improved White Ponni, ADT 38, ADT 39, SAVITRI, BPT 5204, CO46 and KKL(R) 1, Savitri, BPT 5204 and ADT 38
Punjab	HYVs: Pusa 44, PR 118, PR114, PR 116, Pusa 1121, HKR 47, HKR111, HKR 127, Pusa Basmati 1, Pusa 50 and IR 8
Tamil Nadu-1	HYVs: ADT 36, ADT 37, ADT 38, ADT 39, ADT 43, ADT 44, ADT (R) 45, ADT (R) 46, IR 50, Trichy 1, Trichy 2, CR 1009, CO 43, BPT 5204 and White Ponni
Tamil Nadu-2	HYVs: ADT 45, ADT36, ADT38, ADT39, ASD16, IR20, ANNA (R) 4, Improved White Ponni, CO(R) 49, BPT3322, CO50, ASD 16, CR 1009, TPS 3, Indirani, IPL20, RASI Laxmi, BPT 5204, Paiyur1, Sundra Ponni, Sonal, Komal and ADT47 ; Hybrids: Goraknath 509, Loknath 505, Suruchi Hybrid, CORH 3, Loknath 505 and US 312
Tripura	MTU-7029 (Swarna).and NDR-97
Uttar Pradesh-1	HYVs: NDR-97, Narendra Lalmati, Prithvi, Nagma, Mahi Challenger, Goldi, Moti, Sarjoo 52, Sindur, Samba Mahsuri, Swarna, NDR 359, Jallahri, Jalpriya, BPT 5204, Dankal, Sai 6698, Narendra Usar Dhan-3 and Pusa Basmati; Hybrids: Arize 6444, Gorakhnath 510, J.K. 401, US 412, PHB 71, NDRH-2 and Gorakhnath 509; Locals: Shusk Samarat, Lalmati Lohtan, Shakkarchini, Kalajeera, Ari, Kalanamak, Baranideep, Sonkhar and Sarya
Uttar Pradesh-2	HYVs: Sarjoo-52, Pant Dhan 10, NDR-97, NDR-359, BPT-5204, MTU-7029, HUBR 2-1, Type-3. Pant-12, Pusa Basmati, Komal, Moti, Juhi Bengal, Jalpriya, Jalnidhi, Narendra Usar dhan3, Sonam, Badshah bhog, Jaisurya . Kalanamak and Rupali; Hybrids: PHB-71, JK hybrid, PRH-10, Arize-6444, Hybrid-312 and Ganga Kauveri
Utt ar Pradesh-3	HYVs: Samba Mahsuri and NDR 359, Pusa Basmati 1 and Sarjoo-52; Hybrids: PA 6444, Nidhi-99 and PHB 71; Local: Pajpriya, Lalmati, Kalanamak, Madhukar and Indrasan
West Bengal	HYVs: Swarna, Nilanjana, Pratiksha, Lal Sankar, Sarala, Durga, Barsha, IET 5656, , Sabita Ratnai, CR 1001, Pankaj, Satabdi, Pooja, Ranjit, Jareva, CR 1009, Geetanjali, Pratiksha, Samba Mahsuri, GS 1, Lalat, Purnima, Swarna Manjari, Iet 4786, Kshitish, Gotra Selection, Nayanmoni, Swarna Sub 1 (Flood Resistant) and MTU 1010; Hybrids: Arize 6444, PAC 835 and PAC 836; Local: Pataai 23, Tulaipanji, Kataribhog, Chini, Gobbindabhog, Dayal Madina, Dudeswar and Kalma

Table 4: Biotic constraints (Diseases) in different states in India during 2011

State	Diseases															
	LBI	NBI	BS	ShBI	ShR	FS	GD	LS	StR	NBLS	BK	UDB	KH	BLB	BLS	RTD
A & N Islands		S					M-S									
Andhra Pradesh-1	L	L-M	L	L	L	L	L			L				L		
Andhra Pradesh-2				M	L			L	L					L		
Andhra Pradesh-3	L	L-M		M-S	L-M	L	L							L		
Bihar			M-S	L-M	M	M	L-M							L-M		
Chhattisgarh	M-S	M-S	M-S	L-M		L-M								L-M		
Gujarat	L				L-M	L	L-M							L-M		
Haryana	L-S	L	L-M	M-S		L-M	L		L	L-M	L-S		M	S		
Himachal Pradesh	L-M	L-M	L-M	L-M	L-M	M	L	L-M		L-M				L-M		
J & K-1	T-M	T-L					L									
J & K-2	L-M		L-M	L	L	L-M	L							L-M		
Jharkhand	M-S		M-S	L-M	L-M	M-S	M-S							L-M		
Karnataka	M	M		M	M	T						T				
Kerala	L-M		M	L-M	L-M	L-S								L-S		
Madhya Pradesh	M		M	T		T-M	M						L-M	T		
Maharashtra	L-M	L		L		L								L-S		
Puducherry-1	L			M	L-M			L						L-M		L
Puducherry-2	L-M		L-M	L-M	L-M	L-M	L-M							M		
Punjab		L-M	L-M	L-M	L-M	L-M	L-M				M			L-M		
Tamil Nadu-1	L-M	L-M	L-M		L-M	L								L-M	L-M	L-M
Tamil Nadu-2	M	L-M	M	M										L-S		
Tripura	M			M		M								L		
Uttar Pradesh-1				L-M		L								L-M		
Uttar Pradesh-2	L-M		L-M	L-M		L-S								L-M		
Uttar Pradesh-3	L-M	L-M	L-S	L-S	L-M	L-M	L		L					L-M		
West Bengal	L-M	L-M	L-M	L-S	L-M	L-M	L-M		L-M					L-M		

LBI: Blast, **NBI:** Neck Blast, **BS:** Brown spot, **ShBI:** Sheath blight, **ShR:** Sheath rot, **FS:** False smut, **LS:** Leaf scald, **StR:** Stem rot, **GD:** Glume discoloration, **NBLS:** Narrow brown leaf spot, **BK:** Bakanae, **UDB:** Udbatta, **KH:** *Khaira*, **BLB:** Bacterial leaf blight, **BLS:** Bacterial leaf streak, **RTD:** Rice tungro disease; **L:** Low; **M:** Moderate; **S:** Severe.

Table 5: Biotic constraints (Insect pests) in different states in India during 2011

States	Insect pests																					
	SB	LF	BPH	WBPH	GLH	GM	RH	WM	GH	CW	GB	PM	MT	RB	AW	WTN	Rats	Termi	RT	WG	MB	LH
A & N Islands	M-S	M-S			M				L-M		M-S			M-S			L-M					
Andhra Pradesh-1	L-M	L-M	L-M			L	L	L				L					L-M					
Andhra Pradesh-2	L-M	L	L		L	L	L										L					
Andhra Pradesh-3	L-M	M	L			L-M	L					L-M					L				L	
Bihar	L-M	L-M	L-M	L-M	L-M	L-M			L-M								L	L-M				
Chhattisgarh	L-S	M-S				L-M								L-M				L				
Gujarat	L	L	L	L-M	L								L			L						L
Haryana	T	L	L-S		T			L-M										M				
Himachal Pradesh	L-M	L-M						L-M	L-M													
J & K-1					L				L													
J & K-2	L-M								L-M													
Jharkhand	M-S	M-S	M-S			L-M				M-S	M-S						L	M-S				
Karnataka	M	M	M																			
Kerala	L-M	L-M	L					L		L				M								
Madhya Pradesh	T	M		T-M	T									T	T-M		T					
Maharashtra	L	L	L	L-S	L					L				L								
Puducherry-1	L-M	L-M	L-M		L															L		
Puducherry-2	M-S	M			L-M															M		
Punjab	L-M	L-M	L-M	L-M																		
Tamil Nadu-1	L-M	L-M	L-M										L	L								
Tamil Nadu-2	L	L-M	M	L-M	L-M																	
Tripura	M	M	L																			
Uttar Pradesh-1	L-M	T-L							L		T											
Uttar Pradesh-2	L-M	L									M											
Uttar Pradesh-3	L-M								L		L-M						L					
West Bengal	L-M	L-M	L-M		L-M	L		L		L-M			L	L-M								

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, **Termi:** Termites, **RT:** Rice Thrips, **HCP:** Horned Caterpillar, **MB:** Mealy Bug, **LH:** Leaf Hopper, **WG:** White Grub, **ECC:** Ear cutting caterpillar, **T:** Traces, **L:** Low, **M:** Moderate, **S:** Severe.

Minor incidence of hairy caterpillar in AP-3; L-M incidence of crabs in Kerala; L-M incidence of ear head bugs IN Tamil Nadu 1 and 2; L-M incidence of Root knot nematode at UP-2

INTRODUCTION

Production oriented survey (POS) is aimed to provide information on various aspects of rice cultivation *viz.*, general weather and crop conditions, varieties cultivated and yield range, fertilizer application, different inputs and their availability, different biotic and abiotic problems and their management in different states. The survey assesses the needs and problems of the farmers and determines their degree of knowledge and perceptions of crop management problems. POS gives information about the various constraints faced by the farmers in dealing with the problems. The survey also provides information about 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-ordinating centres of All India Co-ordinated Rice Improvement Programme of the Directorate 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, biotic and abiotic production constraints prevalent in the states and usage of plant protection chemicals in brief, are also given.

ANDAMAN AND NICOBAR ISLANDS

Districts surveyed: North and Middle Andamans and Nicobar

Particulars of survey:

Districts	Taluqs/ Blocks	Villages
North and Middle Andamans	Mayabunder, Dighpur, Rangat,	Rampur, Wevi, Horibay, Gannadabla, Prangda-II, Madhupur, Kalapahar, RK Gram, Sivpur, Keralapuram, Duratang, Khudirampur, DV Gram, Jarawa Kreek, Karmatang, Laxampur, Kuli Rampur, Deopur, Bakultala, BS Palli and Nav Gaon
Nicobar	Campbell Bay	Govindnagar, Gandhinagar

Widely prevalent varieties

Districts	Varieties
North and Middle Andamans	HYVs: Jagannath, Jaya, Bhawani, Khusboo, Black Burma, Swarna, CSR-36, CARI-5, Ranjeet, Gayatri, JGL, C-14-8, CARI Dhan, Silver, Topu Jaya, Swarna Jaya Local: Pankher, Gol Dhan; Hybrids: US-312;
Nicobar	HYVs: CSR-36, CSR-23, CARI Dhan 5, Local: Triguni

Production oriented survey was conducted in two districts viz., North and middle Andamans and Nicobar. Though the climatic conditions were normal in North and Middle Andamans, there were reports of excess rainfall in Nicobar district. Some of the widely cultivated varieties were HYVs like Jagannath, Jaya, Bhawani, Khusboo, Black Burma, Swarna, CSR-36, CARI-5, Ranjeet, Gayatri, JGL, C-14-8, CARI Dhan, Silver, Topu Jaya, Swarna Jaya and hybrids like US-312. The common crop rotation practice followed by the farmers were rice-urd bean, rice-vegetables, rice-mungbean/black gram/lobia /lady's finger/cowpea. The average rice yield in the district ranged from 3000-6000 kg/ha among HYVs and 2000-3900 kg/ha among the local rice varieties. The intensity of common weeds like *Echinochloa colona*, *E. crusgalli*, *Cynodon dactylon*, *Imperstus cylindrical*, *Paspalum* spp., *Cyperus javanicus*, jalkambhi, pubgrass, kakori grass moderate to high. Farmers did not apply any weedicides and hand weeding was the main practice for weed management. Among different biotic constraints, blast, grain discoloration, stem borer, leaf folder, rice bugs, gundhi bugs were recorded in moderate to severe intensity while grass hopper and rats were observed in low to moderate intensities.

District wise observation:

North and Middle Andamans: Production oriented survey was conducted in 21 villages in this district. In general the weather conditions were normal for rice cultivation in all the places surveyed. The survey was done at the milk to mature stage. Farmers used 50-100% of their land for rice cultivation. Some of the predominant rice varieties in the district were Jagannath, Jaya, Bhawani, Khusboo, Black Burma, Swarna, CSR-36, CARI-5, Ranjeet, Gayatri, JGL, C-14-8, CARI Dhan, Silver, Topu Jaya and Swarna Jaya among HYVs and local varieties like Pankher and Gol Dhan. Few farmers cultivated rice hybrid US 312. The common crop rotation practice followed by the farmers were rice-urd bean, rice-vegetables, rice-mungbean/black gram/lobia /lady's finger/cowpea. The average rice yield in the district ranged from 3000-6000 kg/ha among HYVs and 2000-3900 kg/ha among the local rice

varieties. Sowing was done during June to early July and transplanting was completed in July and August. About 50% of the farmers applied organic manures like FYM, green manure or neem cake in the nursery bed. The information on fertilizers application in the main fields was available only from few farmers. They applied 30-70 kg N/ha, 30-70 kg P₂O₅/ha and about 30 kg K₂O/ha. Only one farmers among contacted applied green manure Glaircidia. Transplanting was random in most of the cases. The intensity of common weeds like Satna grass, bamboo grass, Cyperus, Motha, Dhanchi and Jharuwa was moderate. Farmers did not use any weedicides and hand weeding was the main practice for the management of weeds. Among the inputs, there were shortages of equipments, fertilizers and pesticides in some places. But drying and storage facilities were inadequate or not available in most of the places. Among different biotic constraints, blast, grain discoloration, stem borer, leaf folder, rice bugs, gundhi bugs were recorded in moderate to severe intensity while grass hopper and rats were observed in low to moderate intensities. Different pesticides like cypermethrin (2 ml/l) and Ustaad (1.5 ml/l) for leaf folder and stem borer, Hamla (1.5 ml/l), thiodan + (2 ml/15 l) and Sevin for gundhi bugs and Tatamida and follidol for other pests were used by the farmers.

Nicobar islands: Survey was conducted in two villages in this district. The general climatic conditions were not good for rice cultivation as there were incidences of excess rainfall in most of the places visited. Farmers took one rice crop in a year and rice-pulse was the main crop rotation. The common rice varieties were CSR-36, CSR-23 and CARI Dhan 5 among HYVs and local varieties like Triguni. The average yield of local varieties was 2-2.5 t/ha. The optimum time for sowing and transplanting was June and July, respectively. Farmers used 35-40 kg seeds/ha. While in case of mat nursery, seed rate of 15 kg was used. No information on fertilizer use was available in this region. The intensity of common weeds was high. The common weeds recorded in and around rice fields were Echinochloa colona, E. crusgalli, Cynodon dactylon, Imperstus cylindrical, Paspalum spp., Cyperus javanicus, jalkambhi, pubgrass, kakori grass etc. Most of the inputs were inadequate in this region. The common needs of the farmers were threshing floor and seeds of HYVs. Different insect pests like stem borer, leaf folder, gundhi bugs, grass hopper, green leaf hopper and rats were recorded in moderate intensities. There were no information on any pesticide use. However, few farmers used Trichogramma card.

Prevalence of pests and dieseaes in Andamans and Nicaobar islands during kharif 2011

Districts	BI	GD	SB	LF	RB	GB	GH	GLH	Rats
North and Middle Andamans	S (up to 60%)	M-S	M-S (25-50%)	S (up to 60%)	M-S	M-S	L	-	L-M
Nicobar islands			M	M		M	M	M	M

ANDHRA PRADESH-1

Districts surveyed: *Ranga Reddy, Mahbubnagar, Karimnagar, Nalgonda, Khammam and Warangal*

Particulars of survey

Districts	Mandal	Villages
Ranga Reddy	Doma and Pargi	Tirumayapalem, Rakonda, Mallepally, Doma, Bhoompalli, Dirsampalli, Gudur, Tirumayapalem, Godegampalli, Motukur, Palepalli, Chigurpalli, Lakhnapuram and Laxmidevi palli
Mahboobnagar	Kodangal, Kosgi, Maddur, Mahabubnagar, Shadnagar, Balanagar, Jadcherla, Nagarkurnool, Kalvakurthy, Gadwal and Wanaparthy	Regadi Mylavur, Palisapur, Humnabad, Dudyala, Chandravarcha, Nacharam, Bijjaram, Peddadaripally, Shadnagar, Kavarampet, Kothakota, Nagarkurnool, Kalvakurthy, Gadwal, Wanaparthy and Kothakota
Karimnagar	Sirsilla, Gollapalli, Manakondur, Shankara patnam, Huzurabad, Jammikunta and Peddapally	Hanksapur, Mamidipalli, Narsimhala palli, Nerella, Shekella, Gattududena pally, Kothagattu, Rangapuram, Shayampet, Nagampeta and Chandapally
Nalgonda	Huzurnagar, Miryalguda, Chilkur, Neradicherla, Kodad, Vemulapally and Tipparthi	Chilkur, Huzurnagar, Allagadapa, Janakinagar, Keethavarigudem, Chimryala, Vemulapally, Madugulapally, Mamidara and Chinna kodur
Khammam	Mudigonda, Nelakondapalli, Cherla, Sattupalli, Bayyaram and Khammam urban	Tatakuru, Madhapuram, Rajeswarapuram, Chennaram, Ananthanagar, Nalakondpalli, Ammuguda, Nalakondpalli, Cherla, Thungur, Thungur, Pakalagudem, Bayyaram and Konijerla
Warangal	Shayampet, Regonda, Venkatapur and Mulugu	Mandaripet, Chennapur, Ramayapur, Palampeta, Venkatapur, Bhuplnagr, Abbapuram and Sarwapuram

Widely grown rice varieties

Districts	Widely prevalent varieties
Ranga Reddy	HYVs: NLR-3041, Tellahamsa, MTU-1010, HMT Sona, Tellahamsa and BPT-5204; Hybrids: Harsha Hybrid
Mahboobnagar	HYVs: MTU-1010, BPT-5204, Tellahamsa and IR-64
Karimnagar	HYVs: IR64, MTU1010, JGL3855, JGL1798, BPT5204, WGL32100 and MTU1001; Hybrids: Kaveri909
Nalgonda	HYVs: BPT5204, MTU1010 and IR64
Khammam	HYVs: BPT5204, WGL347, RNR2458, RNR 2465, RNR2354, Motigold, JGL384, MTU1010, NLR34449, JGL11118, JGL11727, NLR34449 and MTU1061; Hybrids: Loknath,
Warangal	HYVs: BPT-5204, MTU-1010, Moti Gold, RSR-22, JGL3844, Sampada and MTU-1001

The production oriented survey was conducted during *kharif* 2011 in Ranga Reddy, Mahbubnagar, Karimnagar, Nalgonda, Khammam and Warangal districts covering Telangana Region of Andhra Pradesh. The details of the visits containing dates and list of participants are furnished below.

1. GENERAL INFORMATION

1.1 Seasonal Conditions

South West monsoon was set in over the state on 2nd June 2011 and advanced over few parts of Telangana by 7th June. Due to the active South West monsoon in week endings of July, 13.07.2011 and 20.7.2011 moderate to heavy rains occurred over Telangana, while light rains were received during week ending 27.07.2011. Moderate to heavy rain occurred in August over the week endings 24.08.2011 and 31.8.2011. From September onwards, dry spell prevailed in different districts of Telangana. However, Warangal and Khammam districts received good rainfall during week ending 14.9.2011 in September. Other Telangana districts received scanty rainfall. South West monsoon has withdrawn and simultaneously North East monsoon has set in over the state around 24.10.2011. North East monsoon was very weak with severe deficit in all districts and erratic rainfall distribution was noticed during both South West and North East monsoon seasons of 2011.

During South West monsoon period (June 6 September 2011) 584 mm rainfall was received as against normal rainfall of 640 mm (-9%). The rainfall data of the six districts surveyed is presented in the Table 1. In Telangana region as a whole, 470mm rainfall was received as against normal rainfall of 603mm with a deficit of -22%. Among the six districts surveyed, Ranga Reddy and Mahbubnagar districts received deficit rainfall of -30 and -28% respectively, while in Khammam (-7%), Karimnagar (-12%), Nalgonda (-14%), Warangal (+1%), received normal rainfall.

Table 1: District wise rainfall (mm) during South West monsoon / North East monsoon period from 1.6.2011 to 31.12.2011

District	South West monsoon period from 1.6.2011 to 30.9.2011				North East monsoon period from 1.10.2010 to 31.12.2011			
	Normal	Actual	% Dev. (+/-)	Status	Normal	Actual	% Dev. (+/-)	Status
Ranga Reddy	654	460	-30	Deficit	118	23	-81	Scanty
Mahabubnagar	560	400	-28	Deficit	110	36	-67	Scanty
Karimnagar	800	706	-12	Normal	113	7	-94	Scanty
Nalgonda	555	475	-14	Normal	144	11	-92	Scanty
Khammam	860	796	-7	Normal	136	20	-85	Scanty
Warangal	797	806	+1	Normal	119	17	-85	Scanty
Mean of 6 districts	704	607	-14	Normal	123	19	-84	Scanty
Andhra Pradesh	640	584	-9	Normal	213	100	-53	Deficit

Source: Commissioner, Disaster Management & Directorate of Economics and Statistics, Govt. of A.P, Hyderabad, Excess=+20% & above; Normal=+19 to -19%, Deficit=-20 to -59%, Scanty=-60 to 99%, No rain=-100%

During North East monsoon (October to December 2011) the state as a whole received only 100mm rainfall as against normal of 213mm (-53%). In Telangana region as a whole, only 30mm rainfall was received as against normal of 125mm (-76%). All the districts viz., Khammam (-85%), Karimnagar (-94%), Nalgonda (-92%), Warangal (-85%), Ranga Reddy (-81%) and Mahabubnagar (-67%) received scanty rainfall. The districtwise rainfall deviation for respective week endings for monsoon 2011 was presented in Table 2.

In Ranga Reddy and Mahabubnagar there was less rainfall compared to other 4 districts during June. Good rainfall was received in Karimnagar, Warangal and Khammam during 1st week and 3rd week of July, 1st and 4th week of August. After September 2nd week all the districts received deficit to scanty rainfall with prolonged dry spell for 15 consecutive weeks. This led to acute power and water shortage at crucial reproductive phase of rice crop, which might have some impact on rice yields during *kharif* 2011. Further, the paddy area drastically reduced during *rabi* 2011-12, worst affected districts are Ranga Reddy and Mahabubnagar.

1.2 Crop Coverage

A total of 107% of the normal rice area was covered in Telangana region taking advantage of the good rainfall received during June and July months of 2011. In the year 2011 the total cropped area covered was 3.44% higher (103.44%). However, long dry spell from September affected the productivity of crops. Even though, there was less water or shortage of water during reproductive phase of rice crop, due to abundant solar radiation during reproductive phase, and area coverage under short duration varieties like MTU 1010 higher yields were realized. Area covered in the six districts has been furnished in the Table 3. During *kharif* 2011, -16.90% less area was covered as compared to previous year i.e. 717528 hectare as against 863408 ha in *kharif* 2010.

1.2 Varietal Composition

The varietal composition (Table 4) includes BPT 5204, HMT Sona, JGL 384, JGL 1798, MTU 1010, Tellahamsa and WGL varieties (preferred category) ; IR 64, MTU 1001, MTU 7029, MTU 1061, MTU 1075 and other public and private hybrids (non-preferred category). Among the preferred BPT-5204 is still a ruling variety in the surveyed districts occupying maximum area i.e. Nalgonda (55.00 %), Khammam and Warangal (45.0 ó 46.0 %), Mahabubnagar (40.0 %), Ranga Reddy (28.0 %), Karimnagar (25%) due to high premium price in the market, good cooking quality, suitability under late planting situations with over aged seedlings upto 60 days age. However, the farmers expressed that due to cultivation of BPT 5204, their cultivation expenses are much higher than those taking up resistant varieties. They resorted to minimum of 4-6 sprays in BPT 5204, owing to its susceptibility and thereby incurring higher expenditure leading to less net profitability. Further, grain discolouration, poor exertion under delayed plantings is slowly driving farmers towards varietal shift from susceptible BPT 5204 cultivation to resistant MTU 1010 and MTU 1001. It is expected that during *kharif* 2012, there will be 30-50% reduction in area under BPT 5204, in all the districts surveyed.

The variety Cotton Dora Sannalu (MTU-1010) is next leading variety accounting for about 49% coverage in Karimnagar followed by Mahabubnagar (37%), Ranga Reddy (32.0%), Nalgonda (30.0%), Khammam (24.0) and Warangal (20.0%) in the composition. Majority of the farmers were satisfied with this variety because of its duration advantage (125 days), tolerance to BPH, blast etc., and higher yields and in both the seasons. The millers also

showed interest for procurement of MTU 1010. The area under MTU 1010 is likely to increase further during *kharif* 2012. Tellahamsa is another popular variety still occupying larger area especially in Ranga Reddy district, accounting for nearly 22 % and a meager 5% area in Mahbubnagar. In view of its early duration (115-120 days), good cooking and keeping quality besides better palatability of straw it is still preferred. However, few farmers expressed that the yield potential of Tellahamsa is decreasing day by day and hence area under Tellahamsa is likely to decrease further in *kharif*.

Among the new varieties, MTU 1061 (Indra) and MTU 1075 (Pushyami) are gaining popularity in Khammam district, particularly in single cropped areas of Sattupalli, Badrachalam, Vyra etc.,. Further these are resistant to BPH. Similarly, JGL 3844, JGL 3855, JGL 11470 varieties are slowly gaining farmers acceptance, because of their gall midge resistance and high yield potential. Among the non-preferred varieties, Vijetha (MTU 1001) recorded higher per cent coverage in Warangal (22.0%) because it was found to be good in BPH endemic areas, besides giving higher yields. However, narrow brown spot and zinc deficiency were more pronounced in Vijetha. Among the recently released varieties the aromatic short grain variety, Sugandha Samba (RNR 2465) is becoming very popular among the farmers because of its aroma and good cooking quality.

Among the rice minikits of ANGRAU which are under testing in the surveyed districts viz., RNR 2458, RNR 2354, WGL 347, JGL 11727, JGL 11118, JGL 13295 performed better, gaining much popularity in the districts of Khammam, Warangal and Nalgonda owing to possession of some specific features like aroma (RNR 2354), and resistance to either gall midge or blast. As marketing is a problem for aromatic short grain types, they have to be popularized in the state and export potential of such varieties needs to be explored.

Table 4: District wise variety wise rice area (ha) covered during Kharif 2011

Variety	R.R	MBNR	NLG	KMM	KMNR	WGL
Preferred						
BPT 5204	4760 (28.00)	41744 (40.00)	97510 (55.00)	54553 (46.00)	41571 (25.0)	60300 (45.0)
HMT sona	510 (3.00)	5218 (5.0)	7092 (4.0)	2372 (2.0)	8314 (5.00)	2680 (2.0)
JGL varieties	340 (2.0)	6262 (6.0)	3546 (2.0)	15417 (13.0)	13303 (8.0)	5360 (4.0)
MTU1010	5440 (32.00)	38613 (37.00)	53187 (30.0)	28463 (24.00)	81479 (49.0)	26300 (20.00)
Tellahamsa	3740 (22.00)	5218 (5.00)	-	-	-	-
WGL varieties	-	-	-	-	-	3350 (2.5)
Non-preferred						
IR64	850 (5.0)	3131 (3.00)	3546 (2.0)	2372 (2.0)	11640 (7.00)	4020 (3.0)
MTU 1001	680 (4.00)	2087 (2.00)	5319 (3.0)	4744 (4.0)	4988 (3.0)	29480 (22.0)
MTU 1061	-	-	-	2372 (2.0)	-	-
MTU 1075	-	-	-	3557 (3.0)	-	-
Others	680 (4.00)	2087 (2.0)	7092 (4.0)	4744 (4.0)	4988 (3.00)	2010 (1.5)
Total	17000	104360	177292	118774	166283	133500

Figures in parenthesis are percentages

Source: Commissionerate of Agriculture, A.P & concerned district JDAs

1.4 Crop Condition

South West monsoon was active during June and July 2011 wherein copious amount of rainfall was received. However, monsoon rains not only made a good beginning but was very active all through over Telangana districts and its influence resulted in wide spread rains in the six districts which enabled the farmers to take up the sowings of long duration varieties i.e., BPT 5204, HMT Sona, MTU 1061, MTU 1075 etc., in the month of June under wells, bore wells. The transplanting of medium duration varieties mainly MTU 1010, MTU 1001, Kavya, JGL varieties, IR 64 etc., were spread over from July to September depending on the availability of water and labour. Scanty to deficit rainfall from September has lead to severe water and power shortage.

Even the ground water level in the bore wells decreased, which has resulted in moisture stress to the rice crop, particularly at reproductive phase. In some areas, rice crop suffered due to salinity and sulphide injury. Among the insect pests, BPH was more severe in Nalgonda (Miryalguda division) and Warangal resulting in wide spread hopper burns. All the other insect pests were low to moderate, except assuming serious proportions in certain parts. Overall disease incidence was less compared to previous year. However, neck blast, sheath blight, sheath rot and grain discolouration were severe at some places, particularly wherever susceptible varieties were cultivated coupled with high nitrogenous fertilizers, low potash apart from high weed population in and around field bunds.

1.4 Cropping pattern

Rice-Rice is the major prevailing cropping system followed by Dhaincha-Rice-Rice : Greengram-Rice-Rice : Rice-Maize/Jowar : Rice-Groundnut : Rice-Rice-Vegetable : Rice-Vegetables and Rice-Fallow in the surveyed districts. Due to continuous availability of water in tanks, wells and commands, the farmers are showing willingness for rice-rice cropping system. However, the percentage crop land under rice was restricted from 40 to 90 % depending upon the natural resources and availability of labour on the whole. Most of the farmers adhere to the recommended cut off dates for transplanting of rice varieties based on the duration group. However in few locations particularly Mahabubnagar, Karimnagar, Warangal under command areas the transplanting dates for medium/long duration were extended (15-30 days) due to non availability of the labour for transplanting and abnormal weather conditions. Normally, long duration varieties are sown first in June, followed by medium and short duration varieties as per the availability and source of water.

1.5 Direct Seeding

Due to untimely rainfall and lack of water resources in tanks/ wells and labour shortage for transplanting prompted the farmers of Ranga Reddy, Khammam, Warangal to try direct seeding of rice using drum seeder during *kharif*, 2011. The average yields realized was in the range of 4.5 - 5.5 t/ha. However, the farmers expressed that there was severe incidence of leaf mite and panicle mite in direct seeded rice as compared to normal method of transplanting.

2.0 NURSERY MANAGMENT

2.1 Seed Rate

Of the six districts surveyed, majority of the farmers are adopting recommended seed rate of 75 kg/ha since they were purchasing through private agencies, Department of Agriculture & DCMS etc. in the definite packing size of 30 kg. Farmer to farmer spread is very common in case of varieties covered in huge areas like BPT 5204 and MTU 1010. Farmers taking up SRI cultivation are using seed rate of 10kg/ha. Few farmers are experimenting direct seeding with drum seeder. They are using seed rate of 30-40kg/ha depending upon the variety.

2.2 Nutrient Application

About 80% of the farmers in the surveyed districts are applying FYM @ 250-500 kg / 5 cents in nursery along with 2-6kg N, 1-3 kg P for 5 cents in the form of DAP/Urea.

2.3 Nursery protection

About 20% farmers only are adopting seed treatment, with carbendazim @ 1g/l of water. Nursery protection with Carbofuran granules @ 1 kg/5 cents was adopted by majority of the farmers just one week before pulling of the nursery. A lot of awareness about the better performance of the Carbofuran application in nursery enabled the farmers in the management of early stage pest complex. Further, timely application of granules in nursery rather than applying in main field during vegetative phase helps to save protection cost.

3.0 MAIN FIELD

3.1 Manures application

Progressive and marginal farmers were applying FYM @ 2-10 t/ha or Poultry manure @ 2-5 t/ha depending up on the availability. Usage of poultry manure was higher in the districts of Warangal and Karimnagar as compared to other districts. The significant findings of the survey indicated that awareness has come on the importance of green manuring which is evident from the majority of the farmers (40%) growing green manure crops (greengram, dhaincha, *Pongamia*, *Crotalaria* etc.) with the onset of the monsoon. Non availability of green manure seed compelled the majority of the sub marginal farmers to depend only on the inorganic fertilizers. In some areas farmers are not taking up green manuring deliberately, stating that, they have tried earlier and they are refraining from doing so because of some operational problems.

3.2 Fertilizer dosage

The survey revealed that due to moderate and high responsiveness of high yielding varieties to applied NPK, the farmers are going in for various dosages in the ratio of 100-190 N, 40-60 P, 20-40 K in the form of complex fertilizers *viz.*, 18-46-0, 28-28-0, 17-17-17, 19-19-19/ 20-20-0 and 16-16-16. The farmers were applying nitrogen in 2-4 splits coinciding with the tillering, maximum tillering/ booting, panicle initiation and 10-15 % at flowering stage. Few progressive farmers started using liquid fertilizers during dry spells. Few farmers only applied potash in the form of MOP either in single split @ 35-50 kg/acre (black soils) or in two splits @ 10-20 kg/acre (light soils). However, majority of the farmers could not apply potash as potash availability was minimal during 2011. Most of the farmers reported lack of timely potash availability in almost all the districts surveyed. They requested that at least by next *kharif* (*kharif* 2012) this problem has to be sorted out and sufficient quantities of potash made available.

3.3 Any other amendments

During 2011, Zinc was not made available to the farmers by the Department of Agriculture on subsidy. Because of this, only 10-20% of the farmers applied zinc compared to 75-80% farmers applying Zinc in 2010. It was noticed that most of the farmers were applying zinc sulphate @ 25 kg/ha instead of recommended dosage of 50 kg/ha. Few farmers are correcting the zinc deficiency symptoms in the main field by spraying of chelated zinc formulations during the crop growth. But few farmers are mixing zinc with either fertilizers or pesticides due to lack of timely guidance.

3.4 Transplanting method

Zig zag planting method is the only practice adopted by all the farmers even today, however, in Khammam and Nalgonda the farmers (10-15 %) are making alleyways for every 2-3 meters as a part of BPH management.

3.5 Plant density

A plant population of 22-32 hills/m² is generally maintained in majority of the fields irrespective of the variety and planting time. The major reason attributed by farmers for not maintaining recommended plant population is contractual labour. But, this is the major area where more awareness and training has to be provided to both the farmers and labour on maintenance of optimum plant population as per the duration groups. Unless and until this aspect is given proper attention, the productivity is not going to improve.

3.6 Weed infestation

Weed infestation was in the range of low to medium and the predominant weed composition in the surveyed districts was in the descending order (*Echinochloa colanum*, *E.crusgalli*, *Cyandon dactylon*, *Cyprus rotandus*, *Leersia hexandra*, *Panicum ripens*, *Brachiria mutica*, *Arudo donux*, *Stenotaphrum secundatum*, *Dinedra retrofolea*, *Isache elegans*, *Ergostris tenuifolia*, *Plantago spp.*, *Paspalam dictuem*, *Glyceria acutifolia*, *Euphorbia spp.* and *Parthenium spp.*

3.7 Herbicide usage

Usage of herbicides in the rice cultivation gained much importance and popularity among the farmers which can be mainly attributed to its easy availability in the local market and shortage of labour for manual weeding. About 82-87% of the surveyed farmers were using herbicides. The popular herbicides used in the surveyed districts include Oxadiargyl (60%), Butachlor (50%), Anilophos (30%) and Pretilachlor (25%). Farmers are very much interested in post emergence herbicides. Among the new post emergence herbicides, farmers (10%) started using Bispyribac Sodium (Nominee Gold), which is working very well. Another new herbicide gaining popularity among the rice farmers is Londax Power T.

4 PRODUCTION CONSTRAINTS

4.1 Biotic Constraints

During initial stages of crop growth *i.e.*, tillering stage, low intensity of hispa, whorl maggot and horned caterpillar was noticed, in certain pockets. The incidence of BPH was noticed from September 2nd week onwards and became severe from September last week to October 1st week (Table 5). Incidence of BPH was severe from September ending to October 1st fortnight in Nalgonda, Karimnagar, Warangal and Ranga Reddy districts. Particularly BPH incidence was severe in susceptible BPT 5204 and low in resistant (MTU 1010, MTU 1001, MTU 1061 and 1075) varieties. The BPH problem was more severe in farmers fields who have cultivated BPT 5204, used high nitrogenous fertilizers, sprayed resurgence causing chemicals like lamda cyhalothrin, betacyfluthrin or chlorpyriphos 50Ec or Combination of chloropyriphos + cypermethrin or Profenophos etc., during early stages of crop growth (tillering stage).

Due to non-availability of Carbofuran 3G granules at few locations, particularly in Mahabubnagar, Ranga Reddy and Nalgonda farmers were forced to apply Phorate 10G for the management of early stage pest complex and also rodents and wild boars. The incidence of rice yellow stem borer (YSB) during *kharif* 2011 was minimal compared to previous year. Further, brood emergence of YSB was delayed by 1-2 weeks, resulting in escape of the rice crop from stem borer damage. YSB damage was also recorded in all the districts ranging from 2-15% but most of the damage was confined to white ears (WE). However, in few areas of Nalgonda, Mahbubnagar, Khammam and Ranga Reddy the incidence was severe. The damage was more wherever the booting stage coincided with brood emergence and improper timing of insecticide application was done. During this *Kharif* 2011 the incidence of gall midge was minimal ranging from 2-4% because of lack of rainfall in September and low relative humidity. However, gall midge incidence was noticed in susceptible varieties like BPT 5204, MTU 1010 and MTU 1001. Leaf folder incidence was moderate to severe in Warangal, Khammam and Mahabubnagar. Panicle mite incidence was relatively more in Warangal, particularly in varieties with poor panicle exertion. All other insect pests were at low ebb. Problem of rodents was more in Warangal district and low in other districts.

Table 5: District wise insect pest damage recorded during *Kharif*, 2011

District	Percent insect pest damage									
	BPH	YSB (WE)	Gall midge	Hispa	Leaf folder	GLH	Whorl Maggot	Panicle mite	Horned Caterpillar	Rats
KMM	3-10	2-3	2-3	-	3-8	-	-	2-3	-	5
NLG	10-20	2-7	-	2	3-5	-	3	2-3	-	3
MBNR	2-8	3-10	2-3	2-5	2-8	-	5	2-5	-	2
KRMR	1-15	2-12	-	2-3	2-5	5	3	2-5	2	-
WGL	3-12	-	2-4	-	3-10	-	2	3-6	-	5-10
RR	10-12	5-15	-	2-5	-	-	3-5	3-5	-	-

Overall the disease incidence was less compared to previous year owing to uncongenial weather conditions during 2011. Among the various diseases, incidence due to leaf blast was in the range of 2-5% in Khammam, Nalgonda and Mahabubnagar districts (Table 6). However, among the districts surveyed, neck blast was moderate to severe in Mahabubnagar and Warangal, sheath blight in Warangal, grain discoloration in Khammam. Stem rot problem was reported only from Mahbubnagar. Good quality of paddy was received by the markets this year compared to last year.

Table 6: District wise per cent disease incidence recorded during *Kharif*, 2011

District	Per cent disease incidence									
	Leaf blast	Neck blast	Sheath blight	Sheath rot	Stem rot	False smut	Bacterial leaf blight	Brown spot	Narrow brown spot	Grain discoloration
KMM	2-3	2-6	2-5	2-5	-	2-3	-	2	2-4	5-7
NLG	2	2-3	3-5	3	-	2	3-5	3	-	3-5
MBNR	2-5	2-10	2-5	5	3	3-5	2-5	5	-	5
KRMR	2	2-5	2-5	3-5	-	3	3	2	-	3-5
WGL	-	3-8	5-10	2-5	-	3	-	-	-	3-5
RR	3	5	-	3-5	-	2	-	-	2	2-5

Source: Concerned district ADAs and Farmers Interactions

4.2 Abiotic constrains

Continuous cloudy weather and rains from booting to post flowering stage predisposed the crop to intermittent sterility to the extent of 3-8% in fine grain types as compared to coarse grain types (2-3%) which was mainly attributed to the loss of pollen due to heavy down pour during the flowering time particularly in BPT-5204, MTU-1010, MTU-7029, HMT Sona etc.,

5 FARM IMPLEMENTS & MACHINERY

Farmers were able to procure the land preparation, intercultivation equipment through the Department of Agriculture on subsidized rates. They have also expressed that the transplanters suitable to different soils may be made easily available at low cost under subsidy programme due to shortage of man power in the villages.

Only 30-40% of the farmers have gone for usage of combined harvesters because most farmers need straw to feed their cattle and very few combined harvesters are available currently which can retain straw as it is. The availability of such combined harvesters needs to be improved further. The present combined harvesters are unable to operate under ill drained soils. Farmers opined that direct seeding can be a better option. But, drum seeder availability is minimal. In view of labour shortage farmers are also interested in power weeders, for which awareness has to be created and training needs to be conducted

5 PLANT PROTECTION MEASURES

As far as the plant protection measures are concerned a lot of awareness has come among the farming community particularly with usage of granular formulations against control of early stage insect pests. Majority of the farmers (65%) were using Carbofuran 3G @ 1 kg / 5 cents in the nursery management in early stage pest complex instead of phorate 10G. But, this year phorte 10G usage was more compared to previous year. The district wise usage of micro nutrients (Zinc) was in the range of 15-70%, and adoption of plant protection measures was in the range of 20-95% (Table 7). Most of the farmers are correcting zinc deficiency in the rice fields either by soil application of ZnSO₄ @ 25-50 kg / ha or spraying of chelated zinc @ 250-500 gm / ha. Its usage was maximum in Nalgonda (70%) followed by Khammam (50%), Warangal (40%), Karimnagar (45%), Mahabubnagar (35%) and Ranga Reddy (15%). Compared to previous year, usage of Zinc by the farmers decreased by about 10%, mainly because of non supply of Zinc on subsidy by the government.

Table 7: District wise per cent of farmers correcting micronutrient deficiencies and adopting plant protection measures during *kharif*, 2011

District	Per cent Correcting Micro Nutrient Deficiency Measures	Per cent Plant Protection Adoption
KMM	50.00	45-90
NLG	70.00	35-90
MBNR	35.00	35-80
KRMR	45.00	50-90
WGL	40.00	45-95
RR	15.00	20-90

Similarly, the awareness and adoption of plant protection measures by the rice farmers in the surveyed districts gaining momentum and its usage was maximum in Karimnagar (50-90) and Warangal (45-95%) followed by Khammam (45-90%) , Nalgonda (35-90%), Mahabubnagar (35-80%) and Ranga Reddy (20-90%). Cartaphydrochloride (4G) / 50% SP), Chlorantriliprole and Flubendiamide formulations are being extensively used for management of yellow stem borer and leaf folder while Buprofezin is being extensively used for the management of BPH.

The other insecticides viz., Acephate, Imidachlopid, Lamdacyhalothrin and Profenophos are commonly used for the management of different insect pest in the rice ecosystem. It was evident that wherever farmers used lamda cyhalothrin, chlorpyriphos 50Ec or combinations of Chloro + cypermethrin, profenophos etc., in early vegetative stage there BPH was severe and resulted in hopper burns. Hand sprayers and power sprayers are being used for spraying purpose. Among the fungicides usage of Tricyclazole was maximum (80%) followed by Isoprothiolale (15%) and Carbendazim (5%) for the management of leaf blast / neck blast. Farmers are expecting a product that can take care of multiple diseases. The farmers have expressed that the combination products like Saaf, Companion, Master (Carbendazim + Manozeb), Nativo performed better in reducing the false smut and grain discolouration when sprayed during flowering stage. Hexaconazole and Propiconazole were being used to a greater extent for the control of sheath blight / stem rot / sheath rot etc..

7 POST HARVEST LOSSES

As such crop lodging and shattering was noticed due to over drying especially in varieties like MTU 1010, BPT 5204 & HMT Sona. Shattering losses upto 2-5%, losses due to cleaning and handling were estimated to the tune of 2-3% was noticed. As majority of the farmers sold their produce without storing, the storage losses were considered to be negligible. However, in some cases the storage losses were expected to be around 2-5 per cent.

8 MARKETING

Farmers expressed their unhappiness for not procuring the super fine grain type varieties by the Government agencies and private traders thereby the farmers were compelled to sell their produce of BPT-5204, HMT Sona, JGL & WGL varieties to the local traders in the village itself at a lower price Rs.750-950 / quintal as against minimum support price of Rs.1030-1080 / quintal. During this *Kharif*, there was a demand in the market for the fine and coarse type varieties (MTU 1010, MTU 1001 & Swarna) and procured at Rs.950-1030 / quintal as compared to super fine grain varieties.

Under Indira Kanthi pathakam wherein the Government has opened procurement centres in major paddy growing areas with the assistance of DWACRA Mahila groups helped the farming community in getting the expected minimum support price of Rs.1030 / quintal.

9 YIELD

District wise provisional yields recorded ranged from 3625-8400 kg/ha in different districts with an average yield of 5.5, 6.2, 5.5, 5.4, 6.1, 5.3 t/ha in Ranga Reddy, Karimnagar, Warangal, Nalgonda, Khammam and Mahbubnagar districts, respectively. Sampled farmer wise yield data is furnished as Annexures (1-6). The average rice yields are higher than

previous years, mainly because of large area coverage by MTU 1010 (short duration, pest disease resistance, high yield potential) and more sun shine hours during reproductive phase of the crop.

10. COST OF CULTIVATION

The cost of cultivation of paddy / acre ranged from Rs.18000 (Nalgonda) to 23550/- (Warangal) in different districts surveyed (Table 15). Further, the costs also varied with the variety (susceptible/resistant) cultivated. More expenditure was incurred on a susceptible variety like BPT 5204 and less on resistant variety like MTU 1010 or MTU 1001. The farmers said that owner of a rice farm is getting a net profit of Rs 2000-4000/acre on an average and a tenant farmer earning nothing but debts. This amount is insufficient to meet the family needs of not only a small farmer, but also a farmer having 10 acres of land. This is a matter of serious concern and something needs to be done to save the rice farmers by taking some crucial policy decisions. Almost all the farmers were of the opinion that the present minimum support price provided by the Government is insufficient and it must be increased to 1500-1700 rupees/100kg bag. Otherwise they are left with no other option than quitting rice cultivation and shifting to other crops or keep the fields fallow and go and work as labourers.

Table 9. Cost of rice cultivation / acre in different districts

S. No	Details of work / expenditure	District			
		Mahabubnagar		Ranga Reddy	Nalgonda
		Case study 1	Case study 2		
1	Land preparation	1800	3000	2500	1700
2	Transplanting	1200	1000	1200	1200
3	Bund Trimming	550	500	500	500
4	Seed Cost	650	650	600	560
5	Land Leveling	950	1000	900	1000
6	Nursery raising	1100	1000	850	800
7	Nursery lifting	0	800	500	0
8	Fertilizers	3500	3000	2000	2500
9	FYM/ Sheep Penning / Poultry manure / Green manure etc.,	1700	0	600	1000
10	Pesticides	3500	1500	1000	2000
11	Weedicides	1000	800	800	1000
12	Hand Weeding	2000	2400	2500	2000
13	Tractor	550	500	500	500
14	Harvesting & Bundling*	4000*	4000*	3500	3000
15	Winnowing	550	500	500	500
16	Miscellaneous	150	200	150	200
	Total	22200	20850	18500	18000

Table 9 contd., Cost of rice cultivation / acre in different districts

S. No	Details of work / expenditure	District		
		Khammam	Warangal	Karimnagar
1	Land preparation	1600	2700	1500
2	Transplanting	1200	2200	1200
3	Bund Trimming	500	400	500
4	Seed Cost	550	750	600
5	Land Leveling	1000	1000	900
6	Nursery raising	900	1000	1000
7	Nursery lifting	0	0	0
8	Fertilizers	2500	3500	3000
9	FYM/ Sheep Penning / Green manure etc.,	800	500	800
10	Pesticides	2000	3000	2500
11	Weedicides	700	500	1000
12	Hand Weeding	700	1000	1000
13	Tractor	500	500	500
14	Harvesting & bundling* etc.,	3000	5500*	1600
15	Winnowing	500	500	500
16	Miscellaneous	150	500	200
	Total	17800	23550	16800

11. FEED BACK

CHANGES OBSERVED COMPARED TO PREVIOUS YEAR ARE

- Pest and disease incidence was low and quality of produce was good due to prevalence of dry weather at maturity and harvesting stages.
- Varietal shift is very clear and farmers are showing interest on cultivation of fine grain varieties especially MTU 1010, because of short duration, low incidence of pests and diseases and good minimum support price. There isn't much difference between minimum support price or even market price of BPT 5204 and MTU 1010.
- Use of herbicides, combined harvesters etc., has become a common practice.
- Usage of phorate 10G was more compared to previous year, because of low cost, non availability of Carbofuran 3G and to take care of rodents, wild boars etc.,
- Usage of pesticide molecules like flubendiamide, chlorantriliprole, kresoximethyl etc., and herbicides like Londax power T, Bispyribac Sodium etc., is on the rise.

The following were the major issues posed by the farmers are presented in the Table 10.

Table 10. Per cent opinion of the farmers towards requirements

S No	Requirements of the farmers	% Farmers opinion
1	Profitable market price for paddy (@ Rs 1500-1700/100kg	100
2	Requirement of medium duration (130-135 days) varieties having bold/fine grain type along with multiple pest disease resistance	80
3	Adequate supply of potash and zinc (subsidy)	80
4	Supply of rice transplanters at low cost under subsidy programme	70
5	Adequate supply of green manure seed well in advance of season	75
6	New fungicidal molecules for the management of multiple diseases	65
7	Supply of drum seeders on subsidy	60
8	Supply of Power operated weeders on subsidy	60
9	Requirement of varieties resistant to false smut	50
10	Requirement of varieties alternate to MTU 1010 / MTU 1001 particularly for <i>rabi</i>	40

Important issues which need immediate attention to improve rice productivity and farmers profitability are:

- Policy decision to provide a profitable market price to rice farmers with assurance of procurement by FCI / Govt.,
- Policy decision to construct more and sufficient godowns for paddy storage at Govt. level
- Research focused on development of multiple pest disease resistant varieties (bold/fine) mainly to reduce cost of cultivation by cutting down on plant protection costs.
- Development of hybrids which give at least 10 bags extra yield and match present popular high yielding varieties in quality, resistance to insect pests followed by popularization of these hybrids.
- Designing of harvesters capable of harvesting under ill drained conditions
- Designing of power operated weeders with adjustable spacing of 20, 25 and 30cm suitable for both light and heavy soils.
- Designing of drum seeders with adjustable spacing (20, 25 and 30cm)
- Reclamation of problematic soils to raise rice productivity
- Compatibility studies are required on different latest pesticides.
- Popularizing direct seeding technology through drum seeder in view of labour shortage and provision of drum seeders on subsidy to farmers
- Awareness programmes on benefits of both green manure crop and Zinc in paddy
- Educative campaigns on management of saline soils and sulphide toxicity
- Awareness on ill effects of misuse of latest pesticide molecules and resurgence causing chemicals
- There is a need to educate the farmers on time of spraying, dosage and no. of sprays in plant protection
- Awareness on use of latest herbicide molecules (pre / post emergence)
- Awareness on post harvest care including safe storage technologies
- Timely supply of quality seed and inputs
- Providing levelers and awareness on leveling and maintenance of optimum plant population especially for direct seeding followed by all planting methods.

Production Oriented Survey - 2011

- Supply of transplanters (at least 2 per village / mandal level) and training on their usage, nursery raising to suit mechanical transplanters
- Supply of sufficient green manure seed (*kharif*) and Zinc on subsidy (*kharif* and *rabi*) compulsorily and adoption rate increased from present 10-12% to 80-90% in the coming 3 years
- Supply of potash in sufficient quantities
- Facilities for drying, cleaning and storage have to be provided to enable quality produce reaching the markets as per FAQ
- Permitting millers to export BPT 5204 before fresh produce arrives in the market, rather than after rice procurement is completed from farmers.

ANDHRA PRADESH - 2

Districts surveyed: East and West Godavari districts (Godavari Zone)

Particulars of Survey:

District	Mandals	Villages
East Godavari	Ravulapalem, Kothapeta, Mandapeta, Rajanagaram, Rangampeta, Peddapuram, Alamuru, Samalkota, Pithapuram.	Gopalapuram, Mummadivarapadu, Ganti, Gantiped apudi, Pedapalla, Kesavaram, Rajanagaram, Tirupatirajupuram, Vadigaleru, Peddapuram, Jonnada, Samalkota, Jalluru
West Godavari	Nallajerla, Koyyalagudem, Jangareddigudem, Kamavarapukota, Dwarakatirumala, Alamuru	Nallajerla, prakasaraopalem, Chipurugudem, Gavaravaram, Panguturu, Guravaigudem, Pottagattugudem, Uppalapadu, Timmapuram, Bhatlamaguturu

Widely grown rice varieties

District	Varieties
East Godavari	MTU-7029, MTU-3626, BPT-5204, MTU-1061, MTU-1064, PLA-1100, MTU-1001 and IR-64.
West Godavari	MTU-7029, MTU-1010, PLA-1100, MTU-1061, MTU-1001, MTU-3626, BPT-5204, MTU-1064 and MTU-1075.

Particulars of rice area

District	Normal area (ha)	Actual area (ha)	Irrigated area (ha)
East Godavari	2, 29,215	1, 98,229	1, 34,795
West Godavari	2, 44,652	2, 42,410	2, 37,561

Prevailing weather conditions

East Godavari:

Month	Rainfall (mm)	No. of rainy days	Temperature		R.H. (Morning)
			Maximum(°C)	Minimum(°C)	
June 2011	70.8	7	38.3	29.2	76.3
July 2011	166.9	11	35.4	28.0	66.9
August 2011	240.9	9	30.0	27.5	78.0
September 2011	116.5	6	34.5	29.5	64.5
October 2011	0.4	0	34.0	29.0	62.3
November 2011	0.9	0	30.5	27.2	59.2
December 2011	1.8	0	29.4	24.4	67.0

Rainfall pattern in East Godavari district:

Month & Year	Normal Rainfall (mm)	Actual rainfall (mm)	Per cent deviation from normal
June.2011	120.2	70.8	-40
July 2011	216.1	166.9	-11
August 2011	213.0	240.9	13
Sptember 2011	187.0	116.5	-37
October 2011	93.0	0.4	-100
November 2011	93.0	0.9	-100
December,2011	11.0	1.8	-87
TOTAL	933.3	598.2	-64.1

West Godavari:

Month	Rainfall (mm)	No.of rainy days	Temperature		Relative Humidity
			Maximum(°C)	Minimum(°C)	
June 2011	82.7	6	34.1	26.2	79.1
July 2011	268.8	13	31.2	24.8	83.6
August 2011	328.5	16	29.3	24.1	85.4
September 2011	69.0	4	30.9	25.3	88.3
October 2011	26.5	6	31.0	25.0	84.8
November 2011	0.8	0	30.5	19.6	83.2
December 2011	0.0	1	28.9	18.6	82.7

Rainfall pattern in West Godavari district:

Month & Year	Normal Rainfall (mm)	Actual rainfall	Per cent deviation
June.2011	112.0	82.7	-26.16
July 2011	246.0	268.8	+9.3
August 2011	248.0	328.5	+32.5
Sptember 2011	178.5	69.0	-61.3
October 2011	114.7	26.5	-76.9
November 2011	65.0	0.8	-98.8
December,2011	11.0	0.0	-100.0
TOTAL	1031.0	797.1	-22.7

Weather conditions

East Godavari: South West monsoon was set in June but rainfall received during the month was low (70.8 mm) as compared to normal (120.2 mm). A good amount of rainfall was received in July and August months. There was deficit rainfall in September month, while, it was almost nil during October, November and December months. A total of 598.2 mm rainfall was received as against 933.3 mm of normal and there was 64.1% deficit rainfall. Bright sun shine hours favoured good crop growth in delta mandals where there was sufficient canal water for irrigation. However, crop suffered due to drought in upland mandals where borewells are the main source of irrigation.

West Godavari: South West monsoon was set in June but rainfall received during the month was deficit of 26.16 mm as compared to normal. A good amount of rainfall was received in July and August months. But there was deficit rainfall in September and October months, while, it was almost nil during November and December months. A total of 797.1 mm rainfall was received as against 1031.0 mm of normal and there was 22.7% deficit rainfall. Bright sun shine hours favoured good crop growth in delta mandals where there was sufficient canal water for irrigation. However, crop suffered due to drought in upland mandals where bore wells are the main source of irrigation.

Production Oriented Survey (POS) was conducted in East Godavari and West Godavari districts of Andhra Pradesh. Canals were the main source of irrigation water. Other sources of irrigation water were the bore wells, tanks and filter points. Bore well irrigation was common in upland mandals of East and West Godavari districts. Canal water comes from River, Godavari which divides into two major irrigation channels at Dhavaleswaram anicut. Nearly 90% of the cultivable land was occupied by rice crop in these districts. Rice-rice was the predominant cropping system in Godavari delta. The major rice varieties in these districts were Swarna (MTU-7029), MTU-3626, BPT-5204, MTU-1061, MTU-1064, PLA-1100, MTU-1001 and IR-64. (MTU-7029), Amara (MTU-1064), Indra (MTU-1061), Samba mahsuri (BPT-5204), Badava mahsuri (PLA-1100), Cottondora Sannalu (MTU-1010), Prabhat (MTU-3626), Vijetha (MTU-1001), MTU-2716 and IR 64 and of which Swarna (MTU-7029) occupied nearly 75 per cent of the paddy area in these two districts. Short duration rice varieties like MTU-1010, MTU-3626 and IR-64 were sown for seed purpose to be sown in rabi season. MTU-1001 was majorly grown in upland mandals like Nalljerla, Buttaigudem, Jangareddigudem, guravaigudem mandals of West Godavari district.

The common crop rotations were paddy-paddy; paddy-paddy-pulse; paddy-pulse; paddy-sugarcane; paddy-paddy-maize; paddy-maize, paddy-fodder and paddy single crop. The inputs like seeds, pesticides and fertilizers were adequate. Seeds were obtained from Co-operative societies, APSSDC, farmer to farmer and Research Stations. Pesticides and fertilizers were purchased from the local pesticide dealers. Machinery like combined harvester, transplanter and drum seeder were used for direct sowing in upland as well as irrigated mandals. Combine harvester was used in almost all the mandals surveyed. Puddling operation was taken up by using power tillers and tractor mounted cage wheels. Farmers used different types of paddy transplanters (manually operated, Kubota, Yanji sakthi and Yanmar type). Private companies introduced the transplanters as well as combine harvesters during peak season whereas, drum seeder was supplied by the Department of Agriculture. Drying and storage facilities were inadequate. Farmers does not possess any place or threshing floor for threshing operation and hence they took threshing of paddy on the roads.

Very few farmers applied farmyard manure. Most of the farmers applied complex fertilizers as top dressing. The use of phosphatic and potassium fertilizers was satisfactory but some farmers applied excess nitrogenous fertilizers. The fertilizers like DAP, 20-20, 28-28, 14-35-14 and 10-26-26 were used by majority of farmers. Among diseases, sheath blight was low to moderate and other diseases neck blast, false smut were found in low level. Among insect pests, stem borer, leaf folder, panicle mite and brown plant hopper were observed in low to moderate level. Rat damage was severe in almost all the areas and on all the varieties sown. Farmers took protective measures like burrow fumigation, butta trapping, bromadiolone baiting, and passing electricity around the field against rodents. Crop was dried due to non availability of water in the bore wells in upland mandals. In delta mandals higher yields were realized as the incidence of pest and diseases was low and prevalence of

bright sunshine hours. A few farmers heaped the harvested paddy in the field without threshing thinking that it can be threshed whenever market price increases. Crop holiday was declared in East Godavari in different parts of East Godavari district in an extent of 30,000ha. Canal irrigation water was stopped for rabi season in parts of West Godavari and hence farmers have sown pulses like blackgram and greengram.

District wise observations:

East Godavari: The survey was conducted on 3rd and 11th October 2011 covering 9 mandals of the district. The predominant varieties grown in this district were Swarna MTU-7029, MTU-1010, PLA-1100, MTU-1061, MTU-1001, MTU-3626, BPT-5204, MTU-1064 and MTU-1075. Samba Mahsuri was grown mainly in upland mandals like Pitapuram, Peddapuram and Samalkota. The weather conditions were normal and the crop was healthy. Hence yields were increased (2.5-3.0 tonnes/ha) when compared to previous season (1.9-2.5 tonnes/ha). Private agencies played major role in supply of inputs like seeds, fertilizers and pesticides. Canal irrigation was the main source of water to the crop. The main crop rotation in the district was rice-rice, rice-rice-pulse and rice-rice-maize and rice single crop. Fertilizer application consisted of 80 kg N/ha, 40kg P₂O₅ /ha and 40 kg K₂O/ha. Very few farmers applied straight fertilizers and majority of them applied complex fertilizers as top dressing. The commonly used fertilizers were 28-28-0; 20-20-0, DAP and 10-26-26. The main method of planting was random except in fields where machine transplanting was taken up. The level of weed infestation was low to moderate. The common weeds were *Echinochloa colona*, *E. crusgalli*, *Cyprus rotundus*, *C. iria*, *Fimbristilis* spp., *Monochoria vaginalis*, *Marsilia quadrifolia*, *Eclipta alba*, *E. prostrata*, *Eichhornia crassipes* and *Alternanthera sessalis*, *commelina bengalensis*, *Ammamia baccifera*, *Bergia maanioides*, *Phyla nodulosa* and *Mullugo distich*. The predominant weeds in irrigation channels were *Eichhornia crassipes* and *Ipomia aquatica*. Farmers used herbicides like Rifit (pretilachlor), butachlor, Topstar (oxadiargyl), Sathi (pyrazosulfuran) and 2-4D sodium salt for weed control. Weedicide Sathi was mostly used under direct sown condition. Inputs like seed, fertilizers, pesticides were adequate. However, drying and storage facilities were inadequate. Threshing and drying of the produce was done on the roads. Among diseases sheath blight was observed in low to moderate level. Stem borer and leaf folder incidence was low to moderate while brown plant hopper incidence was low. Most of the farmers used hexaconazole for control of sheath blight and Applaud (buprofezin) for control of brown plant hopper. Hand sprayers as well as Thaiwan sprayers were used for application of insecticides. Indiscriminate mixing of fungicide and insecticides was the most common practice adopted by the farmers. The rate of adoption of plant protection measures was almost 100%. Farmers applied pesticides like hexaconazole (2ml/lit), validamycin (2ml/lit.) for sheath blight; profenophos (2ml/lit.) acephate, cartap hydrochloride (4G and 50 SP), chlorantraniliprole (Coragen) and monocrotophos for stem borer control while acephate (1.5g/lit.), monocrotophos (2.2ml/lit.), fenvalrate and buprofezin for brown plant hopper. Though the machinery like drum seeder, combined harvester cum threshers and transplanters are available in this area they were used by only 10% of farmers because they are unsuitable in some area where soil is heavy and will not dry for longer period. There was acute shortage of farm labour during harvesting and heaping period. Farmers were not having any drying and storage facilities. Threshing was done on the roads with tractors since the fields did not dry by the time of crop harvest. Farmers of the district took crop holiday for kharif 2011 in an extent of 30,000ha.

West Godavari: The survey was conducted on 17th November 2011 covering 6 mandals of the district. The predominant varieties grown in this district were Swarna MTU-7029, MTU-

1010, PLA-1100, MTU-1061, MTU-1001, MTU-3626, BPT-5204, MTU-1064 and MTU-1075. The weather conditions were abnormal in upland mandals and normal in delta mandals wherever canal irrigation water was available. The yields recorded were above average (3.0-3.5t/ha) and grain quality was good. Farmer to farmer, APSSDC and co-operative societies supplied seed, whereas private agencies played major role in supply of inputs like fertilizers and pesticides. The main crop rotation in the district was rice-rice, rice-pulse, rice-maize and rice-sugarcane. Canal irrigation was the main source of irrigation. Borewell irrigation was common in upland mandals where direct sowing is practiced. Fertilizer application consisted of 80-100 kg N/ha, 60kg P₂O₅/ha and 40kg K₂O/ha. Phosphorus fertilizer was applied in the form of complex fertilizers as basal and top dressing while, potassium was applied only once after transplanting (7-10 DAT). The level of weed infestation was moderate. The common weeds were *Echinochloa colonum*, *Cyprus rotundus*, *Fimbristilis sp.*, *Monochoria vaginalis*, *Marsilia quadrifolia*, *Eclipta alba*, *E. prostrata*, *Eichhornia crassipes* and *Alternanthera sessalis*, *commelina bengalensis*, *Phyla nodulosa* and *Mullugo disticha*. Usage of herbicides has been increased when compared to previous years. Farmers used herbicides like topstar, pretilachlor and butachlor for weed control. Plant protection equipment, seeds, water, power, fertilizers and pesticides were sufficiently available to the farmers. However drying and storage facilities were not adequate. Threshings were taken on the roads as the fields were wet and did not permit threshing operation. Among diseases, sheath blight was observed in low to moderate level. Stem borer and BPH occurred in moderate level and galmidge incidence was low in the district. Incidence of other pests like rice hispa, leaf folder and green leaf hopper was also observed in the district. Galmidge problem was observed to be increased since last four years. The number of pesticide sprayings was reduced when compared to previous year. Most farmers used thaiwan sprayers for application of insecticides and fungicides. Mixing of fungicide and insecticide was the most common practice adopted by the farmers. They are mixing three or even more chemicals in each of the spray. Phytotoxicity symptoms were noticed in some of the farmers fields where incompatible chemicals were mixed as tank mixtures. There were instances where farmers used more than three pesticides in the same tank mix. The rate of adoption of plant protection measures was almost 100%. Farmers applied pesticides like hexaconazole (2ml/lit) and hexaconazole + zineb (Avtar), trifloxystrobin + tebuconazole (Nativo) 75WG for sheath blight; profenophos (2.0ml/lit.), cartap hydrochloride (50% SP and 4G granules), acephate (1.5g/lit.), monocrotophos (1.6 ml/lit.) and chlorantraniliprole (Coragen) for stem borer control. Chemicals like buprofezin (1.6ml/lit.) and acephate (1.5g/lit.), diclorovas in combination with monocrotophos were used against brown plant hopper. Crop suffered due to drought dried at panicle emergence stage in upland mandals where bore well irrigation water exhausted.

Prevalence of diseases and pests in coastal Andhra Pradesh during 2011 kharif

District	Diseases					
	ShBI	NBI	FS	STR	Sh.R	BLB
East Godavari	M	--	L	L	L	L
West Godavari	M	--	L	--	--	L

District	Insect pests						
	LF	SB	RH	GM	BPH	GLH	Rats
East Godavari	L	M	L	L	L	L	M
West Godavari	L	L-M	L	L	L	L	M

ANDHRA PRADESH-3

Districts Surveyed: Srikakulam, Vizianagaram and Visakhapatnam

Particulars of survey

District	Mandal	Villages covered
Srikakulam	Boorji, Palakonda, Amadalavalasa, Seetampeta, Narasannapeta, Polaki, Echerla, Ranastalam, Laveru, Ponduru	Lakshmannapeta, Uppinavalasa, Kollivalasa, Kondapuram, Seetampeta, Konikavalasa, Pedaramam, Akkivalasa, Gudem, Kamarti, Sattivaram, Challabanda, Thotada, Sidhapanipeta, Gollavalasa, Selapanivaripeta, Budumurru, Ranastalam, Kondamulagam, Locherlapalem, Arjunavalasa, Erakalapeta, Rapaka, Kintali, Kotipalli, Kanimetta
Vizianagaram	Bondapalli, Gajapatnagar, Vizianagaram, Jami, Dattarajeru, Ramabhadrapuram, Saluru	Nelliwada, Bodasigapeta, Madupada, Korukondapalem, Korukonda, Annamrajupeta, Venkatapuram, Vizianagaram, Jennivalasa, Kamutapalli, Angathoda, Gigiram, Pattaki, Ramabhadrapuram, Gajapatnagar, Saluru
Visakhapatnam	Achyutapuram, Rambilli, Yelamanchili, Kasimkota, Pendurti, Sabbavaram, Anandapuram, Bhimili, Venkatapuram	Kondakerla, Dharapalem, Mamidada, Elamanchili, Chinagumuluru, Pedamarajupeta, Narsingapalli, P.Bhayyavaram, Ugginapalem, Bayyavaram, Adireddipalem, Chinnayyapalem, Sabbavaram, Chirlapalem, Singanabanda

Prevalent Varieties in North Coastal Zone of Andhra Pradesh

Predominant Rice Varieties in NCZ
MTU 1001, Swarna (MTU 7029), Samba mashuri (BPT 5204), Sona mashuri (BPT 3291), Srikakulam Sannalu (RGL 2537), Vasundhara (RGL 2538), Cotton dora sannalu (MTU 1010), NLR 34449, Pushyami (MTU 1075), Indra (MTU 1061), Jagityala Sannalu (JGL 1798), Jaya, super Jaya, Pooja, Sabasta, NLR 3041, Ravi, KRH 2.

Table: District wise area covered under rice crop during *kharif* 2011

District	Total cultivated area			Paddy cultivated area			Drought effected
	2010	2011	%	2010	2011	%	
Srikakulam	251056	257318	102.49	205308	206751	105.4	28 out of 38 mandals
Vizianagaram	263486	237737	90.22	122901	122982	100.1	15 out of 34 mandals
Visakhapatnam	217512	212680	97.88	92885	108214	116.5	31 out of 43 mandals.

Source: Department of Agriculture, Srikakulam, Vizianagaram and Visakhapatnam

Table: Rainfall pattern in North Coastal Zone of Andhra Pradesh (2011-12)

Sl. No.	Month	SRIKAKULAM			VIZIANAGARAM			VISAKHAPATNAM		
		Normal Rainfall	2011	Deviation (%)	Normal Rainfall	2011	Deviation (%)	Normal Rainfall	2011	Deviation (%)
1	April	30.5	56.9	86.56	31.0	85.9	177.10	35.0	85.2	143.43
2	May	102.7	87.5	-14.80	114.2	106.3	-6.92	114.5	100.4	-12.31
3	June	134.9	131.2	-2.74	128.4	113.3	-11.76	128.3	73.0	-43.10
4	July	189.4	155.6	-17.85	178.7	170.1	-4.81	197.3	227.0	15.05
5	August	185.1	251.8	36.03	195.1	227.4	16.56	196.5	183.1	-6.82
6	September	196.3	187.1	-4.69	190.5	186.5	-2.10	190.0	190.5	0.26
7	October	182.8	30	-83.59	167.9	38.8	-76.89	205.3	53.9	-73.75
8	November	90.6	0	-100.00	73.3	0.9	-98.77	87.3	1.8	-97.94
9	December	2.6	12.3	373.08	4.6	7.1	54.35	4.6	5.2	13.04
Total		1114.9	912.4	-18.16	1083.7	936.3	-13.60	1158.8	920.1	-20.60

Source: Department of Agriculture, Srikakulam, Vizianagaram and Visakhapatnam

Table: Varietal distributions (Paddy) in North Coastal Zone of Andhra Pradesh

Variety	Srikakulam		Vizianagaram		Visakhapatnam		Total Area (ha)
	Area	%	Area (ha)	%	Area (ha)	%	
RGL 2537	3866	1.9	2460	2	25106	23.2	31432
MTU 7029	72714	35.8	18448	15	23158	21.4	114320
BPT 5204	29627	14.3	7378	6	18829	17.4	55835
BPT 3291	14576	7.1	22137	18	12553	11.6	49266
MTU 1001	64257	30.5	65181	53	8116	7.5	139663
MTU 3626	-	-	-	-	6276	5.8	6276
NLR 34449	248	0.1	-	-	1515	1.4	1763
MTU 1010	703	0.3	1229	1	866	0.8	2798
RGL 2538	2070	1.0	3690	3	866	0.8	4555
JGL 1798	930	0.5	-	-	649	0.6	1580
Others	17719	8.6	2460	2	10280	9.5	30459
Total	206751	100	122982	100	108214	100	437947

Source: Department of Agriculture, Srikakulam, Vizianagaram and Visakhapatnam

Paddy is the predominant crop in the north coastal zone of Andhra Pradesh occupying more than 59% of the total cropped area. During *kharif* 2011-12, a total of 65 locations were surveyed in 26 mandals of north coastal zone (NCZ) of Andhra Pradesh. Majority of the area under cultivation is canal fed, followed by tank fed and rain fed conditions. Swarna (MTU 7029), Vijeta (MTU 1001), Samba mashuri (BPT 5204), Sona mashuri (BPT 3291) and Srikakulam sannalu (RGL 2537) were the predominant varieties grown in the zone. Majority of farmers were small to marginal land holders. Less than 80% of normal rainfall was received during September end, October, November and December 1st fortnight resulting in severe moisture stress at panicle emergence and milking stage which resulted in yield loss. More than normal yields were realized in Swarna, Vijeta and Srikakulam sannalu, however, yields in Samba mashuri and Sona mashuri were below than expected due to high pest and disease incidence. In NCZ, rice is generally grown as a *kharif* crop followed by pulses, sesamum, maize, jowar or sunflower during *rabi*. However, rice-mesta cropping system was also practiced in some areas of Srikakulam district. Depending on the availability of irrigation water, general date of sowing was July I-IV week. However, transplantation depends on the onset of monsoon and release of the canal water. Seed rate of 15-60 kg per acre has been

practiced by farmers of the NCZ. However, one bag (30 kg) per acre was used by majority of farmers. Random transplantation is the most preferred system of cultivation, however, direct sown drum seeded rice is gaining popularity in the zone, particularly in Srikakulam district where, more than 2000 acres was sown using drum seeder. Plant density ranged from 16-65 hills/ m² in the areas surveyed. Difference in nitrogen (11.5-78 kg/ac range), phosphorus (0-58kg/ac) and potassium (0-36 kg/ac) fertilizer application have been recorded. Potassium deficiency symptoms have been observed on the crop in most of the locations surveyed. Some of the farmers gave foliar application of 13-0-45 (KNO₃). Farm yard manure in the range of 2-20 cartloads per acre has been applied by more than 69% of the farmers surveyed. The practice of sheep penning was practiced by 20% of the farmers surveyed. Weed infestation was found to be moderate. *Cyperus rotundus*, *Cynodon dactylon*, *Echinochloa crusgalli*, *Cynotis* spp., *Ipomea* spp., *Sida* spp., *Trianthema* spp., *Buerinia hispida*, *Eclipta alba*, *Gomphrena* spp. and *Cardiospermum* spp. were the common weeds observed in farmers fields. Poor knowledge on weedicides and misconception that weedicides were harmful to the rice follow pulses and would have long lasting effect on soil health resulted in low use of weedicide (<20%) among farmers of the three districts.

Farmers in the NCZ had adequate supply of pesticides. However, seeds of required variety, fertilizers, drying and storage facilities, power, and low cost machinery were inadequate or not available. Farmers felt the need for oil engines and sprayers for better cultivation. Increased input cost was partly due to the forcible procurement of unwanted fertilizer mixtures along with the required fertilizers. In NCZ, Sheath rot on rice was found to be a predominant and emerging disease problem followed by sheath blight, grain discoloration and leaf spots. Whereas, leaf folder, panicle mite and gallmidge constituted important insect pest problems. Moderate to high infestation of gallmidge has been recorded in Srikakulam district of NCZ. However, the disease and insect pest scenario varied with the district. It has been noticed that extreme dry weather during the crop season, resulted in the infestation of the occasional mealy bug at a few locations. Farmers have undertaken 2-3 sprayings during the crop period. Based on the recommendation of local pesticide dealers, majority of farmers in Vizianagaram district used synthetic pyrethroids (Lambda cyhalothrin) for the management of leaf folder. Whereas, some farmers of Srikakulam district used DDT against stem borer and phorate for the management of rats in problematic areas. It has been observed that the disease and insect pest problems during *kharif* 2011-12 was comparatively lower in comparison to the previous year with the exception of sheath rot incidence and gallmidge infestation.

Srikakulam: Majority of farmers are marginal to small farmers. During *kharif* 2011-12, a total of 29 locations were surveyed in 10 mandals of Srikakulam district. Monsoon was erratic with low rainfall (-18.2%) during the crop period. Srikakulam district did not receive rainfall during last fortnight of October, November and December months resulting in drought during critical stages of crop growth. Increase in area under maize, cotton, sugarcane and greengram was observed. Whereas, decrease in area under groundnut, jowar, mesta was recorded. In areas with assured water supply, high light intensities during crop growth period resulted in good yields. Surveys were conducted during tillering, booting, heading, milking and dough stages of crop growth. Rice is generally grown as a *kharif* crop followed by pulses, sesamum, maize, jowar or sunflower during *rabi*. Rice- Mesta cropping system was also practiced in some areas of Srikakulam district. Swarna (MTU 7029), Vijeta (MTU 1001), Samba (BPT 5204), Sona mashuri (BPT 3291), NLR 34449, NLR 3041, Srikakulam Sannalu (RGL 2537), Jagityala sannalu (JGL 1798), MTU 1010 and Pooja are the predominant varieties grown in the district. Depending on the availability of irrigation water, general date of sowing was July II-IV week. However, transplantation dates depend on release of the

canal. Seed rate of 15-60 kg per acre has been practiced by farmers of the district. However, seed rate of one bag (30 kg) per acre was adopted by majority of farmers. The practice of applying FYM was practiced by 48.5% of the farmers surveyed and the application rate ranged from 2-20 cartloads per acre.

Differences with respect to application of nitrogen fertilizer (11.5-64 kg N/acre), phosphorus (0-46 kg P₂O₅/acre) and Potassium (0-30 kg K₂O/acre) have been recorded. Due to increased cost and poor supply of potassium fertilizers, only 34% of farmers have applied potassium fertilizers. Potassium deficiency symptoms have been observed on the crop in most of the locations surveyed. Some of the farmers gave foliar application of 13-0-45 (KNO₃) based on the recommendation of local agricultural department officers. The practice of sheep penning was also practiced by 20% of the farmers for which farmers paid Rs. 300-500 /50 sheep lot/ per night. Random transplantation is the most preferred system of cultivation followed by farmers of Srikakulam district. Plant density ranged from 16-42 hills/m² in the areas surveyed. However, direct sown drum seeded rice is gaining popularity among farmers of the district. More than 2000 acres were sown using drum seeder this year due to unavailability of labour and increased labour costs. Mechanical transplantation was also gaining popularity in the district. Weed infestation was observed to be medium to high at various locations surveyed. Predominant weeds include *Cyperus castaneus*, *Cyperus nutans*, *Cynodon dactylon*, *Echinochloa crusgalli*, *Cyanotis cucullata*, *Sida spp.*, *Paspalum spp.*, *Sesbania spp.*, *Ageratum conyzoides*, *Leersia hexandra*, *Eruva* (local name), *Okkapata gaddi* (local), *Pistia spp.*, *Commelina bengalensis etc.*, Poor knowledge of weedicide use and misconception that weedicides would affect the following pulse crop resulted in poor weedicide adoption by farmers of the Srikakulam district. Among the weedicides used, Oxadiargly, Butachlor and Pretilachlor were the most commonly used.

Among the disease constraints, sheath blight was the most important disease constraint limiting yields in paddy. Mean sheath blight severity of 24.3% was recorded in the district with highest sheath blight severity of 70.7% recorded in Kollivalasa of Boorji mandal. Sheath blight along with grain discoloration was found to be most predominant problems with 51.7% intensity in each of the locations surveyed. During the reproductive stage of crop growth, sheath rot was found to be the major disease constraint affecting yields in paddy. The disease was particularly recorded in BPT 3291, BPT 5204 and MTU 1001. Mean sheath rot incidence of 4.6% has been recorded with highest sheath rot incidence (22.1%) recorded in Boorji mandal. Neck blast (1.9%), leaf spots (1.4%), BLB (1.2%) and false smut (1.0%) were the other diseases of importance affecting paddy yields. Leaf folder was found to be the most predominant insect pest with 12.6% infestation and a peak infestation of 84% recorded in Arjunavalasa village of Ranastalam mandal. Gallmidge was the second most severe pest observed in 55.2% of the locations with a mean infestation of 11.6%. Highest gall midge infestation was recorded in Thotada village of Polaki mandal. Stem borer (mean infestation of 4.2%), panicle mite (4.0%), BPH (2.5%), Rats (1.4%), mealy bug (0.3%) and hairy caterpillar (0.3%) were the pests of importance impacting yields in paddy. Akkivalasa village of amadalavalasa mandal recorded highest stem borer infestation (29.8%). Whereas, Erakalapeta (Ponduru mandal), Challabanda (Polaki mandal) and Kollivalasa villages (Boorji mandal) recorded highest infestation of panicle mite (24.6%), BPH (30%) and rat damage (30%) respectively. Wild boar problem was observed in pockets. The number of pesticide sprays was comparatively reduced to 1-2 compared to 2-4 spraying during the previous year due to low disease incidence.

Increased input cost can be attributed to the forcible procurement of unwanted fertilizer mixtures along with the required fertilizers. Farmers during *kharif* 2011-12 also

faced the problem of poor supply of fertilizers and water scarcity due to deficit rainfall. Farmers in Konikavalasa village have a practice of using DDT for the management of BPH and stem borer. It has been observed that farmers of Pedaramam and Gollavalasa villages of Seetampeta and Polaki mandals respectively did not apply any insecticides during the entire crop growth period. Farmers expressed unavailability of seed of desired paddy variety, power shortage and fertilizers as the major constraints apart from biotic constraints in paddy cultivation. They expressed their need for proper storage facilities and machinery for optimizing returns.

Vizianagaram: Survey was undertaken during November 2011 covering 17 locations in seven mandals of Vizianagaram district. Size of the holdings ranged from 0.5-7 acres among the farmers surveyed. Paddy-pulses, paddy-maize, paddy-ragi and paddy-sesamum were the predominant crop rotations followed in the district. Vijeta (MTU 1001), Sona (BPT 5291) and Swarna (MTU 7029) were the major paddy varieties grown covering more than 80% of the paddy area. Decrease in area under groundnut, mesta, sesame, sugarcane etc was recorded. However, increase in area under Maize and cotton was observed. Farmers at few locations surveyed (Annamrajupeta, Kamutapalli) showed preference to grow new varieties from ANGRAU (RGL 11226, NLR 34449, NLR 3041, MTU 1064) and private hybrids (Sabasta, Ravi). Farmers in the district complained about availability of impure seeds of Sona Mashuri supplied by local dealers. More than 80% of the farmers applied farm yard manure ranging from 4-20 cartloads per acre. Sheep penning was practiced by 29% of the farmers. Average seed rate of 39 kg/ acre (30-60 kg/acre) was adopted. None of the farmers surveyed have followed seed treatment. It has been observed that 30-45 day old seedlings were transplanted during August II-IV week. In comparison to 18-35 bags/acre yield recorded during last year, low yields were expected owing to drought conditions experienced during *kharif* 2011-12. Fifteen out of 36 mandals were declared drought affected. Moisture stress experienced during critical stages of crop growth resulted in chaffy grains in some locations.

Differences in fertilizer use was recorded in the district, nitrogen use ranged from 26.0-71.1 kg/acre. Nitrogen application @ 71.1 kg/acre has been observed in Nellivalasa village of Bondapalli mandal. Whereas, phosphorus and potassium fertilizers use ranged from 16-58 and 14-36 kg/acre respectively. It has been observed that 58.8% of the farmers did not apply any potassium fertilizers due to unavailability or increased cost of MOP fertilizers. Farmers of Kamutapalli, Angathoda and Kottakki villages surveyed applied complex fertilizers as supplement to MOP and the rest of the farmers relied on use of DAP and urea. NPK fertilizers were used at 46.2: 26.5: 9.4 kg/acre in comparison to the recommended NPK of 36:24:20 kg/acre. Random transplanting method is the most common practice followed by farmers of the district. Plant density ranged from 20-65 hills/m² with an average of 30 hills/m². Weed infestation was found to be moderate. *Cyperus rotundus*, *Cynodon dactylon*, *Echinochloa crusgalli*, *Cyrtospora* spp., *Sida* spp., *Ipomea* spp., *Trianthema* spp., *Borreria hispida*, *Cardiospermum* spp., *Eclipta alba* and *Gomphrena* spp. were the common weeds observed in farmers fields. It has been observed that 23.5% farmers used weedicides like oxadiargyl, pretilachlor and butachlor. Poor knowledge about weedicides, their use and negative opinion about weedicide use led to low adoption of weedicides by farmers of the district. Farmers in general have carried out 2-3 hand weedings during the crop season. Occurrence of weedy rice was found to be low among the locations surveyed.

Farmers in the district had adequate supply of pesticides. However, seeds of required variety, fertilizers, drying and storage facilities, power, and low cost machinery were inadequate or not available. Farmers felt the need for oil engines and sprayers for better cultivation. Among the biotic constraints limiting yields in paddy, sheath rot (mean of 5.4%

disease incidence) followed by grain discoloration (2.9%), false smut (2.8%), sheath blight (2.7%) and leaf spots (1.2%) were the major disease problems in Vizianagaram district. Sheath rot severity of 45% was recorded in Pedisella village of Gagapatnagar mandal, whereas, 29.6% sheath rot incidence was recorded in Angathoda village of Ramabhadrapuram mandal. Sheath rot and grain discoloration was recorded in 41.2% of the surveyed locations making them the most prevalent diseases followed by sheath blight and leaf spots.

In terms of insect pest damage, leaf folder was found to be the most prevalent pest (52.9%) infesting paddy with 15.0% mean infestation recorded in the surveyed locations. Severe infestation (62.5%) of leaf folder was recorded in Bodasingapeta of Bondapalli mandal. Panicle mite was also recorded in 47.1% of the locations surveyed with a mean infestation of 4.7%, making it the second most prevalent pest in Vizianagaram district. Rat damage was recorded in 17.7% of the locations surveyed and mealy bug in 5.9% of the locations surveyed. Extreme dry weather during the crop season, aggravated the infestation of the occasional mealy bug infestation at a few locations. Stem borer, gallmidge, BPH, hispa, hairy caterpillar are the other pests of importance recorded in the district. Gallmidge was recorded during vegetative stage of crop growth in Ramabhadrapuram, Bobbili, Saluru, Gajapatnagar mandals of Vizianagaram district. Based on the recommendation of local pesticide dealers, farmers have undertaken 2-3 sprayings with synthetic pyrethroids. Lambda cyhalothrin was particularly used by majority of farmers and pest resurgence was observed in the locations surveyed.

Visakhapatnam: Survey was taken up during milking and dough stages of crop growth during kharif 2011-12. Increase in area under *kharif* paddy was recorded due to availability of irrigation water (tanks) during June-July. However, subsequent drought conditions resulted in severe loss to crop, 31 out of 43 mandals were declared affected by drought during the season. In mandals affected by severe drought conditions, paddy was used either as fodder or left alone. Srikakulam Sannalu (RGL 2537) was the most preferred variety occupying 22.2% of the total paddy area followed by MTU 7029, BPT-5204, BPT 3291, MTU 1001 and MTU 3626. Farmers felt that the climatic conditions were found particularly congenial for the cultivation of Srikakulam sannalu, Swarna and MTU 1001. Varieties like, Jaya, Superjaya were grown in pockets in Chodavaram, Achyutapuram and Rambilli mandals of Visakhapatnam district. Whereas, less than expected and normal yields was achieved in samba and sona mashuri. Paddy-Pulses, Paddy-Sesamum, Paddy-Bajra were the predominant cropping systems in the district.

Seed rate of 30 kg/acre was adopted by majority of farmers. Farmers have the practice of amending with FYM during summer season, 5-20 cartloads of FYM has been applied among the farmers surveyed. However, surveyed farmers of Ugginapalem, Bayyavaram, and Elamanchili did not apply FYM. In comparison to yield of 10-25 bags/acre during previous year decrease in yield was expected due to severe drought conditions. Nitrogen use ranged from 18-78 kg/ac. in comparison to the recommended 36 kg/acre. Highest N use was recorded in Chirlapalem village of Anandapuram mandal and the lowest (18 kg N/acre) was recorded in Bayyavaram village of Kasimkota mandal. Phosphorus application ranged from 0-46 kg P₂O₅/acre, one of surveyed farmer from Bayyavaram village of kasimkota mandal did not apply any fertilizer in P₂O₅ form. 63% of the farmers surveyed did not apply potassium in any form due to poor availability or very high costs. Average NPK use of 48.2:23.5:7.9 kg/acre has been recorded. Random transplantation method was the most common practice in Visakhapatnam district, a plant density of 25-40 hills/m² was recorded in the surveyed locations. Weed infestation was found to be medium with *Cenchrus ciliaris*,

Echinochloa spp., *Dactyloctenium aegyptium*, *Cyperus* spp., *Cynodon* spp., *Commelina* spp., *Alternanthera* spp. *Marsilea* spp., *Physalis minima*, were the predominant weeds recorded. Less than 20% of the farmers surveyed applied weedicides like oxadiargyl and pretilachlor. Whereas, most of the farmers practiced two hand weedings during crop growth. Poor knowledge of weedicides resulted in low weedicide adoption. Majority of the farmers expressed that water, fertilizers, power, equipment suiting the local conditions, proper drying and storage facilities were inadequate. However, seeds and pesticides supply or availability was found adequate.

It has been observed that leaf spots (NBS and Brown spot) was the most prevalent disease constraint observed in 89.5% of the locations surveyed (mean leaf spot incidence of 11.1%) in the district. Whereas, 58.6% sheath rot incidence recorded in Ramapuram village of Pendurthi mandal (12.8% mean sheath rot incidence). Among the other disease constraints, neck blast (4.0% incidence), sheath blight (4.0%), grain discoloration (3.1%) and BLB (1.8%) were recorded during the survey. Highest neck blast (42.2%) and leaf spot incidence (35.0%) was recorded in Chinagumuru village of S. Raghavaram mandal and Chinnarapalem of Anandapuram mandal respectively. In comparison to heavy incidence of false smut during the previous year, only 0.62% false smut has been recorded during *kharif* 2011-12. Among the insect pests, panicle mite (14.7% mean infestation) and leaf folder (12.1%) were the major insect pest constraint limiting crop production. The percent infestation of stem borer was low i.e., 4.7% but it was the most prevalent pest among different locations (84.21%) surveyed. Meager infestation of Brown plant hopper (2.4%), hispa (0.5%) and hairy caterpillar (0.3%), rats (1.3%) and mealy bug (1.0%) was observed among the locations surveyed. In general, it was observed that moisture stress conditions, heavy incidence of sheath rot, panicle mite stem borer infestation severely affected yield in paddy. It has been observed that the disease and insect pest incidence during *kharif* 2011-12 was comparatively lower in comparison to the previous year with the exception of sheath rot incidence and gallmidge infestation.

Biotic constraints (disease and insect pest) presented in terms of disease incidence/ severity and insect pest infestation along with prevalence in districts of North coastal Zone of Andhra Pradesh.

Disease	Srikakulam1		Vizianagaram2		Visakhapatnam3	
	% Incidence/ Severity (Range)	% Prevalence	% Incidence/ Severity (Range)	% Prevalence	% Incidence/ Severity (Range)	% Prevalence
Sheath blight (severity)	24.3 (28.5-70.7)	51.7	2.7 (5.0-45.7)	29.4	4.0 (9.1-25.2)	26.3
leaf blast (Score)	0.3 (1.0-5.0)	10.3	0.4 (1.0-5.0)	11.8	0.3 (1.0-5.0)	5.3
Neck blast	1.9 (1.5-11.3)	24.1	0.6 (1.3-8.6)	11.8	4.0 (1.1-42.2)	15.8
leaf spot	1.4 (1.0-15.0)	37.9	1.2 (2.0-10.0)	23.5	11.1 (2.0-35.0)	89.5
Sheath rot	4.6 (1.9-22.1)	41.9	5.4 (1.4-22.7)	41.2	12.8 (0.9-58.6)	68.4
False smut	1.0 (0.6-14.0)	10.3	2.8 (1.4-29.6)	23.5	0.6 (0.2-4.6)	21.1
Grain discoloration	2.5 (2.0-15.0)	51.7	2.9 (2.0-10.0)	41.2	3.1 (1.0-10.0)	68.4
BLB	1.2 (5.0-30.0)	6.9	0.4 (2.0-5.0)	11.8	1.8 (2.0-20.0)	21.1

Insect Pest	SRIKAKULAM ¹		VIZIANAGARAM ²		VISAKHAPATNAM ³	
	% Infestation	% Prevalence	% Infestation	% Prevalence	% Infestation	% Prevalence
Stem borer	4.2 (0.7-29.8)	41.4	0.9 (0.9-9.9)	23.5	4.7 (0.9-17.5)	84.2
Leaf folder	12.6 (5.6-84.0)	48.3	15.0 (1.8-62.5)	52.9	12.1 (0.9-39.5)	68.4
Gallmidge	11.6 (7.2-42.2)	55.2	1.3 (0.5-12.8)	5.9	0.1 (0.0-2.6)	5.3
Panicle mite	4.0 (0.6-24.6)	31.0	4.7 (0.5-26.6)	47.1	14.7 (8.7-62.6)	63.2
BPH	2.5 (5.0-30.0)	17.2	1.5 (0.0-25.0)	5.9	2.4 (5.0-25.0)	15.8
Hispa	0.7 (2.0-10.0)	20.7	0.4 (0.0-2.0)	17.7	0.5 (2.0-5.0)	15.8
Hairy caterpillar	0.3 (2.0-5.0)	10.3	0.2 (0.0-2.0)	11.8	0.3 (0.0-2.0)	15.8
Rat	1.4 (10.0-30.0)	6.9	1.6 (2.0-20.0)	17.7	1.3 (0.0-25.0)	5.3
Mealy bug	0.3	10.3	0.1	5.9	0.1	5.3

1= mean of 29 locations; 2= mean of 17 locations; 3=mean of 19 locations

BIHAR

District surveyed: Muzaffarpur, Samastipur, East Champaran and West Champaran

Particulars of survey

District	Blocks/Taluq	Villages
Muzaffarpur	Dholi	Raini, Sakra and Dholi
Samastipur	Pusa	Kubauligram, Marpur (North), Marpur, South Marpur, Naryanpur (Tota) and Pusa
East Champaran	Madhwon	Piprakothe and Baragovind
West Champaran	Madhopur	Sanwaliya, Chanraha, Chapra Bahash, Madhopur KVK and Madhopur RS

Widely grown rice varieties

District	Varieties
Muzaffarpur	Improved: Prabhat, Rajendra Sweta, Rajendra Bhagwati, Rajshree, BPT 5204, MTU-1001, MTU-1010, Gautam and CSR 36
Samastipur	Improved: Rajendra Bhagwati, Prabhat, Swarna Sub-1, Nata Mahsuri, Sita, Rajendra Subhasini, Pusa Basmati 1, Pankaj, Saroj, Dhanlaxmi, Subhash, Jaya, Rajendra Kasturi, Kishori and Sudha; Hybrid: Arize-6444
East Champaran	Improved: Prabhat, Rajendra Bhagwati, Rajshree, Sugandha; Hybrid: Goldi, RH 10 and Arize 6444
West Champaran	Improved: Sarju 52, Resma, Rajendra Mahsuri, Nata Mahsuri, Kasturi, Prabhat, Sona Mahsuri and Rajendra Bhagwati; Hybrid: JK hybrids

District wise observations:

Production oriented survey was conducted in 4 districts of Bihar when most of the rice fields were in dough to maturity stage. There were incidences of draught or draught like situations in most of the places surveyed. Most of the farmers took one rice crop in a year and the common crop rotations were rice-wheat, rice-mustard, rice-potato and rice-maize. The commonly grown varieties Rajendra Bhagwati, Prabhat, Swarna Sub-1, Nata Mahsuri, Sita, Rajendra Subhasini, Pusa Basmati 1, Pankaj, Saroj, Dhanlaxmi, Subhash, Jaya, Rajendra Kasturi, Kishori and Sudha among HYVs and Goldi, RH 10 and Arize 6444 among hybrids. The intensity of common weeds like *Cyperus rotundus*, *Cynodon dactylon* and *Echinochloa* spp. were low to medium. Most of the farmers used hand weeding and only some farmers used herbicides like butachlor and 2,4-D. Most of the inputs were either inadequate or not available in most of the places. Among the diseases, brown spot was recorded in moderate to high intensity. Other diseases like sheath blight, sheath rot, bacterial blight, false smut, grain discoloration were recorded in low to moderate intensities. Among the insect pests, stem borer, leaf folder, BPH, WBPH, gall midge and grass hoppers were recorded in low to moderate intensities. Low intensity of rat damage was also recorded in some places.

Muzaffarpur: Production Oriented Survey was conducted in three villages in this district when the crop was in dough to maturity stage. In general, the climatic conditions were not highly favourable for rice cultivation as there were incidences of draught or draught like

situations in many places surveyed. Farmers took one rice crop in a year. The common crop rotations practiced by the farmers were rice-potato, rice-wheat and rice-mustard. The commonly cultivated rice varieties in the district were Prabhat, Rajendra Sweta, Rajendra Bhagwati, Rajshree, BPT 5204, MTU-1001, MTU-1010, Gautam and CSR 36. The average rice yield in the region was 3500-4500 kg/ha among the HYVs and about 5700 kg/ha in hybrids. The optimum time of sowing and transplanting was in June and July, respectively. The average seed rate was 20-25 kg/ha. Most of the farmers applied FYM in nursery beds. In the main fields, farmers applied 100-120 kg N, 40 kg P₂O₅ and 20 kg K₂O per ha. Few farmers applied zinc sulphate (20-25 kg/ha) and vermicompost. Transplanting was random. Some farmers even tried SRI. The intensity of common weeds like *Cyperus rotundus*, *Cynodon dactylon* and *Echinochloa* spp. were low to medium. Most of the farmers used hand weeding and only some farmers used herbicides like butachlor and 2,4-D. Most of the inputs were either inadequate or not available in most of the places. Among the diseases, brown spot was widespread in moderate to severe intensity. Other diseases like sheath blight, sheath rot and false smut were observed in low to moderate intensity. The varieties Rajendra Bhagwati and Rajendra Mahsuri were most affected by false smut. Among the insect pests, stem borer, leaf folder, BPH, WBPH and grass hoppers were observed in low to moderate intensities while incidence of rat damage was low. The symptoms of zinc and iron deficiencies were observed in few places. Insecticides like imidacloprid, monocrotophos, furadan and fungicides like Saaf (carbendazim + mancozeb), Blitox-50, Diathane M-45 and Bavistin were used by the farmers for the control of pests and diseases.

Samastipur: Survey was conducted in 6 villages in this district when rice crop was in dough to mature stage. The weather condition during crop season was not very favourable as there were incidences of draught or draught like situations in most of the places surveyed. Farmers used 90% of their land for cultivation of rice. Farmers took one rice crop in a year and the common crop rotation practices followed by the farmers were rice-wheat, rice-potato, rice-maize and rice-mustard. The most predominant varieties in the region were Rajendra Bhagwati, Prabhat, Swarna Sub-1, Nata Mahsuri, Sita, Rajendra Subhasini, Pusa Basmati 1, Pankaj, Saroj, Dhanlaxmi, Subhash, Jaya, Rajendra Kasturi, Kishori and Sudha. Some of the farmers cultivated rice hybrid Arize 6444. The average rice yield in the district was between 4500-5500 kg/ha in case of HYVs and 5000-5700 kg/ha in case of hybrids. Time of sowing and planting was June and July, respectively. Most of the farmers used FYM in the nursery bed. In the main fields, fertilizers were applied @ 40-60 kg N/ha, 40-60 kg P₂O₅/ha and 15-20 kg K₂O/ha as basal and 40-60 kg N/ha as top dressing (2 splits). Few farmers applied vermicompost and neem cake. Transplanting method was mostly random and some farmers also adopted direct sowing. The intensity of common weeds like *Cyperus rotundus*, *Cynodon dactylon* and *Echinochloa* spp was in low to moderate intensity. The common method of weed management was hand weeding and only few farmers adopted herbicide application like butachlor and 2,4-D. Most of the inputs like equipments, seeds, power, fertilizers, pesticides and fertilizers were inadequate in most of the places. Some of the common needs of the farmers were seeds of HYVs, information on SRI, subsidies on fertilizers and diesel and timely availability of seeds and fertilizers. Among the diseases, brown spot and false smut were in moderate to severe intensity while sheath blight, sheath rot, grain discoloration and bacterial blight were in low to moderate intensities. The insect pests green leaf hopper, leaf folder, stem borer and gall midge were in low to moderate intensities while BPH intensity up to 80% was recorded in some fields. Deficiency symptoms of zinc and iron were noticed in some places. Fungicides like Tilt, Bavistin (1 g/l), Saaf (2 g/l), Blitox-50 (3 g/l), Indofil M-45, Kavach, hexaconazole, streptocycline and Kirlaxyl and insecticides like Furadan, metacystox, Thimet, monocrotophos and imidacloprid were used for the

management of pest and diseases. Some of the farmers used multiplex nutrient mixture for better growth of the plants.

East Champaran: Production oriented survey was conducted in two villages in this district. The crops were in tillering to heading stage at the time of survey. The general climatic conditions were not very favourable as there were draught like situations in most of the places visited. Farmers took one rice crop in a year and the common crop rotations were rice-wheat, rice-mustard, rice-maize and rice-potato. Most commonly cultivated varieties were Prabhat, Rajendra Bhagwati, Rajshree, Sugandha among improved and Goldi, RH 10 and Arize 6444 among hybrids. The average rice yields were 4000-5500 kg/ha in case of HYVs and 5500-6000 kg/ha in hybrids. Optimum time of sowing was June to early July while most of transplanting was done in July. Most of the farmers used FYM in the nursery. In the main fields, fertilizers were applied @ 40-50 kg N/ha, 40-60 kg P₂O₅/ha and 20-30 kg K₂O/ha as basal and 50-80 kg N/ha as top dressing. About 50% of the farmers applied zinc sulphate @ 20 kg/ha. Many farmers applied vermicompost, vermiwash and neemcake. Transplanting was random. Some farmers followed direct sowing. The intensity of weeds was medium. The common weeds were bathua, *Echinochloa* spp., *Cyperus rotundus*, *Eleusine indica*, *Ipomoea* spp. Hand weeding was the common method of weed management though some farmers applied weedicides like butachlor and 2,4-D. Most of the inputs were inadequate in most of the places. Among the diseases, brown spot was in moderate to severe intensities and others like sheath blight, sheath rot, false smut and bacterial blight were in low to moderate intensities. Among the insect pests, stem borer, leaf folder, BPH and gall midge were recorded in low to moderate intensities. There was low incidence of gundhi bug also in some of the places. Fungicides like Bavistin, Saaf, propiconazole, Blitox-50, Kavach and Diathane M-45 and insecticides like Furadan, imidocloprid, metasystox and monocrotophos were used. Some farmers used streptocycline for management of bacterial blight. Bavistin was used mainly as seed treatment. Some of the farmers used multiplex nutrient mixture for better growth of the plants.

West Champaran: Production oriented survey was conducted in 5 villages in this district. The rice fields were in different stages at the time of survey. There were incidences of draught like situations in most of the places surveyed. Farmers used 70-80% area under rice cultivation. The common crop rotations followed by the farmers were rice-wheat, rice-mustard and rice-sugarcane. The commonly grown varieties were Sarju 52, Resma, Rajendra Mahsuri, Nata Mahsuri, Kasturi, Prabhat, Sona Mahsuri and Rajendra Bhagwati among improved varieties. Few farmers cultivated JK hybrids. The average rice yield was 4500-5000 kg/ha among HYVs and 5500-7000 kg/ha in case of hybrids. Most of sowing and transplanting was completed in June and July, respectively. Few farmers adopted late sowing and transplanting. The average seed rate was 20-25 kg/ha. Most of the farmers applied FYM in seed beds. Some farmers also applied vermicompost. In the main fields, fertilizers were applied @ 40-60 kg N/ha, 50-60 kg P₂O₅/ha and 15-40 kg K₂O/ha as basal and 60-80 kg N/ha as top dressing. Some farmers applied vermicompost, neem cake and zinc sulphate. Transplanting was random. The intensity of common weeds like *Cyperus rotundus*, *Cynodon dactylon*, *Ipomoea* spp. and some unidentified weeds was low to medium. Hand weeding was common method of weed management. However, some farmers used herbicides like butachlor, 2,4-D and atrazine. Most of the inputs were inadequate in majority of the places. Farmers reported problem of nilicow (blue cow) in some of the places. Some of the common requirements of the farmers were seeds of HYVs, scented rice varieties, good power supply and availability of fertilizers in right time. Among the diseases, brown spot was in moderate to severe intensity. Other diseases like sheath blight, sheath rot, false smut, grain

discoloration and bacterial blight were in low to moderate intensities. Among the insect pests, BPH, GLH, leaf folder, stem borer, gall midge, grass hopper and rat damage were reported in low to moderate intensities. In some of the places, there were symptoms of zinc and iron deficiency. Pesticides like Saaf, Kaach, Kirlaxyl, ridomil, Indofil M-45, Blios-50, Blitox-50 + streptomycin and Bavistin among the fungicides and Thimet, follidol, furadan, endosulfan, monocrotophos and imidacloprid among insecticides were used. Some farmers treated the seeds with Bavistin. Micronutrient mixture -Multiplexø was applied by few farmers.

Prevalence of diseases and insect pests in Bihar

Districts	Diseases					
	BS	ShBI	SHR	GD	FS	BLB
Muzaffarpur	M-S (30%)	L (5%)	M (20%)		L-M (15%)	
Samastipur	M-S (20-50%)	L-m (5-25%)	M-S (20-35%)	L-M (20%)	M-S (15-50%)	L-M (15-20%)
East Champaran	M-S (20-30%)	L-M (5-20%)	L-M (10-20%)		L-M (5-25%)	L-M (10-20%)
West Champaran	M-S (15-30)	L-M (15-25%)	L-M (15-25%)	L-M (15%)	L-M (15-25%)	L-M (20-25%)

Districts	Insect pests								
	SB	LF	BPH	WBPH	GLH	GM	GH	Term	Rats
Muzaffarpur	L-M (10-20%)	L-M (10-20%)	L-M (10-20%)	L-M (10-20%)			L-M (10-20%)		L (5%)
Samastipur	L-M (5-20%)	L-M (5-20%)	S (80%)		L-M (5-20%)	L-M (5-10%)		L-M (10%)	
East Champaran	L-M (5-15%)	L-M (5-15%)	L-M (5-10%)			L-M (up to 15%)			
West Champaran	L-M (10-20%)	L-M (10-20%)	L-M (15-20%)		L-M (10-15%)	L-M (10-20%)	L-M (15-20%)		L (5%)

CHHATTISGARH

Districts surveyed: Bastar, Dantewada, Bijapur and Narayanpur

Particulars of survey:

Districts	Blocks/Taluqs	Villages
Bastar	Bastar, Jagadalpur, Kondagaon, Pharasganj, Makri, Keshkal, Dharbha, Tokapal, Bakaward, Bohandiguda and Bastanar	Bhamka, Bahogaon, Sigharpur, Kondagaon, Badedongar, Borgaon, Jiram, Tahakawada, Tokapal, Rojur, Parapur, Mardum, Dhobigena, Adawal, Golaward, Muli, Dillmilli, Ghodagaon, Amarwati, Bhand, Parachanpal and Kohkamunda
Dantewada	Chindgarh, Sukama, Nakalnar, Dantewada, Bacheli, Katekalyan and Geedam	Katekalyan, Tongpal, Tarapur, Masapara, Kunakarda, Gadiras, Bhansi and Geedam
Bijapur	Bijapur and Bharomgarh	Bijapur, Bharamgarh and Patelpara
Narayanpur	Narayanpur and Bennur	Narayanpur and Bennur

Widely grown rice varieties in Chhattisgarh during 2011 kharif

District	Varieties
Bastar	Improved: MTU 1010, MTU 1001, IR 64, Swarna, HMT and Poornima; Hybrids: PA 6444, PA 6144, KRH-2; Local: Limchudi, Gadaguta, Satka, Asamchudi, Safari, Masuri, Bhatamkodo, Bhatacotia, Huldigutti, Luluha, Lalhar, Sambalpuri, Gurmutia, Sindhur, Shrinagar, Tendu,Mudi, Mehardhan, Para, Chitari, Daverdhan, Loctimajhi; Scented: Badsahbhag, Dubraj,Javaful
Dantewada	Improved: : MTU 1010, MTU 1001, IR 64, Swarna and HMT, Hybrids: PA 6444, PA 6144, KRH-2; Local: Limchudi, Gadaguta, Satka, Safari, Masuri, Bhatamkodo, Bhatacotia, Huldigutti, Gurmutia, Sindhur, Shrinagar, Tendu,Mudi, Chitari, Scented: Badsahbhag, Dubraj
Bijapur	Improved: MTU 1010, MTU 1001, IR 64, Swarna, HMT and Poornima; Hybrids: PA 6444, PA 6144, KRH-2; Local: Limchudi, Gadaguta, Satka, Safari, Masuri, Bhatamkodo, Bhatacotia, Huldigutti, Gurmutia, Sindhur, Shrinagar, Tendu,Mudi, Chitari, Daverdhan; Scented: Badsahbhag, Dubraj
Narayanpur	Improved: MTU 1010, MTU 1001, IR 64, Swarna, HMT and Poornima; Hybrids: PA 6444, PA 6144, KRH-2; Local: Limchudi, Gadaguta, Satka, Safari, Masuri, Bhatamkodo, Huldigutti, Gurmutia, Tendu,Mudi, Chitari, Mehardhan,Loctimajhi; Scented: Badsahbhag, Dubraj

Particulars of Rice area and production in Chhattisgarh state

District	Total planted area (ha)	Total Rice area (ha)	Total Rice grain production (000MT) till 29.9.11
Bastar	340.502	192.154	221.944
Dantewada	189.694	143.224	204.810
Narayanpur	53.221	29.330	208.844
-	58.752	51.515	38.379
Kanker	233.051	166.856	218.070
Total	875.220	583.079	892.047

Most common weeds in Chhattisgarh state

District	Varieties
Bastar	<i>Cyperus sp.</i> , <i>Echinochloa sp.</i> , Chuhka(local name), <i>Convovulus srvensis</i> , <i>Cynodon dactylon</i> , <i>Commelina bengalensis</i> , <i>Digitaria sangullatus</i> , <i>Dicanthium annulatum</i> , <i>Celocia argentia</i> , <i>Aegeratum conezoids.</i> , Wild millets (<i>Elusin sp.</i>), <i>Saccharum spotaneum</i> , <i>Celosia argantea</i> , <i>Molilotus indica</i> , <i>Polygala chinensis</i> , Wild rice
Dantewada	<i>Cyperus sp.</i> , <i>Echinochloa sp.</i> , Chuhka(local name), <i>Convovulus srvensis</i> , <i>Cynodon dactylon</i> , <i>Commelina bengalensis</i> , <i>Digitaria sangullatus</i> , <i>Dicanthium annulatum</i> , <i>Celocia argentia</i> , <i>Aegeratum conezoids.</i> , Wild millets (<i>Elusin sp.</i>), <i>Saccharum spotaneum</i> , <i>Celosia argantea</i> , <i>Molilotus indica</i> , <i>Polygala chinensis</i> , Wild rice
Bijapur	<i>Cyperus sp.</i> , <i>Echinochloa sp.</i> , Chuhka(local name), <i>Convovulus srvensis</i> , <i>Cynodon dactylon</i> , <i>Commelina bengalensis</i> , <i>Digitaria sangullatus</i> , <i>Dicanthium annulatum</i> , <i>Celocia argentia</i> , <i>Aegeratum conezoids.</i> , Wild millets (<i>Elusin sp.</i>), <i>Saccharum spotaneum</i> , <i>Celosia argantea</i> , <i>Molilotus indica</i> , <i>Polygala chinensis</i> , Wild rice
Narayanpur	<i>Cyperus sp.</i> , <i>Echinochloa sp.</i> , Chuhka(local name), <i>Convovulus srvensis</i> , <i>Cynodon dactylon</i> , <i>Commelina bengalensis</i> , <i>Digitaria sangullatus</i> , <i>Dicanthium annulatum</i> , <i>Celocia argentia</i> , <i>Aegeratum conezoids.</i> , Wild millets (<i>Elusin sp.</i>), <i>Saccharum spotaneum</i> , <i>Celosia argantea</i> , <i>Molilotus indica</i> , <i>Polygala chinensis</i> , Wild rice

Agrometereological data for the year 2011

Date	T _{Max} °C	T _{Min} °C	Rainfall (mm)	Relative Humidity		Vapour Pressure		Wind Vel Kmph	Evap. mms	Sun-shine hours	Rainy Days
				Morning	Evening	Morning	Evening				
Jan	26.9	7.5	0.0	89.6	56.8	9.9	16.8	2.2	2.5	10.3	00
Feb	29.3	10.8	14.6	90.7	48.1	12.1	16.6		4.2	8.0	01
Marh	32.9	15.5	6.4	87.4	38.7	16.6	16.6	3.9	5.8	7.7	01
April	34.6	19.0	41.9	86.5	37.7	20.2	16.8	5.3	6.4	7.0	05
May	37.3	22.1	92.1	73.2	31.7	21.4	17.1	7.4	6.2	7.3	-
June	31.7	21.5	185.1	86.8	59.3	22.8	22.1	8.2	4.6	4.5	07
July	28.6	21.2	317.8	87.3	70.2	22.1	22.2	6.5	2.6	2.5	16
Aug	28.1	21.5	378.6	89.0	70.3	21.7	21.6	5.7	2.1	2.6	21
Sep	27.5	21.0	233.3	90.6	68.5	21.5	20.6	4.4	2.0	2.9	-
Oct	30.0	16.8	0.0	83.8	54.7	18.1	19.7	2.6	4.1	8.5	00
Nov	28.6	10.9	0.0	87.2	57.0	12.6	18.9	2.4	2.8	8.5	00
Dec	28.5	8.6	0.0	90.0	28.0	12.3	7.7	2.2	2.5	8.0	00

Production oriented survey was conducted in 4 districts of this state viz., Bastar, Dantewada, Bijapur and Narayanpur. Most of the crops were in milk to dough stage at the time of survey. The general climatic conditions were not very favourable for rice cultivation as there were incidences of drought in many places surveyed. Most of the farmers contacted were marginal or sub-marginal. The common grown rice varieties in this area were MTU 1010, MTU 1001, IR-64, Swarna, HMT and Poornima among HYVs; PA 6444, PA 6144 and KRH-2 among hybrids; Limchudi, Gadaguta, Satka, Asamchudi, Safari, Masuri, Bhatamkodo, Bhatacotia, Huldigutti, Luluha, Lalhar, Sambalpuri, Gurmutia, Sindhur, Shrinagar, Tendu,Mudi, Mehardhan, Para, Chitari, Daverdhan and Loctimajhi and Badsahbhag, Dubraj and Javaful among scented varieties. The average rice yield in these district were very less in the range of 1000-2500 kg/ha. Majority of the farmers adopted direct sowing. The intensity of different weeds was moderate to high. Among different biotic constraints, neck blast and brown spot were widespread in low to severe intensities while blast, sheath blight, false smut and bacterial blight were in low to moderate intensities. Stem borer and leaf folder were very widespread in low to severe intensities while other like rice bugs, gall midge, mealy bugs and termites were recorded in low intensities in some places.

Common needs of farmer:

- Lack of quality seed due to single government authorized seed centre is available among five districts
- Lack of fertilizers and pesticides due to not a proper supply to farmer by government department
- Lack of irrigation facilities for the use of pesticides for plant protection

District wise observations:

Bastar: Production oriented survey was conducted in 22 villages in 11 taluqs/blocks in this district when the rice crops were dough to heading stage. Almost 100% of the farmers contacted were marginal or sub-marginal. There were incidences of drought or drought like situations in many places (about 60% of the places). The major rice varieties grown by the farmers in the district were MTU 1010, MTU 1001, IR 64, Swarna, HMT and Poornima among HYVs; PA 6444, PA 6144 and KRH-2 among hybrids; Limchudi, Gadaguta, Satka, Asamchudi, Safari, Masuri, Bhatamkodo, Bhatacotia, Huldigutti, Luluha, Lalhar, Sambalpuri, Gurmutia, Sindhur, Shrinagar, Tendu,Mudi, Mehardhan, Para, Chitari, Daverdhan and Loctimajhi and Badsahbhag, Dubraj and Javaful among scented varieties. The average rice yield was low and ranged from 1000-2500 kg/ha. In hybrids, the yield ranged from 2500-3000 kg/ha. The sowing time varied from last week of June to 2nd week of July while the transplanting was done till last week of August. The seed rate was high and ranged from 90-150 kg/ha. Many farmers applied urea in the main field both as basal and as top dressing. However, the dose of N used was not available. Majority of the farmers practiced direct sowing and those followed transplanting, practiced random planting. The intensity of weeds was medium to high. The common weeds are presented in the table. Hand weeding (once in the season) was the main method of weed management. Among the diseases, neck blast and brown spot were very wide spread in moderate to severe intensity. Other diseases like blast, sheath blight, false smut and bacterial bight were in low to moderate intensities. Among the insect pests, stem borer and leaf folder were wide spread in low to severe intensities in different fields while rice bug and gall midge were in low to moderate intensities. Low intensities of termite were also recorded in some of the places. Pesticide use

was very less and only few farmers used pesticides like imidacloprid and chlorpyrifos were used for the control of pests.

Dantewada: Eight villages in 7 taluqs/blocks were covered for production oriented survey during dough to mature stage of the crop. About 60% of the farmers contacted were marginal or sub-marginal. The general climatic conditions were not very favourable for rice cultivation as there were incidences of drought in most of the places visited. The most commonly grown rice varieties in the region were HYVs like MTU 1010, MTU 1001, IR 64, Swarna and HMT; hybrids like PA 6444, PA 6144 and KRH-2; local varieties like Limchudi, Gadaguta, Satka, Safari, Masuri, Bhatamkodo, Bhatacotia, Huldigutti, Gurmutia, Sindhur, Shrinagar, Tendu, Mudi and Chitari and scented rice varieties like Badsahbhag and Dubraj. The average rice yield ranged from 1000-2500 kg/ha in varieties like MTU 1001, MTU 1010, HMT and Satka. The time of sowing was from last week of June to 2nd week of July while transplanting was completed by 2nd week of August. In most cases, the seed rate was high and ranged from 80-150 kg/ha. In the main fields, farmers applied DAP and urea. Many farmers applied 3-24 q/ha FYM in the main fields. Transplanting was random and many farmers in addition to transplanting followed direct sowing. The intensity of common weeds was moderate to high in many places. The common weeds recorded in the area are presented in the table. Hand weeding (once in the season) was the main method of weed management. Among different diseases, neck blast and brown spot were wide spread in low to severe intensities. Other diseases like leaf blast, false smut and bacterial blight were in low to moderate intensities. Among the different insect pests, stem borer and leaf folder were widespread in low to severe intensities. Pesticide usage was very less. Only few farmers used fungicides like carbendazim (Bavistin) and tricyclazole (Sivic) and insecticides like imidacloprid (Confidor) and chlorpyrifos.

Bijapur: Three villages in two blocks in this district were covered for production oriented survey when the rice crops were in milk to dough stage. The farmers contacted were marginal or sub-marginal. The general climatic conditions were not very good for rice cultivation as there were incidences of drought in most of the places visited. The commonly grown varieties in the region were MTU 1010, MTU 1001, IR 64, Swarna, HMT and Poornima among HYVs; PA 6444, PA 6144 and KRH-2 among hybrids; local varieties like Limchudi, Gadaguta, Satka, Safari, Masuri, Bhatamkodo, Bhatacotia, Huldigutti, Gurmutia, Sindhur, Shrinagar, Tendu, Mudi, Chitari and Daverdhan and scented varieties like Badsahbhag and Dubraj. The average rice yields in the district were very low and ranged from 1000-2500 kg/ha in varieties like Swarna, Mahsuri and MTU 1001. Almost all the farmers followed direct sowing and sowing was completed in between last week of June to 1st week of July. In the main fields, farmers applied urea but information on the dose of fertilizers used was not available. The seed rate was high and ranged from 130-150 kg/ha. The intensity of common weeds (Table) was high. Among different diseases, blast, neck blast and brown spot were wide spread in low to severe intensities in severe places in the district. Insect pests like leaf folder and stem borer were recorded in moderate intensities while mealy bugs were in low intensities.

Narayanpur: Two villages were covered for production oriented survey in this district when the rice crops were in milk to dough stage. All the farmers contacted were sub-marginal. There were incidences of drought in all the places visited. The common rice varieties grown by the farmers were MTU 1010, MTU 1001, IR 64, Swarna, HMT and Poornima among HYVs; hybrids like PA 6444, PA 6144 and KRH-2; local varieties like Limchudi, Gadaguta, Satka, Safari, Masuri, Bhatamkodo, Huldigutti, Gurmutia, Tendu, Mudi, Chitari, Mehardhan

and Loctimajhi and scented varieties like Badsabhag and Dubraj. The average rice yield was very less and ranged from 1000-1500 kg/ha in varieties like MTU-1010 and IR-64. Most of the farmers adopted direct sowing and it was completed by last week of June. The average seed rate was 80-120 kg/ha. In the main fields, farmers applied urea and DAP but information on the dose of fertilizers was not available. The intensity of common weeds (Table) was moderate to high. Among different diseases, blast, neck blast, brown spot and sheath blight were observed in low to moderate intensities while stem borer wide spread in low to severe intensities.

Prevalence of disease and insects in Chhattisgarh state during kharif, 2011

Districts	Diseases					
	Bl	Nbl	BS	ShBl	FS	BLB
Bastar	5-25%	10-75%	5-45%	5-15%	5-15%	10-15%
Dantewada	5-10%	5-60%	5-30 %		5%	
Bijapur	5-60%	10-70%	5-45%			
Narayanpur	10-15%	10-15%	20-25%	10-15%		

Districts	Insect pests				
	SB	LF	RB	GM	Term
Bastar	5-35%	5-65%	5-10%	5-10%	2-5%
Dantewada	5-30%	5-50%	8-10%		
Bijapur	5-30%	15-20%			
Narayanpur	10-35%				

GUJARAT

Districts Surveyed: Ahmedabad, Anand, Dang, Gandhinagar, Kheda, Mehsana, Navsari, Panchmahals, Sabarkantha, Surat, Tapi, Vadodara and Valsad

District	Taluqs	Villages
Ahmedabad	Bawala, Dholka, and Sanand	Khanpur, Gangad, Pipan, Sanand, Kayala and Dahegamda. (6)
Anand	Umreth, Khambhat, Tarapur.	Lingda, Isarvada, Tarapur, Jinaj and Laxmipura. (5).
Kheda	Balasinor, Thasara, Kheda and Matar.	Dev, Thasara, Vanoti, Aagarva, Vadala, Traj and Nawagam (7).
Gandhinagar	Dahegam	Sopa.(1)
Mehsana	Kadi	Thol. (1)
Dang	Ahwa	Bheskatri, Jamanpada, Rambhas and Waghai (4).
Navsari	Navsari, Vansada and Chikhli.	Mahuvas, Moti bhumti, Nogama, Khudvel, Vadpada, Toli, Ubharat, Eru and Chikhli. (9).
Valsad	Dharampur and Umargam.	Dhol dungri, Asura (Kukanfalia), Daheri and Jahangirpura (4).
Panchmahals	Godhra, Shahera, Lunavada, Kadana, and Santrampur.	Rampur(Kankanpur), Velvad, Chitripur, Morva, Tarsang, Rambariyanamuvada, Vakoda, Sapora, Hadmatia, Dodia, Sangavada Samantwada, Mehtanamuvada. (13)
Sabarkantha	Prantij, Sathamba.	Poglu and Sathamba (2).
Surat	Bardoli, Mahuva and Mandvi.	Mahovachi, Bardoli, Dungri, Vaniyavad, Nadodara, Boria, Allu and Mahogam (8).
Tapi	Tapi, Vyara and Valod.	Tichakiyapura, Paniyari, Vyara Farm, Kanjan, Gadat, Andhatri, Palod buhari, Kalkva, Musafarm-Vyara and Dolara (10).
Vadodara	Dabhoi	Timbi and Vasai (2).
TOTAL- 13	32	72

Widely Prevalent varieties:

District	Varieties
Ahmedabad	HYVs: Gurjari, GR-11 and Krishna Kamod.
Anand	HYVs: Nath poha, Rashi Ananam, Gurjari, GR-103, GR-11, Sonam, Moti Gold and Rupalee; Hybrids: Arize-6444, Gorakhnath,
Kheda	HYVs: Sathi, Gurjari, Moti-Gold, Poonam Rasi, Surya Moti, Sugam, GR-103, Masuri, GR-101 and GR-11; Hybrids: Arize-6444,
Gandhinagar	HYVs: Gurjari
Mehsana	HYVs: GR-11 and Gurjari
Dang	HYVs: IR-28, TN-1, Gurjari, GR-7, Jaya, Pankhali-203; Hybrids: US-312, Arize-786, US-178

District	Varieties
Navsari	HYVs: NAUR-1, Sita, Gurjari, Jaya, Masuri, IR-28, Roja-342, TN-1, Nath poha, Dandi, HYVs: PA-6201, 786, Suruchi, Gorakhnath-509
Valsad	HYVs: Gurjari, Nawabi colam and Jaya; Hybrids: Arize-786
Panchmahals	HYVs: Gurjari, GR-11, GAR-13, Swarna, and Surekha; Hybrids: Nirmal Hybrid-617, Komal (Hy.), PA-6201 and Arize-6444
Sabarkantha	HYVs: Gurjari and GR-11.
Surat	HYVs: Jaya, GAR-13, Gurjari, Sonali, Hybrids: US-312, Gorakhnath and PA-6201
Tapi	HYVs: Jaya, Nath poha, NAUR-1, GR-4, GAR-13, IR-28, Gurjari and GR-7; Hybrids: Arize-786, 2525, 801, Suruchi, Tej, PA-6201 and Gorakhnath
Vadodara	HYVs: GR-11, Gurjari, GAR-13, Surya Moti & Moti gold.

Particulars of rice area in Gujarat during kharif 2011

District	Total(ha)	Irrigated(ha)	Area planted(ha.)
Ahmedabad	1,20,800	1,20,800	1,20,800
Anand	90100	88,700	88,700
Kheda	97,300	97,300	97,300
Gandhinagar	8,200	8,200	8,200
Mehsana	5,400	5,400	5,400
Dang	18200	15800 (Rainfed TP)	18,200
Navsari	64,400	42,600	64,400
Valsad	71,400	21,400	71,400
Panchmahals	82,600	32,400	82,600
Sabarkantha	5,500	5,500	5,500
Surat	46,200	36,300	46,200
Tapi	44,800	14,800	44,800
Vadodara	69,500	25,400	69,500

Production Oriented Survey in rice growing areas of **Thirteen districts** viz, Ahmedabad, Anand, Dang, Gandhinagar, Kheda, Mehsana, Navsari, Panchmahals, Sabarkantha, Surat, Tapi, Vadodara and Valsad was conducted. **Thirty two taluqus and Seventy two villages were covered under survey.** The Kharif 2011 witnessed little late (First week of July) but well distributed normal monsoon (29days) with the total rain 591.2 mm i.e. less than the average of last 30 years. Predominant varieties cultivated were Gurjari, GR-11, GR-4, Masuri, Jaya, GR-7, GR-12, GR-101, GR-103, GAR-13, NAUR-1, Narmada, Moti-gold, Sonam, Surekha, Sonali, Arize-6444, 786, 2525, 801, Nath Poha, Gorakhnath, PA-6201, Rashi Annam, Poonam Rashi, Komal, Krishna Kamod, Sathi, Suruchi, US-312, US-178, Swarna, Nirmal Hybrid-617. Prevailing crop rotations were rice-wheat-rice, rice-sugarcane, rice-gram, rice-banana, rice-vegetables, rice-rice, rice-tobacco, rice-pearl millet, rice-wheat-Summer Green gram, rice-Castor, etc. In general the rice crop condition was good all over the state. The productivity trend is maintained. There was no rain after second week of September i.e. flowering and maturity stage. Therefore among the biotic constraints the infestation of insect pest like leaf folder, stem borer, WBPH, BPH, army worm, GH, Mite, WTN and GLH were recorded in negligible to low intensity. Among diseases bacterial blight appeared negligible and moderate in two fields in

Baroda district under water logged condition. Blast, Grain discoloration, sheath rot, false smut were low Other common diseases did not appear.

District wise observation:

Ahmedabad: Production oriented survey was conducted in 6 villages in 3 taluqs in this district. The crops were in maturity stage at the time of survey. Rainfall was late but it was well distributed. The common crop rotations followed by the farmers were rice- wheat, rice-summer rice and rice-castor. The most prevalent rice varieties in the district were Gurjari, GR-11 and Krishna Kamod. The average rice yield in different rice varieties in the district varied from 3.8-5.8 t/ha. Farmers used a seed rate of 25-30 kg/ha. Farmers applied N @ 100-120 kg/ha in three splits through urea or ammonium sulphate, P₂O₅ @ 50-60 kg/ha from DAP or SSP and ZnSO₄@ 25 kg/ha. Transplanting was mostly random with plant density of 18-24 plants/m². Among the inputs, equipments, seeds, fertilizers and pesticides were inadequate and inputs like power, water, drying and storage facilities were either inadequate in most of the places surveyed. Major sources of irrigation was rain water, canal, well or tube wells. The intensity of common weeds like *Echinochloa crusgalli*, *E. colona*, *Cynodon dactylon*, *Cyperus rotundus* and *Cyperus irria* was medium to negligible. Hand weeding (1-2) was the general practice among the farmers and only some of the farmers used Aniloguard (1 kg/ha) or Nomino Gold (300 g/ha). Different biotic constraints like sheath rot, false smut, grain discoloration, WBPH, leaf folder and stem borer were recorded in low intensities. Pesticides like cartap hydrochloride- 4G @ 20 kg/ha, Lambda cyhalothrin, imidachloprid, carbofuran-3G and endosulphoan were used by farmers.

Anand and Kheda: Survey was conducted in 5 villages in 3 taluqs in Anand district and 7 villages in 4 taluqs in Kheda district of Gujarat when most of the rice fields were in dough t maturity stage. Rainfall was late and less than average but well distributed. The commonly grown rice varieties in these districts were Nath poha, Arize-6444 (Hybrid), Gorakhnath, Rashi Ananam, Gurjari, GR-103, GR-11, Sonam, Moti Gold, Rupalee, Sathi, Poonam Rasi, Surya Moti, Sugam, Masuri and GR-101. The common crop rotations in these districts were rice- wheat - summer peanut, rice- vegetable and rice- summer rice/fodder. The average rice yields among the different rice varieties in these districts ranged from 3.4-6.2 t/ha. Farmers used a seed rate of 15-30 kg/ha. In the main fields, manures and fertilizers were applied N @ 100 kg/ha in three to four split in the form of urea, ammonium sulphate or NPK spray, while P₂O₅ @ 40-60 kg/ha in the form of DAP or SSP, FYM @ 6-8 t /ha, or castor cake @ 400 kg/ha and ZnSO₄@ 20 kg/ha. method of transplanting was random; however few farmers have adopted line transplanting keeping 22-30 plants/m². The intensity of common weeds like *Echinochloa crusgalli*, *E. colona*, *Cyperus irria*, *C. rotundus* and *E. alba* was negligible to low. Hand weeding once or twice in the crop season was the general practice for management of weeds. But very few farmers used butachlor@ 1.5 kg /ha or pendimethelin @ 1.25kg /ha. Among the inputs, equipments, seeds, fertilizers, water and pesticides were adequate. However, there was shortage of power, storage and drying facilities in some of the places. Rain water, canal, well or tube wells were the main sources of irrigation. Among the different biotic constraints, sheath rot, false smut, grain discoloration, WBPH, leaf folder, stem borer were in low intensities. The pesticides like monocrotophos, imidachloprid, Ectara and Confidor 200SL were used by some of the farmers. There was acute shortage of agricultural labours and farm mechanization is must.

Gandhinagar and Mehsana: Production oriented survey was conducted in one village in each these two districts. The crops were in maturity stage at the time of survey. Rainfall was

late but was sufficient and well distributed. The common rice varieties grown by the farmers in these districts were Gurjari and GR-11. Rice-wheat was the main crop rotation. The average rice yield in the area ranged from 3.4-4.9 t/ha. The average seed rate was 25-30 kg/ha. Fertilizers were applied as N @ 120-140 kg/ha in 1 or 2 splits in form of urea or ammonium sulphate and P₂O₅ @ 40-60 kg/ha in the form of DAP. Transplanting was mostly random with a plant density of 24-25 plants/m². The intensity of common weeds like *Echinochloa crusgalli*, *E. colona*, *Cyperus rotundus*, *C. irria* and *Eclipta alba* was negligible. Hand weeding (twice in a crop season) was the main practice for the management of weeds. Among the inputs, seeds, water, fertilizers and pesticides were adequate while equipments, power, drying and storage facilities were inadequate. Rain water, tube well and canal were the major sources of irrigation. Among the biotic constraints, Among the different biotic constraints, sheath rot, false smut, grain discoloration, WBPH, leaf folder, stem borer were in low intensities. Pesticides like methyl parathion dust 2%, cartep-4G @ 20kg/ha, carbofuran-3G and imidachloprid were applied by some of the farmers for management of insect pests.

Dang: Four villages in one taluqs were covered for production oriented survey in this district when the rice fields were in milk to dough stage. In general, the climatic conditions were good for rice cultivation. Rainfall was sufficient, well distributed and normal for rice crop. The most predominant rice varieties in the district were IR-28, TN-1, US-312 (hybrid), Arize-786 (hybrid), Gurjari, GR-7, Jaya, Pankhali-203 and US-178 (hybrid). The common crop rotation practices followed by the farmers were rice- vegetables, wheat, rice- gram / sugarcane. The average rice yield in different rice varieties in the district ranged from 3.8 to 5.8 t/ha. The average seed rate varied from 15-30 kg/ha. Fertilizers were applied as N @ 80-110 kg/ha in 1 or 2 split in form of urea or ammonium sulphate and P₂O₅ @ 30-60 kg/ha in the form of DAP. Some applied FYM @ 8 to 10 t/ha. The method of transplanting was mostly random and only few farmers adopted line sowing with 28-30 plants/m². The intensity of common weeds like *Echinochloa crusgalli*, *E. colona* and *Cyperus rotundus* was negligible. Hand weeding was the common practice for the management of weeds. Among the inputs, seeds, fertilizers, pesticides and equipments were adequate while water, power, drying and storage facilities were either inadequate or not available in many places. The rice was mainly grown under rainfed condition. Among the different biotic constraints, false smut, leaf folder and stem borer were recorded in low intensities. The insecticide like carbofuran 3G @ 25 kg/ha was used by some farmers for the control of insect pests. Farmers expressed that they need technical guidance, or some kind of training for cultivation and good market price for hybrids.

Navsari and Valsad: Nine villages in 3 taluqs in district Navsari and 4 villages in two taluqs in district Valsad were covered for production oriented survey when the rice fields were in booting to dough stage. Some of the rice fields were in mature stage. The general climatic conditions were good for rice cultivation. Rainfall was late but well distributed and was normal for rice crop. The common rice varieties grown in these districts were NAUR-1, Sita, Gurjari, Jaya, Masuri, IR-28, Gorakhnath-509, Roja-342, TN-1, Nath poha, Dandi, PA-6201, Suruchi, Arize-786, Gurjari, Nawabi colam and Jaya. The main crop rotations followed by the farmers were rice-sugarcane, rice-rice, rice-wheat, rice-vegetables. The average rice yield in these districts ranged from 4.8-6.4 t/ha. Farmers used a seed rate of 15-30 kg/ha. Transplanting was either random or line with a plant density of 25-30 hills/m². The intensity of weeds was negligible and the common weeds were *Echinochloa crusgalli*, *E.colona* and *C. rotundus*. One to two hand weeding was the common practice for the management of weeds. Fertilizers were applied as N @ 120 to 140 kg/ha in three splits in the form of urea or ammonium sulphate or NPK mixture, P₂O₅ @ 30 to 50 kg/ha as basal dose in the form of DAP, SSP or NPK mixture and K₂O @ 40 kg/ha and FYM @ 5-8 t/ha. Some of the farmers practiced green manuring of

Sesbenia. Among the inputs, equipments, seeds, water, fertilizers and pesticides were adequate while other inputs like power, storage and drying facilities were inadequate in some of the places. Rain water and canal were the major sources of irrigation. Among the diseases blast, bacterial blight, sheath rot and false smut and among the insects leaf folder, stem borer, leaf hopper and white tip nematode were observed in low intensities.

Panchmahal and Sabarkantha: Rice fields were surveyed in 13 villages in five taluqs in Panchmahals and 2 villages in 2 taluqs in Sabarkantha districts. The crops were in different stages (heading, milk, dough and mature) at the time of survey. Rainfall was normal and well distributed for the rice crop. Some of the commonly grown rice varieties in these districts were hybrids like PA-6201, Arize-6444, Nirmal Hybrid-617 and Komal and HYVs like Gurjari, GR-11, GAR-13, Swarna and Surekha. The common crop rotations followed by the farmers were rice-wheat/gram, rice- wheat-summer green gram and rice- rabi maize. The average rice yields in the district ranged from 4.4-6 t/ha. Farmers used a seed rate of 20-30 kg/ha. In the main fields, farmers applied N @ 100 to 130 kg/ha in 2-3 splits in from of urea or ammonium sulphate, P₂O₅ @ 25 to 60 kg/ha from DAP or SSP as basal dose. Some of the farmers applied FYM @ 5-10t /ha or green manuring; few applied ZnSO₄@ 25-27 kg/ha + FeSO₄ @ 27 kg/ha. Transplanting was random with a plant density of 25-32 hills/m². The intensity of common weeds like *Echinochloa colona*, *E.crusgalli*, *Cyperus rotundus* and *C. iria* was negligible. Hand weeding once or twice in a crop season was the general practice. However, few have applied butachlor @1.5kg.a.i./ha. Among the inputs, seeds, fertilizers and pesticides were adequate while other inputs like equipments, water, power, storage and drying facilities were either inadequate or not available. Rain water, canal, well or tube well were the main sources of irrigation. Among the diseases, sheath rot, false smut and grain discoloration and among insect pests, leaf folder, stem borer, GLH, mites, BPH and white tip nematode were observed in low intensities. Pesticides like carbofuran-3G @ 25 kg/ha, phorate-10G 10kg/ha, endosulphan-35 EC @ 20-21 ml/10 l and imidacloprid were used for the management of different insect pests. Some of the common requirements of the farmers were seeds of high yielding varieties, good pest/disease resistant variety and mechanization for transplanting and harvesting as there is acute labour shortage.

Surat and Tapi: Production oriented survey was conducted in 8 villages (3 taluqs) in Surat and 10 villages in Tapi (3 taluqs) when the rice crops were in milk to mature stage. Rainfall was sufficient and well distributed and was normal for the rice crop. Most predominant varieties in these districts were HYVs like Jaya, GAR-13, Gurjari, US-312, Sonali, Jaya, Nath poha, NAUR-1, GR-4, GAR-13, IR-28, Gurjari, Suruchi, GR-7 and Tej and hybrids like PA-6201, Arize-786, 2525, 801 and Gorakhnath. The common crop rotations were rice-sugarcane/wheat/gram, rice- rice and rice- summer okra/peanuts/vegetables. The average rice yields in these districts ranged from 4.2-6.5 t/ha. Farmers used a seed rate of 20-30 kg/ha. Some farmers applied FYM @ 5-15 t/ha in the nursery. In the main fields, farmers applied N @ 120 - 150 kg/ha in 3-4 splits in the form of urea or ammonium sulphate and P₂O₅ @ 30-80 kg/ha from DAP or NPK mixture. Farmers applied FYM @ 8-10 t/ha in organic cultivation. Transplanting was mainly random. Some followed line transplanting with 28-33 plants/m². Some of the common weeds recorded in and around rice fields were *Echinochloa colona*, *E. crusgalli* and *Eclipta alba* and *Cyperus rotundus*. However, their intensity was low to negligible. Hand weeding once or twice in a crop season was the common practice for weed management and only few farmers applied herbicides like butachlor 50 EC. Among the inputs, equipment, Seeds, water, fertilizers and pesticides were adequate while other inputs like power, storage and drying facilities were either inadequate or not available in some of the tribal areas. Among the diseases, bacterial blight, sheath rot and grain discoloration were observed in low to moderate

intensities. The insect pests like stem borer and mites were in low intensities. Insecticides like carbofuran-3G @ 25 kg/ha, phorate-10 G 10 kg/ha and endosulphan-35 EC were used by some of the farmers.

Vadodara: Four villages in 2 taluqs were covered for production oriented survey in this district when the crops were in dough to mature stage. The onset of monsoon was delayed. Some of the prominent rice varieties cultivated by the farmers were GR-11, Gurjari, GAR-13, Surya Moti and Moti gold. The common crop rotation practices followed were Rice-wheat-green gram, rice-fodder hybrid sorghum-summer green gram. The average rice yields of different rice varieties in the district ranged from 5.8-6.2 t/ha. The average seed rate used by the farmers ranged from 25-30 kg/ha. Farmers applied N @ 100-130 kg/ha in three splits from urea or ammonium sulphate and P₂O₅ @ 25-50 kg/ha mostly in the form of DAP as basal dose. Organic amendments like FYM @ 10 t/ha, castor cake @ 1 t/ha were applied at 2-4 years intervals. Transplanting was random. However, in case of SRI, line transplanting was followed. The average plant density was 26-30 hills/m². Few farmers have adopted direct sowing of sprouted seeds. The intensity of some common weeds like *E. crusgalli*, *E. colona* and *Cyperus rotundus* was negligible. Hand weeding once or twice in a crop season was the common practice for weed management. Among the inputs, equipments, seeds and pesticides, fertilizers and water were adequate while power, storage and drying facilities were either inadequate or not available in some of the places. In addition to rain water, canal and tube well were the sources for irrigation. Among diseases, bacterial blight, false smut and grain discoloration were observed in low to moderate intensities while insect pests like stem borer and BPH were recorded in low intensities. Insecticides like carbofuran-3G @ 25 kg/ha and imidacloprid were used for the management of insect pests.

Prevalence of diseases and insect pests in Gujarat

District	Diseases							Insect pests						
	BL	BS	BB	SHR	FS	GD	WTN	WBPH	LF	SB	GLH	Mite	BPH	LH
Ahmedabad	-	-	-	L	L	L	-	L	L	L	-	-	-	-
Anand	-	-	-	L	L	L	-	L-M	L	L	-	-	L	-
Kheda	-	-	-	-	L	L	L	L-M	L	L	-	-	-	-
Gandhinagar	-	-	-	L	L	L	-	L	L	L	-	-	-	-
Mehsana	-	-	-	L	L	L	-	L	L	L	-	-	-	-
Dang	-	-	-	-	L	N	-	-	L	L	-	-	-	-
Navsari	L	-	L-M	L	L	-	L	-	L	L	-	-	N	L
Valsad	L	-	-	L	-	-	L	-	N-L	N-L	-	-	L	-
Panchmahals	-	-	-	L	L	L	L	-	L	L	L	L	L	L
Sabarkantha	-	-	-	L	L	L	L	-	L	L	-	-	-	-
Surat	-	-	L-M	L-M	-	L-M	L	-	-	L	-	L	N	-
Tapi	-	-	-	L-M	-	L-M	-	N	N	L	-	N	-	-
Vadodara	-	-	L-M	-	L	L	-	L	L	-	-	-	-	-

N:- Negligible, L:- Low, M:- Moderate, S:- Severe.

HARYANA

District Surveyed: Kaithal, Kurukshetra, Karnal, Jind, Yamunanagar, Ambala, Panipat, Sonapat, Fatehabad and Sirsa

Particulars of survey

District	Blocks	Villages
Kaithal	Kaithal, Pundri, Rajaund, Kalayat, Siwan and Gulha	Kaul, Sanghan, Kheri Lamba, Kataral, Nauch, Kheri Raiwali, Pabnaur, Pabla, Keorak and Bhuna
Kurukshetra	Thanesar, Pehowa, Babain, Ladwa and Shehbad	Alampur, Amin, Lukhi, Sarsa, Kirmach, Barna, Talheri, Harnaicha, Neem Wala and Malikpur
Karnal	Karnal, Nilokheri, Nissing, Garaunda and Assandh	Sandhir, Chirao, Issargarh, Anjanthali, Sambhali, Dharad, Bal Rangra, Pucca Khera, Augand and Achhanpur
Jind	Jind, Julana, Alewa, Safidon, Pilu Khera, Uchana and Narwana	Alewa, Fatehgarh (Chhanya), Bhairom Khera, Lalit Khera, Shimla, Dhanori, Lohchab, Sindhvi Khera, Khanda and Anchera Kalan
Yamunanagar	Jagadhari, Chhchhrauli, Bilaspur, Sadora, Mustafabad and Radaur	Salempur, Mandeber, Opra Kalan, Bhagumajra, Yamunanagar, Gundyana, Dadoli, Namdarpur, Bhogpur and Javaradi
Ambala	Ambala-1, Ambala-2, Shaha, Barada, Mulana, Shajedpur and Naraingarh	Nagal, Mulana, Chudyali, Balana, Khudda Kalan, Hamidpur, Khan Ahmadpur, Mohra, Hasanpur and Mansoorpur
Panipat	Panipat, Matloda, Israna, Samalkha and Bapoli	Sihaw, Assan Kalan, Buana Lakhu, Urlana Kalan, Haldana, Ganjbar, Dadlana, Rasalu, Muhali and Babel
Sonapat	Sonapat, Ganaur, Rai, Kharkhoda, Gohana, Mudlana and Kathura	Modmajra, Kasanda, Badota, Vajirpura, Banwasa, Khandorai, Sardana, Gumbad, Khubhroo and Bhakarpur
Fatehabad	Fatehabad, Ratia, Bhattu Kalan, Bhuna, Tohana and Jakhal	Jamalpur, Samyana, Gorakhpur, Bahal Bambhiyan, Birdana, Binj Lamba Dhari, Ayalaki, Dabur Dani and Dani Chandan Wali
Sirsa	Sirsa, Nathu, Sri Chopta, Rania, Allanabad, Bada Gudha, Dabwali and Odhan	Kotli, Bamboor, Abholi, Rania, Jiwanagar, Pathi Kripal, Kutabad (Premnagar), Malekan, Madho Singhana and Sikanderpur

Widely grown rice varieties in Haryana during *Kharif* 2011

District	Varieties
Kaithal	HYVs: PR 114, PB-4, Pusa 44, HKR 47, PB-1, HKR 127, PAU 201; Scented: CSR 30,
Kurukshetra	HYVs: PR 114, Pusa 44, PR 118, PAU 201, HKR 127, HKR 47, PR 113 and Var. 220, Hybrids: Hybrid 4042, Arize 6444, Hybrid 721; Scented: PB-4, CSR 30
Karnal	HYVs: PAU 201, PR 113, HKR 47, PR 120; Hybrids: Hybrid 232; Scented:

District	Varieties
	PB-4, CSR 30
Jind	Hybrids: Hyb. Royal Bhog (Pepsi), Scented: Taraori Basmati, PB-4, PB-1, CSR 30; Local: Sabnam, Sarbati
Yamunanagar	HYVs: Dhanlaxmi; Hybrids: Arize 6129, PHB 6444, Hybrid Super Kalpana, Hybrid 3325, Hybrid Sudha; Scented: PB-1, PB-4, CSR 30,
Ambala	HYVs: Dhanlaxmi, HKR 47, Var. 220; Hybrids: PB-4, Arize 6444, Hybrid Super Kalpana, Hybrid 2355, Marble 999, Anmol Paddy Cure, Arize 6129, PHB 71, Hybrid Swift, Modi 1101, Hybrid. 3325, Marble 90, Hybrid Bisham; Scented: CSR 30, PB-1,
Panipat	Scented: PB-4, CSR 30, PB-1; Local: Sarbati
Sonepat	HYbrids : Arize 6129, Marble 99; Scented: PB-4, CSR 30, PB-1; Local: Sarbati
Fatehabad	HYVs: PR 114, Scented: PB-1, PB-4, Improved PB-1
Sirsa	HYVs: PR 114; Scented: PB-1, PB-4

Particulars of rice areas in the surveyed districts of Haryana

District	Total geographical area (ha)	Total cultivable area (ha)	Total cultivated area (ha)	Net irrigated area (ha)	Area under paddy (ha)
Kaithal	2,27,330	2,00,156	1,94,257	1,91,359	1,72,000
Kurukshetra	168,253	1,50,370	1,50,370	1,50,370	1,20,000
Karnal	2,46,145	2,16,893	2,08,941	2,07,147	1,65,000
Jind	2,74,529	2,54,598	2,38,212	2,21,733	1,14,000
Yamunanagar	1,72,130	1,27,041	1,19,873	1,08,077	72,000
Ambala	1,53,730	1,21,847	1,17,588	1,06,711	84,440
Panipat	1,29,379	1,04,171	97,549	97,549	77,000
Sonepat	2,14,250	1,81,056	1,72,653	1,66,924	94,000
Fatehabad	2,52,318	2,29,966	2,20,120	2,04,597	84,000
Sirsa	4,27,177	4,03,735	3,83,237	2,83,000	55,000

Weather data for the districts surveyed

District	Weather parameter	June 2011	July	Aug.	Sept.	Oct.	Nov. 2011
Kaithal	Rainy days	6	7	8	8	-	-
	Total rainfall (mm)	344	143	151	276	-	-
Kurukshetra	Rainy days	13	9	15	9	-	-
	Total rainfall (mm)	145	82.25	101	105.55	-	-
Karnal	Rainy days	12	16	17	9	-	-
	Total rainfall (mm)	106.43	65.5	109.6	108.3	-	-
Jind	Rainy days	6	8	11	9	-	-
	Total rainfall (mm)	114.5	68	77.5	104.5	-	-
Yamunanagar	Rainy days	14	12	12	6	-	-
	Total rainfall (mm)	332	226.67	187.83	46.67	-	-
Ambala	Rainy days	13	14	16	8	-	-
	Total rainfall (mm)	255	382.3	136.3	68.3	-	-
Panipat	Rainy days	11	9	12	8	-	-

District	Weather parameter	June 2011	July	Aug.	Sept.	Oct.	Nov. 2011
	Total rainfall (mm)	87	19.5	68.5	113.5	-	-
Sonapat	Rainy days	6	14	15	11	-	-
	Total rainfall (mm)	115.5	90.25	102.75	176.5	-	-
Fatehabad	Rainy days	4	6	9	13	-	-
	Total rainfall (mm)	16.66	42.0	47.97	129.9	-	-
Sirsa	Rainy days	5	7	15	-	-	-
	Total rainfall (mm)	20.9	27.5	117.4	-	-	-

Roving surveys in paddy growing areas of Haryana were conducted during August 19, 20, 24, 25, September 18, 19 and October 5, 10 & 25, 2011. A total of 100 villages (10 in each district) were surveyed in the districts of Kaithal, Kurukshetra, Karnal, Jind, Ambala, Yamunanagar, Panipat, Sonapat, Fatehabad and Sirsa. The commonly grown varieties were Pusa Basmati-4 (Pusa 1121), Pusa Basmati-1, CSR-30, PR 114, Arize 6129, Arize 6444, Pusa 44, HKR 47, HKR 127, PR 118, Sabnam, Royal Bhog (Pepsi), Sarbati and var. 220. In addition, Hybrid Super Kalpana, Dhanlaxmi, Marble 999, Marble 90, Hybrid 2355, Anmol Paddy Cure, Improved Pusa Basmati-1, PHB 71, Hybrid Swift, PR 120, Hybrid Sudha, Taraori Basmati, Modi 1101, Hybrid 4042, Hybrid Bisham, Hybrid 232 and Hybrid 721 were also grown at few locations. Application of weedicide, random planting, inadequate plant population, raising of nursery in unpuddled fields and rice-wheat sequence were common in all the districts. Mixed application of fungicides with insecticides for foliar application and that of granular insecticides with urea as broadcast application was commonly followed. Weedicides like Sofit, Nominee gold and insecticides cartap hydrochloride and chlorpyrifos were also applied by some farmers in nursery. Paddy seed used for raising the nursery of one acre of high yielding and Basmati varieties was quite low (4-5 kg) as against recommended 10-12 kg/acre. The seed treatment was followed by 50, 60, 80, 60, 40, 40, 80, 60, 60 & 80% farmers in Kaithal, Kurukshetra, Karnal, Jind, Yamunanagar, Ambala, Panipat, Sonapat, Fatehabad and Sirsa districts, respectively. The rainfall depression was observed in all the districts surveyed except Ambala (+8.4%) and Sirsa (+9.2%), which ranged from -12.4% in Jind to -47.9% in Panipat. The market price for common (Jaya, PR 113) and superfine (HKR 47, HKR 127, PR 114, PR 116, PR 118) was Rs. 1050-1070 and 1080-1150/q, respectively. The semi dwarf Basmati (Pusa Basmati-1, Pusa Basmati-4) fetched slightly lower market price of 1600-2000/q while traditional tall Basmati (CSR 30, Taraori Basmati) fetched significantly lower market price of Rs. 1500-1800/q respectively compared to previous year. The lower market price particularly of traditional tall Basmati rice will lead to a drastic reduction in area under their cultivation in succeeding year.

The main constraints identified in increasing rice production in Haryana were depletion of water table, depression in precipitation, limited water resources, inadequate and intermittent power and canal water supply, poor quality of underground water, erratic monsoon, deterioration in soil health, sub-optimal plant population, salinity & alkalinity and continuous follow up of rice-wheat cropping system in addition to biotic constraints particularly WBPH, BPH, sheath blight and foot rot & bakanae.

Bacterial leaf blight was recorded in severe form at one location each in the districts of Kurukshetra and Sirsa in PR 118, CSR 30 and Pusa Basmati-1, respectively. False smut was recorded in traces to moderate intensity in 10, 20, 20, 20 and 10% sites in Kaithal, Kurukshetra, Ambala, Yamunanagar and Sonapat districts in PR 114, PR 118, Arize 6129, HKR 47, Pusa Basmati-1, Hybrid Bisham, Super Kalpana and Anmol Paddy Cure. Leaf blast appeared in traces to severe form while neck blast incidence remained low ranging from traces to 5% in CSR

30, Pusa Basmati-4 and Pusa Basmati-1. Foot rot & bakanae ranged from traces to 50% at 90, 70, 70, 90, 40, 20, 80, 80, 70 and 40% locations in the districts of Kaithal, Kurukshetra, Karnal, Jind, Ambala, Yamunanagar, Panipat, Sonapat, Fatehabad and Sirsa, respectively. Maximum disease incidence of 50% was recorded in Pusa Basmati-4 in district Kaithal. Sheath blight was observed in traces to severe form at 50, 60, 30, 10, 10, 10, 20 and 10% locations in the districts of Kaithal, Kurukshetra, Karnal, Yamunanagar, Panipat, Sonapat, Fatehabad and Sirsa, respectively. The disease intensity was moderate in Yamunanagar and Panipat in Pusa Basmati-1 and Pusa Basmati-4 while it was severe in the districts of Kaithal Kurukshetra, Karnal, Fatehabad and Sirsa in Pusa Basmati-1, Pusa Basmati-4 and PAU 201. Stem rot incidence was observed in moderate to severe form at one location each in the district of Kurukshetra and Ambala where its incidence ranged from 8-10% in Arize 6444 and Pusa Basmati-1, respectively.

Other diseases namely, grain discolouration, brown spot and narrow brown leaf spot were recorded in low to moderate intensity at few locations. However, *Khaira* (zinc deficiency) was recorded in low to severe form at 30, 10, 60 and 10% locations in Pusa Basmati-1, CSR 30, HKR 47, Pusa Basmati-4 and PAU 201 in district Kaithal, Karnal, Jind and Panipat (Table 1).

Kaithal: Ten villages in 6 blocks were covered for production oriented survey in this district. Survey was done twice, once in the month of August when the rice crops were in stem elongation to booting stage and again in the month of October, when the crops were in milk to dough stage. In general, the climatic conditions were normal in 90% of the places and only in some places there was sub-normal rainfall. High yielding varieties and hybrids covered almost 50% of the area while Pusa Basmati 4 (Pusa 1121) covered 30% area while rest was covered with varieties like CSR-30 and Taraori Basmati. Farmers used 80-100 % of their land for rice cultivation and rice-wheat was the only crop rotation followed by the farmers. The common varieties cultivated by the farmers are presented in the table. The average rice yield varied from 6000-7000 kg/ha in HKR-127 and Pusa-44; 6000-7500 kg/ha in PR-114, 5000 kg/ha in HKR-47 and Pusa Basmati 1, 4000-5000 kg/ha in Pusa Basmati 4 and 2700-3200 kg/ha in CSR-30. Transplanting was done in between middle of June to middle of July. The seed rate used by the farmers was 4-6 kg for one acre of main field. About 50% farmers treated their seeds before sowing. About 30% farmers applied weedicide like Sofit and Anilophos and pesticides like Chlorpyrifos and Caldan in the nursery. Most of the farmers used fertilizers (5-12 kg urea/kana i.e. 500 m²). Few farmers applied 2 kg zinc sulphate along with urea. In the main field, for HYVs and hybrids, fertilizers were applied as 0-22.5 kg N/ha, 0-57.5 kg P₂O₅/ha and 0-37.5 kg K₂O as basal and 86-172.5 kg N/ha as top dressing (2-3 split application). Many farmers did not apply nitrogen as basal. Most of the farmers applied 12.5-25 kg zinc sulphate/ha. Very few farmers applied potash. In the basmati varieties, dose of N was less (0-11.25 kg/ha as basal and 29.25-115 kg/ha as top dressing). About 10% farmers applied FYM and growth promoters like -Biozymeø (5 kg/acre). Random method of transplanting was common practice everywhere and the plant population varied from 16-24 hills/m². The intensity of common weeds like Echinochloa spp. was negligible. Most of the farmers are using herbicides like butachlor (1 litre/acre), Rifit (500 ml/acre) and aniloguard (500 ml/acre) in addition to hand weeding. Among the inputs, drying and storage facilities were inadequate or nor available in most places and equipments were inadequate in some places. Many farmers are hiring heavy equipments like tractor. Among the diseases, bakanae, sheath blight and brown spot were moderate to severe in some of the places while others like neck blast, false smut, grain discolouration, narrow brown leaf spot and khaira diseases were found in low intensities. Among the insect pests, BPH/WBPH was moderate to severe in some places. About 80-100 adults and nymphs per hill was observed in CSR-30 in some fields of Nauch village in this district. Pesticides like chlorpyrifos (500-1000 ml/acre)+cypermethrin 505 (7.5 kg/acre) and endosulfan (500 ml/acre) for termites; Padan (5-10 kg/acre) and Regent (5 kg/acre) for stem borer and leaf folder; buprofezin (330 ml/acre) +

tricyclazole (Figo) (120 g/acre) + Nuvan (330 ml/acre) for WBPH/BPH and NBI; BPMC (Bipwin) (400 ml/acre) + lambda cyhalothrin (200 ml/acre) + Nuvan (250 ml/acre) for BPH/WBPH, leaf folder and stem borer; imidacloprid (70 ml/acre) + Sheathmar (400 ml/acre) + buprofezin (Tribune) (330 ml/acre) for WBPH/BPH and sheath blight and Tilt (200 ml/acre) + monocrotophos (500 ml/acre) for stem borer and false smut were used by the farmers. There was approximately 2-5% post harvest loss in this area.

Kurukshetra: Production oriented survey was conducted in 10 villages in 5 blocks when the crops were in tillering to booting (during August) or milk to mature (during October). In about, 40% places visited, there were records of sub-normal rainfall. About 60-65% area was covered with HYVs and hybrids, 8-10% area with Pusa Basmati 1 and 4 while traditional basmati varieties covered 20-25 % area. Farmers used 85-100% of their land for rice cultivation. The only crop rotation followed by the farmers was rice-wheat. The common varieties cultivated by the farmers are presented in the table. The average rice yield varied from 6000-7000 kg/ha in PR-114, HKR-127 and Pusa-44; 6700-7000 kg/ha in Aize-6129, 4750 kg/ha in Pusa Basmati-4 and 2200-3500 kg/ha in CSR-30. Transplanting was completed in between middle of June to middle of July. About 80% of the farmers adopted seed treatment and the seed rate varied from 4-6 kg for one acre of main field in case of HYVs and in case of hybrids it was 3 kg for one acre of main field. About 40% of the farmers applied weedicides like Sofit and Erazo and fungicides like carbendazim in the nursery. Most of the farmers applied fertilizers (8-15 kg urea/kanal or 5-6 kg urea + 8-10 kg DAP/kanal). Some farmers applied zinc sulphate @ 1 kg/kanal. In the main field, for HYVs and hybrids, fertilizers were applied as 0-68.75 kg N/ha, 0-57.5 kg P₂O₅/ha and 0-37.5 kg K₂O as basal and 100.62-172.5 kg N/ha as top dressing (2-3 split application). Many farmers did not apply nitrogen as basal. Most of the farmers applied 12.5-25 kg zinc sulphate/ha. Very few farmers applied potash. In the basmati varieties, dose of N was comparatively less. About 60% farmers applied FYM (4-5 trolley per acre). Some practiced dhaincha and moong green manuring. Transplanting was random and the average plant population was 16-20 hills/m². The intensity of common weeds like Echinochloa colona and E. crusgalli was negligible. Most of the farmers applied weedicides like pretilachlor (500 ml/acre), butachlor (1 litre/acre) and Rifit (500 ml/acre) for the management of weeds in addition to hand weeding. Among the inputs, drying and storage in most of the places and power and equipments in some places were inadequate. Among different diseases, bacterial blight and sheath blight were severe in some places while bakanae was moderate. Among insect pests, whorl maggot damage (up to 30 damaged leaves) was noticed in some places and BPH/WBPH were wide spread in low to severe intensity. Typical hopper burn was noticed in some fields of Kirmach and Amin village. Pesticides like chlorpyrifos (500 ml/acre)+cypermethrin 505 and chlorpyrifos (1000 ml/acre) for termites; cartap hydrochloride (5-7.5 kg/acre) and Regent (5 kg/acre) for stem borer and leaf folder; imidacloprid (80 ml/acre) + Beam (120 g /acre) for BPH/WBPH and neck blast; buprofezin (330 ml/acre) + hexaconazole (400 ml/acre) for sheath blight and BPH/WBPH; buprofezin (330 ml/acre) + Beam (120 g/acre) for neck blast and BPH/WBPH; buprofezin (330 ml/acre) + Tilt (200 ml/acre) + lambda cyhalothrin (200 ml/acre) for false smut, leaf folder and BPH/WBPH; buprofezin (330 ml/acre) + hexaconazole (400 ml/acre) + streptomycin (12 g/acre) for BPH/WBPH and sheath blight and buprofezin (330 ml/acre) + Nuvan (125 ml/acre) for BPH/WBPH were applied by the farmers. Overall, there was 3-8% post harvest loss in the region.

Karnal: Production oriented survey was conducted in 10 villages in 5 blocks when the crops were in tillering to booting (during August) or milk to mature (during October). In about, 80% places visited, there were records of sub-normal rainfall. About 50-55% area was covered with HYVs and hybrids, 30-35% area with Pusa Basmati 1 and 4 while other basmati (Taraori Basmati and CSR-30) varieties covered 10-15 % area. Farmers used 80-100% of their land for

rice cultivation. The only crop rotation followed by the farmers was rice-wheat. The common varieties cultivated by the farmers are presented in the table. The average yield of rice varieties ranged from 7000-7200 kg/ha in HKR-47, 2500-4000 kg/ha in CSR-30, 2000-5000 kg/ha in Pusa Basmati 4, 6000-6500 kg/ha in PR-114 and about 8000 kg/ha in PAU-201. Transplanting was completed in between 3rd week of June to 2nd week of July. The average seed rate was 4-5 kg for one acre of main field. Eighty per cent farmers contacted followed seed treatment. Some applied weedicides like Sofit and insecticides like Padan and Caldan in the nursery. All the farmers applied urea (8-10 kg/kanal)+DAP (5-10 kg/kanal) or only 6-12 kg urea/kanal. Few applied zinc sulphate (1 kg/kanal) in the nursery. In the main field, for HYVs and hybrids, fertilizers were applied as 0-22.5 kg N/ha, 20-57.5 kg P₂O₅/ha and 15-75 kg K₂O as basal and 143.75-172.5 kg N/ha as top dressing (2-3 split application). Many farmers did not apply nitrogen as basal. Most of the farmers applied 12.5-25 kg zinc sulphate/ha (33% zinc). Very few farmers applied potash. In the basmati varieties, dose of N was comparatively less (0-22.5 kg N/ha and 0-57.5 kg P₂O₅/ha as basal and 57.5-143.75 kg N/ha as top dressing). About 50% of the farmers contacted followed green manuring with dhaincha or moong. The method of transplanting was random and the average plant population was 15-25 hills/m². The intensity of common weeds like Echinochloa spp was negligible. Almost all the farmers applied weedicides like Rifit (500 ml/acre) and butachlor (1 litre/acre). Among the inputs, drying and storage facilities in all the places and equipments in some places were inadequate. Many farmers hired tractor for cultivation. Among the diseases, sheath blight was severe in some places. Other diseases were in low to moderate intensities. Among insect pests, termite was moderate to severe and BPH/WBPH was in low to moderate intensities (up to 30 adults and nymphs/hill). Pesticides like chlorpyrifos (1 litre/acre) or chlorpyrifos + cypermethrin for termite; cartap hydrochloride (5-7.5 kg/acre), Regent (Fipronil) (5 kg/acre) for stem borer and leaf folder, Bavistin (200 g/acre) for blast and sheath blight; buprofezin (330 ml/acre) + hexaconazole (400 ml/acre) for sheath blight and BPH/WBPH; buprofezin (330 ml/acre) + Beam (120 g/acre) + Diathane M-45 (500 g/acre) for BPH/WBPH, neck blast and brown spot; buprofezin (330 ml/acre) + Beam (120 g/acre) for BPH/WBPH and neck blast; imidacloprid (80 ml/acre) + Tilt (200 ml/acre) and Nuvan (250 ml/acre) for BPH/WBPH and false smut; Beam (120 g/acre) + imidacloprid (70 ml/acre) + hexaconazole (400 ml/acre) for sheath blight, neck blast, blast and BPH/WBPH; imidacloprid (70 ml/acre) + hexaconazole (400 ml/acre) + lambda cyhalothrin (Karate) (200 ml/acre) for sheath blight, stem borer, leaf folder and BPH/WBPH and buprofezin (330 ml/acre) + imidacloprid (80 ml/acre) for BPH/WBPH were applied. In general, there was 2-5% post harvest loss.

Jind: Production oriented survey was conducted in 10 villages in 7 blocks when the crops were in tillering to booting (during August) or milk to mature (during October). About 90% of the rice area was covered with basmati while only 10% was cultivated with HYVs. In about 70% of the locations, there were reports of sub-normal rainfall. Rice wheat was the only crop rotation followed by the farmers. The commonly grown rice varieties are presented in the table. The average rice yield in the region was 3800-4500 kg/ha in Pusa Basmati 4 and 2500-4000 kg/ha in CSR-30. Transplanting was completed by 3rd week of July. The average seed rate was 4-5 kg for one acre of main field. About 60% of the farmers contacted adopted seed treatment. Some applied weedicides like Sofit and Nominee Gold and insecticides like chlorpyrifos, foratox and Caldan. Almost all the farmers applied urea (8-10 kg/kanal) or urea (3-6 kg/kanal) + DAP (5-12 kg/kanal). Some applied 5 kg SSP per kanal. In the main field, for HYVs and hybrids, fertilizers were applied as 11.25-22.5 kg N/ha, 48.75-57.5 kg P₂O₅/ha and 0-75 kg K₂O as basal and 86.25-172.5 kg N/ha as top dressing (2-3 split application). Many farmers did not apply nitrogen as basal. Most of the farmers applied 12.5-50 kg zinc sulphate/ha (33% zinc). Very few farmers applied potash. In the basmati varieties, dose of N was comparatively less (11.25-22.5 kg N/ha and 28.75-57.5 kg P₂O₅/ha as basal and 57.5-86.25 kg N/ha as top dressing). One farmer even

applied 7.5 kg Sulphur in one acre. All the farmers followed random method of transplanting and the average plant population was 16-24 hills/m². The common weed species was *Echinochloa* and its intensity was negligible. Most of the farmers applied weedicides like pretilachlor (500 ml/acre) and Rifit (500 ml/acre). Among the inputs, drying and storage facilities in all the places and equipments in some places were inadequate. Among the diseases, bakanae was severe (up to 35% intensity) in some places on varieties like CSR-30 and Pusa Basmati 4. The intensity of different insect pests was low or in trace intensities. Pesticides like chlorpyrifos (1 litre/acre) or chlorpyrifos + cypermethrin for termite; Regent (5 kg/acre), cartap hydrochloride (5-7.5 kg/acre) for leaf folder and stem borer; carbendazim (46.27%) @ 500 ml/acre for bakanae; sulphur (1 kg/acre) for preventive measures against diseases; imidacloprid (80 ml/acre) + buprofezin (330 ml/acre) + lambda cyhalothrin (200 ml/acre) + tricyclazole (100 g/acre) for neck blast, BPH/WBPH and grass hopper and Nuvan (125 ml/acre) + imidacloprid (80 ml/acre) + Beam (120 g/acre) for neck blast and BPH/WBPH were used by the farmers. Farmers used granular pesticides along with urea or as sand mix. Overall, there was 3-5% post harvest loss in the district.

Yamunanagar: Ten villages in 6 blocks were covered for production oriented survey twice in the crop season; once in August and again in October. In general, the climatic conditions were normal for rice cultivation in the region. About 60% area in the district was covered with HYVs and hybrids, 10% with traditional basmati and 30% with Pusa Basmati 4 and Pusa Basmati 1. The most commonly grown rice varieties in the district are presented in the table. Rice-wheat was the only crop rotation in the district. The average rice yield in the district ranged from 5000-6200 kg/ha in Arize 6444, 4000-5700 kg/ha in Pusa Basmati 1 and Pusa Basmati 4; 6000-8250 kg/ha in Arize 6129, 5500-6250 kg/ha in Dhanlaxmi and, PR-114 and PR-113 and 2500-2600 kg/ha in CSR-30. Transplanting was done in between middle of June to second week of July. The average seed rate was 3-6 kg for one acre of transplanting. Seed rate was less in case of hybrids. About 40% of the farmers adopted seed treatment. Some of the farmers applied weedicide like Eraze in the nursery. Most of the farmers applied urea (5-12 kg/kanal) or DAP (5-10 kg/kanal) + urea (5-6 kg/kanal) in the nursery. Some farmers applied zinc sulphate (1.25 kg/kanal) or SSP (10 kg/kanal). In the main field, for HYVs and hybrids, fertilizers were applied as 25-33.75 kg N/ha, 40-86.25 kg P₂O₅/ha and 15-37.5 kg K₂O as basal and 115-172.5 kg N/ha as top dressing (2-3 split application). Most of the farmers applied 6.25-25 kg zinc sulphate/ha (33% zinc). Very few farmers applied potash. In the basmati varieties, dose of N was comparatively less (22.5-33.75 kg N/ha and 57.5-86.25 kg P₂O₅/ha and 0-37.5 kg K₂O as basal and 28.75-86.25 kg N/ha as top dressing). Some farmers applied FYM (4 trollys/acre) or vermin-compost (45 kg/acre) or followed dhaincha green manuring. The method of transplanting was random and the mean plant population was 16-24 hills/m². The intensity of common weeds like *Echinochloa crusgalli*, *E. colona* and *Cyperus* spp. was negligible. Most of the farmers applied weedicides like aniloguard (500 ml/acre) and butachlor (750-1000 ml/acre) in addition to hand weeding. Among the inputs, drying and storage facilities in all the places and water and power in some places were inadequate. Most of the farmers told that they used own tractor. Among the diseases, false smut (up to 15%), brown spot and sheath blight were in moderate intensities while others were in low intensities. The intensity of different insect pests was in low intensities. Pesticides like chlorpyrifos (1 litre/acre) for termite and root weevil; cartap hydrochloride (5-7.5 kg/acre) and Regent (5 kg/acre) for stem borer and leaf folder; Bavistin (300 g/acre) for bakanae; buprofezin (330 ml/acre) + lambda cyhalothrin (200 ml/acre) for BPH/WBPH, leaf folder and stem borer; buprofezin (330 ml/acre) + Tilt (200 ml/acre) for BPH/WBPH and false smut; tricyclazole (120 g/acre) + buprofezin (330 ml/acre) + imidacloprid (70 ml/acre) for BPH/WBPH and neck blast were used by the farmers. There was overall 2-5% post harvest loss in the district.

Ambala: Ten villages in six blocks were covered for production oriented survey. The survey was done twice in the crop season; once during August when the crops were in tillering to stem elongation stage and another during October when crops were in milk to mature stage. The general climatic conditions were normal in all the places visited. About 80-85% area was covered with HYVs and hybrids and about 15-20% area was covered with basmati rice varieties. The main crop rotation practice was rice-wheat followed by rice-sugarcane and rice-turnip/carrot/seed crop. The commonly grown rice varieties in the region are presented in the table. The average rice yield in the district varied from 2750-5500 kg/ha in CSR-30 and Pusa Basmati 4, 6250-7750 kg/ha in Arize 6444, 7250 kg/ha in Arize 6129, 8000-8250 kg/ha in hybrid Sudha and 7000-7250 kg/ha in Variety 220. Transplanting was done between June 2nd week to July 2nd week. The seed rate used was 4-5 kg for HYVs and 3-4 kg for hybrids for transplanting one acre of land. Seed treatment was done by only 40% of the farmers contacted. Some of the farmers applied insecticides like cartap hydrochloride, fungicides like carbendazim (4 days before uprooting of the seedlings) and weedicides like Erazo. Some of the farmers put a layer of FYM on the nursery after sowing of seeds. Most of the farmers applied urea (8-13 kg/kanal of nursery) or urea (5-6 kg/kanal) + DAP (5 kg/kanal) in the nursery beds. In the main field, fertilizers were applied as 4.5-22.5 kg N/ha and 11.5-57.5 kg P₂O₅/ha and 40.75-75 kg K₂O/ha as basal and 115-172.5 kg N/ha as top dressing (2-3 split application). Most of the farmers applied 5-25 kg zinc sulphate/ha (33% zinc). K application was done only about 40% farmers. In the basmati varieties, dose of N for top dressing was comparatively less (13.8-86.25 kgN/ha). Some farmers applied 6.25-7.25 kg sulphur/ha as basal application. About 50% of the farmers contacted applied FYM in the fields. Some applied biofertilizers (3 kg/acre), Tricontenol (Vipul) or Vigore (100 g) + Cure + Trace elements (organic extract 24%). Transplanting was random and the average plant population was 16-23 hills/m². The intensity of common weeds like Echinochloa spp. and Cyperus spp. was negligible. Most of the farmers applied weedicides like Nominee Gold (80 g/acre), butachlor (1 litre/acre), Rifit (500 ml/acre), Fast Mix (1 litre/acre), Topstar (45 g/acre) and Erazo (500 ml/acre). In some places, moderate intensity of weedy rice was recorded. Most of the inputs except drying and storage facilities were adequate in most of the places. The diseases like blast, false smut, bakanae, sheath blight, grain discoloration and brown spot were recorded in low to moderate intensities. Among insect pests, leaf folder was recorded in severe intensities in some places (35% damaged leaves). Pesticides like chlorpyrifos (1 litre/acre) or mixture of chlorpyrifos and cypermethrin 505 (500 ml/acre) for termites; cartap hydrochloride (5-7. Kg/acre), Regent (5 + 5 kg/acre) and Matador (lambda cyhalothrin) (200-250 ml/acre) for stem borer and leaf folder; Captan 70% + hexaconazole 5% WP (350 g/acre) for bakanae; Folicur (250 ml/acre) + streptomycin (12 g/acre) for bacterial blight and blast; Tilt (200 ml/acre) + Matador + 524NPK for false smut and stem borer; Folicur (150 ml/acre) + buprofezin (330 ml/acre) + NPK + tricyclazole (120 g/acre) for neck blast and BPH/WBPH; hexaconazole (400 ml/acre) + Result (200 ml/acre) + imidacloprid (70 ml/acre) for BPH/WBPH, false smut and sheath blight; hexaconazole (400 ml/acre) + imidacloprid (80 ml/acre) + lambda cyhalothrin (200 ml/acre) + propiconazole (200 ml/acre) for sheath blight, false smut and BPH/WBPH and buprofezin (330 ml/acre) + DDVP (100 g/acre) + tricyclazole (120 g/acre) for neck blast and BPH/WBPH were applied by the farmers.

Panipat: Rice fields were surveyed at the tillering to booting stage (in the month of August) and during dough to maturity stage (in the month of October). At about 60% of the places visited, there were records of sub-normal rainfall. The basmati varieties like Pusa Basmati 4 and Pusa Basmati 1 occupied about 70-75% of the area while traditional basmati covered 10% area and rest 15% area was covered with HYVs and hybrids. The commonly grown rice varieties are presented in the table. Rice-wheat was the only crop rotation followed by the farmers. The average rice yield in the district ranged from 3000-4400 kg/ha in Pusa Basmati 4, 2500-4000 kg/ha in CSR-30 and 3000-5000 kg/ha in Pusa Basmati 1. Transplanting was completed in

between 4th week of June to 2nd week of July. The average seed rate was 5-6 kg for HYVs and 4-5 kg for hybrids for transplanting one acre of land. About 80% of the farmers adopted seed treatment. Some of the farmers applied insecticides like Caldan or Padan and weedicides like Sofit. Most of the farmers applied urea (5-10 kg/kanal) and DAP (5-10 kg/kanal). Few applied zinc sulphate also in the nursery. In the main field, fertilizers were applied as 11.25-33.75 kg N/ha and 43.12-86.25 kg P₂O₅/ha as basal and 57.5-172.5 kg N/ha as top dressing (2-3 split application). Most of the farmers applied 12.5-25 kg zinc sulphate/ha (33% zinc). None of the farmers contacted applied K fertilizers. In the basmati varieties, dose of N for top dressing was comparatively less. Few farmers applied 12.5 kg sulphur/ha as basal application. Some farmers applied FYM or paddy manure and about 40% farmers contacted followed green manuring with dhaincha or moong. Method of transplanting was random and the average plant population was 16-24. The intensity of common weeds like Echinochloa spp. was negligible. Most of the farmers applied weedicides like butachlor (1 litre/acre), Rifit (500 ml/acre) and Topstar (45 ml/acre). Among the inputs, drying and storage facilities were inadequate everywhere and equipments were inadequate in some of the places. Among the diseases, blast in low to severe form and sheath blight and khaira in moderate intensities were recorded in some places. Among insect pests, BPH/WBPH and whorl maggot in low to moderate intensities were recorded in some places. Different pesticides like Kudrat (250 ml/acre), chlorpyrifos (1 litre/acre), chlorpyrifos + cypermethrin 505 (Super 505) (1 litre/acre) for termite and root weevil; cartap hydrochloride (5-7.5 kg/acre), Regent (5 kg/acre) for leaf folder and stem borer; buprofezin (330 ml/acre) + hexaconazole (400 ml/acre) + Baan (120 g/acre) + imidacloprid (70 ml/acre) for BPH/WBPH, sheath blight and neck blast; imidacloprid (75 ml/acre) + Folicur (250 ml/acre) + lambda cyhalothrin (200 ml/acre) for BPH/WBPH and neck blast; buprofezin (330 ml/acre) + Sivic (120 g/acre) for neck blast and BPH/WBPH; buprofezin (330 ml/acre) + DDVP (125 ml/acre) + lambda cyhalothrin (200 ml/acre) for BPH/WBPH, leaf folder and stem borer; imidacloprid (75 ml/acre) for BPH/WBPH; buprofezin (330 ml/acre) + tricyclazole (120 g/acre) for BPH/WBPH and neck blast; hexaconazole (400 ml/acre) + buprofezin (330 ml/acre) for sheath blight and BPH/WBPH were applied by the farmers. The granular pesticides were applied as a mix with urea or sand.

Sonepat: Production oriented survey was conducted in 10 villages (in 7 blocks) twice; once during August when crops were in stem elongation to booting stage and once in October when the crops were in milk to maturity stage. In about 50% of the places, there was sub-normal rainfall. Basmati occupied major rice area (80-85%) in the district while rest is covered with HYVs and hybrids. Rice-wheat was the only crop rotation followed by the farmers. The commonly grown rice varieties are presented in the table. The yield varied from 2000-4500 kg/ha in Pusa Basmati 4, 3000-3200 kg/ha in case of CSR-30, 6250-6500 kg/ha in PA 6129 and 5000-5500 kg/ha in hybrid 999. Transplanting was done between 3rd week of June to last week of July. The seed rate was 5-6 kg for transplanting in one acre land in case of HYVs. In case of hybrids, it was less (4-5 kg). About 60% of the farmers followed seed treatment. Most of the farmers applied urea (8-10 kg/kanal) or DAP (10-12 kg/kanal) or urea (5-6 kg/kanal) + DAP (7-8 kg/kanal) in the nursery. In the main field, fertilizers were applied as 11.25-22.5 kg N/ha and 28.75-57.5 kg P₂O₅/ha as basal and 57.5-172.5 kg N/ha as top dressing (2-3 split application). Most of the farmers applied 12.5-25 kg zinc sulphate/ha (33% zinc). Practically, K application was nil. In the basmati varieties, dose of N was comparatively less. Few farmers also applied 6.25 kg S in each ha of main field. About 60% of the farmers adopted green manuring with dhaincha or moong. Transplanting was random in all the cases and the average plant population was 16-23 hills/m². The intensity of common weeds like Echinochloa colona and E. Crusgalli was negligible. Most of the farmers applied Rifit (500 ml/acre), butachlor (1 litre/acre) and Topstar (45 g/acre) in addition to hand weeding. Among the inputs, drying and storage facilities were inadequate/not available in most of the places and equipments and water were inadequate in some of the places. Among the diseases, only brown spot was noticed in moderate intensities

in some of the places. Among insect pests, BPH/WBPH were recorded in low to moderate intensities (1-25 adults+nymphs/hill). Pesticides like chlorpyrifos (1 litre/acre) or mixture of chlorpyrifos + cypermethrin 505 (500 ml/acre) for termite, cartap hydrochloride (5-7.5 kg/acre), Regent (5 kg/acre) and lambda cyhalothrin for stem borer and leaf folder; hexaconazole (400 ml/acre) + lambda cyhalothrin (200 ml/acre) + imidacloprid (70 ml/acre) + buprofezin (330 ml/acre) + Mentis (120 g/acre) for neck blast, sheath blight and BPH/WBPH; buprofezin (330 ml/acre) + Blastogen (200 ml/acre) for sheath blight and BPH/WBPH; Tribune (buprofezin) (330 ml/acre) + Beam (120 g/acre) + hexaconazole (400 ml/acre) for neck blast, sheath blight and BPH/WBPH; buprofezin (330 ml/acre) + lambda cyhalothrin (200 ml/acre) + Beam (120 g/acre) + Helper (sticker) for neck blast, grass hopper and BPH/WBPH; hexaconazole (400 ml/acre) + lambda cyhalothrin (200 ml/acre) + Bacterianashak (40 g/acre) for sheath blight, bacterial blight and grass hopper; Tribune (buprofezin) (330 ml/acre) + hexaconazole (400 ml/acre) for sheath blight and BPH/WBPH were used by the farmers. Overall, there was 2-6% post harvest loss in the district.

Fatehabad: Ten villages in 6 blocks were covered for production oriented survey twice in the crop season, once during August when the crops were in booting stage and once again in October when the crops were in milk to maturity stage. The weather conditions were not very favourable as there were reports of sub-normal rainfall in 80% of the places visited. About 60% of the area was covered with HYVs and hybrids; 35% are covered with Pusa Basmati-1 and Pusa Basmati-4 and other basmati like CSR-30 and Taraori Basmati covered about 4-5% of the area. Rice-wheat was the only crop rotation followed by the farmers. The commonly grown rice varieties are presented in the table. The average rice yield in the district ranged from 3500-6000 kg/ha in Pusa Basmati 4; 4000-7000 kg/ha in Pusa Basmati 1 and 5500-9500 kg/ha in PR 114. Transplanting was done between 3rd week of June to 3rd week of July. The average seed rate was 5-6 kg in HYVs and 4-5 kg for hybrids for transplanting one acre of land. About 60% of the farmers followed seed treatment. Some of the farmers applied weedicides like Nominee Gold, fungicides like carbendazim and insecticides like Padan in the nursery. Most of the farmers applied 8-15 kg urea/kanal or 5-6 kg urea and 8-10 kg DAP per kanal of nursery. In the main field, fertilizers were applied as 9-22.5 kg N/ha and 28.75-57.5 kg P₂O₅/ha and 0-37.5 kg K₂O/ha as basal and 57.5-172.5 kg N/ha as top dressing (2-3 split application). Most of the farmers applied 12.5-25 kg zinc sulphate/ha (33% zinc). K application was done only by very few farmers. In the basmati varieties, dose of N was comparatively less. Some of the farmers also applied gypsum @ 25 kg/acre, FYM 4 trollys/acre and followed green manuring with moong or dhaincha. Random method of transplanting was common among the farmers and the average plant population was 15-20 hills/m². The intensity of common weeds like Echinochloa crusgalli, E. colona and Cyperus spp. was negligible. Most of the farmers applied weedicides like aniloguard (500 ml/acre) and butachlor (1 litre/acre) for the management of weeds. Among the inputs, drying and storage facilities were inadequate/not available in most of the places and equipments and water were inadequate in some of the places. The diseases like sheath blight in low to severe intensities and brown spot in moderate intensities were recorded in some fields. Other diseases like neck blast, bakanae and brown spot were recorded in low intensities. Among the insect pests, only BPH/WBPH were recorded in low to moderate intensities in some of the fields. Pesticides like chlorpyrifos (1 litre/acre) for termite; Padan (5-7.5 kg/acre) for stem borer and leaf folder; monocrotophos (500 ml/acre) for BPH/WBPH; Hexastop (500 g/acre) and carbendazim (1000 g/acre) for bakanae; validamycin (500 ml/acre) for sheath blight; Ektara (150 g/acre) + imidacloprid (90 ml/acre) for stem borer and leaf folder; Ektara (40 g/acre) + imidacloprid (70 ml/acre) + hexaconazole (400 ml/acre) for sheath blight, BPH/WBPH; lambda cyhalothrin (200 ml/acre) + imidacloprid (70 ml/acre) for BPH/WBPH; carbendazim (200 g/acre) + imidacloprid (70 ml/acre) + Applaud (330 ml/acre) for neck blast and BPH/WBPH; flubendamide (50 ml/acre) + carbendazim (250 g/acre) for stem borer, leaf folder and neck blast; Ektara (100 g/acre) + tricyclazole (120 g/acre) for BPH/WBPH and neck blast and imidacloprid

(100 ml/acre) + Paramsect (300 ml/acre) for BPH/WBPH and stem borer were used by the farmers.

Sirsa: Production oriented survey was conducted in 10 villages in 8 blocks in this district twice in the crop season; once in the month of August when the crops were in booting to heading stage and again in the month of October when the crops were in milk to dough stage. About 50% of the places visited received sub-normal rainfall during the crop season. Basmati varieties like Pusa Basmati 4 and Pusa Basmati 1 covered about 90% area in the district and 4-5% by HYVs and another 4-5% by CSR 30 and Taraori Basmati. Rice-wheat was the only crop rotation followed by the farmers. The commonly grown rice varieties in the district are presented in the table. The average rice yield ranged from 5000-6500 kg/ha in Pusa Basmati 1 and 4000-4500 kg/ha in Pusa Basmati 1. Transplanting was done in between 2nd week of June to 2nd week of July. The average seed rate was 5-6 kg in HYVs and 4-5 kg for hybrids for transplanting one acre of land. About 80% of the farmers adopted seed treatment. Some of the farmers applied insecticides like Confidor, monocrotophos, Caldan and mixture of chlorpyrifos and cypermethrin (1.25 ml/kanal) and weedicides like Sofit. Some farmers put a layer of FYM on the nursery after sowing of seeds. Most of the farmers applied either urea (8-13 kg/kanal) alone or along with 5-10 kg DAP/kanal. In the main field, fertilizers were applied as 11.25-22.5 kg N/ha and 10-57.5 kg P₂O₅/ha and 0-75 kg K₂O/ha as basal and 86.25-172.5 kg N/ha as top dressing (2-3 split application). Most of the farmers applied 12.5-25 kg zinc sulphate/ha (33% zinc). Some of the farmers applied 1.25 kg chelated zinc per ha. K application was done only by very few farmers. In the basmati varieties, dose of N was comparatively less. Some of the farmers adopted green manuring with dhaincha or moong; applied FYM (6 trolleys per acre) and growth stimulators like Biozyme (5 kg/acre) and Nakshtar (500 ml/acre). Transplanting was random in most of the cases. The intensity of common weeds like Echinochloa spp and Cyperus spp. was negligible. Most of the farmers applied weedicides like anilophos (500 ml/acre), butachlor (1 litre/acre) and Rifit (500 ml/acre) for the management of weeds. Most of the inputs except drying and storage facilities were adequate in most of the places. Among the diseases, bacterial blight and sheath blight was severe in some fields while leaf blast in moderate intensity was noticed in some fields. Among the insect pests, BPH/WBPH was recorded in low to severe intensity (up to 50 nymphs and adults per hill) in some fields. Pesticides like chlorpyrifos (1 litre/acre) or mixture of chlorpyrifos and cypermethrin 505 for termites; Caldan (5-7.5 kg/acre) for leaf folder and stem borer; Plantomycin (50 g/acre) for bacterial blight; Bifenthrin (500 ml/acre) + Ektara (thiomethoxam) (40 g/acre) for BPH/WBPH; propiconazole (200 ml/acre) + Fipronil (350 ml/acre) + Ektara (100 g/acre) for leaf folder, stem borer, BPH/WBPH and sheath blight; tricyclazole (120 g/acre) + di-nitro-bromo-propane (Bacteriomycin) (20 g/acre) for neck blast and bacterial blight; tricyclazole (120 g/acre) + Ektara (50 g/acre) for neck blast, stem borer and leaf folder; tricyclazole (120 g/acre) + imidacloprid (70 ml/acre) for neck blast and BPH/WBPH; Diathane Z-78 (500 g/acre) + chlorpyrifos (200 ml/acre) for blast and stem borer; Companion (500 g/acre) + lambda cyhalothrin (200 ml/acre) for blast and stem borer; tricyclazole (120 g/acre) + Ektara (60 g/acre) for neck blast and BPH/WBPH; tricyclazole (120 g/acre) + imidacloprid (70 ml/acre) for neck blast and BPH/WBPH; Sheathmar (400 ml/acre) + Karate (200 ml/acre) + Ektara (50 g/acre) for sheath blight, leaf folder, stem borer and BPH/WBPH; Sheathmar (400 ml/acre) + imidacloprid (70 ml/acre) + ; tricyclazole (120 g/acre) for neck blast, sheath blight and BPH/WBPH; Bacteriomycin (20 g/acre) + imidacloprid (70 ml/acre) + Ektara for bacterial blight, leaf folder and BPH/WBPH; Beam (120 g/acre) + Tilt (200 ml/acre) + Applaud (330 ml/acre) for BPH/WBPH, neck blast, false smut and leaf folder; Beam (120 g/acre) + Tilt (200 ml/acre) + Applaud (330 ml/acre) for BPH/WBPH, neck blast, false smut, grain discoloration and propiconazole (200 ml/acre) + Ektara (50 g/acre) for false smut, grain discoloration and BPH/WBPH were applied by the farmers for the management of pests and diseases.

Table. Prevalence and severity of rice diseases in different districts of Haryana during *Kharif* 2011

District	Diseases recorded at per cent location										
	BLB	Blast		FS	Bakanae	Stem rot	ShBl	GD	BS	NBLs	<i>Khaira</i>
		Leaf	Neck								
Kaithal	-	-	20 L 1-3% ^a CSR-30, PB-4	10 L PR 114 (1-2% tillers & 8-10 smut balls/tiller)	90 Tr-S (Tr-50%) PB-4, CSR-30	-	50 L-S HKR 127, PB-4, Pusa 44, PAU 201, PR 114, CSR 30	10 L (2-3%) PR 114	20 M HKR 127, CSR 30	20 L CSR 30, HKR 127	30 L PB-4, CSR 30, HKR 47
Kurukshetra	10 S PR 118, CSR 30	20 L CSR 30	40 Tr-L Tr-5% CSR-30	20 L (1-3% tillers & 1-4 smut balls/T) PR 114, PR 118	70 Tr-M (Tr-7%) PB-4, CSR-30	10 M (8-10%) Arize 6444	60 Tr-S PR 114, HKR 47, PR 118, var. 220	10 L 4-5% HKR 127	30 Tr-L CSR 30, HKR 127, PR 114	-	-
Karnal	-	20 L-S CSR 30	50 Tr-L Tr-3% PB-4, CSR-30	-	70 Tr-L (Tr-2%) CSR-30, PB-4	-	30 Tr-S PR 120, CSR 30, HKR 47, PB-4, PAU 201	-	20 L CSR 30	-	10 L PB-4, PAU 201
Jind	-	10 L CSR 30	20 Tr CSR-30, PB-4	-	90 Tr-S (Tr-35%) PB-4, CSR 30	-	-	-	-	-	60 L-S PB-4, CSR 30
Yamuna- nagar	-	10 Tr PB-4	-	20 Tr-M (Tr-15% tillers & 3-4 smut balls/tiller) HKR-47, PB-1, Super Kalpana	20 Tr-L (Tr-0.1%) PB-1, PB- 4	-	10 M PB-1	20 L (1-3%) PB-1, Arize 6129, Super Kalpana	10 M Dhanlaxmi	10 L Super Kalpana	-
Ambala	-	20 L-M CSR 30	-	20 L-M (5-10% tillers & 1- 3 smut balls/tiller) Arize 6129, Hybrid Bisham Anmol Paddy Cure)	40 Tr-M (Tr-20%) PB-4, CSR 30, PB-1	10 M (8-10%) PB-1	-	10 L 3-4% PB-4	10 L-M CSR 30	-	-
Panipat	-	20 L-S	40 L	-	80 Tr-L	-	10 M	-	-	-	10 M

District	Diseases recorded at per cent location										
	BLB	Blast		FS	Bakanae	Stem rot	ShBl	GD	BS	NBLs	Khaira
		Leaf	Neck								
		PB-4, CSR 30	1-5% PB-1, PB-4		(Tr-6%) PB-4, CSR 30		PB-1, PB-4,				PB-4
Sonepat	-	20 L PB-4, CSR 30	50 Tr-L (Tr-4%) PB-4, PB-1, CSR 30	10 L Arize 6129	80 Tr-L (Tr-6%) PB-4	-	10 L PB-4	-	10 M PB-1, PB-4	-	-
Fatehabad	-	-	10 Tr PB-4	-	70 Tr-L (Tr-5%) PB-1, PB-4	-	20 L-S PB-4, PB-1	10 L 1-2% PB-4	10 L-M PR 114	-	-
Sirsa	10 S PB-1	30 L-M PB-1, PB-4	40 Tr PB-1, PB-4	-	40 Tr-L (Tr-0.3%) PB-4, PB-1	-	10 S PB-1	-	-		-

^a: Disease incidence Severity: Tr: traces; L: low; M: moderate; S: severe The disease incidence < 10%, 10-25% and > 25% were designated as L, M and S in case of neck blast, bakanae, false smut, stem rot and grain discolouration. Likewise for bacterial blight, leaf blast, brown spot, narrow brown leaf spot and sheath blight, a disease score of 3, 5 and > 5 were treated as L, M and S, respectively. NBLs: Narrow brown leaf spot

Pests

Districts	SB	LF	BPH/ WBPH	WM	GLH	Termite
Kaithal	T		L-S			
Kurukshetra	T	L (1-5% DL)	L-S	L-M (3-30% DL)		L
Karnal	T	T-L	L-M	L (4-5% DL)		M-S
Jind	T		L	T-L (10-15% DL)	T	
Yamunanagar	T-L	T-L	L	T		T
Ambala	T	T-S (up to 35% DL)	L			
Panipat	T		L-M	T-L		
Sonepat	T	T	L-M			
Fatehabad	T	T	L-M			
Sirsa	T		L-S			

HIMACHAL PRADESH

Districts Surveyed: Kangra, Mandi, Una and Sirmour

District	Blocks	Villages
Kangra	Nagrota Bagwan, Kangra, Rait, Baijnath	Baldhar, Rounkher, Kohala, Rait, Shahpur, Ansui, Bagru, Rehlu haar, Rajiana, Trind, Paprola, Deol, Sansal, Gunehar
Mandi	Chauntra, Jogindernagar, Paddhar, Mandi, Sundernagar, Sarkaghat	Dhelu Haar, Chauntra, Jogindernagar, Harabagh, Sundernagar, Balh valley, Lohara, Dadaur, Rewalsar, Jahu
Una	Una	Una, Basal, Fatehpur, Tahliwal
Sirmour	Paonta Sahib	Dhaura Kuan, Shambhuwala, Bhedewala, Misarwala, Fatehpur, Puruwala, Surajpur, Paonta

Widely Prevalent Varieties:

Kangra	Improved: HPR 2143, HPR 1068, RP 2421, China 988, Norin 18, Sabarmati, Nagrota purple, T-23, Palam Dhan 957, PR 108,114,116, Pakistani Basmati, Kasturi. Himalaya-799, Himalaya 741, Himalaya 2216, Sharbati, Hasansarai and Pusa Sugandh-5; Hybrids: Arize 6129, PAC 807 and US 315; Locals: Achhoo, Zheeni, Jeeri and Ram Jawain
Mandi	Improved: HPR 2143, HPR 1156, HPR 1068, RP 2421, Norin 18, Naggar Dhan and Kasturi; Hybrids: PA 6129, PAC 807, US 312 and US 315; Locals: Cheenu, Tapta, Kali Jheeni, Jheeni and Begmi
Una	Improved: PR 112, 114, 116, RP 2421 and Kasturi; Hybrids: PA 6129, PA 6444 and Hybrid- 47, RH 257 and Hybrid 832
Sirmour	Improved: Kasturi, Jaya, Sharbati, HKR 126, Pusa Basmati -1, Lal Quila, Pakistani Basmati, PR 106, PR 113/116, IR-8, Taraori basmati, Pusa 1121; Hybrids: RH 748 and PA 6444

Area under Rice crop in different districts of Himachal Pradesh

District	Area Planted (ha)
Kangra	38000
Mandi	20000
Una	2350
Sirmour	4950

The production oriented survey was conducted in four rice growing districts viz., Kangra, Mandi, Una and Sirmour. Kangra and Mandi are the major rice growing districts contributing about two-third of total production in the state. Kangra district is leading in the area under rice cultivation followed by Mandi, Sirmour and Una districts. Prevalent rice varieties in the state were HPR 2143, HPR 1068, RP 2421, China 988, Norin 18, Sabarmati, Nagrota purple, T-23, Palam Dhan 957, PR 108,114,116, Pakistani Basmati, Pusa Sugandh-5, Kasturi. Himalaya-799, Himalaya 741, Himalaya 2216, Sharbati, Hasansarai under irrigated conditions. Under rain fed conditions, the most prominent cultivars were VL Dhan 221, HPR 1156 and China 988. Some common hybrids grown by the farmers were PA6129, PAC807,

US 312, US 315, Arize 6129, PA 6444 and Hybrid 47, 257 and 832. The common crop rotations were rice-wheat, maize-wheat and rice-potato. Amongst the weeds *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* and *Bonnaya veronicaefolia*. Diseases like leaf blast, neck blast, bacterial blight, false smut, leaf scald, sheath rot and narrow brown leaf spot and insect pests like leaf folder, stem borer, grasshoppers, whorl maggot, chaffer beetle and case worm were recorded in low to moderate intensities. White tip nematode was recorded in low to moderate intensity in Balh valley of Mandi district.

The major constraints in rice cultivation in Himachal Pradesh were:

1. Late onset of monsoon rains in some parts of Una, Sirmour districts delayed transplanting of paddy by 3-4 weeks which resulted in chaffy grains in most of the long duration varieties.
2. Prevalence of high intensity of weeds under rainfed upland rice cultivation.
3. Moderate to high incidence of black beetle and case worm in nursery and transplanted rice, respectively.
4. Inadequate and imbalanced use of chemical fertilizers.

District-wise observations:

Kangra: Fourteen villages from four blocks of district Kangra were covered under production oriented survey during Kharif 2011 at different stages of growth. Farmers were contacted for collecting information in respect of rice cultivation. Most of the farmers contacted were marginal to sub-marginal. Three methods of rice cultivation viz., dry seeding, sowing of sprouted seeds in puddled fields and transplanting are practiced in this district. System of rice intensification was also observed in increasing pattern. The varieties grown under irrigated conditions were HPR 2143, HPR 1068, RP 2421, China 988, Norin 18, Sabarmati, Nagrota purple, T-23, Palam Dhan 957, PR 108,114,116, Pakistani Basmati, Pusa Sugandh-5, Kasturi. Himalaya-799, Himalaya 741, Himalaya 2216, Sharbati, Hasansarai. Under rain fed conditions, the most prominent cultivars were VL Dhan 221, HPR 1156 and China 988. Some local varieties like Achhoo, Zheeni, Jeeri, Tapta, Cheenu, Ramjawain, Begmi and Lal Dhan were also grown by few farmers. Amongst the weeds *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* and *Bonnaya veronicaefolia*. Hand weeding and sub-optimal dose of butachlor was used by some farmers to check weeds under direct sown and transplanted conditions, respectively. The fertilizer dose applied ranged between 0-70 kg N, 0-40 kg P₂O₅ and 0-20 kg K₂O. Diseases such as leaf blast, neck blast, leaf scald, false smut and bacterial leaf blight were observed as low to moderate whereas brown spot, grain discolouration, sheath blight, sheath rot and narrow brown leaf spot were recorded as low. Farmers were using Bavistin 50 WP (0.1%) against blast in some cases. The incidence of leaf folder, stem borer, grasshoppers, whorl maggot and chaffer beetle was low to moderate. The high incidence of case worm was observed in Dodhamb and Ansui areas of Rait block. Farmers were using monocrotophos and chlorpyrifos to control leaf folder.

Mandi: Farmers of ten villages from six blocks were contacted for production oriented survey in this district. Survey was conducted during dough to maturity stage of the rice crop. Some of the fields were in milk stage. Most of the farmers were marginal to sub-marginal. The area under rice cultivation during *Kharif* 2011 in Mandi district was 20,000 hectares. Rice-wheat, maize- wheat and rice- potato were the prevailing crop rotations. The predominant high yielding varieties in the district were HPR 2143, HPR 1156, HPR 1068, RP 2421, Norin 18, Naggar Dhan, Kasturi. In addition, hybrids viz., PA6129, PAC807, US312, US315 were also grown by the farmers. The local germplasm on farmers' fields included Cheenu, Tapta, Kali Jheeni, Jheeni and Begmi. 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. The most common weeds found in the district were *Cyperus iria*, *Echinochloa colona*, *E. crusgalli*, *Monochoria vaginalis*, *Paspalum* spp., *Eragrostis japonica*, *Digitaria sanguinalis*, *Ageratum conyzoides* and wild rice. Machete was used by the farmers. System of rice intensification was also observed in some pockets.

Diseases such as leaf blast, neck blast, brown spot, grain discolouration, leaf scald, narrow brown leaf spot, sheath blight and sheath rot were observed as low to moderate, whereas bacterial leaf blight was recorded as low. False smut appeared in moderate to severe forms in some parts of Mandi district. Infestation of insect pests such as stem borer was low to moderate. Black beetle was found damaging the rice in nursery as well as in transplanted fields in Jogindernagar block. Grass hoppers and leaf folder were in low intensity. White tip nematode was found in low to moderate intensity in hybrids grown in Balh valley. The farmers adopted the control measures for leaf folder, leaf & neck blast. The commonly used pesticides were Bavistin 50 WP, chlorpyrifos and monocrotophos.

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. However, transplanting was done late by 3-4 weeks during this season due to late onset of rain which the farmers feel necessary to begin with rice cultivation. The varieties cultivated were Kasturi, Jaya, HKR 126, Pusa Basmati-1, Lal Quila, Pakistani Basmati PR 106, PR 113/116, IR-8, Taraori basmati, RH 748, PA6444, Pusa 1121. 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. The common weeds were *Cyperus iria*, *Echinochloa* sp., *Panicum* sp., *Paspalum* sp. The planting pattern in hybrids was similar to SRI i.e wide spacing (25-30 cm) and planting single seedling per hill giving yields 9-10 t/ha. The infestation by leaf folder, grasshoppers, stem borer, gundhi bug and hoppers was low to moderate. Diseases, such as leaf blast, neck blast, brown spot, false smut, Sheath blight and leaf scald were low to moderate while grain discolouration, narrow brown leaf spot and bacterial leaf blight were recorded as low. The farmers used Blitox 50WP and Bavistin 50WP against blast, Indofil M-45 against grain discolouration and endosulfan and chlorpyrifos against stem borer and leaf folder. The average yields ranged between 4-6 t/ha. The hybrids gave yields ranging between 8-10 t/ha.

Una: Rice is grown in low hills of Una district comprising Una, Basal, Fatehpur, Tahliwal, Santokhgarh areas where the farmers were contacted for collecting information in respect of rice cultivation. Most of the farmers were marginal to submarginal while few of them were progressive. The genotypes PR 112, 114, 116, RP 2421, Kasturi, hybrids Arize 6129, 6444 and Hy 47, 257 and 832 were grown by the farmers. The farmers used recommended doses of fertilizers. The top dressing of urea at tillering and heading stages was also done. The common weeds were *Cyperus iria*, *Echinochloa colonum* and *E. crusgalli*. Farmers used butachlor and machete for the control of weeds. Diseases like brown spot, false smut, narrow brown leaf spot, sheath rot and bacterial leaf blight were low to moderate; leaf blast, neck blast, grain discolouration, leaf scald and sheath blight were recorded as low. Leaf folder, chaffer beetle, grass hopper and stem borer damage was low to moderate. Pesticides like Bavistin 50 WP against blast and insecticide like monocrotophos and chlorpyrifos for leaf folder were used by farmers.

Prevalence of diseases and insect-pests of rice in HP during kharif 2011

District	Diseases									
	LBL	NBL	BS	GD	FS	LS	NBLS	SHBL	SHR	BLB
Kangra	L-M	L-M	L	L	L-M	L-M	L	L	L	L-M
Mandi	L-M	L-M	L-M	L-M	M-S	L-M	L-M	L-M	L-M	L
Sirmaur	L-M	L-M	L-M	L	L-M	L-M	L	L-M	L-M	L
Una	L	L	L-M	L	L-M	L	L-M	L	L-M	L-M

LBL: Leaf blast, NBL: Neck blast, BS: Brown spot, GD: Grain discolouration, FS: False smut, LS: Leaf scald, NBLS: Narrow Brown leaf spot, SHBL: Sheath blight, SH.R: Sheath rot. BLB: Bacterial leaf blight, VL: Very low, L: Low, M: Moderate, S: Severe.

Districts	Insect pests			
	LF	SB	GH	WM
Kangra	L-M	L	L-M	L-M
Mandi	L	L-M	L	-
Sirmaur	L-M	L-M	L-M	-
Una	L-M	L-M	L-M	L

LF: Leaf folder, SB: Stem borer, RH: Rice hispa, GH: Grass hopper, WM: Whorl maggot, CB: Chaffer Beetle, HP: Hoppers, GB: Gundhi Bug, L: Low, L-M: Low-Moderate.

JAMMU AND KASHMIR-1

Districts surveyed: Pulwama, Bandipora, Shopian, Baramulla, Anantanag and Kulgam

Particulars of survey

Districts	Blocks/Taluqs	Villages
Pulwama	Pulwama and Tral	Tahab, Monghama, Dadsar, Buchoo, Amirabad, Rathsun, Parigam and Kargam
Bandipora	Hajin, Bandipore,	Bonpora Sadarkaot, Kehnusa, Malangaur, Potuderi, Kunan, Lahasnanpore, Aloosa, Takia Laman, Sadarkot-Malapora, Brar, Potushai and Qazipora Watpore
Shopian	Shopian and Imamsahib	Melhura, Wachi, Babapora, Zainapora, Vandena,
Baramulla	Pattan	Habok Tengoo and Reshipora
Anantanag	Bijbehara and Anantnag	Hassanpora, Lasam, Gund Anantnag, Khanabal Batapara, Donipawa, Miniwar, Shamsipora and Sadoora
Kulgam	Kulgam and Qaimoh	Rampora, Bichroo, Sanigam, Brazloo, Adijan (Wudgam) and Tangjan

Widely grown rice varieties

Districts	Varieties
Pulwama	Improved: Jhelum, China 1007, K 448 and K-39
Bandipora	Improved: China 1039, Jhelum, SR-2, China-1007 and K-39
Shopian	Improved: Jhelum, SR-1 and K-39
Baramulla	Improved: Jhelum and IC-39
Anantanag	Improved: Jhelum, K-39 and China-9988
Kulgam	Improved: Jhelum and K-39

Production oriented survey was conducted in six districts of Jammu and Kashmir. The survey was done when rice crops were in maturity stage. In general, the climatic conditions were normal for rice cultivation in most of the places visited. Most of the farmers took one rice crop in a year and the common crop rotation practices were rice-brown mustard, rice-oats, rice-fodder and rice-fallow. The common rice varieties cultivated by the farmers were Jhelum, China 1007, K 448, K-39, China 1039 and SR-2. Sowing was completed by 1st week of May and transplanting was completed by 1st week of June. Most of the farmers applied FYM/organic manure in the nursery. In the main fields, fertilizers were applied as 40-70 kg N/ha, 30-60 kg P₂O₅/ha and 10-30 kg K₂O/ha as basal and 10-30 kg N/ha as top dressing. The common weeds were *Echinochloa* spp., *Marsilea* spp., *Panicum* spp., *Potamogeton* spp. etc. Farmers applied butachlor @ 1.5 kg a.i. per ha for the management of weeds. Except water, most of the inputs were inadequate in most of the places. Among the different biotic constraints, blast, neck blast, grain discoloration and GLH were observed in low intensities. Fungicides like tricyclazole (6 g/10 litre) for the control of leaf blast.

District wise observation:

Pulwama: Survey was conducted in 8 villages in this district when the crops were maturity stage. Most of the farmers were marginal. The climatic conditions were normal for rice cultivation. Most of the farmer took one rice crop in a year and the common crop rotation practices were rice-brown sarson, rice-oats and rice-fodder. The commonly grown rice varieties were Jhelum, China 1007, K 448 and K-39. The average rice yields in the district ranged from 5400-6000 kg/ha in varieties like Jhelum, K-448 and K-39 and 4100-4500 kg/ha in China 1007 and some local varieties. The optimum time of sowing was 1st week of May and that of transplanting was 1st week of June. Many farmers applied FYM in the nursery. In the main fields, fertilizers were applied @ 30 kg N/ha, 50 kg P₂O₅/ha (in the form of DAP) and 10 kg K₂O/ha as basal and 10-20 kg N/ha as top dressing. Transplanting was random. The average plant population was 55-70 /m². The intensity of common weeds was moderate. The common weeds were *Echinochloa* spp., *Marsilia* spp., *Panicum* spp., *Potamogeton* spp. etc. Farmers applied butachlor @ 1.5 kg a.i. per ha for the management of weeds. Among the different biotic constraints, blast, neck blast, grain discoloration and GLH were observed in low intensities.

Bandipora: Thirteen villages in two taluqs/blocks were covered for production oriented survey when rice crops were in maturity stage. About 50% of the farmers contacted were progressive. The general climatic conditions were normal for rice cultivation. The farmers took one rice crop in a year and common crop rotation practices were rice-brown mustard, rice-pea and rice-fallow. The common rice varieties cultivated by the farmers were China 1039, Jhelum, SR-2, China-1007 and K-39. The average rice yields ranged from 4000-7000 kg/ha in China 1039, K-39 and China 1007, 5500-8000 kg/ha in Jhelum and 4000-4500 kg/ha in local varieties. Sowing was done in last week of April to first week of May and transplanting was done during last week of May to first week of June. Almost all the farmers applied FYM in the nursery. In the main fields, the farmers applied 10-40 kg N/ha, 30-45 kg P₂O₅/ha and 30-40 kg K₂O/ha as basal and 10-20 kg N/ha as top dressing. Transplanting was random. The average plant density ranged from 30-55 per m². The intensity of common weeds was low to medium and the common weeds were *Cyperus* spp., *Echinochloa* spp., *Marsilea* spp., *Potamogeton* spp. and *Panicum* spp. Many farmers applied butachlor @ 1.5 kg a.i. per ha. The intensity of weedy rice was negligible. Most of the inputs except water were inadequate in most of the places. Most of the biotic constraints like blast, neck blast, GLH and grass hoppers were recorded in low intensities. Many farmers applied tricyclazole (6 g/10 litre) for the control of leaf blast.

Shopian: Production oriented survey was conducted in five villages in two blocks in this district when rice crops were in maturity stage. Most of the farmers contacted were marginal. The climatic conditions were normal for rice cultivation. All the farmers contacted cultivate rice once in a year and the common crop rotations were rice-brown mustard, rice-oats and rice-fallow. Some of the commonly grown rice varieties in the district were Jhelum, SR-1 and K-39. The average rice yields ranged from 5500-5800 kg/ha in Jhelum, 6400 kg/ha in SR-1, 4000-4500 kg/ha I K-39 and some local varieties. Sowing was done between last week of April and 1st week of May while transplanting was completed by 2nd week of June. Many farmers applied organic manure in the nursery. In the main fields, fertilizers were applied as 40-60 kg N/ha, 35-60 kg P₂O₅/ha and 10-30 kg K₂O/ha as basal and 10-20 kg N/ha as top dressing. Transplanting was random and plant density was 40-60 plants/m². The intensity of weeds was medium to high and the common weeds were *Echinochloa* spp., *Cyperus* spp., *Marsilia* spp., and *Potamogeton* spp. Many farmers applied butachlor @ 1.5 kg a.i. per ha for the management of weeds. The intensity of weedy rice was negligible. Most of the inputs

except water were inadequate in most of the places. The biotic constraints like leaf and neck blast and GLH were recorded in low intensities. Some of the farmers applied tricyclazole (6 g/10 litres) for the control of blast. Symptoms of zinc deficiency were recorded in some places. There was 1-3% post harvest loss in the region.

Baramulla: Production oriented survey was conducted in two villages in this district when rice crops were in maturity stage. The general climatic conditions were normal for rice cultivation. Farmers used 40-90% of their land for rice cultivation. One rice crop was taken in a year and rice fallow was the practiced followed by the farmers. The predominant rice varieties in the district were Jhelum and IC-39. The average rice yield ranged from 3500-4000 kg/ha in local varieties and about 5000 kg/ha in K-39. The time of sowing was last week of April to 1st week of May while transplanting was done from last week of May to 1st week of June. Most of the farmers applied FYM in the nursery beds. In the main fields, fertilizers were applied as 32-45 kg N/ha, 35-50 kg P₂O₅/ha and 15-20 kg K₂O/ha as basal and 15-30 kg N/ha as top dressing. Transplanting was random and the average plant density was 45-60 plants/m². In some of the places, the intensity of weeds was medium to high. The common weeds were *Echinochloa* spp., *Cyperus* spp., *Marsilea quadrifolia*, *Potamogeton* spp. etc. Many farmers applied butachlor @ 1.5 kg a.i. per ha for the management of weeds. Among the inputs, except water all other inputs were inadequate in most of the places. Among the biotic constraints, neck blast, blast, grain discoloration, grass hopper and GLH were recorded in low intensities. Some of the farmers used tricyclazole @ 6 g/10 litre for the control of leaf and neck blast.

Anantanag: Eight villages in 2 blocks/taluqs were covered for production oriented survey when rice crops were in maturity stage. The climatic conditions were favourable for rice cultivation. Farmers used 80-98% of their land for rice cultivation. All the farmers contacted took one rice crop in a year and the common crop rotation practices were rice-brown mustard and rice-oats. The common varieties cultivated by the farmers in the district were Jhelum and IC-39. The average rice yield in the region varied from 6500-7000 kg/ha in Jhelum and 5800-6300 kg/ha in varieties like K-39 and China 988. Sowing was done in between last week of April and 1st week of May while transplanting was done in between last week of May to 1st week of June. Almost all the farmers applied FYM/organic manure in the nursery beds. In the main fields, fertilizers were applied as 40-70 kg N/ha, 50-55 kg P₂O₅/ha and 10-20 kg K₂O/ha as basal and 10-20 kg N/ha as top dressing. Most of the farmers followed random method of transplanting and the average plant density was 55-65 hills/m². The intensity of weeds was low and the common weeds were *Marsilea quadrifolia*, *Echinochloa* spp., *Cyperus* spp. *Panicum* spp. and *Potamogeton* spp. Many farmers applied butachlor @1.5 kg a.i. per ha for the control of weeds. Except water and pesticides most of the inputs were not adequate in most of the places. Among the biotic constraints, neck blast, blast, grain discoloration, grass hopper and GLH were recorded in low intensities. Symptoms of zinc deficiency were recorded in one or two places. Some of the farmers used tricyclazole @ 6 g/10 litre for the control of leaf and neck blast.

Kulgam: Six villages in two taluqs/blocks were covered for production oriented survey when rice crops were in maturity stage. Most of the farmers contacted were marginal. The general climatic conditions were normal for rice cultivation. Farmers used 80-90% of their land for rice cultivation. All the farmers took one rice crop in a year and the common crop rotations were rice-brown mustard, rice-oats and rice-fodder. The common rice varieties grown by the farmers in the district were Jhelum and K-39. The average rice yield in the region ranged from 6000-6700 kg/ha in case of Jhelum, 5000-5600 kg/ha in case of K-39 and about 4200

kg/ha in case of local varieties. Sowing was done in between last week of April and 1st week of May while transplanting was done between 1st week of May to 1st week of June. Most of the farmers applied FYM in the nursery beds @3-5 t/ha. . In the main fields, fertilizers were applied as 30-45 kg N/ha, 45-50 kg P₂O₅/ha and 15-20 kg K₂O/ha as basal and 15-20 kg N/ha as top dressing. Method of transplanting was random and the average plant population was 55-60 hills/m². In general, the intensity of weeds was low and the common weeds were *Echinochloa* spp., *Marsilea quadrifolia*, *Cyperus* spp. and *Potamogeton* spp. Almost all the farmers contacted applied butachlor @ 1.5 kg a.i. per ha for the control of weeds. Except water and pesticides most of the inputs were not adequate in most of the places. Different biotic constraints like blast, neck blast and grasshopper were recorded in low or trace intensities. Most of the farmers used tricyclazole @ 6 g/10 litre for the control of leaf and neck blast.

Prevalence of diseases and insect pests in Jammu and Kashmir during 2011, kharif

Districts	Diseases			Insect Pests	
	BI	NBI	GD	GLH	GH
Pulwama	3-10%	1-5%	2-3%	1-3%	
Bandipora	1-5%	0.5-3%		2-3%	0.2-0.4%
Shopian	3-5%	1-3%		1-4%	
Baramulla	1-2%	3%	1-1.5%	3%	0.1-3%
Anantanag	0.2-20%	0.5-1%	1-3%	3%	2-3.5%
Kulgam	1-10%	0.3-0.5%			3-4%

JAMMU & KASHMIR-2

Districts Surveyed: Poonch, Rajouri, Jammu and Samba

Particulars of survey

District	Block	Villages
Poonch	Poonch, Mendhar, Mandi, Surankote and Buffliaz	Timra, Mankot, Surankote, Mendhar, Nangali, Chandak, Dingla, Ghani, Seklu Mandi, Sathra, Chakrata, Salooni, Draba, Ajoy, Bawali, etc.
Rajouri	Manjakote	Dheri Ralyot, Dabrote, Kat Armal
Jammu	R.S.Pura, Bishnah, Marh, Bhalwal, Khour and Akhnoor	Nandwal, Nadh, Chak Morh, Jourian, Khamb, Dablehar, Malal, Pallanwallah, Panjtoot, Arnia, Kool, Deoli, Gajansoo, Karloop, etc.
Samba	Samba	Pangdore, Glad, Riyan, Baderi

Widely Grown Varieties:

District	Prevalent Varieties
Poonch	K 39, 343, 332 and 448, China and Giza 14
Rajouri	K 39, K 343, Giza 14 and Basmati local
Jammu	Basmati 370, Sharbati, Ratna, Hybrids ó 6444, PHB-71, Poonam, Pusa-1121, CSR30
Samba	Ranbir Basmati, Jaya, Hybrids ó 6444, PHB-71, Poonam, Pusa-1121

Particulars of Rice Area

District	Total Cultivable area (ha)	Area Under Rice (ha)	Irrigated Area (ha)
Poonch	32000	4300	4300
Rajouri	56400	8000	8000
Jammu	169225	45170	-
Samba	45427.5	13290	-

An extensive Production Oriented Survey on rice crop was conducted in the entire three sub-divisions of district Poonch whereas only a few hotspots of rice grown areas were surveyed in another hilly district Rajouri and the subtropical plains of Jammu and Samba districts of J&K State in Kharif 2011. At the time of survey, majority of the crop stood either at Dough or Maturity stage except Basmati which was at milking stage. Farmers in the state practice only one crop of rice in a year. Most of the farmers surveyed were having small land holdings and have poor socio-economic status. The general climate conditions in kharif season remained normal with the well distributed timely rains in irrigated as well as rainfed areas of Samba district. Overall yield of paddy crop was by and far remained excellent in all the regions. Maize was the only crop grown in the entire hilly terrains of Poonch and Rajouri districts followed by the paddy crop that was adopted merely at around the banks of local rivers.

Traditional coarse varieties still forms the major seed input of paddy in the temperate districts whereas other plain subtropical districts are experiencing a boom with the sort of hybrids. The non-availability of weedicides, fertilizers and pesticides at proper time also played an important role in the fluctuation of yield in the entire surveyed area. In fact, non availability of seeds of improved cultivars at the time of sowing pressurized the farmers to

grow seeds from their previous crop that was a mixture of number of local and improved cultivars. As in the past many years, farmers have almost left putting potash in their fields because of its non-availability. Nor they were interested in any plant protection measures despite of the deficiency symptoms visible clearly in the regions. Biotic constraints in the ensuing season remained at low ebb except with a few hybrids that was badly infected with the cancerous disease of false smut. However, district-wise observations noted are as below.

District Poonch: Poonch district of Jammu and Kashmir is located in the extreme North Western course of India and is about 240 km from Jammu. It has an area of 1.14 lakh hectares, out of which only 23% is cultivable. Geographically the area surveyed was between $33^{\circ} 34'$ to $33^{\circ} 47'$ N latitude and $74^{\circ} 02'$ to $74^{\circ} 72'$ E longitude. The altitude varied from 3010 to 4980 ft. Poonch district is the smallest district of J&K and agro-climatically it comes under temperate zone. The district has six blocks. Most of the area in this district is rainfed and only 13.35% of area is having assured irrigation and that, too, alongside the banks of the local river. Maize was the major *kharif* crop while most of the fields in *rabi* were generally kept fallow except with a small area where wheat and fodders would be taken up as their crop sequence. During the current year, paddy occupied about 4250 hectares of land. The most prevalent rice varieties grown were K 39, Giza 14, K 332, 448 and K 343 which are all considered as old varieties. Basmati, too, has found its place in a very little area. The weather remained normal during the cropping season. As the district is merely 80 km from Kashmir, the farmers of the area brought a variety K 332 (not approved for the area) from Kashmir which matured very early and resulted in 50-70% yield reduction in rice. Here in this variety panicle formation started within 20 days after transplanting. The farmers thus had to go for re-transplanting with the prevalent varieties. The irrigation source for the crop was mainly through channels derived from river water basins.

Diseases like blast, bacterial leaf blight, brown spot and sheath blight were conspicuous in most of the areas while infestation of stem borer and grass hopper remained predominant. Rodent problems were also observed in lower belt of Poonch district. For storage, harvested paddy crop was stacked first into the small bundles and then further into a large pile which is opened only at the time of its disposal. The panicles inside the piles remained dry and elusive from the rains. Even in some areas where hailstorm and rains are regular features to occur in the month of October-November, harvesting of rice was made earlier than its real maturity date. Farmers had asked for the improved cultivars and stressed the timely availability of seed as well as other inputs such as fertilizers, weedicides and pesticides. They further demanded that awareness programmes should be organized so that they may become familiar with the latest and improved techniques and practices to get good yield.

District Rajouri: Here, the climate varies from subtropical in the southern part to temperate in the mountainous northern part. Geographically, the block surveyed in the district lied at around $33^{\circ} 30'$ N latitude and $74^{\circ} 14'$ E longitude while altitude varied from 3330 to 4244 feet. climate for the season remained normal to keep away the main pests and diseases. However, blast and bacterial leaf blight were seen as the major diseases in the area whereas stem borer and grass hopper were conspicuous pests that hardly had any impact upon the overall yield of paddy. K-39, China and Roosy still rule among the old prevalent varieties in the region. Neither any improved cultivation practices nor any plant protection measures have been adopted in any of the districts surveyed. Most of the farmers don't apply even recommended fertilizer to the rice crop. Symptoms of Zn deficiency was also noticed in much of the areas. The district was drained and irrigated by the small rivulets. A low infestation of *Echinochloa* and *Cyperus* species among the weeds was commonly noticed

while weedicide application is low. Disease pressure was observed to be negligent or low in the entire block of the district except in Dabrote village that was found infested badly with the stem borer (upto 30%). The farmers demanded high yielding varieties of rice alongwith the supply of fertilizers and pesticides at a proper time.

District Jammu: The district is bestowed with the area that is best known for the famous Basmati 370 or Ranbir Basmati which is being grown since decades for their charismatic aroma and taste. The altitude of the area surveyed in the district was between 840 to 1145feet whereas average latitude and longitude was 32^o 50ø N and 74^o 35ø E, respectively. Almost entire paddy in the region is being cultivated under irrigated condition except in some areas under Bhalwal block. Climatic conditions for the ensuing season remained absolutely normal for getting a bumper yield throughout the region. No major biotic stress or any insect-pest pressure was observed in any field except the false smut incidence that occurred in almost all the hybrids of rice and thereby causing yield loss even to the extent of 40 per cent in Poonam hybrid. Hybrid PHB-71 was an exception that remained elusive from disease and pest pressure and expected to give yield approximately to 80q/hectare. Besides the false smut pressure, it is noteworthy that hybrid acreage has continuously been increased every year. Department of Agriculture has also taken a lead in popularizing hybrids by distributing 416.81q of hybrids (248.71q of PHB-71 and 168.10q of Poonam hybrid) and providing huge subsidy to the farmers by selling its seed at Rs. 60/kg against the prevalent rate of Rs240/kg in the open market. Hybrids especially Pusa 1121 in some areas like Arnia, Kool kallan and Gajansoo were discarded this year by many farmers due to their 1) small land holdings, 2) low procurement rate by private millers, 3) higher disease-pest pressure, 4) no buyer, 5) grain shuttering in field even with the low wind velocity/ hailstorm (Pusa 1121) and 6) lack of taste and aroma vis-a-vis local varieties. Farmers in these areas demanded the release of hybrids only after testing them under local conditions.

An awareness and orientation regarding disease and pests of rice was also sought by some farmers of areas like Kalyana Morh and Dablehar. The problem of weedy rice in many areas was not taken care of and rather they were kept deliberately in field for fodder purpose. No plant protection measures were ever taken except in some villages like Allh in Bishnah and Karloop in Marh block. Farmers in much of the area use less fertilizer because of their fertile lands. Excess urea make Basmati plants grow longer and thus prone to lodging. Potash still eludes from their field schedule for its non-availability in the region. In some villages like Rakh Nagbani, Kanachak, Dhab Sudan, Raipur Mandi and Panjore etc., many fields were badly managed due to the non-replacement of old seed and seed mixture existed to the extent of 20-30 per cent.

District Samba: It is newly created subtropical district carved out of Jammu and Kathua districts. Nearly 23 per cent of the total area is irrigated and rest is rain-fed where maize is the major crop. Almost entire district had experienced a good climatic weather for whole of the season. A sick area (Pangdore, Glad and nearby) was particularly surveyed to find the improvement in paddy crop over the last year whereby the crop was damaged badly due to the high infestation of yellow stem borer. Though the farmers were made aware about the plant protection measures, only a few had actually used the pesticide but at wrong time. The crop scenario was still grim but with less severity as compared to the previous year. Almost every variety except PHB-71 was infected with Brown spot (15-30%), Sheath blight (3-7%), BLB (5-15%), False smut (20-30% in Jaya) and stem borer (upto20%). Out of all, Pusa 1121 still remained the most sufferer followed by Basmati 370. A medium to high infestation of varying weeds could be seen easily even after the use of Machette. Farmers in this area still

require a thread bear orientation to tackle the diseases and pests of rice. Rat menace, too, was found a concern in the areas nearby. In Baderi village, many farmers have grown second generation of hybrids and accordingly had a complaint for their less yields. A number of unknown hybrids, too, were found infected with badly with the false smut. Many fields in the area still can be connected with the canal running through the nearby areas.

Prevalence of diseases and insect pests In Jammu and Kashmir during 2011, Kharif

District	Diseases							Pests	
	BI	BLB	BS	ShBI	ShR	GD	FS	SB	GH
Poonch	L-M	L-M	L	L	L	L	-	L	L
Rajouri	L-M	L-M	L	L	L	L	-	L	L
Jammu	L	L-M	M	L	L	L-M	L-M	L-M	L-M
Samba	-	L-M	L-M	L	-	L	L-M	L-M	L-M

JHARKHAND

District Surveyed: Ranchi, Khunti, East Singhbhum and Saraikela-Kharsawan

Particulars of survey

Districts	Blocks	Villages
Ranchi	Bundu Tamar Khijri Ormanjhi	Katahartoli, Bidri, Londra, Murpa Ladnapirhi, Senjusoren Sadma, Chandragram
Khunti	Khunti Murhu Arki	Phudibasti, , Kamalata, Serandh, Posaia Charid, Bande, Tumbakale Kochang, Huth
East Singhbhum	Musaboni Karandih Ghatsila	Benasol, Upper bandha, Tilaboni Demkadih, Suklara Putru, Pairaguri
Saraikela Kharsawan	Chandil Nimdih	Ramgar, Saharbera, Chandil, Gangudih punarwash. Chingridih, Lupungdih, Karamgora

Widely prevalent varieties of rice in Jharkhand (Kharif, 2011)

Districts	Varieties
Ranchi	Hybrids- PA 6444, PHB-71, 25P25, US 312, US 316, PAC-801, Front line RH-257, Suruchi-5629, Dhania and Arize Tej; HYVs - Swarna, MTU 1001, IR-64, Lalat, MTU 1010, Naveen, Birsa Vikas Dhan-110, Birsamati and IR-36; Local/unreleased- Kalamdani, Karhaini and Kalajeera
Khunti	Hybrids- PA-6444, Arize Tej, PHB-71, K 5152, K 3325, 25P25, Champion HYVs -IR-64, Swarna, MTU1001, Lalat., BVD 110; Local/unreleased- Dhoosari, Laldhan Balagora, Arababa, Pundibaba.
East Singhbhum	Hybrids- PHB-71, 25P25, PA 6444 and KRH 2; HYVs -Swarna, Lalat, IR-64, Naveen, Rajshree, Sita and Jaya Local/unreleased ó Jhatisal, chandrakanta, Lakhansal, Diptisal, Balibhojna, Malti, etc.
Saraikela Kharsawan	Hybrids- KRH-2, 25P25 and PHB-71; HYVs - Swarna, Lalat, Sita, IR -64, MTU 1010 and MTU-1001, etc. Local/unreleased ó Koya, Malot, Supasal, Dhoosari, Lakhansal, Diptisal, Balibhojna, Malti, Kakri, Kalamkhari, Gayawali, Asanloa, and Sitasal etc.

District wise rainfall data (mm) of Jharkhand during Kharif, 2011

Districts	May		June		July		August		September	
	Normal	Actual	Normal	Actual	Normal	Actual	Normal	Actual	Normal	Actual
Ranchi	47.8	60.0	187.7	383.8	362.4	154.2	310.4	490.3	300.3	354.3
Khunti	46.1	0.0	192.2	410.3	334.0	262.6	270.0	485.1	258.3	547.2
East Singhbhum	95.4	74.3	247.9	405.0	316.8	135.2	281.0	435.8	191.9	379.8
Saraikela-Kharsawan	42.5	84.5	138.2	347.3	280.9	210.0	369.2	359.1	208.3	309.0

District wise Paddy coverage of Jharkhand during Kharif, 2011

Districts	Rice (Acrage in 000 ha)			
	Target	Coverage		% Coverage area
		Direct sown	Transplanted	
Ranchi	163.0	5.4	154.5	98.0
Khunti	70.0	12.8	57.2	100.0
East Singhbhum	127.0	24.0	103.3	100.2
Saraikela-Kharsawan	91.0	58.0	33.0	100.0

Production Oriented Survey (POS) in rice growing areas of four districts (Ranchi, Khunti, East Singhbhum and Saraikela kharsawan) covering 31 villages from 12 blocks of Jharkhand were surveyed during Kharif, 2011. Rice was rainfed crop in all the surveyed districts. The general climatic condition was good and rainfall in the above districts was more than actual rainfall with reference to paddy cultivation except July. The monsoon came in time but due to less rainfall in the month of July, transplanting was done up to the September. The survey was conducted during flowering/dough/ maturity stages of the crop. The main source of finance was own savings or borrowing from relatives or bank or money lenders for purchase of inputs like seeds, fertilizers, pesticides etc. Majority of farmers complained that government never supply HYVs paddy seeds in time therefore, they procured seeds from private dealers or Birsa Agricultural University, Ranchi, Krishi Vigyan Kendra and Zonal Research Station (BAU). In case of local or unreleased variety or HYVs, some farmers used own seeds for raising rice crop. In general, fertilizers, and pesticides were mainly procured from private dealers. About eight per cent area of surveyed districts of Jharkhand where irrigation facility was there. The main source of irrigation was well, ponds etc. Electricity and diesel were the main source of power. The specific needs of the farmers in the state were creation of irrigation facility, availability of kerosene oil, quality of seeds and fertilizers at reasonable price. Most of the farmers in the state were either small or marginal. Only a few progressive farmers were ready to adopt new technologies and recommendation were also there especially in Ranchi and East Singhbhum districts. The prevailing crop rotation in the district was rice-fallow and about 10 % farmers in the state followed rice-wheat, rice gram, rice- mustard, rice-vegetable. Few farmers also reported that lack of irrigation and animal grazing are major problem for cultivation of 2nd crop after rice (Kharif). Some farmers followed SRI method of paddy cultivation, promoted by Birsa Agricultural University, Ranchi and State Agriculture Department and they reported that they got good yields from this method of paddy cultivation. Fertilizers were applied @ 30-80 kg N/ha, 10-30 kg P₂O₅/ha and 0-30 kg K₂O/ha. Majority of farmers (about 80%) in the state did not use potassic fertilizer in rice crop. No any chemical fertilizers were applied in traditional varieties of rice in almost all the above surveyed districts of Jharkhand. The weed population was low to medium in medium land and lowland paddy whereas, weed population was high in upland rice. The common weeds were *Cyperus rotundus*, *Cyperus iria*, *Leersia hexandra*, *Paspalum dictuem*, *Echinochloa colonum*, *E. crusgalli*, *Fimbristylis Spp.*, *Eclipta alba*, *Ageratum conyzoides*, *Amaranthus spp.*, and *Cynodon dactylon*. Some progressive farmers used weedicides like butachlor/ pretilachlor @ 1.5 to 2.0 kg a.i./ha as a post emergence. In general, one to two hand weeding was common practice for management of weeds in most of the area of the state. Among diseases, brown spot was most serious disease particularly local tradition varieties or upland rice whereas, blast and false smut was also recorded in medium to severe intensities in HYVs and Hybrids. **IR 64 was susceptible to blast (medium to severe**

intensity) in experiment plots of BAU, Kanke and farmers field. Some farmers used fungicides like mancozeb (0.25%) or carbendazim (0.1%) or Saaf (0.2%) or Hexaconazole (0.1%) etc. for management of above diseases when diseases became severe. The most common insect pests were stem borer, case worm, gall midge, Gundhi bug, BPH and leaf folder etc. were recorded in low/medium/severe intensity. Some farmers used insecticides like monocrotophos (1ml/lit), Rogor (1ml/lit), Metacid (2ml/lit), Phorate 10G (5-6 kg/ha) or Carbofuran 3G (10-15 kg/ha), Super D (2ml/lit) for management of above insect pests when attack of above pests were seen in severe intensity. Some farmers reported that they applied Sindwar (*Vitex niesgundu*) leaves or Podhasi leaves or *Velwa* twig in the main field of rice just before flowering for management of insect pests. The respondent farmers reported damage by rats both in the filled as well as in the store houses to the extent of up to 2 to 3 per cent. A few farmers (< 1%) in the state who treated their paddy seeds with fungicides /insecticides before sowing in nursery/field. Rate of adoption of plant protection measures against insect pests/diseases/ weeds among farmers was limited to 2 to 10 % only. The average grain yield of traditional variety, HYV and Hybrid ranged from 8-15 q/ha, 15 to 25 q/ha and 45-60 q/ha for hybrids. Majority of farmers reported that drying and storage facilities are not available in the survey districts. So farmers used the tar road/ high way for drying their harvested grains.

Ranchi: The survey was conducted in eight villages of Bundu, Tamar, Khijri and Ormanjhi blocks of Ranchi district, when the crop was in mature stages. Rice is mainly grown as rain fed crop with extremely limited life saving irrigation facilities through wells, ponds etc. The monsoon came in time but the rainfall was very less in the month of July therefore, transplanting was done up to the month of September. In general, climatic condition is favourable with reference to rice cultivation. About 65 per cent area of cultivated land under hybrids *Viz.*, PA 6444, PHB-71, 25P25, Front line RH-257, US 312, US 316, PAC-801, Suruchi-5629 and Arize Tej, HYVs *Viz.*, Swarna, MTU1001, IR-64, Lalat, MTU 1010, Naveen, Birsa Vikas Dhan-110, Birsamati and IR-36 were grown in about 30-33 per cent of the cultivated area. In about 2-3 per cent area under Local/unreleased varieties like Laldhan, Kalamdani, Karhaini and Kalajeera were grown by poor tribal farmers in the region. The common crop rotations in the region were rice-fallow, rice-mustard, rice-wheat rice-gram, rice-vegetable (cabbage/potato/pea/ tomato/brinjal). Some farmers grow pigeon pea in bunds of rice crop. They reported that this type cultivation helps in improvement of soil fertility as well as less attack of pests and diseases. Most of the farmers were either small or marginal. However, some progressive farmers concentrated on vegetable cultivation for supply to the city markets in the state or adjoining states. The common needs of the farmers were creation of irrigation facility, availability of seeds, fertilizers at reasonable price. The source of finance were own savings, borrowing from relatives or money lenders or bank etc. Majority of farmers complained that government never supply paddy seeds in time therefore, they procured seeds from private dealers or Birsa Agricultural University, Ranchi. Some farmers used own seeds for raising the crop. Fertilizers, pesticides and farm implements were obtained from local traders. The grain yield of rice ranged from 15-20 q/ha, 40-60 q/ha and 08-15 q/ha for HYV, Hybrids and local varieties, respectively. The farmers applied FYM in the nursery as well as in the main field at the time of land preparation. The farmers applied fertilizers ranged from 50-100 kg N, 10-40 kg P₂O₅ and 0-30 kg K₂O per hectare. Most of the farmers did not apply any fertilizers in local variety and majority of farmers also did not apply potassic fertilizer at all in their rice field. The common weed species were *Echinochloa crusgalli* E. *Colonum*, *Cyperus rotundus*, *Cyperus iria*, *Leersia hexandra* and *Paspalum dictuem* etc. Majority of farmers did not apply weedicides in their rice field. Most of the farmers followed one to two hand weeding for management of weeds. Occurrence and

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intensity of weedy rice was low to medium. Some farmers grow summer rice in some places of the district. Among the diseases, blast, brown spot, were recorded in medium to severe intensities. False smut and grain discoloration in medium intensity and BLB, sheath blight and sheath rot were recorded in low to medium intensity. **IR 64 was susceptible to blast (medium to severe intensity) in experiment plots of BAU, Kanke and farmers field.** Some progressive farmers sprayed Mancozeb (0.25%) or SAAF or companion (0.2%) or Tilt (0.1%) or carbendazim (0.1%) for management of above diseases. The most common insect pests (stem borer, Gundhi bug case worm, gall midge, leaf folder and BPH) were recorded. Stem borer, Gundhi bug and leaf folder were recorded in medium to severe incidence. The attack of case worm, termite and gall midge was recorded in low to medium incidence. Particularly management of above pest problems in the standing crop spraying of cypermethrin (1 ml/lit of water) or super D (2 ml/lit of water) or monocrotophos (1 ml/lit of water) was also undertaken especially for the management of above pest. Some farmers put podhasi leaf/ Karma twig during flowering stage for management of insect pests. Some farmers applied Phrate 10G or carbofuran 3G in nursery as well as main field for the management of above pests. Very few farmers in the district who treated their paddy seeds with fungicides /insecticides before sowing in nursery or field. However, the rate of adoption of plant protection measures against diseases/pests/weeds among farmers was limited *i.e.*, about 5 per cent only. The respondent farmers reported damage by rats both in the filled as well as in the store houses to the extent of up to 2-3 per cent.

Khunti: The survey was conducted in nine villages of Khunti, Murhu and Arki blocks of the Khunti district when the crop was in dough/mature stages. Rice was mainly grown as a rainfed crop under water limited condition. However, the rainfall in the district was uneven and more than normal. The monsoon came in time *i.e.*, 2nd week of June. Most of the farmers were marginal to small holdings. The Hybrids (PA-6444, Arize Tej, PHB-71, 25P25, K 5152, K 3325, and Champion) were grown in about 40% paddy cultivated area of the district. The predominant HYVs were IR-64, Swarna, MTU1001, Lalat, BVD 110 etc. Limited scale cultivation (4-5%) of local varieties *i.e.*, Dhoosari, Laldhan Balagora, Arababa, Pundibaba were also undertaken especially by poor farmers of the district. The prevailing crop rotation in the district was rice-fallow and about 6-8 % farmers in the district followed rice-wheat, rice gram, rice- mustard, rice-vegetable cropping system. They also reported that lack of irrigation and animal grazing are major problem for cultivation of 2nd crop after rice (Kharif). Some farmers followed SRI method of paddy cultivation, promoted by state government and they reported that they got good yields from this method of paddy cultivation. The farmers made use of either own income or borrowed from money lenders/relatives for purchase of procurement of inputs. Seeds were obtained from local markets or blocks. Although some farmers used own seeds for paddy cultivation. Fertilizers pesticides and farm equipments etc were obtained from local traders only. The common needs of farmers in the district included creation of irrigation facilities like bore wells, pond, canal etc., diesel pump set, and other farm implements on hire basis, quality hybrid/HYV seeds and fertilizers at reasonable prices. Majority of farmers reported that drying and storage facilities are not available. So farmers used the tar road/ high way for drying their harvested grains. The average rice yield ranged from 10-12 q/ha for local varieties, 10-25 q/ha for HYV and 30-60 q/ha for hybrid rice. The application of manure (FYM) given by the farmers as per his availability at the time of land preparation, whereas, the fertilizers NPK:: 60:30: 0-20 kg/ha for HYV and 80:40:20-30 kg/ha for rice hybrids and 20:10:0 kg/ha for local varieties. The level of weed infestation was moderate to severe. The common weeds were *Cyperus spp.*, *Echinochloa colonum*, *E. crusgalli*, *Fimbristylis spp.*, *Eclipta alba* and *Ageratum conyzoides* etc. Occurrence and

intensity of weedy rice was low to medium. Some progressive farmers used butachlor/pretilachlor @ 1.5 to 2.0 kg a.i./ha as a post emergence for management of weeds. In general, one to two hand weeding is common practice of farmers in the region for management of weeds. Among the diseases, brown spot and blast were recorded in low/medium/high intensities, Glume discolouration and false smut in medium to severe incidence. Some progressive farmers used fungicides like mancozeb (2.5 kg/ha), carbendazim (0.1%) etc. for management of above disease. The insecticides like monocrotophos (1 ml/lit of water), cypermethrin (1 ml/lit of water), Carbofuran 3G (10-15 kg/ha), phorate 10G (5-6 kg/ha) were applied to reduce the damage by leaf folder (low incidence), stem borer (medium incidence), case worm (medium to severe incidence) gall midge (low to medium incidence), gundhi bug (Low to medium incidence) etc.

East Singhbhum: The survey was conducted in seven villages of Musaboni, Karandih and Ghatsila blocks of the district when the crop was in flowering or mature stage. Rice is grown about 90% of the cultivated area in the district. It is grown mainly as a rain fed crop with extremely limited life saving irrigation through wells and ponds etc. The general climatic conditions with reference to the rice crop were favourable. Only 5-10 per cent area of rice was devoted to different rice hybrids (PHB-71, 25P25, PA 6444 and KRH 2). The predominant HYVs *Viz.*, Swarna, Lalat, IR-64, Naveen, Rajshree, Sita and Jaya were grown in about 70-80% of the area. About 10-15% area under local rice varieties *Viz.*; Jhatisal, Chandrakanta, Lakhansal, Diptisal, Balibhojna, Malti etc. Some farmers followed SRI method of paddy cultivation in the region, promoted by Birsa Agril. University, Ranchi. Farmers reported that they got good yields from this method of paddy cultivation. The prevailing crop rotation in the district was rice-fallow, rice-vegetable, (tomato/brinjal/potato/pea), rice-Mustard, and rice-gram. Most of the farmers were either small or marginal. However, there were some progressive or marginal farmers also who mainly concentrated on vegetable cultivation or supply to the town/city. Some farmers used own seeds for raising crops. Majority of farmers procured seeds from private dealers, Zonal Research Station (BAU), Krishi Vigyan Kendra and blocks. The average grain yield ranged from 40 to 50 q/ha for hybrid rice, 15 to 30 q/ha for HYV and 8 to 12 q/ha for local varieties of rice. The farmers applied FYM in the nursery as well as in the main field at the time of land preparation as per his availability. The farmers applied fertilizers ranged from 30-80 kg N, 10-30 kg P₂O₅ and 0-30 kg K₂O per hectare. The common weeds were *Echinochloa spp*, *Eleusine indica*, *Cyperus spp*, *Cynodon dactylon* etc. None of the farmers applied weedicide for management of weeds in rice in the region. One to two hand weeding is general practice *i.e.*, 25 and 45 DAT for management of weeds. Occurrence and intensity of weedy rice was low. Among the diseases, brown spot, blast, false smut were recorded low to severe intensities, Medium intensities of BLB, Sheath blight, sheath rot were also recorded. Some progressive farmers sprayed Kasu B (0.2%) or Mancozeb (0.25%) for management of above diseases. The most common insect pests (stem borer, Gundhi bug case worm, gall midge leaf folder, termite and BPH) were recorded. The attack of case worm was recorded from Low to medium intensities whereas, stem borer, Gundhi bug, termite and leaf folder were recorded in medium to severe incidence and BPH in medium incidence. Some farmers applied metacystox or chloropyrifos (1.0 to 2.0 ml/lit) for management of above insect pests when its incidence was in severe. Some farmers put *Velwa* twig or *Podhasi* leaf in main field of rice before flowering stage for management of above insect pests. Some farmers also reported damage by rats both in the fields as well as in the store houses to the extent of 1 to 2 per cent. Very few farmers (<1%) farmers in the region who treated their seeds with fungicides /insecticides before sowing of paddy seeds in nursery/field. The respondent farmers also reported about

5% post harvest losses during different stages of the crop. The common needs of the farmers in the region were creation of irrigation facility, available of good quality of seeds, fertilizers and pesticides in reasonable price.

Saraikele Kharsawan: The survey was conducted in seven villages of Chandil and Nimdih blocks of the district when the crop was in mature stage. The rice crop was mainly grown as rainfed under water limited conditions. Most of the farmers in the district were either small or marginal. In this district about 55 per cent paddy grown area was under direct sown. The rainfall was more than normal during kharif in the region. The monsoon came in time but the rainfall was very uneven and erratic in the region so paddy transplanting was done up to September. The prevailing crop rotations followed in the district were rice-fallow, rice-vegetable, rice-wheat, rice-gram, rice-mustard, rice-linseed etc. Linseed was taken as relay crop with rice. Some farmers grow summer rice in some places of the district. Some farmers (less than 5%) cultivate hybrid rice *Viz.*, KRH-2, 25P25 and PHB-71. Area under HYVs (Swarna, Lalat, Sita, IR -64, MTU 1010 and MTU-1001, etc.) was approximately 75 to 80%. The local variety (Koya, Malot, Supasal, Dhoosari, Lakhansal, Diptisal, Balibhojna, Malti, Kakri, Kalamkhari, Gayawali, Asanloa, and Sitasal etc.) were cultivated in the district (about 10-20%). Among the local varieties Lakhansal was very popularly grown in the district. Some tribal farmers reported that rice bear prepared from local variety is better than HYV/Hybrid paddy so they grow local varieties of paddy. The source of seed for raising the crop was either own or local traders. For fertilizers, pesticides and farm implements they were dependent on local traders. Farmers complained against exploitation by the local traders in regard to the cost of fertilizers and also the quality of it. The common needs of the farmers of the region included creation of irrigation facilities, canal, pond, diesel water pump and power tiller. Electricity and diesel were the major sources of power. Non availability of kerosene oil was complained by majority of farmers. The average rice grain yield of hybrid, HYVs and local varieties ranged from 30-60 q/ha, 15-30 q/ha and 8-12 q/ha, respectively. The requisite amount of fertilizer as recommended for hybrid/HYVs to realize the full yield potential was not applied. The total fertilizers consisted of FYM (As per availability) 40-80 kg N, 10-25 kg P₂O₅ and 0-10 Kg K₂O, Most of the farmers did not apply potassic fertilizers in their rice field. Nitrogen was mostly applied in the form of either DAP (basal) or Urea (top dressing). The weed population was low to medium. The predominant weeds were *Cyperus rotundus*, *C. difformis*, *C. iria*, *Echinochloa colonum*, *Cynodon dactylon*, *Amaranthus* spp., and *Ageratum conyzoides*. Two hand weeding was a common practice for weed management. None of the farmers applied weedicide for management of weeds in their rice field in the region. Occurrence and intensity of weedy rice was low. Among diseases, blast and brown spot was recorded in medium to severe disease intensities whereas, false smut, BLB and sheath blight were in low to medium intensities. When the disease became severe then some farmers apply mancozeb (2.5 g/lit of water) or carbendazim (1 g /lit of water) for management of above diseases when the above diseases became in severe incidence. The common insect pests were stem borer, case worm, Gundhi bug and termite were recorded medium to high incidence whereas BPH and leaf folder and rat attack in field was in low incidence. Some farmers used Phorate 10G (3-4 kg/ha) or Carbofuran 3G (5-6 kg/ha) or Hangama (cypermethrin5% + chloropyriphos 50%) (1 ml/lit) or metacid (2 ml/lit) for management of above insect pests. Some farmers put Sindwar, *Podhasi* leaf or *Velwa* twig in their field when crop was in booting stage for management of insect pests. The farmers also reported about 3-5 per cent post harvest losses during different stages of the crop.

Prevalence of diseases and pests of rice in Jharkhand (Kharif 2011)

Districts	Diseases						
	BS	BL	GD	FS	BLB	ShB	ShR
Ranchi	M-S	M-S	M	M	L-M	L-M	L-M
Khunti	L-M	L	M-S	M-S	-	-	-
East Singhbhum	L-S	L-S	-	L-S	M	M	M
Saraikela-Kharsawan	M-S	M-S	-	L-M	L-M	L-M	--

Low- <5% disease incidence; medium- 5-15% disease incidence; severe->15 disease incidence

Districts	Insect pests							
	SB	CW	LF	GB	GM	T	BPH	Rat
Ranchi	M-S	L-M	M-S	M-S	L-M	L-M	-	-
Khunti	M	M-S	L	L	L-M	-	-	-
East Singhbhum	M-S	L-M	M-S	M-S	-	M-S	M-S	L
Saraikela-Kharsawan	M-S	M-S	M-S	M-S	-	M-S	M-S	L

KARNATAKA**Districts surveyed:** Dharwad, Belgaum, Haveri and Uttar Kannada**Particulars of survey:**

District	Rice area (ha)	Talukas
Dharwad	26958	Hubli, Dharwad, Kundagol, Navalagund, Kalaghatagi
Haveri	49995	Haveri, Shiggaon, Hanagal, Ranebennur, Hirekerur.
Balgaum	71888	Khanapur, Bhailhongal, Soudatti, Ramdurga.
Uttara Kannada	80275	Sirsi, Mundagod, Yallapur, Honnavar, Haliyal.

Widely Prevalent varieties:

District	Varieties
Dharwad	Intan, Abhilash, SIRI-1253, MGD-101, Mugad Sugandha, Local varieties Dodiga, Navali, Kagisali.
Haveri	Intan, Dodiga, Doddabhatta, Jaya, MTU1001, Private Hybrids
Balgaum	Inatn, Belgaum Basmati, Private Hybrids
Uttara Kannada	Abhilash, MTU-1001, Jaya, Traditional varieties like Alur sanna, Padmarekha, Adnen kelte

The production oriented survey was conducted in Karnataka, especially in rice growing areas coming under jurisdiction of University of Agricultural Sciences, Dharwad during kharif -2011. The survey was done with multi disciplinary team consisting of Pathologist, Breeder, Economist and drainage engineer. The survey was conducted in districts of Dharwad, Uttar Kannada, Belgaum and Haveri where in rice is grown under drill sown condition (Table 1). The crops were heading to maturity stage. The entire area surveyed was typical rainfed rice area. Major cropping pattern of this areas were rice-pulses, rice-vegetables, rice-rice and rice-maize. The varieties grown in this region were usually local varieties (50%) like, Dodiga, Antarsali, Kumud, Belgaum Basmati Hakkalasali etc. besides, HYV like Abhilash, Jaya, Intan, MTU-1001, MTU-1010, MGD-101 and SIRI-1253. Weed infestation was medium to high and commonly observed weeds were *Cyperus* spp, *Echinochloa colana* and *Cynodon* spp. Zinc deficiency was observed in some places. Among the biotic stresses leaf blast, neck blast, sheath rot and sheath blight were in moderate form while udubatta and false smut were observed in traces. Among the insects stem borer and leaf folder were in moderate form while BPH was observed in moderate form in few places. More emphasis is given for mechanization for the use of weedicides and harvesting to overcome labor shortage.

Dharwad: The production oriented survey was conducted in October in Dharwad district. The crop was milky to grain farming stage. Dharwad district comes under northern transition zone of Karnataka. Popular rice varieties grown were Jaya, Intan, MGD-101, SIRI-1253, Abhilash and some local varieties like Dodiga and Navile. Drill sown method is being practiced for crop establishment. Optimum time of sowing found to be May last week to third week of June, sometimes with pre-emergent or pre soaked seeds @ 80 to 100 kg /ha. Most farmers applied 3-4 tons of FYM/ha about 2-3 weeks prior to sowing and later applied nutrients in the form of either DAP @100 kg/ha i.e. 20 kg Nitrogen and 46 kg/ P₂O₅ or Urea (50 kg/ha i.e 23 kg Nitrogen). Weed infestation ranged from medium to high. Major weed flora observed were *Echinochloa colana*, *Cyperus* spp and weedy rice in traces. Weed management was largely done by mechanical means with the help of slit hoes. Few

progressive farmers used butachlor 50 EC @ 2 l/ha by broadcasting after mixing with sand or spray. Major diseases observed were leaf blast, neck blast and sheath rot, bacterial leaf blight and false smut were noticed in traces. Only few farmers used plant protection means, For diseases, fungicides like carbendazim and for insects insecticides like chlorophyriphos were used.

Haveri: Production oriented survey was conducted when the crop was at flowering to milky stage in the talukas of Shiggon, Ranibennur, Haveri and Hirekerur areas. One or two protective irrigations were given from river and form ponds. Non availability of quality seeds, good pesticides and insecticides were the major constraints in paddy cultivation. Paddy is grown in an area of 23500 ha. Area under paddy came down drastically since the farmers switching over to maize and sugarcane in place of paddy. Fertilizer usage is very low. Major varieties grown were Intan, IR-64, MTU-1001, SIRI-1253 and MGD-101 apart from local varieties. Sporadic occurrence of false smut was seen in some paddy hybrid plots. Other biotic stresses were leaf blast, neck blast and BPH were in moderate form. Leaf folder and stem borer were observed in moderate to severe form and stem borer incidence ranged from 5-10 percent in some of areas surveyed specially in Shiggoan taluk.

Uttara Kannada: In this district more than 18 thousand ha area is under drill sown paddy condition and transplanting was also done in heavy rainfall areas. This district mainly comprises heavy rainfall areas like Sirsi (average rainfall 2457.7 mm), Mundagod (average rainfall 1176.8 mm), Yallapur (average rainfall 2439.2 mm) and Honnavar (average rainfall 3670.5 mm). Sowing was done in the month of June and July. The crop was at grain filling stage at the time of our visit. Important diseases like leaf blast, neck blast and sheath rot were in moderate form. False smut and sheath blight were also seen (5-10 %). Zink and potash deficiencies were noticed in majority of fields. Most farmers were using organic manures (2-4 t/ha) and green manures to maintain soil fertility. Fertilizers were used in the dose of 100:50:50 of NPK/ha.

Belgaum: The average rainfall of this area ranges from 769 to 1200 mm. Drill sown paddy is growing in talukas of Belgaum and Khanapur where the average rainfall was 1284.3 and 1859.1 mm, respectively. The rice area is reducing because of farmers changing the crops to sugar cane and chilly. The main varieties grown were Dodiga, Intan, Jaya, MTU-1001, SIRI-1253, Belgaum Basumati and other local varieties. Some farmers are going for organic cultivation of rice by forming their own associations. The usage of pesticides was also very low. The yield level ranged from 35-45 q/ha. The major constraints in rice cultivation included non availability of quality seeds in time, incidence of stem borer and BPH, false smut and udabatta diseases (5-8%), leaf and neck blast diseases (12-15%). Weed infestation was medium. Mechanization of field operations of paddy is picking up due to shortage of labour.

KERALA

Districts surveyed: Palakkad, Thrissur and Malappuram

Particulars of survey area

District	Blocks	Panchayats
Palakkad	Chittur	Nalleppilly, Kunisseri, Kozhinjambara, Polpully
	Nenmara	Elavanjeri, Nenmara
	Kollenkode	Vadavannur, Kollengode
	Alathur	Tharoor, Kavassery
	Kuzhalmannam	Mathur, Pallanchathanur, Kottayi
	Palakkad	Pirayiri, Kongad, Mankara, Parali
	Pattambi	Paruthoor
	Mannarkkad	Kumaramputhoor, Thenkara
Thrissur	Wadakanchery	Deshamangalam, Wadakkancheri, Mullurkara
	Cherpu	Avinissery, Cherpu
	Pazhayannur	Vallathol Nagar, Pazhayannur, Thiruvillwamala
	Vellangallur	Vellangallur, Puthanchira
	Chalakkudy	Koratty, Kadukutty
	Chovannur	Kedavallur, Karikkad, Chemmanthitta, Chovannur
Malappuram	Tirur	Trippangode, Tirunavaya
	Thirungadi	Moorniyoor
	Perumpadappu	Veliyamkode, Nannammuukku, Perumbadappu
	Vengara	A.R Nagar, Edarikode,
	Perinthalmanna	Perinthalmanna,

Widely grown varieties

District	Varieties
Palakkad	HYV- Jyothi, Uma,, Kanchana, Ponmani, Jaya, Aathira, ASD, Matta Triveni. In small areas non descript varieties such as Sujatha, Sulochana, PC1 were also grown
Thrissur	HYV - Jyothi, Uma, Kanchana, Aiswarya, Ponmani, and Matta Triveni. Local varieties such as Kodiyan, Chitteni, were also grown.
Malappuram	HYV-Uma, Jyothi Ponmani, Jaya, Kanchana, Neeraja, Triveni.

Particulars of rice Area

District	Total cropped area	Total irrigated area
Palakkad	100522 ha	57295 ha
Thrissur	25439 ha	21507 ha
Malappuram	8838 ha	6549 ha

The Production oriented survey was conducted in Palakkad, Thrissur and Malappuram districts of Kerala. The survey was conducted at tillering to maturity stage of the crop. Uma, Jyothi, Kanchana, Ponmani Aishwarya,, Aathira, and Matta Triveni were the predominantly cultivated varieties of these area. Seed rate adopted by the farmers was ranging from 75-100 kg/ ha. The fertilizer application ranged from 0 to 150 kg N/ha, 0-75 kg P₂O₅/ha and 0-150 kg K₂O/ha as basal. Many of the farmers applied fertilizer in two splits as basal and one top dressing. While some of them applied fertilizer as basal and in two top dressings. The first top dressing ranged from 10-110 kg N/ha, 0-75 kg P₂O₅/ha and 15-150 kg K₂O/ha. Second top dressing ranged from 0-70 kg N/ha and 10-45 kg K₂O/ha. Use of organic manure was less. Some farmers applied farmyard manure (1 ton/ha) and neem cake (250 kg/ha) as basal application. Most of the farmers followed random method of transplanting. Direct sowing and SRI were also followed in some places. Transplanting using transplanters were also practiced. The common weeds observed were *Isachne miliacea*, *Sacilepis* spp., *Eichornia* spp., *Echinochloa colona*, *Cyperus* spp., *Marsilia quadrifolia*, *Fimbristylis* spp. and weedy rice. Hand weeding was followed in most of the places. But in some area herbicides such as Rifit, 2,4-D, Nominee Gold etc were used. Diseases such as bacterial leaf blight, blast, brown spot, sheath blight and false smut were commonly observed from low to moderate intensities. In many places kresek symptom of bacterial blight was observed. Bacterial leaf bight was observed in kharif crop in Palakkad district in severe forms in certain pockets. The major pests were leaf folder, stem borer, gall midge, case worm and rice bug in low to moderate intensities. Farmers applied quinalphos, acephate, hostathion, flubendiamide, lamda cyhalothrin, Fenval, phosalone, and coragen (Rynaxypyr) were used for controlling insect pests. Trichogramma egg cards were used by a few farmers for the management of stem borer and leaf folder. The use of fungicides was negligible. *Pseudomonas fluorescens* was used for seed treatment by few farmers. For the management of bacterial leaf blight, streptomycin was used by the farmers. Lack of sufficient labours and high labour cost were the two problems generally raised by the farmers.

Palakkad: The survey was conducted at the maturity stage of the *kharif* crop as well as the early vegetative phase of the *rabi* crop. The climatic conditions were mostly normal in this region. The predominant varieties grown in the district were Uma, Jyothi, Ponmani, PC1 and Aathira. The main crop rotations followed were Rice-Rice-Pulses, Rice-Rice-Vegetables and Rice-Rice-Fallow and in few places Rice-Rice-Sesamum was also followed. The rice crop conditions were satisfactory. The average rice yield was 3.5 t/ha. Farmers managed their finance, from public institutions, equipments and seeds from Krishibhavans or personal source, and fertilizers mainly from co-operative societies and a few from private agencies. Canal and ponds were the main source of irrigation while electricity was the main source of power. Among the inputs, seeds, fertilizers and pesticides were adequate while there was a shortage of drying and storage facilities. The predominant varieties grown in the district were Jyothi and Uma followed by Kanchana and Ponmani, Other varieties such as Jaya, Aathira, ASD, Matta Triveni, Sujatha, Sulochana and PC1 were also grown to some extent. In the *kharif* season, direct sowing was the main method of crop establishment followed by transplanting. The main method of crop establishment in the *rabi* season in the surveyed area was manual transplanting. Direct sowing by wet seeding and transplanting using transplanter were also followed. SRI system was adopted by some farmers. Seed rate adopted by the farmers was ranging from 75-100 kg/ ha. The fertilizer application ranged from 10 -150 kg N / ha, 0 - 75 kg P₂O₅ / ha and 0 - 150 kg K₂O / ha as basal. Majority of the farmers applied factumphos as source of N and P for basal application. Some farmers skipped K₂O in the basal. Most of the farmers applied fertilizer as basal and one top dressing. For first top

dressing, the range was 10-110 kg N/ha, 0-75 kg P₂O₅/ha and 15-150 kg K₂O/ha. Those farmers gave the second top dressing, applied the N and K fertilizers mainly as urea and muriate of potash in the range 10-70kg N/ha and 15-70 kg K₂O/ha. In general use of organic manures is very low due to its non availability. Very few farmers applied cow dung. Liming was done by few farmers where acidity was a problem. The level of weed infestation was medium to high. The common weeds observed were *Echinochloa colona*, *Cyperus* spp., *Marsilia quadrifolia* and weedy rice. Hand weeding and application of herbicide such as Rifit (1.5 lit/ha) to some extent were the common weed management practices followed. Some farmers used bio-control agent *Pseudomonas fluorescens* for preventing incidence of diseases. The incidence of pests and diseases were low to moderate. The major disease problems observed were bacterial leaf blight, leaf blast and false smut. Incidence of sheath rot and sheath blight were also observed. The kresek symptom of Bacterial blight was found in certain regions which were in severe form. The bacterial leaf blight stage was severe in many regions of the district. The major pests were leaf folder, stem borer and rice bug in low to moderate intensities. Other pests such as case worm and brown plant hopper were also noticed at low level. Farmers applied quinalphos (1 l/ha), acephate (1 kg/ha), hostathion (1 l/ha), flubendiamide (2.5 l/ha), lamda cyhalothrin (750 ml-1l/ha), fenval (1 l/ha), phosalone (1 l/ha), Vikarsha (1l/ha) were used for controlling insect pests. *Trichogramma* egg cards were used by a few farmers for the management of stem borer and leaf folder. The use of fungicides was negligible. *Pseudomonas fluorescens* was used for seed treatment by few farmers. For the management of bacterial leaf blight, Streptocycline (15-30 g/ha) was followed.

Thrissur: The survey was conducted during the tillering and maturity stages. The climate was normal in the season. Jyothi and Uma were the predominant varieties in the district. Other varieties such as Kanchana, Aiswarya and Ponmani were also grown. The common crop rotations were Paddy-Paddy, fallow - paddy-fallow, fallow-paddy-daincha, paddy-paddy-pulse and in few places Paddy- Paddy- Sesamum. Canals are the main sources of irrigation. Farmers managed their machinery, seeds and fertilizer through cooperative societies and private agencies. The common problem of farmers was lack of labours and high cost of labour. The average yield ranged between 3000 kg/ha in normal lands and upto 7500 kg/ha in kole lands. Most of the farmers used *Pseudomonas fluorescens* for seed treatment. Some of the farmers applied farmyard manure and ash in the nursery. The rate of fertilizer application ranged from 18- 50 kg N / ha, 0- 45kg P₂O₅ /ha and 0-45 kg K₂O/ha as basal. For top dressing the fertilizer ranged from 10- 90 kg N / ha, 0-10kg P₂O₅ /ha and 0-45 kg K₂O / ha. Most of the farmers applied fertilizers in two splits. But few farmers applied in 3 split doses also. They applied N and as urea and muriate of potash in the range of 25 kg-45 kg N/ha and 10-45 kg K₂O / ha. Lime was also applied as ameliorant for managing acidity and iron toxicity depending upon the subsidies obtained through Krishibhavans. Few farmers adopted organic farming. They used FYM, vermicompost, Groundnut cake/ neemcaken and poultry manure. The rate of weed infestation was low to high. The common weeds observed were *Sociolepis* spp., *Fimbristilis*, *Echinochloa* spp, *Isachne* spp., *Monochoria vaginalis*, *Cyperus iria* and *Eichornia* spp. Hand weeding as well use of herbicides were the common weed management practices. The herbicide commonly used was Nominee gold (250-300ml/acre). The incidence of pest and diseases were low to moderate. The major diseases observed were bacterial blight, sheath blight and leaf blast. The major pests were leaf folder, stem borer and case worm in low to moderate intensities. Farmers applied quinalphos (1 l/ha), lamda cyhalothrin, flubendiamide (50 ml/ha) acephate (1 kg / ha), phosalone (1l/ha) and choragen (1 l/ha) for the management of insect pests. Propiconazole was the fungicide commonly used for the management of fungal diseases. Use of *Pseudomonas fluorescens*

particularly for seed treatment was followed by majority of the farmers. *Trichogramma* egg cards were used for the management of leaf folder and stem borer by the farmers of kole lands. Farmers mainly used knapsack sprayer for pesticide application.

Malappuram: The survey was conducted during tillering to maturity stage of the crop. The climate was normal. The popular varieties in these districts were Uma, Jyothi, Ponmani, Jaya, Triveni and Neeraja. The common crop rotation were fallow- paddy- fallow, paddy-paddy-fallow, fallow-fallow- paddy, fallow-rice-vegetables, paddy-paddy-pulse. Farmers managed their finance from cooperatives and public institutions, equipments and seeds by Krishibhavan, fertilizers and plant protection chemicals mainly from co-operatives and to some extent from private agencies. Ponds and canals were the main source of irrigation and electricity was the main source of power. Among the inputs, seeds, pesticides, drying and storage facilities were adequate while there was a shortage of fertilizers and power reported by some farmers. The average yield range between 2000-5000 kg/ha. The seed rate ranged from 75-100 kg/ ha. The fertilizer application ranged from 0 to 100 kg N/ha, 0 to 50 kg P₂O₅/ha and 0 to 55kg K₂O/ha as basal and 0 to 100 kg N/ha, 0 to 50 kg P₂O₅/ha and 0 to 55kg K₂O/ha as top dressing. Majority of the farmers applied fertilizer as basal and one top dressing. Liming was done by some farmers to correct soil acidity. Some of the farmers applied poultry manure (1 ton/ha) or green manure as basal application. Most of the farmers applied fertilizer as basal and in one top dressing. A few farmers applied fertilizers in three splits. Most of them followed random method of transplanting. The level of weed infestation was negligible to moderate. The common weeds were *Echinochloa colona*, *Isachnae miliaceae*, *Sacciolepis sp.* *Fimbristylis* and *Eichornia sp.* Hand weeding was the common weed control method followed by the farmers of this region. Herbicides were used in kole region. The herbicide Londax (bensulfuron methyl @ 10kg/ha was used by the farmers. The problem of soil acidity and hence acute iron toxicity was observed in some places of Perumbadappu block. The incidence of pests and diseases were low to moderate in general. The incidence of bacterial leaf blight which was severe in several places. Brown spot was also observed in some places. The major pests were case worm, leaf folder and stem borer and rice bug in low to moderate intensities. Farmers applied quinalphos (1-1.25 l/ha), chorogen (750ml/ha), lamda cyhalothrin (600 ml-750 ml/ha), flubendiamide (50 ml/ha) acephate (1 kg / ha), phosalone (1 l/ha), choragen (1 l/ha), and Furadan (250g/acre) for different pests. Most of the farmers used knapsack sprayer for spraying plant protection chemicals. Use of *Pseudomonas fluorescens* for seed treatment was followed by many of the farmers especially in kole region. *Trichogramma* egg cards also were used for the management of stem borer and leaf folder in this region. Some farmers expressed the problem of non-availability of potash in time and also lack of proper equipments for agronomic operations as well as plant protection activities. The non availability of labourers and high labour charges were other constraints faced by the farmers. Lack of paddy procurement by the government agencies in many part of the district and hence exploitation by private agencies was also reported by farmers.

Incidence of diseases and insect pests in Kerala

District	Diseases					
	BLB	ShBl	BL	BS	ShR	FS
Palakkad	L- S	L-M	L	-	L-M	L-H
Thrissur	L -M	L-M	L-M	L-M	-	L
Malappuram	L - H	L-M	L-M	L-H	L-M	-

District	Insects and Pests						
	LF	SB	CW	RB	BPH	WM	Crabs
Palakkad	L-M	L-M	L	L-M	L	L	L-M
Thrissur	L-M	L-M	L	M-H	-	-	L
Malappuram	L-M	L-M	L	L	-	-	L-M

MADHYA PRADESH

Districts surveyed: Rewa, Satna, Sidhi, Shahdol, Katni, Umaria , Panna and Anoop pur

Particulars of rice surveyed area:

District	Block	Village Surveyed
Rewa	Rewa, Sirmour, Raipur Karchulian, Hanumana, Mauganj, Teonthar, Jawa,	Raghunath Pur, Deotalab, Naigarhi, Deori, Ramnai, Badwar, Jawa, Raipur Karchulian, Teonthar, Mahsua, Khuj, Amiliki, Hanumana, Godhar, Baikunthpur ,Sirmour Mauganj, Maghiar Raghunathpur, Karahiya, Badwar, Tamara, Gudh Palia, Maghigama, Patehara, Ram bag, Itaura, Konia, Persia, Tilkhan, tamara, Govind garh, Gurh, Badwar, Semaria, Laua, Sagara, Khaur, Kothi, Laxamanpur
Satna	Nagod, Sohawal , Rampur Baghelan, Ram Nagar, Amarpatan, Maihar	Biruhuli, Nagod, Bahelia Bhat, Karahi, Krishnagarh Sonaudi, Maihar, Sonwari, Badera, Bhadan pur, Dharampura, Etaura Bartona, Sajjanpur, Teonthari, Mauhari ,Katara ,Piparikala, Kudarai kala, Khaira Gorhai, Govindpur Tala, Teonthari, Bahaliabhat Bela, Deoraj Nagar, Hinauti, Jigana Jigana, Lagaragama Karahi, Dinapur, Mauhari, Ram Nagar, Choragadi and Deoraj Nagar, Uchehara
Sidhi	Maghauri, Sidhi, Ram pur Naikin, Churahat, Deosar	Patpara Jhagh, Shivpur Duara, Bairiha, Kaithaha, Kherawa Chanmaradol Bagadara, Pasagadi, Maghauri, Baghwar, Churahat, Dadhiya Sonvarsha, Amaha, Bada Tikat, Lakoda, Kuchawahi Rampur Naikin, Jhagh, Kandawar, Chauphal, Barahat Mamadar, Jhalwar Janakpur, Hardua, Barkheda Motawa Devaraha, Bharat pur, Raiduria Semaria, Bodari tola, Semaria Parsili, Chilari, Bhitari, Padkhuri, Pand, Misirgama
Shahdol	Beohari, Jaisingh Nagar, Gohaparu, Sohagpur, Burhar	Sohagpur, Sinduri, Ghorasa, Barakach, Deoganva Aswari, Karkati, Karaki, Tihiki, Tetaka, Silpari Balbehra, Dhurwar, Dhangama, Deori, Jaisingh Nagar ,Burhar, Kanchanpur, Silpari, Khannaudhi, Chachai, Beohari Chamaradol, Khadda, Chuhari, Koni
Panna	Ajaygarh, Pawai, Devendra nagar,	Madha, Birahaul, Naunia, Navganv Barkheda, Janakpur Pawai, Saleha, Devendra nagar Barwaha, Rajapur, Fulwari, Papakhara, Dadar, Hardua, Bhulani ,
Katni	Barahi, Katni, Mudwara, Vijayraghavgarh,	Patharahata, Pakara, Piparia, Bahori band, Dhimarkheda Mudwara, Vilayat kala, Jhalawara, Badawara , Rupandh Gangewaria, Barahitola, Jhukehi, Sabhaganj, Ghunwara, Khirahani, Kaudia, Dhanadi, Amaraia, Banjari, Barahi, Mohan tola, Salaiya, Lata ganav
Anooppur	Rajendragram Keshawahi, Anooppur	Lila tola Pusparaj garh, Karkati, Pathara, Rora pani, Singhpur, Koni, Birahuli, Dhurawar, Narabaspur, Dhogargama, Rajendra gram
Umaria	Manpur, Chandia, Karkeli, Pali	Virsinghpur Bharaula, Baderi, Lodha, Kudari, Kareli, KoChandia, Pali, Umari, Kohaka, Indawar, Bharewa, Jobi, Sarasi, Bijuri, Rahatha

Particulars of Rice Surveyed area

District	Total Rainfall (mm)	Total Rice Area (000 ha)	Irrigated area (000 ha)	Area Planted (000ha)
Rewa	1147	105	45	92
Satna	1170	75	25	68
Sidhi	1178	97	32	88
Shahdol	1230	65	20	61
Katni	1320	45	20	32
Umaria	1270	46	15	40
Panna	1080	55	20	51
Anoop pur	1385	102	25	94

District wise widely prevalent Rice Varieties :

District	Varieties
Rewa	BS158, BS6129, PA6111, PAC-832, PAC-807, Sonali, Reshma. RH-10,432,434, Basanti, Sita, Samrat, BH-21, US316, US-10 777, 786, Poonam, Basanti, Sita, Samrat, BH-21, Khusboo, Ganga Kaveri, Jagtial sanali, US312, MR219 Shabnam, MTU 1010, Biranj, Lohandi Bhejari, Ganga Kaveri, Jiledar, Mansooriya, Nanhi, Samasar, JR-75, PRH10, Pusa Sugandha 5, JR201, Dehula, Newari, Govinda, IR-36, IR-50, Basmati, Vandana, Pro-Agro 6201, PA 6444, Champion, Subeej Sugandha ,Dhanteswari, Azan, Badalphool, Jalkeshar, Baksha, Bhadaili, Bohita, Badalphool, Goraknath,,Dubraj, IR 64 , Madhuri ,Biranj , Nokhi , Lochai, Bhantaphool, Sonkharchi, JRH 4, JRH 5, PAC 801, Pusa sugandha 3, Dilbaksha, Kapoorshah, Rambhog, Sonachoor, Lonagi, Geeta, Tej, Excel, Loknath, Lonhdi, Karanphool, Jiledar , Pardeshi, Rasi, NH5, NH96, Gulab Champa, Suruchi, China Ric , Yashoda Bhog. (Dominance of Improved varieties 65%)
Satna	,Bhadaili, Vandana, JRH 4, JRH 5, Pusa Sugandha 3, Pusa Sugandha 5, Excel, Bhantaphool, Biranj, NH5, NH96, Gulab Champa, Suruchi, China Rice, Yashoda Bhog. PAC-801, PHB71, Champion, Rambhog, Laloo-14, Biranjphool, IR-36, IR-64, IR-50, Sonam, Basmati, JR-75, Azan, Bhadaili, Karaga, Balbhog, Laichi, Lochai, Mahak, Balkeshar, Rabina, Roopali, Lal Dhan, KRH 2, Pro-Agro-6201, Pro-Agro-6111, PA6444, Indo American-1001 Loknath, Sonam, Jaya, Sonali, Dehula, Newari, Kaniga, Lonhadi, Jalkeshar, Dilbaksha, PRH 10, Tej (Improved variety 60%)
Umaria	Bhejari, Samsar, Siyari, Menaka, Kajari, Rambhog, Badshah Phool, Chhinmauri Amagaur, Kanji, MTU1081, JRH8, Loknath, Pro-Agro-6201, PA6444, Ranikajal, Butanagar, Lonhadi, NH5, NH96, Gulab Champa, Suruchi, China Rice, Yashoda Bhog. Lochai JRH 4, JRH 5, Sonam, Shabnam, IR 36, IR 64, IR 50, MTU1010, Kanak, Kranti, Balkeshar Saunthi Karahani, Padmasar, Gulab Kali, Belari, Gurmatia, Biranj, Kanak, Karahani, Menaka,Rupali, Basmati, Vishnubhog, Kalisugandh, Kanakjir, Bohita, Kosam, Kanji, Karanphool, Khoonta, Gurmatia, PRH 10 Lochai, Lonagi, Lonhadi, Kerakhambh, Kosam (Improved variety 35%)

Sidhi	IR-36, IR-64 IR 50, Newari, Pro-Agro-6201, Dehula, Lonagi, Biranj, Ledua ,Banspore, Bohita,Loknath, Shukla Phool, Goraknath, Sonkarchi, Doodhi, Samasar, Poornima, Basmati, Sonam, Govinda, Banspore Ganga Kaveri JRH4, JRH5, Sabnam PAC-832, PAC-807, Sonali, Reshma. RH-10,432,434 ,Basanti, Sita, Samrat, BH-21, US316,US-10 777,786, Poonam Nadawal, Bhantaphool, Karaga, Raghuwar Prasad, Nanhi, Mulayam 999, Shabnam, Champion, Jwalaphool, Ranikajal, Vishnubhog, Butanagar Koilari, Kanakjir, Annada , Bhanta Phool PRH10,PS5, PS 4, Malti, Lalita, Patna , Vandana (Improved variety 35 %)
Shahdol	Chandra hasini, Kanak, Karahani, Bhejari, Safari, Keshar, Rambhog ,Badshah Phool, Chhinmauri, Balkeshar, Vishnubhog BD 1, MTU1010, Gulab Kali, Belari, Gurmatia, Ramunwa, Kerakhambh, IR-36, IR-64, IR 50, Pusa Sugandha3, Lonhadi, Lochai, Basmati, Vishnubhog, Kalisugandh, Kanakjir, Bohita,Kosam, Kanji Nisotawa, Nadawal, Basmati, P1460 Amagaur, Kanji, JRH 4, JRH 5, Loknath, Biranj, PAC 801, Mahyco 117, Saunthi, Karahani, Padmasar Kajari Lok Nath Karanphool, Khoonta, Gurmatia, Pro-Agro-6201, PA6444, Ranikajal, Butanagar, Kanak Samsar, Siyari, Menaka, Pusa Sugandha 5, Mahamaya, Swarna PAC-832, PAC-807, Sonali, Reshma. RH-10,432,434, Basanti, Sita, Samrat, BH-21, US316, US-10 777,786, Poonam (Improved variety 30-35 %) S
Katni	PAC-832, PAC-807, Sonali, Reshma.RH-10,432,434, Basanti, Sita, Samrat, BH-21, US316, US-10 777,786, US316, US-10,777,786, Poonam, Basanti, Sita, Samrat, BH-21, Khusboo, Sonali, Reshma, Poonam, Samrat Dhaur, IR36, IR 50, IR 64, Kranti, Lochai, Jalkeshar, Vishnu bhog, Basmati, Chhattri, Tulsi, PA 6201, Loknath, Sonam, Shabnam, Menaka, Juari, Dubaraj, Keshar , Bhanta Phool, JRh 4, JRH 5, MR219, WGL 32100, Champion, Goraknath , PA 4444, Tej, Bhadaili, Kanak, PHB71, US312, Subeej sugandha, HMT, PRH10 (Improved variety 45 %)
Panna	NPH567, Chaimpion -NPH207, Mayur- NPH4113, US316, US-10 777,786, Poonam, Basanti, Sita, Samrat, BH-21, Khusboo, Subeej Sugandha, SBH 999, Raja, NPH 369, PAC 801, PRH 10, Lonagi, Lonhadhi, PHB 71, Kari, ,Ratna, Laichi, Jalkeshar, PA 6201, PA6444, Tej, Kuturba, Kanji, Doodhi, Haru, Sathia Sonam Loknath, Menaka, MTU1010, Parasanwasa, IR36, IR64, IR50, Lonhadi, Gorak nath, Kari,Newari Karadhana, Basanti, Bhadali, (Improved variety 40-45 %)
Anoopur	Vishnubhog, Kalisugandh, Kanakjir, Bohita, Kosam, Kanji JRH4, JRH5, IR36. IR64, Kranti, Pusa Sugandha 3, Pusa Sugandha 5, HMT, Mahamaya Dhanteswari Samasar, Siyari, Menaka, Kajari, Rambhog, Badshah Phool, Chhinmauri, Balkeshar Saunthi, Karahani, Padmasar, Lonhadi, Lochai ,Badshah Phool, Chhinmauri, PAC-832, PAC-807,Sonali, Reshma.RH-10,432,434, Basanti, Sita, Samrat, BH-21, US316, US-10 777,786, Poonam, Balkeshar,PAC 801, Saunthi, Karahani, Padmasar, Lonhadi, Lochai, Basmati, (Improved variety 40-45 %)

Production Oriented Survey of rice was conducted in eight districts viz. Rewa, Satna, Sidhi, Shahdol, Umaria, Anoopur, Katni and Panna districts situated in Kymore and Satpura hills under rice-wheat crop zone in Madhya Pradesh. The weather conditions during crop growth period were normal. The distribution of rainfall was good in the state and therefore, sowing of direct seeded rice either un-sprouted broadcasting or lehi (sprouted seeds) was carried out timely

in rain fed ecosystem in the state. There was good rains in the month of June and July therefore farmers have sown the seeds in the nursery in the month of June and transplanting was completed timely in the month of July. It was observed that due to continuous rains in the month of July, soybean, black gram, moong and sesamum area was replaced by rice or kept unsown. The crop condition of sesame and urad was found to be poor in the surveyed area due to heavy rains. Over all the rainfall was very good and there distribution was proper after a long period and crop growth was found to be excellent in the surveyed area. The transplanting of hybrid rice or improved varieties were undertaken by the farmers having assured irrigation in Rewa, Katni, Panna and Satna district but the farmers have sown direct seeding of rice under rain fed or partial irrigated area of Shahdol, Umaria and Anoop pur district. It was estimated that 45 to 50% urad, moong and sesamum area was replaced by rice in Rewa Satna, Panna, Sidhi and Katni district whereas, 80 to 90% rice area was covered under rice in Shahdol, Umaria and Anoop pur district under rain fed and irrigated conditions.

There was heavy rainfall (>1500 mm) in Jabalpur, Balaghat, Damoh and western part of Madhya Pradesh and central district therefore, direct seeding and transplanting both were performed well in rain fed and irrigated ecosystem. The predominant varieties in the state were PRH 10, IR-36, IR-64, IR 50, Govinda, Vandana, Pusa Sugandha 3, Kranti, HMT, Pusa Sugandha 5, PA6201, PA 6444, PHB71, PAC 801, Basmati, Lochai, Sonam, JR-75, JR 201, Sabnam, Loknath, Winner and Champion. It was noted that rice hybrids are being popularized by the private sectors and government agencies in the state and therefore, the farmers are taking keen interest to grow hybrid rice and benefited by obtaining the grain yield ranging from 50 to 70 q/ha over improved varieties (25-40q/ha) under irrigated ecosystem. With regard to hybrid rice adoption Rewa, Satna and Sidhi districts covered maximum area (approximate 25-35 %) by the progressive and medium farmers under irrigated ecosystem where as, Shahdol, Panna, Katni and Anooppur districts have less adoption of hybrid rice ranging from 10 to 15 %. It was also noted that farmers are taking keen interest to replace the local varieties with hybrid rice and improved high yielding varieties and strengthening the economic status. The replacement of local rice varieties was maximum in, Rewa, Satna, Sidhi and Katni districts whereas. It was comparatively low in Shahdol and Panna districts. The predominant cropping system in the state was rice-wheat, rice-gram and rice-pea, rice-lentil, rice-berseem. Rice-fallow, rice-barley is commonly practiced in Anooppur Shahdol, and Umaria districts where light poor soil is predominant and very poor irrigation facilities are available. The major source of irrigation is bore-well followed by open well and canal irrigation. The main source of power for agricultural operations was electricity in Rewa, Satna, Sidhi and Katni where as, diesel source was commonly used in Umaria, Shahdol, Anooppur and Panna districts. The electric power supply is becoming the major limiting factor for irrigation therefore, farmers are facing acute problem and demanding at least 14 hour assured power supply for raising the crop successfully. The rice productivity in the state was very low (1.7 to 2.3 t/ha) due to dominance of local extra early and medium poor yielder varieties, low fertilizer application, poor irrigation resources, poor plant protection measures and poor socio-economics status of the farmers. However, it was noted that the progressive, medium and marginal farmers having irrigation facilities have adopted the cultivation of hybrids and obtaining the grain yield ranging from 60 to 75 q/ha. The farmers are demanding the extra early high yielding varieties (90 to 100 days duration) and early hybrids looking to the poor rainfall scenario for last five years. This year demand for urea was very high and due to poor supply of urea farmers were facing problems. The farmers were not satisfied with the efforts of the department of agriculture for un-timely supply of seeds, fertilizers and poor quality pesticides in the region. The availability of improved seeds, irrigation sources and equipments were inadequate where as pesticides are satisfactory. The storage and drying facilities were either inadequate or not available The specific needs of the farmers were seeds of

improved variety in time, paddy thresher, sprayers, duster, cono weeder and rotavator and paddy transplanter. It was observed that weed infestation was very high in rain fed ecosystem and causing heavy economic yield losses as compared to irrigated ecosystem. It was estimated that approximate 35 to 40% yield losses was occurred due to weed infestation in upland rainfed ecosystem and farmers were facing a lot of problem to combat the losses due to heavy investment in manual weeding and labour crisis. Weed infestation was very high in Rewa, Satna, Katni, Panna and Sidhi districts in rain fed upland rice ecosystem as compared to irrigated rice where as, it was minimum in Shahdol and Jabalpur districts due to wide adoption of transplanting. Very few progressive farmers are using weedicide like butachlor, Web super and Almix in rice whereas, Laso, Pursuit weedicides were commonly adopted in Soybean for effective management of weeds. Application of laundrex power/Sathi weedicide @10kg/ha at the time of transplanting in Shahdol Sidhi and Rewa district effectively managed the post emergence weeds and reduced the cost of cultivation for weed control was observed. Zinc deficiency was commonly noticed in Rewa, Satna, Sidhi, Shahdol and Panna as compared to Katni, Umaria and Anoopur districts. However, leaf blast, brown spot, Khaira, false smut, sheath blight, seed discoloration, case worm, WBPH, leaf folder, army worm, gundhi bug and termite infestation were commonly noticed in the surveyed area. Leaf blast, false smut and WBPH, leaf folder appeared this year in moderate to severity causing considerable yield losses. Rat infestation was observed in paddy fields, threshing floor and storage in all the surveyed area in traces. Two hundred farmers seed societies established in the division with the efforts of JNKVV KVK scientists and Department of agriculture are playing vital role to supply good quality of seeds to the farmers.

Rewa: In Rewa district, seven blocks were surveyed when the crop was at tillering, dough and maturity stage. The weather condition during the crop growth period was normal and favourable for rice cultivation. There was good rains in the month of June and July and therefore, direct seeding was adversely affected and most of the farmers were adopted transplanting practices in the district. It was noted that due to continuous rains in the month of June and July, the pulse and oilseed area was to some extent replaced by rice or remained unsown. This year irrigated area increased due to Bansagar canal and therefore, farmers have planted rice hybrids and high yielding improved varieties. Local varieties were recorded in Mauganj, Teonthar and Hanumana blocks. The prominent cropping systems were Rice-Wheat, Soybean- Gram, Rice-Gram and Rice-Lentil. The most popular varieties grown in the district were, IR-36, IR-64, PS 5, Sonam, Basmati, JRH 4 JRH 5, IR-50, Govinda, Lochai, JR201, Vandana, PRH10, Lohandi, Newari, PS 3, Pro-Agro-6201, Champion, Subeej Sugandha, MTU1010 and other available Pvt hybrids. Public demand for hybrid seeds was very high in the district and farmers purchased seeds from private hybrids in higher price from market. The farmers are mostly using their own local seeds or improved seeds from private and government agencies but it was commonly noticed that public sector seeds were not sufficiently provided to the farmers in time therefore, farmers were purchasing the seeds from private shops.

Electricity supply has become a major constraint for irrigation. Bore well, canals and well are the main source of irrigation. It was noted that due to Bansagar canal the irrigation was tremendously increased in Rewa district therefore the cropping intensity and crop productivity are increasing. The primary source of finance was public sector followed by cooperative societies and self-finance. Kisan Credit Card facilities and short term loan from nationalized bank are playing a vital role for assisting to the agricultural resources. The source of fertilizers was from public, cooperative and private institutions. Most of the farmers in the district were marginal and sub marginal. The land holding capacity is being declined in the district. The averaged yield during the previous seasons ranged between 2.5 to 4 t/ha in IR-36, IR 64,

Govinda, Sonam, PS3, PS5 and PS 3. While, farmers obtained the higher grain yield ranging from 60 to 65q/ha in hybrids under irrigated ecosystem. With regard to weed infestation *Echinochloa* spp., *Cyprus rotundus*, *Paspalum* spp., etc were most predominant in rain fed farming system whereas, it was minimum in transplanted rice. The availability of labours are also becoming a major constraint due to cement industries in the region. The management of weeds through herbicidal application was in traces because of uncertain rains and high price of weedicides. Therefore, hand weeding was commonly practiced for effective weed management in rice where as in soybean, farmers are applying weedicides like alachlor, Turga Super, imazathpyr and other effective herbicides. The average fertilizer consumption of the district was 40 kg/ha. The basal fertilizer application consisted of 20-30 kg/ha Single super phosphate and 10-20kg/ha muriate of potash with zinc sulphate (20 kg/ha) adopted by the progressive farmers followed by top dressing of urea 30-35 kg/ha. Whereas, marginal and sub marginal farmers followed top dressing of urea only (15-30 kg/ha) during tillering and grain filling stage. This year farmers have faced acute shortage of urea supply in the district. Use of Organic fertilizers viz. FYM, green manuring, vermicompost and blue green algae culture were also introduced in the district and farmers are taking keen interest to improve the soil health through organic farming system. Zinc deficiency symptoms which are commonly known as khaira were also reported in the district. Therefore recommendation of zinc sulphate @ 20 kg/ha was given to combat the losses in the district and progressive farmers have adopted the technology. With regard to pest and disease scenario, it was noted that the severity were moderate to heavy this year due to congenial microclimate. The common biotic stresses like leaf blast, brown spot, false smut, seed discolouration, leaf folder, WBPH, caseworm, Gundhi bug, termite and rat infestation were recorded in the district. The application of monocrotophos, chloropyriphos, trizophos and imidacloprid was done in hybrid rice, basmati and other improved varieties by the progressive farmers for controlling and combating the economic losses in the district.

Satna: Six blocks of Satna district were surveyed at flowering, grain filling stage and maturity stage. This year, the distribution of rainfall was very good in the month of June and July therefore. The direct seeding area was reduced and transplanting was carried out in the month of July under rainfed and irrigated situations. The farmers transplanted maximum hybrid and improved varieties this year and soybean area was reduced as compared to previous year. Overall, due to good and continuous rainfall 40-50% pulse area was replaced by rice. It was noted that the farmers were requesting for extra early maturing varieties, fertilizers, weeds control devices, paddy transplanters, plant protection equipments in time and adequate supply of electricity for assured irrigation. The major crop rotations were soybean-gram, rice-wheat, rice-gram, rice-lentil and rice-barley. Tank, canal and bore wells were the main sources of irrigation. This year the shortage of urea and other fertilizers were noticed in the surveyed area. In regard to fertilizer application, it was observed that in rice, farmers have applied only urea in low doses in splits rather than balanced application of nutrients super phosphate and muriate of potash, and micronutrients. Although, direct seeded rice area was very low, the weed population was noted to be very high as compared to transplanted rice. Hand weeding was commonly practiced, and few farmers applied herbicides viz butachlor @ 1.5 lit/ha and Sathi for effective weed control. The laborer crisis was also noted in the district because of huge number of cement industries and becoming constraints in the district. Local varieties were also noted in Rama Nagr, Maihar and Nagod blocks, whereas, IR-36, Sonam IR 64, IR 50 and hybrid rice viz JRH 4, JRH5, PA66201, Loknath, Poonam, PRH 10 were cultivated in irrigated conditions with good productivity. It was observed that hybrid rice cultivation is becoming popular and widely adopted by the farmers because of good productivity and monetary returns under irrigated conditions. SRI method is becoming very popular and farmers are taking keen interest to adopt the technology under limited water resources. Khaira disease was commonly noticed in

Sohawal, Ramnagar, Amarpatan, Rampur baghelan and Maihar blocks. In regard to biotic stresses, leaf blast, brown spot, false smut, sheath blight, leaf folder, case worm, WBPH, stem borer and gundhi bug were recorded in moderate severity. It was recorded that due to continuous good rains in the month of September, the rice pests and diseases occurred in moderate severity. It was noticed that application of monocrotophos or chloropyriphos and trizophos were commonly practiced by the farmers for controlling the pest. The productivity of rice was much below (1.5 to 2 t/ha) in rain fed areas whereas, it was satisfactory (3. to 4.5 t/ha) in irrigated ecosystem. Good quality of fertilizers, improved seeds of early varieties drying facilities, equipment, irrigation, proper supply of electricity, trainings on improved package of practices are the main demand of farmers in the district.

Sidhi: Five blocks were surveyed at dough and maturity stage in the district. Rainfall was very good. Therefore instead of dry seeding farmers adopted lehi and transplanting system. In the district jowar, moong, urad and sesamum area was slightly reduced; however, in the undulated upland fields these crops were successfully cultivated with good productivity crops. Transplanting of hybrids and improved varieties were carried out in Churahat, and Rampur Naikin blocks under irrigated situations and low lying fields. Progressive farmers replaced the local rice varieties and grown the hybrids and improved cultivars under irrigated ecosystem Direct seeding (Jhuria) method was commonly practiced in rain fed farming system for local traditional varieties in Maghauri and Deosar blocks and transplanting was adopted for improved high yielding varieties in irrigated conditions. Hybrid rice is being adopted by the farmers and SRI method is becoming very popular in the district. Rice-Wheat, Rice-gram, Rice-fallow, Jowar-Kodo-Arhar, Rice-fallow and fallow-Linseed were the predominant cropping system. Kodo, Kutaki, and Arhar as sole crop and mix cropping of Arhar with kodo, kutki, urad and til are being commonly practiced in the district under rain fed upland and hilly tracts in the tribal dominating areas viz Deosar, Chitarangi and Maghauri blocks in the district The predominant varieties were, IR-36, PA 6201, PA6444, Loknath, Prasanna PRH 10, PS 3, PS 5, Sonkharchi, Laichi, Samasar, Karahani, Dehula, and Bhataphool. Fertilizer application in kharif crops was noted to be very poor (20 kg /ha) whereas, in Rabi basal dose of fertilizer and line sowing were practiced in the district. Due to light soil and low irrigation facilities, farmers are not applying chemical fertilizers; however, farmers are applying urea at tillering stage at very low doses (15-20kg/ha). It was noted that top dressing of only urea was commonly practiced in rice without basal application whereas, in Rabi, farmers adopted line sowing followed by basal application of super phosphate and potash in the district. Very few progressive farmers applied basal fertilizer as single super phosphate followed by muriate of potash and zinc sulphate in low land/ bunded rice fields where improved varieties like Poornima, PS 3, PS 5 JRH 4, JRH5, Basmati, IR-36, IR64, JR201, Sonam and hybrids were grown under irrigated conditions. Urea shortage was noticed in the district and therefore farmers demanded timely and adequate supply of urea in the blocks. The productivity was low ranging from 1.5 to 2 t/ha due to very low dose of fertilizer application, less irrigation and dominance of local varieties, undulated topography and marginal lands with low nutritional status of soil in the Maghauri and Deosar blocks whereas, the productivity in Churahat and Rampur Naikin blocks were good (3-4t/ha). The district had maximum bore well facilities. Therefore, adoption of hybrid rice is becoming more popular as compared to other blocks. Bore wells, wells and canal irrigation were the main sources of irrigation. Zinc deficiency was noted in Churahat, Maghauri, Rampur Naikin and Deosar blocks. Weed infestation was observed very high in direct seeded fields where as, it was less in transplanted ecosystem. Hand weeding was commonly practiced and labour crisis was also noted in Churahat and Rampur Naikin Blocks in the district. Electricity shortage in the surveyed area was noticed and becoming a limiting factor for irrigation. Drying and storage facilities were not available. In regard to pest and disease scenario it was noted to be moderate this year.

Incidence of brown spot, leaf blast, sheath blight, bacterial blight, false smut, grain discoloration, WBPH, leaf folder and leaf folder, case worm and army worm were recorded in moderate severity in the surveyed area. False smut infection in hybrid rice was noted in the district in the surveyed area in moderate severity. Over all pest incidence was noted to be very low in the district. Only 10% farmers adopted plant protection measures; however traditional ITKs were commonly adopted by the farmers due to low cost. Very few progressive farmers applied post emergence herbicides like butachlor and pesticides like chloropyriphos and monocrotophos.

Shahdol: Five blocks of Shahdol district were surveyed at grain filling, dough and maturity stage. The rainfall was very good and their distribution was also proper. Therefore, transplanting was carried out timely in rain fed and irrigated ecosystem. The district is known for rice monocropping because of dominance of sandy soil and low irrigation facilities. Rice is the main crop and transplanting is commonly practiced in rain fed areas due to low line fields. It was also noted that due to continuous rains the pulse and millets area were replaced by rice or kept unsown. As regard to the crop rotation, Rice-fallow was predominant; however, Rice- wheat, Rice- Barley and Kodo, Kutaki as sole crop and, mix cropping with Arhar are being practiced due to variation in soil types in the district. The district has very low irrigation facilities and wells and tank are the main sources of irrigation. The socio economic status of the farmers are very poor due to dominance of tribes however, farmers are obtaining rice yield ranging from 25-35q/ha due to mono cropping. Application of FYM and other forest products were commonly adopted by the farmers. The farmers are demanding early duration varieties less than 90 days maturity in Beohari, Sohagpur, Jaisingh Nagar blocks and mid duration 90 to 120 days maturity in Gohaparu and Burhar blocks with good productivity. The major varieties of rice were Lonagi, Lochai, PS5, JRH4, JRH5, Kera Khambh, Dubaraj, Vishnubhog, Kanak, Bhejari, Bohita, IR-36, IR64, IR50, Sonam and PS3. Progressive farmers had grown hybrid rice Pro-Agro-6201, Loknath, Raja, Champion, Winner, Mulayam-999 and PAC 801 where assured irrigation was available. Fertilizer application was noted to be very poor (10-12 kg/ha) because of less irrigation, light soil and existence of forest rich soil. However, only nitrogenous fertilizer was applied in rice at tillering stage. FYM application was commonly practiced due to large number of domestic animals and rich forest area. Farmers used their own traditional varieties in the tribal dominated district. However, progressive farmers have grown hybrids and improved varieties. SRI cultivation was very much popularized and adopted by the farmers in Burhar and Gohaparu blocks. It was noted that SRI was practiced in 25000 ha area in the district. Very good efforts were made by the department of Agriculture and KVK scientists for promotion and adoption of SRI in the district. Weed infestation was noted to be very low in transplanting ecosystem. Herbicide application was not adopted and hand weeding was commonly practiced in the district. In Sohagpur block, application of Laundrex power herbicide as post emergence @ 4 kg/acre followed by mycorrhiza was demonstrated by KVK Scientists for the management of weeds and promoting the crop growth. The average yield in the district was moderate 20-30 q/ha. Equipment, irrigation, electricity, improved seeds, storage facility, financial support from government organizations and transfer of technology were the main requirements of farmers. Demonstration of agricultural equipments was successfully done in Sinduri and other KVK adopted villages with coordination of Agriculture Engineering department in the district.

With regard to biotic stresses, moderate severity of pest incidence was noted this year due to good rainfall and congenial microclimate. However, leaf blast, brown spot, false smut, seed discoloration case worm, leaf folders and rice bug were reported. Heavy infestation of case worm was noted in low lying areas and caused considerable yield losses. Khaira was commonly recorded in Gohaparu Jaisingh Nagar and Beohari blocks. Plant protection measures adoption

was noted to be very poor. Very few farmers applied chloropyriphos and monocrotophos for the management of pest. ITK's viz, application of cow urine, neem leaf, Bhelama, Salaiya were commonly practiced for the management of pest and diseases. Lac cultivation is adopted by the tribals in the district in collaboration with the department of forest and KVK in Burhar and Gohaparu blocks. Special trainings on Lac cultivation were organized by the KVK and major emphasis was given on self help group movement for agricultural development. RAWE students were actively participated and demonstrated the effective low cost technology in the adopted villages. Twenty farmers seed societies established in the division with the efforts of JNKVV KVK scientists and Department of agriculture

Umaria: Four blocks were surveyed in the district. The district has cropping intensity 128.5% and rice occupied major area in the district. Survey was conducted during grain filling and maturity stage. The onset of monsoon was on 1st week of June and there was good rain in the crop season. The major cropping systems were Rice-wheat, Rice-barley and Rice- fallow in the district due to variation in soil types. The sandy soil is dominated in the district therefore rice fallow cropping system is predominant. It was noted that farmers have sown hybrid and improved high yielding varieties in irrigated ecosystem. This year transplanting and lehi area was increased due to good rains and late maturing varieties performed well due to good rains in the month of September and October under rain fed and irrigated ecosystem. The major varieties of rice were Bohita, Kera khambh Kosam Dubaraj, Vishnubhog, IR-36 Kanak, Bhejari, and Lal dhan. Progressive farmers have grown Pro-Agro-6201, PA6444, Sonam, Shabnam, Loknath Tej, Excel, MTU 1010 Pusa Sugandha 5, JRH 4 JRH 5, Mulayam-999, PAC801 in Karkeli, Chandia and Manpur blocks where assured irrigation was available. Farmers used their own seeds in the tribal dominated district. However, progressive farmers were grown hybrids and improved varieties. Equipment, irrigation, electricity, improved seeds and transfer of technology were the main requirements of farmers. However, the average yield in the district was moderate 20-30q /ha. The fertilizer consumption was very poor 18.23 kg/ha. Only nitrogenous fertilizers were applied in rice at tillering stage. FYM application was commonly practiced and nutritional status of the field is good due to rich forest area. Weed infestation was noted to be low to moderate. Normally weeding was not practiced but very few farmers adopted hand weeding for weed management. The economic status of the farmers was found to be very poor due to dominance of tribals in the district, poor soil texture and less agricultural input resources etc. SRI cultivation was also adopted by the farmers and they have obtained the grain yield 50-65 q/ha in Manpur and Chandia blocks. In regard to biotic stresses, leaf blast, brown spot, false smut, case worm, leaf folders, armyworm and rice bug were reported in moderate severity. This year false smut incidence was commonly reported in hybrid rice and late maturing varieties in moderate severity. Case worm and leaf folder infestation were high in low lands under late sown crop in Chandia and Karkeli block. Khaira was also noted in the surveyed area. Adoption of plant protection measures was noted to be very poor

Anooppur: Four blocks were surveyed in the district. The district is having total rice cultivated area 102 m ha with total irrigated area with cropping intensity of 129.0%. Survey was conducted during grain filling and maturity stage. Direct seeding and transplanting were carried out in time due to good rains in the month of July and therefore some of the pulse area was unsown. There was no dry spell in the month of September, hence early maturing varieties performed well than late maturing varieties under rainfed ecosystem. The average fertilizer application was 15 kg/ha which is much below than other districts. Transplanting method is very common. Hand weeding and weedicides application were not practiced in the district and therefore, weed population was observed moderate to high in rain fed direct seeded fields as well as transplanted rice. The major

varieties of rice were Kanaka, Gurmatia, Bohita IR-36, IR64, Vishnu bhog, Kera khambh, Lochai etc. Very few farmers had grown HYVs like Poonam, Basanti, Sita, Samrat, BH-21, MTU 1010, Manisha, Tara, Chadini, Jagtial sanali and hybrids like US312, MR219, Shabnam, Pro-Agro-6201 Mulayam-999, Khusboo, Ganga Kaveri, PAC 801, in Keshawahi and Anooppur area where assured irrigation was available. Dubaraj Local scented popular rice was grown in the district in low line fields and farmers are obtaining grain yield 30-40 q/ha. The major cropping system were Rice-wheat, Rice-gram, Rice-barley and Rice-fallow due to vast variation in soil types in the district. Niger crop is also grown in the hilly fields in Rajendra gram Pusparajgarh area. The sandy soil and black cotton sandy soils are dominated in the district therefore rice fallow, rice-gram, rice-wheat cropping system are predominant.

Farmers used their own seeds in the tribal dominated district. However, progressive farmers cultivated hybrids and improved varieties. Equipment, irrigation, electricity, improved seeds and transfer of technology were the main requirements of farmers. However, the average yield of the district was moderate 20-30q/ha. The farmers are applying only nitrogenous fertilizer at tillering stage; however, very few farmers are applying super phosphate, potash and zinc. FYM application was commonly practiced in the district due to rich forest area and large no. of domestic animals. The economic status of the farmers was found to be very poor due to dominance of tribal in the district, poor soil texture and less agricultural input resources etc. In regard to biotic stresses leaf blast, brown spot, false smut, bacterial blight, case worm, WBPH, leaf folders, armyworm and rice bug were reported in moderate to traces. Case worm infestation and leaf folder were high in low lands under late sown crop in Kotama, Funga and Keshawahi area. Adoption of plant protection measures was noted to be very poor however. ITKs practices were commonly adopted by the farmers.

Panna: Three blocks were surveyed in Panna district at panicle initiation, grain filling and maturity stage. The rainfall was satisfactory and the distribution was proper; therefore, the rice area was increased tremendously this year in the district. The pulse area was to some extent replaced by rice in upland area due to good rains. However 10-15% area was unsown due to continuous rains in the month of July. The varieties like IR-36, IR 64, Parsanwasa, Chinnaur, IR 50 and hybrid rice were cultivated in irrigated conditions with good productivity. It was observed that hybrid rice cultivation is becoming very popular and farmers are applying sufficient dose of fertilizer ranging from 35-45 kg/ha and obtaining grain yield 60-70 q/ha under irrigated ecosystem. The most popular hybrids grown in the district were PA6111, PAC-832, PAC-807, Sonali, Reshma, RH-10, US312, Samrat US316, US-10 777,786, Poonam, Khusboo and Ganga Kaveri. The productivity was much below (2 to 2.5 t/ha) in rain fed area whereas, it was good (3 to 4 t/ha) in irrigated ecosystem. Major crop rotations were rice-wheat, rice-lentil Rice-gram, and rice-barley. Bore wells, canal and tank were the main sources of irrigation. Poor power supply was reported in the surveyed area which was a limiting factor for irrigation. The fertilizer application was found to be very poor in rice but moderate in rabi crops. The average fertilizer application in the district is 30 kg/ha which is very poor as compared to other parts of the state. It was observed that top dressing of urea only (20-25 kg/ha) was commonly practiced by the farmers in rice rather than basal application of phosphorus and potash. Shortage of urea was reported in the district. Khaira disease was also noticed in Devendra Nagar and Ajaygarh. The inputs *viz.* improved early maturing varieties seeds and plant protection devices were inadequate in the surveyed area. It was noticed that weed population was high in direct seeded rice and hand weeding was commonly practiced. A few farmers applied herbicides *viz.*, butachlor and Sathi for weed control. In regard to biotic stresses, brown spot, leaf blast, seed discoloration, sheath blight, leaf folder, case worm and gundhi bug were recorded in moderate

severity. It was also noted that the rice pests were not severe this year due to continuous rains in the month of September and October which was not conducive for the occurrence of pest and diseases. The farmers are demanding timely supply of seeds, equipment, proper power supply, good quality of fertilizers and special trainings on improved package of practices for increasing the rice production in the district.

Katni: Four blocks were surveyed under this programme. The survey was conducted during grain filling, dough and maturity stage. The onset of monsoon was on first week of June and there was good rain in the month of June and July; therefore, direct seeding was carried out in time in rainfed upland ecosystem. Farmers usually adopted direct seeding in the district in rain fed and irrigated ecosystem. Thus, approximate 90 to 95 % rice area was sown. However, progressive farmers have transplanted rice under irrigated ecosystem. Hybrids and scented rice like Basmati, Kalmoonch and Vishnubhog are also becoming popular. SRI cultivation in the district was found very low. It was also noticed that the area under hybrid rice is very low as compared to other surveyed area. The major cropping systems were Rice-wheat, Rice-gram and Rice-pea. The farmers are taking keen interest to grow pigeon pea intercropping with tomato and other vegetable cash crops like onion.

The major varieties of rice were Basmati, Dubaraj, Chhatri Dubaraj, Vishnubhog, IR-36, Karadhana, Dhaur, IR 64, Kranti, JR353 and Pusa Sugandha. Very few progressive farmers had grown hybrid rice Pro-Agro-6201, PA6444, Kranti, Sonam, JRH 4, JRH 5, Loknath, Mulayam-999, PAC 801 in Barahi block where assured irrigation was available. Due to Bansagar command area the irrigated area was tremendously increased and cropping intensity was increased in the district.

The fertilizer consumption was moderate 40-45 kg/ha. However, nitrogenous fertilizer urea was applied in rice in two split doses. FYM application was commonly practiced and nutritional status of the field was good due to adoption of organic resources. Weed infestation was noted to be moderate and hand weeding was only practiced for weed management. Equipment, irrigation, power supply, improved seeds and transfer of technology were the main requirements of farmers. However, the average yield of the district was moderate 30-35 q/ha. The economic status of the farmers was found to be good in the district. In regard to biotic stresses, leaf blast, brown spot, false smut, bacterial blight, seed discolouration, sheath blight, leaf folders, case worm, WBPH and rice bug were reported in moderate severity. Khaira disease was recorded in few pockets in the surveyed area. Adoption of plant protection measures was noted to be very poor, less than 15 % for the management of pests.

Prevalence of diseases and insect pests in Madhya Pradesh in Kharif 2011

District	Diseases						
	LB	BS	ShBl	BB	Khaira	FS	GD
Rewa	M	M	T	T	M	M	M
Satna	M	M	-	T	M	M	M
Sidhi	M	H	-	-	M	T	T
Shahdol	M	M	T	T	M	M	M
Panna	M	H	T	T	L	T	T
Katni	M	M	-	T	T	T	M
Umaria	M	M	T	T	M	T	M
Anooppur	M	M	T	T	T	M	M

District	Insect pests							
	WBPH	GLH	AW	CW	LF	SB	RB	Rat
Rewa	M	T	T	M	M	T	M	T
Satna	M	T	T	M	M	T	M	T
Sidhi	M	T	T	M	M	T	M	T
Shahdol	T	T	T	M	M	T	T	T
Panna	T	-	M	T	T	T	T	T
Katni	T	-	M	T	T	T	T	T
Umaria	T	T	T	M	M	T	T	T
Anooppur	M	-	T	M	M	T	T	T

MAHARASHTRA

Districts surveyed: Raigad, Ratnagiri, Sindhudurg and Thane

Particulars of survey:

Districts	Taluka	Villages
Raigad	Karjat, Panvel, Pen, Khalapur, Sudhagad pali, Alibag, Murud, Roha, Tala, Mangaon, Shrivardhan, Masala, Mahad, Poladpur and Uran	Lakharan, Vadavli, Damad, Wadavli, Palaspe, Abiwali, Wakrul, Ransai, Naringi, Swali, Tmbati, Pali, Rabgaon, Chaul, Poyanad, Shahabaj, Malang, Borli, Khamb, chille, Tala, Indapur, Ratwad, Koshimbale, talashet, ghotwal, Nagroli, Vidhvali, Hareshwar, Nigadi, Nanavde, Pachhad, Temghar, Mahad, Poladpur Kasheli, Chirner and Vidhane.
Ratnagiri	Mandangad, Dapoli, Khed, Chiplun, Guhaghar, Sangameshwar, Ratnagiri, Lanja and Rajapur	Nigadi, Tide, dabhat, Gimawane, Kandvali, Palgad, Amadas, Songaon, Lote, Durgawadi, Donavali, Alore, Velamb, Pachri, Guhaghar, Kondye, Dhamni, Kase, Ganeshgad, Navre, Shirgaon, Bhavane, Asbhe, Lanja, Kumbharwadi and Rajapur.
Sindhudurg	Kudad, Kankawali, Malvan, Sawantwadi, Deogad, Vaibhavwadi, Dodamarga and Vengurla	Humarmal, Zarap, Bibavne, Halawal, Chinchavali, Natal, Polsamb, Katta, Gothane, Kunkeri, Malgaon, Banda, Sahudale, Deogad, Funasgaon, Ghanegadwadi, Kokisare, Polye, Zoebazar, Bedhasi, Velore, Saubachiwadi and Hodavde.
Thane	Murbad, Shahapur, Bhivandi, Wada, Vikramgad, Jawahar, Mokhada, Palghar, Talasari, Dahanu, Vasai, Kalyan and Ambarnath	Inde, Hedavali, Talavali, Shendharun, Dhile, Khutgher, Mehili, Dugad, Vadavali, Lakhampur, Kharavali, Hamrapur, Khudedh, Dadade, Kondgaon, Sansun, Katari, Chambharshet, Ose,gonde- budruk, Adoshi, Duktan, Navali, Savroli, Sutrakar, Charoti, Kosbad, Chari, Devatale, Satpada, Agashi, Titavala, Yeve, Mulgaon and Sonivali.

Widely grown rice varieties

Districts	Varieties
Raigad	HYVs: IR 64, G 17, Swarna, KJT-3, KJT-7, MTU-1010, KJT-184, Jaya, Panvel-1, Panvel-3, G-4, HMT Sona, Neelam, atna, Mahsuri, Komal, Jaishri Ram, Karjat-4, Rupali, Karjat-5, Sonam, Karjat-6, Meghraj, PKV Shriram, Minakshi, Karjat-2 and G-11; Hybrids: Sahyadri 4, Sahyadri-3, Komal, PA-6444 and Ankur-46; Local: Kalamb, EK-70 and Mhadi
Ratnagiri	HYVs: Rupali, Karjat-2, Samba Mahsuri, Jaya, Ankur Sonam, Ratna, RPR-14, Karjat-3, Sairam, Karjat-2, HMT Sona, Gujarat-17, Karjat-184, Ratnagiri-5 and Swarna; Hybrids: Sahyadri, PA-6444 and Sahyadri-2; Local: Patni
Sindhudurg	HYVs: Komal, Punam, Sonam, Ratnagiri-24, Pusa Basmati 1, Jaya, Sairam, Radha, MTU-1010, Mohini and Swarna; Hybrids: PA-6444, PA

	6201, Sahyadri and Sahyadri-4; Local: Valai, Bela, Patni and Kothimbira
Thane	HYVs: Karjat-5, Gujarat-11, Karjat-2, Sairam, Gujarat-17, Jaya, Gujarat-4, Palghar-1, Palghar-2, Rupali, Ratna, Karjat-3, G-4, Karjat-184, Karjat-7, Rupali, Gujarat-11, Karjat-6, Sonam, Karjat-2 and HMT Sona; Hybrids: Sahyadri-3, PA-6444 and Sahyadri; Local: Wada Kolam, Shahapur Local, Mokhada Zinni and Surti Kolam;

Rainy days(R D) and Rainfall (R F) data of the four districts surveyed

District		June	July	Aug.	Sept.	Oct.	Nov.	Total
Thane	R D	21	25	23	13	6	-	89
	RF	204.4	1149.0	623.2	305.8	44.2		2331.0
Raigad	R D	24	27	30	15	13	0	109
	RF	691.4	1446.0	1134.9	869.2	278.8	0	4420.3
Ratnagiri	R D	23	28	26	16	5	1	99
	RF	1023.3	1736.1	950.7	439.0	101.5	6.2	4256.8
Sindhudurg	R D	-	-	-	-	-	-	123
	RF	-	-	-	-	-	-	5096.5

Production oriented survey was conducted during Kharif 2011, when the rice crop was at dough to maturity stage in Thane, Raigad, Ratnagiri and Sindhudurga districts of the Konkan region of Maharashtra. The regular monsoon were commenced on last week of May 2011. In general the weather conditions were ideal for the growth of rice crop. Rice is grown in rainfed condition as a main crop in the region due to heavy rainfall during the *Kharif* season. The prevailing crop rotation in the region were Rice-pulses, Rice-fallow, Rice-Groundnut, Rice-Rice, Rice-Vegetables, were the most common cropping pattern adopted by the farmers of the region. Most of the farmers in the region grow high yielding varieties viz. Karjat-3, Karjat-2, Karjat-184, Karjat-5, Karjat-7, Jaya, Ratnagiri, Ratnagiri711, IR 64, Palghar1, Gujrath-4 Gujrath 11, Gujrath-17, Sonam, Sairam, Rupali, Swarna, HTM Sona. The varieties viz. Panvel-2, Panvel-3 & Jaya in saline soil. The farmers also grow local cultivar viz. Ek-70, Zinnia, Bhadas, Patani, Valai, Kothimbira, Bela, Wada kolam, Mokhada kolam, Shahapur kolam etc. mainly for their home consumption. The maximum area of hybrid rice crop under the sindhudurga district. The hybrid varieties grown in the region were Sahyadri, Sahyadry-3, Sahyadri 4, Sahyadri-2, PA 6444, P 6201 and hybrid from Ankur Company. Most of the farmers in the Konkan region are having small land holding. As per the report of Maharashtra Sate Agril department (2010-2011) the seed replacement ratio is 30 per cent. The farmers mainly use their own seed, they also depend for seed on Government agencies panchayat committee, ZP, Agril. Department, Agril. University, Agril. Research Stations. They also obtained seeds from private Agro Service Centre, and private seed supplying agencies. Around Karjat the farmers have their own seed supplying group. Generally farmers use higher seed rate for their local cultivar (80 kg/ha), 40 kg/ha seeds for high yielding varieties and 20 kg/ha for hybrid varieties. Farmers aware of importance of organic manure and FYM. But it is not available in adequate quantity. The cost of FYM is also high therefore many farmers avoid to use it on large and recommended quantity. Many farmers use FYM only at the time of nursery bed preparation. Most of the farmers were using mixture fertilizer Suphala (15: 15:15) and some of them use Godavari (14:35:14) none of them uses soil amendments. Some farmers also using the urea + DAP briquette.

Weeds in nursery are a problem faced by the farmers everywhere in the region. In South Konkan especially in Ratnagiri and Sindhudurg district. There is practice of 'Rabø' followed by most of the farmers. 'Rabø' is the burning of nursery area with organic waste and thin layer of soil before sowing in the month of May. In most of the area in Raigad and Thane farmers sow germinated seed on puddle soil to manage low weed in main field. Some common weeds observed in the region are *Echinochloa crusgallis*, *E. colonum*, *Cynalon dactilon*, *Cyperus rofendus*, *C. irria*, *Isailema globusa*, *Digitearea arvensis*, *Alternatra triandra*, *Cylosia argentina*. Only few progressive farmers use selective weedicide for weed management. Few farmers in the region demands for the training about the use of weedicides for weed management in directly sown rice by seed drill.

There were heavy incidence of bacterial leaf blight at maximum tillering stage in Thane and Raigad district resulted in the losses in grain yield in this area. The nursery was burn due to leaf blast was reported in some area in Chiplun taluka of Ratnagiri district on varieties Swarna, Gujarat4, Gujarat-11, Gujarat -17 and Rupali. Heavy incidence of yellow stem borer was observed in Murbad and Shahapur taluka of Thane district (up to 30%) on late variety Sairam.

- Farmers want hybrid seeds at subsidy rates.
- Due to shortage of laborers the demands for transplanters, harvesters, threshers be made available on rent basis on subsidy rate.
- They want fertilizers, pesticides weedicides at proper time at subsidy rates.
- They needs training on use of weedicides in rice fields.
- Crop loans at low interest rate.
- Drum seeder & Cono weeder should be available on low cost.
- Sprayer, Dusters, Paddle thresher should be available on low cost.
- Farmers demands for forecasting of pest and disease incidence on mobile.

District wise information:

Raigad: Thrity eight villages in 15 talukas were covered for production oriented survey in this district. The rice fields were in maturity stage at the time of survey. Most of the farmers contacted were marginal or sub-marginal. The regular monsoon commenced on last week of May 2011. The climatic conditions were ideal for rice cultivation in the region. The commonly grown rice varieties are presented in the table. The common crop rotations followed by the farmers were rice-pulses, rice-vegetables, rice-rice and rice-fallow. Few farmers also followed rice-sweet corn, rice-water melon and rice-ground nut. The average rice yield in the district ranged from 3100-4200 kg/ha in varieties like Ratna, Swarna, KJT-184, HMT Sona, Mahsuri, Komal, Sonam, MTU-1010, Rupali, Ratnagiri-2 and Indrayani; 3800-4850 kg/ha in KJT-3, KJT-5 and KJT-7; 3600-5100 kg/ha in Jaya and 4800-5500 kg/ha in case hybrids like Sahyadri, Sahyadri-2, Sahyadri-4 and KRH-2. The yield was low in case of local varieties like Zinia (about 2800 kg/ha). Most of the sowings were done between 3rd week of May to 3rd week of June while transplanting was done between 3rd week of June to 3rd week of July. Most of the farmers used un-germinated seeds and the seed rate was 40-60 kg/ha in HYVs, 20 kg/ha in case of hybrids and 60-80 kg/ha in case of local varieties. Some of the farmers applied organic manure/FYM/poultry manure and urea in the nursery. Burning of organic matter and a thin layer of soil at the nursery area, a method called 'RABø' was followed by some of the farmers for the management of weeds. In the main fields, fertilizers were applied @ 15-45 kg N/ha, 10-40 kg P₂O₅/ha and 10-40 kg K₂O/ha as basal

and 20-60 kg N/ha as top dressing (2 splits). The nutrients were applied main through urea and suphala (15:15:15) or urea and Godavari. Majority of the farmers followed random method of transplanting and only some followed line transplanting. Very few also followed direct sowing. The average plant density was 24-33 hills/m². The intensity of weeds was negligible in about 50% of the places and in another 50% places it was low to medium. The common weeds were *Echinochloa crusgalli*, *E. colona*, *Cynalon dactilon*, *Cyperus rotundus*, *C. iria*, *Iseilema globosa*, *Digitaria arvensis*, *Ischemum rugosum*, *Alternanthera triandra*, *Celosia argentina* and *Euphorbia hirta*. Herbicide application was less and some of the farmers applied weedicides like pendimethaline (5 ml/litre), Sathi @ 5 ml/kg of urea (applied along with urea), oxydygril (2 ml/litre) and Pontachlor (5 ml/litre) for the management of weeds. Among the inputs, equipments, drying and storage facilities were inadequate in most of the places while water and power were adequate in some places. Among the diseases, bacterial blight was wide spread in severe intensity. In general the KJT varieties recorded comparatively less BB intensity. Among the different insect pests, stem borer, leaf folder, BPH, WBPH, case worm, GLH and rice bugs were recorded in low intensities. Some of the farmers applied phorate 10 G (10 kg/ha) for stem borer, monocrotophos 36% (700 ml/ha) for case worm and GLH, malathion dust 5% (20 kg/ha) for rice bugs, GLH and leaf folder and malathion 50% (1000 ml/ha) for GLH.

Ratnagiri: Production oriented survey was conducted in 26 villages (in 9 talucas) in this district when the rice crops were in maturity stage. Most of the farmers interviewed were marginal or sub-marginal. In about 80% of the places visited, the climate was normal but in about 20% of the places, the climate was not favourable as there were records of excess rainfall at the time of crop maturity/harvest. The commonly grown rice varieties in the district are presented in the table. The different crop rotation practices followed by the farmers were rice-pulses (like dolichos bean), rice-vegetables, rice-fallow, rice-groundnut, rice-flower and rice-cowpea. The average rice yield in the district ranged from 3200-4000 kg/ha in case of Ratnagiri-2, Karjat-2, Karjat-6, Jaya, Swarna, KJT-189 and Gujarat-11; 2900-4200 kg/ha in Ratna, 4500 kg/ha in KJT-5, 4500-7000 kg/ha in Sahyadri and 2700-3000 kg/ha in case of local varieties like Patni. Most of sowings were done in between last week of May to 3rd week of June and transplanting was done in between last week of June to 2nd week of July. Farmers used un-germinated seeds for sowing. The average seed rate was about 40-60 kg/ha in HYVs, 20 kg/ha in hybrids and 60-80 kg/ha in local varieties. Many farmers used -RABØ method for weed management in nursery. Many farmers applied FYM/organic manure and urea in the nursery. In the main fields, fertilizers were applied @ 10-40 kg N/ha, 10-40 kg P₂O₅/ha and 10-40 kg K₂O/ha as basal and 20-50 kg N/ha as top dressing (2 splits). The nutrients were applied main through urea and suphala (15:15:15). Random transplanting was common practice among the farmers and only 20% farmers adopted line transplanting. The average plant population varied from 24-33 hills/m². Some of the common weeds were *Echinochloa* spp., *Cyperus rotundus*, *Iseilaema globosa* and *Cynodon dactylon*. The weed intensity was negligible. None of the farmers applied any weedicides. In majority of the places, most of the inputs were inadequate. Some of the common needs of the farmers were availability of seeds and fertilizers at proper time and at subsidized rates, availability of seeds of HYVs and hybrids, implements like harvester, thresher and cono weeder at low cost or as a rent basis, crop loan, crop insurance, subsidy on inputs, mobile intimation for the control of pests and diseases. Some of the farmers also expressed that they need training on weed management and hybrid rice seed production. Most of the biotic constraints like blast, neck blast and bacterial blight among diseases and stem borer, leaf folder and case worm were recorded in low intensities. Few farmers applied phorate 10 G (10 kg/ha) for stem borer,

monocrotophos 36% (700 ml/ha) for case worm, malathion dust 5% (20 kg/ha) for rice bugs and leaf folder, GLH and leaf folder and malathion 50% (1000 ml/ha) for leaf folder.

Sindhudurg: Twenty three villages in 8 talucas were covered for production oriented survey. The rice fields were in maturity stage at the time of survey. Most of the farmers interviewed were marginal or sub-marginal and about 10% of the farmers were progressive. The general weather conditions were normal for rice cultivation. The commonly cultivated rice varieties are presented in the table. The common crop rotation practices followed by the farmers were rice-vegetables, rice-pulses, rice-fallow and rice-groundnut. The average rice yield in the district ranged from 3700-4500 kg/ha in varieties like Komal, Jaya, KJT-2, KJT-7, Rupali, Sonam and Swarna; 4200-6000 kg/ha in hybrids like Sahyadri and 2800-3500 kg/ha in local varieties like Valai, Bela and Patnai. Sowings were completed from 2nd week of May to last week of May while transplanting was done from 2nd week of June to last week of June. The average seed rate was 35-60 kg/ha in HYVs, 20 kg/ha in hybrids and 60-85 kg/ha in local varieties. Many farmers applied FYM/organic manure and urea in the nursery. In the main fields, fertilizers were applied @ 25-50 kg N/ha, 10-50 kg P₂O₅/ha and 10-50 kg K₂O/ha as basal and 25-50 kg N/ha as top dressing (2 splits). The nutrients were applied main through urea and suphala (15:15:15). Transplanting was random in majority cases and about 25% farmers followed line transplanting. The average plant density was 22-30 hills/m². The intensity of weeds was negligible in about 50% of the places and in another 50% places, it was low to medium. The common weeds were *Echinochloa crusgalli*, *E. colona*, *Erragrostis* spp., *Digitaria sanguinalis*, *Iseilema globosa*, *Cynodon dactylon* and *Celosia* spp. Weedicide application was practically nil. Most of the inputs except seeds and water were inadequate in majority of the places. Some of the common needs of the farmers were power tiller, harvester, paddy thresher and sprayers on rent basis, seeds of HYVs at reduced price, availability of inputs in proper time. Some of the farmers also expressed training on hybrid rice seed production, crop loan and crop insurance, books on improved methods of rice cultivation in local languages and information on pests and diseases of rice and their management on mobile. Most of the biotic constraints were in low intensities. Some of the farmers applied phorate 10G (10 kg/ha) for stem borer, monocrotophos (700 ml/ha) for GLH and case worm, malathion 50% (1000 ml/ha) for BPH, rice bugs and GLH, Blitox-50 (3 g/litre) for bacterial blight, propiconazole (Tilt) (1 ml/litre) for false smut and copper oxy chloride (2-2.5 g/litre) for blast and neck blast.

Thane: Survey was conducted in 35 villages in 13 talucas in this district when rice crops were in maturity stage. Almost 90% of the farmers contacted were marginal or sub-marginal. The climatic conditions were normal for rice cultivation. The common crop rotation practices followed by the farmers were rice-vegetables, rice-pulses, rice-fallow, rice groundnut, rice-flower and rice-watermelon. The commonly grown rice varieties are presented in the table. The average rice yield in the district ranged from 3000-4600 kg/ha in varieties like Karjat-5, Karjat-6, Jaya, Karjat-7, Ratna, Palghar-2, Palghar-1, Karjat-2, Rupali and Mahsuri and 2700-3200 kg/ha in local varieties like Zinnia and Shahpur local. Most of the sowings were done in between 1st to 2nd week of June and transplanting in between last week of June to 2nd week of July. Farmers used un-germinated seeds for sowing and the average seed rate was 40-45 kg/ha in HYVs, 20 kg in hybrids and 50-80 kg/ha in local varieties. Most of the farmers applied FYM/poultry/organic manure in the nursery beds. However, the availability of FYM was a problem. In the main fields, fertilizers were applied @ 10-50 kg N/ha, 10-50 kg P₂O₅/ha and 10-50 kg K₂O/ha as basal and 10-40 kg N/ha as top dressing (2 splits). The nutrients were applied main through urea and suphala (15:15:15). Method of transplanting was random and only about 15% farmers followed line transplanting. The average plant

density was 20-33 hills/m². In most of the places, the intensity of weeds was negligible. The common weeds encountered were *Echinochloa crusgalli*, *E. colona*, *Cyperus rotundus*, *Euphorbia hirta*, *Alternanthera traindra* and *Celosia argentina*. The application of herbicides was minimal and only few farmers applied herbicides like pedimethaline and oxydiagryl. Among the inputs, equipments, drying and storage facilities were inadequate in many places. The common sources of inputs were panchayat samitee and Agro service centre. Some of the needs of the farmers were availability of seeds and fertilizers at proper time, power harvester at subsidized rate or on rent, inputs should be available at reduced rate, crop loan and crop insurance. Some of the farmers expressed that they need training on pest management, weed control, organic farming and free information about pests and diseases on mobile. Most of the biotic constraints were in low intensities. Heavy incidence of yellow stem borer was observed in Murbad and Shahapur taluka of Thane district (up to 30%) on late variety Sairam. Some of the farmers applied phorate 10G (10 kg/ha) for stem borer, monocrotophos 36% (700 ml/ha) for GLH and case worm, malathion 5% dust (20 kg/ha) for rice bugs and copper oxy-chloride (2 g/litre) for blast.

Prevalence of diseases and insect pests in Maharashtra during 2011, Kharif

Districts	Diseases				
	BI	NBI	ShBI	FS	BB
Raigad				L	S
Ratnagiri	L	L			L-M
Sindhudurg	L	L	L	L	L
Thane	L-M	L			M-S

Districts	Insect pests						
	SB	LF	BPH	WBPH	CW	GLH	RB
Raigad	L (1-3%)	L (2-2%)	L (2%)	L (2%)	L (1-3%)	L (1-3%)	L (1-3%)
Ratnagiri	L (1-2%)	L (1-3%)			L (1-3%)		
Sindhudurg	L (2-3%)	L (1%)	L (1%)		L (1-3%)	L (1-2%)	L (1-3%)
Thane	L(1-3%; 30%)	L(1%)	L(.2-2%)	S	L(1-3%)	L(1-2%)	L(1-3%)

PUDUCHERRY-1

District Surveyed: *Puducherry, Yanam and Mahe*

Particulars of survey

District	Villages Surveyed
Puducherry	Thirukanchi, Keezhagraharam, Perungalur, Embalam, Karikalampakkam, Nathamedu, Ariyur, Kizhur, Sivaranthagam, Anandapuram, Sellipet, Sorapet, Vinayagampet, Vambupet.
Yanam	France Thippa, Kanakalpet, Mettacur and Darial Thippa
Mahe	Palloor, Pandakkal, Chalakkara, Cherukallayi and Chembra

Widely prevalent rice varieties

District	Varieties
Puducherry	CR 1009, I.White Ponni, PY-7, TRY-1, ADT-39, ASD-18, ASD 19, ADT 43, ADT 45, TRY-2, BPT 5204.
Yanam	Swarna (MTU-7029), Samba Mahsuri (BPT 5204), Cotton dora Sannalu (MTU-1010), Vijetha (MTU 1001), Bondalu (MTU 3626).
Mahe	Uma(MO-16), Thampuran Kaima, Rangoon Kaima, Jothi, Athira.

Production Oriented Survey was conducted in three regions of the Union Territory of Puducherry viz., Puducherry and Yanam and Mahe Regions. Puducherry region is situated about 160 km south of Chennai. Yanam region is situated on the East Coast of Andhra Pradesh bounded on all sides by the East Godavari District at a distance of 870 kms from Puducherry. Mahe region is situated on the Malabar Coast, bounded on the west by the Arabian Sea, on the other sides by a stretch of calcareous hills of medium height and at a distance of 626 kms from Puducherry. The Popular rice varieties in Puducherry Region are CR 1009, I.White Ponni, ADT 39 and ADT 43. In Yanam Region, Swarna, Cotton dora Sannalu, Samba Mahsuri and Bondalu are the rice varieties grown while at Mahe rice varieties like Uma, Thampuran Kaima, Jothi and Athira are popular. The main cropping sequences in these regions were rice-rice-rice, rice-rice-pulses and rice (Single crop) respectively. Canals, wells, tanks and filter points were the main sources of irrigation. Among the inputs, seeds, pesticides and fertilizers were adequate. Machineries like combine harvester and transplanter were in use in Puducherry region while the same were not in use in Yanam and Mahe regions. But, the same shall be put into use if awareness is created among the farmers by means of demonstrations and machinery availability at Yanam Region. Drying and storage facilities were inadequate. The use of phosphatic and potassic fertilizers was satisfactory but some farmers applied excess nitrogenous fertilizers. Straight fertilizers, DAP, 17:17:17, 18:18, 20:20 and 28:28 were used by majority of farmers. Among diseases, sheath rot, sheath blight and BLB were low to moderate and other diseases were found in low intensities. Among insect pests, leaf folder and stem borer were observed in low to moderate in these Regions. Plant protection measures were not carried out in Mahe region.

Puducherry: Production Oriented Survey was conducted in fourteen villages in this region. Rice is grown in an area of 14,203 hectares with an average yield of 5.8 tonnes/hectare. Climatic conditions were normal during the year. The annual rainfall was 1525.6 mm, the maximum of which was during October & November 2011. Rice varieties like I.White Ponni, CR 1009, ADT 39 and ADT 43 were grown in this tract with irrigation water from bore wells. Direct seeding was practiced in some areas using drum seeder. SRI method of cultivation with wider spacing of 22.5 x 22.5 cm, planting of young and single seedling (14

days), using cono weeder was practiced in the region. Machineries like transplanter, harvester etc. were in use by the farmers. Rice-Rice-Rice is the cropping system followed in the region. Farmers generally used a seed rate of 40 kg/ha in conventional method and 8-10 kg/ha in SRI method of cultivation. Some farmers have registered themselves as seed growers with the Seed Certification Agency and produced foundation/certified seeds. A few farmers only applied the recommended level of fertiliser dosage i.e. 150:60:60 kg NPK/ha. In general, farmers used the NPK fertilizers in the main field at the rate of 30-50 kg N/ha, 20-40 kg P₂O₅/ha, 20-50 kg K₂O/ha as basal and 80-120 kg N/ha, 10-20 kg K₂O/ha as top dressings. Common weeds in the rice fields were *Marsilia quadirfoliata*, *Echinochloa crusgalli* and *Cyperus* spp. Hand weeding was commonly followed. Herbicides like butachlor @ 2.5 lit/ha were used for weed control. Inputs like seeds, fertilizers, pesticides and plant protection equipments were available. The transplanter, combine harvester and thresher were used in many places. Occurrence of bacterial leaf blight and sheath blight was noticed at low to medium level in this region and farmers applied carbendazim and mancozeb for disease control. Farmers also used bio-pesticide *Pseudomonas fluorescens* for disease control. Fresh cow dung spray @ 20% was practiced for disease control.

Among the insect pests, stem borer and leaf folder was recorded at low to medium level of incidence across the region. The other pest population found were green leaf hopper and thrips. Farmers used chlorpyrifos, monocrotophos and profenophos for insect control. Farmers were adopting integrated pest management methods. More than 50% farmers applied only neem pesticides. Farmers also adopt bio agents viz., *Trichogramma chilonis* and *Trichogramma japonicum* to control insect pests viz., leaf folder and stem borer respectively. Power sprayer was mostly used by the farmers for spraying plant protection chemicals. Proper facilities for drying and storage were not available in many villages. Shortage of farm labourers is prevailing.

The major requirements of farmers were:

- Government to fix procurement price for Paddy
- Availability of seeds, fertilizers, chemicals and bioagents in time
- Government to hire planter, harvester etc. through Uzhavar Udaviagams
- Tractor available in the Farmer's Society to be kept in working condition
- Provide the inputs and the subsidy portion in time
- Government to procure the produce from the farmers through Market Committee / Corporation
- Crop insurance to be implemented for individual farmer and not for a specified area or locality
- Government to arrange for fencing the paddy fields to avoid cattle grazing
- Agricultural loan to be disbursed by the bank by reducing the formalities

Yanam: The survey was conducted from 13th-15th December 2011 covering four villages of the region. In Yanam region rice is being cultivated in an area of about 270 hectares in Kharif, 250 hectares in rabi and 90 hectares as dry paddy. The predominant rice varieties grown in the region were Swarna (MTU-7029) and Samba Mahsuri (BPT 5204), Cottondora Sannalu (MTU-1010), Vijetha (MTU 1001), Bondalu (MTU 3626). The weather conditions were normal with the annual rainfall of 899.4 mm, the maximum during October 2011. The crop yield were normal (3.5 to 4.5 tonnes/ha) compared to the last season (1.9 to 2.5 tonnes/ha). Private agencies played major role in supply of inputs like seeds, fertilizers and pesticides. Canal irrigation was the main source of water to the crop. The main crop rotation in the region was rice-rice and rice-rice-pulse. Fertiliser application consisted of 80 kg N/ha, 40 kg P₂O₅/ha and 40 kg K₂O/ha. A very few farmers applied straight fertilizers and majority of them applied complex fertilizers as top dressing. The commonly used fertilizers were 28:28 and 20:20. Some farmers used farm yard manure. The common weeds were

Echinochloa colona, *E. crusgalli*, *Cyperus rotundus* and *Marsilia quadrifolia*. Farmers used herbicides like butachlor and topstar (oxadiargyl). The weedicide Erase was mostly used under direct sown condition. Most of the farmers followed hand weeding. Among the diseases, bacterial leaf blight and sheath blight were observed in moderate to severe form. Bacterial leaf blight was severe on BPT-5204 and MTU 3626, whereas it is low in MTU 7029 (Swarna) and early sown crop affected more rather than late sown. Stem borer and leaf folder incidence was low to moderate while brown hopper incidence was low. Farmers applied pesticides like hexaconazole (2 ml/lit), validamycin (2 ml/lit) for sheath blight; profenophos (2 ml/lit), acephate, cartap hydrochloride (4 G and 50 SP) and monocrotophos (1.6 ml/lit) for stem borer control while acephate (1.5 g/lit), monocrotophos (2.2 ml/lit), fenvalrate and buprofezin (Applaud) for brown plant hopper. Hand sprayers as well as power sprayers were used for application of insecticides. Mixing indiscriminately the fungicides and insecticides was the most common practice adopted by the farmers. The rate of adoption of plant protection measures was almost the maximum. Machineries like drum seeder, transplanters, combine harvester and threshers are not available in this region. There was acute shortage of farm labour during harvesting and heaping period. Threshing was done on roads. Drying and storage facilities were inadequate.

The major requirements of farmers were:

- Availability of agricultural labourers
- Availability of tractor, mechanised transplanter and harvester
- Common threshing and drying yards
- Bank and Department Coordination
- Implementation of crop insurance scheme to compensate the loss caused by natural calamities
- Preventing the use of irrigation canals as drainage canals

Mahe: The survey was conducted on 12th and 13th October 2011 covering five villages of the region. Rice is being cultivated in small holdings in a total extent of 15 to 20 hectares, for domestic consumption. The village Pandakkal in Mahe region was once a Paddy belt and now because of crop diversification, paddy cultivation has slowly decreased and has no scope for survey in future. The average annual rainfall is 3211.6 mm, the maximum during the month of June 2011 and mainly the showers received by South West Monsoon. The rice varieties grown in the region were Uma (MO-16), Rangoon Kaima, Thampuram Kaima, Jothi and Athira and the crop is irrigated through wells. Both direct seeding and line sowing was practiced. Farmers used seeds from their own source. The main weeds found were *Tridax procumbance*, *Echinochloa sp.*, *Digitaria sp.*, *Eupherbia sp.*, Diseases like brown spot, false smut and BLB were in low to moderate intensities. Insect pests like stem borer and leaf folder were also of the same intensity. Plant protection activities adopted by the farmers were not enough to control weeds, pests and diseases. Farmers applied farm yard manure alone as basal and applied 18:18:18 complex fertilizers as top dressing.

The major requirements of the farmers were:

- Government to promote rice growing farmers through attractive schemes as rice cultivation is slowly vanishing
- Special programmes for promotion of organic farming

Prevalence of diseases and insect pests in Puducherry -1.

District	Diseases						Insect Pests				
	BI	ShR	ShBI	LS	BLB	RTD	LF	SB	GLH	BPH	Thr
Puducherry	L	L-M	-	L	L-M	L	L-M	L-M	L	L	L
Yanam	-	L	M-S	L	M	-	L-M	L-M	-	L-M	-
Mahe	-	-	L	-	L-M	-	L-M	L-M	-	-	-

PUDUCHERRY-2District surveyed: *Karaikal*

District	Villages surveyed
Karaikal	Agramankudy, Agalankannu, Madur, Muppaithankudy, Thennankudy, Sethur, Serumavilangai, Valathamangalam, Thirunallar, Thenpedagai, Pandaravadai, Ambakarathur, Neravy, Keezamanai, Kakamozhi, Uoziapathu, Sellur, Kumarakudy, Nallambal, Nallazhandore, Neravy, Thirumalai Rayan Pattinam, Kottapackam, Kannapore Melakasakudy, Pettai, Vizhidiyur, Thiruvettakudy, KottucherryMedu, Keezhekasakudy, Surakudy, Mathalangkudy, Nedungadu, Nallathore, Kottucherry, Vadamattam, Thalatheru and Varichikudy (38 villages)

In Karaikal district, during the year of report (2011) the area under *Kuruvai* crop was recorded as 1100 ha. The average yield of *Kuruvai* rice crop was recorded as 5 tonnes/ha whereas the area under *Samba* cultivation has been recorded as 4000 ha (out of which 10 per cent of the area is under direct sowing) with an expected average yield of about 5.0 tonnes/ha. The *Thalady* crop was raised in an area of 1200 ha utilising the bore wells/ filter point wells in the villages of Thirunallar and Nedungadu communes of Karaikal District. In order to alleviate the Cauvery water problem, Government of Puducherry has installed as many as 70 bore wells (Deep and Shallow) spread all over Karaikal District to raise *Kuruvai* crop. Considering the importance of intensive rice cultivation with uncertainty or less quantum of Cauvery water received, an intensive production oriented survey covering thirty eight villages of Karaikal district has been carried out during 2011. During the Production Oriented Survey 2011 about 45 farmers belonging to different categories (small, marginal and big farmers) hailing from thirty eight villages of Karaikal District were personally interviewed by the team members on different dates (August 2011– December 2011).

The rice varieties TKM 9, ADT 37 and ADT 43 were predominantly used during *Kuruvai* Whereas Improved White Ponni, ADT 38, ADT 39, Savitri, BPT 5204, CO46 and KKL(R) 1 (a promising *Samba* variety released from PAJANCOA &RI, Karaikal) are the major rice varieties grown during *Samba* season (August-January). Among these varieties, Savitri, BPT 5204, Improved White Ponni and ADT 38 accounts about half of the cultivated area. The above said varieties were also cultivated during *Thaladi* (October-January) depending upon the irrigation source (Bore well areas). In some of the *Kuruvai* areas, due to continuous exploitation of underground water and sea water intrusion, the EC (electrical conductivity) and pH of the irrigation water were found to increase which inturn affects the survival of rice plants especially in villages like Sellur, Muppaithankudy, Madur, Sethur, Nallambal, Nellazhandour, Kannapore and Ambagarathore etc ultimately affecting the yield of *Kuruvai* crop.

The prevailing cropping pattern in this region is Rice-Pulse, Rice-Rice-Pulse. In few areas, farmers are going for Rice-Cotton cropping system wherever there is assured water source of filter point wells/deep borewells. Most of the farmers are using the seeds purchased from Pondicherry Agro Service and Industries Corporation (PASIC) Ltd, a public sector undertaking of U.T of Puducherry, and about 50% of the farmers are using their own saved seed.

During *Kuruvai* season, the incidence of leaf folder and stem borer was found @ 20% and 40% respectively. During *Samba*, stem borer and leaf folder caused the damage to the

extent of 12 and 25% respectively irrespective of variety screened. In this season, there was a heavy incidence of stem borer and moderate incidence of leaf folder, GLH, and ear head bug on the varieties like ADT 38, ADT 39, BPT 5204, Savithri and White Ponni. Most of the Samba nurseries were found to be infested with moderate level of thrips. Hence, suitable management practices has been submitted to the extension wing for immediate adoption by the farmers. In general, pesticides like profenophos 50EC @ 400ml/ac chlorpyriphos 20EC @ 400 ml/ac and quinalphos 25% @ 400ml/ac were commonly used to bring down the population of leaf folder incidence below alarming level. Profenophos 50EC, cartap hydrochloride 4% G & 40 SL, imidacloprid 17.8 SL, acephate 75 SP, fipronil 5%SC and imidacloprid 70% WS are the predominant pesticide used by different categories of farmers to combat rice pests without ascertaining the nature of pests. Heavy rat damage to the Samba crop was noticed during the period of report. The various control measures adopted by the farmers are poison baiting, Thanjavur bow trap and planting small sticks tied with white polythene sheets etc.

Rice diseases like bacterial leaf blight (25-30% infection), blast, brown spot, sheath blight, sheath rot, false smut and grain discolouration were noticed during Samba season especially in BPT 5204, Savitri, ADT 38, ADT 39 and Improved White Ponni. Fungicides like Bavistin, mancozeb, propiconazole and Kocide (for BLB control) are common fungicides used in this district for control of various rice diseases. False smut was also noticed (15% incidence) in some of the location like Ambagarathore, Agramankudy, Kottapackam, Melakasakudy, Madur, Pettai, Sethur Vizhidiyour, Thiruvettakudy villages on varieties viz., Improved White Ponni, BPT 5204, ADT 38, CO 43 and CR1009 .

In general, grasses and sedges were the dominant weed flora of this region. Among the grasses, *Echinochloa crusgalli* was found to be the dominant; *Cyperus irria* was found to be the most problematic sedge weed. In Broad leaved weeds *Eclipta alba* and *Marsilia quadrifoliata* are the dominant weed flora found in the farmers' field. Mostly hand weeding was followed twice on 25th and 45th day after transplanting.

HIGHLIGHTS OF POS 2011 – KARAIKAL DISTRICT

- ❖ The high yielding varieties like ADT 43, and ADT 37 during Kuruvai and high yielding varieties like BPT 5204, Savitri, ADT 38, CO-46, KKL-1 and Improved White Ponni were grown in more area during *Samba (Rabi)* season utilising Cauvery water.
- ❖ Heavy incidence of Bacterial leaf blight (30-40%) was noticed on cultivars ADT 43, TKM 9, BPT 5204, CR 1009, ADT 38 and ADT 39 in most of the villages due to excess application of N as top dose and the conducive environmental condition noticed during the cropping season.
- ❖ Use of bio-control agents like *Pseudomonas fluorescens* as soil application and as foliar spray (0.5%) is getting importance in some of the villages surveyed
- ❖ Use of mechanised transplanter is gaining momentum in most of the villages surveyed due to acute labour shortage. In some of the villages surveyed like Nedungadu, contract was entered with M/S Tegra of Syngenta Pvt Ltd has been noticed for Mechanical transplanting.
- ❖ Use of harvester-cum-thresher is gaining momentum among the various categories of farmers since the above facility was extended by the Department of Agriculture on hire basis.

- ❖ The use of various natural products like fresh cowdung extract (20%) and Neem products like Neem oil (3%), NSKE@ 5% and Neem cake are being adopted by most of the farmers who are interested in organic farming.
- ❖ Drainage Problem is noticed due to conversion of cultivable land for non Agricultural purposes viz., real estate business.

Urgent needs of the farmer

- ❖ Special programmes for adopting SRI techniques
- ❖ Government legislation to restrict the conversion of fertile land for non- Agricultural purposes
- ❖ Timely supply of certified seeds and other inputs at subsidised cost.
- ❖ Special subsidy programmes towards promotion of organic agriculture.
- ❖ Mechanical transplanter to combat labour shortage during peak season
- ❖ Mass eradication campaign for rat control
- ❖ Minimum support price for rice
- ❖ Early release of Cauvery water to bring more *Kuruvai* crop.
- ❖ Establishment of direct purchase centres either by the state government or Food Corporation of India
- ❖ Implementation of crop insurance scheme wherein the premium amount may be paid by the Government department

PUNJAB

Districts surveyed:

Barnala, Bathinda, Faridkot, Fatehgarh Sahib, Ferozepur, Hoshiarpur, Jalandhar, Ludhiana, Mansa, Moga, Muktsar, Nawan Shahr, Patiala, Ropar, Sangrur and SBS Nagar

District	Villages
Barnala	Sekha, Ruske Kalanmangewala, Nihalwala, Chauhan Ke Kalan, Pakho Kalan
Bathinda	Lehra Moharhat, Rampura Phul And Hakam Singh Wala
Faridkot	Panjgram Kalan, Rajowala, Pimply Kalan, Bilewakla, Mudki, Chenol Beja, Moran Wali, Jhoti Kalan and Doad
Fatehgarh Sahib	Khumaon, Adampur, Mavimazari And Mandera
Ferozepur	Mau Begu, Rukna Begu, Kotkarori Kalan, Ratoul Rohi, Lohke Kalan, Bharana, Alwala And Golewala
Hoshiarpur	Ferge Raul, Mehalpur, Paddi Possi And Garshankar
Jalandhar	Jhak Kalan, Asmailpur And Mallian
Ludhiana	Kotha Ponna, Ghagara/Jagram, Malak/Jagram, Latlon Kalan, Bharani Pura, Mullarpur, Sidhewan Bet, Rakbe, Sarakha, Jodhan, Dhapai, Tibka, Raikot, Multanpur
Mansa	Kangri Boda, Bhsini Baghar, Baha, Ama Kalan
Moga	Talwandi Shangarlani, Khakhrana, Kotla Rai, Kaleke, Samadh Bhai, Moga, Minia, Ragru and Ajitwal
Muktsar	Lambi Dwar, Jhabewali
Moga	Talwandi Sangarlan, Khakhrana, Kotla Rai, Kale Ke, Samadh Bhai, Minia, Dagra, Ajitwal
Nawan Shahr	Bela, Rasidpur, Garhi, Balani
Patiala	Bhadson, Nandapur Kesho, Chandanpur, Rauni, Cheenthawala, Bhemaheri And Sikhpora
Ropar	Bhurare, Malan And Belaghaunali
Sangrur	Ratta Khera, Tungan, Badrukhan, Jhaloor, Hatho, Chhajari And Dhuri .
SBS Nagar	Ghalar, Nagar, Jadla, Nangal Jatam

Widely grown varieties:

Name of District	Varieties
Barnala	Pusa 44, PR 118, PR114,
Bathinda	Pusa 44, PR 116 and PR 118
Faridkot	PR 114, Pusa 44, Pusa 1121, HKR 47, Pusa 1121, PR 118 and PR 116.
Faridkot	PR 114, Pusa 1121, PR 118, HKR 47, HKR 111 and Pusa 44
Fatehgarh Sahib	PR 118, Pusa 44, HKR 127 and Pusa Basmati 1.
Ferozepur	Pusa 1121, PR 114, PR 118, Pusa 44, Pusa 50, Pusa Basmati 1.
Hoshiarpur	HKR 47, PR 116 and Pusa 44
Jalandhar	Pusa 44, HKR 47, HKR 127 and Pusa 1121
Ludhiana	Pusa 44, Pusa 1121, HKR 47 and PR 116.
Mansa	Pusa 44, PR 118 and Pusa 1121.

Name of District	Varieties
Moga	PR 116, PR 118, Pusa 44, PR 111.
Muktsar	HKR 47, Pusa 1121, PR 111, PR 116.
Nawan Shahr	PR 114, Pusa 44, Pusa 1121, HKR 127
Patiala	PR 114, PR 116, PR 118 Pusa 44.
Ropar	Pusa 118, Pusa 1121, HKR 127 and IR 8.
Sangrur	Pusa Basmati 1, Pusa 44, Pusa 1121 and PR118.
SBS Nagar	Pusa 44, Pusa 1121 and PR116

The production oriented survey was conducted in 17 districts in the Punjab state during the crop season of 2011. The districts surveyed were Barnala, Bathinda, Faridkot, Faridkot, Fatehgarh Sahib, Ferozepur, Hoshiarpur, Jalandhar, Ludhiana, Mansa, Moga, Muktsar, Nawan Shahr, Patiala, Ropar, Sangrur and SBS Nagar. The climatic conditions in this state were normal. The prevalent varieties grown in this region were Pusa 44, PR 116, Pusa Basmati 1, PR 114, PR 118, HKR 47, PR 111 and Pusa 1121. Predominant weeds observed were *Echinochloa* sp., and *Cyperus* sp the usage of weedicides like Machete and Rift was a common practice for the management of weeds. Among the inputs, there was adequate availability of water, power, seeds and equipments. The basal dose of the fertilizer consisted of 120 Kg N/ha and 25 kg P₂O₅. Top dressing was done with 125 Kg of N in three split applications. The transplanting method followed was random method. The common diseases observed were brown spot, sheath blight, sheath rot and false smut at low to moderate intensities on Pusa 44 and Pusa 1121. Among the insect pests BPH, WBPH, leaf folder and stem borer were recorded in low intensity to moderate intensities. The farmers used Confider and chloripyriphos as insecticides to control plant hoppers, stem borer and leaf folder. District wise details of survey are presented below.

District wise observation:

Hoshiarpur: The production oriented survey was taken up in 4 villages in Hoshiarpur district in Punjab in *kharif* season of 2011. Rice crops were mostly in booting stage at the time of survey. The leading high yielding varieties in the district were HKR 47, PR 116 and Pusa 44. Most of the farmers adopted random method of transplanting. In general, farmers had maintained adequate number of plants/m² was 25plants/m². Farmers applied FYM and chemical fertilizers. The average seed rate was 5 Kg seeds for transplanting one acre of field. In the nursery, most of the farmers applied 120 Kg N, 25 Kg P₂ O₅. In the main field, the farmers applied 120 Kg N in 3 splits. The population of weeds was low to moderate. The common weeds were *Cyperus* sp. *Echinochloa* sp. The usage of weedicide like Machete was a common practice for the management of weeds. Among the inputs, there was adequate availability of water, power, seeds and equipments. The availability of drying and storage facilities was inadequate. Among the diseases, false smut, sheath rot and sheath blight were recorded in low to moderate intensities. Among the insect pests, leaf older, BPH, WBPH, stem borer and leaf folder were observed in low to moderate intensities. The pesticides like confidor and Karate were used to control of pests.

Jalandhar: Production oriented survey was conducted at 3 villageø viz., Jhak Kalan, Asmailpur and Mallian. The survey was undertaken during milk stage of the crop. The high yielding rice varieties like Pusa 44, HKR 47, HKR 127 and Pusa 1121 were grown during the season. The availability of fertilizers, power, water, seeds and equipments were adequate. Drying and storage facilities were either inadequate or not available. Random method of

transplantation was followed with planting density of 25 plants/m². Seed rate followed was 5 Kg of germinated seed per hectare. Farmers used 6t/ha of Farm Yard Manure and also applied 130 Kg N as basal and another 130 Kg N in 3 splits. The level of weed infestation was low to medium. The common weeds were *Cyperus* sp. and *Echinochloa* sp. For weed management, application of weedicides like Rift 600 ml/acre was a common practice. . Among diseases, low to medium intensities of brown spot, grain discolouration, sheath blight and neck blast were recorded. BPH, WBPH, stem borer and leaf folder among insect pests were recorded on Pusa 1121. Some farmers reported sprays of confidor and Padan for the management of insect pests. Farmers used knapsack sprayer for spraying of insecticides.

Batinda: Survey was conducted at 3 villages in Batinda during kharif 2011. During the survey the crop was at heading stage. The prevailing climatic conditions were normal. The major varieties of this district were Pusa 44, PR 116 and PR 118. The basal dose of the fertilizer consisted of 120 Kg N/ha and 25 kg P₂O₅. Top dressing was done with 125 Kg of N in three split applications. The transplanting method followed was random method. Among the inputs, seeds, and fertilizers were adequate. The availability pesticides and facilities for storage was inadequate. Most of the farmers were marginal in their land holdings. The seed rate used was 5kgs/ acre. The level of weed infestation was low. Among the diseases, brown spot, sheath rot were observed in low to moderate intensities. On Pusa 44, sheath blight incidence was noticed at moderate intensity. Low to moderate intensity of leaf folder and BPH damage was observed in this area on PR 118 and Pusa 44 varieties. Usage of pesticides was not noticed during the survey period. Usage of Rift 600 ml/ acre was a common practice to control the weeds like *Echinochloa* sp. and *Cyperus* sps.

Sangrur: Production oriented survey was conducted in 8 villages in Sangrur district during *kharif* 2011. At the time of survey, the crop was at booting to heading to stage. The weather condition was favourable for crop growth. The popular rice varieties grown in the district were Pusa Basmati 1, Pusa 44, Pusa 1121 and PR118. The seed rate used was 5kgs/ acre. The basal fertilizer application was 140-150 Kg N/h and 22 Kg P₂O₅ /ha in the nursery and 150 Kg N was applied in two split doses in the main field. The common weeds like *Echinochloa* sp. and *Cyperus* sp. were observed in low to moderate intensity. Most of the farmers practiced hand weeding; a few ones used Machete and Rift as weedicides. The common diseases observed were brown spot, sheath blight, sheath rot and false smut at low to moderate intensities on Pusa 44 and Pusa 1121. Among the insect pests BPH, WBPH, leaf folder and stem borer were recorded in low intensity to moderate intensities. The farmers used Confider and chloripyriphos as insecticides to control plant hoppers, stem borere and leaf folder.

Ferozpur & Moga: Survey was conducted in eight villages each in Ferozpur and Moga districts of Punjab during *kharif* 2011. The climatic conditions of the districts were normal. Availability of inputs like seeds, water and fertilizers pesticides was adequate. Some of the equipments, power and drying and storage facilities were inadequate. Farmers maintained the seed rate for sowing was 5 Kg/acre. Random transplanting method was followed with 25 plants/m² density. The rate of fertilizer application was 130:22:00 NPK Kg/ha. In the main field 140 Kg N/ha applied in 3 split doses. The weed infestation found was negligible and the common weeds were *Echinochloa* sp. and *Cyperus* sp., In general biotic constraints were less. Brown spot and false smut were observed in low to moderate intensities on Pusa 44. The insect pest infestation observed was stem borer, leaf folder and WBPH at low intensities.

Ludhiana & Fatehgarh Sahib: The survey was conducted in 13 villages in Ludhiana and 4 villages in Fatehgarh Sahib Districts, when the crop was either in milk stage or heading

stages. As such the general climatic conditions for the rice crop was quite favorable during the year. The major varieties grown in these 2 districts were Pusa 44, Pusa 1121, HKR 47, and PR 116. PR 118, HKR 127 and Pusa Basmati 1. Most of the farmers in the district were either marginal or sub-marginal. The inputs like seeds, fertilizers and pesticides were locally available. The fertilizer application consisted of 140 Kg N, 20 Kg P₂O₅ at the time of nursery. In the main field 140 Kg N/ha applied in 3 split doses. The weed population was low or medium. The most prevalent weed species were *Cyperus* sp, *Echinochloa* sp. Some farmers applied herbicides (Rift 500 ml/ acre) for management of weeds. False smut and grain discoloration was observed in low intensity where as false smut appeared in traces in Fatehgarh Sahib; Moderate intensity of sheath blight and BLB was observed on Pusa 44 in Ludhiana. Bakane disease was observed in the Pusa 1121 at moderate to severe form. Stem borer and leaf folder were recorded in low intensities. Farmers applied monocle, chloripyriphos, confidor, Padan for the control of stem borer and leaf folder.

Patiala and Ropar: Production oriented surveys were conducted in the two districts at heading stage. The predominant varieties of this district PR 114, PR 116, PR 118 Pusa 44, Pusa 1121, HKR 127 and IR 8. The general climatic conditions were normal during the survey period. The average fertilizer application of 140 Kg N/ha was followed in the nursery and applied 140 kg N in 3 splits in the main field. Majority of the farmers used their own source of seeds and equipment. The availability of the inputs like fertilizers, pesticides and supply of water and power was adequate in this region. The majority of weeds consisted *Cyperus* sp, *Echinochloa* sp. The pests like stem borer, leaf folder and grass hopper were observed in low to medium intensities. Among the diseases, sheath blight, false smut and BLB was occurred in low to moderate form. The pesticides like chloropyriphos, Confidor and Padan were used for control of insect pests like BPH, leaf folder and stem borer. .

Nawan Sahar, Barnala and Mansa: Survey was conducted in districts when the crop was either booting or heading stage. The weather conditions were normal. The predominant varieties were PR 118, PR 114, Pusa 44, Pusa 1121, and HKR 127. The availability of the inputs like seeds, water, power, fertilizers, pesticides except drying facilities, storage facilities were adequate. Fertilizers were applied in three split doses @ 40 Kg of N at each time. The weed infestation was very less. Sheath blight has been observed as moderate form on Pusa 44 variety and false smut was notice on PR 118 at low intensity levels. Among the insect pests BPH, WBPH, leaf folder and stem borer damage was observed on PR 116 and Pusa 1121. Insecticides like confidor+acephate+tilt 200 ml were used against sheath blight and brown spot. Padan and dursban used for control of stem borer and leaf folder.

SBS Nagar and Muktsar: In the district of SBS Nagar 5 villages and from Muktsar district 2 villages were surveyed during the crop growth period of *kharif* 2011. The crop was mostly at milk stage, when the survey was conducted. The climatic condition was normal during the crop ping period. The common varieties cultivated by farmers were Pusa 44, Pusa 1121 and PR116 in SBS Nagar and HKR 47, Pusa 1121, PR 111, PR 116 in Muktsar disrict. Farmers used 4-6 Kg of seed rate and many farmers used un-decomposed cow dung as manure. A few of the farmers also applied fertilizers in the main field. The dosage was 120 Kg N/ha; 12 Kg P₂O₅/ha in the nursery and 120 kgs of N was applied in 2 split doses in the main field. The method of transplanting was random and the average plant population ranged between 25 plants per m². The weed population was low and the common weeds recorded were *Ehinochloa* sp. Weedicide application was very low and only few farmers applied Rift @ 600 ml/ acre as weedicide. . Among the biotic constraints sheath blight, brown spot and false smut were at moderate level; leaf folder, BPH, and WBPH also recorded at moderate level of

infestation. Most of the farmers applied caldan and confidor as pesticides to manage the pests in both the districts.

Faridkot: The production oriented survey conducted during *kharif* 2011 in 9 villages in Faridkot district. The survey was mostly either in milk stage or heading stage of the crop. The climatic conditions prevailed in this district was normal. Only single crop was grown per year in that area. The prevalent varieties grown by the farmers were PR 114, Pusa1121, PR 118, HKR 47, and HKR111and Pusa 44. The seed rate used by most of the farmers was 4-6 Kg/acre. Farmers applied un-decomposed cow dung. Most of the farmers practiced fertilizer application as 140 N Kg /ha, 20 Kg P₂O₅/ ha in the nursery and remaining 150 Kgs N was applied in 3 split doses in the main field. The random method of transplanting was done by most of the farmers. The plant density maintained was 25plants/m². In general weed population was very less and common weeds observed were *Echinochloa sp* and *Cyperus sp*. The weedicide applied was Rift @ 600 ml/acre. Farmers faced the problems like shortage and drying facilities in this area. The availability of equipments, pesticides and electricity and water was adequate. The biotic constraints generally observed were brown spot, sheath blight, sheath rot and traces of false smut on the var. PR 114. Low infestation of pests like BPH, WBPH and stem borer were observed during the crop season.

Prevalence of Diseases and Insect Pests in Punjab:

Districts	Diseases							BKN	Insect Pests			
	BS	ShBI	GD	FS	ShR	BLB	NBL		LF	BPH	WBPH	SB
Barnala	L-M	L-M							L-M	L-M	L-M	L-M
Bathinda		M							L-M	L-M		
Faridkot	L-M	L-M		TR	L-M					L	L	L
Fatehgarh Sahib	L-M	L-M		L-M	L-M							
Ferozepur	L-M			L-M								
Hoshiarpur	-	L-M	-	L-M	L-M	-			L-M	L-M	L-M	
Jalandhar	L-M	L-M	L-M				L-M		L-M	L-M	L-M	L-M
Ludhiana	L-M	L-M		L-M	L-M			M	L-M	L-M	L-M	L-M
Mansa	L-M	L-M							L-M	L-M	L-M	L-M
Moga	L-M			L-M								
Muktsar	M	M		M					M	M	M	
Moga												
Nawan Shahr	L-M	L-M							L-M	L-M	L-M	L-M
Patiala		L-M		L-M		L-M			L-M	L-M		L-M
Ropar		L-M		L-M		L-M			L-M	L-M		L-M
Sangrur	L-M	L-M		L-M	L-M				L-M	L-M	L-M	L-M
SBS Nagar	M	M		M					M	M	M	

TAMIL NADU-1

Districts surveyed: *Thanjavur, Tiruvarur, Nagappattinam, Tiruchirappalli, Pudukkottai, Cuddalore, Perambalur and Vilupuram*

Districts surveyed

District	Villages surveyed
Thanjavur	Pasupathikovil, Ayyampettai, Sundaraperumalkovil, Soorakkottai, Telungankudikkadu, Nattuchalai, Melaulur, Pappanadu, Punalvasal and Naduvur
Tiruvarur	Podhakkudi, Lakshmgudi, Narikkudi, Sundarakkottai, Paravakkottai, Alangudi, Tholuvur, Nemmalai, Semmankudi and Koradacheri
Nagappattinam	Mathirimangalam, Sannanallur, Sembanarkovil, Mayiladuthurai, Vettangudi, Vaimeedu, Aayakkaranpulam, Muthupettai, Malliam and Kovangudi
Pudukkottai	Vadakadu, Tiruvonam, Keeramangalam, Sedhubhavachatram, Manalmedu, Aavudiyarkovil, Thirumayam and Solagampatti
Tiruchirappalli	Perugamani, Pudukkudi, Valampakkudi, Lalgudi, Pettaivaithalai, Manachanallur, Jeeyapuram and Navalur
Cuddalore	Kupparnatham, Kammapuram, Panruti, Mutlur, Parangipettai, Pichavaram and Alapakkam
Perambalur	Jayankondam, Thirumanoor, Sendurai, Kasankottai, Siruvachur, Meensurutti and Thirumalappadi
Vilupuram	Thenkodipakkam, Salavathi, Vikkravandi, Iruvelpattu, Pidagam, Kolianoor and Krishnapuram

Widely grown rice varieties

District	Varieties
Thanjavur	ADT 36, ADT 38, ADT 39, ADT 43, ADT 44, ADT (R) 45, ADT (R) 46, CR 1009, CO 43, BPT 5204 and White Ponni
Tiruvarur	ADT 36, ADT 38, ADT 39, ADT 43, ADT 44, ADT (R)45, ADT (R) 46, CR 1009, CO 43, White Ponni and BPT 5204
Nagappattinam	ADT 36, ADT 38, ADT 39, ADT 43, TKM 9, ADT 44, ADT (R) 45, ADT (R) 46, CR 1009, CO 43, White Ponni and BPT 5204
Pudukkottai	ADT 36, ADT 38, ADT 39, ADT 43, CR 1009, Trichy 1, Trichy 2, White Ponni and BPT 5204
Tiruchirappalli	ADT 36, ADT 38, ADT 39, ADT 43, Trichy 1, Trichy 2, CR 1009, CO 43, White Ponni and BPT 5204
Cuddalore	ADT 36, ADT 37, IR 50, ADT 38, ADT 39, ADT 43, CR 1009, CO 43, White Ponni and BPT 5204
Perambalur	ADT 38, ADT 39, ADT 43, ADT (R) 45, CR 1009, CO 43, White Ponni
Vilupuram	ADT 36, ADT 37, ADT 38, ADT 39, ADT 43, IR 50, CR 1009, White Ponni and BPT 5204

Particulars of rice area surveyed

District	Normal rice area (ha)	Area planted (ha)	Percentage of area covered as against normal area
Thanjavur	190000	180878	95.2
Tiruvarur	173701	158541	91.3
Nagappattinam	178677	178677	100.0
Pudukkottai	95462	95462	100.0
Tiruchirappalli	80907	71628	88.5
Cuddalore	117000	114379	97.8
Perambalur	35000	30000	85.7
Vilupuram	148400	148400	100.0
Total	1019147	977965	

Production oriented survey was conducted in eight districts of eastern and northern part of Tamil Nadu. In general rice crop condition was good both in *kharif* (Kuruvai) and *rabi* (Samba/ Thaladi) seasons of the year 2011 with normal rainfall. About 95 % of normal rice area was planted during this year. The cyclone named as “**Thane**” hit at a wind speed of 135 to 145km damaged the rice crop in an area of 16,432 hectares in Cuddalore and Vilupuram districts. Rice crop at flowering, milky and maturity stages (*rabi* crop) were severely affected by the cyclone. The wind injury was witnessed as sterile, chaffy and discoloured panicles due to the absence of pollination / fertilization. The crop affected at milky stage later exhibited ill filled and discoloured grains. The matured crop which was completely lodged due to heavy wind was submerged in subsequent rains and majority of the grains showed in-situ germination. In *kharif* season, rice varieties ADT 36, ADT 43, ADT (R) 45 and in *rabi* season ADT 38, ADT 39, ADT (R) 46, CO 43, CR 1009, White Ponni, BPT 5204 were predominantly grown in this region. SRI method of cultivation with young seedlings, one seedling/hill, wider spacing of 22.5 x 22.5 cm and conoweeder operation was adopted by many farmers. Combine Harvesters were used in a big way in this region. Some farmers used Transplanters also. In general, pest and disease pressure was low during the year. However, widespread occurrence of bacterial diseases viz., bacterial leaf blight and bacterial leaf streak was recorded in rice varieties ADT 38, BPT 5204, CR 1009 and ADT 46. False smut incidence was relatively low. Unusual prevalence of yellow leaf mite was noticed in this region during rainy season. Low to medium incidence of leaf folder and stem borer was noticed both in *kharif* and *rabi* seasons.

District wise observations

Thanjavur: Ten villages were covered for production oriented survey in this district. Rice crop was grown in 40,283ha (22%) in *kharif* season and 1,40,595ha (78%) in *rabi* season. During the year 2011, there was a deficit of 200mm rainfall in this district. The average yield of rice crop in *kharif* season was 6540 kg/ha. In *rabi* crop, the average yield was about 5.0-5.5 tons/ha. Farmers applied the nitrogenous fertilizer at the recommended level of 140-160 kg N/ha, phosphorus and potassic fertilizers at lower level of 20-30 kg/ha as against the blanket recommendation of 150:50:50 kg NPK/ha. In conventional method of planting, farmers used a higher seed rate of 90-110 kg/ha whereas in SRI method of cultivation 10-12 kg of seeds were used per hectare. Most of the farmers adopted only few components of SRI method of cultivation. Awareness on the use of herbicides is increasing in this district. Some farmers used Butachlor @ 2.5 lit/ha at 3 DAT for the control of common wetland weeds like *Cyperus rotundus*, *Echinochloa crusgalli*, *Eclipta alba* and *Marsilia quadrifolia*. Bacterial leaf blight and bacterial leaf streak diseases were widely noticed to the extent of 10-30% in all the rice varieties grown. A new medium duration rice variety ADT 49 was found to be more

susceptible to bacterial diseases. Sheath rot incidence was recorded up to 20% in ADT 38, ADT 46, BPT 5204 and CO 43. Carbendazim @ 500 g/ha was sprayed for disease control. Farmers used Kocide (Copper hydroxide) at 1.25 kg/ha (or) Plantamycin (Streptomycin sulphate + Oxy tetracycline compound) @ 300g/ha along with copper oxy chloride @ 1.25 kg/ha for the control of BLB and BLS. Low incidence of false smut (<10%) was recorded in CR 1009, CO 43 and ADT 39. Among the insect pests, leaf folder, stem borer and BPH incidence were noticed to the extent of 10-20%. Scattered incidence of black bug (<10%) was also noticed. Farmers applied the insecticides profenophos or monocrotophos @ 1 lit/ha. Unusual incidence of yellow leaf mite was noticed in rainy season. Combine Harvesters were used by more than 80% of the farmers. Some farmers used Transplanters also.

Tiruvapur: Production Oriented Survey was conducted in ten villages of this district. In *kharif* season, rice crop was grown in 11,957 hectares (8%) with an average yield of 5.5-6 tons/ha. During *rabi* season, rice crop was grown in 1,46,583 hectares (92%) with an average yield of 4.5-5.5 tons/ha. Direct seeding was practiced in 12,200 ha which contributes about 7.7% of total rice area of this district. Rice crop was mainly grown as single crop with rice varieties CR 1009, BPT 5204 and ADT 44. Rice ó Pulses, Rice-Rice-Rice and Rice ó Rice ó Pulses were the major cropping systems followed. Farmers used higher seed rate of 80-100 kg/ha and followed the random method of planting with 40-45 hills/sq.m. Some farmers used herbicides for weed control. In general pest and disease pressure was low. Moderate incidence (20-30%) of bacterial leaf blight, bacterial leaf streak and low incidence (5-10%) of blast, sheath rot and false smut diseases were recorded. Farmers applied the bio control agent *Pseudomonas fluorescens* and cow dung extract for disease control. The major constraints in rice cultivation were inadequate power supply, canal water and non availability of quality seeds, drying and storage facilities. Leaf folder and stem borer were the predominant insect pests with 10-25% level of incidence. Scattered incidence of BPH upto 10-15% was also recorded. Farmers applied recommended insecticides like profenophos, monocrotophos and chlorpyrifos @ 1 lit/ha for insect control.

Nagappattinam: The survey was conducted in ten villages of this district during the year 2011. It is located in the tail end of Cauvery river basin. Rice crop was grown in 42,848 ha during *kharif* season which exceeded by 22.4% over the normal area. During *rabi* season, rice was grown in 135829 ha which contributes about 76% of total rice area. Direct seeding was followed in 15,863 ha in Vedaranyam and Nagappattinam taluks. Rice ó Pulses and Rice ó Rice ó Pulses were the major cropping systems adopted. Generally farmers used a higher seed rate of 70-100 kg/ha in conventional method of cultivation. *Cyperus sp*, *Echinochloa crusgalli*, *Astracantha longifolia*, *Marsilia quadrifolia* were the common weeds found in the rice field. Hand weeding was done by most of the farmers. Machineries like Combine Harvester, Thrasher and Transplanter were used in rice cultivation. Brown spot and sheath rot diseases were recorded at low to medium level in rice varieties CR 1009, ADT 38, ADT 39, BPT 5204 and CO 43. Bacterial leaf blight incidence was moderate to severe in Mayiladuthurai and Nagappattinam taluks. Leaf folder (5-20%) and stem borer (10-20%) incidences were reported in Sirkazhi, Vedaranyam and Sembanarkovil blocks. Scattered incidence of BPH was also recorded in this district. Black bug incidence was also reported in some villages at low level. Profenophos or Monocrotophos or Chlorpyrifos at 1.0 lit./ha along with Carbendazim @ 500g/ha or Mancozeb 1.0 kg/ha were applied for pest and disease control. Hand sprayers were used for spraying of pesticides. Canal water and electricity were not adequately available for rice cultivation.

Pudukkottai: Eight villages were covered for production oriented survey in this district. Rice crop was grown in 3250 ha in *kharif* season and 92,212 ha in *rabi* season. Direct seeding was practiced in 32000 ha which contributes about 33.5% of total area. Rice varieties ADT

38, ADT 39, Trichy 1 and Trichy 2 were raised as direct sown crop. Rice-Pulses and Rice ó Rice were the two major cropping patterns followed in this district. Farmers used a higher seed rate of 75-90 kg/ha. Hand weeding was generally followed. Farmers applied the chemical (NPK) fertilizers at lower level than the recommended dose. Few farmers applied ZnSo₄ as foliar spray at 0.5% along with 1.0% urea in order to correct the Zinc deficiency in samba / thaladi crop. Among the diseases, blast and brown spot were noticed in BPT 5204, ADT 38, ADT 39 and CR 1009 to the extent of 10-25% in Aranthangi, Manamelgudi and Pudukkottai taluks. Scattered incidence of BLB was also recorded in BPT 5204, ADT 38, ADT 39 with 10-30% intensity. BPH incidence was recorded at low to medium level in some villages. Farmers sprayed the insecticides phosphomidan @ 350 ml/ha (or) imidacloprid @ 250 ml/ha (or) dichlorvos @ 500 ml/ha for BPH control. Low incidence of insect pests leaf folder, stem borer and leaf mite was also recorded. Power supply and quality seeds were inadequate. Farmers availed crop loans from Village Primary Co-operative Societies and Nationalized Banks.

Tiruchirappalli: Production Oriented Survey was conducted in eight villages of this district. Rice was grown as only transplanted crop. It was grown in 4750 ha in kharif season, 62824 ha in samba / thaladi and 4054 ha in Navarai season. Rice-Rice, Rice ó Rice ó Pulses / Gingelly and Rice ó Pulses / Vegetables were the major cropping systems adopted. In *kharif* season, rice varieties ADT 43 and ADT 36 were predominately grown and in rabi season White Ponni, BPT 5204, Trichy 2 and CR 1009 were grown in larger areas. In the rice field, weeds like *Cyperus sp*, *Echinochloa crusgalli*, *Ecllypta alba*, *Marsilea quadrifolia* and *Astracantha longifolia* were commonly seen. Hand weeding was mostly followed by the farmers. Some farmers applied butachlor @ 2.5 litre/ha for weed control. Low to medium level incidence of leaf folder, stem borer and BPH were recorded in rice varieties BPT 5204, ADT 38, CO 43, CR 1009 and Trichy 2. Neck blast in White Ponni, Leaf blast in BPT 5204, ADT 38, CR 1009, bacterial leaf blight and bacterial leaf streak diseases were recorded in BPT 5204, ADT 38, CR 1009 and ADT (R) 49 to the extent of 10-20%. Sheath rot and false smut incidences were also recorded in few villages of Kulithalai and Musiri blocks. Farmers applied recommended insecticides / fungicides for pest and disease control. Combine Harvesters were used in most of the areas in this district.

Cuddalore: The survey was conducted in seven villages of this district. In *kharif* season, rice was grown in 20300 ha and 94,079 ha in rabi season. Direct seeding was followed in 600ha in Cuddalore taluk and 400ha in Parangipettai taluk. The cyclone-*Thaneø* which hit at a wind speed of 135 to 145 km in December 2011 damaged the rice crop in an area of 5802 hectares in Cuddalore district. Rice crop at flowering, milky and maturity stages (*rabi* crop) were severely affected by the cyclone. The wind injury was witnessed as sterile, chaffy and discoloured panicles due to the absence of pollination / fertilization. The crop affected at milky stage later exhibited ill filled and discoloured grains. The matured crop which was completely lodged due to heavy wind was submerged in subsequent rains and majority of the grains showed in-situ germination. Rice ó Rice and Rice ó Pulses were the two important cropping sequences followed in this district. In general farmers used the NPK fertilizers at lower level than the blanket recommendation of 150:50:50 kg NPK/ha for samba / thaladi crop. Machineries like combine harvester, thrasher, transplanter were widely used by the farmers. Power supply and canal water were not adequately available. Storage and threshing facilities were also inadequate. Hand weeding was mostly followed. Few farmers used herbicides like butachlor @ 2.5 lit/ha or Alxmix @ 20 gm/ha in transplanted crop and pre-emergence herbicide Sathi @ 250 gm/ha in direct sown crop. Among the diseases, bacterial leaf blight, brown spot and sheath rot were noticed to the extent of 10-20% intensity. Scattered occurrence of BPH was recorded (5-10%). Leaf folder and stem border were noticed to the extent of 10-15% in ADT 39, CR 1009, BPT 5204 and White Ponni.

Perambalur: Production oriented survey was conducted in seven villages of this district. Rice ó Pulses / Onion/Maize and Rice ó Rice were the major cropping systems followed. Tanks and open wells were the main sources of irrigation. Rice was grown in Thirumanoor, Thirumalapadi and Keelapalur blocks with Cauvery river irrigation. Medium duration varieties ADT 38, ADT 39, CO 43, BPT 5204 and long duration variety CR 1009 were grown in most of the areas. Conventional method of cultivation with random planting was done in many areas. Farmers used higher seed rate of 80-110 kg/ha. The major constraints of rice cultivation were inadequate water, power supply and quality seeds. Among the diseases, bacterial leaf blight and bacterial leaf streak were found to the extent of 10-25% in Perambalur and Thirumanoor taluks. False smut incidence was low (<10%) in CO 43. Scattered incidence of BPH and rice black bug was recorded. Low to medium level of leaf folder and stem borer attack (10-25%) was reported throughout the district.

Vilupuram: The survey was conducted in seven villages of this district. Rice was mostly grown as transplanted crop. Rice ó Rice ó Groundnut, Rice ó Rice ó Pulses and Rice ó Sugarcane were the major cropping systems adopted in the district. Rice crop was cultivated in about 20000 ha in *kharif* and 128000 ha in *rabi* season. Open wells (55%) followed by tanks (22%) and bore wells (20%) were the sources of irrigation. Short duration rice varieties ADT 36, ADT 37 and ADT 43 and medium / long duration varieties *viz.*, ADT 38, ADT 39, White Ponni, BPT 5204 and CR 1009 were grown in this district. Thane cyclone damaged the rice crop in 10630ha. Rice varieties ADT 39, White Ponni, BPT 5204 and CR 1009 at flowering, milky and maturity stages were affected. Moderate incidence of blast was recorded in BPT 5204, CR 1009 and ADT 38. Low to medium incidence (15-25%) of bacterial leaf blight was noticed in ADT 38, BPT 5204 and CR 1009. Among the insect pests, leaf folder, stem borer and black bug were commonly found to the extent of 10-15%. Recommended insecticides and fungicides were sprayed. Combine Harvesters were used by most of the farmers. Inadequate power supply, water, quality seeds and machineries were the major constraints of rice cultivation.

Prevalence of diseases in Tamil Nadu-I

District	BL	NBL	SHR	BS	BLB	BLS	FS
Thanjavur	-	-	L-M	-	L-M	L-M	L
Tiruvarur	L	-	L	-	L-M	L-M	L
Nagappattinam	-	-	L-M	L-M	L-M	L-M	-
Pudukkottai	L-M	-	-	L-M	L-M	-	-
Tiruchirappalli	L-M	L-M	L	-	L-M	L-M	L
Cuddalore	-	-	L-M	L-M	L-M	-	-
Perambalur	-	-	-	-	L-M	L-M	L
Vilupuram	M	-	-	-	L-M	-	-

District	LF	SB	BPH	RB	MT
Thanjavur	L-M	L-M	L-M	L	L
Tiruvarur	L-M	L-M	L	-	L
Nagappattinam	L-M	L-M	L	L	L
Pudukkottai	L	L	L-M	-	L
Tiruchirappalli	L-M	L-M	L-M	-	-
Cuddalore	L	L	L	-	-
Perambalur	L-M	L-M	L	L	-
Vilupuram	L	L	-	L	-

T – Trace; L – Low; M – Medium; S – Severe

TAMIL NADU-2

Districts surveyed: Coimbatore, Erode, Krishnagiri, Kanyakumari, Madurai, Namakkal, Ramanathapuram, Sivagangai, Theni, Tirunelveli, Thiruvanamalai, Thoothukudi, Vellore, and Virudhunagar

Particulars of survey

Districts	Places / Villages
Coimbatore	Thondamuthur, Anamalai, Udumalpet, Pollachi, Amaravathinagar and Mugasimangalam
Erode	Poosaripalayam, Vedachinnanur, Indiyampalayam, Nalla Goundampalayam, Narikottai, Nanjangoundampalayam, Pariyur, Karatupalayam, Ugalore, Chellappagoundanvalasu, Thireerapalayam,
Krishnagiri	Dam Road, Sundakuppam, Kaveripttinam, Thamborankottai, Chinnamuthur, Periyamuthur, Sokkadi, Palayapeyanpatti, Singarpattai
Kanyakumari	Kotarakulam, Thuvarangadu, Veerananarayanamangalam, Eraichakulam, Masanakovil, Pallakudi, Erachikulam, Alvarkuruchi, Ponagaparai
Madurai	Meetupatti, Kalanthirai, Keeklanthari, Athampatti, Kalanai, Alaganallur, Solavandhan
Namakkal	Pallipalayam, Elankutti, Vedarasanpalayam, Elanthaikuttai
Ramanathapuram	Singarayapuram, Sathrakudi, Panaikulam, Uthrakosamangai, Kalinikudi, Mundurvarkundam, Vadavaiyal, Mettusolanthur, Manakudi, Cuddalore, Uppur, Paranoor, Konaikudi, Vagaikudi
Sivagangai	Vellikuruchi, Sulamkudi, Samuvaraya Neendal, Manakudi, Singampunari, Keelaipatti
Theni	Veerapandi, Podaientrapuram, Chinnamannur, Karkathankulam, Palanichettipatti, Keelagudalur, Uthamapalayam,
Tirunelveli	Kulanari, Surandai, Soundrapandiyapuram, Keelapuliyur, Pavoorchathram, Panpozhi, Karsukudi, Vadakarai, Needuvaiyal, Achampudur,
Thiruvanamalai	Manoorpatti, Valva, Pudu Sanayanthal, Sananthan, Kolarthambadi, Kalarthampadi, Uthangal, Kearthambadi, Kothanthavadi, Urumpoondi, Sthpatti, Indhiravanam Village, Agrapalayam
Thoothukudi	Thentiruperai, Angamangalam, Puraiyur, Kurukattur, Kuttithottam Mattathi, Kadaiyanodai, Punainagar, Vanathirupathi, Nallore, Mellaputhukudi, Arumugamangalam,
Vellore	Aayarpadi, Mellapulam Mootur, Panapakkam, Nangamangalam, Nimili, Kariyakudal
Virudhunagar	Annaikaraipatti, Maniyapatti, Allampatti, Nattathi, Nalamchettipatti, Nathampatti, Irkankudi, Nenmeni

Wide grown rice varieties

Districts	Varieties
Coimbatore	HYVs: ADT 45, Improved White Ponni, CO(R) 49, CO50 & BPT 5204; Hybrids: CORH 3 (H),
Erode	HYVs: BPT3322, BPT5204, ADT39, ASD16, CO43, IR20, ADT38
Kanyakumari	HYVs : ASD 16, CR 1009, TPS 3 ,
Krishnagiri	HYVs : ADT 36, ASD16, I W Ponni, IR 20, Paiyur l
Madurai	HYVs: ASD 19, ADT43, ADT45, Indirani, IPL20, RASI Laxmi.
Namakkal	HYVs: BPT5204, IR20, ASD16
Ramanathapuram	HYVs : ADT43, ADT45, ADT36, CO43, BPT5204, ANNA (R) 4 & Land races
Sivagangai	HYVs : BPT5204, ADT43, ADT45, ADT36, CO43, ADT39 & Land races
Theni	HYVs: ADT 36, ADT 39, CO 43, ASD 19, I.W. Ponni, BPT 5204 and Sundra Ponni; Hybrids: Koracnath 509, Loknath 505, Suruchi Hybrid, CORH 3Koracnath509, Loknath 505 and US 312
Thoothukudi	HYVs: ASD 16, ADT 43, ADT45, ADT36, BPT5204
Tirunelveli	HYVs: BPT 5204, JGL, ADT39, CR1009, Sonal, Komal, ADT45, ADT43, IR50, ADT36
Thiruvanamalai	HYVs: IR20, ADT39, ASD16, I.W. Ponni, ADT37, ADT43, ADT47; Hybrids: US312, ADT45
Virudhunagar	HYVs: BPT 5204 , ADT 36, ASD16
Vellore	HYVs: ADT37, ADT43, ADT45,

Particulars of rice area and coverage in different districts of Tamil Nadu

Districts	Normal rice area (ha)	Area planted (Approx.) (ha)	Approximate representation covered in the survey (%)
Coimbatore	2,400	2500	25
Erode	43,539	43621	30
Krishnagiri	21,980	19863	20
Kanyakumari	22,000	17,071	35
Madurai	85000	79500	30
Namakkal	27,000	13,606	40
Ramanathapuram	1,27,395	119254	20
Sivagangai	85,000	88,000	25
Theni	16,700	15,000	40
Tirunelveli	92,000	86,441	50
Thoothukudi	19,400	17,992	60
Thiruvanamalai	1,42,744	140125	50
Virudhunagar	26,000	27,000	10
Vellore	58,163	58740	40

During this year Production Oriented survey was conducted in 14 districts mostly bordering the western ghat regions of Tamil Nadu both during Kuruvai (Kharif) and Samba (Rabi) seasons. The rainfall and other weather factors were very favorable for rice. The Rainfall for the period from 01.06.11 to 14.09.11 (South West monsoon) was excess in the following districts viz., Coimbatore, Erode, Sivagangai, Theni, and Tiruvannamalai, while it was normal in Krishnagiri, Namakkal, Tirunelveli, Vellore, Villupuram and deficient in Kanyakumari, Madurai, Ramanathapuram, and Thoothukudi districts. The Rainfall for the period from 01.10.11 to 31.12.11 (North East Monsoon) was excess in Coimbatore, Erode, Krishnagiri, Madurai, Namakkal, Ramanathapuram, Sivaganga, Theni, Tirunelveli, Thoothukudi and Virudhunagar districts and it was normal in Kanyakumari, Thiruvannamalai and Vellore. High yielding varieties and hybrids were popular in all the districts. With the able support of Government of Tamil Nadu, The State Department has popularized the SRI cultivation in all the districts surveyed. Considerable area, approximately to a extent of 5. Per cent has been planted under SRI. In all the districts mechanization has been achieved to the tune of 50 percent (Transplanter, Combined harvester etc.). In two districts viz., Ramanathapuram and Sivagangai, the irrigation water has become saline (8.4 pH, EC14.2) (after effect of Tsunami) and it has affected about 1.5 lakh Hectares. In general, the Plant hopper populations is in increasing trend especially in southern districts, Madurai, Ramanathapuram and Sivagangai. There was an outbreak in BPH in RS Mangalam and Thiruvadana blocks of Ramanathapuram and Karaikudi block of Sivagangai districts which was observed mainly due to indiscriminate usage of synthetic pyrethroids like lambda-cyhalothrin and due to sublethal dose of Dadece (combination of Buprofezin + Deltamethrin). Stem borer was found to be predominant in Kanyakumari district. The monsoon was near normal to excess in all the districts surveyed. As a result of good monsoon, farmers have raised the high yielding fine grain varieties like ADT 43, ADT 45, BPT 5204, ADT 36, ADT 39 and private sector varieties and hybrids resulting in wide spread incidence leaf blast in the early stages of crop growth, neck blast during Samba season. The occurrence of Tungro was once again confirmed in Thirunelveli, Thoothukudi and Kanyakumari districts. Bacterial blight and Brown spot were common in all the districts. These two diseases varied in intensity from district to district.

Districtwise Observation

Coimbatore: In this district, during this year the area under rice was 2500 ha as against the normal of 2400 ha.. All the dams and irrigation systems were full. The main sources of irrigation were dams viz., Bhavanisagar, Aliyar, Amaravathy and lakes. Among the cropped area 50 percent has been covered by ARI. The commonly grown varieties were ADT 45, Improved White Ponni, CORH 3 (H), CO(R) 49, CO 50 and BPT 5204. During this year the insect pest damage was low to moderate. Though there were incidence of leaf folder and stem borer, they were not in an alarming rate. While the damage due to blast was to tune of 10 per cent. Brown spot was severe in all the varieties. No abiotic stresses were noticed. The variety ADT 45 has a considerable area under cultivation.

Erode: During this year, the area under rice was 61,000 ha (normal 65,000) ha). The main irrigation sources are Cauvery, lower Bhavani and Parambikulam-Aliyar project. The cropping system followed is rice-rice, rice-vegetable, rice-turmeric, rice-banana and rice-sugarcane. Most of the rice growing areas were raised with short duration fine grain varieties and BPH and leaf folder were present below ETL level followed by blast and bacterial blight. Due to labour shortage and high cost of labourers, the farmers have started utilizing combined harvester. In spite of hardships faced by the farmers, practices like green manuring, application of FYM, biofertilizers, along with required quantity of fertilizers were done perfectly.

Kanyakumari: In general the rice crop is cultivated in almost all the seasons and this district is found with good irrigation sources. Varieties TPS 3, ASD 16, CR 1009 were popular. In general the farmers of this area prefer bold grain type. The rainfall was deficient during South West monsoon and normal in North East monsoon. However the area covered under was only 78 percent. In this district Rice tungro disease is being noticed for the last seven years and as such it has become endemic on ASD16 and CR 1009 . Around 40 per cent of area is affected by this problem particularly in second season (Rabi).. Stemborer is the major pest in this district.

Krishnagiri: In this district the rice is irrigated mainly by Krishnagiri Dam . During this year the rainfall was normal during SW monsoon and excess during NE monsoon. Two rice crops have been raised during this year and the predominant varieties were BPT 5204, I.W. Ponni and Paiyur 1. Here the rice is being rotated with vegetables and cassava. There was no major pest and diseases during the period of survey.

Madurai: The district has a command area irrigated by Periyar Vaigai and two cropping seasons namely *Kuruvai* and samba have been raised and harvested. Short duration varieties namely ADT 36, ADT 43, ADT 45 , were cultivated predominantly. Private varieties viz., Indirani, IPL20, RASI Laxmi. were popular during Samba season. Farmers uses DAP mainly for basal application while application of Zinc sulphate has become a common agronomic practice among the farmers. Plant protection in this district was taken by application of Lambda cyhathrin 250 ml (two rounds) and Ekalux, (Quinalphos) @250 ml. Leaf Blast was been recorded in the all the varieties. In this district the rainfall was deficient during Kuruvai but excess during Samba.

Namakkal: The average rice area in this district is 27,000 Ha but the area planted during 2011-2012 was only 13,606 Ha. The prime reason is labour shortage. The South West monsoon was normal while the North East monsoon was excess. The major source of irrigation is Cauvery canal. The major varieties being cultivated are ADT 43, ADT45, IR20 and BPT5204. Leaf Blast, Neck Blast and Bacterial Blight were the predominant diseases particularly in BPT 5204 both leaf and neck blast were observed simultaneously. In IR 20 Bacterial Blight was very severe. Among the pest, the leaf folder, Stem borer and BPH were very severe.

Ramnathapuram: This district has an area of 1,27,395 ha under rice . The varietal distribution is as follows, ADT 39 (30 %) , CO43 (20%), ADT45 (25%) and BPT 5204 (25% in Devakottai, RS Mangalam and Karaikudi blocks). The rainfall was deficient during SW monsoon and excess during NE monsoon. Irrigation is through Tanks fed with Thampirarani river. In Devakottai and Karaikottai Synthetic pyrethroids are being used

indiscriminately for management of Leaf folder as a result of which BPH resurgence has occurred wherein the farmers have raised BPT5204. On the other hand the BPH was not noticed in university varieties. The soil and water has high pH and EC.

Sivagangai: Next to Ramanathapuram district this is one district where the rice area cultivated during this year was in excess (88,0000 Ha) to the normal area (85,000 ha). This district has been blessed with excess rainfall during both the monsoon and that is the reason for increase in rice area. But unfortunately as noticed in Sivagangai here also the pH and EC of both soil and water has increased being the after effect of Tsunami. Due to early stages infestation with leaf folders, indiscriminate usage of synthetic pyrethroids was recorded as a result of which the occurrence of BPH was alarming. However, due to the efforts taken by the extension functionaries and scientists awareness has been created among the farmers. New varieties released from TNAU, Viz., CO (R) 50 and ADT (R) 49 is gaining popularity .

Theni: In this district the rainfall was excess, as the Periyar dam was full, the area under rice has exceeded more than 100 per cent. In this district, the major rice growing areas viz.,Periyakulam, Theni, Chinnamanur, Uthamapalayam, Cumbum and Kela-Gudalur were surveyed. Predominant varieties are ADT 43, ADT36, ADT 39, BPT 5204 and hybrids like Koracnath 509, Hybrid Loknath 505 & Surshi and CORH 3. In this district this year the area under hybrid rice has increased and around 5000 ha has come under Korachnath 509, Loknath 505 , Surshi and CORH3 hybrids. Application of green manure is compulsory among the farmers. Split application of N & K along with neem cake helps the farmers of this tract to get higher yield. The urea application was done after missing with neem oil. Large number of fields has been planted under SRI system and farmers pressurize for suitable mechanical transplanter during the survey programme. No major pest and disease has been observed during this year.

Thirunelveli: This district in Tamil Nadu was one of the districts wherein the rainfall was normal during SW monsoon and excess during NE monsoon during this year , but the increase in rainfall did not reflect in the area coverage under rice as the area covered was only 93 percent of the normal. There was no serious insect pest problem except low to moderate incidence of leaf folder, BPH and stem borer. The major diseases were leaf and neck blast, Tungro and brown spot. During last three years the farmers were happy raising this variety due to the premium price fetched by this variety.

Thiruvanamalai: During this year the rainfall was excess during SW monsoon and normal during NE monsoon seasons.. Area coverage under rice was reported to be normal. The farmers of the district like short slender variety and as such BPT 5204, ADT 43 and I.P. Ponni were raised during this year. Not much biotic stresses were noticed however the farmers are using Synthetic pyrethroids indiscriminately. Generally the university varieties were completely free from pest, diseases and other stress

Thoothukudi: Important irrigation sources are canals of Thamiraparani river, tanks and wells. The rainfall was deficient during SW monsoon and excess during NE monsoon . The rice based cropping system are rice (single crop), rice-rice, rice-banana, rice-cotton, rice-pulses, rice-betel vine, rice-sugarcane and rice-vegetables. SRI has gained popularity in this district as a result of the efforts taken by the Agriculture Department officials. The major diseases were leaf blast and tungro. The tungro incidence was around 20-30 per cent in ASD 16. Like Kanyakumari this district has also become endemic with tungro.

Vellore: In this district the normal rice area is 58,163 ha and during this year almost whole the target area was planted with rice and the major varieties are ADT37, ADT 45, ADT 43 and private sector varieties. This year the rainfall was normal during both the monsoon, however most of the rice is being irrigated by tanks and bore wells. This district farmers raise rice crop during three seasons and in certain pockets rice is being rotated with vegetables. Most of the farmers use only complex fertilizers. Since, this district is a RTD notified one ADT 37 is popular, however is other varieties the RTD was noticed to the tune 40 per cent.

Virdhunagar: The main rice growing season is Rabi (Samba) through NE monsoon. Rainfall was below normal during SW monsoon and excess during NE monsoon. Tank (Veendankulam tank) and Irukankudi dam are the main irrigation source. Rice-cotton, rice-millet and rice-sugarcane are the major rice based cropping system followed. Earlier, varieties like ASD 16 was very popular but this year BPT 5204 and other private varieties have become popular. Among the diseases, blast, neck blast and bacterial blight, was an important problem during this year.

The following recommendations are made from the survey

- Timely supply of quality seeds
- A short and medium duration fine grain variety with durable blast resistance and bacterial blight to be evolved.
- The variety ASD 16 and CR 1009 have to be replaced with RTD resistance specifically for Kanyakumari, Thoothukudi districts where the RTD has become endemic..
- For transplanting rice seedlings a transplanter has to be released for the labour has become scarce.
- The labourers engaged by the Government under the NREGA programme may be diverted for Agricultural purposes during cropping seasons and during lean season they can be engaged for the general development of the state.
- Indiscriminate usage of Synthetic pyrethroids should be discouraged by conducting intensive training programme and rice insecticide/fungicide should be used for the specific pest and disease problem.
- The thrashing floor and storage facilities have to be provided to the rural areas on a war footing so that the wastage (about 25%) can be avoided.

Prevalence of diseases and pests in Tamil Nadu-II

Districts	Diseases						
	Blast	Neck Blast	BS	BB	Sheath blight	RTD	False smut
Coimbatore	M	-	M	L	-	-	-
Erode	M	-	M	L	L	-	-
Kanyakumari	M	M	M	L	-	-	-
Krishnagiri	-	-	L	L	-	-	-
Madurai	M	-	M	M-S	-	-	-
Namakkal	M	M	M-S	M-S	M	-	-
Ramanathapuram	M	-	M	L	-	L	-
Sivagangai	M	-	M	L	-	L	-
Theni	M	M	M	L	-	-	-
Thoothukudi	M	M	M	L	-	L	-
Tirunelveli	L	L	M	L	M-S	M	-
Thiruvannamalai	M	M-S	M	L	-	-	-
Vellore	M	-	M	L	L	-	-
Virudhunagar	L	L	M	L	L	-	-

Districts	Insect pests						
	LF	SB	BPH	WBPH	GLH	EB	CW
Coimbatore	M	L	-	-	-	M	-
Erode	M	L	M	L	-	M	-
Kanyakumari	M	L	L	-	L	L	-
Krishnagiri	-	L	M	-	-	-	-
Madurai	L	L	M	-	-	-	-
Namakkal	L	L	M	L	-	-	-
Ramanthapuram	L	-	-	-	-	-	-
Sivagangai	L	L	M	M	-	-	-
Theni	-	-	-	-	-	-	-
Thoothukudi	-	-	-	-	-	-	-
Tirunelveli	L	L	M	L	-	L	-
Thiruvannamalai	L	-	-	-	-	-	-
Virudhunagar	-	-	-	-	-	-	-
Vellore	-	L	-	-	M	-	-

+++ : High; ++ (Medium); + (Low); - (Nil)

TRIPURA

District surveyed: *South Tripura*

Production Oriented Survey for the year 2011-12 was conducted at Matabari Agri. Sub-Division of District, Tripura South. The general climatic condition of the area during the cropping period was normal. During the survey, the crop was mostly at maturity stage. Most of the farmers are marginal having 85.0% area covered under rice crop. Maximum numbers of farmers are following System of Rice Intensification (SRI) method of paddy cultivation. As per survey, the predominant high yielding varieties for the 2nd kharif season was found to be MTU-7029 (Swarna) and NDR-97. Seed rate for S.R.I was found to be mostly 5 kg/ ha while 40 to 50 kg in case of conventional method of paddy cultivation. Transplanting of paddy was mostly completed with in the 2nd fortnight of July to 1st fortnight of August. Majority of the farmers preferred to apply cow dung manures although it was not as per recommended dose due to non availability. Farmers have also adopted transplanting in line instead of random transplanting. Numbers of plant density was found to be 16 hills/m² in case of S.R.I. while in Conventional method of paddy cultivation it varies from 30 to 36 hills/m². The farmers depend on Govt. Store and Private retailers for obtaining fertilizers, pesticides and seeds. Availability of irrigation facility is the prime need of the farmers along with availability of inputs like fertilizer, bio-fertilizers, and bio-pesticides at proper time. The weed population was medium. Among weeds, *Cyperus rotandus*, *C. irria*, *Echinochloa crusgalli*, *E. colonum* and *C. globosus* were found to be in majority. Farmers prefer manual weeding and use of weeder in case of S.R.I. Only few farmers were found to use chemical weedicides. Among insect pests infestation of stem borer and leaf folder was significant while among plant diseases incidence of sheath blight, blast and false smut disease was observed. Infestation of brown plant hopper (BPH) was significantly recorded in an alarming manner in the concerned Agri. Sub Division as a new pest. On an average, 2 times plant protection chemicals were sprayed in a cropping season. Knapsack sprayer was mostly used as equipment for spraying plant protection chemicals. In respect to pesticide application insecticides (namely, monocrotophos 36 %, triazophos 40%, chlorpyriphos 50% + cypermethrin 5%) are more popular .Few progressive farmers were found to prefer new insecticides like flubendiamide 39.35% SC, kresoxim methyl 44.3%SC etc. Among the fungicides carbendazim 50%, Saaf (carbendazim 12 % + mancozeb 63 %) propicnazole25%EC, validamycin are commonly used against rice diseases. No instance of mixing up of fungicides with insecticides/weedicides/fertilizers was recorded.

Prevalence of diseases and insect pests of rice in Tripura during 2011 Kharif

District	Diseases				Insect Pest		
	ShBl	BLB	BI	FS	LF	SB	BPH
South Tripura (Matabari Agri. Sub Division)	M	L	M	L	M	M	L

UTTAR PRADESH-1

Districts Surveyed: *Ambedkar Nagar, Barabanki, Basti, Faizabad, Gorakhpur, Maharjganj, St. Kabir Nagar and Sultanpur*

Particulars of survey

Districts	Block/Village
Ambedkar Nagar	Katehri, Akbarpur, Ram Nagar, Tanda
Barabanki	Ram Sanahi Ghat, Hydergarh, Siraulij, Banikodra
Basti	Harriya, Vikramjot, Sadar, Kaptanganj
Faizabad	Rudauli, Mawai Harringtonganj, Masodha, Pura, Milkipur, Khandasa, Bikapur, Maya,
Gorakhpur	Sahjanwa, Chargawa, Paniara, Bhitirawat
Maharjganj	Sadar, Partawal, Ghani, Pharenda,
St. Kabir Nagar	Dhanaghata, Mehdawal, Khalilabad, Semeria
Sultanpur	Baldirai, Dhanpatganj, Kurebhar

Widely Grown Varieties

Districts	Varieties
Ambedkar Nagar	Shusk Samarat, Arize 6444, Narendra Lalmati, NDR-97, Gorakhnath 510, J.K. 401, US 412, Prithvi, Nagma, Mahi Challenger, Goldi, Moti, Sarjoo 52, PHB 71, Sindur, Sabha Mahsuri, Swarna, NDR 359
Barabanki	Shusk Samrat, Lalmati Lohtan (Local), Sarjoo 52, NDR 359, Shakkarchini, Kalajeera (Local), NDRH-2, Ari (Local), PHB-71, Sabha Mahsuri, Swarna, Dankal, Arize 6444, Basmati, NDR-97
Basti	Prithivi, Jallahri, Jalpriya, NDR 97, Swarna, BPT 5204, Dankal, Sarjoo 52, NDR 359, Gorakhnath 509, Komal, Kalanamak, Arize 6444, PHB 71, Basmati, Sai 6698, Moti, NDRH 2
Faizabad	Shusk Samarat, NDR 2064, NDRH-2, Arize 6444, PHB 71, Sarjoo 52, NDR 359, Sabha Mahsuri, Swarna, NDR 97, Gorakhnath 509, Gorakhnath 510, Narendra Usar Dhan-3, Pusa Basmati, Type-3, Narendra Lalmati, Jallahri, Prithvi, Nagma, Baranideep
Gorakhpur	Arize 6444, Bengal Juhi, PHB-71, Golden, Sambha, Kalanamak, Sarjoo-52, Arize 6201, Sonkhar, Sarya (Local), NDR 97, Komal, SAI ó 6698, Sonam, Rupali Gorakhnath 509, Gorakhnath 510
Maharjganj	Shusk Samrat, Baranideep, Kalanamak, Pusa Basmati, Arize 6444, PHB 71, NDR -359, Bengal Juhi, SAI - 6698, NDR 97, Swarna, Sambha Mahsuri, Sarjoo 52, Type-3, Sahbaghi, Gorakhnath 509, Gorakhnath 510
St. Kabir Nagar	Bengal Juhi, NDRH 2, Sarya (Local), Sonkhar (Local), Sabha Mahsuri, Swarna, NDR 359, Sarjoo 52, Gorakhnath-510, JK 401, Gorakhnath-509, SAI - 6698, Arize 6444, PHB-71, SAI 6698, Kalanamak, Basmati, Komal, Jalpriya, Gorakhnath-509, US -312, Sunder, Sindoor, Moti, NDR 97, Arize 6201, Jallahri
Sultanpur	Prithivi, PHB-71, Shusk Samrat, NDR 97 Sarjoo 52, Swarna, Arize 6444, Narendra Usar Dhan 3, Lalmati, Sabha Mahsuri, NDR 359

Particulars of rice area in selected districts

Division	Area under rice production (thousand hectare)			
	Hybrid	Scented	HYV/Others	Total
Faizabad	182.663	7.008	420.315	609.986
Basti	96.953	6.690	282.427	386.070
Gorakhpur	144.742	4.931	428.493	578.166

Production Oriented Survey of rice was undertaken in 8 districts of eastern Uttar Pradesh viz., Faizabad, Sultanpur, Ambedkar Nagar, Barabanki, Basti, Sant Kabir Nagar, Maharajganj and Gorakhpur from tillering to maturity stage of rice crop during WS 2011. This year average rainfall was 786.4 mm as against 841.2 mm of the normal which was 93.50% of the normal. Out of the 72 districts of U.P. ten districts received more than normal rainfall (i.e. excess >120%); in 40 districts 80-120% of the normal (normal), 17 districts 60-80% of the normal (deficient), 3 districts 40-60% of the normal (highly deficient) while only one (Maharajganj) district very less rainfall below 40% of the normal (scanty). In U.P. targeted area of rice was 59.00 lac hectares while 59.53 lac hectare were planted. Last year total planted area of rice was 57.53 lac hectare. Due to timely onset of the monsoon during kharif 2011, targeted area of rice could be easily achieved. After starting of the monsoon with uniform distribution of rainfall in most of the districts, crop establishment was very good. However in the some districts of eastern U.P. crop suffered drought at the reproductive stage.

In this year diseases like sheath blight, bacterial leaf blight and false smut and insects like stem borer, hoppers, grass hoppers, gundhi bug and leaf folder were observed in surveyed districts in low to moderate intensity. The most popular varieties like BPT 5204 and MTU 7029 were infected with sheath blight, bacterial leaf blight and false smut in some hybrids while Kalanamak, Basmati and some hybrids with Stem borer. In some areas zinc and sulphur deficiency was also observed. The varieties NDR 359, Sarjoo-52, NDR 2064, NDR 97, Shusk Samrat, Shambha Mahsuri, Swarna and hybrids Arize 6444, NDRH ó 2, PHB 71, Gorakhnath -509, Gorakhnath -510, SAI ó 6698 were found very popular among the farmers of eastern U.P. The supply of inputs like fertilizers and electricity was not adequate during crop season. Most of the farmers used DAP/NPK as basal dose during transplanting while urea as topdressing. Some progressive farmers used green manuring before transplanting. Use of rotavator in preparation of main field becomes popular among farming community. Poor availability of the farm laborers were also noticed during survey. Majority of farmers were adopting plant protection measures for controlling disease, insects and weeds. Majority of the farmers are small farm holders and adopted mainly rice-wheat cropping system followed by rice-sugarcane, rice-mustard, rice-pulses and rice-vegetables. The main source of farmers finance is cooperative societies and kisan credit card. The major economic weeds namely *Echinochloa crusgalli*, *E. colona*, *Cyperus iria*, *C. rotundus*, *Cloeme viscosa*, *Eclipta alba* and *Fimbristylis dichotoma* were observed. Majority of the farmers adopted random transplanting. Use of combine harvester in the Maharajganj, Gorakhpur, St. Kabir Nagar, Basti and Ambedkarnagar districts is common. The main source of irrigation is tube well/pumping sets followed by canals. In certain pockets, short grain aromatic rices including Kalajeera, Shakkarchin, and Lalmati in Barabanki, Bengal Juhi, Kalanamak in St. Kabir Nagar, Maharajganj and Gorakhpur were also grown in limited area due to the preference and liking of these varieties by the farmers. Short duration local varieties viz. Saraiya and Sonkhar in St. Kabir Nagar, Ari and Lohtan in Barabanki, were also cultivated.

Ambedkar Nagar: Predominant varieties in this district were Shusk Samarat, Arize 6444, Narendra Lalmati, NDR-97, Gorakhnath 510, J.K. 401, US 412, Prithvi, Nagma, Mahi Challenger, Goldi, Moti, Sarjoo 52, PHB 71, Sindur, Sabha Mahsuri, Swarna, NDR 359. The prevailing crop rotations were rice-wheat, rice-sugarcane and Rice-Pulses. Most of the farmers are using seeds of high yielding varieties and hybrids obtained from private and Govt. agencies. Random transplanting was adopted by majority of the farmers. Biotic stresses such as diseases (sheath blight, BLB and false smut) and insects (stem borer) were observed from low to moderate intensity. Insects like Leaf folder, gundhi bug and grass hoppers were also recorded in traces. Common weeds of rice were *Echinochloa crusgalli*, *E. colona*, *C. rotundus* and *Fimbristylis dichotoma*. Butachlor @ of 2.5 l/ha and Nominee gold @ 200 ml/ha were used to control the weed by majority farmers. Multiplex was also used to supply the micro nutrients while some farmers ZnSO₄ was used by some farmers to meet out the zinc deficiency. Urea, MOP and DAP is major source of nutrients. Carbendazim @ 1 kg/ha, Saaf @ 1.5 kg/ha and hexaconazole @ 1.5 l/ha for disease and carbofuran/forate and Folidal 20 kg/ha were used for insect control. The main sources of irrigation are tube well and canal. Majority of the farmers this districts growing hybrids due to higher yield. Harvesting was done by manual followed by combine harvester.

Barabanki: The predominating varieties in this districts were Shusk Samrat, Lalmati Lohtan (Local), Sarjoo 52, NDR 359, Shakkarchini, Kalajeera (Local), NDRH-2, Ari (Local), PHB-71, Sabha Mahsuri, Swarna, Dankal, Arize 6444, Basmati, NDR-97. The major crop rotation adopted by the farmers were Rice-wheat, Rice-Mentha, Rice-Mustard/Potato and Rice-Sugarcane. Main source of irrigation are Tube well and Canal. Urea and DAP used as basal dose of fertilizer. Biotic stresses such as diseases (sheath blight and bacterial leaf blight) and insects (stem borer) were observed from low to moderate intensity. However other insects like leaf folder, gundhi bug and grass hoppers were also observed in traces. Most of the farmers were using certified seeds and few are their own seed. Zinc sulfate @ 20 kg/ha and multiplex were used to meet out zinc deficiency. Common weeds of rice were *Echinochloa crusgalli*, *E. colonom*, *C. rotundus* and *Fimbristylis dichotoma*. Pesticides like carbendazim, hexaconazole, propiconazole, and copper oxychloride+streptocyclin were used to control the disease and insecticides like Folidal @ 25 kg/ha and monocrotophos @ 1 l/ha for insects.

Basti: The prevailing varieties in the district were Prithivi, Jallahri, Jalpriya, NDR 97, Swarna, BPT 5204, Dankal, Sarjoo 52, NDR 359, Gorakhnath 509, Komal, Kalanamak, Arize 6444, PHB 71, Basmati, Sai 6698, Moti, NDRH 2. Major cropping systems adopted by the farmers were Rice-wheat, Rice-Sugarcane and Rice-Pulses. DAP and urea was used at the time of transplanting while the potash was used by few farmers. Biotic stresses such as diseases (sheath blight, bacterial leaf blight and false smut) and insects (stem borer, leaf folder and gundhi bug) were observed from low to moderate intensity. The common weeds of rice were *Echinochloa crusgalli*, *E. colona* and *Fimbristylis dichotoma*. Fungicides like carbendazim, hexaconazole, propiconazole and Saaf for sheath blight and insecticides like monocrotophos for insects and weedicides like butachlor, pretilachlor and 2,4 - D were used to control of the weeds. Zinc sulphate was used to overcome zinc deficiency. Use of combine harvester is a common practice in this district. Source of irrigation are tubewell/pumping sets and canal.

Faizabad: Survey was conducted in 9 blocks of Faizabad districts. The prevailing varieties were Shusk Samarat, NDR 2064, NDRH-2, Arize 6444, PHB 71, Sarjoo 52, NDR 359, Sabha Mahsuri, Swarna, NDR 97, Gorakhnath 509, Gorakhnath 510, Narendra Usar Dhan-3, Pusa

Basmati, Type-3, Narendra Lalmati, Jallahri, Prithvi, Nagma, Baranideep. The major cropping systems adopted by the farmers were rice-wheat, rice-sugarcane and rice-pulses. The main source of irrigation is tube well/pump sets and canal. Progressive farmers used moong bean and dhaincha (*Sesbainia* spp.) as green manure and FYM before transplanting for enhancing soil health. Biotic stresses such as diseases (sheath blight, bacterial leaf blight and false smut) and insects (stem borer) were observed from low to moderate intensity. However other insects like leaf folder, gundhi bug and grass hoppers were also recorded in traces in certain pockets. The major common weeds of rice were *Echinochloa crusgalli*, *E. colona*, *Cyperus rotundus* and *Fimbristylis dichotoma*. Use of weedicides (Nominee gold, butachlor) has become popular among the farmers to control the weeds. Different pesticides like carbendazim, propiconazole, Saaf, hexaconazole, monocrotophos and Folidol were used as crop protection measures. Farmers faced problem in timely availability of inputs and laborer for transplanting and weeding. Other nutrients like ZnSO₄, FeSO₄ and multiplex were used to meet out the micronutrient deficiency. Most of the farmers are using nitrogenous and phosphatic fertilizers only. Majority of the farmers used certified seeds of high yielding varieties.

Gorakhpur: The popular widely grown varieties were Arize 6444, Bengal Juhi, PHB-71, Golden, Sambha, Kalanamak, Sarjoo-52, Arize 6201, Sonkhar, Sarya (Local), NDR 97, Komal, SAI 6698, Sonam, Rupali, Gorakhnath 509, Gorakhnath 510. Major cropping pattern were Rice wheat, Rice Sugarcane, Rice-Mustard/Potato and Rice Pulses. The main source of irrigation is tube well and canal. Biotic stresses such as diseases (sheath blight, bacterial leaf blight and false smut) and insects (stem borer) were observed in low to moderate intensity. However other insects like leaf folder, gundhi bug and grass hoppers were also observed in traces. The Common economic weeds of rice were *Echinochloa crusgalli*, *E. colona*, *C. rotundus* and *Fimbristylis dichotoma*. Different pesticides like carbendazim, propiconazole, copper oxychloride + streptomycin and monocrotophos & Folidol were used as crop protection measures. Herbicides like butachlor and Nominee gold were used for weed management. Multiplex was used for supply of micronutrients.

Maharajanj: The prevailing varieties were Shusk Samrat, Baranideep, Kalanamak, Pusa Basmati, Arize 6444, PHB 71, NDR -359, Bengal Juhi, SAI - 6698, NDR 97, Swarna, Sambha Mahsuri, Sarjoo 52, Type-3, Sahbaghi, Gorakhnath 509, Gorakhnath 510. The major crop rotation practice adopted by farmers were Rice wheat and Rice Sugarcane. Swarna (MTU 7029) and Sambha Mahsuri (BPT-5204) were dominating variety of rice and major rice growing area is occupied by them. FYM is used by some farmers before transplanting. Low to moderate incidence of diseases (sheath blight, bacterial leaf blight and false smut) and insects (stem borer) were observed. Occurrence of other insects like leaf folder, gundhi bug and grass hoppers were noticed in traces. Main common weeds of rice were *Echinochloa crusgalli*, *E. colona* and *Fimbristylis dichotoma*. Different pesticides like copper oxychloride+streptomycin, carbendazim and propiconazole for diseases, monocrotophos, carbofuran and Forate for insects and butachlor and pretilachlor for weed control were used by farmers. Zinc deficiency was also recorded which was recovered by use of ZnSO₄. Most of the farmers used combine machine for harvesting of crop. Main source of irrigation is tube well/pumping sets and Canal.

Sant Kabir Nagar: The prevailing varieties were Bengal Juhi, NDRH 2, Sarya (Local), Sonkhar (Local), Sabha Mahsuri, Swarna, NDR 359, Sarjoo 52, Gorakhnath-510, JK 401, Gorakhnath-509, SAI - 6698, Arize 6444, PHB-71, SAI 6698, Kalanamak, Basmati, Komal, Jalpriya, Gorakhnath-509, US -312, Sunder, Sindoor, Moti, NDR 97, Arize 6201, Jallahri.

Rice ó wheat and Rice ó Sugarcane were major cropping systems adopted by the farmers. Biotic stresses such as diseases (sheath blight, bacterial leaf blight and false smut) and insects (stem borer) were observed from low to moderate intensity. Other prevailing insect/pests of the region were found in traces. Tube well and canals are major source of irrigation. Common weeds of rice were *Echinochloa crusgalli*, *E. colona*, *C. rotundus*, *Cleome viscosa* and *Fimbristylis dichotoma*. Zinc deficiency was also recorded. Different pesticides like carbendazim, propiconazole & hexaconazole for the diseases and carbofuran, Folidol and monocrotophos were used for insect management. Weedicides like Nomineegold, 2-4 D and butachlor were used for weed management. Harvesting is done by combine harvester followed by manual.

Sultanpur: The predominating varieties were Prithivi, PHB-71, Shusk Samrat, NDR 97 Sarjoo 52, Swarna, Arize 6444, Narendra Usar Dhan 3, Lalmati, Sabha Mahsuri, NDR 359. Major crop systems adopted by the farmers were rice-wheat, rice-surgarcane and rice-pulses. Moong bean and Dhaincha (*Sesbania* sp.) as a green manure were used by few farmers. Nitrogen and phosphorous were used by majority of farmers while potash was used by very limited farmers. Random transplanting was done by majority of farmers. Biotic stresses such as diseases (sheath blight, bacterial leaf blight and false smut) and insects (stem borer) were observed from low to moderate intensity. The common weeds of rice were *Echinochloa crusgalli*, *E. colona*, *Cyperus iria*, *C. rotundus* and *Fimbristylis dichotoma*. Different pesticides like carbendazim and hexaconazole for different diseases and insecticides like monocrotophos for stem borer were used. Herbicides like butachlor @ 2.5 l/ha and Nomineegold @ 200 ml/ha were used for control of the weed. Zinc deficiency was also recorded. To meet out the zinc deficiency 20 kg/ha zinc Sulphate was applied by farmers.

Prevalence of diseases and Insect pests in Eastern Uttar Pradesh during kharif' 2011

Districts	Diseases			Insects			
	ShB	BLB	FS	SB	LF	GB	GH/HP
Ambedkar Nagar	L-M	L-M	L	L-M	L-T	T	T
Barabanki	L	L	L	L-M	T	T	T
Basti	L-M	L	L	L-M	T	T	T
Faizabad	L-M	L-M	L	L-M	L-T	T	T
Gorakhpur	L-M	L-M	L	L-M	L-T	L	L
Maharjganj	L-M	L-M	L	M	L-T	L	L
St. Kabir Nagar	L-M	L	L	L-M	L-T	L	L
Sultanpur	L	L	L	L	T	T	T

ShB- Sheath blight, BLB-Bacterial leaf blight, FS- False smut, LF-Leaf folder, SB- Stem borer, GB- Gundhi Bug, GH- Grass hopper, HP- Hopper, L- Low, M-Moderate, S-Severe, T-Traces

UTTAR PRADESH-2

Particulars of survey in eastern Uttar Pradesh in 2011-12

Districts	Blocks	Villages
Varanasi	Chiraigaon, Kashi Vidya peeth, Araziline	Chaubeypur, Muskabad, Cholapur, Rajwari, Kadipur, Ashapur, Lahanz, Sattarpur,, Jakhani, Sihorwa, Virbahnpur, Barthana, Dhaurasra, Umraha, Lahartara, Bithari, Bishunpur, Lohta, Khanao
Chandauli	Niyamtabad, Chakiya, Chandauli	Jagdispur Bathariya, Lakhapur, Chitauri, Ganela, Latif Shah, Kaudihar, Thekha, Karnaul, Jamokhar, Narayanpur.
Sonebhadra	Robertsganj, Ghorawal	Karma, Mahuao, Tintali, Gaurahi, Boghar, Fulwari, Rurna, Dhurkari, Madhuka, Pandri, Parsanna, Jamgaon,
Jaunpur	Dobhi, Kerakat, Shahganj, Badlapur,	Bishunpur, Kadwan, Kushew, Narayanpur, Loharkoat, Bhora, Senapur, Ratanpur, Behra, Parsodi, Amihit Rajdharpur, Samodhpur, Kuthan, Pattinarendrapur, Phatehgarh Takha, Badlapur
Ghazipur	Jakhaniya Manihari Mardha, Bara Chawar,	Padampur, Dhamopur, Nasratpur, Madra, Ranpur, Manihari, Kharwa, Hansrajpur, Tezpura, Gai, Chawar, Gariha, Bahadurganj, Patar, Bharauli, Uttarao, Akathi., Abnishan, Prithivipur, Khojua, Dumrao
Azamgarh	Belariyaganj, Thekma Rani ki saray	Miharganj, Rampur, Katherwa, Lahura, Pavani, Katai, Lafia, Salempur, Chewar.
Mau	Pardaha, Ratanpura, Mohmdabad,	Dumarao Bakauich, Unaich, , Haldharpur Duraona, Katra, Pilkhi, Parmanand, patii, Rajanpur Sahroj, Bara, Khirikotha, kathghara, Telswa
Ballia	Dubhar Sohao,	Mishrauly, Chatha, Bhouli, Dauni, Pachphedwa, Chitauni, Nahari, Laxmanpur, Chaura, katharia, Gopalpur

Widely prevalent rice varieties in eastern Uttar Pradesh

Districts	Rice Varieties
Varanasi	HYVs: Sarjoo-52, Pant Dhan 10, NDR-359, BPT-5204, MTU-7029, HUBR 2-1, Type-3. Pusa Basmati, Komal, Moti; Hybrids: PHB-71
Chandauli	HYVs: Sarjoo-52, Moti, Sonam, Badshah bhog, NDR-359, BPT-5204, MTU-7029, HUBR 2-1; Hybrids: JK hybrid
Sonebhadra	HYVs: Sarjoo-52, NDR-97, NDR-359, BPT-5204, MTU-7029, Pant-12, Govindbhog, Sonam, PRH-1, Rupali, Jaya, Balidan,; Hybrids: PHB-71, Arize-6444, Hybrid-312
Jaunpur	HYVs: Sarjoo-52, Pant Dhan 10, Pant Dhan 12, NDR-97, NDR-359, BPT-5204, MTU-7029, Rupali, Sonam, Jaisurya . Kalanamak, Type -3 Pusa Basmati, Komal; Hybrids: Ganga Kauveri
Ghazipur	HYVs: Sarjoo-52, Sonam, NDR-359, BPT-5204, MTU-7029, Kalanamak, Moti, Jui Bengal; Hybrids: Arize 6444
Azamgarh	HYVs: Sonam, Sarjoo-52, Pant Dhan 10, NDR-97, Narendra Usar dhan3, NDR-359, BPT-5204, MTU-7029, Moti;
Mau	HYVs: Sarjoo-52, NDR-97, NDR-359, BPT-5204, MTU-7029, Pusa Basmati, Moti, Sonam, Kalanamak
Ballia	HYVs: Sarjoo-52, Type-3, NDR-359, BPT-5204, MTU-7029, Moti, Jalpriya, Jalnidhi,; Hybrids: PHB-71, Arize 6444 and JK hybrid

Targeted Area, Production and Productivity for rice crop during kharif season 2011-12

Districts	Hybrids (ha)	Scented/Basmati (ha)	Other (ha)	Total area (ha)	Production (tones)	Productivity (q/ha)
Varanasi	1,683	0,300	48,126	50,109	109,242	21.80
Chandauli	7,370	1,120	101,294	109,784	326,542	29.74
Sonebhadra	6,380	0,000	31,410	37,790	62,442	16.52
Jaunpur	22,605	1,000	118,777	142,382	321,008	22.56
Azamgarh	20,283	0,880	189,842	210,765	466,535	22.14
Mau	8,984	0,500	74,674	84,058	188,285	20.02
Ballia	17,249	0,860	95,087	112,996	232,436	20.57
Ghazipur	7,979	1,120	140,401	149,500	339,638	22.72
Uttar Pradesh	1095,803	591,471	4212,726	5900,000	13500,000	22.28

Source : Data provided by U.P. State Department of Agriculture

Area, Production and Productivity under rice crop during kharif season 2010-11

Districts	Area of Rice crop (ha)	Production of Rice crop (tones)	Productivity (q/ha)
Varanasi	42,021	84,882	20.20
Chandauli	98,325	270,984	27.56
Sonebhadra	27,442	42,014	15.31
Jaunpur	139,885	292,220	20.89
Azamgarh	203,577	417,536	20.51
Mau	84,040	155,894	18.56
Ballia	106,588	208,931	19.06
Ghazipur	149,321	314,321	21.05
Uttar Pradesh	5631,949	11936,078	21.20

Source : Data provided by U.P. State Department of Agriculture

This year Production oriented survey of rice was conducted in eight district of Eastern Uttar Pradesh viz., Varanasi, Chandauli, Sonebhadra, Jaunpur, Ghazipur, Azamgarh, Mau, and Ballia covering nearly ten to twenty villages in each district during Kharif season 2011-12 with the help of scientist from Banaras Hindu University and Krishi Vigyan Kendra functioning in these districts for the biotic stresses like diseases and insects of the rice crop. During survey, agriculture state government officers and some of the NGO's working in these areas also helped to facilitate the dissemination of rice growing knowledge among farmers. For reaching more farmers during survey a brief group meeting with farmers was organized with the help of government workers, some NGO's working in these area and with the help of some progressive farmers. The topic of discussion was mainly focused on the biotic and abiotic stresses particularly with the rice crop but interaction and discussion was opened on all the aspects of agriculture in view to understand the basic constraints of rice production in both qualitative and quantitative terms and to suggest the remedial measures of their problem. The farmers actively participated in the group meeting and were keen to listen and adoption of scientific views.

These districts were surveyed some time in a planned manner after getting the approval from the host institution during dough to maturity stages of the crop. In some areas crop was often surveyed from nursery to harvesting stages as time permitted for visit. The survey was conducted on the basis of randomly selected farmers field. Most of the farmers those who were interacted was marginal and submarginal farmers with the small land holdings. Most of the areas was under transplanted rice except in some of the areas of Sonebahdra districts were direct seeded rice were also in practiced. This year also climatic conditions in this region were very conducive for the rice crop and sometime rainfall occurs at the critical time of water requirement of the crop and helped in the crop establishment sufficiently.

In 2010-11 rice crop was grown in the entire state covering 56.31 lakh hectare with the total production of 119.36 lakh metric tones with the productivity of 21.20 q/ha. For the year 2011-12 the projected target area under rice crop was increased to nearly 59 lakh hectare with 10.95 lakh hectare area under hybrid rice, 5.91 lakh hectare under scented or basmati rice, while for other rice varieties targeted area in the state was 42.12 lakh hectare with the total production of 135 lakh metric tones and productivity of 22.88 q/ha.

In this region, for the irrigation most of the farmers uses tubewell and pumping-sett. Among the surveyed districts, Chandauli districts have nearly highest productivity of the rice crop in the entire state and also called as rice bowl area. Most of the cultivation in the district is based on the canal irrigation and farmers prefer to grow long duration varieties because of their high yields and prolonged time schedule of water in the canal which restrict them to grow short duration or medium duration varieties. Some of the big progressive farmers have adopted zero tillage practice during rice- wheat cropping system and harvest crop through combiner harvester. Majority of the farmers have adopted random transplanting, only some of the farmers were found using transplanter for transplanting rice field.

The predominant cropping system followed by farmers in the surveyed districts of eastern Uttar Pradesh was Rice- wheat cropping system. The other cropping system was rice-pulses, rice- mustard, rice- sugarcane, rice- vegetables etc. Most of the farmers who were interacted this time was marginal to sub marginal farmers prefer to grow rice for their own

consumption or for local marketing and give more emphasis to get more yield in terms of quantity rather than quality. Therefore they preferred to grow rice varieties like Sarjoo-52, NDR-359, MTU 7029, BPT 5204 for getting more yield rather than growing basmati or scented rice. Now government is emphasizing more to increase the area under hybrid and basmati rice by providing seeds and some incentives through their own agencies. In some of the surveyed districts this year Swarna sub-1 varieties was also promoted but there was some hiccups in their adoption among the farmers about their yield and quality parameter.

In this region the specific needs of the farmers were irrigation facility, timely availability of good quality seeds and fertilizers. The basic constraints in adopting new rice technology among farmers were there small holdings deficient in terms of money and grow rice crop mainly for their domestic consumption. Non availability of labours during critical period of time of agricultural operation is also a basic constraint. The specific needs of the farmers in the surveyed areas were increase in irrigation facilities, timely availability of good quality seeds and fertilizers. The main source of irrigation in the surveyed districts was tubewell and pumping set which require electricity and diesel oil these power supply was also needed for other agricultural operations and their rise in prices make acute problems by increasing cost of production among the farmers. Most of the small holding farmers are poor, usually they enquire and apply insecticides and fungicides when losses seems severe and for weed control most of them preferred hand weeding. Hand weeding was a common practice adopted in the region for removal of weed in rice nursery as well as in the main field. Only few progressive farmers use selective weedicides like Butachlor and 2,4-D for weed management. Commonly observed weeds in the fields were viz., *Echinochloa crusgalli*, *E. colomum*, *Cynodon dactylon*, *Cyperus rotundus*, *C. irria*, *Commelena bengalensis*, *Ecilipta alba*.

Some of the progressive farmers showed keen interest in getting trained on new technology required for growing hybrid and basmati rice with full adoption of package and practices for the control of insect and plant diseases. Some multinational companies of seeds and pesticides also conducted some demonstration trials in the farmer's field of this region to promote their varieties and products.

Day by day farmers are neglecting cattle rearing for household and farm use which compel them to use inorganic fertilizers rather than using FYM or organic manures. Some of the farmers were found aware about their consequences and adopted FYM, Vermicompost and organic manures mainly for land preparation for raising nursery. Only some of the farmers were found using FYM or organic manures for both nursery and transplanted fields. Most of the farmers applied DAP and Urea for growing rice crops and depend mainly on the Primary Agriculture Credit Society (PACS) rather than purchasing from open market but sometime delayed or non availability of fertilizers at the critical juncture of application leads to drastic reduction in the rice yield. Only few farmers were recognizing the fact that only balanced use fertilizer doses will be a economically viable solution for increase in rice production. Some of the farmers used micronutrients also in the field. The application of manures and fertilizers consisted of FYM and NPK 40-60:20: 10 for HYVs and 40-80: 20:10 for rice hybrids.

The availability of improved seeds, fertilizers and pesticides were inadequate Farmers purchased seeds from State seed supplying agencies or from private agencies but most of the marginal and sub-marginal farmers grow the seed harvested from last year crops. Farmers were in need of hybrid seeds at subsidy rate, power transplanter, harvesters, threshers,

sprayers, dusters on low cost basis. They were also in need of fertilizers, pesticides, weedicides at proper time at subsidy rates, crop loans at low interest rate and training on the use of weedicides and herbicides. Farmers usually hire plant protection equipment from the market at per hour basis for spraying or some of them who possess it exchange among themselves as per need.

In this year due to good monsoon the disease and insect pressure was quiet low. Although disease like sheath blight, bacterial leaf blight, false smut and symptoms of brown spots and leaf blast or neck blast were quiet often observed at low to moderate intensity . Among insects infestation, stem borer, leaf folder, gundhi bug were observed commonly in the surveyed field but their intensity was also quiet low. In some of the field at Institute farm or in some of the surveyed districts at the time of nursery root galls were also observed showing stunted plant growth and yellowing of leaved with white to brown root galls in the nursery plants.

Loss in storage was inevitable in view of improper drying threshing and storage facilities among the farmers Regarding the loses in the post harvest 10-12 % of the losses were reported during harvest and 1-5 % occurred during threshing, handling, cleaning and storage.

Varanasi: In Varanasi districts area under rice crop was 42,021 hectare in 2010-11 and targeted area this year increased to 50,109 ha, with total rice crop production 84,882 tones with the productivity of 20.20 q/ha during 2010-11. This year targeted production of the district was 109,242 tones with the production of 21.20 q/ha. The varieties grown by farmers were Sarjoo52, NDR 359, Sambha mahsuri, Swarna, Pant Dhan 10, Arize 6444, Arize 6201, Pusa Basmati, Type-3, Moti, Ganga Cauvery etc. The main source of irrigation in the district is tubewell and canal. Biotic stresses such as disease (Sheath blight, bacterial leaf blight, leaf blast, brown spot) were observed from moderate to low intensity. False smut was also observed in some areas but their intensity was quiet low this year. In some of the nurseries root galls were observed in rice plants, the infestation of stem borer and gundhi bug were observed low to moderate intensity. The major common weeds of rice were *E. colonum*, *E crusgalli*, *Cyperus rotundus*. Most of the farmers prefer hand weeding. Carbendazim, Propiconazole, Saaf, Hexaconazole, Monocrotophos, Chloropyriphos and Carbofuran were used for the crop protection. In some of the areas zinc and iron deficiency was also observed.

Chandauli: In this district major area were under rice crop during kharif season was 98325 ha in 2010-11 with the total production of 270,984 tones having the productivity of 27.56 q/ha. Area under Hybrid rice for 2011-12 is 7,370ha while area with scented or basmati was 1,120ha and most of the area covered by late maturing varieties which account for 101,294 ha. Farmers mostly preferred to grow late maturing varieties like Sambha mahsuri and Nati mahsuri. In some villages, where canal irrigation is not possible farmers were also growing varieties like Sonam, Badshah bhog, Ram bhog, Ganga cauveri, Moti etc. The cropping system adopted by the farmers were maily rice ó wheat, cropping system. This year bacterial leaf blight, brown spot and blast disease was observed at low to moderate intensity, while sheath blight and false smut was observed moderate to severe form. Insects like stem borer was found commonly in most of the fields while gundhi bug and leaf folder was also observed to moderate to low in intensity. Most of the progressive farmers of the district uses herbicides and well equipped with all the implements and adopt zero tillage practices. Farmers uses sheathmar, contaf, hexaconazole and validamycin to control sheath blight, copper oxychloride was used for the control of false smut, while for the control of leaf blast

and brown spot farmers did not use any fungicide because their incidence comes late in the rice crop mainly at the time of maturing and harvesting of the crops. Farmers use Phorate and Monocrotophos for the control of insects while Butachlor was used @ 2.5 lit /ha for the control of weeds.

Sonebhadra: During 2010-11 area under rice crop in Sonebhadra district was 27,442 ha with the production of 42,014 tones with the low productivity of 15.31q/ha. The target area for 2011-12 for hybrid rice covers 6,380 ha while other varieties cover 31,410 ha. The total production targeted for this district was 62,442 tonnes with the increase in productivity level of 16.52 q/ha. Most of the farmers in the district were marginal to sub marginal and due to lack of irrigation facility, most of the area of this district depend upon rainfall for the rice cultivation farmers preferred to grow Jaya, Sonam, Sarjoo-52, NDR-359, Pant -10, MTU 7029 and BPT 5204 for its own consumption and for marketing purposes. Sheath blight and false smut was observed in low to moderate intensities while in some of the fields symptoms of blast and brown spot was observed at the time of maturity of the crop. Farmers preferred to use Sheathmar and Carbendazim @ 1.0 kg/ha for the management of diseases. Stem borer and Gundhi bug were found to moderate intensity. Termite was the main problem among the farmers and for their control they use Chloropyriphos @ 1.5-2 lit / ha.

Jaunpur :- In Jaunpur district rice was grown in an area of 139,885 ha area during 2010-11 with the production of 292,220 tones having productivity as 20.89 q/ha. In 2011-12 Government targeted to increase the area under hybrid rice up to 22,605 ha area under basmati rice was 1000ha while for other rice varieties area covered was 118,777 ha with the total production targeted to be achieved was 321,008 with the productivity of 22.51 q/ha. Area under hybrid rice was nearly maximum throughout the state. The predominant varieties in this district were Nati mahsoori, Sambha mahsoori, NDR-359, Sarjoo-52, Pant -4, Moti, Komal, Sonam, Pusa Basmati etc. The crop rotations followed by most of the farmers were rice- wheat, rice- sugarcane and rice- pulses. Disease like sheath blight and bacterial leaf blight was observed at moderate to low intensity while at low to moderate intensity stem borer, leaf folder, gundhi bug was also observed. Zinc deficiency was also observed in some of the field where farmers practiced to apply 20-25 kg ZnSO₄ or Sulphur dust.

Ghazipur: During 2010-11 Ghazipur district covered 149,321 ha area under rice crop with the production of 314,321 tone and having productivity of 21.05 q/ha nearly the same productivity of state. In 2011-12 total targeted area under rice crop was increased to 149,500 ha with 7,979 ha area under hybrid rice, 1,120 ha area under basmati or scented varieties remaining areas covered with other varieties. Targeted production is also increased to 339,638 tones with the productivity of 22.72 q/ha. The crops was surveyed two to three times from nursery to the maturity stage. The common varieties grown in the district was Sarjoo-52, Sambha Mahsoori, NDR-359, Jaya, Moti, Juhi Bengal, kalanamak sonam etc. The weed population was low to medium and most of the farmers used hand weeding for weed control. Only few of the farmers were using Butachlor and 2-4 D as weedicide. Most of the biotic stresses like Sheath blight, bacterial leaf blight and false smut were found in moderate intensity among the diseases while stem borer and leaf folder were found in low to moderate intensity. Most of the farmers interacted were not using any fungicides for the control of disease few of them occasionally used carbendazim, Tricyclazole, Contaf or sulphur dust and spray of insecticides like Phorate, Monocrotophos for the control of insects. Zinc deficiency was also recorded in some field where farmers were applying 20 Kg ZnSO₄.

Azamgarh: In the azamgarh district total cultivated area under rice crop was maximum of 203,577 ha in 2010-11 which increases to 210,765 ha for 2011-12 with the production of 417,536 tone and productivity of 20.51q/ha . The area under hybrid rice was 20,283 ha for scented/ basmati rice the area covered as 880ha with the total targeted production of 466,535 tone with the total productivity as 22.14 q/ha . The varieties which were found most popular among the farmers of this district were Sonam, Jaya, Swarna, Sarjoo-52, NDR 359, PHB71, Arize 6444, NDR-97, Sambha mahsoori. Biotic stresses such as diseases (sheath blight, brown spot and leaf blast) were observed at moderate to low intensity. Stem borer, Leaf folder and gundhi bug were observed in the field to low to moderate intensity.

Mau: In this district, area of rice crop in 2010-11 was 84,040 with the production of 155,894 tones with the productivity of 18.56 q/ha. The area under hybrid rice was 8,984 ha, scented varieties cover 500ha area while other area covers by high yielding varieties was 84,058 ha. The predominant varieties in the district were NDR-97, NDR-359, Sarjoo-52, Sambha mahsoori, Swarna Moti etc. Most of the farmers used hand weeding for the weed control only few farmers applied weedicides like Butachlor (2.5lit/ha). Among the diseases bacterial leaf blight, sheath blight and brown spot were present in low to moderate intensities. Insect pests like stem borer, gundhi bug was also recorded as sporadically in all the surveyed field. In some field there was observed some patches of sodic soil. Farmers were found using Bavisitn, Blitox-50, Copper oxychloride, Contaf for different disease and Phorate and Monocrotophos were applied for the management of insect pests. Zinc deficiency was also recorded in some of the field where farmers applied Zinc sulphate @ 20 kg /ha.

Ballia: Total area covered by rice crop during 2010-11 in the Ballia districts was 106,588 ha with the total production of 208,931 tones with the productivity of 19.06 q/ha. For 2011-12 the targeted area under rice crop was 112,996 ha with the total production of 232,436 tone and targeted productivity of 20.57 q/ha. This district have 17, 249 ha area under hybrid rice with 860 ha under scented or basmati rice while other varieties have 95087 ha area. The predominant varieties of rice cultivated in this district were Swarna, Sarjoo-52, Type-3, Sambha mahsoori, Arize-6444, Kalanamak, Jk-hybrid. Among diseases brown spot sheath blight and bacterial leaf blight was observed to moderate to low intensity form. Among insect pest stem borer and gundhi bug was recorded at moderate to low intensity. For disease and insect control farmers were using Sheathmar, Streptocyclin, Phorate, Monocrotophos only when the damage caused by insect and disease become apparent.

Incidence of disease and pest in the surveyed districts of Eastern region of Uttar Pradesh in 2011-12

Districts	Diseases					Insects			
	ShB	BIB	BS	LB	FS	SB	LF	GB	RKN
Varanasi	M	L	M	M	L	L	L	M	M
Chaundauli	M-S	M	L	M	M-S	M	L	M	-
Sonebhadra	M-L	L	L	L	L	M	-	M	-
Jaunpur	M-L	M-L	L	L	L	M	L	M	-
Ghazipur	L	M	L	L	L	L	L	L	M
Azamgarh	M	L	M-L	L	L	L	L	M-L	L
Mau	M-L	M-L	L	L	L	L	L	L	-
Ballia	M-L	M-L	M	M	L	M	L	M	-

UTTAR PRADESH-3

Districts surveyed: *Barabanki, Baharaich, Shrawasti, Balrampur and Gonda*

Details of survey:

Districts	Taluqs/Blocks	Villages
Barabanki	Ramnagar and Masoli	Ganeshpur and Nau Basta
Baharaich	Pakhapur, Kaisherganj, Jarwal Kasba, Payagpur and Vishesswarganj	Nandwal, Bawanipura, Awastipura, Konari Bagla, Alinagar, Garhi, Adampur, Katra, Barolee, Gari, Beragava, Baragarh, Purna and Vishesswarganj,
Shrawasti	Econa block	Maniva, Purnibhalaviza, Dinnamghar, Darwa Mohant and Bharatpur
Balrampur	Tulsipur	Sikdiva, Tusipur and Deviputan
Gonda	Colonelganj, Mankapur and Nawabganj,	Colonelganj, Bandrha, Giluva, Parsapur and Lavabirpur

Widely grown rice varieties

Districts	Varieties
Barabanki	HYVs: Samba Mahsuri and NDR 359; Hybrids: PA 6444; Local: Pajpriya and Lalmati,
Baharaich	HYVs: Samba Mahsuri, Pusa basmati 1 and NDR 359; Hybrids: PA 6444; Local: Kalanamak, Madhukar and Indrasan
Shrawasti	HYVs: Samba Mahsuri, NDR 359, Pusa Basmati 1, Hybrids: PA 6444,
Balrampur	HYVs: NDR-359, Sarjoo-52, NDR-97 and Pusa Basmati 1; Hybrids: Nidhi-99 and PA 6444
Gonda	HYVs: NDR 359, Sarjoo-52, Samba Mahsuri and Pusa Basmati 1; Hybrids: PA 6444 and PHB 71

Production oriented survey was conducted in 5 districts of this part of Uttar Pradesh when the crops were in tillering or stem elongation or maturity stage. Overall, the climatic conditions were normal for rice cultivation. The commonly grown varieties were HYVs like NDR-359, Sarjoo-52, NDR-97 and Pusa Basmati 1; hybrids like Nidhi-99 and PA 6444 and some local varieties like Pajpriya, Lalmati, Madhukar and Indrasan. Most common crop rotation was rice-wheat. Most of the farmers applied in the main fields, 40-60 kg N/ha, 40-50 kg P₂O₅/ha and about 30-40 kg K₂O/ha as basal and 10-30 kg N/ha as top dressing. Many farmers adopted direct sowing. Among the diseases, brown spot was wide spread in moderate to severe intensity in many places. Other diseases like blast, neck blast, sheath rot, sheath blight, false smut and bacterial blight were recorded in low to moderate intensities. Among different insect pests, stem borer, grass hoppers and rats were observed in low intensities.

District wise observations

Barabanki: Production oriented survey was conducted in two villages in this district when the rice fields were in different stages of growth (tillering, booting and maturity). Most of the farmers contacted were marginal or sub-marginal. In general, the weather conditions were normal. Many farmers are taking two rice crops in a year. The predominant rice varieties in the district were Samba Mahsuri and NDR 359 among HYVs; hybrids like PA 6444 and local varieties like Pajpriya and Lalmati. Rice-wheat was the main crop rotation practice followed by rice-potato and rice-vegetables. The average rice yield for HYVs and hybrids was about 4500 kg/ha while for local varieties like Lalmati and Jalpriya it was 2000-2400 kg/ha. The

optimum time of sowing was last week of May to 1st week of June while optimum time of transplanting was last week of June to 1st week of July. Majority of the farmers applied manure in the nursery beds. The fertilizers were applied @ 50 kg N/ha, 40-50 kg P₂O₅/ha and about 40 kg K₂O/ha as basal and 40-90 kg N/ha as top dressing. Among different diseases, blast, neck blast, brown spot, false smut and bacterial blight were observed low to moderate intensities while sheath rot and stem rot were in low intensity and were sporadic. Among the insect pests, stem borer and gundhi bug were observed in low to moderate intensities while rats were observed in low incidence. There were records of zinc deficiency in some of the places.

Baharaich: Production oriented survey was conducted in 14 villages in 5 blocks/taluqs in this district when the crops were in tillering or stem elongation or maturity stage. Most of the farmers were marginal or sub-marginal. The weather conditions were more or less normal for rice cultivation. Many farmers took two rice crops in a year. The most predominant varieties in the district were Samba Mahsuri, Pusa basmati 1 and NDR 359 among HYVs; hybrids like PA 6444 and local varieties like Kalanamak, Madhukar and Indrasan. Rice-wheat was the main crop rotation followed by sugarcane-wheat, rice-mustard and sugarcane-sugarcane. The average rice yields among the HYVs and hybrids like Samba Mahsuri, NDR-359 and PA 6444 was 4000-500 kg/ha while among the locals it was 1200-3000 kg/ha. The optimum time of sowing was last week of May to 3rd week of June and optimum time of planting was last week of June to 3rd week of July. Many farmers applied compost, parley fold and compost in the nursery beds. In the main fields, farmers applied 40-50 kg N/ha, 40-50 kg P₂O₅/ha and about 40 kg K₂O/ha as basal and 10-25 kg N/ha as top dressing. Many farmers adopted direct sowing. The intensity of common weeds like *Echinochloa* spp., *Cynodon dactylon* and *Cyperus* spp. was low. Among the diseases, blast, neck blast, brown spot, sheath rot, false smut and bacterial blight were recorded in low to moderate intensities while sheath blight was in moderate to severe in some places. Among the different insect pests, stem borer and rats were in low intensities.

Shrawasti: Five villages in one block were covered for production oriented survey in this district when the crops were either in tillering stage or maturity stage. Majority of the farmers were marginal. The climatic conditions were normal for rice cultivation. Farmers used 80-95% of their land for rice cultivation. Many farmers took 2 rice crops in a year. Some of the commonly grown rice varieties were HYVs like Samba Mahsuri, NDR 359 and Pusa Basmati 1 and hybrids like PA 6444. Rice-wheat was the main crop rotation followed by the farmers. The average rice yield among HYVs and hybrids ranged from 4000-5000 kg/ha while in Pusa Basmati 1 it was about 2500 kg/ha. The optimum time of sowing was first week of May to first week of June while optimum time of transplanting was last week of June to 2nd week of July. Many farmers applied compost and green manure in the nursery beds. In the main fields, farmers applied 40-50 kg N/ha, 40-60 kg P₂O₅/ha and about 40 kg K₂O/ha as basal and 10-30 kg N/ha as top dressing. Many farmers adopted direct sowing. The intensity of common weeds was low. Among the diseases, sheath blight, brown spot and sheath rot were in moderate to severe intensities in some of the places. Other diseases like blast, false smut and bacterial blight were recorded in low to moderate intensities while neck blast and stem rot were in low intensities. Among the insect pests, grass hopper and rat damage were in low intensities. In many places, symptoms of zinc deficiency were noticed.

Balrampur: Survey was conducted in three villages in this district when the rice crops were in stem elongation or tillering or maturity stage. Majority of the farmers were marginal or sub-marginal. The farmers took one rice crop and rice wheat was the main crop rotation

followed by the farmers. Most commonly grown rice varieties in the district were NDR-359, Sarjoo-52, NDR-97 and Pusa Basmati 1 among HYVs and hybrids like Nidhi-99 and PA 6444. The average rice yields of HYVs like NDR 359, Sarjoo-52 and hybrids like Nidhi-999 and PA 6444 ranged from 3700-4240 kg/ha. The optimum time of sowing was 2nd of June to 2nd week of July and most of transplanting was completed by end of July. In the main fields, farmers applied 50-60 kg N/ha, 35-60 kg P₂O₅/ha and about 30-40 kg K₂O/ha as basal and 10-30 kg N/ha as top dressing. Transplanting was mainly random. The intensity of common weeds was high in most places. The common weeds were *Cyperus* spp., *Echinochloa* spp. and Dawaza (local name). Among the diseases, blast, neck blast, sheath blight, brown spot, sheath rot and false smut were observed in low to moderate intensities while grain discoloration was recorded in low intensity. Among the insect pests, stem borer and rat damage were in low intensities. In many places, symptoms of zinc deficiency and alkalinity were noticed.

Gonda: Production oriented survey was conducted in 5 villages in 3 blocks/taluqs in this district when the crops were in tillering or heading or maturity stage. About 60% of the farmers were marginal or sub-marginal. Farmers used 80-85% of their land for rice cultivation. Many farmers took 2 rice crop in a year. The general climatic condition was normal for rice cultivation. The predominant rice varieties in the district were Samba Mahsuri, Sarjoo 52, Pusa basmati 1 and NDR 359 among HYVs, hybrids like PA 6444 and PH-71. The average rice yield varied from 3500-4800 kg/ha in HYVs like Sarjoo-52, NDR-359 and Samba Mahsuri; 2400-2500 kg/ha in Pusa Basmati 1 and 4500-5200 kg/ha in case of hybrids like PA6444 and PHB-71. The optimum time of sowing and transplanting was 1-2 week of June and 1-3 week of July, respectively. Some of the farmers applied compost in the nursery beds. The fertilizers application consisted of 40-50 kg N/ha, 50-60 kg P₂O₅/ha and about 40 kg K₂O/ha as basal and 10-20 kg N/ha as top dressing. Transplanting was mostly random. The intensity of weeds was low and some of the common weeds were *Echinochloa* spp., *Cynodon dactylon* and *Cyperus* spp. Among the diseases, brown spot was widespread in moderate to severe and sheath blight was moderate to severe but was recorded only in some places. Others like blast, sheath rot, false smut, grain discoloration and bacterial blight were recorded in low to moderate intensities. Among the insect pests, stem borer and grass hopper were recorded in low intensities. Symptoms of zinc deficiency were noticed in some of the places.

Prevalence of diseases and insect pests in Uttar Pradesh

Districts	Diseases (% incidence)								
	BI	NBI	ShBI	BS	ShR	FS	StR	GD	BLB
Barabanki	20%	20%		8-20%	2%	15-20%	2%		8%
Baharaich	10-20%	5-12%	3-30%	5-20%	2-20%	8-25%		2-5%	8-10%
Shrawasti	5-8%	2-5%	15-30%	40%	20-30%	5-15%	2-8%	2-8%	10%
Balrampur	5-10%	10%	20%	15-25%	25%	8-10%		2%	
Gonda	5-10%	2%	30%	10-40%	4-15%	5-10%		5-8%	10%

Districts	Insect pests			
	SB	GB	GH	Rats
Barabanki	2-5%	2-20%		2-5%
Baharaich	2-10%			2-5%
Shrawasti			5%	5%
Balrampur	2-5%			5%
Gonda	4-8%		5%	2%

WEST BENGAL

District surveyed: Purba Medinipur, Hooghly, South 24-Parganas, North 24-Parganas, Malda, Dakshin Dinajpur, Uttar Dinajpur, Mushirabad and Nadia

Particulars of survey

District	Blocks/ Taluques	Villages
Purba Medinipur	Khejuri II, Ramnagar I &II, Contai I	Dulalpur, Betgaria, Dakshin Purusatampur, Duttakpur, Medinagar, Chotogarania, Adampur,
South 24-Parganas	Basanti, Gosaba, Magrahat II	Roypur, Ganakhati, Chandpur, Ramkrishnapur, Rangabelia, Uttar Rangabelia, Dakshin Mokamberia
North 24-Parganas	Habra, Badurdia	Kuchlia, Mamudpur, Narayanpur
Malda	Old Malda	Kharika dighi, Sanjail, Belahar,
Uttar Dinajpur	Hematabad/Kaliuagunj	Hajaratpur, Dhoarai,
Dakshin Dinajpur	Balurghat, Gangranpur, Bansihari, Buniadpur	Bhatpara, Dangai, Chowkghatak, Sukhdevpur, Bhoral, Barail, Rahimpur
Mushirabad	Lagandighi, Beldangra I, Bghampre, Nabagram	Bawarh, Mohula, Baninathpur, Natun Mohula, Mohula, Jagannathpur, Andharmanick Dharat, Gopinathpur, Chanak, Gopegram,
Nadia	Krishnagar II and Ranaghat II	Itaberia, Gopalpun, Kuthirpara, Purnanagar, Nokari,
Hooghly	Pandua, Arambag (Khanakul-I)	Kachhra, Duadanda, Bele, Belegram

Widely grown varieties

Districts	Rice varieties
Purba Medinipur	Swarna, Nilanjana, Pratiksha, Lal sankar, MTU 7029, Sarala, Durga, Barsha, IET 5656, Dudeswar and Kalma
South 24-Parganas	Sabita ratnai, CR 1001, Pankaj, Pooja, Ranjit, Jareva, Swarna, Geetanjali, CR 1009
North 24-Parganas	Ranjit, Pratiksha, MTU 7029, Satabdi, GS 1, Pataai 23 (local variety) and Sonamukhi
Malda	GS 1, Swarna, Lalat, Sambamahsuri, Arize 6444, CR 1010 and Nilanjana
Uttar Dinajpur	Niranjana, Swarna, Ranjana and Tulaipanji
Dakshin Dinajpur	Swarna, Samba mahsuri, Purnima, Lalat, Ranjit, Nirangan, Ranjan, Parijat, Gobbindabhog, Kataribhog, Chini and Swarna manjari and PAC 835 (hybrid)
Mushirabad	Gotra Bidham, MTU7029, IET 4786, Swarna, Ganga, Kshitish, BR 11, lalat, Swarna Dhan, Gotra selection, Satabdi, Afgan and Dayal madina
Nadia	Nayanmoni, Satabdi, Swarna, Ranjit, IET 4786, IET 4029 and PAC 836
Hooghly	Swarna, Swarna Sub 1 (flood resistant), Triguna, Dhanraj, IET 4786, Pratiksha, Kshitish and MTU 1010.

In west bengal production oriented survey (pos) was conducted in 9 districts viz., Purba Medinipur, Hooghly, South 24-Parganas, North 24-Parganas, Malda, Dakshin Dinajpur, Uttar Dinajpur, Mushirabad and Nadia. The weather condition during the crop growth period

was normal, though; excess rainfall, flood and drought were reported as major problem in some of the districts surveyed. The survey was conducted mainly during dough and maturity stages of the crop in most of the districts. The commonly grown varieties and hybrids were Afgan, Arize 6444, Barsha, BR 11, Chini, CR 1001, CR 1009, CR 1010, Dayal madina, Dhanraj, Dudeswar, Durga, Ganga, Geetanjali, Gobbindabhog, Gotra Bidham, Gotra selection, GS 1, GS 1, IET 4029, IET 4786, IET 5656, Jareva, Kalma, Kataribhog, Khitish, Lal sankar, Lalat, MTU 1010, MTU7029, Nayanmoni, Niranjana, PAC 835 (hybrid), PAC 836, Pankaj, Parijat, Pataai 23, Pooja, Pratiksha, Purnima, Ranjan, Ranjana, Ranjit, Sabita ratnai, Samba mahsuri, Sarala, Satabdi, Sonamukhi, Swarna Dhan, Swarna manjari, Swarna Sub 1 (flood resistant), Swarna, Triguna and Tulaipanji. Most commonly practiced crop rotations were Rice ó vegetables (tomato/cabbage/chilli) ó rice, aman rice- boro rice, rice ó potato/rice, vegetables (beans/ cabbage) ó rice- jute, rice- rice- rice, vegetable- rice-vegetable, aman rice-lentil-jute, aman rice-mustard-boro rice, aman rice ó yellow sarson-boro rice, rice- rai- boro rice/jute, rice ó mustard/lentil/onion- boro rice and rice ó peas/rai. The farmers used 35 ó 100% of their land for rice cultivation. Most of the famers applied organic and inorganic manures and used weedicide for reducing the weed infestation. Major biotic stresses like blast, neck blast, brown spot, sheath blight, sheath rot, false smut and grain discoloration were recorded in low to high intensities. In some of the areas severe crop damage caused by sheath blight and browns pot was recorded. Common insect pest problems were stem borer, leaf folder, brown plant hopper, mite, green leaf hopper, whorl maggot, rice bug, cutworm and rats etc. Some of the common needs of the farmers were power tiller, availability of labor, irrigation facility, quality seeds, storage and drying facility.

District wise observations:

Purba Medinipur: The production oriented survey was conducted at maturity and dough stages. Farmers used 75-200% of their land for rice cultivation. Total rice area in this district is 2,51,677 ha of which 184490 ha is irrigated and planted area is 251677 ha. During kharif season, the weather condition of the district was normal. Most commonly practiced crop rotations were Rice ó Vegetables, Rice ó vegetables (tomato/cabbage/chilli) - Rice. The popular rice varieties grown at this area were Swarna, Nilanjana, Pratiksha, Lal sankar, MTU 7029, Sarala, Durga, Barsha, IET 5656 and a local variety Dudeswar and Kalma. The average yield of Kharif rice in the district ranged from 3500-4500 kg/ha in Lal sanker, 3200 to 4000 kg/ha in Swarna. The average yield of Rabi season was 4500 kg/ha in IET 4094 and 4200 kg/ha in Nilanjana. Transplanting was completed between first week of July to third week of July. The average seed rate was 60 ó 65 kg/ha. None of the farmers adopted seed treatment. However, farmers applied mustard cake (100 kg ó 200kg /katta), farmyard manure (150 kg/katta) along with in organic fertilizers viz., urea (20 kg/acre) and DAP (45 kg/ac). In the main fields, farmers applied complex fertilizer (10: 26: 26 ó 15kg/ha) along with 75- 90 Kg P/ha and 22-90 Kg K/ha as basal; 37.5 ó 80 kg N/ha, 37.5 ó 125 kg P/ ha in the first split; 37.5 ó 52.5 kg N /ha and 25 kg of MOP/ ac in second split and 22.5 ó 37.5 kg N/ha in the third split. Most of the farmers followed random method of transplanting and plant density ranged from 25-40 hills/m². The intensity of weed infestation was low to medium and the common weeds were Marselia and farmers do hand weeding and applied butachlor (30 ó 37.5 Kg/ha). Occurrence of weedy rice was negligible. Most of the inputs for rice cultivation were adequate except equipments, power, drying facility, storage facility and quality seeds. Farmers requested for power tiller on subsidized rate along with quality seeds and pesticides. Among the diseases sheath blight low intensity recorded in sarala, durga, lal shanker, MTU 7029, swarna, nilanjana, sabita patnai and low intensity of neck blast and brown spot was recorded in lal chanker, MTU 7029, nilanjana, sabita patnai. Low intensity of false smut

recorded in dudheswar, lal shanker, IET 5656, MTU 7029, nilanjana, sabita patnai. Similarly bacterial leaf blight was recorded in low intensity in MTU 7029 and lal shanker. The insect pests recorded were BPH, stem borer, leaf folder and mite infection in low intensity in almost cultivated varieties. Some farmers reported about 3 % of rat damage in lal shanker and IET 5656 varieties. Most of the farmers adopted plant protection measures and they used knapsack sprayer for applying different pesticides. Farmers applied fungicides like Risosin @ 2ml/lit, Tilt @ 1ml / lit, Contaplus 2 1ml/ lit against sheath blight, Tricyclazole @ 0.75 g/ lit and Biltox @ 1 gm/lit against blast, Chlorothalonil @ 1.5 g/lit, Carbendazim @ 1 gm/lit, Bavistin @ 1 gm/lit for false smut. Farmers applied insecticides Curtap@ 1 g/lit, Anakonda @ 2 ml/lit, Spark @ 1.5ml/lit, Canon 1.75 ml/Lit, Hamla (Chlorpyrifos + Cypermethrin) @1.75 g/lit for stem borer, Imidachloprid @ 0.25 ml.lit for BPH and GLH, Endocil @ 2 ml/lit for mite infection. Normally The fungicides 2-4 sprays of fungicides and insecticides were given. The post harvest loss was negligible. Some farmers reported salinity problem but they do not taken any control measure.

Hooghly: Production oriented survey was conducted with marginal, sub-marginal and progressive farmers. The crops were either in dough or in maturity stage. Most of the farmers utilized 100% of their land for paddy cultivation. The weather was abnormal viz., excess rainfall, flood, cyclone were reported. The main crop rotation was Aman rice, aman rice-boro rice, rice ó potato/rice, rice ó rice. The common varieties grown in the district were Swarna, Swarna Sub 1 (flood resistant), Triguna, Dhanraj, IET 4786, Pratiksha, Kshitish, and MTU 1010. Some of the farmers also cultivated local varieties like lakshman lal because of good quality grains. The average rice yield during the last year's *kharif* season ranged from 3000 -6200 kg/ha in varieties like Swarna, Pratiksha and 5000-6000 kg/ha in Dhanraj, MTU 1010, IET 4786. In Rabi season the yield was 4800 to 7500 kg/ha in Triguna, IET 4786, Satabdi and MTU 1010. Farmers used a seed rate of 40 to 70 kg of seed /ha. In nursery, farmers applied fertilizers like urea (10 -75 Kg N/ha), DAP (20 kg/ha), MOP (20 kg/ha) and also IFFCO complex (50 kg/ biha). Some farmers applied farm yard manure (150 kg/ kata), mustard cake (20 kg/ kata) and cowdung manure (500 kg/kata) along with inorganic fertilizers. In the main field the fertilizer application ranged from 40 ó 135 Kg N/ha, 37.5 ó 190 Kg P₂O₅/ha and 52- 150 Kg K₂O/ha as basal. The split application (1-2 splits) of were given as 2.5- 75 N Kg/ha, 75 kg P/ ha and 12.5 to 75 kg K/ha. The weed problem was low to medium. The common weeds were Shyama, Motha, Durba, Marcelia, *Echinochola crusgalli*, Melenche, Cyanodan and Kalmi. Farmers used weedcide like Butachlor (1 l/acre) and Punch (37. 5kg/ha) along with the practice of hand weeding. Most farmers reported availability of adequate facilities and some farmers reported need of timely availability of equipments, pesticides and storage facility. The biotic and abiotic constraints sheath blight, bacterial leaf blight, sheath rot, false smut, stem borer, leaf folder, BPH and GLH were in low to moderate intensities. Brown spot intensity was severe in Swarna. Moderate level of rat damage was reported in Swarna. Most of the farmers followed plant protection measures with Knapsack sprayer. The farmers applied fungicides like Baan (450 g/ha) for sheath rot, Hamla (1 ml/ lit), Tarjan (150 ml/ha), Thidan (2 ml/ lit) for stem borer and leaf folder. Some farmers reported that plant protection measures could not carried out because of snake problem. Overall there was 1-15 % loss from harvesting to cleaning.

South 24-Parganas: The production oriented survey was conducted with majority of marginal land holding farmers mostly at mature stage of the rice crop in the district. Most of the farmers utilized 70-100% of their lands for *kharif* rice cultivation. The weather condition of the district during *kharif* season was abnormal because of flood at transplanting and drought at flowering stage. Most commonly practiced crop rotations were rice óvegetables-

rice, vegetables (beans/ cabbage) ó rice- jute, rice- rice- rice, vegetable- rice- vegetable. The popular rice varieties grown at this area were sabita ratnai, CR 1001, pankaj, pooja, ranjit, jareva, swarna, geetanjali, CR 1009. Farmers also cultivated a hybrid PAC 835 and popularly known local variety Dudesawar. The average yield of Kharif rice as reported by the farmers varied between 3000 to 4800 kg/ha. In Rabi the yield was between 4500 to 6500 kg/ha. Farmers completed transplanting in the first week of August to first week of September. The optimum seed rate used was 24 to 28 kg / ac. In the nursery beds, most of the farmers applied cowdung manure (75 ó 450 kg/kata) and farm yard manure (400 ó 450 kg/ kata) along with inorganic fertilizers viz., urea (5 hg/ kata), SSP (2 kg/ kata) and 3to 5 kg of MOP/ kata. Some farmers practiced organic cultivation and most of the farmers applied less quantity of inorganic fertilizers. In the main fields, farmers applied 75 ó 112. 5 kg P/ha, 75 ó 90 kg K/ha as basal along with split doses of 37. 5 -112.5 kg N/ha and 37. 5 -75 Kg K/ha. Transplanting was random and plant density ranged from 30-38 hills/m². The intensity of weed infestation was low to medium and the common weeds were *E. crussgali* and grassy weeds. Some of the farmers do hand weeding and for weed management and some of them applied butachlor (25 kg/ha). Inputs for rice cultivation were adequate except Storage facility, equipments, Drying facility, quality seeds, Government subsidy on equipments. Farmers requested for salt and flood tolerant variety and irrigation facility for boro rice. In almost all the cultivated high yielding varieties, hybrids and local varieties recorded diseases viz., grain discolouration, brown spot, sheath blight, sheath rot and false smut in low to moderate intensity. Similarly the insect pests recorded were stem borer, leaf folder, green leaf hopper, BPH, gall midge, case worm, whorl maggot and rice bug in low intensity. Some farmers reported low intensity of rat damage also. Most of the farmers adopted plant protection measures and they used knapsack sprayer for applying different pesticides. Some of the farmer reported soil salinity but no corrective measures were adopted. Most of the farmers applied insecticides endocil (2 ml/ lt), thimet (25 kg/ ha), Phorate (12 kg/ha), fipronil (2 ml/lt), hamla (2 ml/lt), for stem borer and leaf folder, imdachloprid for BPH and GLH; neem products for rice bug, stem borer and leaf folder. The overall post harvest loss was 2-5%

Murshidabad: Survey was taken up when the crop were in maturity stage. The climatic conditions were normal and in few places abnormal condition was reported due to excess rain fall and flood. Rice was cultivated in 50 ó 100 % of land area and most of the farmers cultivated two crop per year. The prevailed crop rotation was aman rice-lentil-jute, aman rice-mustard-boro rice, aman rice ó yellow sarson- boro rice, rice- rai- boro rice/jute, rice ó mustard/lentil/onion- boro rice, rice ó peas/rai, jute ó rice- rice/wheat/lentil/mustard and rice-rice/mustard. Most predominant varieties in this region were Gotra Bidham, MTU7029, IET 4786, Swarna, Ganga, Kshitish, BR 11, lalat, Swarna Dhan, Gotra selection, satabdi. Local varieties like Afgan and Dayal madina (from Bangladesh) were also cultivated due to less susceptibility to pest and diseases. The average rice yield in the district ranged from 3600-6000 kg/ha. In Rabi season most the high yielding varieties recorded 5000 -7500 kg/ha. Sowing was taken up between first week of June to last week of July and transplanting was completed between first week of July to second week of August. Farmers used 50-70 Kg of seed/ha. Most of the farmers applied farm yard manure, cow dung manure (3 to 7.5 t/ha), vermi compost (200 kg/ha) and compost (2000 kg/ha). One of the farmer applied bioagents like *Pseudomonas* (7.5 kg/ha) and *Trichoderma* (15 kg/ha). Majority of the farmers applied inorganic fertilizers viz., 75- 300 kg N/ha, 7.5 ó 65 kg P/ha, 450 kg K/ha along with ZnSO₄ (15 kg/ha). In the main field, some of the farmers applied vermicompost (750 kg/ha) and cowdung (7.5 t / ha) farmers applied IFFCO complex fertilizer (25 ó 180 kg /ha) as a source of nitrogenous and phosphate fertilizer in basal application along with 15 - 30 kg of urea as nitrogen source, 28 ó 100 kg of SSP as phosphorus source and 9 ó 130 kg of MOP as potash

source. In split doses they applied 150 kg of IFFCO + 15 ó 150 kg of urea, 75 kg of ammonium sulfate and 75 kg of MOP per hectare (first split); 15 ó 150 kg of urea, 110 - 180 kg of ammonium sulfate, 9 kg of MOP in second split per hectare. Some of the farmers applied lime (15kg/ha), dolomite as a calcium fertilizer (200 kg/ha) and few farmers reported zinc deficiency and applied ZnSO₄ (15 kg/ha). Farmers followed both random and line method of planting and maintained the plant population between 33- 50 hills/m². Weed intensity was low to medium and the weed species viz., Shyama, Motha, Durba, Jaona, Sushni and algal weeds were recorded. To manage weeds farmers applied butachlor (750 ml/ha). Regarding the availability of inputs, most of the inputs available in adequate and some of the inputs viz., water, drying and storage facility were inadequate. Unavailability of combined harvester, power tiller, power and unavailability of labour in time were identified as main constraints in rice production. The diseases like sheath blight (MTU 7029 - 80%; Gotra Bidhan ó I ó 70%) and false smut (Gotra Bidhan ó I- 50%; Gotra Bidhan ó II ó 60%) were recorded in moderate to severe intensities; blast, brown spot, sheath rot and stem rot in low to moderate intensities. Insect pests like stem borer and BPH were recorded in moderate severe form where as leaf folder, army worm and rat damage was recorded in low to moderate intensities. In some areas low intensity of termite infection was also reported. In this district most of the farmers were adopted plant protection measures. Farmers applied Contaf (2 ml/l), Tilt (1 ml/l) and Capritop (3 g/l) fungicides for sheath blight, propiconazole (1 ml/l) for sheath blight and sheath rot, false smut and blast; endosulfan (2.5 ml/l), hamla (2.5 ml/l), kurazin (2.0 ml/l), imdachloprid (0.2 ml/l) for stem borer; phorate (10 kg/ha) for stem borer, leaf folder, BPH, cut worm and Cartap Hcl 50 SP (1 g/l) for stem borer and cut worm. Mostly one to 3 rounds of plant protection rounds were given with hand sprayer and knapsack sprayer and there was 2 ó 10 % of post harvest losses were reported.

Nadia: Production oriented survey was conducted when the rice crop was in dough to mature stages. There was subnormal rainfall and drought in most of the places surveyed in this district. The main crop rotation followed was rice- vegetable/mustard-rice; vegetable/jute-rice/vegetable- vegetable/mustard/rice; vegetable/jute- rice/flower- vegetable/mustard/rice; rice-tuberos/marigold- mustard/rice/marigold- jute; rice/ bhendi/ tuberos/ coriander-marigold/ brinjal/ bean-wheat/rice; riceórice/groundnut; riceó mustard/jute/ coriander/marigold -rice. The common varieties grown in the district were Nayanmoni, satabdi, swarna, ranjit, IET 4786, IET 4029 and PAC 836 (Hybrid). The average rice yield during the previous *kharif* season ranged from 4000-6000 Kg/ha and in the rabi season the yield was ranged from 4500 ó 6000 kg/ha. Sowing was done between first week of June and July and transplanting was completed by the end of august. The seed rate was 40 - 80 Kg/ha. In nursery, farmers applied complex fertilizers (10: 26: 26 ó 225kg/ha) and 70 ó 110 kg N/ha, 50 kg P/ha, 50-110 kg K/ha. Some of the farmers applied cowdung (100 - 7500 kg/ ha), oil cake (360 kg/ha) and mustard cake (188 kg/ha). In the main field farmers applied 40-187.5 kg of complex fertilizer (10: 26: 26), 30 -60 kg P/ha and 30-60 kg /ha as a basal; 25 ó 50 kg N/ha, 30-150 kg P/ha, 67 ó 150 kg K / ha in the first split and 5-112.5 kg N/ha, 30 kg P/ha and 67kg/ha in the second split applications. Some of the farmers also applied special recommendations like cowdung (2000 kg/biha) and lime (CaCO₃). Most of the farmers followed random method of planting while few farmers adopted line method of transplanting and maintained the plant density of 33- 35 hills / m². The common weeds were Cyanodan, Marcelia, Shyana, Algae, Durba, Suania, Doob, Sushni, Kalmi and Melenche and the weed infestation was medium to heavy. Farmers applied butachlor (0.75 lt/ha) for managing the weeds. The intensity on the occurrence of weedy rice was recorded as low. Among the inputs, there was shortage of water, power, drying and storage facilities and farmers were in need of power tiller. Diseases like sheath rot, false smut, bacterial leaf blight, blast were recorded in low to moderate

intensities where as sheath blight was occurred in moderate to severe intensities. Among the insect pests, stem borer was occurred in moderate to severe form and leaf folder and gall midge and grass hopper were recorded I low to moderate intensities. Most of the farmers applied two rounds of insecticide spray with knapsack sprayer. Commonly used fungicides were bavistin (1 g/lt) for sheath rot and sheath blight and Tilt (2 ml/lt) for sheath blight. Farmers managed the insect pests with application of endosulfan 35 EC (2 ml/lt), Thiodan (2 ml/lt) for stem borer, Thiodan + Suvidan (2 ml/lt) and Baan (2 ml/lt) for stem borer; BHC powder for stem borer, leaf folder and grass hopper. Interestingly some farmers applied micronutrients known as Miraculam (2.5 ml/lt) for the better growth of the rice crop. Farmers reported 5 to 10% of the post harvest loss.

Dakshin Dinajpur: Production oriented survey was conducted in this district when the crop was at dough to mature stage. The climatic condition was normal and most of the farmers followed two crops of rice. The prevailed crop rotation was rice-wheat-jute; rice, rice-rice-vegetable; rice-mustard-jute, rice-rice, rice-mustard-boro rice. Farmers utilized 25- 100% of the land for rice cultivation. The commonly grown varieties were swarna, samba mahsuri, purnima, lalat, ranjit, niranjan, ranjit, ranjan, parijat, gobbindabhog, kataribhog, chini and swarna manjari and PAC 835 (hybrid). The overall yield during Kharif was 3600-5700 kg/ha in swarna, 2400- 4800 kg/ha in gobindabhog, lalat, parijat and ranjit. The yield was quite high during rabi in IET 4094 (5000 to 6400 kg/ha) and in PAC 835 (5200 kg/ha) yield was reduced due to ox damage. Farmers used 8 kg of seed for an acre and sown the rice seeds in the month of mid june to first week of july and transplanted the seedlings in the month of july last week to august first week. In nursery, farmers applied cowdung compost (6 Q/katta), jute ash stick and cowdung compost (7Q/7 katta) along with urea (5 kg/katta). In main field 112-150 kg of complex fertilizer (10:26:26), 20-50 kg of urea/ha, 100 kg of P/ha, 40 kg of K/ha was applied as basal and 10-50kg/ha of urea, 112 kg of P/ha was applied as first split dose. Some of the farmers applied cowdung manure (2t/ha) and oil cake (40kg/ha). In this district almost all the farmers followed random method of transplanting and maintained the plant population as 25-33 hills/m². Weed infestation was low to medium and commonly reported weeds were grasses, marcelia quadrifolia etc and for reducing the weed population farmers applied butachlor (250 g/ac) and petilachlor (400 ml/ac) along with the practice of hand weeding. Most of the inputs were available and farmers were in need of low cost fertilizer, quality hybrid high yielding variety seeds and insisted for price protection. The biotic constraints like sheath blight, sheath rot, false smut, stem borer were in low to moderate intensities. Majority of the farmers used insecticide viz., hostathion (2 ml/lt), carbosulfan (1.5 ml/lt), phorate (1 kg ai/ha) and furadon 3G for stem borer. Farmers reported 1- 7 % of post harvest losses.

North 24-Parganas: Production oriented survey was conducted in this district when the crop was in maturity stage. The prevailing crop rotation was rice-mustard-rice; rice-jute-rice-vegetable and about 60-100% of the land was used for paddy cultivation. The commonly grown varieties were ranjit, pratiksha, MTU 7029, Satabdi, GS 1, Pataai 23 (local variety) and Sonamukhi (local variety). In kharif season the yield was varied between 3900-5100kg/ha and in rabi season the yield was 4200 to 5400 kg/ha in satabdi variety. Farmers used 40-60 kg of seed per hectare and practiced sowing in the month of june and july and transplanted the seedlings up to the month of first week of august. In nursery farmers used 2.5 of cowdung manure along with the inorganic fertilizers viz., 90-100kg N/ha, 12-100 kg/ha P/ha and 50-100kg K/ha. In the main field 10:26:26 (30kg/ha), 14:35:14 (30kg/ha) complex fertilizers were applied as basal dose and few farmers applied 150-225 kg N/ha, 110-150kg P/ha, 110-150kg K/ha as a basal dose. In the split doses SSP (225-300 kg/ha) and MOP

(112.5 to 150 kg/ha) was applied. Line method of planting was adopted and maintained a plant population of 30 hills/m². Medium intensity of weed infestation was reported. Weed population includes *Echinochloa crusgalli*, water hyacinth and Rifit (750g/ ha) was applied to control weeds. Most of the inputs are adequate and inputs like equipments, power, drying facility and storage facility were reported as inadequate. Farmers were in need of low cost fertilizer and irrigation facility. Diseases like sheath blight, sheath rot, neck blast, false smut were occurred in low to moderate intensities and in swarna severe intensity of sheath blight was recorded. Pests like stem borer, leaf folder, BPH and rice bug were reported low to moderate intensities. Zinc deficiency was reported and for salinity problem farmers applied chelamin (5g/lt). Insecticides viz., demacron, phorate (2.5kg/ha), furadon (5 kg/ha), hamla (2 ml/lt) were applied for stem borer and hinosan (1 ml/lt) for blast.

Malda: In this district survey was conducted during dough stage of the crop and farmers utilized 100% of their land for rice cultivation. The crop rotation followed was rice-potato-vegetable. The commonly grown varieties were GS 1, Swarna, Lalat, Sambamahsuri, Arize 6444, CR 1010 and Nilanjana. In Kharif, the average yield was 3600-4500 kg/ha. Farmers completed sowing in the first week of May and transplanted the seedlings in the second week of July. In main field some of the farmers applied complex fertilizer (10:26:26; 150 kg/ha) as basal dose, 52.5 to 75kg of urea /ha as a first split dose. Farmers followed random method of planting and Bichha grass was the common problem in rice cultivation and Repeat (50-100g/bigha) and Butachlor (100g/bigha) for weed control. Among the biotic constraints neck blast, sheath blight and stem borer were recorded in low to moderate intensities. Farmers applied hexaconazole for sheath blight and Thiodan (2 ml/lt) for stem borer.

Uttar Dinajpur: The survey was conducted when the crop was in dough to mature stage. About 80 to 100 % of the land was cultivated with paddy crop. The climatic conditions are normal and some farmers reported drought. Most of the farmers followed the crop rotation of rice & rice/jute, rice, rice & rice/vegetable. The commonly grown varieties were Niranjana, Swarna, Ranjana and Tulaipanji (local variety). In kharif season the yield was varied between 2500 & 5100 kg/ha and in rabi the yield was 4800-6500kg/ha. Sowing was taken up in the first to last week of May to second week of June and transplanting was completed in last week of June to third week of July. Most of the famers used 50 kg of seed per hectare. In the nursery farmers applied farm yard manure and in the main field 150 kg of complex fertilizer 40 kg of urea as a basal dose and 115-150 kg of urea in the first split dose. Farmers followed both random and line planting and the weed infestation was at medium intensity and butaclor and petilachlor was applied for weed control. Farmers requested for quality seeds, agro equipments on subsidy basis and low cost fertilizer. Among the biotic constrains neck bast, sheath blight, sheath rot, false smut, grain discolouration, stem borer and army worm damage were recorded in low to moderate level. Farmers applied furadon 3G (2kg/bigh) for sheath blight and most of the farmers were not adopted plant protection measures and over all post harvest losses were 2 & 5%.

Prevalence of diseases and insect pests in West Bengal

Districts	Diseases								
	BI	NBI	BS	ShBI	SHR	FS	STR	GD	BLB
Purba Medinipur		L	L	L		L			L
South 24-Parganas				L-M	L-M	L-M			
North 24-Parganas		L		M-S	L-M	L			
Malda		L-M		L-M					
Uttar Dinajpur		L-M		L	L	L-M		L	
Dakshin Dinajpur				L-M	L-M	L-M			
Mushirabad	L-M		L-M	M-S	L-M	M-S	L-M	L-M	
Nadia	L-M			M-S	L-M	L-M			L-M
Hooghly			S	L-M	L-M				L-M

Districts	Insect Pests								
	SB	LF	BPH	Mite	GLH	WM	RB	CW	GM
Purba Medinipur	L	L	L	L					
South 24-Parganas	L	L	L		L	L	L	L	L
North 24-Parganas	L-M	L	L-M				L		
Malda	L-M								
Uttar Dinajpur	L-M								
Dakshin Dinajpur	L-M								
Mushirabad	M	L-M	M					L-M	
Nadia	M-S	L-M							L
Hooghly	L-M	L-M	L-M		L-M		M		

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, NBL- Narrow brown leaf spot, BK- Bakanae, KSM- Kernel smut, UDB- Udbatta, KH- Khaira, BLB- 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

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