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NOTE TO CONTRIBUTORS

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STATISTICAL TABLES

Abbreviations used

N.A.	—	Not Available.
N.Q.	—	Not Quoted.
N.T.	—	No Transactions.
N.S.	—	No Supply/No Stock.
R.	—	Revised.
M.C.	—	Market Closed.
N.R.	—	Not Reported.
Neg.	—	Negligible.
Kg.	—	Kilogram.
Q.	—	Quintal.
(P)	—	Provisional.

Plus (+) indicates surplus or increase.

Minus (–) indicates deficit or decrease.

We are pleased to inform that our monthly journal *Agricultural Situation in India* has been accredited by the National Academy of Agricultural Sciences (NAAS) and it has been given a score of 2.76 out of 6. The score is effective from January, 2016 onwards. The score may be seen in the following website: www.naasindia.org

Soft copy of the journal may be seen in PDF at the following URL : eands.dacnet.nic.in/publication.htm

Farm Sector News

Rs.10 Lakh for each mandi for setting up Waste Management Plants Under e-Nam Scheme and One Percent Funds of RKVY would be spent on Solid and Waste Management : Shri Radha Mohan Singh

Union Agriculture & Farmers Welfare Minister, Shri Radha Mohan Singh briefed the media about the outcome of Swachhta Pakhwada and initiatives taken by the Ministry on 2nd November, 2016. Shri Singh informed that as per the directions of Hon'ble Prime Minister of India, the Swachhta Pakhwada was observed this year from 16th to 31st October, 2016 in all the three Departments under the Ministry of Agriculture & Farmers Welfare, namely, Department of Agriculture, Cooperation & Farmers Welfare, Department of Animal Husbandry Dairying & Fisheries and Department of Agricultural Research & Education. Going out from the confines of the office premises, Swachhta drive was carried out in Agricultural Mandis, Fish Markets & villages near each Krishi Vigyan Kendras (KVKs). During the Pakhwada focus was laid to put certain measures that are dynamic and to be continued beyond Pakhwada period. Some of the activities carried out are as under:

Cleaning drives were undertaken in 271 Agricultural Mandis. Further, Swachhta Action Plan has been prepared in which it was decided to make provision of Rs.10 lakh for each mandi for setting up waste management plants under e-Nam scheme. It was also decided that under one flagship scheme, namely RKVY, managed by DAC&FW, one percent funds will be spent on Solid and Waste Management. Besides this, various offices under the three Departments were cleaned involving, *inter alia*, installation of sensors in toilets, installation of motorized grinder and weeding out of unwanted records, removing encroachments and all junk lying in the offices. Hon'ble Agriculture & Farmers Welfare Minister was involved in cleanliness & plantation drive at DAC&FW (Headquarter) in Krishi Bhavan on 26.10.2016 and at Agricultural Mandi in Chandigardh on 18.10.2016. Centers of All India Soil & Land Use Survey of India (SLUSI), a subordinate office under DAC&FW, involved local MPs/ public representatives in the Swachhta Activities. Further, a Compost pit has been inaugurated in SLUSI, Kolkata. Compost Machines are being installed in the Mandis in coordination with States.

The National Fisheries Development Board (NFDB), Fishery Survey of India (FSI), Central Institute of Fisheries Nautical and Engineering Training, (CIFNET), National Institute of Fisheries Post Harvest Technology and Training (NIFPHATT), Central Institute of Coastal Engineering for Fishery (CICEF), in coordination with State/UTs conducted the following major activities during the Swachhta Pakhwada:

i. Cleaning of 50 wholesale & retail Fish markets in 15 states was done and also awareness about maintenance of cleanliness was spread during this drive.

ii. Cleaning of Institute Buildings and premises by all the Subordinate institutes under Fishery Division.

iii. Awareness camps including Padayatra (procession) on hygienic Fish handling, maintaining cleanliness in fish markets, cleanliness in processing, cleanliness in marketing etc. and distribution of Pamphlets.

iv. Conducting of State level Workshops viz., (i) Recycling of waste through integrated fish farming for NE States at NFDB NE Center, Guwahati (ii) Waste Water Aquaculture, Nalban, Kolkata etc.

Hon'ble Members of Parliament, State Fisheries Minister from West Bengal, Mayors and Councilors from Kerala and Tamil Nadu, Senior officials from the State Fisheries Department, District Collectors etc. actively participated in the Swachhta Pakhwada activities. Minister of State for Agriculture & Farmers Welfare, Shri Parshottam Rupala also participated in cleanliness activities at Amreli (Gujarat). Also, the Fish vendors, retailers, net makers, students, staff and trainees of the institutes, members of fisherman associations and general public were also involved in the various activities under taken during Swachhta Pakhwada across the State/UTs. The awareness camps/cleaning drives were taken up across the country with the help of State/UT Governments. Some of the notable activities were held in Bilaspur and Durg in Chhattisgarh, Guwahati, Silchar, Cachar in Assam, Bishnupur in Manipur, Nellore in Andhra Pradesh Cuddalore and Nagercoil in Tamil Nadu and also in Kolkatta Bangalore, Lucknow , Ranchi and Kochi.

Source : www.pib.nic.in

India - Sri Lanka Meeting regarding Fishermen issues addressed by the Minister of Agriculture & Farmers Welfare Shri Radha Mohan Singh on 5th November, 2016 in New Delhi

The excerpt of hon'ble Minister's speech is given as under:

> "I extend my warm welcome to Sri Lankan Foreign Minister H.E. Mangala Samaraweera, Sri Lankan Fisheries Minister H.E. Mahinda Amraveera and all other members of the Sri Lankan delegation to India.

I am especially thankful to H.E. Mahinda Amraveera, for accepting my invitation for this visit to New Delhi.

I hope that we will move forward towards a meaningful solution through discussion on Fishermen's issues between both the countries.

The relationship between India and Sri Lanka is more than 2,500 years old. Both countries have a legacy of intellectual, cultural, religious and linguistic interaction. Trade and investment have grown and there is cooperation in the fields of development, education, culture and defence. Both countries share a broad understanding on major issues of international interest".

Both the countries agreed upon a real and practical arrangement to address the issue of crossing the International Maritime Boundary Line International Maritime Boundary Line (IMBL) by fishermen. It was decided that issues related to the custody of fishermen should be settled on 'humanitarian grounds' which may only be possible through mutual consent between both the countries.

The Government of India was also committed to find a permanent solution to this problem. During the India-Sri Lanka Joint Commission meeting held in Colombo in February 2016, both the sides had understood the complexity of the fishermen's issues and consented on the need of moving forward in finding a permanent solution to this problem. The Fishermen's issues were also discussed during the meeting between Prime Minister of India and the President of Sri Lanka held in New Delhi in May 2016, wherein the top leaders of the two countries discussed the matter for finding a permanent solution to this problem.

Taking a step forward in this direction, an invitation was sent on 22 July, 2016 to Fisheries Minister of Sri Lanka to visit India. Welcoming this initiative, Sri Lanka also sent a positive message by immediately releasing Indian fishermen. India welcomed this gesture. Recently, Sri Lanka had again released our fishermen for which our government expressed gratitude.

The government was aware of the concerns expressed by Sri Lankan fishermen during meeting between Fishermen's Associations of India and Sri Lanka held on 2ndNovember, 2016. Their demand for ban on bottom trawling or other destructive fishing methods, which cause harm to the marine environment and bio-diversity in the Palk Bay, seems to be genuine. In order to ensure availability of natural resources to future generation while meeting the livelihood needs of the present, it was decided to make conscious and collective efforts in this regard.

The bilateral mechanisms of Joint Working Group (JWG) between India and Sri Lanka for cooperation in Fisheries and issues related to early release of fishermen and related matters was also discussed

A 'Special Package' for encouraging the fishermen of Tamil Nadu to undertake deep sea fishing by diversifying their bottom trawlers into Tuna long liners was also considered.The Department (DADF/MoAFW) has permitted for construction of fishing harbour at Mukaiyur, which is being executed by the State Government. At the same time, efforts are also being made regarding construction of fishing harbours at Rameshvaram and Ennore in Tamil Nadu. All these efforts may be useful in solving the fishermen issues between India and Sri Lanka. Besides, efforts are also being made to introduce modern technical information to the fishermen and to train them.

The Government believes that both the countries would be able to find out permanent solutions to the problems and issues of fishermen on either side through collective efforts.

Curtain raiser -First-ever International Agro-bio-diversity Congress held in New Delhi from 6-9 November, 2016

The 1st International Agro-bio-diversity Congress - IAC 2016 -gathered 900 delegates from 60 countries in New Delhi, India, from 6-9 November, 2016. This international Congress initiated and encouraged a dialogue among relevant stakeholders - including farmers - to better understand everyone's role in agro-bio-diversity management and the conservation of genetic resources.

Agricultural bio-diversity - or agro-biodiversity - is the foundation of sustainable agricultural development and is an essential natural resource to ensure current and future food and nutrition security. As the world faces challenges, such as global malnutrition, climate change, increasing agricultural productivity, reducing risk and increasing shrinking food security, we need everyone's attention and concern for the conservation and use of these precious resources because they provide essential raw materials for our agricultural systems and peoples' livelihoods.

India is the perfect venue for the first-ever International Agro-bio-diversity Congress as it is one of the most diverse countries in the world. It takes up only 2.4% of the world's land area, and yet it harbours 7-8% of all recorded species, including over 45,000 species of plants and 91,000 species of animals (CBD, 2014).

The Congress would provoke discussion and

knowledge-sharing on issues for the effective and efficient management of genebanks; science-led innovations in the field of genetic resources; livelihood, food and nutrition security though crop diversification, including use of lesser known crops and the role of crop wild relatives in crop improvement; issues relating to quarantine, bio-safety and bio-security; and Intellectual Property Rights and Access and Benefit Sharing in the context of exchange of germplasm. To deliberate on the role of all the stakeholders in effective management and use of agro-bio-diversity, a Public Forum has also been planned during the Congress.

The Congress was inaugurated by the Honourable Prime Minister of India, Shri Narendra Modi, at Vigyan Bhawan on 6 November 2016.

There is a need to take Steps to Promote use of Equipments for Crop Residue Management in a Big Way: Shri Radha Mohan Singh

A meeting under the Chairmanship of the Union Minister of Agriculture & Farmers Welfare, Shri Radha Mohan Singh was held on 8th November, 2016 in New Delhi to discuss various issues regarding crop residue management. In the meeting, the Minister of State for Agriculture, Shri S.S.Ahluwalia was also present. Secretary, Department of Agriculture, Cooperation and Farmers Welfare, Additional Secretary, Ministry of Environment, Forest and Climate Change, Chairman, Central Pollution Control Board, Deputy Director General, ICAR and representatives of the State Agriculture Departments of Punjab, Haryana and UP were also present.

In the meeting, various issues related to crop residue management and stubble burning was discussed and Shri Radha Mohan Singh directed the officials of the Ministry and State Governments to take steps to promote use of equipments for crop residue management in a big way. The Minister also emphasised that the State Governments should create massive awareness on crop stubble management and create large number of customs hiring centres in which machines for crop residue management are included.

In January 2015, a workshop on crop stubble burning issues and management was held in Chandigarh in which the central and state government officials discussed the issues and made several recommendations on the issue. Similarly, in Haryana and UP, the Chief Secretaries and Principal Secretaries of Agriculture took several meetings to monitor the progress of this important crop residue management issue. Under various state government schemes like SMAM, RKVY, NFSM, CDP, Agrcultural Machineries like Happy seeder (used for sowing of crop in standing stubble) Rotavator (used for land preparation and incorporation of crop stubble in the soil), Zero till seed drill (used for without land preparations directly sowing of seeds in the previous crop stubbles), Baler (used for collection of straw and making bales of the paddy stubbles), Paddy Straw Chopper (cutting of paddy stubble for easily mixing with the soil) and Reaper Binder (used for harvesting of paddy stubble and making into bundles) were distributed to farmers as a result of which there is substantial reduction in stubble burning in Haryana, UP and Punjab. In the meeting, the Union Minister directed the state governments to use these machines for crop residue management effectively.

Organic farming is an integrated one through which bio diversity, bio cycling as well as soil bio activities are promoted: Shri Radha Mohan Singh

Union Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh said that there are unlimited potentialities of agriculture in North Eastern states; therefore, Central Government is focusing exclusively on the development of agricultural sector in north eastern states. The Minister said that government is implementing a number of agriculture related programmes in this region while keeping in view the potentialities of organic farming along with different agriculture schemes in North Eastern States so that the people of villages may prosper. Shri Singh briefed the names of these projects as Mera Gaon, Mera Gaurav, Rashtriya Fasal Bima Yojana, Soil Health Card, and Mission for Integrated Development of Horticulture, strengthening of Krishi Vigyan Kendras as well as extension of agricultural education. The Agriculture Minister said it at the inaugural occasion of Regional Agriculture Fair 2016-17 in Central Agriculture University, Imphal, and Manipur on 10th November, 2016. The subject of this fair was "to highlight, the importance of organic as well as integrated farming methodologies." In second Green Revolution.

Union Agriculture Minister said that organic farming is an integrated one. Through this bio diversity, bio cycling and soil bio activities are promoted. Organic farming creates environment friendly atmosphere for the crops as well as animals without the use of synthetic fertilizers, growth hormones, increasing antibiotics, stuff and synthetic pesticides. The Minister said that government is promoting organic farming through and through in the North Eastern Region.

Shri Singh briefed that earlier, there were only 7 agriculture colleges whose number has gone up to 13 at present. The Minister further added that during 2014-15, the budget of agriculture education for North Eastern States was Rs. 150 crore which has shot up by adding Rs. 20 crore amalgamated as a sum of Rs. 170 crore. He further said that during 2016-17, there has been an unprecedented enhancement of almost Rs. 500 crore (32.8%) for agricultural research budget which is now is Rs. 2020 crore. There is an addition of almost Rs. 90 crore (13.6%) as compared to the previous year in agriculture extension which has been gone up as a sum of Rs. 750 crore.

The Minister of Agriculture & Farmers Welfare further said that there are tremendous potentialities for bee keeping in North Eastern States. Therefore, National Bee Board and Ministry of Agriculture have decided to set up an Integrated Bee Keeping Development Centre (IBDC) in Central Agriculture University, Imphal, and Manipur. With this, the Bee keeping sector would be developed in Manipur and the Bee Keeper farmers will be assisted in every way.

Farmers income may double in Rajasthan by 2022: Shri Radha Mohan Singh

Union Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh addressed the closing ceremony of Global Rajasthan Agritech Conference in Jaipur, Rajasthan on 11th November, 2016. Shri Singh said that Rajasthan has been much ahead in the policy related decisions for last 2 years. Owing to this, this state would be successful to make the farmers income double by the year 2022.

The Agriculture Minister said that Niti Aayog has given Rajasthan third place related to agriculture marketing and farmers oriented improvement index for the year 2016. The agriculture processing and Agriculture Marketing Policy 2015 of the state inspires value addition of agricultural products. It reduces the losses on post harvesting scenario as well as motivate the use of new technologies in the field of agricultural marketing.

The Agriculture Minister said that the "Global Rajasthan Agritech Conference" has got two prominent objectives - the first one is to pave the way of progress for technologies related to agriculture and to bring forth the best methodologies related to agricultural sector in the world before the farmers community and secondly, to provide knowhow to the farmers community about the investment proceedings throughout the world.

Shri Singh said a number of schemes have been initiated in the able guidance of Hon'ble Prime Minister so as to make the farmers income double. To provide irrigation facilities, to every farm, - Pradhan Mantri Krishi Sinchai Yojana, "under organic farming, to bring more and more area under cultivation,Prampargat Krishi Vikas Yojna, National Agriculture Market, E-NAM to provide better return for farmers produce have been initiated. E-NAM has been commenced while covering 21 mandis spread over 8 states since 14th April 2016. As yet, all the 250 mandis situated in 10 states have been linked up with E-NAM,Soil Health Card Scheme had been started at Suratgarh, Rajasthan. As on date against the target of 14 crores Soil Health Cards up to March 2017, so far 3.15 crore Cards have been distributed. This scheme will be conducive for the farmers to take accurate decision related to the appropriate use of fertilizers. With the initiatives taken by Hon'ble Prime Minister, the deficiencies existed in Fasal Bima Yojana have been erased and a new scheme named as Pradhan Mantri Fasal Bima Yojana has been implemented throughout the country.

Milk availability Per Capita with the Existing Level of 337 Gram is Likely to Go Up 500 Gram Per day by the Year 2021-22: Shri Radha Mohan Singh

The Union Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh said that with the hard labour extended by the people engaged in diary sector and the unabated efforts of Central Government, India has achieved 4.2% average growth in milk production and has left behind the world average of 2.2%. During 2015-16 the growth in milk production in India has been 6.7%. The Minister of Agriculture and Farmers Welfare said it in the conference of stake holders related to dairy industry in National Dairy Development Board on 15th November, 2016. Speaking on the occasion, the Union Minister informed that owing to the enhancement in milk production, the availability of milk statistics based on daily basis per capita with the existing level of 337 gram is likely to go up 500 gram daily by the year 2021-22. An expenditure of Rs. 2242 crore will be incurred on this scheme. Shri Singh said that it is also very much imperative to create awareness and to improve veterinary services.

Shri Singh said that Ministry of Agriculture and Farmers Welfare has taken a number of steps to increase the production of milk in which Gokul Mission is very much prominent. Under this mission, for the year 2014-15 to 2016-17, a provision of Rs. 500 crore has been made. NDDB with the assistance of World Bank and Central Government, has taken several measures under National Dairy Scheme Phase - I, a centrally sponsored scheme. It includes a genetic improvement among bovines, betterment of rural infrastructure in dairy and to provide better opportunities for milk vendors. The initiation of NDDB -I had been made in 14 states and at present it is being carried out in 18 states along with Jharkhand, Chattisgarh, Uttarakhand and Telangana.

Shri Radha Mohan Singh further added that an enhancement of more than 6% in milk production sector is necessary for a true development of this sector. In order to achieve this objective, improved technologies, capacity building, marketing, scientific livestock management, know how related to milk production and better arrangement of loans are necessary to operate a dairy systematically and in a balanced way. Agriculture Minister opined that the youth and females are enjoying hand some employment opportunities in the dairy sector. Shri Singh also said that by the year 2022 the income of the farmers is to be made as double and to achieve this target the dairy sector is to play a very important role.

Cabinet approved enhanced MSP for Rabi Crops of 2016-17 season and announced Bonus for Gram, Masur, Rapseed/Mustard and Safflower cultivation

The Cabinet Committee on Economic Affairs, chaired by the Prime Minister Shri Narendra Modi gave its approval for the increase in the Minimum Support Prices (MSPs) for all Rabi Crops of 2016-17 Season. Further, to incentivise cultivation of pulses and oilseeds, in the country Government has announced a bonus on these crops, payable over and above the following approved MSP.

Commodity	MSP for 2015-16 Season (Rs/Quintal)	MSP approved for 2016-17 (Rs/Quintal)	Increase	
			Absolute (Rs / Quintal)	percentage
Wheat	1525	1625	100	6.6
Barley	1225	1325	100	8.2
Gram	3500 (includes bonus of Rs.75 per quintal)	4000 (includes bonus of Rs.200 per quintal)	500	14.3
Masur (Lentil)	3400 (includes bonus of Rs.75 per quintal)	3950 (includes bonus of Rs.150 per quintal)	550	16.2
Rapeseed / Mustard	3350	3700 (includes bonus of Rs.100 per quintal)	350	10.4
Safflower	3300	3700 (includes bonus of Rs.100 per quintal)	400	12.1

The approval to increase MSPs is based on the recommendations of Commission for Agricultural Costs and Prices (CACP) which, while recommending MSPs, takes into account the cost of production, overall demand-supply, domestic and international prices, inter-crop price parity, terms of trade between agricultural and non-agricultural sectors, the likely effect on the rest of the economy, besides ensuring rational utilization of production resources like land and water.

The recommendations of CACP, being the expert body, are generally accepted as such. However, to incentivise cultivation of pulses and oilseeds, the Cabinet has decided to give a bonus of Rs.200/- per quintal for Gram, a bonus of Rs 150/- per quintal for Masur/Lentil and a bonus of Rs 100/- per quintal each for Rabi oilseeds viz. Rapeseeds/Mustards and Safflower, over and above the recommendations of the CACP. There is an increasing gap between the domestic demand and supply of pulses and oilseeds, as a result of which reliance on import is increasing. Government has, therefore, announced this bonus on pulses and oilseeds to give a strong price signal to farmers to increase acreage and invest for increasing in productivity of these crops. The increase in cultivation of leguminous pulses and oilseeds will also have additional environmental benefits as these crops are less water consuming and help in nitrogen fixation in the soil.

Food Corporation of India (FCI) will be the designated central nodal agency for price support operations for cereals, pulses and oilseeds. To supplement the efforts of FCI, the National Agricultural Cooperative Marketing Federation of India Limited (NAFED), National Cooperative Consumers' Federation (NCCF), Central Warehousing Corporation (CWC) and Small Farmers Agri-Business Consortium (SFAC) may also undertake procurement of oilseeds and pulses as per their capacity.

Cooperatives can Play a Very Important Role in Creating Job Opportunities in Rural Areas: Shri Radha Mohan Singh

The Union Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh said that cooperatives can play a paramount role in creating employment opportunities in rural areas. Cooperatives related to dairy have proved this while creating employment opportunities in plenty. Shri Radha Mohan Singh said that cooperatives have made themselves prominent in every walk of life and through the vast network of cooperatives about 100 million people have benefitted with opportunities of employment throughout the world. The Minister of Agriculture and Farmers Welfare was speaking at a conference of the 12th International Cooperative Alliance (ICA) - Asia Pacific Regional Assembly and 9th Cooperative Forum. Shri Singh warmly welcomed almost 250 foreign delegates coming from Asia Pacific region to participate in the conference and expressed hope that this conference would prove a milestone to strengthen the cooperatives in Asia - Pacific Region.

The Minister added that the Government of India has launched a number of schemes of paramount importance under the guidance of Hon'ble Prime Minister, Shri Narendra Modi. Shri Singh said that cooperatives can play a vital role in implementing schemes such as Toilets in Schools, Jan Dhan Yojana, Swachh Bharat Abhiyan, Pradhan Mantri Krishi Sinchai Yojana, Make in India, Soil Health Card because it has large network spread in the remotest areas as well as in villages. The Minister further said that government has put a strong thrust on the creation of employment opportunities related to skills. As nearly 65% population of the country is below 38. Keeping in view this sort of scenario the cooperatives can play a very important role in creating the opportunities of employment as well as access to rural areas.

Shri Radha Mohan Singh further said that there are more than 6 lakh cooperatives in the country. The membership of them has gone up to 2491.20 million. These cooperatives have made the cooperative movement as the largest movement in the world. These cooperatives are working in the regime of fertilizers delivery, sugar production, handlooms as well as retail sector. The cooperatives sector imparts self employment to 17.80 million people and cooperatives related to fisheries, labour, handlooms and gender have played very important role in bringing improvement in socio-economic condition of the weaker sections of the society. The cooperatives related to dairy sector have made the country self dependent by realizing "White Revolution". Housing cooperatives have provided facilities of accommodation to the weaker section of the society at reasonable price.

Assistance to Farmers for Crop Loss

Government of India is implementing yield based Pradhan Mantri Fasal Bima Yojana (PMFBY) which has replaced the National Agricultural Insurance Scheme (NAIS) & Modified National Agricultural Insurance Scheme (MNAIS), from Kharif 2016 season. Comprehensive risk insurance is provided under PMFBY to cover yield loss due to non-preventable risks viz. natural fire and lightening; Storm, hailstorm, cyclone, typhoon, tempest, hurricane, tornado etc.; flood, inundation and landslide; drought, dry spells; pests/ diseases etc. on the other hand, Weather Based Crop Insurance Scheme (WBCIS) provides insurance protection to the farmers against adverse weather incidence, such as deficit and excess rainfall, high or low temperature, humidity etc. which are deemed to impact adversely the crop production.

Financial assistance is also provided to farmers as per guidelines on the items and norms of assistance from State Disaster Response Fund (SDRF)/ National Disaster Response Fund (NDRF) dated 8th April, 2015 of Ministry of Home Affairs, where assistance is admissible for crop loss of 33% and above due to notified natural calamities viz. avalanches, cyclone, cloud burst, drought, earthquake/ tsunami, fire, flood, hailstorm, landslides, pest attack, frost and cold wave. The norms of relief under SDRF/NDRF are Rs. 6800/- per ha for rainfed areas, Rs.13500/-per ha for assured irrigated areas and Rs.18000/-per ha for all types of perennial crops. Assistance under SDRF/NDRF provided is for immediate relief and not by way of compensation for the loss suffered.

National Dairy Plan to Increase Milk Production & to Reduce Spoilage of Milk

The Department is implementing the following Dairy Development schemes in which assistance is provided among others for creation and strengthening infrastructure for providing market access to milk & milk products which helps to reduce spoilage of milk due to high temperature:-

i. National Dairy Plan (Phase-I):

The Government of India has approved National Dairy Plan Phase- I (NDP-I) with an outlay of Rs. 2,242 Crore for implementation during 2011-12 to 2018-19 as a Central Sector Scheme. The Scheme is implemented through National Dairy Development Board and the objectives of the National Dairy Plan, Phase I are:-

(a) To increase the productivity of milch animals and thereby increase milk production to meet the rapidly growing demand for milk.

(b) To provide help to rural milk producers with greater access to the organized milk-processing sector.

NDP-I is being implemented in the 18 major milk producing States of Uttar Pradesh, Punjab, Haryana, Gujarat, Rajasthan, Madhya Pradesh, Bihar, West Bengal, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana (after bifurcation of Andhra Pradesh), Orissa, Jharkhand, Chhattisgarh, Uttarakhand and Kerala constituting 90% of the milk production of nation. Under NDP-I, 364 projects have been approved with a total outlay of Rs.1904.22 crore out of which Rs.897.97 crore has been released to the implementing agencies. Under this scheme, Bulk Milk Coolers (BMCs) for milk of 5200 thousand litres per day (TLPD) capacity has been approved to help reducing spoilage of milk due to high temperature.

ii. National Programme for Dairy Development under the Central Sector Scheme "National Programme for Bovine Breeding and Dairy Development (NPBBDD)":

The new Scheme, namely, National Programme for Dairy Development (NPDD) was approved during 2013-14 with the budget provision of Rs.600 crore for implementation during 12th Plan. The objective of the scheme is to create dairy infrastructure for improved procurement, processing and marketing of milk and milk products.

NPBBDD is implemented throughout the country including Sikkim. Under NPDD, 31 projects have been approved with a total outlay of Rs.340.77 crore out of which Rs.140.19 crore has been released to the implementing agencies. Under this scheme, Bulk Milk Cooler for milk of 388 TLPD capacity and processing capacity of 1820 TLPD capacity has been approved to help in reducing spoilage of milk due to high temperature.

With the objective of doubly Farmers of income, the Centre is trying to Enhance the Production of Food-grain, and to Reduce the Cost: Shri Radha Mohan Singh

Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh, on 24th November, 2016 said that to make the income of the farmers double, the Government of India is trying tooth and nail to enhance the production of foodgrain, to reduce the cost, to find out the new means and ways for the generating incomes to farmers and to give them better return of their produces in appropriate marketing system. Shri Singh said this in a programme conducted by ASSOCHAM. The subject of the programme was how to link the farmers with the markets.

Agriculture Minister further said that the farmers can sell their produces through online trading from anywhere and they can obtain better prices of their produces as per its quality. If farmer is not satisfied with the price, he can reject even the highest bid. Option of online payment system is also available to the farmers. The system which is known to us as e-NAM (National Agricultural Market) has been started on 14.04.2016. By the year 2018, total 585 mandis are proposed to be linked with e-NAM portal. By September, 2016, 250 mandis have been linked with e-NAM against a target of 200 mandis.

The states which have made 3 mandatory amendments to their APMC Act can join the e-NAM platform. The amendments are provision of e-trading, single point levy of mandi fee and single trading license valid throughout the states. Two major states viz. Bihar and Kerala don't have APMC Act at present and are not on the e-NAM portal. Government is persuading these states to create some regulatory mechanism in their states and join the e-NAM platform.

Shri Singh said that the organized marketing of agricultural products in the country is carried through by regulated markets whose number is about 6746. As per the recommendations of the National Commission constituted on farmers, there should be a Mandi within the precincts of 80 square kilo meters. In the existing scenario, there is only one mandi within the reach of 580 square kilo meter. The present government is making endeavour to encourage set up of private mandis to improve reach of farmers to markets. So far, 21 states have amended their APMC Acts in this matter.

Central Government released Rs. 118 crore for the year 2016-17 for farm mechanization: Shri Radha Mohan Singh

Union Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh, on 25 th November, 2016 said that it is essential to use maximum and best technology available resources in fast changing world and growing world economic competition so that domestic requirement of foodgrains can be met and export may be promoted. Agriculture Minister said this while releasing coffee table book "Farm Mechanization for Make in India'.

Agriculture Minister said that farm mechanization has become an important part of crop production, processing and transport but it is facing double challenges in the whole world. The first challenge is to increase the supply of food for growing population and the second is the protection of environment. He said that the challenge of farm mechanization still exists in India. Most of our land holding is small; therefore, commercial use is not proving beneficial but government is ensuring the availability of farm machine- rota vator, blow sprayer, cotton cultivator, cutter and shredder through the establishment of custom hiring centre for those farmers who cannot buy costly farm machines. Four regional farm machinery training and testing institutes have been established in the country which caters to the needs of standard and quality farm machinery and equipments.

The Minister further said that the central government released Rs. 340 crore for this sector in last two years i.e. 2014-16, whereas the previous government released only Rs. 62 crore between 2012 and 2014. Shri Singh said that Centre Government has released Rs. 118 crore for this purpose.

Shri Singh said that food safety, rural employment and soil conservation, sustainable natural resource management and bio-diversity production are essential for sustainable technology and total rural development. Sustainable development of agriculture is required for increase in rural income, doubling the income of farmers and catering to the needs of food and nutrition and farm mechanization plays an important role in it. He said that Brazil, Russia, India, China and South Africa (Five BRICS countries) along with Japan and Turkey are in the category of the markets of modern farm machines.

Rabi Crops Sowing Crosess 327 Lakh Hactare

As per preliminary reports received from the States, the total area sown under Rabi crops as on 25th November, 2016 stands at 327.62 lakh hectares as compared to 313.17 lakh hectare this time in 2015. Wheat has been sown/ transplanted in 127.15 lakh hectares, rice in 6.82 lakh hectares, pulses in 95.09 lakh hectares, coarse cereals in 34.35 lakh hectares and area sown under oilseeds is 64.21 lakh hectares.

The area sown so far and that sown during last year this time is as follows:

(*In Lakh hectare*)

Crop	Area sown in 2016-17	Area sown in 2015-16
Wheat	127.15	117.32
Rice	6.82	9.10
Pulses	95.09	88.12
Coarse Cereals	34.35	42.37
Oilseeds	64.21	56.26
Total	327.62	313.17

Shri Radha Mohan Singh launches e-pashuhaat portal (www.epashuhaat.gov.in)

The Union Agriculture & Farmers Welfare Minister, Shri Radha Mohan Singh launched e-pashuhaat portal (www.epashuhaat.gov.in) on the occasion of National Milk Day on 26th November, 2016. Shri Singh informed that for the first time in the world under the scheme National Mission on Bovine Productivity 'e-pashuhaat' portal has been developed for connecting breeders and farmers regarding availability of bovine germplasm. Through the portal breeders/farmers can sell and purchase breeding stock, information on all forms of germplasm including semen, embryos and live animals with all the agencies and stake holders in the country has been uploaded on the portal. Through this portal, farmers will be made aware about the availability of quality disease free bovine germplasm with different agencies in the country. The portal would lead to propagation of high genetic merit germplasm.

General Survey of Agriculture

Trends in foodgrain prices

During the month of November, 2016 the All India Index Number of Wholesale Price (2004-05=100) of foodgrains increased by 2.33 percent from 283.6 in October, 2016 to 290.2 in November, 2016.

The Wholesale Price Index (WPI) Number of cereals increased by 1.60 percent from 249.5 to 253.5 and WPI of pulses increased by 4.21 percent from 444.1 to 462.8 during the same period.

The Wholesale Price Index Number of wheat increased by 5.20 percent from 232.9 to 245.0 while that of rice decreased by 0.28 percent from 249.5 to 248.8 during the same period.

Weather, Rainfall and Reservoir Situation during December, 2016

Rainfall Situation

Cumulative Post-Monsoon Season rainfall for the country as a whole during the period 01st October to 28th December, 2016 has been 45% lower than the Long Period Average (LPA). Rainfall in the four broad geographical divisions of the country during the above period has been lower than LPA by 72% in North-West India, 60% in South Peninsula, 27% in East & North East India and 14% in Central India.

Out of total 36 meteorological sub-divisions, 03 sub-divisions received large excess rainfall, 07 sub-divisions received excess/normal rainfall, 13 sub-divisions received deficient rainfall and 13 sub-divisions received large deficient rainfall.

Water Storage in Major Reservoirs

Central Water Commission monitors 91 major reservoirs in the country which have total live capacity of 157.80 Billion Cubic Metre (BCM) at Full Reservoir Level (FRL). Current live storage in these reservoirs (as on 29th December, 2016) is 92.59 BCM as against 73.32 BCM on 29.12.2015 (last year) and 94.58 BCM of normal storage (average storage of last 10 years). Current year's storage is higher than the last year's storage by 26% but lower than normal storage by 2%.

Sowing Position during Rabi 2016

As per latest information available on sowing of crops, around 93% of the normal area under Rabi crops has been sown upto 30.12.2016. Total area sown under Rabi crops in the country has been reported to be 582.87 lakh hectares as compared to 545.46 lakh hectares during the same period of last year. This year's area coverage so far is higher by 37.4 lakh ha. than the area coverage during the corresponding period of last year and 15.7 lakh ha. than the normal as on date.

Economic Growth

As per the estimates of Gross Domestic Product (GDP) for the second quarter (July-September) 2016-17, released by the Central Statistics Office (CSO) on November 30, 2016, the growth rate of GDP in Q2 of 2016-17 was 7.3 per cent, as compared to the growth of 7.6 per cent in Q2 of 2015-16 and 7.1 per cent in Q1 of 2016-17. The growth rate for the first half (H1) of the current year works out to 7.2 per cent as against a growth of 7.5 per cent in H1 of 2015-16.

The growth in Gross Value Added (GVA) at constant (2011-12) basic prices in Q2 of 2016-17 was 7.1 per cent, as compared to the growth rate of 7.3 per cent in Q2 of 2015-16. At the sectoral level, agriculture, industry and services sectors grew at the rate of 3.3 per cent, 5.2 per cent and 8.9 per cent respectively in Q2 of 2016-17 (Table 2).

The growth rate GDP at constant (2011-12) prices for the year 2015-16 was 7.6 per cent (provisional estimates), as compared to the growth rate of 7.2 per cent (1st revised estimates) in 2014-15 (Table 1).

The share of total final consumption in GDP at current prices in 2015-16 was at 70.1 per cent as compared to 68.5 per cent in 2014-15. The fixed investment rate (ratio of gross fixed capital formation to GDP) declined from 30.8 per cent in 2014-15 to 29.3 per cent in 2015-16. During first half (H1) of 2016-17, total consumption as a share of GDP was 73.7 per cent, and GFCF as a share of GDP was 27.7 per cent.

The saving rate (ratio of gross saving to GDP) for the years 2014-15 and 2013-14 was 33.0 per cent, as compared to 33.8 per cent in 2012-13. The investment rate (rate of gross capital formation to GDP) in 2014-15 was 34.2 per cent, as compared to 34.7 per cent and 38.6 per cent respectively in 2013-14 and 2012-13.

Agriculture and Food Management

Rainfall: The cumulative rainfall received for the country as a whole, during the period 1st October,—14th December,

2016, has been 43 per cent below normal. The actual rainfall received during this period has been 68.3 mm as against the normal at 118.9 mm. Out of the total 36 meteorological sub-divisions, 5 sub-divisions, received excess season rainfall, 6 sub-divisions received normal season rainfall and the remaining 25 sub-divisions received deficient/ scanty/no season rainfall.

All India Production of Foodgains: As per the 1st Advance Estimates (AE) released by Ministry of Agriculture & Farmers Welfare on 22nd September, 2016 production of Kharif foodgrains during 2016-17 is estimated at 135.0 million tonnes, as compared to 124.1 million tonnes in 2015-16 (1st AE) (Table 3).

Procurement: Procurement of rice as on 1st December 2016 was 16.6 million tonnes during Kharif Marketing Season 2016-17 whereas procurement of wheat was 23.0 million tonnes during Rabi Marketing Season 2016-17 (Table 4).

Off-take: Off-take of rice during the month of October 2016 was 26.2 lakh tonnes. This comprises 24.9 lakh tonnes under TPDS/NFSA and 1.3 lakh tonnes under other schemes. In respect of wheat, the total off-take was 24.5 lakh tonnes comprising 18.8 lakh tonnes under TPDS/ NFSA and 5.7 lakh tonnes under other schemes. Cumulative off-take of foodgrains during 2016-17 (till October 2016) was 40.3 million tonnes (Table 5).

Stocks: Stocks of foodgrains (rice and wheat) held by FCI as on December 1, 2016 was 43.5 million tonnes, as compared to 51.2 million tonnes as on December 1, 2015 (Table 6).

TABLE

TABLE 1: Growth of GVA at Basic Prices by Economic Activity (at 2011-12 Prices) (in per cent)

Sector	Growth			Share in GVA		
	2013-14 2nd RE	2014-15 (1st RE)	2015-16 (PE)	2013-14 2nd RE	2014-15 (1st RE)	2015-16 (PE)
Agriculture, forestry & fishing	4.2	-0.2	1.2	17.5	16.3	15.4
Industry	**5.0**	**5.9**	**7.4**	**31.6**	**31.2**	**31.3**
Mining & quarrying	3.0	10.8	7.4	2.9	3.0	3.1
Manufacturing	5.6	5.5	9.3	17.4	17.1	17.5
Electricity, gas, water supply & other utility services	4.7	8.0	6.6	2.2	2.2	2.2
Construction	4.6	4.4	3.9	9.0	8.8	8.5
Services	**7.8**	**10.3**	**8.9**	**51.0**	**52.5**	**53.4**
Trade, hotels, transport, communication and broadcasting services	7.8	9.8	9.0	18.4	18.9	19.2
Financial, real estate & professional services	10.1	10.6	10.3	20.3	21.0	21.6
Public administration, defence and other Services	4.5	10.7	6.6	12.3	12.7	12.6
GVA at basic prices	**6.3**	**7.1**	**7.2**	**100.0**	**100.0**	**100.0**
GDP at market prcies	**6.6**	**7.2**	**7.6**	—	—	—

Source: Central Statistics Office (CSO), 2nd RE: Second Revised Estimates, 1st RE: First Revised Estimates, PE: Provisional Estimates.

TABLE 2: Quarter-wise Growth of GVA at Constant (2011-12) Basic Prices (per cent)

Sector	2014-15				2015-16				2016-17	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Agriculture, forestry & fishing	2.3	2.8	-2.4	-1.7	2.6	2.0	-1.0	2.3	1.8	
Industry	**8.0**	**5.9**	**3.8**	**5.7**	**6.7**	**6.3**	**8.6**	**7.9**	**6.0**	**5.2**
Mining & quarrying	16.5	7.0	9.1	10.1	8.5	5.0	7.1	8.6	-0.4	-1.5

Sector	2014-15				2015-16				2016-17	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Manufacturing	7.9	5.8	1.7	6.6	7.3	9.2	11.5	9.3	9.1	7.1
Electricity, gas, water supply & other utility services	10.2	8.8	8.8	4.4	4.0	7.5	5.6	9.3	9.4	3.5
Construction	5.0	5.3	4.9	2.6	5.6	0.8	4.6	4.5	1.5	3.5
Services	8.6	10.7	12.9	9.3	8.8	9.0	9.1	8.7	9.6	8.9
Trade, hotels, transport, communication and services related to broadcasting	11.6	8.4	6.2	13.1	10.0	6.7	9.2	9.9	8.1	7.1
Financial, real estate & professional services	8.5	12.7	12.1	9.0	9.3	11.9	10.5	9.1	9.4	8.2
Public administration, defence and other Services	4.2	10.3	25.3	4.1	5.9	6.9	7.2	6.4	12.3	12.5
GVA at basic prices	7.4	8.1	6.7	6.2	7.2	7.3	6.9	7.4	7.3	7.1
GDP at market prcies	7.5	8.3	6.6	6.7	7.5	7.6	7.2	7.9	7.1	7.3

Source: Central Statistics Office (CSO).

TABLE 3: PRODUCTION ON MAJOR AGRICULTURAL; CROPS (1ST ADV. EST.)

Crops	Production (in Million Tonnes)				
	2012-13	2013-14	2014-15	2015-16 (4th AE)	2016-17 (1st AE)
Total Foodgrains	257.1	265.0	252.0	252.2	135.0
Rice	105.2	106.7	105.5	104.3	93.9
Wheat	93.5	95.9	86.5	93.5	—
Total Coarse Cereals	40.0	43.3	42.9	37.9	32.5
Total Pulses	18.3	19.3	17.2	16.5	8.7
Total Oilseeds	30.9	32.8	27.5	25.3	23.4
Sugarcane	341.2	352.1	362.3	352.2	305.2
Cotton#	34.2	35.9	34.8	30.1	32.1

Source: DES, DAC&FW, M/o Agriculture & Farmers Welfare. 1st AE: 1st Advance Estimates of Kharif crops only, 4th AE: Fourth Advance Estimates, # Million bales of 170 kgs. each.

TOTAL 4: PROCUREMENT OF CROPS IN MILLION TONNES

Crops	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Rice#	35.0	34.0	31.8	32.0	34.2	16.6$
Wheat@	28.3	38.2	25.1	28.0	28.1	23.0$
Total	63.3	72.2	56.9	60.2	62.3	39.6

#Kharif Marketing Season (October-September), @ Rabi Marketing Season (April-March), $Position as on 01.12.2016.

Source: DFPD, M/o Consumer Affairs and Public Distribution.

TABLE 5: OFF-TAKE OF FOODGRAINS (MILLION TONNES)

Crops	2012-13	2013-14	2014-15	2015-16	2016-17 (Till April)
Rice	32.6	29.2	30.7	31.8	21.0
Wheat	33.2	30.6	25.2	31.8	19.2
Total (Rice & Wheat)	65.8	59.8	55.9	63.6	40.3

Source: DFPD, M/o Consumer Affairs and Public Distribution.

TABLE 6: STOCKS OF FOODGRAINS (MILLION TONNES)

Crops	December 1, 2015	December 1, 2016
1. Rice	9.9	11.1
2. Unmilled Paddy#	20.4	23.7
3. Converted Unmilled Paddy in terms of Rice	13.7	15.9
4. Wheat	27.6	16.5
Total (Rice & Wheat) (1+3+4)	51.2	43.5

#Since September, 2013, FCI gives separate figures for rice and unmilled paddy lying with FCI & State agencies in terms of rice.

ARTICLES

Impact of Machine Transplanting in Rice Cultivation in Cauvery Delta Region, Tamil Nadu

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Introduction

In Tamil Nadu, Thanjavur, Thiruvarur, Nagapattinam, Trichy, Ariyalur and Cuddalore are the Delta districts covered under Cauvery Delta Zone, in which Government of Tamil Nadu has implemented the Kuruvai Package for the farmers to boost up the production in Kuruvai cultivation during 2015. Thiruvarur district consists of 10 blocks, namely, Needamanagalam, Valangaiman, Kodavasal, Nannilam, Thiruvarur, Kottur, Mannarkudi, Koradachery, Thiruthuraipoondi and Muthupettai. Except Thiruthuraipoondi and Muthupettai blocks, remaining eight blocks has been covered under Kuruvai Package 2015. Based on the number beneficiaries of the program in each block, proportionate random sampling procedure was followed to select sample of respondents. In Thiruvarur district, the Govt. of Tamil Nadu has implemented the Kuruvai Package 2015.

Objectives

The major objective of the study is to asses the impact of machine transplanting in Cauvery delta region of Thiruvarur District of Tamil Nadu.

Methodology

During the year 2015, 1006 farmers received Kuruvai package of the Govt of Tamil Nadu. In Thiruvarur district, 564 farmers received Kuruvai Package. It has been decided to select 25 per cent of the population as sample, and accordingly the sample size has been fixed as 250 respondents from the above districts by adopting proportionate random sampling method. Accordingly, from Thiruvarur district 120 farmers have been selected for the study. Beneficiary farmers list has been obtained from the office of Joint District of Agriculture, Thiruvarur and by employing simple random sampling procedure, 120 farmers were selected. The primary data were collected from the sample respondents during the month of last week July to First week August 2015 and last week of October 2015. The simple percentage analysis were used for analyzing the data.

Results and Discussion

General Particulars of the Beneficiaries

Age

Age is an important factor which may influence the thinking, attitude towards technology adoption and risk among the farmers. The details on the age of sample farmers are in Table 1.

TABLE 1: AGE DISTRIBUTION OF SAMPLE FARMERS

S. No	Age [years]	Thiruvarur	
		Number of farmers	Per cent
1	<30	02	1.67
2	30-50	72	60.00
3	>50	46	38.33

From the Table 1, it could be inferred that, among the sample farmers of Thiruvarur district, 65.71 per cent of the sample farmers were in the age group of 30-50 years, followed by 32.85 percent in the age group of more than 50 years and 1.42 percent in the age group of less than 30 years.

Educational Status

The education levels of sample farmers were categorized into illiterate, primary, middle school, secondary, higher secondary and collegiate. The data on the educational status of the sample farmers were analyzed and the results are presented in Table 3 and it is inferred from the Table, that remarkably cent per cent of the beneficiaries [100 per cent] were found literates. Among the beneficiaries majority [52.51 per cent] of the beneficiaries had studied till higher secondary level. None of the respondent was found to be illiterate.

TABLE 2: EDUCATIONAL STATUS OF THE SAMPLE FARMERS

S. No	Education	Thiruvarur	
		Number of farmers	Per cent
1	Illiterate	0	0
2	Primary	14	11.67
3	Middle school	20	16.67
4	Secondary school	29	24.17
5	Higher secondary	31	25.83
6	Graduate	26	21.67
	Total	120	100

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Farming Experience of the Sample Farmers

It is strongly believed that farming experience has a positive influence in enhancing the farming efficiency of the farmers. The sample farmers were grouped into four categories such as less than 10 years, 11-20 years, 21-30 years and more than 31years based on their experience. The results of the same are presented in Table 3

TABLE 3: FARMING EXPERIENCE OF THE SAMPLE FARMERS

S. No	Experience [years]	Thiruvarur	
		Number of farmers	Per cent
1	<10	15	12.50
2	11-20	28	23.33
3	21-30	31	25.83
4	>30	46	38.33
	Total	120	100

From the Table 3, maximum of 38.33 per cent farmers had more than 30 years of experience. One fourth of the beneficiaries had 21 to 30 years of experience in farming followed by 23.33 per cent and 12.50 per cent of the beneficiaries who had a farming experience of about 11-20 years and less than 10 years respectively.

Size of Holdings

Size of land holding of the farmers may influence the cropping pattern, farm mechanization, adoption of modern technologies and buying behavior of the farmers with respect to agricultural inputs. The sample respondents were categorized into four groups based on the size of holding and the results are presented in the Table 4.

TABLE 4: SIZE OF LAND HOLDING OF THE SAMPLE FARMERS

S. No	Size of Land holding [in ha]	Thiruvarur	
		Number of farmers	Per cent
1	Marginal [<1 ha]	1	0.83
2	Small [1-2 ha]	39	32.50
3	Medium [2.1-4 ha]	43	35.83
4	Large [>4 ha]	37	30.83
	Total	120	100

It could be observed from the Table 5, that among the sample farmers of Thiruvarur district, 35.83 per cent belonged to medium farmers category followed by 30.83 per cent in large farmers category. It is revealed that majority of the beneficiary farmers in the study area [68.33 per cent] belonged to small and medium farmers' category. Rest one third of the beneficiaries belonged to the category of large and marginal farmers [30.83 per cent and 0.83 per cent] respectively.

Annual Income

Annual income of the family is directly related to the adoption of new technologies, investment opportunities in the farm venture and risk taking ability. Annual income of sample farmers was divided into 3 categories *viz* less than Rs. 1, 00, 000, Rs. 1, 00, 000 - Rs. 2, 00, 000 and more than Rs. 2, 00, 000. The annual income of the sample farmers is presented in the Table 5.

TABLE 5: ANNUAL INCOME LEVEL OF THE SAMPLE FARMERS

S. No	Annual Income [Rs.]	Thiruvarur	
		Number of farmers	Per cent
1	< 1,00,000	55	45.83
2	100000-2,00,000	41	34.17
3	>2,00,000	24	20.00
	Total	120	100

It could be observed from Table 5 that in Thiruvarur district, 45.83 per cent of the farmers were earning an income of less one lakh rupees per year, followed by the income category of one to two lakh rupees per year which constituted 34.17 per cent while 20.00 per cent of the beneficiaries reported their annual income of more than two lakh rupees per year.

Major Rice Varieties Grown

The findings are summarized in Table 6, which shows that ADT 43 is the major rice variety being cultivated in Thiruvarur district (30.83 per cent). and ASD 16 and ADT 45 are the second and third major rice varieties being cultivated (25.00 per cent and 24.17 per cent) by selected beneficiaries respectively. The other varieties *viz.*, ADT 36, TMK 9 and ADT 37 are being cultivated by a minimum percentage of the beneficiaries.

TABLE 6: MAJOR RICE VARIETIES GROWN BY THE SAMPLE FARMERS

S. No	Rice variety	Thiruvarur	
		Number of farmers	Per cent
1	ADT 43	37	30.83
2	ASD 16	30	25.00
3	ADT 45	29	24.17
4	ADT 36	12	10.00
5	TKM 9	7	5.83
6	ADT 37	5	4.17
	Total	120	100

Source of Irrigation

Well Irrigation is common and major source of irrigation in alluvial plains of the state except the hilly zones of state. Rest of the Tamil Nadu state is more prominently under the well irrigation during non rainy seasons. The very common type of wells in the study area is bore well or tube wells, fitted with the 6.5 HP to 7.5 HP sub-mersible motors operating in the three phase electricity condition.

Soil Type

The soil's moisture-holding capacity, intake rate and depth are the principal criteria affecting the type of planting system selected. Sandy loam soils typically have high intake rates of water and low soil moisture storage capacities and may be require an entirely different transplanting strategy than the deep clay loam soil with low infiltration rates but high moisture-storage capacities. Sandy loam and sandy clay loam soil requires more frequent, smaller applications of water whereas clay loam soils can be irrigated less frequently and to a larger depth. In the study area, the distribution of soils may vary widely over a field and may be an important limitation on the methods of planting of rice seedling selected such as manual transplanting or mechanical transplanting or direct seeding.

Comparative Economics in Seedling Production per acre

The comparative economics of seedling production per acre is given in Table 8. In this part of analysis three situations of seedling production were taken for working out the economics of seedlings namely convention method of seedling production for conventional planting, mat nursery method of seedling production for mechanical transplanting by farmers themselves and third one is outright purchase of seedlings from nurseries owned by agri-preneurs.

With regard to the human labour employed in conventional nursery system is concerned an average of seven man days with an average labour cost of Rs.1500/- per acre was required and in case of mat nursery seedling production, the total number of human labour employed was only three labour man days. The net difference in human labour employed between conventional and mat nursery methods was four man days, which in monetary terms it a worked to saving of Rs. 900/- per acre. Similarly, use of machine power in nursery in both conventional and mat system also had difference in monetary terms with a saving of Rs. 300/- in mat nursery system over the traditional system.

There was no difference in the cost of seeds, but there was significant difference in quantity of seeds used in conventional and mat system of seedling production. Under conventional method of seedling production, on an average 45 to 55 kgs of seeds were used for one acre of land rice planting through conventional method. Where as, seedlings requirement for one acre of main field planting needs only 20 kgs of seeds, seedlings produced through mat nurseries. The net difference in seed rate was 25 to 35 kgs per acre, which worked to about Rs. 1050/- per acre in monetary terms.

Value of manures and fertilizers applied in rice nursery was ranging between Rs. 50 to Rs. 250 per mat and conventional nurseries. Moreover, an average quantity of 10 kgs of DAP was used in conventional nursery and in mat nursery method very minimum [two kgs] fertilizer was used. Use of plant protection chemicals on average 100 ml of insecticides/fungicides was used in conventional nursery by spending an average cost of Rs.100 and in mat nursery method the farmers used only 50 ml of insecticides/ fungicides with an average cost of Rs.50. Finally, estimation of interest on working capital in conventional nursery was Rs.32/- and in mat nursery it was Rs. 12/- respectively.

The Table 8 reveals the total cost of seedling under three different sources. For traditional method of planting seedlings under conventional nursery, the cost of seedling per acre was Rs. 6100/- per acre. The cost of seedlings for machine transplanting was estimated to be Rs. 5492/- per acre.

Coming to the expenses incurred on plant protection, the was slightly higher in case of conventionally planted fields [Rs. 1067/-], as compared to the mechanically transplanted fields [Rs.943/-]. There was less incidence of pest and diseases in case of mechanical transplanted fields compared to the conventionally planted field, mainly because of the perfect maintenance of ventilation due to proper spacing between plants and rows.

TABLE 7: Comparative Economics of Rice Seedling Production per acre

S. No	Particulars	Conventional Transplanting		Mechanical Transplanting	
		Physical Quantity	Cost [Rs.]	Physical Quantity	Cost [Rs.]
I	Up to Nursery costs incurred	—	2133	—	2367
	Pulling out and transporting the seedling + transplanting+gap filling	8+18 male and female labour	3967	1labour +machine hiring cost	3125
			6100		5492

S. No	Particulars	Conventional Transplanting		Mechanical Transplanting	
		Physical Quantity	Cost [Rs.]	Physical Quantity	Cost [Rs.]
II	Main Field Operational costs				
	Operational Cost	Tractor Ploughing+ bund trimming+ manual 1 levelling	2323	Tractor Ploughing+ lazer guided levelling bund trimming	1896*
	Manures and Fertilizers	1bag DAP+2bag Urea+1bag MOP+ 2labour	2682	1bag DAP+2bag Urea+1bag MOP+ 2labour	2682
	Plant protection	1labour +chemicals	1067	1 labour+chemicals	943
	Weed management	3labour+weedicide	1217	6 labour+weedicide	1307
	Harvest	1labour +machine hiring cost	2318	1labour +machine hiring cost	2136
	Interest on working capital @ 7%		576		567
III	Total Cost [after planting]		9227		8382
IV	[Grand] Total cost of cultivation		16096		14837
	Productive tillers per square meter		219		275
	Yield [Kg/acre]		1852		2339

* Excluding the subsidy amount of Rs. 2375/- for machine transplantation.

In case of expenses incurred on weed management it was comparatively higher at (Rs. 1307/-) in case of mechanical transplanted fields. This is mainly because of practicing Cono weeder (one or two times). Farmers reported that use of cono weeders increased the sprouting more tillers per hill through providing more aeration to the roots and also increase the nutrients uptake. But in case of conventionally planted fields, the weeding expenses reported was only Rs. 1217/- .

There would not be significant difference on expenses incurred on harvesting expenditures since all farmers used combined harvester for harvesting of the crop.

TABLE 8: Cost and Return in Rice Cultivation

S. No	Particulars	Conventional	Machine planting*
1	Yield [productivity] in kgs	1852	2339
2	Average Price [per kg]	Rs. 14.60/-	Rs. 14.60/-
3	Cost of Cultivation [Rs. per acre]	Rs. 16096/-	Rs. 14837/-
4	Gross return [per acre]	Rs.27040/-	Rs.34150/-
5	Net return [per acre]	Rs.10944/-	Rs.19313/-

* Excluding the subsidy amount of Rs. 2375/- for machine transplantation.

It could be seen from the table 8 that yield increase was reported in case of mechanically transplanted fields as compared to the conventional planted fields. Cost of cultivation was almost 20 per cent lesser in case of mechanically transplanted fields as compared a to conventional planted fields, this was mainly due to reduction in seed cost, reduction in manures and fertilizer application and plant protection. The reduction or saving in the cost of cultivation automatically resulted in the fall in cost of production.

Finally, it was very well demonstrated and reported by the study farmers that gross return were significantly higher that net return and almost doubled net return. This was mainly because of more tiller per hill was reported for almost all the farmers who had adopted the mechanical

transplanting system. Farmers reported that almost 40 to 50 per cent increase in number of tillers per hill which would increase the yield/productivity of the crop.

Merits or Reasons for Adoption of Mechanical Transplantation

The findings on the merits or reason for machine transplanting are given in Table 9, which showed that more than 90 per cent of the beneficiaries stated that non availability of labour, government subsidy, no nursery maintenance, high cost of labour, timely planting, more area coverage and high yield were the major reasons for adopting machine transplanting.

TABLE 9: Merits or Reasons for Adoption of Mechanical Transplantation

S. No	Particulars	Response	Percentage	Rank
1	Non availability of labour	118	98.33	I
2	Government subsidy	111	92.50	II
3	No nursery maintenance	98	81.67	III
4	High cost of labour	98	81.67	IV
5	Timely planting	97	80.83	V
6	More area coverage	93	77.50	VI
7	High yield	92	76.67	VII

Level of Satisfaction about Kuruvai Special Package 2015

All the respondents reported that they were satisfied with mechanical transplantation. Further, they stated that extra care for first 20 days after mechanical transplantation was required to be given through provision of proper drainage facility and irrigation.

Constraints of the Mechanical Transplanting Reported by the Farmers

The demerits of the machine transplanting methods were also studied and the findings were presented in Table 10. It could be inferred from the table that cent percentage [100 per cent] of the beneficiaries reported additional cost for land preparation and Gap filling. About 90 per cent of the beneficiaries stated that proper care should be given for the control of weeds.

TABLE 10 : Constraints of the Mechanical Transplanting Reported by the Farmers

S. No	Particulars	Response	Percentage
1	Additional cost for land preparation and Gap filling	120	100.00
2	More weed problem	108	90.00
3	Young seedlings affected	72	60.00
4	Non availability of required number of machines	65	54.17
5	Maintaining fixed number of seedlings per hill	19	15.83

TABLE 11: Suggestion for Improvement of Adoption of Mechanical Transplanting

S. No	Particulars	Response	Percentage
1	Subsidies may be increased	120	100.00
2	Suitable leveler for wet condition	78	65.00
3	Strengthening the machineries availability in depots/PACCS	75	62.50
4	Power supply for bore wells	56	46.67
5	Village based nursery maintenance	28	23.33
6	Uniform no. of seedlings per hill should be maintained	21	17.50

Conclusion

Majority of the beneficiaries were between 30 and 50 years of age. Cent per cent of the beneficiaries were literates. Majority of the beneficiaries farming experience was more than 30 years. Around 55 per cent of the beneficiaries were in the annual income of less than Rs. 1 lakh. ADT 43, ASD 16 and ADT 45 were the major rice varieties being cultivated by the beneficiaries. All the beneficiaries were fully satisfied in machine transplanting. Beneficiaries need this programme to be continued for the coming years also. All the beneficiary farmers were interested to follow machine transplantation in the years to come if the subsidy was provided to them. All the beneficiary farmers suggested for an increase in the subsidy.

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Impact of Training Programmes of Krishi Vigyan Kendra

Dr Dilip Kumar Mazumdar*

Abstract

This study aims to analyse the impact of training programmes of Krishi Vigyan Kendra, Kamrup, Assam on adoption of improved production technology for paddy crop from 2009-10 to 2013-14 and the constraints associated with its adoption. A sample of 100 farmers that attended training under KVK, Kamrup, was randomly selected from Chaygaon block in Kamrup district of Assam. The findings of the study revealed that the trainees were satisfied with the training procedure and nature of training provided and it also helped them to increase their productivity and income. The major constraints in adoption of improved technology identified were farmer's inability to invest more because of their poor economic condition, lack of irrigation facilities, inadequate credit facilities and non-availability of inputs in time. There was also a need of institutional intervention in the field of market information, price support, warehousing, extension services and subsidy. On the whole, the study revealed that training can play a vital role in enhancing farmer's knowledge and skill, improving income and better livelihood opportunities for farm families and overall positive impact on the national/ state economy.

Key words: Krishi Vigyan Kendra, training, paddy, improved technology, adoption, constraints.

Introduction:

Assam is an agrarian economy. It has tremendous potential for promotion of agriculture on national and international platform. Farmers are the main drivers for agricultural growth and as such motivating and grooming the farming community for adoption of improved technology for crops, livestock, etc. through the extension network is of utmost importance. Krishi Vigyan Kendra, Kamrup, under Assam Agricultural University, has been trying to provide better knowledge to the farmers regarding the different aspects of agriculture and allied sectors through various training and other developmental programmes. They provide information regarding the improved package of practices for crops on seed rate, appropriate fertilizer dose, use of insecticides and pesticides to protect crops from different pests and diseases, irrigation schedule, post harvest management, marketing channels, etc. Rearing of livestock, fishery and bee keeping commercially by inculcating scientific management practices, women empowerment are also covered by the organisation.

The present study was undertaken to assess the impact of training programmes of Krishi Vigyan Kendra, Kamrup from 2009-10 to 2013-14 for paddy, the most important cereal and field crop in the district/state. The crop is cultivated in three seasons of the year as winter, summer and autumn paddy covering an area of 25.03 lakh hectare in 2013-14 which was about 89 percent and 60 percent of the net cropped and gross cropped area of the state, respectively (Anon, 2015). Crop-wise the area under winter, summer and autumn paddy were 2.23, 18.81 and 3.99 lakh hectares respectively. Taking into account the significance of the above mentioned facts, the objectives of the present study were as follows.

1. To study the effectiveness and extent of adoption of improved technology.
2. To study the impact of training on productivity, income and employment.
3. To analyse the constraints associated with adoption of improved technology.

Methodology of the study:

This section contains the sample design and method of data collection which was used for further analysis and findings. Simple Random Sampling technique was adopted for the study. A sample of 100 farmers who had attended training under KVK, Kamrup, was randomly selected from Chaygaon block in Kamrup district. The selected farmers consisted of a heterogeneous group comprising marginal, small and medium farmers. Large farmers were excluded from the study as they comprised a meagre percentage. Primary data pertaining to the objectives of the study was collected through structured questionnaires by personal interview and interaction with the farmers. The questionnaire consisted of thirteen close-ended questions and one open-ended question. The questions had been designed in such a way that the respondents could understand the type of information they were being specifically asked for and were able to provide the same without much hassles. Secondary data to substantiate the objectives of the study was collected from published documents, organizational records, etc. The collected data was tabulated followed by analysis using appropriate statistical tools. The data was collected during the month of November, 2013.

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Garrett's Ranking Technique:

To find the significant constraints of the trainees in implementation of improved technology, Garrett's ranking technique was used (Garrett, 1981). The trainees were asked to assign ranks to all the factors and the outcome of such ranking was converted into percentage score with the help of the following formula.

$$\text{Percentage score} = \frac{100\ (R_{ij} - 0.5)}{N_j}$$

Where,

R_{ij} = Rank given for the ith factor by the j^{th} respondent and

N_j = Number of factors ranked by the j^{th} respondent.

The percentage score of each rank obtained was converted into scale values using the Scale Conversion Table given by Garrett and Woodworth (1969). The scale values for first rank to tenth rank were 81, 70, 63, 57, 52, 47, 42, 36, 29 and 18, respectively. The score value for each factor (fx) was calculated by multiplying the number of respondents (f) with the respective scale values (x). The total scores were found by adding the score values (fx) of each rank for every factor. The mean score was then calculated for each factor to know the order of constraints given by the respondents. Based on the mean score, the overall ranks were assigned for each factor.

Results and Discussion:

The results of the study are discussed in this section with reference to the stated objective.

Socio-economic characteristics:

The socio-economic profile of the trainees in respect of age, education level, family size, land holding and annual family income, are depicted in table 1.

TABLE 1: Socio-economic Profile of the Trainees.

Sl No	Variable	Category		Respondents	
				Frequency	%
1	Age	i.	Young age (upto 35 years)	35	35
		ii.	Middle age (36 - 55 years)	53	53
		iii.	Old age (above 55 years)	12	12
2	Education level	i.	Illiterate	6	6
		ii.	Primary	11	11
		iii.	Middle	22	22
		iv.	High school	23	23
		v.	Intermediate	26	26
		vi.	Graduate	12	12
3	Family size	i.	Small (5)	44	44
		ii.	Medium (5-8)	37	37
		iii.	Large (above 8)	19	19
4	Land holding	i.	Marginal (upto 1.00 ha)	41	41
		ii.	Small (1.01 - 2.00 ha)	46	46
		iii.	Semi-medium (2.01 - 4.00 ha)	13	13
		iv.	Medium (above 4.01 ha)	—	—
5	Annual Family income	i.	Low (Rs 60000/-)	49	49
		ii.	Medium (Rs 60,001/- to 1,20000/-)	40	40
		iii.	High (above Rs 1,20,000/-)	11	11

It was observed that 53 percent of the trainees belonged to the middle age group (up to 35 years) while 35 percent and 12 percent belonged to the young (below 35 years) and old age (above 55 years) group, respectively. The academic attainment of the trainees is important as it would have an overall impact on the effectiveness of the training programmes. It was found that at the overall level 6 percent was illiterate, 11, 22, 23 and 26 percent studied upto primary, middle and high school and intermediate level, respectively. The remaining 12 percent were graduates. It could thus be interpreted that the literacy level was satisfactory considering their socio-economic background, occupation and nature of training. The family size categorized into small (up to 5 members), medium (5 - 8 members) and large (above 8 members) revealed that 44 percent and 37 percent belonged to the small and

medium size, respectively and only 19 percent belonged to the large family size. Out of the 100 trainees, the majority i.e., 87 percent belonged to the marginal and small category of land holding and only 13 percent belonged to the semi-medium group. It was found that no trainees had holding size above four hectares.

A study of the annual income distribution revealed that 49 percent of the trainees belonged to the income group below Rs. 60,000/-, 40 percent in the range of Rs.60,001/ to Rs.1,20,000/- and only 11 percent above Rs 1,20,000/- . Thus, the majority of the trainees belonged to the low income group.

Farmer's Perception on the Training Procedure:

In this section, the farmer's opinion on various aspects of the training has been discussed.

Satisfaction level:

Table 2 presents the satisfaction level of trainees with regard to the training procedure. It could be inferred from the table that 20 percent of farmers were highly satisfied and 80 percent of the total farmers were moderately satisfied with the training procedure provided to them. However, none of the farmers showed their dissatisfaction to be moderate or highest. Thus, it appeared from the table-2 that almost all the farmers were moderately satisfied with the training procedure provided to them.

TABLE 2: Satisfaction Levels of Trainees in Regard to Training Procedures.

Response	No. of Responses	In percentage (%)
Highly Satisfied	20	20
Moderately Satisfied	80	80
Moderately Dissatisfied	0	-
Highly Dissatisfied	0	-
TOTAL	100	100

Nature of Training:

Table 3, which depicts the trainee's perception regarding the nature of training provided to them showed that, 34 percent of the total numbers of farmers were highly satisfied, 38 percent were moderately satisfied and 28 percent were averagely satisfied with the nature of training provided to them. However, none of the farmers were dissatisfied. Thus, it could be inferred that maximum numbers of farmers were moderately satisfied with the nature of training provided to them.

TABLE 3: Trainees Perception Regarding Nature of Training.

Response	No. of Responses	In percentage (%)
Highly Satisfied	34	34
Moderately Satisfied	38	38
Averagely Satisfied	28	28
Highly Dissatisfied	0	-
TOTAL	100	100

Productivity Improvement:

Table 4 showed that out of a sample of 100 respondents, 30 percent of the total farmers agreed that training helped to increase their productivity level, 14 percent of the total farmers neither agreed nor disagreed, 56 percent of the total farmers strongly agreed. However, none of the farmers strongly disagreed. It appeared from the above analysis that more than half of the total numbers of farmers strongly agreed that training helped them to increase their productivity level.

TABLE 4: Productivity Improvements of Farmers.

Response	No. of Responses	In percentage (%)
Agree	30	30
Disagree	0	-
Neither Agree nor Disagree	14	14
Strongly Agree	56	56
Strongly Disagree	0	-
TOTAL	100	100

Adoption of Improved Technology:

Table 5 showed that 70 percent of the total number of farmers agreed that training helped to understand the improved technology for paddy, 30 percent said that they had partially acquired the knowledge of improved technology. However, none of the farmers said that they rarely or never acquired any knowledge of improved technology. It could be inferred from the table that maximum number of farmers agreed that training provided to them helped to understand the new improved technology.

TABLE 5: KNOWLEDGE REGARDING ADOPTION OF IMPROVED TECHNOLOGY.

Response	No. of Responses	In percentage (%)
Definitely Yes	70	70
Partially Yes	30	30
Rarely	0	-
No, Never	0	-
TOTAL	100	100

Need of Change in Training and Development Procedure:

Table 6 showed that 54 percent of the total number of farmers agreed that there is a need to change in training and development procedure, 10 percent of the farmers disagreed, 20 percent of the farmers neither agreed nor disagreed and 16 percent of the farmers strongly agreed. However, none of the farmers strongly disagreed. It appeared from the above that maximum number of farmers agreed that there is a need to change in the training and development procedure adopted by Krishi Vigyan Kendra, Kamrup.

TABLE 6: NEED OF CHANGE IN THE TRAINING AND DEVELOPMENT PROCEDURE.

Response	No. of Responses	In percentage (%)
Agree	54	54
Disagree	10	10
Neither Agree nor Disagree	20	20
Strongly Agree	16	16
Strongly Disagree	0	-
TOTAL	100	100

Constraint analysis:

At the time of survey, the trainees were interviewed to indicate the factors that had acted as constraints in their farm business. The constraints as perceived by the sample households are discussed in the following section and are presented in table 7.

Based upon the ranks assigned by the trainees, it may be inferred from the table that poor and unsustainable farm income was the major impediment (55.61 percent), followed by lack of irrigation facilities (54.78 percent), escalating cost of cultivation (53.48 percent), lack of credit facilities (52.79 percent) and non-availability of inputs in time (51.92 percent). Zalkuwi et al. (2015) also reported high cost of important farm inputs and inadequate credit facilities as major constraints in their study on factors influencing farmers for efficient sorghum cultivation. It is also in consonance with the findings of Swaminathan et al. (2014) who reported escalating cost of cultivation perceived by tomato growers in Tamilnadu and Vijayasarathy et al. (2015) in their study on constraints in adoption of climate resilient technologies. Thus strengthening of agricultural credit, provision of irrigation and supply of crucial inputs in time have been found to be the most important components needed for technological interventions on a priority basis.

Besides these, the other constraints identified were inadequate and delay in institutional assistance and subsidy (46.80 percent), non-remunerative price of produce (46.15 percent), poor extension service and departmental coordination (46.07 percent), lack of market intelligence (43.94 percent) and the least constraint in order of rank was given to lack of storage facilities (43.46 percent).

TABLE 7: CONSTRAINTS OF TRAINEES IN IMPLEMENTING IMPROVED TECHNOLOGY.

Factors	Ranks / Scale		I 81	II 70	III 63	IV 57	V 52	VI 47	VII 42	VIII 36	IX 29	X 18	Total	Total Score	Mean Score	Rank
1.	Non availability of inputs	f	13	11	10	8	12	13	7	11	8	7	100			
	in time	fx	1053	770	630	456	624	611	294	396	232	126		5192	51.92	V
2.	Escalating cost of cultivation	f	10	11	13	15	13	10	9	9	6	4	100			
		fx	810	770	819	855	676	470	378	324	174	72		5348	53.48	III
3.	Poor and unsustainable	f	18	16	13	11	6	8	5	7	9	7	100			
	farm income	fx	1458	1120	819	627	312	376	210	252	261	126		5561	55.61	I
4.	Inadequate water/lack of	f	14	18	14	9	9	7	8	5	8	8	100			
	irrigation facilities	fx	1134	1260	882	513	468	329	336	180	232	144		5478	54.78	II
5.	Non remunerative price of	f	8	8	5	10	10	9	12	15	11	12	100			
	produce	fx	648	560	315	570	520	423	504	540	319	216		4615	46.15	VII
6.	Inadequate and delay in	f	8	6	9	12	10	10	11	11	9	14	100			
	institutional asistance &															
	subsidy	fx	648	420	567	684	520	470	462	396	261	252		4680	46.80	VI
7.	Lack of storage facilities	f	3	9	7	9	8	11	10	12	16	15	100			
		fx	243	630	441	513	416	517	420	432	464	270		4346	43.46	X
8.	Lack of adequate credit	f	15	10	13	7	11	12	9	6	10	7	100			
	facilities	fx	1215	700	819	399	572	564	378	216	290	126		5279	52.79	IV
9.	Poor extension service and	f	8	7	7	9	9	11	14	10	12	13	100			
	departmental coordination	fx	648	490	441	513	468	517	588	360	348	234		4607	46.07	VIII
10.	Lack of market intelligence	f	3	4	9	10	12	9	15	14	11	13	100			
		fx	243	280	567	570	624	423	630	504	319	234		4394	43.94	IX
	TOTAL	Σf	100	100	100	100	100	100	100	100	100	100				

Note: x = Scale value; f = Number of respondents and fx = Score

Summary and Conclusion:

The study had focussed on the impact of KVK training programme on the adoption of improved technology for paddy crop and the constraint associated with its adoption. The organization provided training to the farmers regarding the improved package of practices for paddy on seed rate, appropriate fertilizer dose, use of insecticides and pesticides to protect crops from different pests and diseases, irrigation schedule, post harvest management, marketing channels, etc. The study revealed that the trainees were satisfied with the training procedure and nature of training provided to them and had helped them to increase their productivity and income.

The major constraints to adoption of improved technology identified were farmer's in-ability to invest more associated with adoption of improved technology because of their poor economic condition, lack of irrigation facilities followed by inadequate credit facilities and non-availability of inputs in time. There was also a need of institutional intervention in the areas of market information, price support, warehousing, extension services and subsidy. To sum-up, the study revealed that training can play a vital role in improving income and better livelihood opportunities for farm families and have an overall positive impact on the national/state economy.

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Indebtedness and Farmer Suicides in Punjab

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Abstract

With the emergence of the green revolution in mid-sixties not only the agricultural production increased in the nation but also made India become self-sufficient in foodgrains production. But in 1980s crop yield became stagnant, and farmers had to spend huge amount of money on modern inputs to carry out production operations. The recent crop failure of cotton crop in Malwa region has added fuel to the fire. The gap between expenditure and income was fulfilled by borrowings either through institutional or non-institutional sources. The incidence and extent of indebtedness have considerably increased over the past one decade across the states in India. The most tragic face of India's agrarian crisis emerged as the number of farmer suicides increased, not just in the hotspot areas of Andhra Pradesh and Maharashtra but also in the allegedly prosperous agricultural zones of Punjab and Karnataka as well. Hence, it is a matter of serious concern that the major contributing sector of employment is itself in a severe condition and the employees of this sector are committing suicide day by day.

Keywords: Cotton, White-fly, Suicides, Indebtedness, Agrarian crisis.

Introduction

"Indian farmer is born in debt, lives in debt and dies in debt"

Royal Commission

About 54 per cent of the country's population depends directly or indirectly on agriculture. In the post green revolution era, agriculture in Punjab has become a very complex phenomenon. Progressive and hardworking farmers of Punjab stood ahead in the successful history of green revolution and fulfilled the nation's food requirements. But, now, it is no longer the food basket of India. The farmer, so called Annadatta (one who provides food to all the people) in Punjab is now himself becoming the victim of indebtedness, poverty and hunger. As a result, he has taken the path of suicides. At the time of independence, India's agriculture was in a hopeless condition and was carried on the subsistence basis rather than a commercial enterprise. As a result, for meeting both the ends, farmers were caught into the clutches of the village money lenders. In the mid-sixties, with the emergence of green revolution, the expenditure on crop production started increasing because of costly inputs like chemical fertilizers, high-yield variety seeds, and modern machinery. In 1980s, along with yield level the net returns from farming also stagnated (Singh, 2000). Farmers have to spend huge amounts of cash on purchasing market supplied farm inputs to carry out their production operations. Also a significant proportion of the gross income of the progressive farmers is ploughed back into agriculture. Farming demands regular outflow of cash to acquire various agricultural inputs, but the inflow of the same is not continuous due to its seasonal nature, high price fluctuations and due to attached risk factor. The gap between expenditure and income was fulfilled by borrowed funds from either institutional or non-institutional sources. The incidence and extent of indebtedness have considerably increased over the past one decade across the states in India (Singh et al., 2014). The extent of indebtedness is greater among the agriculturally developed states. In Punjab, on an average in every two days three farmers commit suicide due to indebtedness (Singh, 2016). Hence, low yields, rising costs of cultivation and dipping incomes have eroded the ecstasy of attaining green revolution and self-sufficiency in food grains.

Although, borrowing is not considered as a sign of weakness and dishonor till investment through it are giving positive net returns, but it becomes a sin only when the repaying capacity of the farmer for the borrowed money is eroded, and farmers in distress take a severe step to commit suicide rather than be faced with the humiliation that comes with indebtedness (Gill, 2008). Farmers' suicides are being reported from different parts of the country, but the underlying story is more or less the same - the agrarian crisis which is engulfing the country is bankrupting farming communities. The phenomenon of debt-to-death in particular and agrarian crisis in general, thus, needs to be studied, analyzed and solved together.

Agrarian crisis has mainly impacted the small and marginal farmers resulting in suicides in many parts of India. The majority of the farmers are in the category of small and marginal farmers and their proportion is growing over time. In 2010-11, marginal and small farms accounted for 85.01 per cent of the operational holdings and 45 per cent of the operated area (GOI, 2010-11). These farms are uneconomical and cannot yield income enough to sustain the families' requirements. India loses 2,035 farmers every day to other sectors, said a study by an Indian NGO 'Called centre for the Study of Developing Societies' and about 76 per cent are ready to quit agriculture for better jobs. According to recent government data, about 52 per cent of

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India's agricultural households are indebted (Umar, 2015). Even the number of cultivators has declined from 49.9 per cent in 1951 to 24.6 per cent in 2011, whereas the percentage of agricultural labourers has increased from 19.5 per cent in 1951 to 30 per cent in 2011 (NCRB, 2014).

Farmer Suicides in India

The most tragic face of India's agrarian crisis emerged as the number of farmer suicides is increasing, not just in the hotspot areas of Andhra Pradesh and Maharashtra but in the allegedly prosperous agricultural zones of Punjab and Karnataka as well (Sahai, 2007). A large number of suicides by farmers in various parts of the country is perhaps the most distressing phenomenon observed in India (Kaur, 2011). It has become a public issue because these are not occasional, but are increasing both in total numbers as well as the states in which they are occurring (Gill, 2008). In the last 20 years, nearly 3 lakh farmers have ended their lives by ingesting pesticides or by hanging themselves. Only in Maharashtra state, during January to June 2015 on daily basis an average of 7 farmers ended their lives. The suicide rate among Indian farmers was 47 per cent higher than the national average, according to a 2011 census. In India, on an average forty-one farmers commit suicide every day, leaving behind orphans and widows. Punjab's case is not much different. In Punjab, 3054 farmers and 2072 agricultural workers have committed suicide during 2000 to 2011.

Table 1 presents the scenario of the suicide of farmers, all suicides and the percentages share of farmers for the period of 2000 to 2013. The numbers of farmers' suicides show an irregular pattern as their number was highest during 2004 and the lowest during 2013. One of the main reasons for fluctuations in suicides may be attributed to growth rate in agriculture and allied sector. In 2004-05, the number of suicides was highest as the growth rate at the current prices in agriculture and allied sector was 3.81 per cent only whereas during 2013-14, the growth rate of this sector was 15.89 per cent and at the same time the suicide rate was lowest (GoI, 2014). But the numbers of all other suicides shows an increasing trend throughout the periods. The percentage share of farmer's suicide remained above the 10 per cent throughout the period except the year 2013.

TABLE 1: Numbers and Trends in Farm Suicides in India

Year	Farmer Suicides	All Suicides	Farmers Suicide % of all Suicides
2000	16603	108593	15.3
2001	16415	108506	15.1
2002	17971	110417	16.3
2003	17164	110851	15.5
2004	18241	113697	16.0
2005	17131	113914	15.0
2006	17060	118112	14.4
2007	16632	122637	13.6
2008	16196	125017	13.0
2009	17368	127151	13.7
2010	15964	134599	11.9
2011	14027	135585	10.3
2012	13754	120488	11.4
2013	11772	134799	8.7
Total number of suicides in the period 2000-2013	226298	1684366	13.43

Source: NCRB (Various Issues)

National Crime Records Bureau (NCRB) released its annual report titled 'Accidental Deaths & Suicides in India 2014' (ADSI). According to this report, 6710 agricultural labourers and 5650 farmers have committed suicides and this constituted 9.4 per cent of overall suicides in India in 2014. The highest number of farmer suicides has been reported in Maharashtra followed by Telangana, Madhya Pradesh, Chhattisgarh and Karnataka. These states together are often referred to as the 'Big-five'. These 'Big-five' states have become the hub of farmer suicides in the country.

Table 2 presents the state wise and community wise farmers' suicide for major states of India during 2014. It is realized that almost all the categories of farmers committed suicides, but the marginal and small farmers together have the highest proportion in some of the Indian states because their proportion is also highest among the farm community. During 2010-11, marginal and small farmers accounted for 85.01 per cent of the operational holdings and 45 per cent of the operated area as against 0.70 per cent large holdings with a share of 10.59 per cent in the operated area.

TABLE 2: Distribution of Farmer Suicides in Major States by Landholding Status

State	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers
Andhra Pradesh	64	48	47	1
Assam	4	10	7	0
Chhattisgarh	136	195	89	23
Gujarat	3	8	30	4
Haryana	0	2	10	2
Himachal Pradesh	14	18	0	0
Karnataka	51	149	117	4
Kerala	44	43	18	2
Madhya Pradesh	403	267	150	6

TABLE 2: DISTRIBUTION OF FARMER SUICIDES IN MAJOR STATES BY LANDHOLDING STATUS—CONTD.

State	Marginal Farmers	Small Farmers	Medium Farmers	Large Farmers
Maharashtra	627	1335	544	62
Punjab	3	14	7	0
Sikkim	22	0	13	0
Tamil Nadu	48	17	3	0
Telangana	129	366	377	26
Uttar Pradesh	13	38	11	1

Source: NCRB, 2014

Effects of Agricultural Changes in Punjab

Green revolution brought significant changes in the agrarian economy of Punjab. The growth rate of the agriculture sector of Punjab dwindled from 5.15 per cent in the 1980s to minus 2.36 per cent in 2014-15. The 1980s was characterized by a period of slow growth in productivity of agriculture accompanied by rising costs of production resulting to stagnating income of the farmers. Punjab is the land famous for realizing the dream of Jai Jawan, Jai Kisan. Now, both are dying, one is the victim of drugs and another of political apathy (Shergill, 2015). The main reason for farmers' suicides is that the agriculture is no longer a profitable enterprise. Income from crop cultivation is not enough to meet the annual cultivation expenditure in most of the states, including agriculturally developed states like Punjab and Haryana (Narayanamoorthy, 2006). The main causes of indebtedness in Punjab are the failure of the cotton crop, the high cost of pesticides, overuse of chemical fertilizers and use of fake pesticides supplied by dealers and over-mechanization of agriculture (Bose, 2000). Farmers' total debt in the state has risen to Rs. 69,355 crore. Among marginal and small farmers, 83.3 per cent and 88.64 per cent farmer households are under debt, respectively. In the case of semi-medium and medium farmers, the figures are 89.06 per cent and 84.09 per cent, respectively. About 82.61 per cent of large farmers are under debt in the state. But large farmers are not so heavily dependent on non-institutional loans. As 40 per cent marginal farmers and 30 per cent small farmers have taken the loan from non-institutional sources as against 8.16 per cent large farmers (Dhaliwal, 2016). This is even more dangerous for small and marginal farmers as private money lenders charge high rate of interest and can even exploit them.

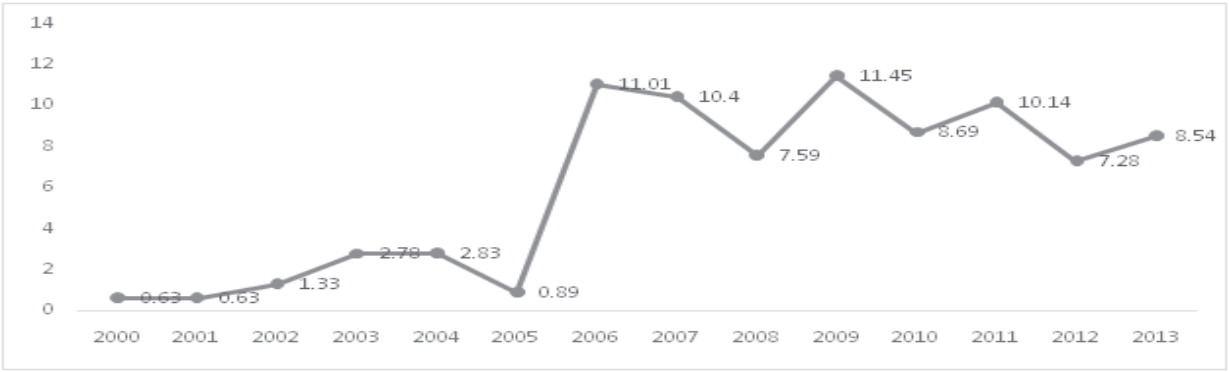
Table 3 presents the scenario of suicides in Punjab for the period of 2000 to 2013. It is analyzed that both farmers' suicide as well as all suicides increased greatly since 2006. The available literature found certain reasons for the farmers committing suicides such as bankruptcy, farming issues, family problem, illness and poverty etc. Among the various reason of farmers' suicides, bankruptcy or indebtedness were found to be the majors reason for the rural farmers. The Tribune has done a series of reports on Punjab farmers who ended their lives under tragic circumstances. According to BKU (Dakaunda) vice-president Manjit Dhaner, nearly 3,000 farmers and labourers killed themselves in the last three years (Kamal, 2016). The worst affected districts are Sangrur, Mansa and Bathinda as the number of suicides are 1132, 1013 and 827, respectively in these regions in 2015. However, the officially available reported suicides for Punjab as per the National Crime Records Bureau are less than that of the BKU and The Tribune estimates. This data could be underestimated because of underreporting by households to avoid police investigation linked with suicide being a criminal act in India or to avoid shame or for other reasons.

TABLE 3: EXTENT OF FARMER SUICIDES IN PUNJAB

Year	Farmer Suicides	All Suicides	Farmers Suicide % of all Suicides
2000	12	409	0.63
2001	12	413	0.63
2002	5	376	1.33
2003	10	360	2.78
2004	13	459	2.83
2005	3	336	0.89
2006	85	772	11.01
2007	88	847	10.40
2008	66	869	7.59
2009	97	847	11.45
2010	80	920	8.69
2011	98	966	10.14
2012	75	1030	7.28
2013	83	972	8.54

Source: NCRB (Various Issues)

Figure 1: Farmers Suicide as percentage of total Suicide



Factors Underlying Farmers' Suicides

In many reports, government leader says that farmers are themselves responsible for their suicides. They commit suicide due to fashion instead of unemployment and food scarcity issue. But this is not the reality as according to NSSO 2005 data, 65 per cent of the borrowed money is used in agriculture only. No doubt 35 per cent share of borrowed money for other unproductive purposes like education, to meet family needs, social ceremonies, medical cost etc. But social ceremonies are not fully responsible for farmers' indebtedness. Low and uncertain incomes are one of the major causes of suicides. Since expenditure does not yield any repaying capacity so many times farmers fail to repay the full amount or a part of loans and major chunk remains outstanding. Apart from these outstanding loans, farmers borrow money for next crop operation but they are not able to repay their loans mainly due to widening the gap between the prices of farm inputs and farm produce. Excessive expenditure on domestic consumption due to inflation and frequent crop failures are the other reasons of non-repayment of crop loans. Hence, farmers are becoming indebted. 'Bankruptcy or Indebtedness' and 'Family Problems' are major causes of suicides, accounting for 20.6 per cent and 20.1 per cent, respectively of total farmers' suicides during 2014. The other prominent causes of farmers' suicides are 'Failure of Crop' (16.8 per cent), 'Illness' (13.2 per cent) and 'Drug Abuse/Alcoholic Addiction' (4.9 per cent).

Spread of Whitefly Attack on Cotton in Punjab

The problem of Whitefly attack on cotton had started since June, 2015. Total area under cotton crop in Punjab, mainly grown in Fazilka, Bathinda, Mansa, Muktsar and Abohar, was about 4.5 lakh hectares, almost all of it is genetically modified Bt cotton, resistant to some major pests such as bollworm but defenceless against the whitefly. In the state, more than 60 per cent of the area under cotton cultivation was affected by the attack of whitefly. Fazilka district was the worst hit by the whitefly attack as around 40 per cent of the standing crop of cotton was damaged by the white fly attack. In Arniwala block alone, cotton crop cultivated on over 500 acres was uprooted. Muktsar, Bathinda, Mansa and Faridkot districts were also highly affected by the damage of cotton crop. Besides Punjab, Haryana was also caught by the attack of whitefly. The destruction of almost two-thirds of the state's cotton crop by the whitefly had forced as many as 15 farmers to commit suicide and pushed hundreds of others into debt (Dutt, 2015).

Cases of Farmer Suicides in Punjab

A farmer consumed pesticide and hanged himself from a tree in his field, a day after he destroyed his pest-ridden cotton crop. What is worrying the elders most is the repayment of Rs. three lakh bank loan that was taken by the farmer in Punjab.

A resident of Baiman Diwana village of Bhatinda District, 70-year-old Labh Singh lost his two sons. While his eldest son Resham Singh died at the age of 22, 15 years ago in 2001, youngest who was 42 had consumed poison and then hanged himself on October 4 as he had lost his whole cotton crop due to a pest called white fly. He had raised Rs 2.5 lakh loan to grow cotton and basmati rice. While the cotton crop was lost due to pest attack and the prices of basmati rice fell almost half as compared to the last year (Sehgal, 2015).

As per the 2011 census, Tamkot village of Mansa has a population of 2916. According to a resolution passed by the Gram Sabha, 55 farmers and agricultural labourers have committed suicide since the early 1980s. Of these, the families of 21, who committed suicide between 2000 and 2009, have been given compensation by the State Government, but the lady (Sukhwant Kaur) whose husband died before 2000 and her son after 2009, were not eligible for any relief (Bharti, 2016)

Pesticides have failed to check pest attacks on cotton crops, leading to nearly 60 per cent of the crop being damaged in about six lakh acre area. The number of suicides by farmers, continue to mount in Punjab's Malwa region.12 farmers had committed suicide between August to October. Maximum 9 suicides had been reported from Bathinda while one farmer committed suicide in Sangrur, Mansa and Barnala districts each (Patel, 2015).

Pakkan village in Fazilka district witnessed three dozen suicides in the past 15 years. Of the total of 3,200 acres of land in the village, over 1,000 acres have been rendered barren. None of the debt-ridden families of farmers who committed suicide has ever been paid any compensation by the government. It is the vicious circle of debt in which they continue to remain trapped. There have been consecutive crop failure, and problems of debt and poverty are getting only worse, not better (Nagpal, 2016)

Conclusion

The national agricultural policy reported that despite technological and economic advancements, the financial condition of farmers continued to be unstable owing to natural calamities and price fluctuations. With the introduction of the green revolution, the expenditure on crop production is increasing because of costly inputs like chemical fertilizers, high-yield variety seeds and modern machinery and its agrarian economy is now turned as one of the worst affected, ecologically distressed and economically crumbling state of the country. The sweetness of the green revolution has turned sour, pushing the agrarian society into debt, disruption and death trap. The situation was worse in the south-west belt due to attack of whitefly on cotton crop in 2015. The recurrent whitefly attacks are forcing the farmers for shifting their land use pattern towards paddy crop, that may further play role in enhancing

the Punjab's agrarian problems like water depletion, monoculture of wheat-paddy. Hence, it is a matter of serious concern that the major contributing sector of employment is itself in severe condition and the employees of this sector are committing suicide day by day. Farmer suicides are the result of the crisis in agriculture sector that can be solved by taking adequate efforts like proper checking of prices and quality of inputs available in markets, well structured contract farming model to avoid price fluctuations of crops.

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Organic Agriculture in Sikkim: Challenges and Future Strategy

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Abstract

This paper has reviewed the Indian and Sikkim scenario with reference to organic farming. The key issues emerging in organic agriculture include yield reduction in conversion to organic farm, soil fertility enhancement, integration of livestock, certification constraints, ecology, marketing and policy support. In Sikkim, organic agriculture practice was adopted by the agriculture community of the state for ages. But in due course of time, when chemical fertilizers and pesticides came into supply of plant nutrients and control of diseases, the noble practice slowly started fading and chemicals took over in certain crops over a period of time. Still the consumption of fertilizers and pesticides was very low as compared to other states of India and far below the National average. The state has planned to become fully organic state in 2015. This would certainly make the organic movement easier. Green revolution launched in India in the early seventies enhanced chemical fertilizer use leading to significant increase in production and productivity of crops under irrigated agriculture. But mountainous state like Sikkim and other North Eastern states, where agriculture is rain-fed, the chemical use did not have significant impact on production and productivity. Therefore, in order to get benefit from an emerging sector in agriculture in states like Sikkim, there are some advantages of continuing traditional agriculture alongwith farmers having certain level of knowledge and skills for organic farming. These states also possess variety of agro-climatic conditions, unique commodities indigenous to their agriculture and an emerging new class of educated farmers, wanting to make agriculture a professionally viable vocation. For mountain states like Sikkim, this offers hopes of improving soil health of largely marginal hill farmlands, reducing cost of inputs and developing cash crops and agri-enterprises with an aim to offer opportunities of employment to a section of its people. A well defined state policy indicating priorities and taking care of food security, sustainability, economic and income generating aspects need to be framed. There is need to plan and build organic extension system and technology support services. There is urgent need to create/strengthen basic infrastructures like soil testing laboratory, IPM laboratory, organic research farm, biofertilizer production unit, human resource development. There is need to initiate development of local manorial resources to generate sufficient organic manure. Outside help will be needed for System knowledge in formation and materials. Quality of Inputs needs to be ensured. The three livelihood schools of organic agriculture should be equipped to train youths in organic agriculture for which resource persons need to be identified to train the master trainers. Animal population is equally important to recycle and generate organic manure besides income generation. The state Government should be approached to amend policy to increase grazing and fodder area. Marketing federation of the state should play proactive role in commodity marketing. Firm supply chain mechanism needs to be developed. Organic trade mark with logo should be developed and create a brand name for Sikkim.

Keywords : Organic farming, Biofertilizer, Productivity, Food security, Sustainable agricultural proactive.

Introduction

Organic agriculture is defined as an agriculture system, which is environment friendly, ecologically safe, socially just, culturally sensitive, economically viable agricultural production system that consist of efficient management and sustainable production techniques. FAO defined organic agriculture as a form of agricultural production and management system that relies on ecosystem management and attempts to reduce or eliminate external agricultural inputs, especially synthetic ones. It is a holistic production management system that promotes and enhances agro ecosystem health, including biodiversity, biological cycles, and soil biological activity. Obviously, organic agriculture is environment and ecology-friendly food production system.

Organic agriculture offers the most sustainable solution for developing the agricultural sector and provides food security with least negative impacts on the environment. Organic agriculture offers solutions for sound rural development. It provides healthy food, maintains and creates jobs. High quality organic foods are market openers for both national and international markets. The demand for organic produce in global market is very high. Costs of organic products are 2-3 times higher than the conventional ones depending on the product and country. The Organic Products Market amounts to 40-45 billon EURO per year. The biggest consumers of organic produce are: USA and Canada - 13-14 billion; after European Union -about 16-17 billion EURO.

Organic agriculture is system of production that relies on animal manures, organic wastes, crop rotations, legumes

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and aspects of biological pest control. It avoids (or legumes excludes) the use of synthetically produced fertilizers, pesticides, growth regulators and livestock additives. It is the ecological production management system that promotes and enhances biodiversity, biological cycles and biological activity of the soil. The essence of organic agriculture is to feed the soil rather than the crops to maintain optimum soil health with its vibrancy and resilience. Organic agriculture aims at sustaining and increasing the productivity by improving the soil health and overall improvement of agro ecosystem.

Organic agriculture is no longer to be considered a niche market within developed countries but a pulsating agricultural production system, being practiced in more than 120 countries. Worldwide statistics for organic agriculture reveals that 30.42 m ha land, sharing 0.65 per cent of total agricultural land, is certified according to organic standards (Willer et al. 2008). Australia continues to account for the largest certified organic surface area, with 12.3 m ha followed by China (2.3 m ha), Argentina and USA (Table 1). The World organic market (2006) is estimated at over US $ 38.6 billion with global organic area of 30.4 million ha (Prasad and Gill, 2009). The value of organic market is expected to reach $ 70 billion by 2012.

The leading organic products consumers are North America and Europe.

Major Advantages of Organic Agriculture are the Followings

i. Organically grown crops are preferred most by people as it is believed to be more Nutritious and safe compared to the conventional ones.

ii. Organic produce fetches more prices in the national and international market.

iii. Brings about long haul increment in the yields because of the utilization of moderate inputs to a great extent focused around neighborhood biodiversity.

iv. Organic agriculture has an objective of decreasing its ecological effect, contamination, and expands vitality protection.

v. Prevents soil disintegration, which has these days turned into a genuine concern over the world.

Scope and Opportunities of Organic Agriculture

The certified organic area in India is 0.33 million ha (2006-07) with organic produce of about 585 thousand tone having export value of 3012 million rupees (Mahapatra et al. 2009). India has now become a leading supplier of organic herbs, organic spices, organic rice (basmati, joha etc.). The organic produce includes all varieties of food products (cereals, pulses, honey, tea, spices, coffee, oilseeds, fruits, vegetables) and their value added products. Country also produces organic cotton fibres, garments, cosmetics, functional food products, body care products etc. Though very nascent, the Indian organic sector is growing rapidly and has already made in roads into the world organic sectors. India has a great potential for export of organic products, if inspection and certification are streamlined and credibility in the international market is established. There are inbuilt organic practices already existing among the farmers of our country. Perhaps, there is no other country as India where almost all crops, both temperate and tropical, can be grown. Reasonable quantity of organic matter also can be sourced for plant nutrients. Several indigenous technologies knowledge of plant protection is available in this country. The Indian Council of Agricultural Research has already documented nearly 3000 indigenous technological knowledge. Many of these technologies would be useful for organic farming.

TABLE 1 ; Area under Organic Agriculture in Different Countries (as of 2006)

Country	Area (million ha)	Per cent of organic land to total land
Australia.	12.3	2.8
China	2.3	0.4
USA	1.62	0.5
Uruguay	0.931	6.1
Italy	1.15	9.0
Argentina	2.22	1.7
Spain	0.93	3.7
Brazil	0.88	0.3
Germany	0.83	4.8
India	0.53 (cert + uncertified)	0.4

Source : Mahapatra et. a.l, (2009)

It is obvious from the above that India has very less area (0.4%) under organic cultivation. Italy, Spain Germany, Australia, Urugway have more areas under organic cultivation. More countries are now putting their areas under organic cultivation seeing the future threat of pesticides and insecticides on human and animal health.

Currently, India ranks 10th among the top ten countries in terms of cultivable land under organic certification. The certified area includes 15% cultivable area with 0.72 million Hectare and rest 85% (3.99 million Hectare) is forest and wild area for collection of minor forest produces. The total area under organic certification is 4.72 million Hectare (2013-14).

The Government of India has implemented the National Programme for Organic Production (NPOP). The

national programme involves the accreditation programme for Certification Bodies, standards for organic production, promotion of organic farming etc. The NPOP standards for production and accreditation system have been recognized by European Commission and Switzerland as equivalent to their country standards. Similarly, USDA has recognized NPOP conformity assessment procedures of accreditation as equivalent to that of US. With these recognitions, Indian organic products duly certified by the accredited Certification Bodies of India are accepted by the importing countries.

TABLE 2: STATE-WISE AREA IN HA UNDER ORGANIC CERTIFICATION (INCLUDING WILD HARVEST) 2011-12

Name of States	Area (ha) under organic certification	% share of the total area under organic certification
Andhra Pradesh	47456.77	0.86%
Arunachal Pradesh	520.43	0.01%
Assam	2048.27	0.04%
Bihar	188.6	0.003%
Chhattisgarh	299970.6	5.40%
Delhi	100238.7	1.81%
Goa	153684.6	2.77%
Gujarat	41978.94	0.76%
Haryana	17442.36	0.31%
Himachal Pradesh	933798.2	16.82%
J&K	26834.26	0.48%
Jharkhand	29794.42	0.54%
Karnataka	118739.7	2.14%
Kerala	15790.49	0.28%
Lakshadweep	891.93	0.02%
Madhya Pradesh	432129.5	7.79%
Maharashtra	245339.3	4.42%
Manipur	1296.91	0.02%
Meghalaya	288.23	0.01%
Mizoram	7023.97	0.13%
Nagaland	7762.6	0.14%
Orissa	43868.18	0.79%
Punjab	927.28	0.02%
Rajashthan	222319.1	4.01%
Sikkim	25716.55	0.46%
TN	38554.33	0.69%
Tripura	4.05	0.00%
UP	2593821	46.73%
Uttarakhand	122880.6	2.21%
West Bengal	19095.55	0.34%
Total	5550405	100.00%

Source: APEDA, 2011-12

As per APEDA, state wise data on organic certification shows that area under organic certification during 2011-12 were highest in Uttar Pradesh (46.73%) followed by Himachal Pradesh (16.82%), Madhya Pradesh (7.79%), Maharashtra (4.42%). The small states of Goa, Uttarakhand and Sikkim contribute 2.77%, 2.21%, and 0.46%, respectively of the total area under organic cultivation. The major crops under organic cultivation are depicted below:

TABLE 3: MAJOR PRODUCTS PRODUCED IN INDIA BY ORGANIC FARMING TYPE OF PRODUCT PRODUCTS

Commodity	Tea, coffee, rice, wheat
Spices	Cardamom, black pepper, white pepper, ginger, turmeric, vanilla, tamarind, clove, cinnamon, nutmeg, mace, chili
Pulses	Red gram, black gram
Fruits	Mango, banana, pineapple, passion fruit, sugarcane, orange, cashew, nut, walnut
Vegetables	Okra, brinjal, Garlic, onion, tomato, potato
Oil seeds	Mustard, sesame, castor, sunflower
Others	Cotton, herbal extracts

Source: Garibay and Jyoti (2003)

TABLE 4: COMMODITY-WISE PRODUCTION DETAILS OF TOP TEN PRODUCTS (2011-12)

Product Name	Organic Production (MT)	In Conersion Production (MT)	Total Production (MT)
Cotton	107591	3792	111383
Cereals & Millets (excluding rice)	33888	6898	40786
Rice (Basmati & non Basmati)	17345	5329	22674
Pulses	12504	453	12957
Fruits and Vegetables	. 7801	5427	8228
Tea	5272	1.0	5273
Oil Seeds excluding Soyabean	2835	15	2850
Coffee	1139	238	1377
Dry Fruits	490	32	522
Medicinal & Herbal Plants	189	0	189

Source: APEDA, 2011-12

India produced around 1.24 million MT of certified organic products which includes all varieties of food products, namely, Sugarcane, Cotton, Oil Seeds, Basmati rice, Pulses, Spices, Tea, Fruits, Dry fruits, Vegetables, Coffee and their value added products. The production is not limited to the edible sector but also produces organic cotton fiber, functional food products etc. Among Oil seeds, Soybean (70%) lead among the products exported followed by Cereals & Millets other than Basmati (6%), Processed food products (5%), Basmati Rice (4%), Sugar (3%), Tea (2%), Pulses and Lentils (1%), Dry fruits (1%), Spices (1%) and others.

Among all the states, Madhya Pradesh has covered largest area under organic certification followed by Himachal Pradesh and Rajasthan.

India exported 135 products last year (2013-14) with the total volume of 194088 MT including 16322 MT organic textiles. The organic agri-export realization was around 403 million US $ including 183 US $ organic textiles registering a 7.73% growth over the previous year. Organic products are exported to US, European Union, Canada, Switzerland, Australia, New Zealand, South East Asian countries, Middle East, South Africa etc.

Organic Agriculture in Sikkim

The area under organic cultivation in the country is yet to cross 1 per cent of the total agricultural land. The State of Sikkim has stolen the show as its entire agriculture is set to go organic by 2015. The State has only around 60,000 hectares of farmland and already 40 per cent of it is under organic cultivation. About 40 per cent of the State's farmland is under certified organic cultivation The state has a stringent mechanism to monitor and certify the genuineness of organic produce. Sikkim has got rid of the use of pesticides and chemical fertilizers in its agriculture fields, with 8,000 hectares of farm lands shifting to organic farming. Kerala is now planning to emulate the same agro-model in Kasaragod district as a pilot project, and has taken the technical assistance of the Sikkim Organic Mission to kick-start the project. Over the years, around 75000 hectares of land has been converted into certified organic farms following the guidelines as prescribed by National Programme for Organic Production. However, it had its share of struggle. Though sikkimese farmers never depended on chemicals heavily, but there was the use of synthetic fertilizers. It was when the state banned its use that the farmers were compelled to go the organic way.

Organic cultivation doesn't involve the use of chemical pesticides and fertilizers and thus helps to maintain a harmonious balance among the various complex ecosystems. Also, it has improved the quality of the soil which further improves the standards of the crops produced there. Within 1.24 million tonnes of organic production in the country, around 80000 million is supplied by Sikkim alone.

In Sikkim, products grown through organic cultivation are as follows :

Spices:	Ginger, Turmeric, King Chilli, Cardamom (L), Pepper, Large Cardamom
Fruits:	Pineapple & Citrus
Vegetables:	Potato, French bean, Cabbage, Cauliflower & Local vegetables
Cereals:	Maize, Paddy & Buck wheat
Plantation:	Tea

TABLE 5 : District wise Area Allocation in Sikkim 2011-12

Districts	Area (ha)	Area covered (Ha)	Area to be taken up (ha)	Service provider
North Sikkim	3840.48	85.13 (New)	3755.35	SIMFED, ITS ltd, Mevedir
East Sikkim	7062.11	60.00	6615.99	ICCOA, IPL, SSWYA, MEVEDIR
SOUTH Sikkim	5136.71		5136.71	Sresta, Morarka
West Sikkim	22416.41	1114.769	20839.871	Amar Jyoti, Organic Sikkim, Sheel
Total	38455.71	1259.899	36347.92	

Source: Sikkim Organic Mission, 2011-12

Role of the State Government

Sikkim government has begun preparation for marketing to promote organic agriculture in the state to ensure benefit for farmers, traders and customers. Sikkim is using organic agriculture as a tool to bring about economic development of farmers. A systematic marketing and procurement network has been put in place by setting up the apex body of SIMFED, which provides forward and backward linkages.

As part of its plan to make the entire State take to organic cultivation by 2015, Sikkim has banned the use of chemical fertilizer and pesticides from 2003 itself. Going organic has twin advantages, viz. protecting the health of people by avoiding chemical fertilizer and pesticides, and getting premium value for the produce. Organic agriculture has emerged as an appropriate option for us as we can send our produce to niche markets not just in India but also abroad to get maximum returns for farmers.

SIMFED has about 170 grass-roots level multipurpose cooperative societies which buy agricultural produce from farmers at their doorstep. After setting aside certain quantum for domestic consumption, the remaining produce is either sent to niche markets in other States or foreign countries. A premium of about 25 per cent is offered to organic produce with respect to prices. "The marketing and payment system is transparent. Government has a policy of making payments within 15 days of receiving

consignments. The main crops under organic cultivation in Sikkim include cardamom, orange, ginger, different varieties of beans, paddy, baby corn and sweet corn. Vegetable collection centers are being set up in all districts for the convenience of sellers and buyers and a committee has been formed to oversee the plans. A mobile vegetable distribution van for Gangtok town recently has been started.

Organic agriculture is adding to the tourism potential of the State and providing additional income to farmers as the Sikkim government has also taken up organic tourism. Nature tourism is being promoted by setting up home stays in villages that have been declared "completely organic". Under this concept, tourists are served organic food and also taken on a visit to fields where organic cultivation has been taken up. Tourists can also buy organic produce directly from farmers.

Sikkim's Organic Mission - 2015

Govt of Sikkim has already set up a broad target of making Sikkim largely organic by 2015. Under this initiative, state will need to make all out progress in all sectors. Selected indicators of the mission are listed below;

i. The naturally organic wild lands of Sikkim, which are home to cardamom, medicinal plants, fruits, vegetables, orchids and other flora and fauna will have certified organic status. That means every product coming from the forests will be certified organic.

ii. Sikkim will have converted 50,000 hectares of farmland (out of the total 100,000 hectares of farmland of the state) into organic where over 60,000 farming families will be engaged in organic farming.

iii. SIKKIM ORGANIC BRAND takes roots by developing strong production and supply chain mechanisms for selected commodities. Organic enterprises are established by some Sikkim entrepreneurs, promoting Brand Sikkim Organic products, which enable the state export niche commodities, such as, orange, ginger, cardamom, tea, bamboo shoots, etc.

iv. Organic farm produce of Sikkim is able to substantially reduce/substitute (60-80 %) outside state supplies of fresh vegetables, milk, fruits etc.

v. Making hill farmers food secure on their farmlands, thus reducing dependence on PDS by (Producing adequate food grains, pulses, oil seeds, vegetables, milk, eggs, meat and fruits for consumption of family). Tangible impact is made to reduce dependence of the rural families of Sikkim on the PDS system.

vi. Efficiently functioning of Institutional infrastructure mechanism (policies and govt support services infrastructure including marketing channels) is in place in the state. Defined Policies, strategic road map and delineated line agencies, functioning to guide growth of organic sector.

The target set is to convert 50,000 hectares of farmland into Organic by 2015 in the following manner,

TABLE 6: Target of Conversion of Farmland into Organic in Sikkim

Year	Area
2010-2011	(18,000 hectares).
2011-2012	18,000 hectares.
2012-2013	14,000 hectares.

To achieve the target, massive capacity building of various stake holders is needed looking into the need for huge trained manpower to take over different aspects of Organic farming.

Prospects for Organic Agriculture in Sikkim

There are immense opportunities across the value chain for private agribusiness companies as well as government. Owing to its strategic location, friendly government and untapped market potential for organic produce, there is immense scope for market development and investment.

There is great prospects of enhancing market accessibility, development of forward linkage and backward linkages, development of trade centers / market specific to trade, Brand Creation, Backward integration though innovative supply chain. Market trading through electronic spot exchange of spices like ginger, turmeric, chillies, etc. can be explored in Sikkim

There are opportunities in infrastructure creation like Cold chain, storage facilities, processing facilities like drying units for ginger & turmeric, pineapple etc. Development of export zones, Pack houses - Sorting, Grading, and Packing, Logistics & transport are need of the hour. Creation of marketing infrastructure in terms of special economic zones, food parks etc can also be explored in the state.

The Challenges for Organic Agriculture

Sikkim is a potential organic hub and various organizations including Government sectors, NGO's and Private sectors are putting their efforts in promoting this sector. However, its full potential is yet to be explored and this is due to various challenges as shown below:

Benchmark survey of the region for identifying the potential areas for organic food production is lacking.

Research, development and extension strategies for promotion of organic cultivation are in primary stage in the state. .

The state is deficient in production of biofertilizers, vermicompost and organic pesticides. There is need of human resource development in production of organic inputs like biofertilizers, vermicompost, botanicals for pest management etc.

The state needs to provide more assistance to farmers in post harvest handling, processing and value addition.

There is lack of certification agency and there is a need for reduction in certification cost The state does not have sufficient infrastructure and mechanisms for marketing of organic produce.

Lack of branding is another constraint in organic production.

Future strategy

Sikkim should attract investments for building post-harvest infrastructures

It should enable producers to undertake market-driven production planning.

There is need to facilitate integration of farm production with domestic and global markets.

Foster/Nurture through self sufficient juicing extraction at the grower's level in Pineapple producing areas.

Promote contract agriculture in the region through a tripartite agreement with state as one

party and farmer groups and buying houses as other parties. The state government can be represented by departments like State Agriculture Marketing Boards

Facilitate branding of organic produce of North East to fetch better market value. Facilitate certification of organic produce primary processing which include design, procurement, operations and training of youth, so as to curb post harvest losses and create employment opportunity for youth

Ensuring better connectivity through improved transportation for the bulky and perishable fruits and vegetables Encouraging investment into the processing of fruits and vegetables by providing attractive incentives and bringing policy reforms Cluster identification and integration Training & Capacity Building for farmers - (areas such as Production, Market driven Production Planning, Aggregation, Primary Processing, Marketing etc).

Production & process certification should be arranged.

Facilitate aggregation of farmers through context specific group based models

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Agro-Economic Research

Assessment of Marketed and Marketable Surplus of Major Foodgrains in India

VIJAY PAUL SHARMA AND HARISH WARDHAN*

Agriculture constitutes only about 12 per cent of India's GDP, even though it is the largest employer and majority of the rural population depend on agriculture for their fivelihood. Improving the performance of agriculture is, therefore, crucial for achieving food security, rural development and poverty reduction. The contribution of the agricultural sector to national Gross Domestic Product (GDP) has withnessed a secular decline with the consequent increase in shares of other sectors, particularly services. However, agriculture's output share is declining faster than that of employment. Indian agriculture, which withnessed a visible deceleration during the 9th and 10th Five-Year Plans, recorded a robust growth during the 11th Plan. The foodgrains production touched a new peak of about 265 million tonnes in 2013-14, an addition of about 55 million tonnes between TE 2005-06 and TE 2013-14.

Indian agriculture has also withnessed structural changes with the composition of agricultural output shifting from traditional foodgrains to high-value products. Agriculture is increasingly being driven by expanding demands for livestock products and other high-value crops like fruits and vegetables, processed foods and beverages. Since 1980s, the composition of agriculture output has shifted dramatically. At the all-India level, the share of high-value commodities/products (fruits and vegetables, livestock products, fisheries) has increased from about one-third in TE 1983-84 to over 50 per cent in TE 2011-12. The composition of export trade has also changed, away from traditional products towards products such as horticulture, lievestock, as well as processed products. The Indian food consumption basket has become increasingly diversified and expenditure on fruits, vegetables, milk, eggs, meat and fish, and beverages and processed food is rising, leading to changes in cropping pattern in the country.

Indian agriculture has become increasingly market-oriented and monetized. The proportion of agricultural production that is marketed by the farmers has increased significantly over the last few decades. In the early 1950s, about 30-35 per cent of foodgrains output was marketed, which now has increased to more than 70 per cent. The marketed surplus is relatively higher in case of commercial crops than subsistence crops.

Understanding marketing behaviour of producers and reliable estimates of marketed surplus as well as factors affecting it can be of significant help in designing appropriate production, procurement, storage, distribution and pricing policies. Recognizing its importance, Government of India initiated an all India survey for estimation of marketable surplus and post-harvest losses in early-1970s which continued up to late 1990s. As Indian agriculture has undergone significant transformation, and no reliable estimates of marketed and marketable surplus are available, the present study was undertaken to estimate marketed and marketable surplus of major food crops in leading producing states and examine important factors which determine the level of marketed surplus for various categories of farms. It is expected that the results of the study would be useful in designing effective food procurement, distribution and price policy.

Objectives of Study

The main objectives of the study are:

1. The estimate marketable and marketed surplus of selected cereals (rice, wheat, maize, and bajra) and pulses (gram and tur) in selected states,
2. To estimate farm retention pattern of households for self-consumption, seed, feed, wages and other payments in kind , and
3. To examine the impact of various socio-economic, technological institutional, infrastructure, and price factors on marketed surplus of major crops.

Methodology and Coverage

As the major focus of the study was on the estimation of the marketed and marketable surplus of foodgrains and response of marketed surplus to price and other exogenous variables, the study uses both primary and secondary data pertaining to selected foodgrains. In order to understand the emerging trends in production and yield performance, secondary data on area, production and productivity were collected from different published sources. The primary data was collected from 918 households selected from nine disticts in four major rice producing states, Haryana, Punjab, Uttar Pradesh and West Bengal; 1193 wheat farmers from 15 districts of Rajasthan, Madhya Pradesh, Uttar Pradesh, Haryana and Punjab, 358 maize growers from Rajasthan, Maharashtra and Karnataka, 500 bajra farmers from seven districts of Haryana, Rajasthan and

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Uttar Pradesh, 553 farmers from major gram growing states, namely, Rajasthan, Maharashtra, Karnataka and Madhya Pradesh and 441 households cultivating tur from seven districts of Uttar Pradesh, Madhya Pradesh, Maharashtra and Karnataka (Table 1). The household survey was conducted by participating Agro-Economic Research Centres/Units. The reference period for the study is 2011-12.

TABLE 1: List of Selected Crops, States and Farm Category-wise Sample size

States	Marginal <1ha	Small 1-2 ha	Semi Medium 2-4 ha	Medium 4-10 ha	Large >10 ha	Total
			Rice			
Haryana	58	79	34	23	6	200
Punjab	36	60	96	84	24	300
Uttar Pradesh	61	21	11	7	0	100
West Bengal	124	97	65	32	0	318
Total	279	257	206	146	30	918
			Wheat			
Rajasthan	21	100	70	79	23	293
Madhya Pradesh	42	16	21	19	2	100
Uttar Pradesh	126	41	22	11	0	200
Haryana	86	110	59	36	9	300
Punjab	36	60	96	84	24	300
Total	**311**	**327**	**268**	**229**	**58**	**1193**
			Mazie			
Rajasthan	9	38	33	29	9	118
Maharashtra	37	37	20	6	0	100
Karnataka	40	43	39	14	4	140
Total	**86**	**118**	**92**	**49**	**13**	**358**
			Bajra			
Haryana	21	31	27	18	3	100
Rajasthan	18	80	69	100	33	300
Uttar Pradesh	65	20	11	4	0	100
Total	104	131	107	122	36	500
			Gram			
Rajasthan	11	28	46	95	32	212
Maharashtra	36	35	19	10	0	100
Karnataka	27	34	26	36	18	141
Madhya Pradesh	24	23	17	20	16	100
Total	98	120	108	161	66	553
			Tur			
Uttar Pradesh	52	24	12	12	0	100
Madhya Pradesh	9	13	28	34	16	100
Maharashtra	33	42	20	5	-	100
Karnataka	19	39	33	36	14	141
Total	113	118	93	87	30	441
Grand Total	991	1071	874	794	233	3963

Source: Field Survey

Primary data from the households growing selected crops were collected. The data on the socio-economic profile, operational holding, cropping pattern, crop production, farm retention, acress to inputs and services,etc. were also collected from farmers in selected states.

Summary of Findings

Rice

Rice is the most important crop in India occupying about 43.2 million has of the total cultivated area and having a total production of over 102 million tonnes (TE 2012-13). Rice had the highest contribution (14.5%) to the total value of output from agriculture and allied activities in TE 2012-13 and also emerged as India's India's top agricultural export commodity with about 15.2 per cent of the total agricultural export value in TE 2013-14.

Rice production in the country increased at an annual compound growth rate of 2.35 per cent during the period 1971-2012, of which yield accounted for nearly 84 per cent and area, 16 per cent of the production growth rate (Table 2). Rice production has continued to increase during the last four decades; however, rice production (4.2%) and yield (3.58%) recorded the highest growth rate during the 1980s and the lowest (1.85% in production and 1.07& in yield) during the 1990s. However, growth rate picked up during the last decade.

TABLE 2: Trends in Compoound Annual Growth Rates (%) in Area, Production and Yield of Selected Crops in India: 1971-72 to 2012-13

	1970s	1980s	1990s	2000s	All Period
			Rice		
Area	0.92***	0.6	0.78***	0.08	0.36***
Production	2.58*	4.20***	1.86***	2.10***	2.35***
Yield	1.65	3.58***	1.07**	2.03***	1.96***
			Wheat		
Area	2.34***	0.36	1.40***	1.53***	0.99***
Production	4.91***	3.39***	3.11***	3.13***	3.25***
Yield	2.51***	3.02***	1.69***	1.58***	2.24***
			Maize		
Area	0.03	0.07	1.17***	2.62***	0.96***
Production	1.4	2.6	3.74***	5.88***	3.28***
Yield	1.36	2.52	2.55***	3.17***	2.34***
			Bajra		
Area	-1.2	-0.93	-1.06*	-1.02	-0.83***
Production	-0.08	1.35	1.58	2.16	1.71***
Yield	1.12	2.3	2.67	3.22*	2.49***
			Gram		
Area	-0.81	-1.42	0.24	3.35***	0.02
Production	-0.64	-0.51	1.19	5.51***	1.05***
Yield	0.17	0.92	0.95	2.10***	1.03***
			Tur		
Area	1.59***	2.22***	-0.22	1.63***	1.04***
Production	1.3	1.7	0.73	2.22**	0.94***
Yield	-0.29	-0.51	0.95	0.57	-0.11

Uttar Pradesh has the largest share (13.3%) in rice acreage, followed by West Bengal (12.4%), Odisha (9.8%), Andhra Pradesh (9.5%), Chhattisgarh (8.7%), Bihar (8%) and Punjab (6.6%). Punjab, Haryana and Karnataka have consistently increased their shares in rice acreage during the last three decades while Odisha, Tamil Nadu and West Bengal have marginally lost their share. In terms of production, top five states accounted for 55 percent of the total rice production in the country. Currently, West Bengal is the largest producer, accounting

for 14.5 per cent of the total rice production in the country. other major producers include Andhra Pradesh (13%), Uttar Pradesh (13%), Punjab (11.2% and Odisha (6.7%).

Rice yields, which were low (about 1393 kg/ha on the average) during the early-1980s, witnessed a steady increase during the last three decades and reached a level of 2175 kg/ha in the recent period (2006-11). However, rice yield in the country is lower compared to other major rice producing coutries such as China (6.74 t/ha). Indonesia (5.14 t/ha), and Vietnam (5.63 t/ha) as well as the world average (4.39 t/ha). At the state level, Punjab has the highest yield (3949 kg/ha), followed by Andhra Pradesh (3134 kg/ha) and Haryana (3024 kg/ha), while Madhya Pradesh (933 kg/ha), has the lowest yield. Rice yields are relatively lower in eastern states of Assam, Jharkhand, Chhattisgarh and Odisha.

Due to effective government procurement policy, rice procurement has increased significantly from about 21 million tonnes in 2000-01 to 35 million tonnes in 2011-12 with a slight decline to 34 million tonnes in 2012-13 and 31.3 million tonnes in 2013-14. Procurement as percentage of production has also increased during these years from about 24 percent in 2000-01 to about 33.7 per cent per cent in 2011-12 and declined in the next three years and reached 29.4 per cent in 2013-14. It is estimated that government procures about 40 per cent of marketed surplus at national level and it varies from less than 5 per cent in Karnataka and Assam to over 90 per cent in Chhattisgarh, Punjab (76%), Andhra Pradesh (68%) and Odisha (66%). Large scale procurement by government drives out the private sector from the market and thus restricts competition.

The procurement of rice, which was highly concentrated in few states like Punjab, Haryana and Andhra Pradesh up to the late-1990s, has become more diversified. Punjab is still the largest contributor (24.1%) to national procurement and Andhra Pradesh ranks number two (22.9%), but both states have lost their shares between TE2002-03 and TE2012-13. While states like Chhattisgarh, odisha, West Bengal, and Bihar have increased their share in rice procuement. The share of decentralized procurement states, namely, Andhra Pradesh, Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Odisha, Tamil Nadu, Uttarakhand, West Bengal, and Bihar, has increased significantly and crossed 50 percent share in TE2013-14.

The pattern of marketed surplus of rice, based on the household data collected from over 1000 farmers from 9 districts of four major rice producing states, namely, West Bengal, Punjab, Uttar Pradesh and Haryana showed that gross marketed surplus (sales as a proportion of production) was marginally lower than marketable surplus (Table 3). Medium farms had the highest rate of marketed surplus (83.2% of total production), followed by semi-medium (80.9%) and marginal farms (62.8%). In the case of selected states, Punjab and Haryana farmers sold more than 95 per cent of their rice output in the market. West Bengal farmers, on the other hand, sold about 61 per cent of the total output. Since rice is a staple crop in eastern and southern regions, a significant proportion of crop output was for self-consumption. The average farm retention (self-consumption, seed, and other purposes) on sample households was 14.5 per cent but varied from less than one percent on large farms to 35.3 per cent on marginal farms. In the case of states, average retention was lowest (less than one percent) in Punjab and the highest (37.4%) in West Bengal. More than 90 per cent of the total retention was for self-consumption. It is interesting to note that farmers purchased for self-consumption, even after they have sold their produce in the market. Since farmers need cash for the next crop and for other requirements, they (particularly small and marginal farmers) are forced to sell part of the grains after harvest and buy at a later date at a higher price. Farmers' market participation was quite high in all the states and varied from 94.7% in West Bengal to 100 per cent in Punjab and Haryana.

Over 60 per cent of the sample farmers had access to regulated markets while around 39 per cent sold their produce in unregulated markets. The pattern of market access gives a somewhat different picture when analysis is carried out by size of farm. In the case of medium (76.2%) and large farms (100%), access to regulated markets was very high while small and marginal farmers had poor access to regulated markets. About one-third of the total marketed surplus was procured by government agencies, followed by private traders (30.2% and processors (27.5%). Large farmers sold about 71.4 per cent of the marketed surplus to government agencies while small farmers sold about 30.2 per cent to government agencies. The price paid by private traders and processors was significantly lower than the price paid by public agencies. However, large farmers received almost the same price from all agencies, showing their better bargaining power compared with small and marginal farmers, who received lower prices than large farmers. However, there were large inter-state variations in market access. For example, due to effective government procurement policy in Punjab and Haryana, more than 96 per cent of the total marketed surplus of sample farmers was purchased by the government agencies. In contrast, in West Bengal more than 68% of the total paddy output marketed was sold to village-level traders, and less than 1 percent of the marketed surplus was procured by government agencies. The rice millers purchased about 30 per cent of the paddy output from farmers in 2011-12 because mills were forced to purchase specified quantities directly from the farmers at MSP under the new government regulations. It is also worth noting that the prices received by farmers in Punjab were much higher than West Bengal under all channels.

TABLE 3: MARKETABLE AND MARKETED SURPLUS OF RICE ON SAMPLE HOUSEHOLDS

States	Marketable Surplus (% of Production)	Gross Marketed Surplus (% of Production)	Net Marketed Surplus (% of Production)
Haryana	95.5	95.5	95.1
Punjab	99.4	99.4	99.4
Uttar Pradesh	77.0	75.8	75.8
West Bengal	62.6	40.5	37.9
Total	85.5	78.0	77.1
Marginal	64.7	63.0	59.6
Small	73.6	74.0	72.2
Semi-medium	81.0	80.9	79.9
Medium	90.3	83.2	82.7
Large	99.1	72.1	72.1
All farms	85.5	78.0	77.1

The results of regression analysis to examine the factors affecting marketed surplus revealed that output price, farm size, and market access have positive impact on marketed surplus of rice (Table 4. Family size matters too on marginal and small farms and has a negative impact on marketed surplus. Household's awareness about minimum support price (MSP) has positive and significant impact on marketed surplus and so has access to regulated markets. The relative importance of factors in influencing marketed surplus as measured by standardized regression coefficients indicated that the price received by farmers was the most important factor, followed by access to regulated markets, farm size and awareness of MSP. Family size turned out to be the least important variable in influencing marketed surplus of rice.

TABLE 4: FACTORS INFLUENCING MARKETED SURPLUS OF SELECTED CROPS IN INDIA

Factors	Crop			
	Rice	Wheat	Maize	Bajra
Constant	(-)***	(-)***	(+)	(+)***
Farm Size	(+)***	(+)***	(+)***	(+)***
Family Size	(-)	(-)***	(-)***	(-)
Price Received	(+)***	(+)***	(+)***	—
Awareness about MSP	(+)*	(+)***	—	(+)***
Access to Regulated Market	(+)***	(+)***	—	(+)***
Distance to Market	(+)***	(-)	(+)***	(+)***

Wheat

Wheat is an important staple food crop in India and occupies about 15 per cent of the total cultivated area with a total production of nearly 92 million tonnes (TE 2012-13). The share of wheat in the total value of output from agriculture and allied activities was about 10.4 per cent in TE 2011-12 but varied from more than on-fourth to crop output in states like Punjab (34.4%), Haryana (34%) and Uttar Pradesh (25.2%) to less than one percent in many southern and eastern states.

Wheat acreage in the country increased from 19.1 million ha in TE 1973-74 to 29.6 million ha in TE 2012-13 and production increased from 24.3 million tonnes to 91.8 million tonnes in TE 2012-13. During the same period, wheat productivity more than doubled from 1274 kg/ha to 3094 kg/ha. As a percent of total cropped area, wheat acreage share increased from 11.5 percent in TE 1973-74 to 15.3 percent in TE 2012-13. Wheat production increased at an annual compound growth rate of 3.25 per cent during 1971-72 and 2012-13 and this was due to a modest area expansion of 0.99 percent per year but a significant yield increase of 2.24 percent per year. Growth in wheat production was the highest (4.91%) during seventies which decelerated to 3.39 percent per year during 1980s, 3.11 per cent during the 1990s but improved marginally (3.13%) during the last decade. Among the major producers, Madhya Pradesh showed the highest growth rate (6.27%) during the last decade, foolowed by Rajasthan (4.79%) as against the national average of 3.13 per cent. Haryana, Punjab and Uttar Pradesh, the other three major producers, recorded lower than all-India growth rate.

Wheat yield growth rates were particularly rapid during the 1970s and 1980s. Growth in wheat yield, 2.51 percent per year in the 1970s and 3.02 percent per year in the 1980s, slowed down to 1.69 percent in the 1990s and 1.58 per cent in the first decade of the 2000s. During the last two decades, acreage expansion and yield improvement contributed almost equally to growth in wheat output while yield was the major source of growth in output during the 1980s (Table 2).

Uttar Pradesh had the largest share with one-third of the total production, followed by Punjab with 18.6 per cent and Haryana with 13.3 per cent during TE 2011-12. These three states together contribute around two-thirds of the total wheat production in the country. Madhya Pradesh is the fourth largest producer with 10.5 per cent share, followed by Rajasthan (9.2%) and Bihar (5.1%). Punjab and Bihar have marginally lost their share in national production while Haryana, Madhya Pradesh and Rajasthan have increased their shares. Wheat is an important foodgrains crop in many states such as Haryana (69.7%), Uttar Pradesh (64%), Madhya Pradesh (61.4%) and Punjab (58.8%).

Wheat yields vary substantially across states and Punjab and Haryana have higher yields of 4513 kg/ha and 4441 kg/ha, respectively. These are followed, after a significant gap, by Rajasthan, U.P., Uttarakhand and Bihar with 2982, 2935, 2156 and 2041 kg/ha respectively. Madhya Pradesh, one of the major producers, has much lower yield of 1876 kg/ha, even lower than the national

average (2904 kg/ha). However, wheat yields have shown consistent improvement in almost all states during the last three decades. The average yield of wheat in India during 2011-13 was 3.1 tonne/ha as against the global average of about 3.2 tonne/ha, which is comparable to the global benchmark but much lower than countries like China, Egypt and Uzbekistan. Government plays an important role in procurement. Wheat procurement which reached a peak of about 21 million tonnes in 2011-02, witnessed a stady decline and touched the lowest level of 9.23 million tonnes in 2006-07. India imported about 5.4 million tonnes of wheat in 2006-07 and about 1.9 million tonnes in 2007-08 which concerned the policy makers, and concerted efforts where made to increase wheat production and procurement. This led to a significant increase in wheat production as well as procurement. Wheat production increased from 75.8 million tonnes to 93.5 million tonnes between 2006-07 and 2012-13, while procurement increased from 9.2 million tonnes to 37.9 million tonnes during the same period. Wheat procurement as percentage of total production increased from about 12 per cent in 2006-07 to 40.6 per cent in 2012-13 but fell during 2013-14.

In the late 1990s, wheat procurement was mainly concentrated in Punjab and Haryana and share of government procurement as a percentage of production was 59.2 per cent in Punjab and 51.4 per cent in Haryana.

The share of Punjab, Haryana and Uttar Pradesh in total procurement was more than 90 per cent in TE 2003-04, making them almost a monopoly *vis-a-vis* other states. However, during the last decade, the share of traditional states like Punjab, Haryana and Uttar Pradesh has declined and the decline in share of these states has been compensated by an increase in share of Madhya Pradesh and Rajasthan. The share of Madhya Pradesh has increased from less than 2 percent to over 24 per cent during the last decade. This has happened primarily due to the state policy of additional bonus over the MSP. The procurement trends show that wheat procurement has diversified in terms of coverage of states but at an additional cost. The share of government procurement has been rising over the years in all wheat producing states. Madhya Pradesh has recorded the highest increase of over 30 per cent, from six per cent in TE 2001-02 to 37.5 per cent in TE 2011-12. These results indicate that the government has almost a monopsony in wheat procurement and restricted participation of private sector.

The findings of the study conducted in five major wheat producing states, namely, Punjab, Haryana, Uttar Pradesh, Madhya Pradesh and Rajasthan covering 1193 wheat producers spread over 15 districts showed that marketed surplus of wheat was about 82 per cent and ranged from about 61 per cent on marginal farms to 86 percent on large farms (Table 5). The gross marketed surplus was the highest (90.1%) in Punjab, followed by Haryana (82.9%), Madhya Pradesh (82.6%) and the lowest (54.3%) in Rajasthan.

The share of various farm size groups in total output, marketed surplus, and area operated as well as farmers'participation in wheat marketing showed that more than two-thirds of the total output of sample households was contributed by medium and large farms while marginal farmers contributed about 5 per cent. A comparison of the shares of respective farm size groups in the total marketed surplus shows that marginal farmers contribute the lowest quantity (4.1%), whereas medium farms offered the highest share of marketable surplus (35%) of the total marketed surplus. The share of small and marginal farmers in total output as well as marketed surplus was higher than their share in total area under wheat. More than 96 per cent of the sample households participated in the marketing of wheat, and there was no significant difference among various farm categories. The results also show that all farmers including small and marginal farmers have access to markets and the main reason for market access is effective government procurement system in all selected states.

TABLE 5: MARKETABLE AND MARKETED SURPLUS OF WHEAT ON SAMPLE HOUSEHOLDS

States	Marketable Surplus as % of Total Production	Gross Marketed Surplus as % of Total Production	Net Marketed Surplus as % of Total Production
Haryana	82.9	82.9	82.9
Punjab	90.1	90.1	90.1
Uttar Pradesh	68.6	65.1	65.1
Madhya Pradesh	75.2	82.6	80.4
Rajasthan	61.6	54.3	48.4
Total	83.0	80.7	80.1
Marginal	64.8	61.2	56.3
Small	72.2	69.4	66.9
Semi-medium	79.9	77.7	77.1
Medium	84.7	82.6	82.5
Large	88.1	86.0	86.0
All farms	83.0	80.7	80.1

The average farm retention (self-consumption, seed, and other purposes) was 15.3 per cent of the total production but varied from 11.6 percent on large farms to 33.3 per cent on marginal farms and from about 10 percent in Punjab to 38.7 per cent in Rajasthan, as wheat is an essential part of the daily diet in the northern part of India. About 60 per cent of the total retention was for self-consumption, followed by for seed (21.4%) and feed purpose (12.0%).

More than 63 per cent of the total marketed surplus was procured by government agencies, followed by private

traders (20.4%) and less than 5 per cent by millers/ processors. Large farmers sold about 91 per cent of the marketed surplus to government agencies while small farmers sold about 25.3 per cent to government agencies. The price paid by private traders and processors was lower than the price paid by public agencies. However, large farmers received marginally higher price from private traders and the price received was also higher compared to small and marginal farmers, thereby indicating that large farmers had better bargaining power compared with small and marginal farmers. About 73 per cent of the sample farmers in the study areas were aware of MSP, but the awareness was comparatively low in case of marginal farmers. Traders were the main source of price information (30.2%), followed by print media (24.2%), and APMC mandi (10.5%). Large farmers had better access to print and electronic media while small and marginal farmers mainly depended on traders and other informal channels like visit to mandis.

Farm size, wheat price, awareness about MSP and access to regulated market have positive influence on marketed surplus while family size and distance to markets have negative influence and most variables are statistically significant, indicating that they significantly influence marketed surplus (Table 4). The relationship between farm size and marketed surplus is positive and statistically significant, indicating that with an increase in farm size, marketed surplus ration also increases. This result holds for all farm-size categories except for large farms where it is positive but non-significant. The relative importance of factors in influencing marketed surplus indicated that the price received by farmers was the most important factor, followed by awareness of MSP, farm size and access to regulated markets. Distance to market was the least important variable in influencing marketed surplus of wheat.

Maize

Maize is the third important cereal in the country with 22.8 million tonnes production contributing about 9.5 percent to the country's total cereals production. The area under maize has increased from 5.8 million ha in TE1973-74 to about 8.7 million ha in TE2012-13 while production increased by more than 280 per cent from 5.7 million tonnes to about 21.9 million tonnes during the same period, primarily due to a significant increase in yield. The average yield of maize also increased from about 990 kg per ha in early-70s to 2528 kg per ha during TE2012-13 but is still much lower compared to the world average and major producers like the United States and China (4.93 t/ha).

Maize production in the country increased at an annual growth rate of 3.28 per cent during 1971-2012 while area and yield increased at 0.96 per cent and 2.34 per cent, respectively during the same period. During the nineties, production of almost all cereals, including rice and wheat witnessed deceleration in growth rates but maize production exhibited an impressive positive and accelerated growth rate (3.74%). During the last two decades, in new non-traditional maize growing areas, more acreage has been brought under maize cultivation and the contribution of area was very close to the contribution of yield in increased production (Table 2).

Maize has experienced a marked regional shift in the production as well as acreage. Traditionally, maize was grown in Uttar Pradesh, Bihar, Madhya Pradesh, and Rajasthan with nearly two-thirds of the total area and over half of the total production in early-80s. However, in the recent period, peninsular India has emerged as a dominant maize-growing region and accounts for more than 40 per cent of the total production. Three states, namely, Andhra Pradesh, Karnataka and Tamil Nadu increased their share in total acreage from less than 10 per cent in TE1983-84 to 27.4 per cent in TE2011-12, while production share increased from 15.4 per cent to 42.8 per cent during the same period. Traditional maize-growing states have lost their share in total acreage as well as production during the last three decades. For example, Uttar Pradesh, the largest producer of maize in the eighties lost its share from 13.8 per cent in TE1983-84 to about 6 per cent in TE2011-12. Similarly, Madhya Pradesh, the second largest producer during the eighties, lost its share from 12.8 per cent in TE1983-84 to about 6.5 per cent during the TE2011-12.

The results of household data collected from 358 maize producers from three states, Karnataka, Maharashtra and Rajasthan, shows that relatively younger households were engaged in maize cultivation. The average productivity of maize on the surveyed households was 2969 kg per ha, higher than the national average. The highest yield of kharif maize was observed in Karnataka (3692 kg/ha), followed by Maharashtra (2888 kg) and the lowest in Rajasthan (2179 kg). The main reason for this low productivity in Rajasthan was the lack of irrigation facilities as less than one percent of the maize area was under irrigation, while in Karnataka about 40 per cent of the maize areas was irrigated. The average productivity of maize under irrigated conditions was significantly higher (3468 kg/ha) than unirrigated areas (2913 kg/ha) on sample households.

The average farm retention (self-consumption, seed and other purposes) was 9.1 per cent but varied from 6.7 per cent on medium farms to 18.8 per cent on large farms. The average retention was the lowest (1.7 per cent) in Maharashtra while in Rajasthan farmers retained about 19 per cent of maize for household use because maize was an important part of their diet. More than half of the total retention was for self-cumsumption, while 29 per cent was kept for animal feed. However, there were regional differences. On an average, gross marketed surplus

accounted for 88.3 per centof total maize production in the study area (Table 6). In the case of different farm sizes, marketed surplus was the highest (93.35) on medium households and the lowest on marginal farms (79.9%). Among states, Maharashtra had the highest (98.1%) marketed surplus. The marketed surplus was lower than marketable surplus in case of small and marginal farmers, thereby indicating distress sale.

Only 10 per cent of the sample farmers had access to regulated markets while around 90 per cent sold their produce in unregulated markets. However, large farmers (about one-third) had better access to regulated markets compared with small (9.1%) and marginal farmers (6.1%). Among states, Karnataka farmers had better access to regulated markets compared with Maharashtra and Rajasthan because Karnataka Food and Civil Supplies Corporation Limited and Karnataka State Cooperative Marketing Federation Limited procure maize from farmers directly, while in other states, government procurement is either absent or negligible. Less than half of the sample farmers in the study area were aware of MSP, but the awareness was quite high (83.3%) for large households. The traders and commission agents were a major source of price information (60.7%) to the farmers, while about 21 per cent households were dependent on APMC mandies. Small and marginal farmers were mainly dependent on traders formarket information while medium and large farmers had better access to print and electronic media.

TABLE 6: Marketable and marketed Surplus of Maize on Sample Households

States	Marketable Surplus as % of Total Production	Gross Marketed as Surplus % of Total Production	Net Marketed as Surplus % of Total Production
Karnataka	90.5	86.5	86.5
Maharashtra	98.3	98.1	98.1
Rajasthan	81.0	86.4	84.4
Total	90.5	88.3	88.1
Marginal	86.8	79.9	79.9
Small	88.7	83.7	83.4
Semi-medium	91.6	91.1	90.9
Medium	93.4	93.3	93.0
Large	81.1	88.2	88.2
All Farms	90.5	88.3	88.1

The size of farm and maize price had a positive and statistically significant impact on marketed surplus, incicating that with an increase in farm size and higher prices, marketed surplus increases. Family size and number of livestock had a negative impact on marketed surplus, which shows that larger the household family size and livestock herd size, the lower is the marketed surplus of maize (Table 4).

Bajra

India is one of the world's leading producers of bajra, both in terms of area (8.54 million ha) and production (9.8 million tonnes) with average productivity of about 1152 kg per ha during TE2012-13. The area under bajra declined by about 26 per cent between early-80s and TE2012-13, but production increased by nearly 60 per cent, mainly due to a significant increase (118%) in productivity. Bajra which was the second largest millet in the country after sorghum in terms of area and production till early-2000s has thereafter surpassed sorghum and occupied the first position. The share of bajra in total cereals acreage, as well as production, has declined during the last four decades from 12.2 per cent and 6.7 per cent during the TE1971-72 to 8.6 per cent and 4.2 per cent in the TE2012-13, respectively. However, the performance of bajra has slightly improved during the last decade mainly due to improvement in yield, from 736 per ha to 1149 kg per ha.

Bajra recorded a negative (-0.08%) growth in production during the 1970s before increasing to 1.35 per cent in 1980s and reaching a level of 2.16 per cent during the last decade. The productivity witnessed an accelerated growth rate during the last four decades. The production (2.16%) and productivity (3.22%) recorded the highest growth rate during the last decade while the growth rates were the lowest during the 1970s (Table 2). The variability in both production and productivity has remained fairly high due to expremely low coverage of irrigation facilities (about 8-9%).

Rajasthan alone accounts for 57.4 per cent of the acreage and 41.2 per cent of bajra production in the country. The top five states, Rajasthan, Uttar Pradesh, Haryana, Gujarat and Maharashtra, account for over 93 per cent of acreage and about 92 per cent of bajra production during the last three decades while Maharashtra and Gujarat have lost their shares. Bajra is an important food crop and accounts for about 22 per cent and 14 per cent in total foodgrains in Rajasthan and Gujarat, respectively, whereas in Haryana and Maharashtra, it accounts for about 6 per cent. Bajra has lost its share in foodgrains production in all major producing states except Rajasthan.

It is evident from the results of primary data collected from about 500 farmers growing bajra in Rajasthan, Haryana and Uttar Pradesh, that the average productivity per hectare varied significantly among different farm size classes, from 1977 kg on large farmers to 1819 kg in case of marginal farmers with average yield of 1526kg. There are also significant inter-state variations in yield. The highest yield (2221 kg/ha) was recorded in Uttar Pradesh, followed by Haryana (1448 kg/ha) and the lowest (956 kg/ha) in Rajasthan. An inverse relationship between farm size and crop productivity was observed for the entire sample and for the states of Haryana and Rajasthan.

A considerable quantity (about 25% of total production) was retained by sample households for various

purposes. More than two-thirds of the total produce was retained for self-consmption while about 27 per cent was kept for feed purposes. Marginal farmers retained a larger proportion (32.7%) of the produce for household requirements compared with large farmers (19.8%). The share of produce retained for household requirements was higher in Rajasthan (30.3%) compared to Uttar Pradesh and Haryana because bajra is main staple food in Rajasthan.

The marketed surplus of bajra was estimated at 67.7 per cent on all farms and varied from about 60 per cent on small farms to 74 per cent on large farms (Table 7). In Haryana, the marketed surplus was higher (83.5%) compared to Uttar Pradesh (61.4%) and Rajasthan (63.4%). The marketed surplus was lower than marketable surplus on all farm categories as well as in Rajasthan and Uttar Pradesh. Market participation of farmers was 100 per cent in Haryana and Uttar Pradesh while in Rajasthan about 87 per cent farmers sold their produce in the market. About 15.6 per cent of the total marketed surplus was producred by government agencies, while about 85 per cent farmers sold their produce in the market. About 15.6 per cent of the total marketed surplus was procured by government agencies, while about 85 per cent was sold to private traders and other buyers. However, large farmers had better access to government agencies than small and marginal farmers. The government agencies paid a higher price (Rs. 878/q) than private sector (Rs. 857/q). The large farmers received higher price than small and marginal farmers under both market channels, showing their better bargaining skills.

Family size and age of head of household had adverse impact on marketed surplus while impact of farm size on marketed surplus was positive and statistically significant indicating that with an increase in farm size, marketed surplus of bajra also increases. Other important factors, which influenced marketed surplus positively, include farmers' awareness about MSP and access to regulated markets (Table 4).

Gram

Gram is the most important pulses crop in India and accounts for approximately 35 percent of total pulses acreage and about 46 per cent of the total production in the country. The area witnessed a declining trend during the post-reforms period as crop acreage declined from 7.5 million ha in TE1981-82 to 6.1 million ha in TE1993-94 and reached 5.9 million ha in TE2001-02 but the trend reversed during the last decade. Although the area under gram cutlivation declined during the nineties, production increased from 4.5 million tonnes to 4.8 million tonnes. Gram production reached a record level of 8.83 million tonnes in 2012-13 and is expected to touch 9.88 million tonnes as per fourth estimates for 2013-14. The gram yield increased from 607 kg/ha in 1971-73 to 913 kg/ha in 2012-13. The last decade witnessed the highest increase (12.7%), followed by the period between 1981-83 and 1991-93 (12%) and the lowest (8.1%) during the 1970s.

TABLE 7: MARKETABLE AND MARKETED SURPLUS OF BAJRA ON SAMPLE HOUSEHOLDS

States	Marketable Surplus as % of Total Production	Gross Marketed Surplus as % of Total Production	Net Marketed Surplus as % of Total Production
Haryana	83.5	83.5	83.5
Rajasthan	69.5	63.4	60.6
Uttar Pradesh	72.9	61.7	61.7
Total	73.7	67.7	66.1
Marginal	67.5	60.2	57.8
Small	71.8	66.2	64.4
Semi-medium	74.4	68.7	66.7
Medium	72.8	67.9	66.9
Large	80.4	74.1	73.2
All farms	73.7	67.7	66.1

Gram production recorded a negative growth rate during the 1970s and 1980s (during green revolution period) but started showing some improvement during the last two decades. The annual growth rate of production became positive (1.19%) during the 1990s and reached 5.51 per cent during the last decade. Gram production (5.51%) and yield (2.10%) recorded the highest growth rate during the last decade (Table 2).

Gram is the primary pulse crop in Madhya Pradesh, Rajasthan, Maharashtra, Karnataka, Andhra Pradesh, and Uttar Pradesh and these states account for about 94 per cent of the total acreage and production. Madhya Pradesh had the largest share in crop acreage and production, followed by Rajasthan, Maharashtra and Karnataka. Madhya Pradesh, Maharashtra, Karnataka and Andhra Pradesh have increased their share in acreage as well as production while Rajasthan and Uttar Pradesh have lost their share during the last three decades. Andhra Pradesh, Madhya Pradesh and Uttar Pradesh had higher crop yield compared with the national average (873 kg/ha). The all India average yield has increased from 674 kg per ha in 1981—95 to 873 kg per ha in 2006—11, an increase of about 30 per cent.

Gram production increased at an annual compound growth rate of about 1.41 per cent during 1981—2011, while crop acreage and yield recorded 0.34 per cent and 1.06 per cent growth rates, respectively. In the long term, of the 1.41 per cent annual growth in gram production, increase in yield accounted for about three-fourths of the growth in production while remaining one-fourth came from area expansion. All the major gram producting states except Rajasthan and Uttar Pradesh recorded a positive significant growth rate in production during 1981—2011. Andhra Pradesh had the highest growth rate, followed by

Karnataka, Maharashtra and Madhya Pradesh. In most of the major producing states, growth rates were higher during the 1990s and 2000s compared to the 1980s.

The estimates of marketed surplus based on data collected from about 550 households from four major gram producing states, namely, Maharashtra, Madhya Pradesh, Uttar Pradesh and Karnataka showed that, on an average about 87 per cent of total gram production was sold in the market (Table 8). The marketed surplus was highest (88.7%) on the large farms, followed by semi-medium (87.1%) and the lowest on marginal farms (85%). The average farm retention for self-consumption, seed, and other purposes was 12.2 per cent and varied from 11.7 per cent on medium farms to 13.8 per cent on marginal farms. In the case of states, average farm retention was the lowest (8.8%) in Rajasthan while in Madhya Pradesh, farmers retained about 19.3 per cent of gram for household use because seed replacement rate in Madhya Pradesh is one of the lowest.

Nearly 60 per cent of the total retention was for seed purpose while 32 per cent was kept for self-consumption. However, there were regional differences, Rajasthan and Maharashtra kept more than two-thirds of the total retention for food purpose while in Madhya Pradesh, about 80 per cent was kept for seed purpose. In Karnataka about half of total output was retained for seed and 32 per cent for food purpose.

The average productivity of gram was 949 kg. per ha and ranged from 847 kg per ha in case of large farms to 973 kg per on semi-medium farm. The highest yield was recorded in Madhya pradesh (1124 kg/ha), followed by Maharashtra (971 kg/ha) and the lowest in Rajasthan (843kg/ha).

TABLE 8: Marketable and Marketed Surplus of Gram on Sample Households

States	Marketable Surplus as % of Total Production	Gross Marketed Surplus as % of Total Production	Net Marketed Surplus as % of Total Production
1	2	3	4
Maharashtra	90.2	85.2	84.4
Madhya Pradesh	80.7	88.4	88.4
Karnataka	89.6	88.3	88.3
Rajasthan	91.2	84.4	84.3
Total	87.6	87.2	87.0
Marginal	86.5	85.0	84.7
Small	87.1	86.7	86.5
Semi-medium	87.8	87.1	86.9
Medium	88.4	85.9	85.7
Large	87.2	88.7	88.7
All farms	87.6	87.2	87.0

Majority of gram growers sold their produce in unregulated markets and a small proportion of households (<20%) sold in the regulated markets. The average price received in unregulated markets was higher than regulated markets on all categories of farms except for large farms. Less than 30 per cent of the sample farmers in the study areas were aware of MSP, but there was a positive association between farm size and MSP awareness. Traders were the main source of price information to the respondents, followed by visit to APMC mandies and electronic and print media being the least important.

Tur

India is the world's largest producer of tur and accounts for about 63 per cent of the total global production. Tur is cultivated on about 4.1 million ha, grown mainly under rainfed conditions (4% area under irrigation), with a production of about 2.8 million tonnes in the country. More than three-fourths of the total cropped area is concentrated in the semi-arid tropics and Maharashtra has the largest acreage (about 31%) under the crop, followed by Karnataka (19.2%), Andhra Pradesh (about 12%), Madhya Pradesh (13.2%) and Uttar Pradesh (about 8%). The top five states account for nearly 85 per cent of the total tur area and production. Among major tur producing states, Andhra Pradesh, Gujarat, Karnataka and Maharashtra have increased their share in total production during the last three decades while Uttar Pradesh and Madhya Pradesh have lost their share in national production. Gujarat has the highest yield (966 kg/ha), followed by Uttar Pradesh (860 kg/ha) and the lowest yield of 444 kg per ha in case of Andhra Pradesh.

Tur production in the country increased from about 1.7 million tonnes in TE1973-74 to 2.8 million tonnes in TE2012-13 amounting to about 70 per cent increase in about four decades. During the same period, acreage under the crop increased from about 2.5 million ha to just over 4 million ha, representing an increase of about 60 per cent. Yield, on the other hand, increased very marginally by about 2 per cent during the same period. The crop has experienced consistently high inter-annual acreage as well as yield variability over time. Most of the increases in production was due to an increased acreage as yield increased marginally from 682 kg per ha (1971-73 average) to 698 kg per ha (2010-12).

The compound annual growth rates of area, production and yield of tur as given in Table 2 revealed that growth performance of the crop was not impressive during the last four decades as the crop production registered an annual growth rate of less than one per cent (0.97%) while area grew by nearly one percent and growth rate in yield was negative. However, performance was relatively better during the last decade when production recorded the highest growth rate (2.22%). Tur yield witnessed a negative growth rate during the 1970s and 1980s before improving marginally during the last two decades but with a less than one per cent growth. The growth trends showed that performance of tur has not been

very encouraging in Gujarat, Madhya Pradesh and Uttar Pradesh during the last three decades.

The average productivity of tur based on household data from 441 tur producers spread over seven districts in four major producing states, namely, Maharashtra, Madhya Pradesh, Uttar Pradesh and Karnataka, revealed that average productivity was 895 kg per ha and varied from 838 kg per ha in case of small farmers to 928 kg per ha on semi-medium farms.

The crop yield in Karnataka, Maharashtra and Madhya Pradesh was higher than the sample average while Uttar Pradesh had lower yield. the main reason for low productivity in tur was lack of irrigation facilities as less than five percent of tur area is under irrigation at national level.

The average farm retention (self-consumption, seed, and other purposes) was about 9.5 per cent and ranged from 5.1 per cent on large farms to 15-16 per cent on small and marginal farms. In the case of states, average farm retention was lower (7.3%) in Karnataka while in Uttar Pradesh, farmers retained about 24 per cent of tur for household use because tur was the main pulse in their diet. More than 57 per cent of the total retention was for self-consumption, while nearly 43 per cent was kept for seed purpose.

The average marketed surplus in case of tur was quite high (92.5%) and was the highest (99.5%) on medium households and the lowest on semi-medium farms (Table 9(. The marketed surplus was the highest (96.8%) in Madhya Pradesh and the lowest (85.7%) in Maharashtra. These trends clearly indicate that in Madhya Pradesh, farmers grow tur primarily for the market. All categories of tur growers sold output in the market and the proportion of farmers who sold in the market was very high (97.7%). About 45 per cent of sample households sold more than 90 per cent of the output in the market, while nearly 13 per cent sold less than 60 per cent.

More than two-thirds of the output was sold to government agencies, while 31.4 per cent was sold to private traders. With increase in farm size, share of marketed surplus sold to government agencies also increased, which shows that large farmers have better access to public procurement system, while small and marginal farmers are more dependent on private traders. However, there are regional variations; for example, more than 93 per cent of the produce in Karnataka was sold to governemnt agencies, while in Maharashtra, 95.5 per cent of the total marketed surplus was sold to private traders. In the case of Madhya Pradesh, 52 per cent was sold to government agencies while 40.7 per cent was sold to private traders.

The price paid by governemnt agencies was higher (Rs. 3223/q) than private traders (Rs. 3165). Small and marginal farmers received marginally lower prices compared with large farmers. Karnataka farmers received higher price comapred with other states under both public and private trade.

TABLE 9: MARKETABLE AND MARKETED SURPLUS OF TUR ON SAMPLE HOUSEHOLDS

States	Marketable Surplus as % of Total Production	Gross Marketed Surplus as % of Total Production	Net Marketed Surplus as % of Total Production
Karnataka	92.7	90.8	90.8
Madhya Pradesh	88.1	96.8	96.8
Maharashtra	83.3	85.7	82.9
Uttar Pradesh	76.0	85.8	85.8
All	90.5	92.5	92.5
Marginal	84.0	89.5	89.5
Small	85.0	90.5	90.5
Semi-medium	85.9	86.5	86.5
Medium	90.7	99.5	99.5
Large	94.9	85.0	85.0
All farms	90.5	92.5	92.5

Policy Implications

Development of efficient and competitive agricultural marketing system is essential for accelerating the growth of agricultural production and marketed surplus and also has the potential to benefit poor consumers. However, marketing structure and organization for agricultural commodities in Idnia varies across different states and commodities, and consists of both public and private sectors. For few commodities, like rice and wheat, governemnt has direct intervention, while in most other crops, marketing is dominated by the private sector. The organised marketing of agricultural commodities promoted through a network of regulated markets has helped in ameliorating the market constraints of producers at the wholesale assembling level and protect them from the exploitation of market intermediaries and traders as well as ensured better prices and timely payment for the produce. However, these markets have become restrictive and monopolistic, and restricted private investment in the sector, which has led to poor market infrastructure due to lack of investment. To improve the investment in market infrastructure, however, requires undertaking significant investments in technology, institutions, infrastructure and management. Understanding marketed surplus and marketing behaviour can help in designing appropriate policies, technology choices and institutions to facilitate the development of agriculture. Some important policy implications for improving the marketed surplus and infrastructure drawn from the analysis of the present study based on a cross section analysis of household data of about 5000 farmers growing major foodgrains in major producing regions are discussed below.

Strengthen Physical Infrastructure

Physical market infrastructure is critical in enhancing production and marketed surplus and ensuring higher returns to farmers. Due to the reliance of output market development on physical infrastructure such as markets/ yards, collection centres, grading and packaging, rural roads, etc., it should be the top-most priority for investment and development. The development of quality physical infrastructure will reduce transactional costs and improve market efficiency. Improved roads and creation of market hubs that are closer to producers can reduce transportation costs and post-harvest losses, which in turn can lead to higher prices received for outputs, resulting in farmers receiving higher returns from agricultural production. Farmers growing coarse cereals and pulses have poor access to regulated markets and are forced to sell their produce in unregulated markets at lower prices. Since farmers can receive higher prices under competitive markets, there is a need to create more competitive market structure by liberalizing agricultural markets so that farmers could choose the agency to whom they wished to sell their produce. Small and marginal farmers are forced to sell their produce just after harvest at lower prices. Sometimes farmers may want to sell it later when prices are higher but feel constrained by among other things, lack of storage facilities and access to credit. Therefore, as competitive market combined with storage facilities can ensure better prices to small farmers by allowing them to have greater flexibility in the timing and location of their sales.

Improve the Reach and Quality of Information Services

Market information and extension services play a significant role in increasing productivity and market participation of small farmers. However, availability of timely and reliable market information has been seen as a major constraint by farmers in marketing of their produce, leading to low price realization. A significant proportion of farmers especially the marginal are dependent on the traders/commission agents for price and market information, hence, there is a need to strengthen dissemination of market intelligence/information so that farmers can make appropriate marketing decision. Most of the extension services being provided by government agencies are focused on crop cultivation despite a need for post-harvest management and marketing extention services.

Facilitate Access to Institutional Credit and Develop Storage Facilities

Marketed surplus ratios were lower for coarse cereals among cereals and generally lower for cereals than pulses. Among different farm size groups, the marketed surplus ratios were lower for small and marginal farmers compared with large farms. It was also found that marketed surplus increased with an increase in farm size and output. Further, marketed surplus was higher than marketable surplus for small and marginal farmers, indicating distress sale. There are also considerable differences in marketed surplus ratios across states and generally lower in states with less developed market infrastructure. Farmers sold almost entire marketed surplus immediately after the harvest as they need credit for the next crop and that leads to serious constraints in handling and storage of produce for procurement agencies, particularly in rice and wheat. Therefore, access to institutional credit and proper storage at farm household level will play an important role increasing marketed surplus and reduce distress sale.

Improve Regulation of Markets

High proportion of farmers growing pulses and coarse perceive lack of market regulation to be a major problem. They indicated that lack of access to organized/regulated markets leading to exploitation by middlement and non-remunerative prices were among the major problems for the producers. Public procurement was an important factor in creating competitive market particularly in the case of rice and wheat in some states and helping farmers receive higher prices. Since the government has no effective procurement policy for coarse cereals and pulses in majority of the states, there is a need to improve regulation of markets to avoid exploitation of farmers by market intermediaries.

Commodity Reviews

Foodgrains

During the month of October,2016 the Wholesale Price Index (Base 2004-05=100) of pulses increased by 7.01%, cereals decreased by 0.12% & foodgrains increased by 1.76% respectively over the previous month.

INDEX NUMBER OF WHOLESALE PRICES

(Base: 2004-2005=100)

Commodity	Weight (%)	WPI for the month of October, 2016	WPI for the month of September, 2016	WPI A year ago	Percentage Change during	
					A month	A year
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Rice	1.793	249.5	249.1	238.6	0.16	4.57
Wheat	1.116	232.9	231.9	219.1	0.43	6.30
Jowar	0.096	291.6	296.5	279.7	-1.65	4.25
Bajra	0.115	289.1	297.5	255.7	-2.82	13.06
Maize	0.217	283.3	291.6	249.8	-2.85	13.41
Barley	0.017	276.3	277.3	230.6	-0.36	19.82
Ragi	0.019	369.7	339.3	326.6	8.96	13.20
Cereals	3.373	249.5	249.8	235.1	-0.12	6.13
Pulses	0.717	444.1	415.0	364.6	7.01	21.80
Foodgrains	4.09	283.6	278.7	257.8	1.76	10.01

SOURCE: Office of the Economic Adviser, M/O Commerce and Industry.

Procurement of Rice

The total procurement of rice in the current marketing season i.e 2016-2017, up to 31.10.2016 stood at 11.45 million tonnes, as against 8.66 million tonnes of rice procured, during the corresponding period of last year. The details are given in the following table:

PROCUREMENT OF RICE

(in Thousand Tonnes)

State	Marketing Season 2016-17 (upto 31.10.2016)		Corresponding Period of last Year 2015-16		Marketing Year (October-September) 2015-16		2014-15	
	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Andhra Pradesh	0	0.00	0	0.00	4326	12.65	3591	11.17
Chhatisgarh	0	0.00	0	0.00	3442	10.06	3423	10.64
Haryana	3243	28.31	2471	28.51	2861	8.36	2015	6.27
Maharashtra	0	0.00	0	0.00	230	0.67	199	0.62
Punjab	8124	70.92	5996	69.17	9350	27.33	7786	24.21

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Tamil Nadu	7	0.06	35	0.40	1191	3.48	1049	3.26
Uttar Pradesh	29	0.25	51	0.59	2910	8.50	1698	5.28
Uttarakhand	19	0.17	19	0.22	598	1.75	465	1.45
Others	33	0.29	96	1.11	9301	27.19	11936	37.11
Total	11455	100.00	8668	100.00	34209	100.00	32162	100.00

Source: Department of Food & Public Distribution.

Procurement of Wheat

The total procurement of wheat in the current marketing season i.e 2016-2017 up to June, 2016 is 22.93 million tonnes against a total of 27.89 million tonnes of wheat procured during last year. The details are given in the following table.

PROCUREMENT OF WHEAT

(in Thousand Tonnes)

State	Marketing Season 2016-17 (upto 30.06.2016)		Corresponding Period of last Year 2015-16		Marketing Year (April-March) 2015-16		2014-15	
	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Haryana	6722	29.32	6692	24.00	6778	24.13	6495	23.20
Madhya Pradesh	3990	17.40	7195	25.80	7309	26.02	7094	25.34
Punjab	10645	46.42	10346	37.10	10344	36.83	11641	41.58
Rajasthan	762	3.32	1300	4.66	1300	4.63	2159	7.71
Uttar Pradesh	802	3.50	2267	8.13	2267	8.07	599	2.14
Others	9	0.04	85	0.30	90	0.32	6	0.02
Total	22930	100.00	27885	100.00	28088	100.00	27994	100.00

Source: Department of Food & Public Distribution.

Commercial Crops

Oil Seeds and Edible Oils

The wholesale Price Index (WPI) of nine major oilseeds as a group stood at 212.1 in October, 2016 showing a decrease of 4.6% and 3.3% over the previous month and year respectively. The WPI of cotton seed increased by 1.1%, safflower (kardi seed) by 0.6% & copra (coconut) by 0.5% over the previous month. The WPI of soybean decreased by 10.1%, groundnut seed by 8.1%, gingelly seed by 2.9% , sunflower by 2.4% rape & mustard seed by1.7% and niger seed remain unchanged over the previous month.

The WPI of edible oils as a group stood at 157.2 in October, 2016 showing an increase of 0.2% and 4.6% over the previous month and year respectively. The WPI of cotton seed oil increased by 3.0%, soybean oil by 0.4% and sunflower oil by 0.1% over the previous month. The WPI of groundnut oil decreased by 3.0%, copra oil by 2.2%, gingelly oil by 0.5%, and mustard & rapeseed oil by 0.1% over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 265.6 in October, 2016 showing a decrease of 3.5% & 1.9% over the previous month and year respectively.

Potato

The WPI of potato stood at 284.7 in October, 2016 showing a decrease of 5.1% over the previous month and increase of 60.6% over the year.

Onion

The WPI of onion stood at 218.6 in October, 2016 showing a decrease of 5.3% and 66.0% over the previous month and year respectively.

Condiments & Spices

The WPI of condiments & spices (group) stood at 352.7 in October, 2016 which shows a decrease of 0.8% and an increase of 1.7% over the previous month and year respectively. The WPI of chillies (dry) increased by 0.9% over the previous month. The WPI of black pepper & turmeric decreased by 0.7%, and 0.2% respectively over the previous month.

Raw Cotton

The WPI of raw cotton stood at 222.0 in October, 2016 showing a decrease of 4.8% over the previous month and an increase of 20.7% over the previous year.

Raw Jute

The WPI of raw jute stood at 411.7 in October, 2016 showing a increase of 0.1% & 2.7% over the previous month and year.

WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

Commodity	Latest	Month	Year	% Variation Over	
	October, 2016	September, 2016	October, 2015	Month	Year
OIL SEEDS	212.1	222.4	219.3	-4.6	-3.3
Groundnut Seed	249.5	271.5	240.5	-8.1	3.7
Rape & Mustard Seed	237.7	241.8	232.4	-1.7	2.3
Cotton Seed	229.2	226.6	215.5	1.1	6.4
Copra (Coconut)	120.8	120.2	146.7	0.5	-17.7
Gingelly Seed (Sesamum)	313.9	323.2	304.8	-2.9	3.0
Niger Seed	321.9	321.9	354.1	0.0	-9.1
Safflower (Kardi Seed)	157.7	156.8	146.8	0.6	7.4
Sunflower	191.1	195.7	195.2	-2.4	-2.1
Soyabean	180.9	201.3	220.3	-10.1	-17.9
EDIBLE OILS	157.2	156.9	150.3	0.2	4.6
Groundnut Oil	216.0	222.7	197.2	-3.0	9.5
Cotton Seed Oil	203.7	197.7	186.6	3.0	9.2
Mustard & Rapeseed Oil	186.1	186.2	188.3	-0.1	-1.2
Soyabean Oil	154.3	153.7	147.9	0.4	4.3
Copra Oil	135.2	138.3	149.3	-2.2	-9.4
Sunflower Oil	135.6	135.4	134.7	0.1	0.7
Gingelly Oil	185.1	186.0	163.4	-0.5	13.3
FRUITS & VEGETABLES	265.6	275.1	270.8	-3.5	-1.9
Potato	284.7	300.0	177.3	-5.1	60.6
Onion	218.6	230.8	642.3	-5.3	-66.0
CONDIMENTS & SPICES	352.7	355.7	346.8	-0.8	1.7
Black Pepper	737.0	742.1	735.8	-0.7	0.2
Chillies(Dry)	397.8	394.1	365.2	0.9	8.9
Turmeric	242.0	242.5	246.6	-0.2	-1.9
Raw Cotton	222.0	233.3	183.9	-4.8	20.7
Raw Jute	411.7	411.1	400.9	0.1	2.7

STATISTICAL TABLES

WAGES

1. DAILY AGRICULTURAL WAGES IN SOME STATES (CATEGORY-WISE)

(In Rs.)

State	District	Centre	Month & Year	Daily Normal Working Hours	Field Labour		Other. Agri Labour		Herdsman		Skilled Labour		
											Carpenter	Black Smith	Cobbler
					M	W	M	W	M	W	M	M	M
Andhra Pradesh	Krishna	Ghantasala	Dec,15	8	200	200	300	NA	250	NA	300	NA	NA
	Guntur	Tadikonda	Dec,15	8	270	218	275	NA	225	NA	NA	NA	NA
Telangana	Ranga Reddy	Arutala	Feb, 16	8	350	269	NA	NA	NA	NA	350	300	NA
Karnataka	Bangalore	Harisandra	May, 16	8	375	360	400	305	400	305	600	400	NA
	Tumkur	Gidlahali	Nov, 15	8	180	170	180	NA	NA	NA	200	190	NA
Maharashtra	Nagpur	Mauda	Sep, 14	8	100	80	NA	NA	NA	NA	NA	NA	NA
	Ahmednagar	Akole	Sep, 14	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jharkhand	Ranchi	Gaitalsood	March,14	8	120	120	100	100	75	75	200	200	NA

1.1 DAILY AGRICULTURAL WAGES IN SOME STATES (OPERATION-WISE)

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily working Hours	Ploughing	Sowing	Weeding	Harvest-ing	Other Agri Labour	Herds-man	Skilled Labour		
												Carpenter	Black Smith	Cobbler
Assam	Barpeta	Laharapara	May, 16	M	8	300	250	250	250	250	200	350	300	250
				W	8	NA	200	200	200	200	NA	NA	NA	NA
Bihar	Muzaffarpur	Bhalui Rasul	June,16	M	8	300	300	300	300	300	300	400	400	NA
				W	8	NA	300	NA	NA	300	NA	NA	NA	NA
	Shekhpura	Kutaut	June,16	M	8	250	NA	225	100	NA	NA	500	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chhattisgarh	Dhamtari	Sihava	July,16	M	8	NA	NA	170	NA	150	150	250	200	250
				W	8	NA	NA	150	NA	100	100	NA	NA	150
Gujarat*	Rajkot	Rajkot	Sep, 15	M	8	215	205	163	180	150	188	450	450	360
				W	8	NA	175	150	175	135	117	NA	NA	NA
	Dahod	Dahod	Sep,15	M	8	180	160	160	160	130	NA	260	210	210
				W	8	NA	160	160	160	130	NA	NA	NA	NA
Haryana	Panipat	Ugarakheri	Mach, 16	M	8	400	400	400	400	400	NA	NA	NA	NA
				W	8	NA	300	300	300	300	NA	NA	NA	NA
Himachal	Mandi	Mandi	June,16	M	8	NA	182	182	182	182	182	300	300	NA
Pradesh				W	8	NA	182	182	182	182	182	NA	NA	NA
Kerala	Kozhikode	Koduvally	March,16	M	4-8	1290	675	NA	675	1008	NA	825	NA	NA
				W	4-8	NA	NA	475	575	550	NA	NA	NA	NA
	Palakkad	Elappally	March,16	M	4-8	NA	500	NA	500	467	NA	600	NA	NA
				W	4-8	NA	NA	300	300	300	NA	NA	NA	NA
Madhya	Hoshangabad	Sangarkhera	Sep, 16	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pradesh				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Satna	Kotar	Sep,16	M	8	200	200	200	200	200	200	300	300	300
				W	8	NA	200	200	200	200	200	NA	NA	NA
	Shyopurkala	Vijaypur	Sep,16	M	8	NA	300	300	300	300	NA	300	300	NA
				W	8	NA	300	300	300	NA	NA	NA	NA	NA

1.1. Daily Agricultural Wages in Some States (Operation-wise) - *Contd.*

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily working Hours	Ploughing	Sowing	Weeding	Harvest-ing	Other Agri. Labour	Herds-man	Skilled Labour		
												Carpenter	Black Smith	Cobbler
Odisha	Bhadrak	Chandbali	April, 16	M	8	300	NA	NA	300	300	300	350	300	250
				W	8	NA	NA	NA	200	200	200	NA	NA	NA
	Ganjam	Aska	March, 16	M	8	300	200	200	250	300	NA	400	400	200
				W	8	NA	100	100	200	200	200	NA	NA	NA
Punjab	Ludhiyana	Pakhowal	Nov, 15	M	8	395	NA	395	395	380	100	400	400	200
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rajasthan	Barmer	Kuseep	Aug,15	M	8	NA	NA	300	NA	NA	300	700	500	NA
				W	8	NA	NA	200	NA	NA	200	NA	NA	NA
	Jalore	Sarnau	Aug,15	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tamil	Thanjavur	Pulvarnatham	June, 16	M	8	NA	343	NA	355	344	NA	NA	NA	NA
Nadu*				W	8	NA	NA	110	133	128	NA	NA	NA	NA
	Tirunelveli	Malayakulam	June, 16	M	8	NA	350	375	400	491	NA	NA	NA	NA
				W	8	NA	NA	171	180	329	NA	NA	NA	NA
Tripura	State Average		June, 15	M	8	294	280	280	281	279	295	328	291	297
				W	8	NA	216	218	216	215	225	NA	NA	NA
Uttar Pradesh*	Meerut	Ganeshpur	Sep,16	M	8	250	250	261	250	256	NA	377	NA	NA
				W	8	NA	200	215	200	215	NA	NA	NA	NA
	Aurraiya	Aurraiya	Sep,16	M	8	170	175	150	235	171	NA	350	NA	.NA
				W	8	NA	NA	150	235	171	NA	NA	NA	NA
	Chandauli	Chandauli	Sep,16	M	8	200	200	200	NA	200	NA	400	NA	NA

M-Man
W-Woman
NA- Not Available
* States reported district average daily wages

2. WHOLESALE PRICES OF CERTAIN AGRICULTURAL COMMODITIES AND ANIMAL HUSBANDRY PRODUCTS AT SELECTED CENTRES IN INDIA

Commodity	Variety	Unit	State	Centre	Oct-16	Sep-16	Oct-15
Wheat	PBW 343	Quintal	Punjab	Amritsar	1700	1700	1600
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1640	1660	1590
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1744	1780	1535
Jowar	-	Quintal	Maharashtra	Mumbai	2500	2350	2300
Gram	No III	Quintal	Madhya Pradesh	Sehore	9200	9150	4370
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1330	1440	1285
Gram Split	-	Quintal	Bihar	Patna	8550	8550	6200
Gram Split	-	Quintal	Maharashtra	Mumbai	12300	10750	6500
Arhar Split	-	Quintal	Bihar	Patna	11000	11000	15500
Arhar Split	-	Quintal	Maharashtra	Mumbai	9100	8350	14750
Arhar Split	-	Quintal	NCT of Delhi	Delhi	9675	9775	12500
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	11200	11400	14000
Gur	-	Quintal	Maharashtra	Mumbai	4050	4100	3000
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4600	4600	4000
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2810	3000	2500
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	4325	4375	4050
Mustard Seed	Black	Quintal	West Bengal	Raniganj	4650	4700	5100
Mustard Seed	-	Quintal	West Bengal	Kolkata	4850	5000	5400
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	6500	6530	4380
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	4630	4900	4020
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	2500	2600	2100
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	2500	2500	2300
Castor Seed	-	Quintal	Telangana	Hyderabad	3300	3325	3700
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	8530	9020	13565
Copra	FAQ	Quintal	Kerala	Alleppey	6500	6400	7150
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	5500	5500	4500
Groundnut	-	Quintal	Maharashtra	Mumbai	8000	8400	5800
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1470	1474	1440
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1550	1585	1755
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	1570	1900	1395
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1935	2010	1845
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1545	1541	1414
Castor Oil	-	15 Kg.	Telangana	Hyderabad	1125	1125	1200
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	1485	1495	1375
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2205	2205	1725
Coconut Oil	-	15 Kg.	Kerala	Cochin	1410	1380	1530
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2550	2260	2160
Groundnut Cake	-	Quintal	Telangana	Hyderabad	3714	4000	3929
Cotton/Kapas	NH 44	Quintal	Andhra Pradesh	Nandyal	4800	5500	3950
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	3800	3875	4800

2. Wholesale Prices of Certain Agricultural Commodities and Animal Husbandry Products at Selected Centres in India - *contd.*

Commodity	Variety	Unit	State	Centre	Sep-16	Aug-16	Sep-15
Jute Raw	W 5	Quintal	West Bengal	Kolkata	3800	3875	4750
Oranges	-	100 No	NCT of Delhi	Delhi	NA		650
Oranges	Big	100 No	Tamil Nadu	Chennai	NT	NT	500
Banana	-	100 No.	NCT of Delhi	Delhi	375	420	333
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	505	520	505
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	80000	80000	80000
Almonds	-	Quintal	Maharashtra	Mumbai	70000	80000	95000
Walnuts	-	Quintal	Maharashtra	Mumbai	70000	55000	80000
Kishmish	-	Quintal	Maharashtra	Mumbai	11000	11000	23000
Peas Green	-	Quintal	Maharashtra	Mumbai	3400	3400	4100
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	1650	1760	1650
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	1300	1500	2500
Cauliflower	-	100 No.	Tamil Nadu	Chennai	1500	1600	2200
Potato	Red	Quintal	Bihar	Patna	1400	1550	850
Potato	Desi	Quintal	West Bengal	Kolkata	1580	1620	730
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	2200	2417	
Onion	Pole	Quintal	Maharashtra	Nashik	550	400	3100
Turmeric	Nadan	Quintal	Kerala	Cochin	15500	15500	12500
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	8400	8500	8000
Chillies	-	Quintal	Bihar	Patna	9500	9500	9400
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	65000	65000	66000
Ginger	Dry	Quintal	Kerala	Cochin	14500	15000	20000
Cardamom	Major	Quintal	NCT of Delhi	Delhi	130500	130000	130000
Cardamom	Small	Quintal	West Bengal	Kolkata	105000	100000	105000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	3800	3800	3600
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	34017	34684	32016
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	46000	46000	47000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	37150	36300	35450
Fish	Rohu	Quintal	NCT of Delhi	Delhi	11500	11000	9500
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	34500	34500	32000
Eggs	Madras	1000 No.	West Bengal	Kolkata	4250	4000	4000
Tea	-	Quintal	Bihar	Patna	21200	21200	21100
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	34000	34000	33000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	26000	26500	31000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	15500	16000	13500
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	—	—	4450
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	—	—	3510
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13500	13200	NA
Rubber	-	Quintal	Kerala	Kottayam	10200	10000	10400
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	32700	32700	31500

3. Month end Wholesale Prices of Some Important Agricultural Commodities in International Markets during Year 2016

Commodity	Variety	Country	Centre	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
CARDAMOM	Guatmala Bold Green	U.K.	-	Dollar/MT	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00
				Rs./Qtl	61281.00	61542.00	60210.00	59796.00	60255.00	60516.00	60309.00	60309.00	60138.00	60210.00
CASHEW KERNELS	Spot U.K. 320s	U.K.	-	Dollar/MT	8350.09	8143.20	8333.00	9184.69	9568.85	9560.20	9620.02	8629.11	10342.18	10479.17
				Rs./Qtl	56855.76	55683.20	55747.77	61023.08	64063.45	64282.78	64463.75	57823.67	69106.45	70105.65
CASTOR OIL	Any Origin ex tank Rotterdam	Netherlands	-	Dollar/MT	1374.00	1244.70	1244.70	1244.70	1274.70	1249.90	1249.90	1335.00	1439.70	1439.00
				Rs./Qtl	9355.57	8511.26	8327.04	8269.79	8534.12	8404.33	8375.58	8945.84	9620.08	9626.91
CHILLIES	Birds eye 2005 crop	Africa	-	Dollar/MT	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00
				Rs./Qtl	27916.90	28035.80	27429.00	27240.40	27449.50	27568.40	27474.10	27474.10	27396.20	27429.00
CLOVES	Singapore	Madagascar	-	Dollar/MT	8650.00	8650.00	8650.00	8700.00	8750.00	8750.00	8900.00	8250.00	8250.00	8000.00
				Rs./Qtl	58897.85	59148.70	57868.50	57802.80	58581.25	58835.00	59638.90	55283.25	55126.50	53520.00
COCONUT OIL	Crude Phillipine/Indonesia,	Netherlands	-	Dollar/MT	1155.00	1255.00	1545.00	1535.00	1430.00	1600.00	1500.00	1610.00	1475.00	1515.00
	cif Rotterdam			Rs./Qtl	7864.40	8581.69	10336.05	10198.54	9573.85	10758.40	10051.50	10788.61	9855.95	10135.35
COPRA	Phillipines cif Rotterdam	Phillipine	-	Dollar/MT	687.50	714.50	811.00	813.00	767.00	798.50	797.00	818.00	789.00	795.50
				Rs./Qtl	4681.19	4885.75	5425.59	5401.57	5135.07	5369.11	5340.70	5481.42	5272.10	5321.90
CORRIANDER		India	-	Dollar/MT	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	1650.00	1650.00	1650.00
				Rs./Qtl	13618.00	13676.00	13380.00	13288.00	13390.00	13448.00	13402.00	11056.65	11025.30	11038.50
CUMMIN SEED		India	-	Dollar/MT	2200.00	2200.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00
				Rs./Qtl	14979.80	15043.60	16725.00	16610.00	16737.50	16810.00	16752.50	16752.50	16705.00	16725.00
GROUNDNUT OIL	Crude Any Origin cif Rotterdam	U.K.	-	Dollar/MT	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00
				Rs./Qtl	8170.80	8205.60	8028.00	7972.80	8034.00	8068.80	8041.20	8041.20	8018.40	8028.00
MAIZE		U.S.A.	Chicago	C/56 lbs	369.25	359.75	368.50	380.75	404.75	393.00	335.75	327.50	329.25	354.00
				Rs./Qtl	988.09	966.77	968.85	994.17	1064.95	1038.52	884.20	862.47	864.62	930.73
OATS		CANADA	Winnipeg	Dollar/MT	283.14	250.42	250.99	247.92	244.91	263.38	314.33	221.77	214.72	281.80
				Rs./Qtl	1927.90	1712.37	1679.12	1647.18	1639.67	1770.97	2106.33	1486.08	1434.76	1885.24
PALM KERNAL OIL	Crude Malaysia/Indonesia,	Netherlands	-	Dollar/MT	890.00	1030.00	1320.00	1285.00	1200.00	1410.00	1350.00	1505.00	1410.00	1390.00
	cif Rotterdam			Rs./Qtl	6060.01	7043.14	8830.80	8537.54	8034.00	9480.84	9046.35	10085.01	9421.62	9299.10
PALM OIL	Crude Malaysian/Sumatra,	Netherlands	-	Dollar/MT	575.00	637.50	705.00	710.00	717.50	710.00	655.00	775.00	740.00	750.00
	cif Rotterdam			Rs./Qtl	3915.18	4359.23	4716.45	4717.24	4803.66	4774.04	4389.16	5193.28	4944.68	5017.50
PEPPER (Black)	Sarawak Black lable	Malaysia	-	Dollar/MT	10000.00	10000.00	10000.00	10000.00	10200.00	10200.00	10200.00	10200.00	8200.00	8200.00
				Rs./Qtl	68090.00	68380.00	66900.00	66440.00	68289.00	68584.80	68350.20	68350.20	54792.40	54858.00
RAPESEED	Canola	CANADA	Winnipeg	Can Dollar/MT	481.20	460.70	469.50	499.50	524.80	480.00	453.90	468.80	464.20	510.20
				Rs./Qtl	2334.78	2298.89	2378.02	2643.85	2707.97	2515.20	2312.62	2432.60	2358.14	2549.98
	UK delivered rapeseed,	U.K.	-	Pound/MT	247.00	247.00	245.00	245.00	245.00	232.00	252.00	252.00	255.00	250.00
	delivered Erith(buyer)			Rs./Qtl	2415.66	2352.43	2314.03	2378.22	2405.66	2271.05	2222.39	2227.93	2208.81	2035.75
RAPESEED OIL	Refined bleached and deodorised	U.K.	-	Pound/MT	660.00	614.00	615.00	658.00	602.00	602.00	594.00	594.00	670.00	726.00
	ex-tanks,broker price			Rs./Qtl	6454.80	5847.74	5808.68	6387.21	5911.04	5892.98	5238.49	5251.55	5803.54	5947.39
SOYABEAN MEAL	UK produced 49% oil & protein ('hi-pro') ex-mill seaforth UK bulk	U.K.	-	Pound/MT	248.00	255.00	249.00	291.00	342.00	325.00	331.00	314.00	295.00	322.00
				Rs./Qtl	2425.44	2428.62	2351.81	2824.74	3358.10	3181.43	2919.09	2776.07	2555.29	2622.05
SOYABEAN OIL		U.S.A.	-	C/lbs	30.87	30.92	33.36	33.62	31.34	31.55	29.53	33.57	32.64	35.72
				Rs./Qtl	4632.67	4659.94	4918.85	4923.10	4624.46	4675.61	4361.29	4957.95	4806.93	5266.83
	Refined bleached and	U.K.	-	Pound/MT	618.00	639.00	650.00	616.00	590.00	596.00	653.00	714.00	714.00	786.00
	deodorised ex-tanks,broker price			Rs./Qtl	6044.04	6085.84	6139.25	5979.51	5793.21	5834.24	5758.81	6312.47	6184.67	6400.40

3. Month end Wholesale Prices of Some Important Agricultural Commodities in International Markets during Year 2016

Commodity	Variety	Country	Centre	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
SOYABEANS		U.S.A.	-	C/60 lbs	883.00	867.50	905.25	1019.00	1085.50	1137.50	1010.50	1030.75	945.50	1010.00
				Rs./Qtl	2206.53	2177.03	2222.60	2484.68	2667.14	2807.02	2485.09	2534.89	2318.64	2479.78
	US NO.2 yellow	Netherlands	Chicago	Dollar/MT	377.20	372.90	385.60	409.20	426.00	456.40	412.00	420.90	397.10	407.90
				Rs./Qtl	2568.35	2549.89	2579.66	2718.72	2852.07	3068.83	2760.81	2820.45	2653.42	2728.85
SUNFLOWER SEED OIL	Refined bleached and deodorised ex-tanks,broker price	U.K.	-	Pound/MT	674.00	720.00	720.00	720.00	720.00	720.00	746.00	748.00	781.00	838.00
				Rs./Qtl	6591.72	6857.28	6800.40	6989.04	7069.68	7048.08	6578.97	6613.07	6765.02	6839.76
Wheat		U.S.A.	Chicago	C/60 lbs	476.50	442.75	463.00	474.25	466.00	458.75	414.75	404.00	403.25	411.50
				Rs./Qtl	1190.73	1111.10	1136.77	1156.39	1144.99	1132.06	1019.98	993.54	988.89	1010.33

Source - Public Ledger

Foreign Exchange Rates

Currency	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
CanDollar	48.52	49.90	50.65	52.93	51.60	52.40	50.95	51.89	50.80	49.98
UKPound	97.80	95.24	94.45	97.07	98.19	97.89	88.19	88.41	86.62	81.43
USDollar	68.09	68.38	66.90	66.44	66.95	67.24	67.01	67.01	66.82	66.90

Crop Production

4. Sowing and Harvesting Operations Normally in Progress During January, 2017

State	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Summer Rice, Ragi, (R), Small Millets (R) other Rabi, Pulses, Sugarcane, Onion	Winter Rice, Jowar (K), Maize (R), Ragi, (K), Tur (K), Urad (K), Mung (K), Winter Potato (Plains), Sugar cane, Groundnut, Castorseed, Cotton, Mesta, Sweet Potato, Garlic.
Assam Bihar		Winter Rice, Winter Potato, Sugarcane, Sesamum, Cotton.
Bihar	Summer Rice, Winter Potato (Plains), Sugarcane	Winter Potato (Plains), Sugarcane, Groundnut, Rapeseed & Mustard, Linsed.
Gujarat	Sugarcane	Small Millets (R), Tur (K), Sugarcane Ginger, Chillies, Tobacco, Castorseed, Cotton, Turmeric
Himachal Pradesh	Winter Potato (Hills), Onion	—
Jammu & Kashmir	Onion	Winter Potato, Chillies (Dry).
Karnataka	Summer Rice, Ragi (R), Urad, Mung (R) Potato (Plains) Sugarcane	Winter Rice, Jowar (R), Bajra (K), Ragi (K), Wheat, Barley, Small Millets (K), Gram, Tur (K), Mung (K), Other Kharif Pulses Potats (Plains) Sugarcane Black Pepper, Chillies (Dry) Tobacco Castorseed, Rapeseed & Mustard, Linseed, Cotton, Mesta, Sweet Potato, Turmeric, Kardiseed, Tapioca.
Kerala	Summer Rice, Sugarcane, Sesamun (3rd Crop)	Winter Rice, Ragi, Tur, (K) Other Kharif Pulses, (Kulthi), Urad (R) Other Rabi Pulses, Sugarcans, Ginger, Black Pepper, Seamum (2nd Crops) Sweet, Potato, Turmeric, Tapioca.
Madhya Pradesh	Sugarcane, Onion	Jowar (K), Small Millets (R), Tur (K), Urad (R) Mung (R), Other Rabi, Pulses, Sugarcane, Ginger, Chillies (Dry), Tabacco, Castorseed, Rapeseed & Mustard, Cotton, Mesta, Sweet Potato, Turmeric, Sannhemp.
Maharashtra	Sugarcane	Winter Rice, Jowar Gram, Urad (R) Mung (R), Sugarcane, Chillies (Dry), Tobacco, Cotton Turmeric, Sannhemp.
Orissa	Summer Rice, Chillies (Dry).	Winter Rice, Winter Potato (Plains), Sugarcane, Chillies (Dry), Tobacco, Castorseed, Nigerseed.
Punjab and Haryana	Potato, Tabacco, Onion.	Potato, Sugarcane, Sweet Potato.
Rajasthan	Sugarcane, Tobacco	Tur (K), Winter Potato (Plains), Sugarcane, Chillies (Dry).
Tamil Nadu	Winter Rice, Jowar (R), Sugarcane, Tur (R), Tobacco, Groundnut, Sesamum, Onion, Bajra (R)	Rice, Jowar (K), Bajra (K), Ragi, Small Millets (K) Gram, Tur (K) Urad (K) Mung (K), Other Kharif Pulses Winter Potato (Hills), Sugarcane, Black Pepper, Groundnut, Castorseed, Sesamum, Cotton, Turmeric, Onion.
Tripura	Summer Rice	Winter Rice Gram, Winter Potato (Plains), Sugarcane, Rapeseed & Mustard, Sweet Potato.
Uttar Pradesh	Summer Rice, Sugarcane, Jute Onion Tobacco (Late).	Tur (K), Winter Potato (Plains), Sugarcane, Tobacco (Early), Castorseed Rapeseed & Mustard, Cotton, Sweet, Potato, Turmeric, Tapioca.
West Bengal	Summer Rice, Sugarcane.	Tur (K), Urad (R), Mung (R) Other Rabi Pulses, Winter Potato (Plains), Sugarcane, Ginger, Chillies (Dry), Sesamum, Rapeseed & Mustard.
Delhi	Winter Potato (Plains) Onion	Summer Potato (Plains), Sugarcane, Chillies (Dry), Onion.
Andaman & Nicobar Inlands	—	Winter Rice.

(K)—Kharif (R)—Rabi

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