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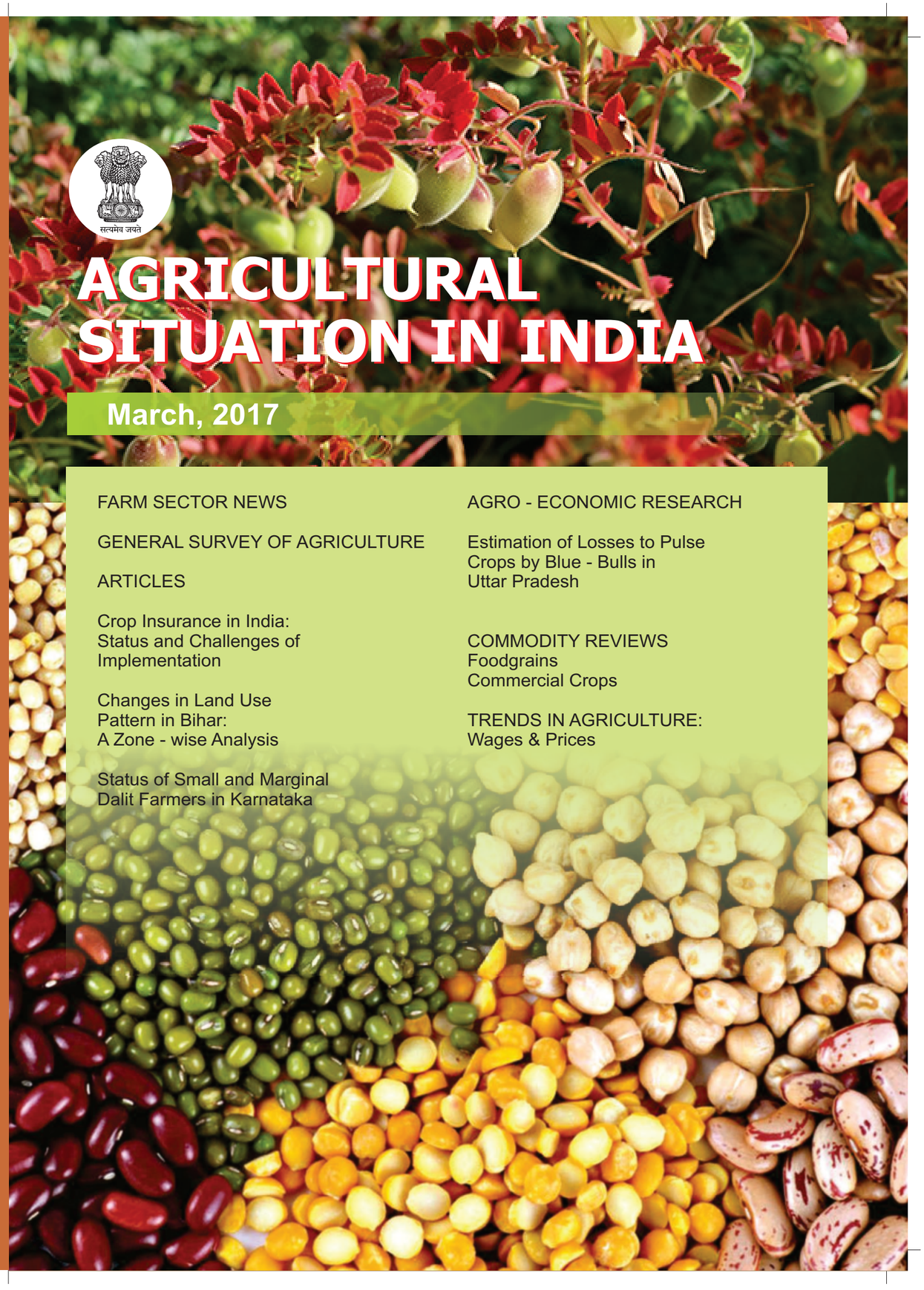

AGRICULTURAL SITUATION IN INDIA

March, 2017

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The Journal is brought out by the Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, it aims at presenting an integrated picture of the food and agricultural situation in india on month to month basis. The views expressed are not necessarily those of the Government of India.

Note to Contributors

Articles on the State of Indian Agriculture and allied sectors are accepted for publication in the Directorate of Economics & Statistics, Department of Agriculture, Cooperation & Farmers Welfare's monthly Journal "Agricultural Situation in India". The Journal intends to provide a forum for scholarly work and also to promote technical competence for research in agricultural and allied subjects. Good articles in Hard Copy as well as Soft Copy (agri.situation@gmail.com) in MS Word, not exceeding five thounsand words, may be sent in duplicate, typed in double space on one side of foolscap paper in Times New Roman font size 12, addressed to the Editor, Publication Division, Directorate of Economics and Statistics, M/o Agriculture & Farmers Welfare, C-1, Hutments Dalhousie Road, New Delhi-110 011 along with a declaration by the author(s) that the article has neither been published nor submitted for publication elsewhere. The author (s) should furnish their e-mail address, Phone No. and their permanent address only on the forwarding letter so as to maintain anonymity of the author while seeking comments of the referees on the suitability of the article for publication.

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Disclaimer: Views expressed in the articles and studies are of the authors only and may not necessarily represent those of Government of India.

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 3.15 out of 6. The score is effective from January, 2017 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

Agriculture Growth Rate of 4.1% shows that the government is working seriously for the betterment of the farmers and farming: Shri Radha Mohan Singh

Union Minister of Agriculture & Farmers Welfare, Shri Radha Mohan Singh said that this time it has become very clear again that the Central Government is working for the villages, the poor and farmers. Shri Singh further added that agriculture growth rate has increased from 2% to 4.1% and it shows that the government is working seriously for the betterment of the farmers and farming. The commitment of the Government to double the income of the farmer in 5 years has been under scored in this budget. Shri Singh said this in an informal talk with journalist in the Ministry. On this occasion, Union Agriculture Minister informed the journalist in detail the provision made for agriculture sector in the budget.

Shri Singh said that this budget manifests government's commitment to double the farmers income in a span of 5 years. Apart from this, provisions have been made to continue erstwhile schemes. Goals of White and Blue Revolution have been reiterated in this budget. Ambitious schemes have been chalked out to promote the agriculture sector in this budget. For instance, a sum of Rs. 9000 crores has been provided for Pradhan Mantri Fasal Bima Yojana resulting in the enhancement of crop security coverage to the farmers.

Agriculture & Farmers Welfare Minister said that this budget has provided security coverage to agriculture sector as well as farmers. The government has made up its mind to dig one million ponds. This is a praise worthy step. By providing irrigation and fisheries facilities through these ponds, this would help farmers to double their incomes. In the previous year, 5 lakh ponds have been built. Besides, this budget aims to provide 100 employment days to the farmers through MNREGA which is also a praise worthy step. To promote "per drop more crop", those areas would also be provided water for irrigation which were earlier deprived of this facility through long term irrigation fund.

Shri Singh informed that budgetary provision of Rs. 45,250 crore for the year 2016-17 was made for Ministry of Agriculture & Farmers Welfare which has now been increased by 15.31% to Rs. 51,026 crore for the year 2017-18. The Minister highlighted the following provisions of the Budget:

While accelerating the implementation of Pradhan Mantri Fasal Bima Yojana, 40% agricultural area will be brought under the scheme this year. It was 30% in the previous year. Similarly, it will be increased to 50% for the year 2018-19. During the previous year, there was a budget provision of Rs. 5.5 thousand crores which will be increased to Rs. 9000 crore during this year. Simultaneously, an additional sum of Rs. 7.7 thousand crores has also been provided during this year to meet the dues of previous year.

Soil Health Card - for all 648 KVKs, a provision has been made to establish mini soil testing labs. 1000 labs will be activated through local entrepreneurs. Loan related subsidy will be provided for this purpose by the government.

e-NAM - at present, 250 mandis are linked with e-NAM platform which will be increased to 585 mandis. For this purpose, each mandi will be provided assistance upto Rs. 75 lakhs for their basic infrastructures (sanity grading and packaging). In addition to this, it has also been suggested to denotify from APMC Act (Mandi Act) those commodities which are quickly perishable.

Dairy is a prominent part of agriculture economy. During year 2016-17, there was a budgetary provision of Rs. 1136 crore for White Revolution which has been increased by 43.8% in the form of Rs. 1634 crore for year 2017-18. Along with this, dairy processing and infrastructural fund will be set up with a sum of Rs. 8000 crore for the modernization of old milk processing units under Operation Flood. This will be completed within a period of 3 years. Initially it will be started with a sum of Rs. 2000 crores.

Blue Revolution is one of the priorities of the government. Keeping this in view, the budget provision of Rs. 247 crore for year 2016-17 has been increased by 62.35% amounting to Rs. 401 crore. The MNREGA was given an assurance to make 5 lakh ponds during last year to cope with the problem of drought prevailing in rural areas. During present year, 5 lakh new ponds would also be built up.

A sum of Rs. 5189 crore for Pradhan Mantri Krishi Sinchai Yojna has been increased to Rs.7377 crore. Besides a long term irrigation fund has been set up with a sum of Rs. 20,000 crore for irrigation scheme in previous financial

year concerned with NABARD. During this year, it would be doubled in the form of Rs. 40,000 crore.

Percentage of milk producers/farmers with bank accounts increased from 49.27% to 63.42% after demonetization

Consequent upon the Central Governments decisions of demonetization, certain unintended impacts have been observed especially in the sectors thriving upon sheer cash transactions. In this regard, non-availability of funds to the co-operative banks for making payments to Milk producers/ farmers by dairy co-operative against the milk supplied by them came to the notice of the Government.

Responding promptly to the prevailing situation of reported payment problems, the Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh regularly reviewed and directed to take appropriate action to alleviate the problems. Meetings with Mother Dairy, Gujarat Cooperative Milk Marketing Fed (GCMMF) / Amul, Delhi Milk Scheme and other State Co-operative Dairy Federations were taken at regular intervals.

In order to take stock of the prevailing situation, the Secretary, Animal Husbandry, Dairying and Fisheries, Shri Devendra Chaudhry accordingly convened a series of meetings and initiated actions for streamlining the payment system to Milk producers and even sale of milk to consumers through cashless transactions primarily.

GCMMF/Amul had been specifically directed to ensure 100% milk producers accounts to be opened by 30th December, 2016. Similarly, other co-operatives had been directed to ensure the opening of 100% accounts of milk producers/farmers by 30th January, 2017.

Specific instructions have been issued to all the agencies such as National Dairy Development Board, Mother Dairy, Delhi Milk Scheme and all state Dairy co-operative federations for ensuring direct payment to milk producer's bank account at the earliest. Low penetration of nationalized banks and co-operative bank accounts in rural areas need adequate financial support with appropriate safe guards. This department vides D.O. letters dated 06.12.2016 have taken up the matter with the Department of Economic Affairs and Reserve Bank of India to provide necessary funding support to the cooperative banks in rural areas with appropriate safeguard to protect the interest of milk producers and for timely payment of the milk supplied by them.

It is to be noted that there are 1.70 lakh Dairy Co-operative Societies (DCS) at village level having 1.6 crore milk producers affiliated with 218 milk unions. About 850 lakh litres per day Milk is procured totally, of which co-operative sector procures about 425 lakh litres per day and about 425 lakh litres per day is procured by private sector. The value of the milk procured by Village level DCS is to the tune of rupees 120 crore per day. For weekly and 10 days payment cycle, the substantive amount is to be disbursed to lakhs of milk producers spread over varied geographical areas.

Using the window of opportunity opened by the demonetization decision, it is high time to accelerate the opening of bank accounts of all those unbanked milk producers to make it cashless and digital sooner than later. Eventually, transparency in saving habits, financial enclosure etc. would benefit milk producers in multiple ways.

Steps taken to Promote Fisheries under the scheme of Blue Revolution

The Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture and Farmers Welfare under the Central Plan Scheme on Blue Revolution; Integrated Development and Management of Fisheries provides financial assistance to all State Governments and Union Territories including Lakshadweep for promoting fisheries Sector. The Blue Revolution Scheme, with its multi-dimensional activities, focuses mainly on increasing fisheries production and productivity from aquaculture and fisheries resources. Besides, the Administration of Lakshadweep is also implementing schemes for development of fisheries.

The Marine Products Export Development Authority (MPEDA), Ministry of Commerce & Industry convened a meeting of officials of Kerala State Cooperative Federation for Fisheries Development Ltd. (MATSYAFED), National Institute of Fisheries Post Harvest Technology and Training (NIFPHATT) and a representative exporter to explore the export prospects of tuna from Lakshadweep on 06-01-2017. One of the exporters had shown interest in setting up of tuna processing facility in Lakshadweep with the technical assistance from Japan. A team from the exporter side visited the Island during the second week of January, 2017. MPEDA offered all possible assistance in this regard.

BULL Mother Farms

Under Rashtriya Gokul Mission, all the bull mother farms available with State Governments and State Implementing Agencies/ State Livestock Development Boards are covered for modernization and strengthening of existing infrastructure.

Government has undertaken establishment of two National Kamdhenu Breeding Centres in the Country. An amount of Rs.25.00 Crore has been released to Madhya Pradesh for establishment of National Kamdhenu Breeding Centre in Itarsi, Hoshangabad in Northern region of India and Rs 25 crore has been released to Andhra Pradesh for establishment of National Kamdhenu Breeding Centre in Chintaladevi, Nellore in Southern region of India.

In order to complement and supplement efforts made by the State for strengthening infrastructure available at bull mother farms Government of India has undertaken following steps:

i) Replacement of poor genetic merit stock with high genetic merit bull mothers

ii) Modernization and strengthening of existing cattle sheds

iii) Replacement of agricultural implements for in-house fodder production.

Cooperation with Israel in Farm Sector

Since the signing of an Agreement for cooperation in the field of Agriculture held on 24.12.1993, the two sides met frequently and held several discussions. As a result, Phase-I (2010-2012) and Phase-II (2012-2015) of Indo-Israel Action Plan under the Agreement had been successfully completed. The two countries have since extended the Action Plan to Phase - III for the period 2015-2018. Under the Action Plan, 21 participating States were covered for cooperation in the field of energy efficient green houses, recycling of waste water for irrigation, Post Harvest Management for horticulture crops, training and visiting facilities in respective countries and private sector collaboration.

Facilities to Farmers

This Ministry has implemented various crop development schemes for increasing production and productivity of the crops in the country viz. National Food Security Mission(NFSM) on rice, wheat, pulses, coarse cereals and Commercial Crops (cotton, jute & sugarcane); Bringing Green Revolution to Eastern India (BGREI) and Crop Diversification Programme(CDP). Under these schemes, scientific crop production technologies are being promoted at the farmers' field through organization of cluster demonstrations and training of farmers with latest crop production technologies such as timely sowing, seed rate, recommended package of practices etc. for reduction in the cost of cultivation. At least 30% of the cluster demonstrations under NFSM and BGREI are being conducted by adopting cropping system approach to utilize the rice fallow area for pluses cultivation. Assistance is given to farmers on distribution of improved seeds/hybrids, farm implements/machines, irrigation devices, plant protection chemicals, bio pesticides for promoting Integrated Pest Management and soil ameliorants etc. through State Government. New initiatives like distribution of seed minikits of newer varieties of pulses free of cost, production of quality seed (breeder, foundation and certified seed), creation of seed hubs at SAU and KVKs, strengthening of bio-fertilizers and bio agent labs at SAUs/ ICAR Institute, technological demonstration by KVKs and enhancing up breeder seed production had been included under NFSM during 2016-17 for enhancing pulses production and productivity. The Commercial Crops (cotton/jute/sugarcane) primarily focus on cropping system approach for transfer of technology in the approved States. Besides, Crops Diversification Programme is being implemented in original green revolution states viz. Punjab, Haryana and in Western UP to diversify paddy area towards less water requiring crops like oilseeds, pulses, coarse cereal, agro-forestry and shifting of tobacco farmers to alternative crops/cropping system in tobacco growing States viz. Andhra Pradesh, Bihar, Gujarat, Karnataka, Maharashtra, Odisha, Tamil Nadu, Telangana, Uttar Pradesh and West Bengal.

Under NFSM and BGREI, there is provision of 'Cropping system based Training' of farmers which includes four sessions i.e. one before kharif and rabi season, one each during kharif and rabi season. Under this programme, training of trainers/farmers is imparted by Crop/Subject matter specialist of ICAR Institute/SAUs /KVKs and involves various crop management practices (agronomic and plant protection practices) including primary processing of produce, storage etc. and also to create awareness about the new high yielding varieties/hybrids and new practices. A group of 30 participants/farmers in each session and participants in all four sessions remain same. Central assistant of Rs. 14000/-per training (Rs. 3500/-per session) is made available.

ii) The Per Drop More Crop component of PMKSY is implemented with the objective of enhancing Water Use Efficiency. The scheme is farmer centric and assistance is provided to the farmers for adopting precision irrigation technologies and on farm water management practices. The scheme had been approved with an outlay of Rs. 50,000 Crore for a period of 5 years (2015-16 to 2019-20). During 2015-16, Rs. 7298.7 Crore were released under the above components of NMSA through all concerned implementing Ministries/ Departments.

iii) The Government is implementing "Strengthening and Modernization of Pest Management Approach in India" through 35 Central Integrated Pest Management Centres (CIPMCs) of directorate of Plant Protection Quarantine and Storage established across the country with an aim to promote Integrated Pest Management (IPM) approach. CIPMCs inter alia, produce biological agents for release in the fields, conserve natural bio-control agents, promote bio-pesticides as an alternative to chemical pesticides and advocate judicious and safe use of chemical pesticides as a last resort. These activities are implemented through Farmers Field Schools (FFSs), 2 days and 5 days training programmes and season long training program for State Agriculture Extension officers.

iv) National Mission on Oilseeds and Oil Palm (NMOOP) programme is under implementation since 2014-15. The various interventions of this Mission were implemented through the State Government. Under this

programme, the Transfer of Technology (TOT) component, the assistance is provided to states for conducting Farmers Training and Trainers Training programme, in which training is provided to the farmers and extension workers so that the farmers could avail the benefits of the NMOOP programme. An assistance of Rs. 24,000/- per training of 3 days for farmers and Rs. 36,000/- per training of 2 days for extension workers are available under NMOOP.

v) The Mission for Integrated Development of Horticulture (MIDH), envisages production and productivity improvement of horticulture crops like fruits (including Apple) and vegetables through various interventions. Activities such as production of planting material, vegetable seed production, coverage of area with improved cultivars, rejuvenation of senile orchards, protected cultivation, creation of water resources, adoption of Integrated Pest Management (IPM), Integrated Nutrient Management (INM), organic farming, including insitu generation of organic inputs are taken up for development of fruits and vegetables. Capacity buildings of farmers and technicians are also provided for adopting improved technologies. Scheme also envisages for creation of infrastructure for post harvest management (PHM) and marketing for better price realization of produce.

Under NHM/HMNEH of MIDH, subsidy is provided to the farm size limited to 4 ha in majority of the intervention. Also small and marginal farmers are mobilized to form FPO/FIG for aggregation and economies of scale. FPOs are eligible for financial assistance under MIDH.

Under MIDH, in certain components like cultivation of flowers in open field and horticulture mechanization, there is a provision to provide higher rate of assistance for small and marginal farmers for their upliftment.

vi) The Government has taken several steps to improve marketing facilities for farmers, which includes development of alternative marketing channels with private sector partnership through advocacy of reforms. Further, to enhance transparency in the transactions, price discovery and farmers' reach to large number of markets and buyers, the Government had launched a scheme called National Agriculture Market (e-NAM) on 14.04.2016. The scheme aims to create a unified agri-marketing portal for online trading of agri-produce. With online bidding, transparency and competition in APMC transactions is bound to increase. This scheme is farmer focussed and would help fetch better prices to the farmers for their produce. Capacity building and awareness campaigning for all stakeholders are done regularly.

Ministry of Agriculture & Farmers Welfare constituted a committee to achieve the target of doubling of income of farmers by March, 2022

In order to achieve the target of doubling of income of farmers by March, 2022, the Department of Agriculture, Cooperation and Farmers Welfare has constituted a Committee under the Chairmanship of Additional Secretary, for the following aspects:

i) To study the current income level of farmers/ agricultural labourers

ii) To measure the historical growth rate of the current income level

iii) To determine the needed growth rate to double the income of farmers/agricultural labourers by the year 2021-22

iv) To consider and recommend various strategies to be adopted to accomplish (iii) above

v) To recommend an institutional mechanism to review and monitor implementation to realise the goal

vi) To examine any other related issue.

To understand the impact of demonetization on farming sector, Indian Council of Agricultural Research (ICAR)-National Institute of Agricultural Economics and Policy Research (NIAP) conducted a short survey of farmers in few villages around Delhi under Mera Gaon Mera Gaurav (MGMG) initiative. Survey findings could not establish any significant adverse effect of demonetization on input availability, market arrivals of produce and area sown in Rabi season. As per preliminary reports received from the States, the total area sown under Rabi crops as on 27th January, 2017 stands at 637.34 lakh hectares as compared to 600.02 lakh hectares this time in 2016 indicating no significant impact of demonetization on Rabi sowing.

Centre is committed to the development & strengthening of the cooperatives sector: Shri Radha Mohan Singh

The Union Minister for Agriculture and Farmers Welfare, Shri Radha Mohan Singh said that cooperative societies have provided inputs like credit, fertilizer, seed and have established themselves in many fields of Indian economy such as dairy, banking, sugar, fertilizer, marketing, handloom, fisheries and housing. Shri Radha Mohan Singh said this at Golden Jubilee celebrations of Cooperative Institution, IFFCO in Motihari on 10th February, 2017. IFFCO is completing its 50 years of establishment on the 3rd November, 2017.

Shri Singh informed that IFFCO came into existence with only 57 cooperative societies in the year 1967-68 but, today, it is one of the largest cooperative societies of India. Now, it has more than 36,000 cooperative societies. Its business is spread over from general insurance to rural telecommunication apart from manufacturing and sale of manure. Agriculture Minister said that through its vast network, IFFCO is rendering its services to about 5.5 crores

of farmers. IFFCO has extended its international involvement through important memorandum of understanding and agreements for supply of raw materials to many international fertilizer industries. He said that IFFCO is working for the prosperity of the farmers after providing environment friendly and real time reliable, high quality agricultural products and services. IFFCO is implementing several schemes and programmes for their welfare.

Shri Singh further added that the present government of the centre is committed to the development and strengthening of the cooperatives. The government has formed NCDC keeping in view of the importance of cooperatives in rural economy and it caters to the several dimensions and necessity of the cooperatives. Agriculture Minister said that there are more than 249 million of members of cooperatives in India in which 6.10 lakh cooperative societies and more than 71% rural families are the members of the cooperatives. Cooperatives have provided direct and indirect employment to about 23.86 millions of people.

Shri Singh hoped on this occasion that the production of the farmers would increase from the profitable schemes of IFFCO and it would help to get them additional income. The Minister said that cooperative societies should be made strong democratically and by providing occupational services to the farm labourers, we would have to make the rural people strong. Agriculture Minister also praised the Managing Director of IFFCO, Dr. U.S. Awasthi and his team for the best efforts and assured every possible assistance to the IFFCO.

Pandit Deendayal Upadhyay Unnat Krishi Shiksha Scheme launched in the year 2016 to promote agricultural education under which 100 centres are being opened with a fund of Rs.5.35 crore: Shri Radha Mohan Singh

The Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh said that all courses upto Agricultural Graduate are being linked with employment and are being made profession oriented. This would be a big help for the students in earning their livelihood. Shri Radha Mohan Singh said that from last year, 5th Dean Report has been implemented in all the Agricultural Universities of the country and will be enforced from the academic session of 2016-17. Agriculture Minister gave this statement on 14th February, 2017, in the Annual Vice Chancellors and Directors Meeting organised in New Delhi. On this occasion, State Agriculture and Farmer Welfare Minister Shri Parshottam Rupala, Secretary, Department of Agriculture Research and Education & DG ICAR, Dr. Trilochan Mohapatra and all Vice Chancellors of the Agricultural Universities were present.

Shri Singh said that youth are the strength of this nation and it is imperative for the overall development of agriculture that these youth are attracted towards this sector. Therefore, Agricultural Universities and Research Institutes play a very important role. ICAR launched "Student Ready" scheme in this direction. In this scheme, from the year 2016-17, scholarship to the students had been increased from Rs. 1000 to Rs. 3000. Beside this, another scheme "ARYA" is also being implemented successfully. Pandit Deendayal Upadhyay Unnat Krishi Shiksha Scheme was launched in the year 2016 to promote agricultural education under which 100 centres are being opened with a fund of Rs.5.35 crore.

Shri Singh also informed that with the opening of new Universities and Colleges, many initiatives are being taken to promote agriculture education such as Rajendra Agricultural University, Pusa, Bihar has been upgraded to Rajendra Central Agricultural University, Pusa, Bihar and 4 new colleges have been opened under this University. One National Research Centre had been established on Integrated Agricultural System in Motihari, six new colleges had been opened in CAU, Imphal and with this, the number of colleges has been increased to 13. Four new colleges had been opened in Rani Laxmibai Central Agricultural University, Jhansi, Bundelkhand, out of which 2 are in Uttar Pradesh and 2 Colleges are in Madhya Pradesh.

Shri Singh also informed that IARI-Jharkhand has been established and students of the state are studying in various courses. To promote agriculture education in the north-east states of the country, land for IARI has been identified in Assam. An amount of Rs. 122.5 cr. each has been released for Acharya NG Ranga Agriculture University in Andhra Pradesh & SKTLSHU in Telengana. Agriculture Minister said that in the arena of International Co-operation, our relations with foreign Govts., foreign Universities, and International Bodies have been strengthened. A MoU has been signed for Establishing a BRICS Agriculture Platform (a Virtual Network). Agriculture Ministry of Afghanistan is providing assistance for establishing of Afghan National Science and Technology University (ANASTU) in Afghanistan. It is also providing assistance to establish Advance Centre for Agriculture Research and Education in Mayanmar. Similar cooperation is also being provided in the African Continent.

Shri Singh was very hopeful that with this Conference, PSP, viz. productivity, sustainability and profitability would be improved. Shri Radha Mohan Singh also said that it is necessary to take forward "Lab to Land Programme" and for this KVKs have a major role to play. Shri Singh said that to achieve the Govt's target of doubling the income of farmers, all the institutes of ICAR should emphasise on developing economically feasible models. It is necessary for the Institutes to work pro-actively in the area of digitization. In the end, Agriculture Minister appealed to all the representatives present in the Conference to work in synergy for research and education and to contribute fully in building a viable nation.

Total foodgrains production in the country is estimated at record 271.98 MT

The 2nd Advance Estimates of production of major crops for 2016-17 have been released by the Department of Agriculture, Cooperation and Farmers Welfare on 15th February, 2017. The assessment of production of different crops is based on the feedback received from States and validated with information available from other sources.

1. As per 2nd Advance Estimates, the estimated production of major crops during 2016-17 is as under:

   Foodgrains - 271.98 million tonnes (record)

   - Rice - 108.86 million tonnes (record)
   - Wheat - 96.64 million tonnes (record)
   - Coarse Cereals - 44.34 million tonnes (record)
   - Maize - 26.15 million tonnes (record)
   - Pulses - 22.14 million tonnes (record)
   - Gram - 9.12 million tonnes
   - Tur - 4.23 million tonnes (record)
   - Urad - 2.89 million tonnes (record)

   Oilseeds - 33.60 million tonnes (record)

   - Soyabean - 14.13 million tonnes
   - Groundnut - 8.47 million tonnes
   - Castorseed - 1.74 million tonnes

   Cotton - 32.51 million bales (of 170 kg each)

   Sugarcane - 309.98 million tonnes

2. As a result of very good rainfall during monsoon 2016 and various policy initiatives taken by the Government, the country has witnessed record foodgrain production in the current year. As per Second Advance Estimates for 2016-17, total Foodgrain production in the country is estimated at 271.98 million tonnes which is higher by 6.94 million tonnes than the previous record production of foodgrain of 265.04 million tonnes achieved during 2013-14. The current year's production is also higher by 14.97 million tonnes than the previous five years' (2011-12 to 2015-16) average production of Foodgrains. The current year's production is significantly higher by 20.41 million tonnes than the last year's foodgrain production.

3. Total production of rice is estimated at record 108.86 million tonnes which is also a new record. This year's rice production is higher by 2.21 million tonnes than previous record production of 106.65 million tonnes achieved during 2013-14. It is also higher by 3.44 million tonnes than the five years' average rice production of 105.42 million tonnes. Production of rice has increased significantly by 4.45 million tonnes than the production of 104.41 million tonnes during 2015-16.

4. Production of wheat, estimated at 96.64 million tonnes is also a record. This year's wheat production is higher than the previous record production of 95.85 million tonnes achieved during 2013-14. Production of wheat during 2016-17 is also higher by 4.03 million tonnes than the average wheat production. The current year's production is higher by 4.36 million tonnes as compared to wheat production of 92.29 million tonnes achieved during 2015-16.

5. Production of coarse cereals estimated at a new record level of 44.34 million tonnes is higher than the average production by 3.00 million tonnes. It is higher than the previous record production of 43.40 million tonnes achieved during 2010-11 by 0.94 million tonnes. Current year's production it is also higher by 5.82 million tonnes as compared to their production of 38.52 million tonnes achieved during 2015-16.

6. As a result of significant increase in the area coverage and productivity of all major pulses, total production of pulses during 2016-17 is estimated at 22.14 million tonnes which is higher by 2.89 million tonnes than the previous record production of 19.25 million tonnes achieved during 2013-14. Production of Pulses during 2016-17 is also higher by 4.50 million tonnes than their Five years' average production. Current year's production is higher by 5.79 million tonnes than the previous year's production of 16.35 million tonnes.

7. With an increase of 8.35 million tonnes over the previous year, total oilseeds production in the country is estimated at record level of 33.60 million tonnes. It is higher by 0.85 million tonnes than the previous record production of 32.75 million tonnes achieved during 2013-14. The production of oilseeds during 2016-17 is also higher by 4.34 million tonnes than the five year's average oilseeds production. The current year's production is significantly higher than the production of 25.25 million tonnes during 2015-16.

8. Production of sugarcane is estimated at 309.98 million tonnes which is lower by 38.46 million tonnes than the last year's production of 348.45 million tonnes.

9. Despite lower area coverage during 2016-17, higher productivity of cotton has resulted into

higher production of 32.51 million bales (of 170 kg each) as compared to 30.01 million bales during 2015-16.

10. Production of jute & mesta estimated at 10.06 million bales (of 180 kg each) is marginally lower than their production of 10.52 million bales during the last year.

Cabinet approved Establishment of Food Legumes Research Platform (FLRP) at Amlaha, Sehore, Madhya Pradesh with Satellite Hubs in West Bengal and Rajasthan by International Center for Agricultural Research in Dry Areas (ICARDA)

The Union Cabinet chaired by the Prime Minister Shri Narendra Modi approved:

1. The Establishment of Food Legumes Research Platform (FLRP) at Amlaha, Sehore, Madhya Pradesh with Satellite Hubs in West Bengal (for pulses) and Rajasthan (for Natural Resource Management) by ICARDA in the second phase; by International Center for Agricultural Research in Dry Areas (ICARDA);
2. Signing of lease deed with State Government of Madhya Pradesh for the land provided by them (70.99 hectares, 175.42 acre) at Amlaha Farm, Sehore on land rent of Rs. 1 per acre per year for 30 years on lease and to further lease it to ICARDA to establish the FLRP at Madhya Pradesh;
3. In principle approval of the Cabinet for conferring on the Food Legume Research Platform of ICARDA an international status as contemplated in Clause 3 of the United Nations (Privileges and Immunities) Act, 1947.
4. Authorizing the Department of Agricultural Research (DARE) on behalf of Government of India in all matters regarding establishment of the Platform.
5. Authorizing the Ministry of Agriculture to carry out technical modifications in the Supplementary Agreement signed between ICAR and ICARDA relating to establishment of FLRP, if required.

The establishment of FLRP in India would enable India to harness the best of international science in meeting the emerging food security challenges. India would be able to rapidly and effectively absorb the research output achieved in the country by FLRP. A major international R&D institution would make India an even bigger center for agricultural research in the world and this in turn, would attract further research & development investment in the country.

This is a research set up by an international organization. ICARDA has a good track record of innovation, as in climate resilient technologies including suitable food legume varieties for dry-land production systems. ICARDA would carry out research through a multi-disciplinary team of scientists for enhancing productivity of crops range-land and livestock. This platform would contribute significantly towards reducing poverty, improving food security, improving nutrition and health, and sustaining the natural resource base.

Government took many initiatives in the budget for the welfare of agriculture & for the prosperity of farmers: Shri Radha Mohan Singh

The Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh said that despite difficult challenges being faced by ICAR in its working period of 87 years, it has attained many achievements and these achievements are the milestones of progress of agriculture. Increase in production and income, development of institutes, human resources, development of new techniques, agriculture diversification are the areas in which ICAR has established new standards of success. Shri Radha Mohan Singh made this statement on 16th February, 2017, in the 88th AGM of ICAR Society in New Delhi.

On this occasion, Secretary, the Department of Agricultural Research and Education & DG, ICAR, Dr. Trilochan Mohapatra and distinguished members of Society and senior officers of ICAR were also present. Shri Singh said that Government is committed to double the income of farmers in five years. In this budget, holistic development of agriculture is the main focus in which to provide credit to farmers on affordable rates, assured supply of seeds and fertilisers, increase in irrigation facilities, increase in productivity through soil health cards, through E-nam assured market and providing profitable price has been emphasised.

Agriculture Minister said that for the progress of agriculture and prosperity of farmers, Government has made many initiatives in the budget, In comparison to the budget last year, in the budget of year 2017-18, the fund for rural, agriculture and allied sectors has been increased by 24%, it is now Rs. 1,87,223 crore. In the next financial year, it is estimated that the progress rate of agriculture sector will be 4.1%.

Shri Singh added that because of a good monsoon and policy initiatives by the government, there is a record production of food grains this year. As per the second advance estimate for the year 2016-17, there would be a total of 271.98 million tonnes production of food grains which is 6.94 million tonnes compared to last records (265.04 MT is 2013-14) 20.41 million tonnes higher than last year production.

Shri Singh infomed that during this rabi season in comparison to last year 2015-16, more sowing has been done viz. 7.7% in wheat, 12.96% in pulses and 12.69% in

oilseeds which is in total 6.86% more in comparison to last year. Agriculture Minister said that Indian agriculture scientists have played a major role developing research and technology and bringing green revolution, and thereby in the development of agriculture. Since 1951, production of food grains has increased five times, horticulture production by 9.5 times, Fisheries production by 12.5 times, milk production by 7.8 times and egg production by 3.9 times. This has made a considerable impact on national food nutritional security. Our scientists have major role in increasing the excellence of higher agriculture education.

Shri Singh said that in the International Pulse Year 2016, 150 seed herbs of pulses were established. Early maturing variety of moong "IPM 205-7(VIRAT)" had been released. The efforts for promoting research in agriculture sector have been remarkable in the last two and a half years. From the year 2012 to May, 2014, 261 new varieties of different crops were released and from of June, 2014 to December, 2016, 437 new varieties were released.

To increase International co-operation in the field of agriculture during October, 2016, in New Delhi with the help of coordination unit, one MoU had been signed for establishment of BRICS research platform in agriculture. This unit will be managed by DARE, GoI. Besides this, in the year 2016, 17 international collaborative projects had also been approved.

Shri Singh said that since agriculture is state subject, so State Agriculture Ministers have an important role in its progress. On this occasion Agriculture Minister appealed to all the representatives to develop scientists-state-farmer linkage and to work unitedly in coordination with centre for the prosperity of farmers and progress of agriculture.

Estimated production of major livestock products based on Integrated sample survey 2016-17 rainy season (July-October 2016)

The Integrated Sample Survey is a regular sample survey under taken on a general principle of 15% sample basis across the country. The sample Villages/Urban wards are selected from the entire rural and urban areas of States/ UTs and the survey is conduct by the States/UTs in three seasons. The list of latest Livestock Census villages constitutes the sampling frame. As per general principle, for the estimation of livestock numbers, 15% (5% for each season) of the villages/urban wards would be selected in the form of two independent sub-samples in a State for complete enumeration of livestock and poultry population by using Simple Random Sampling Without Replacement (SRSWOR). Subsequently, 5 samples would be selected from each of the sub-sample to carry out detailed survey for the estimation of yield rates. The number of sample would increase or decrease according to the number of villages in each district.

1. *Period of Survey* : The Survey period for rainy season was 1st July, 2016 to 31st October, 2016.

2. *Key Findings* : The key finding of the survey is summarised as under:

Milk Production: The total milk production increased from 52.21 Million Tonnes during 2015-16 (Rainy) to 54.50 Million Tonnes during 2016-17 (Rainy) registering a growth 4.38%. As against the targeted production of 163.74 Million Tonnes during 2016-17, the total estimated production in two seasons, summer and rainy, is 105.42 Million Tonnes showing an achievement of 64.38%. Further, as compared to previous year's (2015-16) rainy estimates, the average milk yield per day marginally improved for indigenous category of cows and buffaloes.The average yield rates of exotic and crossbred cows are estimated to be as 10.85Kgs and 7.40Kgs per animal per day respectively and the average yield rates of indigenous and non-descript cows are estimated to be as 3.56 Kgs and 2.29 Kgs per animals per day. The average yield rates of indigenous and non-descript buffaloes are estimated to be as 5.86Kgs and 4.04Kgs per animals per day, respectively.

The first five highest milk producing States are Uttar Pradesh, Rajasthan, Madhya Pradesh, Gujarat and Andhra Pradesh during the Rainy Season.

Egg Production: The total egg production increased from 27.33 Billion during 2015-16 (Rainy) to 29.09 Billion during 2016-17 (Rainy) registering a growth 6.42%. As against the targeted production of 87.05 Billions of eggs during 2016-17, the total estimated production in two seasons, summer and rainy, was 55.11 Billion showing an achievement of 63.31%. The production of egg is largely contributed by commercial poultry farms with nearly 75.75% and remaining production is from household/ backyard poultry. The first five highest eggs producing States are Tamil Nadu, Andhra Pradesh, Telangana , West Bengal & Haryana during the Rainy Season.

Meat Production: The total meat production increased from 2.24 Million Tonnes during 2015-16 (Rainy) to 2.43 Million Tonnes during 2016-17 (Rainy) registering a growth 8.74%. As against the targeted production of 7.37 Million Tonnes during 2016-17, the total estimated production in two seasons, summer and rainy, was 4.67 Million Tonnes showing an achievement of 63.28%. Nearly, 47.86% of the meat production were contributed by poultry and 20.11% is from buffaloes. The first five highest Meat producing States are Uttar Pradesh, Maharashtra, West Bengal, Andhra Pradesh, & Telangana during the Rainy Season.

Wool Production: The total wool production decreased from 5.91 Million Kgs during 2015-16 (Rainy) to 5.78 Million Kgs during 2016-17 (Rainy), a decline of 2.16%. As against the targeted production of 44.07 Million Kgs during 2016-17, the total estimated production in two seasons, summer and rainy, was 20.66 Million Kgs showing an achievement of 46.89%. The first five highest Wool

producing States are Karnataka, Gujarat, Maharashtra, Himachal Pradesh, & Jammu & Kashmir during the Rainy Season.

Good potential for cooperation with Norway in the field of dairying for increasing the yield of milk in India: Shri Radha Mohan Singh

Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh met H.E. Shri Jon Georg Dale, Norwegian Minister for Agriculture on 16th February, 2017, in New Delhi. On this occasion, Shri Singh said that India and Norway have traditionally close relations and our efforts will be to maintain the same in future. Shri Radha Mohan Singh further said that bilateral cooperation in fisheries between India and Norway has grown and there is ample potential for furthering relationship in this sector.

Shri Singh said that both countries can cooperate on developing and introduction of climate smart fishing techniques; to explore and develop technologies to capture underutilized fish resources; to increase the export of marine products. Shri Singh further said that Norway may also consider cooperation in the field of dairying for increasing the yield of milk in India.

The Agriculture Minister appreciated the research work being done on CLIMAWATER, CLIMARICE and ClimaAdapt in Andhra Pradesh, Telengana and Tamil Nadu states in India by Norwegian Institute of Bio-economy Research (NIBIO), Ministry of Agriculture. ClimaAdapt focuses on climate change in the Agriculture and water sectors. Shri Singh hoped that Norway may consider extending the research programme to other states also.

Shri Singh stated that India's trade in agricultural commodities with Norway in 2014-15 included US$ 17.65 million in exports which increased to US$25.57 million the next year. Imports were of the order of US$ 2.48 million in 2015-16. Both the countries can, however, do much more in bilateral trade.

India is a signatory of the Global Crop Diversity Trust since 2006 to ensure the long-term conservation and availability of plant genetic resources for food and agriculture to achieving global food security and sustainable agriculture. Accordingly, Government of India has deposited 25 accessions of pigeon pea (Arhar) to Svalbard Global Seed Vault in 2014 for safety duplication. GoI has now intended to deposit 100 accessions of Sorghum and 100 accessions of Paddy during the visit of Indian delegation in February, 2017.

Shri Singh stated that our Government put great focus on furthering relationships with likeminded countries, not only for catalyzing our trade and investment prospects but also sharing the knowledge that we have accumulated over the years with our friends. Shri Radha Mohan Singh hoped that Mr. Jon Georg Dale, Norwegian Minister for Agriculture's visit to India will set a milestone in achieving the objective of expanding and strengthening bilateral ties between the two countries in the Agriculture sector.

After that, Union Agriculture Minister inaugurated the retail sale counter of National Seeds Corporation in Krishi Bhawan. In order to match up with the government campaign to provide food items on affordable prize to common man, National Seed Corporation is now entering in to the production of Rice, Wheat Flour, Pluses, mustard oil, Besan, Dalia, Oats etc along with value addition to the Seeds which is not suitable for sowing. Corporation has opened the Retail Sale Counter in Krishi Bhawan. These products will be supplied to the customers at reasonable rates under "Farm Sona" Brand of the Corporation. Corporation not only increased its revenue but non-seed will be utilized and also the food product will be provided directly from 'farm to the kitchen' of the consumer.

Thereafter, Shri Singh inaugurated "Organic Cafeteria" in Krishi Bhawan to promote Organic farming. All food items in this "Organic Cafeteria" would be prepared from organically produced raw materials. This Cafeteria would be run by Sikkim State Co- operative Supply, and Marketing Federation Ltd. (SIMFED).

Final Estimate of 2015-16 & First Advance Estimates for 2016-17 of Area & Production of Horticulture Crops

The Department of Agriculture and Farmers Welfare released the Final Estimates: 2015-16 and First Advance Estimates of 2016-17, of area and production of horticulture crops. These estimates are based on the information received from different State/UTs in the country.

The following table summarizes the All-India Final Estimates: 2014-15, Final Estimates: 2015-16 & First Advance Estimates: 2016-17;

(*Area in '000 Ha, Production in '000 MT*)

Total Horticulture	2014-15 (Final)	2015-16 (Final)	2016-17 (First Advance Estimate)
Area	23410	24472	24369
Production	280986	286188	287323

Highlights : - 2015-16 (Final Estimates)

The total horticulture production of the country is estimated to be around 286 million tonnes during 2015-16 which is 2% higher than the previous year. Production of fruits is estimated to be 90 million tonnes which is 1% higher than the previous year. Production of vegetables is estimated to be around 169 million tonnes which is about 1.5% higher than the previous year. Production of spices is estimated to be around 7 million tonnes which is 14% higher than the previous year. Production of onion is estimated to be around 209 lakh tonnes which is 11% higher than the previous year. Production of potato is estimated to be around 434 lakh tonnes which is 10% lower than the previous year. Production of tomato is estimated to be around 187 lakh tonnes which is about 15 % higher than the previous year.

Highlights:- 2016-17 (First Advance Estimates)

The horticulture production of the country during 2016-17 is estimated to be around 287 million tonnes which is marginally higher as compared to 2015-16. Production of fruits is estimated to be 92 million tonnes which is about 2% higher than the previous year. Production of vegetables is estimated to be around 168.6 million tonnes which is marginally lower by 0.3% than the previous year. Production of spices is estimated to be around 7 million tonnes which is almost same as previous year. Production of onion is estimated to be around 197 lakh tonnes which is 6 % lower than the previous year, which was a bumper production year. However as compared to the past 5 year's average onion production, this is about 5% higher. Production of potato is estimated to be around 439 lakh tonnes which is 1% higher than the previous year. Production of tomato is estimated to be around 189 lakh tonnes which is about 1 % higher than the previous year.

Cabinet approved signing of an Agreement between India and Poland on cooperation in the field of agriculture and allied sectors

The Union Cabinet chaired by the Prime Minister Shri Narendra Modi gave its approval for signing of an Agreement between India and Poland on cooperation in the field of agriculture and allied sectors.

The agreement covers various activities in the field of agriculture and allied sector including exchange of information on the current situation in agriculture, the phytosanitary conditions of crops, threats posed by harmful organisms and the threats posed by animal infectious diseases. It also covers the participation in fairs, exhibitions, seminars and conferences related to agriculture and agri-food processing; undertaking and developing joint economic initiatives including the support or agrifood trade between the states of the Contracting Parties.

The Agreement provides for constitution of a Joint Working Group (JWG) comprising of representatives from both countries. The JWG will prepare plans of cooperation and to provide solutions to the problems arising during the implementation of the Agreement.

Shri Parshottam Rupala inaugurates NDDB's national workshop on improving feed production efficiency & quality control aspects of cattle feed plants.

The Union Minister of State for Agriculture & Farmers Welfare, Shri Parshottam Rupala said that agriculture is the back bone of rural economy in the country and dairying plays an important role in it. Even though India is the largest milk producer in the world, there is ample scope to improve per animal productivity. Shri Rupala stated it while inaugurating a National Workshop on Improving Feed Production Efficiency & Quality Control Aspects of Cattle Feed Plants organized by the National Dairy Development Board (NDDB) in Anand, on 28th February, 2017. Shri Dilip Patel, Member of Parliament, Shri Dilip Rath, Chairman, NDDB and Dr HPS Makkar, FAO, Rome graced the occasion. Around 200 cattle feed plant professionals from all over the country participated.

Shri Rupala said that with the increase in demand for milk, productivity of dairy animals should increase. It is time to refocus our efforts in providing good quality feed and mineral mixture and put up concerted efforts in promoting different variants of compound cattle feed for different categories of animals. For ensuring quality in feed production, we need to have qualified trained manpower, efficient plants and machinery and technical expertise to produce right type of feeds. Shri Rupala thanked NDDB for organizing this workshop to address all these issues with participation from dairy cooperatives all over the country. The Minister hoped that this workshop would discuss ways to achieve global standards in the feed production and requested NDDB to take benefit from budget allocation by Government of India for modernization of dairy technology.

Shri Parshottam Rupala also launched NDDB's Cattle Feed Knowledge Portal, an interactive knowledge platform on various aspects of compound cattle feed production. The portal will also have information on least cost formula for feeds, suppliers of feed ingredients, raw material specifications as well as a discussion forum to share information.

Shri Dilip Patel released a booklet titled Understanding Your Bovine. The booklet creates awareness on easily discernible signs of bovines so that corrective measures can be taken for management, feeding, health, hygiene practices, levels of discomfort etc, thereby avoid losses which at times could be disastrous.

While delivering the welcome address, Shri Dilip Rath, Chairman, NDDB said that India's model of milk production is based on feeding crop residues and agricultural by-products and using family labour to add value to resources which otherwise have limited alternative economic value. It is in this context that the role of compound cattle feed in animal nutrition to help support the increase in milk production becomes significant. The Chairman said that feeding balanced ration can help the milch animals produce milk commensurate with their genetic potential with the attendant benefits of lower cost, increased SNF, higher immunity to disease, improved reproductive efficiency and reduced methane emissions. In the absence of adequate quantity of quality green fodder, concentrate feeds provide bulk of essential nutrients in the diet of dairy animals.

The Chairman, NDDB informed that the dairy cooperative network produces about 3.6 million tonnes per annum with an installed capacity of about 5 million tonnes in 70 cattle feed plants. In addition the private sector produces an additional 4.5 million tonnes. A total of 8 million tonnes per annum is sufficient for only about 8 million of the more than 100 million breedable animals.

General Survey of Agriculure

Important Policy decisions taken during the month of February, 2017: The 2nd Advance Estimates of production of major crops for 2016-17 have been released by the Department of Agriculture, Cooperation and Farmers Welfare on 15th February, 2017. As per 2nd Advance Estimates, the estimates production of major crops during 2016-17 is as under:

- **Foodgrains**-271.98 million tonnes (record)
  - Rice-108.86 million tonnes (record)
  - Wheat-96.64 million tonnes (record)
  - Coarse Cereals-44.34 million tonnes (record)
  - Maize-26.15 million tonnes (record)
  - Pulses-22.14 million tonnes (record)
  - Gram-9.12 million tonnes (record)
  - Tur-4.23 million tonnes (record)
  - Urad-2.89 million tonnes (record)
- **Oilseeds**-33.60 million tonnes (record)
  - Soyabean-14.13 million tonnes
  - Groundnut-8.47 million tonnes
  - Cstor seed-1.74 million tonnes
- **Cotton-32.13 million bales (of 170 kg each)**
- **Sugarcane-309.98 million tonnes**

The estimated production of various crops as per the 2nd Advance Estimates for 2016-17 vis-a-vis the comparative estimates for the years 2003-04 onwards is given at Table I.

Trends in Foodgrain Prices

During the monh of January, 2017 the All India Index Number of Wholesale Price. (2004-05+100) of foodgrains decreased by 3.46 percent from 289.2 in December, 2016 to 279.2 in January, 2017.

The Wholesale Price Index (WPI) Number of cereals decreased by 0.27 percent from 255.6 to 254.9 ad WPI of pulses decreased by 12.01 percent from 447.1 to 393.4 during the same period.

The Wholesale Price Index Number of wheat decreased by 0.56 percent from 251.7 to 250.3 while that of rice decreased by 0.69 percent from 247.7 to 246.0 during the same period.

Railfall Situation

Cumulative Winter Season rainfall for the country as a whole during the period 01st January to 22nd February, 2017 has been 5% higher han the Long Period Average (LPA), Rainfall in the four broad geographical divisions of the country during he above period has been higher than LPA by 52% in North-West India but lower than LPA by 80% in Central India, 64% in East & North East India and 3% in Souh Peninsula.

Out of total 36 meteorological Sub-divisions, received large excess rainfall, 07 sub-divisions received excess/normal rainfall, 08 Sub-divisions received deficient rainfall, 12 sub-divisions received large deficient rainfall and 06 sub-divisions received no 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 (FRI). Current live storage in these reservoirs (as on 23rd February, 2017) is 68.74 BCM as against 52.36 BCM 23.02.2016 (last year) and 66.98 BCM of normal storage (average storage of last 10 years). Current year's storage is higher than the last year's storage by 31% and 3% higher than the normal storage.

Showing Position during Rabi 2016-17

As per 2nd Advance Estimaes for 2016-17, area sown under all rabi crops taken together has been 622.02 lakh hectares at All India level as compared on 610.44 lakh hectares during last year.

Area reported was higher by 10.9 lakh ha. under gram, 5.8 lakh ha. under rapeseed & mustard, 1.4 lakh ha. under barley but lower by 1.9 lakh ha. under wheat, 1.0 lakh ha. under rice, 7.5 lakh ha. under jowar and 1.2 lakh ha. under sunflower as compared to last year.

Agriculture Statistics Division
Directorate of Economics & Statistics
Department of Agriculture, Cooperation and Farmers Welfare
Second Advance Estimates of Production of Foodgrains for 2016-17

As on 15.02.2017

Million Tonnes

Crop	Season	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16		2016-17	
														2nd Advance Estimates	Final	Targets	2nd Advance Estimates
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Rice	Kharif	78.62	72.23	78.27	80.17	82.66	84.91	75.92	80.65	92.78	92.37	91.50	91.39	90.59	91.41	93.00	96.02
	Rabi	9.91	10.90	13.52	13.18	14.03	14.27	13.18	15.33	12.52	21.87	15.15	14.09	13.02	13.00	15.50	12.84
	Total	88.53	83.13	91.79	93.36	96.69	99.18	89.09	95.98	105.30	105.24	106.65	105.48	103.61	104.41	108.50	108.86
Wheat	Rabi	72.16	68.64	69.35	75.81	78.57	80.68	80.80	86.87	94.88	93.51	95.85	86.53	93.82	92.29	96.50	96.64
Jowar	Kharif	4.84	4.04	4.07	3.71	4.11	3.05	2.76	3.44	3.29	2.84	2.39	2.30	2.04	1.82	3.00	1.91
	Rabi	1.84	3.20	3.56	3.44	3.81	4.19	3.93	3.56	2.69	2.44	3.15	3.15	2.99	2.42	3.00	2.84
	Total	6.68	7.24	7.63	7.15	7.93	7.25	6.70	7.00	5.98	5.28	5.54	5.45	5.03	4.24	6.00	4.75
Bajra	Kharif	12.11	7.93	7.68	8.42	9.97	8.89	6.51	10.37	10.28	8.74	9.25	9.18	8.47	8.07	9.50	9.42
Maize	Kharif	12.73	11.48	12.16	11.56	15.11	14.12	12.29	16.64	16.49	16.19	17.14	17.01	15.59	16.05	17.50	19.27
	Rabi	2.25	2.70	2.55	3.54	3.85	5.61	4.43	5.09	5.27	6.06	7.11	7.16	5.41	6.51	7.00	6.89
	Total	14.98	14.17	14.71	15.10	18.96	19.73	16.72	21.73	21.76	22.26	24.26	24.17	21.00	22.57	24.50	26.15
Ragi	Kharif	1.97	2.43	2.35	1.44	2.15	2.04	1.89	2.19	1.93	1.57	1.98	2.06	1.76	1.82	2.00	1.75
Small Millets	Kharif	0.56	0.48	0.47	0.48	0.55	0.44	0.38	0.44	0.45	0.44	0.43	0.39	0.43	0.39	0.50	0.42
Barley	Rabi	1.30	1.21	1.22	1.33	1.20	1.69	1.35	1.66	1.62	1.75	1.83	1.61	1.71	1.44	1.85	1.85
Coarse Cereals	Kharif	32.22	26.36	26.74	25.61	31.89	28.54	23.83	33.08	32.44	29.79	31.20	30.94	28.29	28.15	32.50	32.77
	Rabi	5.39	7.10	7.33	8.31	8.86	11.49	9.72	10.32	9.58	10.25	12.09	11.92	10.11	10.37	11.85	11.57
	Total	37.60	33.46	34.07	33.92	40.75	40.04	33.35	43.40	42.01	40.04	43.29	42.86	38.40	38.52	44.35	44.34
Cereals	Kharif	110.84	98.59	105.01	105.78	114.55	113.45	99.75	113.73	125.22	122.16	122.70	133.34	118.88	119.56	125.50	128.79
	Rabi	87.45	86.64	90.21	97.30	101.46	106.45	103.70	112.52	116.98	116.63	123.09	112.53	116.95	115.66	123.85	121.05
	Total	198.28	185.23	195.22	203.08	216.01	219.90	203.45	226.25	242.20	238.79	245.79	234.87	235.83	235.22	249.35	249.84
Tur	Kharif	2.36	2.35	2.74	2.31	3.08	2.27	2.46	2.86	2.65	3.02	3.17	2.81	2.55	2.56	3.62	4.23

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Gram	Rabi	5.72	5.47	5.60	6.33	5.75	7.06	7.48	8.22	7.70	8.83	9.53	7.33	8.09	7.06	9.60	9.12
Urad	Kharif	1.20	0.95	0.90	0.94	1.12	0.84	0.81	1.40	1.23	1.43	1.15	1.28	1.11	1.25	1.45	2.11
	Rabi	0.27	0.38	0.35	0.50	0.34	0.33	0.42	0.36	0.53	0.47	0.55	0.68	0.64	0.70	0.70	0.78
	Total	1.47	1.33	1.25	1.44	1.46	1.17	1.24	1.76	1.77	1.90	1.70	1.96	1.74	1.95	2.15	2.89
Moong	Kharif	1.43	0.81	0.69	0.84	1.25	0.78	0.44	1.53	1.24	0.79	0.96	0.87	0.96	1.00	1.22	1.51
	Rabi	0.28	0.25	0.26	0.28	0.27	0.26	0.25	0.27	0.40	0.40	0.65	0.64	0.59	0.59	0.65	0.62
	Total	1.70	1.06	0.95	1.12	1.52	1.03	0.69	1.80	1.63	1.19	1.61	1.50	1.55	1.59	1.87	2.13
Other Kharif Pulses	Kharif	1.18	0.61	0.54	0.70	0.96	0.80	0.49	1.33	0.93	0.62	0.71	0.77	0.75	0.72	0.96	0.87
Other Rabi Pulses	Rabi	2.48	2.32	2.31	2.29	2.00	2.23	2.31	2.27	2.40	2.73	2.53	2.77	2.64	2.47	2.55	2.90
Total Pulses	Kharif	6.16	4.72	4.86	4.80	6.40	4.69	4.20	7.12	6.06	5.91	5.99	5.73	5.36	5.53	7.25	8.72
	Rabi	8.74	8.41	8.52	9.40	8.36	9.88	10.46	11.12	11.03	12.43	13.25	11.42	11.97	10.82	13.50	13.41
	Total	14.91	13.13	13.38	14.20	14.76	14.57	14.66	18.24	17.09	18.34	19.25	17.15	17.33	16.35	20.75	22.14
Total Foodgrains	Kharif	117.00	103.31	109.87	110.58	120.96	118.14	103.95	120.85	131.27	128.07	128.69	128.06	124.24	125.09	132.75	137.51
	Rabi	96.19	95.05	98.73	106.71	109,82	116.33	114.15	123.64	128.01	129.06	136.35	123.96	128.92	126.47	137.35	134.47
	Total	213.19	198.36	208.60	217.28	230.78	234.47	218.11	244.49	259.29	257.13	265.04	252.02	253.16	251.57	270.10	271.98
Groundnut	Kharif	68.60	52.62	62.98	32.94	73.62	56.17	38.52	66.43	51.27	31.87	80.58	59.30	57.29	53.68	64.30	70.54
	Rabi	12.67	15.12	16.95	15.69	18.20	15.51	15.76	16.22	18.37	15.08	16.56	14.71	14.52	13.66	20.70	14.18
	Total	61.27	67.74	79.93	48.64	91.83	71.68	54.28	82.65	69.64	46.95	97.14	74.02	71.81	67.33	85.00	84.72
Castorseed	Kharif	7.97	7.93	9.91	7.62	10.54	11.71	10.09	13.50	22.95	19.64	17.27	18.70	17.27	17.52	22.00	17.38
Sesamum	IKharif	7.82	6.74	6.41	6.18	7.57	6.40	5.88	8.93	8.10	6.85	7.15	8.28	8.32	8.50	9.00	8.21
Nigerseed	Kharif	1.09	1.12	1.08	1.21	1.10	1.17	1.00	1.08	0.98	1.02	0.98	0.76	0.79	0.74	1.15	0.85
Rapeseed & Mustard	Rabi	62.91	75.93	81.31	74.38	58.34	72.01	66.08	81.79	66.04	80.29	78.77	62.82	68.35	67.97	85.00	79.12
Linseed	Rabi	1.97	1.70	1.73	1.68	1.63	1.69	1.54	1.47	1.52	1.49	1.41	1.55	1.38	1.25	1.60	1.42
Safflower	Rabi	1.35	1.74	2.29	2.40	2.25	1.89	1.79	1.50	1.45	1.09	1.13	0.90	0.78	0.53	1.60	0.59
Sunflower	Kharif	3.06	4.31	4.56	3.66	4.63	3.57	2.14	1.92	1.47	1.87	1.54	1.11	0.67	0.66	2.40	0.87
	Rabi	6.24	7.56	9.83	8.62	10.00	8.01	6.36	4.59	3.69	3.57	3.50	3.23	2.68	2.30	6.10	1.54
	Total	9.30	11.87	14.39	12.28	14.63	11.58	8.51	6.51	5.17	5.44	5.04	4.34	3.35	2.96	8.50	2.41
Soyabean	Kharif	78.18	68.76	82.74	88.51	109.68	99.05	99.64	127.36	122.14	146.66	118.61	103.74	91.34	85.70	136.15	141.25
Total Nine Oilseeds	Kharif	166.72	141.49	167.67	140.12	207.13	178.08	157.28	219.22	206.91	207.91	226.12	191.89	175.68	166.80	235.00	239.10
	Rabi	85.14	102.04	112.11	102.77	90.42	99.11	91.53	105.57	91.08	101.52	101.37	83.21	87.70	85.71	115.00	96.86
	Total	251.86	243.54	279.78	242.89	297.55	277.19	248.82	324.79	297.99	309.43	327.49	275.11	263.39	252.51	350.00	335.96

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Cotton #	Total	137.29	164.29	184.99	226.32	258.84	222.76	240.22	330.00	352.00	342.20	359.02	348.05	306.92	300.05	360.00	325.07
Jute # #	Total	102.52	93.99	99.70	103.17	102.20	96.34	112.30	100.09	107.36	103.40	110.83	106.18	98.92	99.40	110.00	96.21
Mesta ##	Total	9.21	8.73	8.70	9.56	9.90	7.31	5.87	6.11	6.63	5.90	6.70	5.08	5.10	5.83	7.00	4.43
Jute & Mesta ##	Total	111.73	102.72	108.40	112.73	112.11	103.65	118.17	106.20	113.99	109.30	116.90	111.26	104.02	105.24	117.00	100.63
Sugarcane	Total	2338.62	2370.88	2811.72	3555.20	3481.88	2850.29	2923.02	3423.82	3610.37	3412.00	3521.42	3623.33	3463.85	3484.48	3550.00	3099.84

#Lakh bales of 170 kgs. each

##Lakh bales of 180 kgs. each

Economic Growth

As per the 2nd advance estimates of national income, released by the Central Statistics Office (CSO) on February 28, 2017, growt1- rate of Gross Domestic Product (GDP) at constant market prices is placed at 7.1 per cent in 2016-17 as compared to 7.9 per cent in 2015-16.

The growth in Gross Value Added (GVA) at constant (2011-12) basic prices for the year 2016.17 is estimated to be 6.7 per cent, as compared to 7.8 per cent in 2015-16. At the sectoral level, agriculture, industry and services sehtors grew at the rate of 4.4 per cent, 5.8 per cent and 7.9 per cent respectively in 2016-17.

The share of total final consumption in GDP at current prices in 2016-17 is estimated to be 69.3 per cent as compared to 68.1 per cert in 2015-16. The fixed investment rate (ratio of gross fixed capital formation to GDP) declined from 29.2 per cent in 2015-16 to 26.9 per cent in 2016-17.

The saving rate (ratio of gross saving to GDP) for the years 2015-16 was 32.2 per cent, as compared to 33.0 per cent in 2014-15. The investment rate (rate of gross capital formation to GDP) in 2015-16 was 33.2 per cent,as compared to 34.2 per cent in 2014-15.

Agriculture and Food Management

Rainfall: The cumulative rainfall received for the country as a whole, during the period January 1-February 8, 2017was 29 per cent above normal. The actual rainfall received during this period was 31.9 mm as against the normal at 24.7 mm. Out of the total 36 meteorological sub-divisions, 11 sub-divisions received large excess/ excess rainfall, 3 sub-divisions received normal rainfall, 4 sub-divisions received deficient rainfall, 12 sub-divisions received large deficient rainfall and remaining 6 sub-divisions received no rainfall.

A**ll India production of foodgrains:** As per the 2nd Advance Estimates of production of foodgrains for 2016-17, the production of total kharif foodgrains is estimated at 137.5 million tonnes for the kharif season, as compared to 124.2 million tonnes for the kharif season of 2015- 16. As per 2nd Advance Estimates,the total foodgrains production for 2016-17 is estimated at 272.0 million tonnes (Table 3) as against 253.2 million tonnes for 2015-16.

Procurement: Procurement of rice as on February 1, 2017 was 27.5 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 December, 2016 was 30.2 lakh tonnes. This comprises 25.3 lakh tonnes under TPDS/NFSA and 4.9 lakh tonnes under other schemes. In respect of wheat, the total off-take as 27.1 lakh tonnes comprising 21.0 lakh tonnes under TPDS/NFSA and 6.1 lakh tonnes under other schemes. The cumulative off-take of foodgrains during 2016-17 (till December, 2016) is 57.2 lakh tonnes (Table 5).

Stocks: Stocks of foodgrains (rice and wheat) held by FCI as on February 1, 2017 was 40.7 million tonnes, as compared to 49.2 million tonnes as on February 1, 2016 (Table 6).

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

Sector	Growth			Share in GVA		
	2014-15 2nd RE	2015-16 1st RE	2016-17 2nd AE	2014-15 2nd RE	2015-16 1st RE	2016-17 2nd AE
Agriculture, forestry & fishing	-0.3	0.8	4.4	16.5	15.4	15.1
Industry	6.9	8.2	5.8	31.3	31.4	31.1
Mining & quarrying	14.7	12.3	1.3	3.2	3.3	3.1
Manufacturing	7.5	10.6	7.7	17.4	17.8	18.0
Electricity, gas, water supply &	7.2	5.1	6.6	2.2	2.1	2.1

Sector	Growth			Share in GVA		
	2014-15 2nd RE	2015-16 1st RE	2016-17 2nd AE	2014-15 2nd RE	2015-16 1st RE	2016-17 2nd AE
Other utility services						
Construction	3.0	2.8	3.1	8.5	8.1	7.9
Services	9.5	9.8	7.9	52.2	53.2	53.8
Trade, Hotel, Transport Storage	8.6	10.7	7.3	18.5	19.0	19.1
Financial, real estate & prof servs	11.1	10.8	6.5	21.3	21.9	21.9
Public Administration, defence and other services	8.1	6.9	11.2	12.4	12.3	12.8
GVA at basic prices	6.9	7.8	6.7	100.0	100.0	100.0
GDP	7.2	7.9	7.1	--	---	---

Source: Central Statistics Office (CS0). 2" RE: Second Revised Estimates Pst RE: First Revised Estimates, 2nd AE: as per second advance estimates of GDP released on 28th Februar 2017.

TABLE 2: QUARTER-WISE GROWTH OF GVA AT CONSTANT 2011-12) BASIC PRICES (PER CENT)

Sectors	2014-15				2015-16				2016-17		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Agriculture, forestry & fishing	2.3	2.8	-2.4	-1.7	2.6	2.3	-2.2	1.7	1.9	3.8	6.0
Industry	8.0	5.9	3.8	5.7	7.4	7.4	9.5	8.6	6.1	5.1	6.6
Mining & quarrying	16.5	7.0	9.1	10.1	11.2	13.9	13.3	11.5	-0.3	-1.3	7.5
Manufacturing	7.9	5.8	1.7	6.6	8.5	10.3	12.8	10.8	9.0	6.9	8.3
Electricity, gas, water supply & other utility services	10.2	8.8	8.8	4.4	2.5	5.9	4.1	7.8	9.6	3.8	6.8
Construction	5.0	5.3	4.9	2.6	4.8	0.0	3.2	3.0	1.7	3.4	2.7
Services	8.6	10.7	12.9	9.3	9.5	10.4	9.4	10.1	8.8	8.2	6.8
Trade, hotels, transport, communication and services related to broadcasting	11.6	8.4	6.2	13.1	10.6	8.9	9.6	13.2	8.2	6.9	7.2
Financial, real estate & professional services	8.5	12.7	12.1	9.0	10.2	13.1	10.4	8.9	8.7	7.6	3.1
Public administration, defence and Other Services	4.2	10.3	25.3	4.1	6.3	7.2	7.5	6.7	9.9	11.0	11.9
GVA at Basic Price	7.4	8.1	6.7	6.2	7.8	8.4	7.0	8.2	6.9	6.7	6.6
GDP at market prices	7.5	8.3	6.6	6.7	7.8	8.4	6.9	8.6	7.2	7.4	7.0

Source: Central Statistics Office (CS0).*: Implied growth rate calculated from the second advance estimates of GDP released on 28th February 2017.

TABLE 3: PRODUCTION OF MAJOR AGRICULTURAL CROPS 2ND ADV. EST.) PRODUCTION (IN MILLION TONNES)

Crops	2012-13	2013-14	2014-15	2015-16	2016-17
Total Foudgrains	**257.1**	**265.0**	**252.0**	**251.6**	**272.0**
Rice	105.2	106.7	105.5	104.4	108.9
Wheat	93.5	95.9	86.5	92.3	96.6
Total Coarse Coarse Cereals	40.0	43.3	42.9	38.5	44.3
Toral Pulses	18.3	19.3	17.2	16.4	22.1
Total Oilseeds	30.9	32.8	27.5	25.3	33.6
Sugarcane	341.2	352.1	362.3	348.4	310.0
Cottor#	34.2	35.9	34.8	30.0	32.5

Source DES, DAC&FW, M/o Agriculture & Farmer's Welfare # Million bales of 170 Kgs. each.

TABLE 4: Proocurement 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	32.8	34.2	27.5$
Wheat@	28.3	38.2	25.1	28.0	28.1	23.0$
Total	**63.3**	**72.2**	**56.9**	**60.2**	**62.3**	**50.5**

Kharif Marketing Season (October-September), @ Rabi Marketing Season (April-March,), $ Position as on 01.02.2017

Source: DEPD, M/p 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 December)
Rice#	32.6	29.2	30.7	31.8	30.2
Wheat	33.2	30.6	25.2	31.8	27.0
Total (Rice & Wheat)	65.8	59.8	55.9	63.6	50.2

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

TABLE 6: STOCKS OF FOODGRAINS (MILLION TONNES)

Crops	February 1,2016	February 1,2017
1. Rice	16.2	17.0
2. Unmilled Paddy #	18.9	18.3
3. Converted Unmiled Paddy in terms of Rice	12.7	12.2
4. Wheat	20.3	11.5
Total (Rice & Wheat) (1+3+4)	49.2	40.7

#Since September, 2012 FCI gives separate figures for rice and unmilled paddy lying with FCI & state agencies in terms of rice.

Articles

Crop Insurance in India: Status and Challenges of Implementation

CH. SHANKAR RAO*

Abstract

Indian Agriculture is highly prone to the vagaries of weather and market forces. The crop insurance is risk management option for the farmers to stabilize farm income and investment. The present paper is an attempt to study the status of outreach of crop insurance in India and challenges that arise in its implementation in the context of newly introduced central crop insurance scheme called the Pradhan Mantri Fasal Bhima Yojana (PMFBY). It is based on the data from Agricultural statistics at Glance 2015 and Situation Assessment Survey of Agricultural Households in India, NSS 70th Round, 2014. The results show that despite the remarkable increase in the coverage of crop insurance in India, in terms of crop area and farmers, it is still at a lower base, covering only less than one quarter of the total area and just above the one third of total farmers. Also, there has been wide regional and crop disparities in its coverage. Large proportion of farmers do the crop insurance through bank or cooperative loan linkage and only small proportion of them do it independently. The crop insurance in India suffers from low realization of its benefit to the farmers. The crop insurance levels are low among small, illiterates and inexperienced farmers. Lack of awareness is the major reason for the farmers for lack opting for the crop insurance followed by lack of interest & need, lack of availability and others. Lacks of transparency in the estimation of crop loss and delay payment of indemnity to the farmers are other problems. Though there has been a steady rise in the government's crop insurance support as the share of Agricultural GDP to 0.11 per cent in 20014-15, but it is very minimal compare to developed countries. The paper suggest for deepening the crop insurance in India to ensure minimum farm income with the lead role by the government along with private participation by emphasizing more on bringing awareness, speedy payment of indemnity, transparency in decision making about crop loss and involving the informal honest lenders in crop insurance.

Keywords : Crop insurance, PMFBY, Risk Management, India.

1. Background

Indian Agriculture is highly prone to vagaries of weather and market forces. The crop insurance is envisaged as one method, by which farmers can stabilize farm income and investment and guard against disastrous effect of losses due to natural hazards or low market prices. Crop insurance not only stabilizes the farm income but also helps the farmers to initiate production activity after a bad agricultural year. Crop insurance, exists in many countries as an institutional response to nature induced risk (Hardaker et al 1997).

The risk bearing capacity of an average farmer in the semi-arid tropics is very limited (Rao et al., 1988). A good crop insurance programme combines both self as well as mutual help principle. It protects farmers' investment in crop production and thus improves their risk bearing capacity. It also facilitates adoption of improved technologies, encourages higher investment resulting in higher agricultural production. Credit linked crop insurance also reduces the risk of becoming defaulter of institutional credit (Hazell et al. 1986; Pomareda 1986; Mishra 1996;). Crop insurance encourages crop specialization among Tamil Nadu rice producing farmers (Varadan and Kumar 2012). A properly designed and implemented crop insurance programme will protect the numerous vulnerable small and marginal farmers from hardship, bring in stability in the farm incomes and increase the farm production (Mishra 1994; Bhende 2002 & 2005).

India has been implementing crop insurance since 1979 as a public funding programme linking it to subsidized crop loans. Since inception, it has been implemented under various schemes - Comprehensives Crop Insurance Scheme since 1985 to 1999, National Agricultural Insurance Scheme (NAIS) from 1999 operated in few states, National Crop Insurance Program with components of Modified national Agricultural Insurance Scheme (MNAIS) and Weather Based Crop Insurance Scheme (WBCIS) with the private companies' participation. Currently, Pradhan Mantri Fasal Bima Yojana (PMFBY) has been introduced in 2016-17 by replacing NAIS and MNIAS. PMBSY is a multi-peril crop insurance programme, introduced in 2016-17 agricultural year. It is a head-way from the previous schemes in terms of cut in premium rates to 2 per cent of sum insured (SI) in Khariff and 1.5 per cent of SI in Rabi season for all foodgrain and oilseeds crops and flat 5 per cent of SI for commercial/horticultural crops in both seasons (Govt of India 2016).

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Despite technological and economic advancements, the condition of farmers continues to be unstable due to natural calamities and price fluctuations (Raju and Chand 2008). National Agricultural Insurance Scheme has done well on equity grounds, but the coverage and indemnity payments are biased towards a few regions and crops and there are delays in settlement of claims (Reshmy Nair 2010a). The weather-based insurance as an alternative has addressed several limitations of traditional insurance, and has much larger spread of benefits (Reshmy Nair 2010b). Still very small segment of agricultural households in India insured their crops against possible crop loss and the prominent reason was lack of awareness (NSSO 2014).

Against the above background, the present paper is aiming to study the status of crop insurance in India and the challenges in its implementation in the context of PMFBY.

Data and Methodology

The paper is based on secondary level data sources such as Agricultural Statistics at Glance 2015, Directorate of Economics and Statistics, Ministry of Agriculture, Cooperation and Farmers Welfare, Govt of India and the Situation Assessment Survey of Agricultural Households in India, NSS 70th Round, 2014, National Sample Survey office, Ministry of Statistics and Program Implementation, Govt of India. The data on area coverage, number of farmers, amount of premium and claim amount etc is obtained from Agricultural Statistics at Glance 2015. We also use the unit level data from Situation Assessment Survey of Agricultural Households in India, which comprises the rich household level information on the crop insurance. The basic statistics and tabular methods are used to analyse the data.

2. Results and Discussions

2.1. Status of the Implementation of Crop Insurance in India

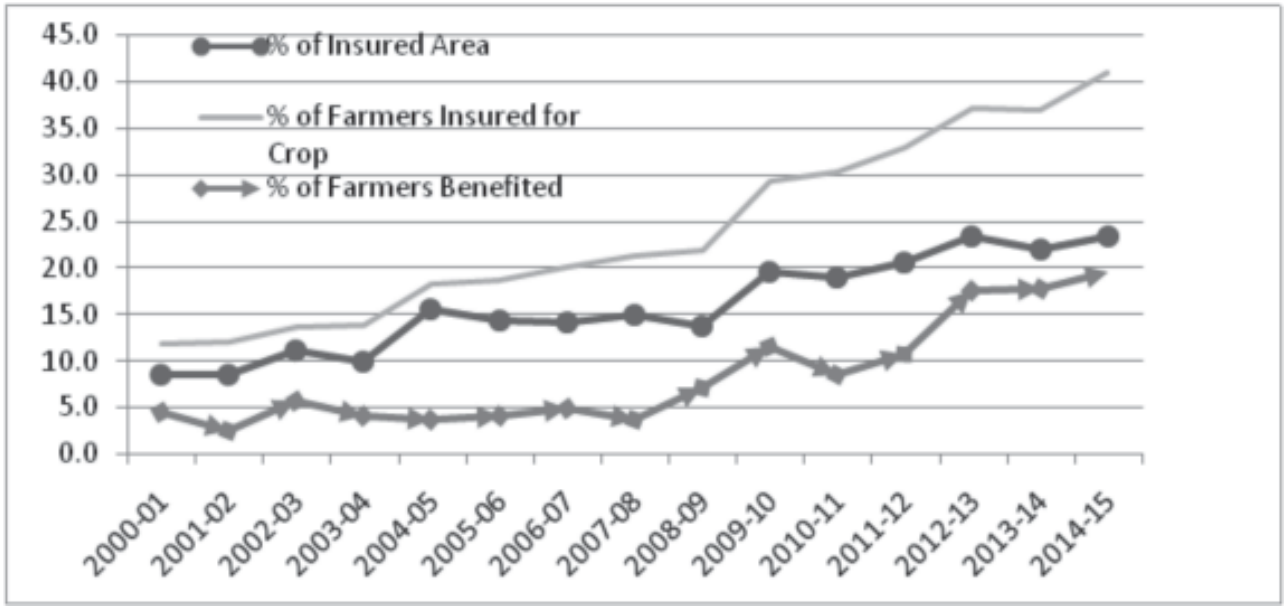
Crop insurance in India is solely led by the government programs, namely, National Agricultural Insurance Scheme (NAIS), Weather Based Crop Insurance Scheme (WBCIS) and Modified National Agricultural Insurance Scheme (MNAIS) which have been introduced in different phases that run majorly by Agricultural Insurance Corporation (AIC), a public subsidiary and also by the private companies with assurance of reinsurance by the government. The total coverage of crop insurance, in terms of crop area and farmers, under the above three schemes together, has increased remarkably over the time. The data (Table 1) reveals us that area under insurance witnessed three fold rise from 16.3 million hectare in 2000-01 to 45.5 million hectare by 2014-15, registering the compound annual growth rate (CAGR) of 0.39 per cent. The share of insured area in total cropped area also rose from 8.8 per cent to 23.4 percent during the same period. However, this is far below the United States of America (USA) levels (72 per cent in 2013 and 78 per cent of area insured at is coverage levels of 70 per cent or higher) (Glauber 2015). The coverage of farmers registers even higher CAGR of 0.52 per cent from 8.8 million to 37 million in the study period. The share of insured farmers to the total farmers increased from 10.5 per cent to 40.9 per cent during the above period. It is also interesting to notice that the farmers who benefited from crop insurance has increased many folds from 4.7 per cent to about 20 per cent of total farmers during the above period. It can be inferred from the Figure 1 that there has been fast increase in crop insurance in India since late 2000s to present because of increasing government's emphasis on introducing the new variety of crop insurance options to the farmers under WBCIS and MNAIS.

TABLE 1: Area and Farmers Covered under Crop Insurance (NAIS+WBCIS+MNAIS) in India

Year	Area covered under Crop Insurance (Mill Ha)	per cent of Insured Area	No of Farmers Covered (Mill)	per cent of Farmers Insured for Crop	per cent farmers benefited from covered
2000-01	16.3	8.8	10.5	11.8	4.7
2001-02	16.0	8.5	10.7	11.9	2.5
2002-03	19.6	11.3	12.1	13.5	5.8
2003-04	18.8	9.9	12.4	13.9	4.3
2004-05	29.6	15.5	16.2	18.1	3.9
2005-06	27.7	14.4	16.7	18.7	4.1
2006-07	27.3	14.2	17.9	20.0	5.0
2007-08	29.2	15.0	19.1	21.3	3.8
2008-09	27.0	13.8	19.6	21.8	7.2
2009-10	37.1	19.6	26.3	29.2	11.7
2010-11	37.5	19.0	27.3	30.3	8.6
2011-12	40.4	20.6	29.7	32.9	10.7
2012-13	45.5	23.4	33.4	37.0	17.7
2013-14	42.7	22.0	33.2	36.8	17.9
2014-15	45.5	23.4	37.0	40.9	19.7
CAGR	0.39*		0.52*		

Source: Author's Calculation based on data from various reports of Agricultural Statistics at Glance.* Significant at 1 per cent level.

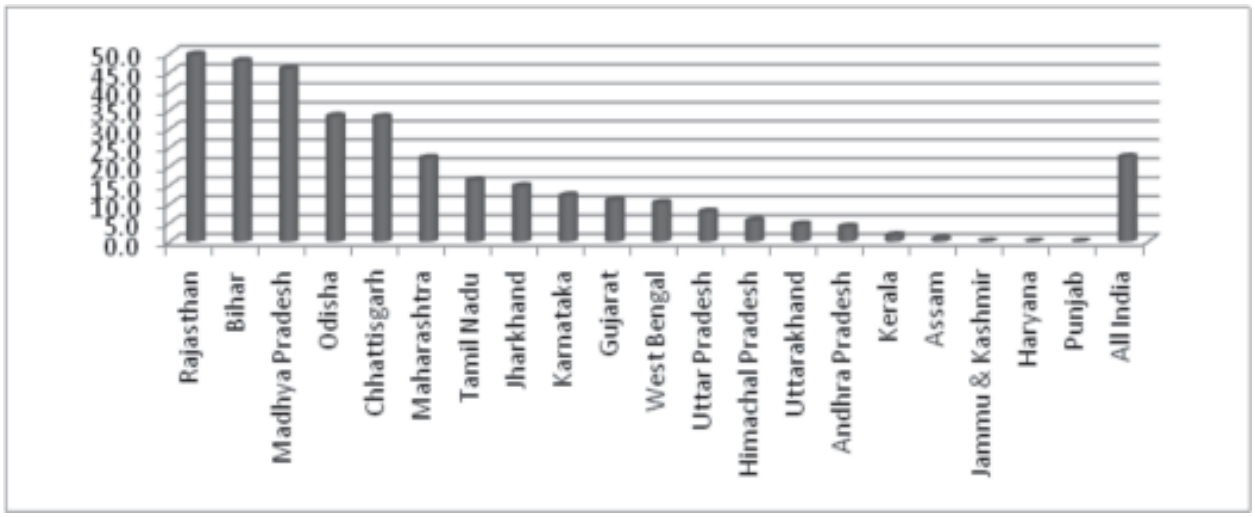
Figure 1: Proportion of Area and Farmers under Crop Insurance in India



Source: Table 1

It is also important to understand the regional and crop wise spread of the crop insurance in India. Figure 2 shows that the Rajasthan stands first in the share of insured area with nearly half of the total area insured, which is followed by Bihar, Madhya Pradesh, Odisha, Chhattisgarh and Maharashtra, which are mainly dry land agricultural areas, growing majorly oilseeds and pulses. Interestingly, the agriculturally developed states of Punjab and Haryana are not covered with any crop insurance programmes. The Haryana government found that premium rates are too high for the state like Haryana where a fair degree of drought proofing had been done and chances of damage to paddy and wheat were minimum and productivity of the main crops in the state are gradually rising so that there is a very little chance of farmers getting any indemnity under the formula of threshold yield (Sinha 2004). But with the stagnation in the yields of major crop, there is supposed to be an increasing need of crop insurance in the state. Kerala, which is mainly growing commercial crops (tea, coffee, rubber and spices), shows very lower share of insured area. Among southern states, Tamil Nadu and Karnataka have medium level of coverage while Andhra Pradesh shows very low coverage. The states of Gujarat, West Bengal and Uttar Pradesh also report middle level of coverage. The hilly states like Himachal Pradesh and Uttarakhand report less coverage. The North-Eastern state of Assam reports very low coverage. The above analysis conveys us that there has been a wide regional disparities in the coverage of crop insurance in India and hence there is a need for spread of the crop insurance to non-dray land agricultural regions also because of increasing risk in agriculture due to high fluctuation in both weather conditions and markets.

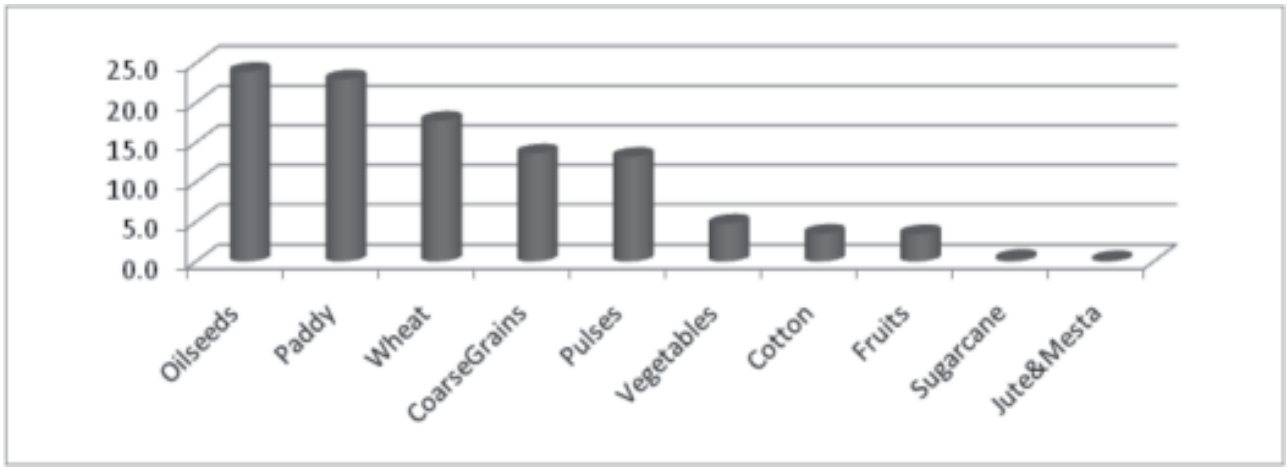
Figure 2: State wise Share of Area covered under Crop Insurance in India in 2014-15



Source: Same as in Table 1

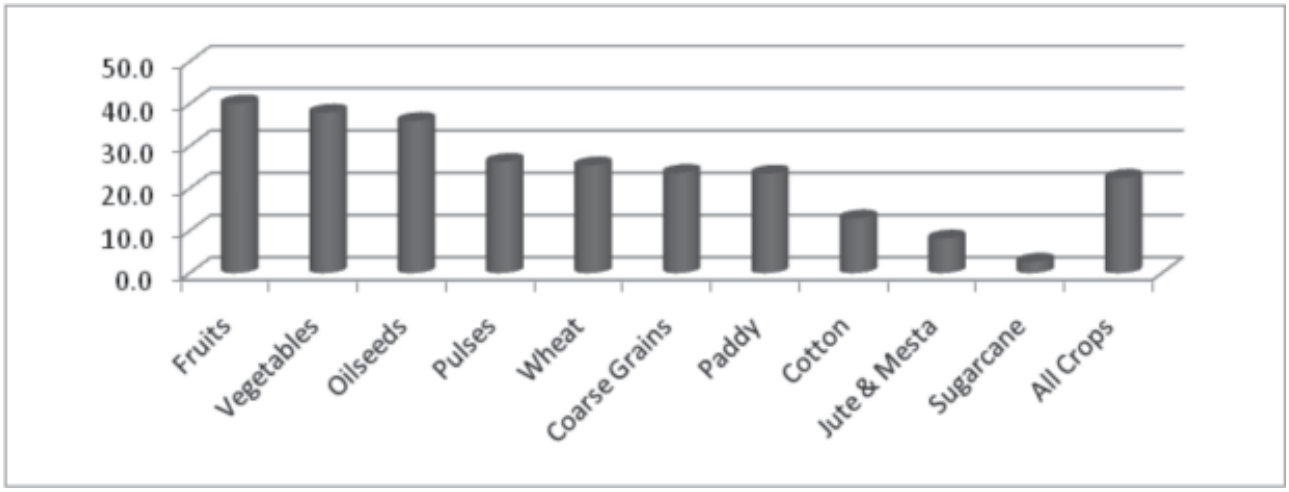
It is important to know the disparities across the crops. Figure 3 indicates that oilseeds (24 per cent) occupy the major share in the total insured area followed by paddy, wheat, coarse grains and pulses. The trend is lightly different when we see the insurance coverage in terms of ratio of insured area to total sown area under the crop (Figure 4). The fruits, vegetables and oilseeds are insured more than 35 per cent of the sown area of those crops. The crops like pulses, wheat, coarse grains and paddy are covered relatively low i.e., less than 25 per cent. Interestingly, the crop of cotton, the pure commercial crop which is prone to high market risks, reports relatively less insured, about 10 per cent, and also the crops of jute and sugarcane. This indicates us that the crop insurance in India is mainly against the yields not by the revenue that includes the prices. This happens because of government crop insurance programmes, so far, are mostly concentrating on the crop yields not the crop revenues which is taken in the new insurance schemes PMFBY from 2015-16 onwards.

Figure 3: Share of Insured Area of Crops in Total Insured Area in India in 2014-15



Source: Same as in Table 1

Figure 4: Crop wise Share of Insured Area in total area sown of the same crop in India in 2014-15



Source: Same as in Table 1

When we compare the above results from the data of Department of Agriculture, Cooperation & Farmers Welfare (Credit Division), Govt of India, the picture of crop insurance coverage in India and across the states, depicts a different picture by the unit level data from "The Situation Assessment of Agricultural Households", National Sample Survey (NSS), 70th Round, 2012-13. The department data is collected from the credit and insurance organizations while the NSS data is collected directly from farm households on the representative sampling basis. As per NSS data, at all India level, only 8.4 per cent of area and 6.7 per cent of farmers are covered under insurance (Table 2). The regional disparities are similar to the above data with minor exceptions where Telangana and Andhra Pradesh have higher intensity and Bihar has less intensity of crop insurance.

Despite all these differences, the NSS data reveals many other interesting aspects of crop insurance. It is still a major concern in India regarding the way farmers opt for the crop insurance since large proportion of farmers (88 per cent) buy the crop insurance through bank or cooperative loan linkage and only small proportion of them (12 per cent) buy voluntary crop insurance. It is mandatory in India to buy crop insurance for a farmer to obtain a subsidized crop loan from the bank or cooperative. The bank linkage method is dominant in major crop insurance intensity states such as Madhya Pradesh, Chattishgarh, Telangana, Rajasthan, Odisha, Gujarat, West Bengal, Andhra Pradesh, Uttar Pradesh etc. The data also elucidate another important problem of crop insurance in India that despite of 45 per cent of area and 35 per cent of farmers experienced crop loss during 2012-13 that causes average value loss about Rs 78800 per hectare, only less than one per cent (0.9) of farmers, who had insured the crops, received the average indemnity of Rs 8711 per hectare. This condition tells us the very shocking fact about the crop insurance in India that suffers from low realization of its benefit or indemnity to the farmers on the event of crop loss. This may be because the crop insurance benefits are applicable not at the individual level but at the village or block levels and the decision is to be made by the experts who may always underestimate or delay the problem. No transparency is practiced in the estimation of crop loss and payment of indemnity to the farmers and politics are often played for the vested interest.

TABLE 2: State-wise Crop Insurance Details in India during 2012-13 based on NSSO Data

Sl. No.	State	per cent of Area Insured	per cent of Farmers Insured	per cent of Farmers Insured with Bank Loan	per cent of Farmers with Crop Loss	per cent of Area under crop Loss	Average Loss per Ha (Rs)	per cent of Farmers of Received Indemnity	Average Indemnity per Ha (Rs)
1	Madhya Pradesh	18.5	13.7	99.0	58.7	43.5	51588	0.04	30000
2	Chhattisgarh	17.9	14.3	94.6	31.4	21.8	7335	0.69	6605
3	Telangana	16.1	18.4	95.1	44.1	34.8	38397	0.00	
4	Rajasthan	15.3	12.6	98.3	62.2	50.0	49298	0.06	18000
5	Odisha	15.3	9.9	84.3	40.8	31.8	57103	2.90	4534
6	Andhra Pradesh	13.3	17.0	89.6	49.7	39.8	47010	0.00	
7	Gujarat	10.6	10.1	98.7	32.6	37.4	43333	0.00	
8	Tamil Nadu	8.3	7.6	71.8	44.8	41.1	470177	5.42	13606
9	West Bengal	5.9	7.9	99.9	26.1	13.5	37833	0.00	
10	Maharashtra	4.6	5.3	35.8	55.5	51.0	91928	3.68	7413
11	Karnataka	4.4	4.0	62.8	64.5	50.8	129503	3.85	2354
12	Uttar Pradesh	3.8	2.6	97.9	45.8	29.4	54910	0.06	7500
13	Jharkhand	2.0	4.1	15.4	72.7	50.4	312553	4.53	6546
14	Himachal Pradesh	1.4	1.6	43.9	84.1	57.5	308511	0.00	
15	Kerala	1.1	2.1	49.3	43.9	20.0	267627	3.02	67235
16	Bihar	0.8	1.3	80.6	38.9	28.4	35006	0.12	3000
17	Uttaranchal	0.3	0.2	0.0	55.9	47.5	69604	0.00	
18	Assam	0.2	0.4	19.2	17.9	8.3	10668	0.00	
19	Punjab	0.2	0.4	74.7	6.9	4.1	13731	0.00	
20	Jammu & Kashmir	0.2	3.1	100.0	23.6	17.3	75312	0.00	
21	Haryana	0.1	0.0	100.0	14.0	7.4	19771	0.00	
22	All India	8.4	6.7	87.9	44.7	35.3	78836	0.92	8711

Source: Author's Calculation based on Unit level data of Situation Assessment Survey of Agricultural Households, National Sample Survey Organisation (NSSO) 70th Round, 2012-13

2.2. Finances of the Crop Insurance in India

It is also essential to study the financial aspect of the crop insurance in India since it is largely public funded program. The data (Tables 3) indicates us that the sum insured (SI), the premium contribution by the governments (Union and State) and the individual farmers and the claims/indemnities paid have increased many folds over the time. The data (Table 4) also reveals that the per hectare premium has increased by 7 times from Rs 144 in 2000-01 to Rs 1090 in 2014-15 which is three times lower than that of USA that is Rs 3440 in 2014 (Glauber 2015). This is contributed more by the individual farmer but with declining trend (76 per cent to 54.5 per cent) and the increasing contribution by the government (24 per cent to 45.5 per cent) during the same period. However, the ratio of government subsidy to total premium in USA stands at 62 per cent in 2014 (Glauber 2015). The increasing cost of crop insurance per hectare in India also reflected in the 'ratio of premium to SI' that has sharply increased from 3 per cent to 6 per cent in the study period. However, the statistics of 'ratio of premium to claim paid' of crop insurance stands very high (116 per cent in 2014-15) but with declining trend which may increase crop insurance business in India in future (Figure 5). However this ratio is much above the 35 per cent norm, on exceeding this ratio government should pay loss amount to insurance companies. The government's crop insurance support as the share of Agricultural GDP steadily increased from 0.01 per cent in 2000-01 to 0.11 per cent in 20014-15 which is far below than the USA's i.e., 2.8 per cent in 2014 (Glauber 2015) and the ratio has sharply raised from 2008-09 onwards but with slight downward trend in later one from 2013-14 (Figure 6). This forms the strong base for the enhancement of crop insurance under new PMFBY with high government support.

TABLE 3: Details of Insurance, Sum Insured and Claims of Crop Insurance in India (Rs in Millions)

Year	Sum Insured	Farmers' Premium	State Govt's Premium	Union Govt's Premium	Gross Premium	Claims Reported	Claims Paid
2000-01	85061	1789	278	278	2345	12820	12820
2001-02	90000	2364	277	277	2918	5583	5583
2002-03	112692	3124	258	258	3640	20129	20129
2003-04	111636	3167	153	153	3474	11498	11498
2004-05	169448	5106	121	121	5348	11989	11989
2005-06	185908	5291	128	128	5548	14248	14248
2006-07	213016	5722	236	143	6102	22922	22922
2007-08	262665	6836	793	685	8314	18312	18312
2008-09	277022	7224	1152	518	8894	39371	39370
2009-10	435979	11396	2638	1988	16022	54698	54620
2010-11	497260	12485	5778	5303	23566	29504	29498
2011-12	583371	15145	8165	7724	31035	35661	34751
2012-13	734856	20006	12590	10447	43043	74523	69401
2013-14	712929	24602	12170	10663	47436	75389	72218
2014-15	818603	27060	11967	10618	49646	74006	57484
CAGR	0.08	0.09	0.17	0.17	0.10	0.07	0.07

Source: Same as in Table 1

TABLE 4: Contribution by farmers and Government to Crop Insurance in India

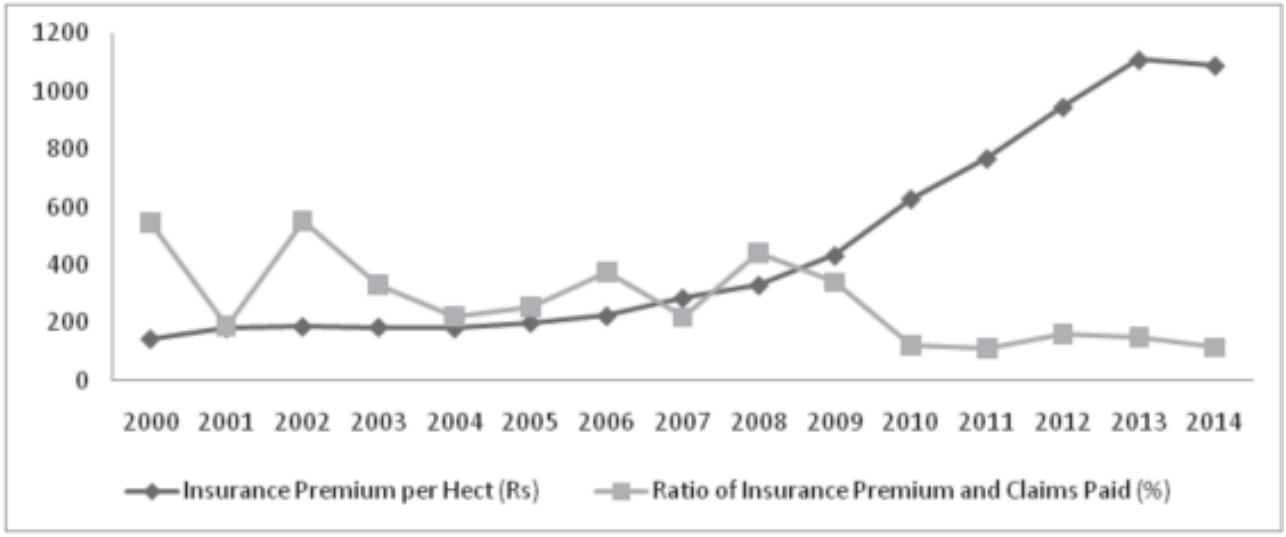
Year	Insurance Premium per Ha (Rs)	Ratio of Farmers' share in total Crop Insurance Premium (%)	Ratio of Insurance Premium and Sum Insured (%)	Ratio of Insurance Premium and Claims Paid (%)	Ratio of Govt's share in total Crop Insurance Premium (%)	Share of Govt's Crop Insurance Support in AGDP (%)
2000-01	144	76.3	2.8	546.6	23.7	0.012
2001-02	182	81.0	3.2	191.3	19.0	0.011
2002-03	186	85.8	3.2	553.0	14.2	0.011

TABLE 4: CONTRIBUTION BY FARMERS AND GOVERNMENT TO CROP INSURANCE IN INDIA—*Contd.*

Year	Insurance Premium per Ha (Rs)	Ratio of Farmers' share in total Crop Insurance Premium (%)	Ratio of Insurance Premium and Sum Insured (%)	Ratio of Insurance Premium and Claims Paid (%)	Ratio of Govt's share in total Crop Insurance Premium (%)	Share of Govt's Crop Insurance Support in AGDP (%)
2003-04	185	91.2	3.1	331.0	8.8	0.006
2004-05	181	95.5	3.2	224.2	4.5	0.004
2005-06	200	95.4	3.0	256.8	4.6	0.004
2006-07	223	93.8	2.9	375.7	6.2	0.005
2007-08	285	82.2	3.2	220.3	17.8	0.018
2008-09	330	81.2	3.2	442.7	18.8	0.018
2009-10	432	71.1	3.7	340.9	28.9	0.043
2010-11	628	53.0	4.7	125.2	47.0	0.084
2011-12	768	48.8	5.3	112.0	51.2	0.106
2012-13	946	46.5	5.9	161.2	53.5	0.140
2013-14	1110	51.9	6.7	152.2	48.1	0.120
2014-15	1090	54.5	6.1	115.8	45.5	0.114
USA in 2014*	3440				62.0	2.8

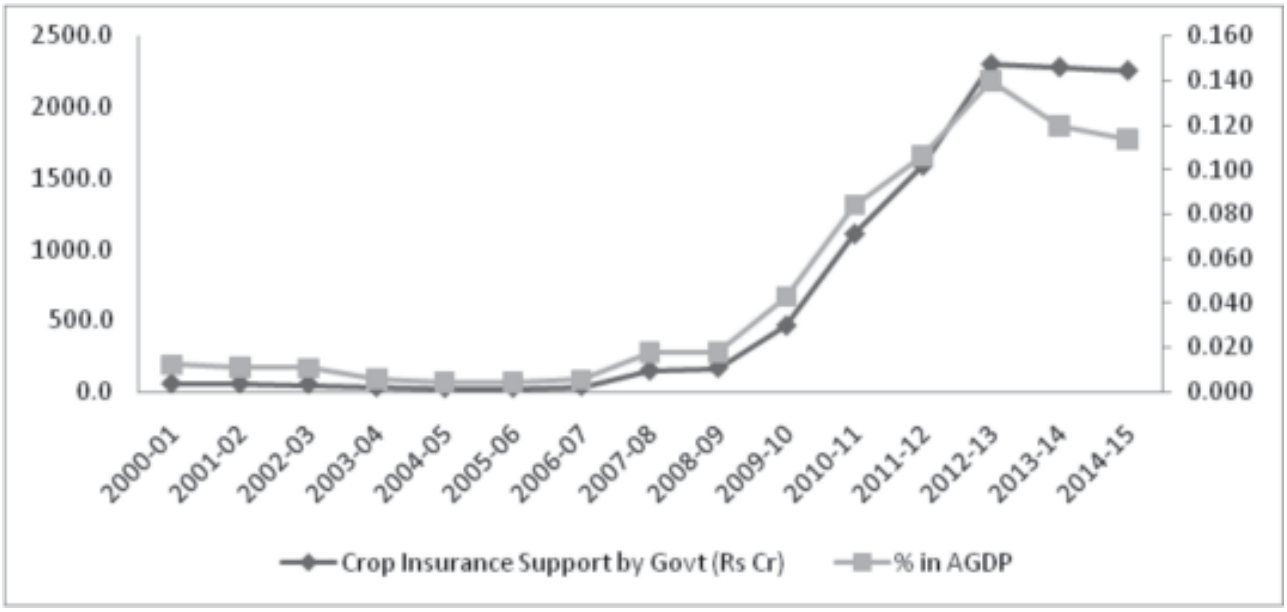
Source: Same as in Table 1. *USA figures are from study by Joseph W. Glauber 2015.

Figure 5: Trends of Insurance Premium and Claim Ratio for Crop Insurance in India



Source: Same as in Table 1

Figure 6: Trends of Government Subsidy and Share in AGDP for Crop Insurance in India



Source: Same as in Table 1

2.3. Factors affecting the Crop Insurance in India

The characteristics of the farmers like farm size, education and age/experience etc are expected to influence his/her decision about the crop insurance. The information in the Table 5 conveys us that crop insurance is opted more by the larger farmers than that of the smaller ones, may be because the crop insurance in India is majorly done with the bank loan linkage and unlike smaller ones, the larger farmers, having higher access to bank loans, are under obligation to opt for crop insurance. The crop insurance levels are slightly low among the illiterates than the literate farmers and not much difference is found between the different levels of education of the farmers that shows at least minimum education is required to the farmer to opt for the crop insurance in India. Similarly, the age which can be considered as proxy for the experience does matter up to certain level for a farmer to do crop insurance where the crop insurance levels are very low among the young farmers i.e., below 30 years and are relatively high among the farmers above 30 years but not much difference is found between the above 30 age groups.

A large proportion of farmers (93 per cent) do not show interest in insuring their crops because of various reasons. The data (Table 6) reveals that, at all India level, majority of the farmers (61 per cent) have not bought the crop insurance because of the lack of awareness about the importance of crop insurance in the risk management of farming. About one quarter of them (25 per cent) do not opt for crop insurance as they are not interested and feel no need and significant proportion of them reason about lack of availability (9 per cent) and other reasons (15 per cent) which comprise of lack of resources for premium payment (3.7 per cent), complex procedures (2.5 per cent), non satisfaction with terms & conditions (2 per cent), delay in claim payment (0.7 per cent) etc. While all the states face the problem of 'no awareness' as the major reason and some states like Kerala and Uttaranchal report 'not interested & no need' as the major reason for not insuring the crops. The major concern of the reasons for not insuring the crops lies in 'lack of awareness' which has adversely increased from 2002-03 level (57 per cent) and only impressionable progress is made in making availability of crop insurance to the farmers during the last decade. The new PMFBY shall focus largely on bringing the awareness about the importance of crop insurance in the agricultural risk management in the country.

TABLE 5: PROPORTION OF FARMERS INSURED THE CROPS ACROSS DIFFERENT CATEGORIES

Farm size wise	
Marginal (< 1 ha)	2.4
Small (1 to 2 ha)	5.6
Semi-medium (2 to 4 ha)	9.5
Medium (4 to 10 ha)	12.8
Large (>10 ha)	14.4
Age group wise	
Below 30 years	1.8
31 to 40 years	5.9
41 to 50 years	4.2
51 to 60 years	4.3
Above 60 years	4.4
Education group wise	
Non-literate	4.5
Up to Primary	4.8
Middle & Secondary	4.4
Higher Secondary	4.2
Graduation & Above	3.1
All	4.5

Source: Same as in Table 2

TABLE 6: STATE-WISE PROPORTION OF FARMERS UNDER DIFFERENT REASONS FOR NOT INSURING THE CROPS DURING 2012-13

Sl.No.	State	Not Aware	Not Interested & No Need	Not Available	Other
1	Assam	73.6	25.4	5.1	14.0
2	Himachal Pradesh	73.6	24.1	13.7	11.5
3	Rajasthan	70.5	17.6	2.9	16.9
4	Bihar	70.0	26.1	5.9	17.1
5	Uttar Pradesh	69.7	18.7	10.5	15.0
6	Madhya Pradesh	68.1	23.0	6.3	25.0
7	West Bengal	67.6	22.1	7.7	19.1
8	Jharkhand	67.1	28.2	20.3	27.9
9	Telangana	58.5	24.1	15.0	24.0
10	Maharashtra	55.6	28.8	3.3	26.4
11	Andhra Pradesh	52.9	13.8	19.9	20.3
12	Jammu &Kashmir	52.7	22.1	26.1	6.1
13	Chhattisgarh	52.1	42.8	1.7	23.2
14	Karnataka	51.4	28.3	6.3	25.8
15	Odisha	49.0	28.3	6.3	31.2
16	Haryana	45.5	40.3	12.4	7.1
17	Tamil Nadu	44.7	27.0	6.6	13.6
18	Gujarat	40.9	29.0	14.1	18.4
19	Kerala	38.8	64.3	5.1	17.8
20	Punjab	38.2	36.0	9.7	7.2
21	Uttaranchal	26.3	42.2	36.7	6.9
22	All India	60.9	25.2	9.0	19.0
	In 2002-03	57	16	24	4

Source: Same as in Table 2

3. Conclusion and Policy Suggestions

Despite the remarkable increase in the coverage of crop insurance in India; in terms of crop area and farmers, it is still at lower base covering only less than one quarter of the total area and just above the one third of total farmers. Also, there has been wide regional and crop disparities in its coverage where it is low in the states of Punjab, Haryana, Andhra Pradesh, West Bengal, Uttar Pradesh, Assam etc and confined to only few crops of oil seeds, fruits, vegetables, pulses but not to other food and commercial crops. Large proportion of farmers (88 per cent) buy the crop insurance through bank or cooperative loan linkage and only small proportion of them (12 per cent) do it independently. The crop insurance in India suffers from low realization of its benefit or indemnity to the farmers in the event of crop loss. No transparency is practiced in the estimation of crop loss and payment of indemnity to the farmers and politics are often played for the vested interest. Crop insurance is preferred more by the larger farmers than that of the smaller ones, the insurance levels are slightly low among the non-literates than the literate farmers and the age / experience does matter up to certain level for a farmer to do crop insurance. Large proportion of farmers do not show interest in insuring their crops because of various reasons. Lack of awareness is the major reason for the farmers for not opting for the crop insurance followed by lack of interest & no need, lack of availability and others.

The premium contribution by the individual farmers has steadily increased than the government's one and realization of indemnity by the farmer on the event crop is very less. Despite the steady rise in the government's crop insurance support as the share of Agricultural GDP to 0.11 per cent in 2014-15 this is very minimal compare to developed countries. This forms the strong base for the enhancement of crop insurance under new PMFBY with high government support.

Based on the above discussion, this paper makes the following policy suggestions

a. There is a need for the increase in the insurance base by spreading it to non-dray land agricultural regions and non covered commercial crops because of increasing risk in agriculture imposed by weather under climate change and markets under globalization and liberalisation.

b. On the line of compulsory crop insurance linked to bank loan, government can think on involving the informal honest agricultural lenders to do crop insurance for the loan lent for the farming purpose.

c. Since 'no awareness' is found to be the major reason for the farmers for not insuring crops, the new PMFBY should focus largely on bringing the awareness about the importance of crop insurance in the agricultural risk management in the country.

d. There is a need for the full transparency in the decision making process by the authorities about agricultural loss and indemnity should be paid to eligible farmers with immediate effect.

e. Since the crop insurance is assurance of the very livelihoods and minimum income to the farmers who are the India's largest section of poor, currently the contribution by the government for it is still very low. Hence, the government's lead role and support should continue in the crop insurance and with involvement of the private players.

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Changes in Land Use Pattern in Bihar: A Zone-wise Analysis

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Abstract

Agriculture plays an important role in food and nutritional security in addition to overall development of the state. Land is an important input for the agriculture sector, any change in land use pattern has significant implications for food security of the state in particular and nation in general. This paper is based on secondary data published by Government of Bihar and an attempt has been made to investigate the land use pattern of state and also in its different agro-climatic zones. The study reveals that the net sown area has declined both at zonal and state level. Decline in net sown area in agro-climatic zone-III is more pronounced than that of Zone-I and Zone-II. As state capital is located in agro climatic Zone III, urbanization has been quite prominent in this part of the state. The other reasons for changes undergoing in land use pattern may be increasing population, fragmentation of land holdings and declining water table in this region. As Zone-I & Zone-II are primarily flood prone, farmers are forced to leave their land as current fallow due to fear of devastating flood threat causing damage to their crops. Land under trees and groves have also witnessed positive growth rate, this may be the other reason for decline in net sown area in the state. Motivating farmers to increase productivity to protect growing population and serving their demand for food and nutritional security, we have to make such kind of strategies which may lead to enhance the income of the cultivators as well as fulfill the food demand of growing population, keeping in mind the fast changing climatic conditions all over the world and protecting wasteful and careless use of natural resources for betterment of future generation.

Key words: Land use pattern, Net sown area, Agro-climatic zone, Compound Growth Rate (CGR), Bihar

Introduction

Land is considered as an important natural resource that includes the elements like the temperature, moisture, topography, soil matrix and physical structure. It connotes the past and present human activities. It is obvious that the land has the characteristics of its fixity in supply and scarcity. Land is thus a wider concept than soil or terrain. Variation in soils, or soils and landforms, is often the main cause of differences between land mapping units within a local area. It is for this reason that soil surveys are sometimes the main basis for definition of land mapping units. However, the fitness of soils for land use cannot be assessed in isolation from other aspects of the environment, and hence it is land which is employed as the basis for suitability evaluation. Land is a scarce resource, whose supply is fixed for all practical purposes. At the same time, the demand for land for various competing purposes is continuously increasing with the increase in human population and economic growth. The types of use considered are limited to those which appear to be relevant under general physical, economic and social conditions prevailing in an area. These kinds of land use serve as the subject of land evaluation. They may consist of major kinds of land use or land utilization types (FAO).

The physical, economic and institutional factors together determine the pattern of land use of a state in a particular period of time. Land use is not only important from the point of producing foodstuffs, cereals, fruits and vegetable for consumption purpose but also for generating surplus to match the increasing demand created by rising population and growing industrial sector (Premakumara & Seema, 2013). The agricultural land use refers to primary use of geographical area for different purposes and activities. Land use is the surface utilization of all developed and vacant land on specific point at given time and space (Mandal, 1982).

Agriculture holds a vital role in food and nutrition security of the state/country in addition to overall development. Any change or changes in the land use pattern and diversification of area cropped has significant implication in food security of the state/country. No doubt, Bihar agriculture is regarded as land based activity, where water and land act as basic inputs for life support system and also vital resource for the economic life of majority of people in the state. Due to urbanization, increase in population and fragmentation of land holdings, land use pattern has been undergoing changes over the years (Ashrit, 2014).

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The economy of Bihar is predominantly considered as an agrarian economy where 68 percent of population earns their livelihood from this sector. Agriculture contributes nearly 22% of the state GDP. Bihar agriculture is still interwoven in the clutches of vicious circle of poverty that it follows the sequences like low investment, low productivity, low income, low saving and again low investment. To meet the demands of an ever rising population, pressure on land is likely to increase further as demand for more food grains production gains ground in days to come. To obtain larger production from declining net sown area or declining area under most of the crops, there is an urgent need to raise the productivity of crops.

Since inception of Green revolution, the income level of the farming community has obviously enhanced, however, it is many fold lower as compared to developed states like Punjab & Haryana, even lower than national average. Nowadays a debate is going on that eastern India may be the potential area for food basket of India in the present century, where abundant untapped natural resources are available for rational uses. This may further scale up agricultural production and productivity, lead to rise in income of the agrarian masses of the state, ultimately add to the national income/ exchanger.

Land use pattern at any given point of time is determined by several factors including size of human and livestock population, the demand pattern, the technology in use, the cultural traditions, the location and capability of land, institutional factors like ownership pattern and rights and state regulation. The land use pattern, besides having economic implications, has also important ecological dimensions, which if ignored can have disastrous consequences. Land utilization pattern refers to proportion of area under different activities such as area under forest, land put to non-agricultural uses, Culturable waste land, permanent pastures, land under trees and groves, fallow land other than current fallow, current fallow and net sown area etc. In other words, land utilization pattern is the distribution of area on which different activities are undertaken. Agricultural land is becoming a scarce commodity and shrinking land is a challenge for agricultural development in Bihar. Data pertaining to the land use pattern in Bihar showed that the net sown area is declining and areas under current fallow and land under non-agricultural uses have increased over the last 10 years. An annual decline of about 15 thousand hectares in net area sown has been observed during last 10 years. (Singh, et al., 2014)

The present study is an attempt to understand the changes taking place in land use pattern in the state of Bihar, and different agro-climatic zones of Bihar to understand the dynamics and causes of changes after bifurcation of the state for decade 2003-2013, data for which was available.

Methodology

The study is based on secondary data collected from various published sources like various issues of Bihar through Figures, Statistical Handbook of Agriculture, Bihar Economic Survey and also various online resources like websites of Agriculture Department and Horticulture Mission of Government of Bihar for the period under reference, i.e., 2003-2013.

Bihar has been divided into three agro-climatic zones such as Zone-I, Zone-II and Zone-III based on soil, land use, topography and other such natural parameters. Zone-I & Zone-II are located north of river Ganga and are named as North Western and North Eastern Alluvial Plains Zone, respectively are characterized as flood prone compared to Zone-III, which falls under South of river Ganga and are called as South Bihar Alluvial Plains Zone.

Compound Growth Rate (CGR) was worked out using exponential equation

$$Y = ab^t$$

$$r = (\text{antilog } 'b' - 1) \times 100$$

Where Y = different components of land use pattern (in '000 ha)

a = Intercept

b = Regression coefficient

t = Time periods (t = 1,2,3,……10)

r = Compound Growth Rate (CGR) per annum.

Results and Discussion

Changes in Land Use Pattern in Bihar

Table 1 reveals the changes in land use pattern during the periods between TE-2003 and TE-2013, showing the changes in different activities over the periods. The higher the proportion of net sown area to the total geographical area higher the agricultural production (Malik, 2012). It is observed that the net sown area for the state as a whole has markedly reduced from 63.73 percent during TE-2003 to nearly 57.19 percent during the year TE-2013, the compound growth rate for the same was also found to be negative

(– 0.29%). Rise in the area under non-agricultural uses, land under trees & groves as well as area under current fallow may also be the one of the reasons for decline in net sown area. The area put to non agricultural uses has sharply ascended from 17.53 to 18.20 percent, the area under this category increased at 0.20 percent per annum. The reason

for sharp increase in area under this activity may probably be attributed to settlement of rising human population, construction of recreation grounds, development of infrastructural facilities for public, set up of factories/ companies etc. The land under trees & groves set the rising trend at 0.16 percent per annum. Thus, the total uncultivable land has jumped up from 39.27 to 42.81 percent during the period under study. Further, it was observed that the land under current fallow has risen at 2.21 percent per annum during the study period. Swift rise in current fallow may probably be due to the global warming situation causing erratic rainfall, decline in water table, rising cost of production as well as leaving the soil fallow for maintaining soil fertility/ health.

TABLE 1: LAND UTILIZATION PATTERN IN BIHAR (AREA IN '000 HA)

Sl. No.	Particulars	TE-2003	TE-2013	CGR (2003-13)
1.	Geographical area	9359.57 (100.00)	9359.57 (100.00)	-
2.	Forests	619.91 (6.62)	621.64 (6.64)	0.00
3	Barren and unculturable Land	436.46 (4.66)	431.71 (4.61)	-0.06
4	Land put to non -agricultural use	1641.05 (17.53)	1703.50 (18.20)	0.20
	(a). Land area	1278.98 (13.66)	1346.77 (14.39)	0.27
	(b). Permanent water area	207.39 (2.22)	207.39 (2.22)	0.00
	(c). Temporary water area	154.68 (1.65)	149.02 (1.59)	-0.18
5	Culturable waste land	46.22 (0.49)	45.15 (0.48)	0.09
6	Permanent pasture	17.77 (0.19)	15.67 (0.17)	-0.66
7	Land under trees & groves	234.21 2.50	245.10 (2.62)	0.16
8	Fallow land other than current fallow	134.21 (1.43)	121.59 (1.30)	-0.43
9	Current fallow	545.86 (5.83)	822.72 (8.79)	2.21
10	Total unculturable land(2 to 8)	3675.70 (39.27)	4007.08 (42.81)	0.41
11	Net area sown	5683.87 (60.73)	5352.49 (57.19)	-0.29

Source: Various issues of Bihar through Figures, Bihar Economic Survey Govt. of Bihar, Patna

Figures in parentheses indicate percentage values

CGR: Compound Growth Rate

Agro-Climatic Zone-wise land use pattern in Bihar.

Land use pattern in agro-climatic Zone-I (Table 2) reveals that the net sown area has declined from 66.01 to 64.23 percent during the period TE-2003 & TE-2013, per annum decline in it (growth rate) was estimated as negative (- 0.10%). The area under another activity such as non-agricultural uses has been recorded as to escalate at 0.13 percent compound growth rate.

TABLE 2: LAND USE PATTERN IN AGRO-CLIMATIC ZONE-I OF BIHAR (AREA IN '000 HA)

Sl. No.	Particulars	TE-2003	TE-2013	CGR (2003-13)
1.	Geographical area	3449.10 (100.00)	3449.10 (100.00)	-
2	Forests	91.86 (2.66)	91.86 (2.66)	0.00
3.	Barren and unculturable Land	101.37 (2.94)	100.00 (2.90)	-0.08
4.	Land put to non- agricultural use	685.05 (19.86)	703.28 (20.39)	0.13
	(a). Land area	526.64 (15.27)	547.33 (15.87)	0.20
	(b). Permanent water area	88.85 (2.58)	88.85 (2.58)	0.00
	(c). Temporary water area	69.57 (2.02)	66.95 (1.94)	-0.22
5.	Culturable waste land	5.47 (0.16)	5.11 (0.15)	-0.30
6	Permanent pasture	5.84 (0.17)	5.35 (0.16)	-0.41
7.	Land under trees & groves	144.64 (4.19)	150.48 (4.36)	0.16
8.	Fallow land other than current fallow	25.37 (0.74)	23.14 (0.67)	-0.42
9.	Current fallow	112.87 (3.27)	154.43 (4.48)	0.98
10.	Total unculturable land (2 to 8)	1172.47 (33.99)	1233.66 (35.77)	0.19
11.	Net area sown	2276.63 (66.01)	2215.44 (64.23)	-0.10

Figures in parentheses indicate percentage values

Further, the land under tree crops & groves has also gone up at 0.16% per annum growth rate. The barren and unculturable land includes lands in mountains and hill slopes, desert, plateaus, rocky area and extremely degraded lands. These lands cannot be brought under cultivation unless at a very high input cost with possible low returns. So it is not beneficial to bring these lands under cultivation because it demands a very high input cost with possible low returns (Malik, 2012). It is observed that the area under barren and unculturable land have been reduced marginally over the period under study.

It can be inferred that the decline in net sown area may be on account of shift of agricultural lands towards non-agricultural uses such as settlement for rising population, expansion for public infrastructures, recreation grounds and development of industries etc. as well as also on account of putting more area under trees and groves and current fallows. On the other hand, the reason for rise in current fallow may be due to continued global warming situation, leading to erratic rainfall, declining water table, growing cereal crops like paddy and wheat becoming un-remunerative due to high cost of production as well as leaving the land fallow for maintaining the soil fertility.

Land use pattern in agro-climatic Zone-II of the state has been presented in Table 3. A perusal of the figures presented in table indicates that net sown area continued to decline as its growth rate declined at the rate of (-) 0.03 percent per annum.

TABLE 3: LAND USE PATTERN IN AGRO-CLIMATIC ZONE-II OF BIHAR (AREA IN '000 HA)

Sl. No.	Particulars	TE-2003	TE-2013	CGR (2003-13)
1.	Geographical area	1798.12 (100.00)	1798.12 (100.00)	-
2.	Forests	3.09 (0.17)	3.09 (0.17)	0.00
3.	Barren and unculturable Land	100.13 (5.57)	99.16 (5.51)	-0.06
4.	Land put to non-agricultural use	323.64 (18.00)	335.28 (18.65)	0.18
	(a). Land area	241.30 (13.42)	252.97 (14.07)	0.24
	(b). Permanent water area	58.81 (3.27)	58.81 (3.27)	0.00
	(c). Temporary water area	23.53 (1.31)	23.48 (1.31)	0.01
5.	Culturable waste land	6.56 (0.36)	6.01 (0.33)	-0.42
6	Permanent pasture	2.90 (0.16)	2.45 (0.14)	-0.86
7.	Land under trees & groves	59.84 (3.33)	61.79 (3.44)	0.11
8.	Fallow land other than current fallow	33.90 (1.89)	33.41 (1.86)	0.28
9.	Current fallow	100.39 (5.58)	122.40 (6.81)	1.19
10.	Total unculturable land(2 to 8)	630.46 (35.06)	663.59 (36.90)	0.07
11.	Net area sown	1167.66 (64.94)	1134.53 (63.10)	-0.03

Figures in parentheses indicate percentage values

Following the same trend as in Zone-I, the area put to non-agricultural uses and the land under tree crops and groves in Zone II also showed an increasing trend which recorded to have CGR of 0.18 percent and 0.11 percent, respectively. The reasons for decline in the net sown area and rise in the land under tree crops and groves may probably be the same as has been explained earlier. The interesting point to note is that in Zone-II, area concerning fallow land other than current fallow has registered increasing trend, revealing the CGR at 0.28 percent. The growth in current fallow area was recorded comparatively larger (1.19%). Since, Zone-II is more flood prone area, thus the fallow lands of both categories in this zone may have increased due to the reasons that the farmers may have kept their land as fallow on account of recurring devastating flood.

Table 4 consists of land use pattern of agro-climatic Zone-III of the state revealed the extent of changes accrued so far in different activities, included in the table over the period under study.

TABLE 4: LAND USE PATTERN IN AGRO-CLIMATIC ZONE-III OF BIHAR (AREA IN '000HA)

Sl. No.	Particulars	TE-2003	TE-2013	CGR (2003-13)
1.	Geographical area	4112.36 (100.00)	4112.36 (100.00)	0.00
2.	Forests	524.95 (12.77)	526.68 (12.81)	0.00
3.	Barren and unculturable Land	234.96 (5.71)	232.55 (5.65)	-0.06
4	Land put to non- agricultural use	632.36 (15.38)	664.94 (16.17)	0.27

TABLE 4: LAND USE PATTERN IN AGRO-CLIMATIC ZONE-III OF BIHAR (AREA IN '000HA)—*CONTD.*

Sl. No.	Particulars	TE-2003	TE-2013	CGR (2003-13)
	(a). Land area	511.04 (12.43)	546.47 (13.29)	0.35
	(b). Permanent water area	59.73 (1.45)	59.73 (1.45)	0.00
	(c). Temporary water area	61.58 (1.50)	58.59 (1.42)	-0.22
5.	Culturable waste land	34.19 (0.83)	34.03 (0.83)	0.00
6.	Permanent pasture	9.04 (0.22)	7.87 (0.19)	-0.76
7.	Land under trees & groves	29.73 (0.72)	32.84 (0.80)	0.23
8.	Fallow land other than current fallow	74.94 (1.82)	65.04 (1.58)	-0.77
9.	Current fallow	332.60 (8.09)	545.88 (13.27)	2.84
10.	Total unculturable land(2 to 8)	1872.77 (45.54)	2109.83 (51.30)	0.66
11.	Net area sown	2239.59 (54.46)	2002.52 (48.69)	-0.62

Figures in parentheses indicate percentage values

So far as the net sown area is concerned, the compound growth rate was estimated negative (- 0.62%), indicating thereby decline in net sown area over the periods TE-2003 to TE-2013. There has been a rapid increase in the area put to non-agricultural uses as it was upheld by the comparatively larger compound growth rate (0.27%). Larger growth in this category of land may be assigned to the fact that the pace of urbanization, zone being the centre/ capital of the state, was comparatively high in this zone.

The other reason may be concentration of industries, fast pace of expansion of infrastructures in this zone. The land covered under trees & groves has also gone up at 0.23 percent compound growth rate, because cultivators of this zone are leaving their lands under this category due to scarcity of irrigation water sharpened by declining water table in the area. On the other hand, the current fallow land has been found rising at 2.84 percent per annum growth rate, this may probably be also on account of scarcity for irrigation water arising from declining water table in the zone, farmers are putting their land as current fallow.

Conclusions

It is quite apparent from the agro-climatic zone-wise analysis above, that net sown area has reduced sharply in Zone-III as compared to Zone-I and Zone-II. Further, net sown area for the state as a whole has also shown a declining trend which might be due to increase in the following categories of land such as area under non-agricultural uses, area put to trees and groves and area under current fallow in the state. The pressure of rising population on land has led to shift of cropped land towards the categories of non-agricultural uses. The scarcity of irrigation water, labour etc may be the probable cause for shift of land to tree crops current fallows. Other studies have also found that decline in net sown area is mainly due to unabated and massive conversion of agricultural land for building houses and construction of infrastructure. Similarly, increase in current fallows might be due to erratic rainfall, peak time scarcity of labour, unreliable and costly irrigation and tiny unviable farm holdings in Bihar. Policy makers are not realizing the challenge posed to agriculture due to decline in net area sown and increasing fallow land in the state which warrants their immediate attention (Singh et al. 2014).

On account of rapid changes in the climate world over, water table in the state has also gone down leading to rising cost of irrigation. Further, due to shortage of electricity, the state largely uses diesel pumps for irrigation this along with declining water table puts the small and marginal farmers of the state under tremendous pressure as to how raise the productivity/income from per unit decreasing crop land. Contemplating the foregoing discussion, it may be suggested that timely supply of quality seeds, fertilizers larger use of electrical and solar devices for extraction of irrigation water, desiltation of canals and also linking different canals as well as proper marketing of agricultural produces will certainly encourage the farmers for not putting their land as current fallow and also help them in harvesting/garnering more income from per unit of land area.

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Status of Small and Marginal Dalit Farmers in Karnataka

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Abstract

According to National Sample Survey Organisation (NSSO) (2003) report, 89.35 million farmer's households were engaged in agricultural activities in rural India. Agricultural sector significantly contributed to GDP since independence. In 1970-71, agriculture contributed about 44 per cent to GDP, which declined to 31.4 per cent in 1990-91, again declined to 16.8 in 2007-08 and further declined to 14.6 per cent in 2010-11(CSO, 2011). There are 48.67 lakh hectares of land which were operated by marginal farmers during 2010-11 in overall Scheduled Caste (SCs) community in India. In Karnataka state, Small farmers operated on 6.15 lakhs hectors of land during same period. Karnataka was purposively selected as the study area. The sample respondents were selected by using the multi-stage random sampling technique. In the first stage, the entire state was divided into three main regions, namely, North, Central, and South Karnataka. In the second stage, according to Census 2011, two districts with the highest SC population in each region were selected as the study areas. In the third stage, two villages with highest SC population were selected in each district. Finally, in each village, 150 households were selected randomly. The total sample size is 1,800.

The main findings of the paper are: Cauvery River provides water to two villages (Sosale and Muguru) in the whole year. In addition, Dalits are able to get full employment in their villages in Kharif and Rabi seasons. Secondly, majority of the Dalits do not have own land. Among the landless people, Mugalkhod Dalits are high. Due to lack of land, superstition, illiteracy etc., the Mugalkhod and Harugeri villages' women are practicing Devadasi system in their villages. Thirdly, in overall study villages, nearly 30 per cent of the Dalits are having own land. Among the land households, many of the Dalit's land size are less than one acre. Finally, 60 Dalit households received land from the Government and same households reported that Government allotted land were not suitable for cultivation.

Key Words: Small, Marginal and Dalits Farmers in Karnataka.

Introduction

According to National Sample Survey Organisation (NSSO) (2003) report, 89.35 million farmer's households were engaged in agricultural activities in rural India. Agricultural sector significantly contributed to GDP, since independence. In 1970-71, agriculture contributed about 44 per cent to GDP, which declined to 31.4 per cent in 1990-91, again declined to 16.8 in 2007-08 and further declined to 14.6 per cent in 2010-11 (at 2004-05 prices), (CSO, 2011). According to usual principal status, 204.4 millions of the people were engaged in agricultural sector during 2011-12 (Economic Survey, 2014-15). Agricultural sector export value declined from 18.5 per cent in 1990-91 to 10.6 per cent in 2009-10. In most of the developed countries, GDP comes from the Services and Industrial sectors. There are 359.08 lakhs hectares of land which were operated by marginal farmers during 2010-11 in all overIndia, in all social groups. But in case of Karnataka, all social groups' marginal farmers, operated land share is 4.15 per cent to the all India level. In case of Scheduled Caste, there are 48.67 and 2.44 lakhs hectors of land operated by marginal farmers land during 2010-11 in India and Karnataka state, respectively. In case of Small farmers, there are 34.55 and 3.71 lakhs of hectors of land that were operated in India and Karnataka, respectively.

The above data indicates that the government of India has given importance to agricultural sector but, the agricultural sector's contribution to GDP has come down drastically. India is a caste based society. Socially advanced group of people are occupied in various occupations in India. Most of the land is in their hands, since much before independence. The ownership pattern of land has been slowly shifting towards Other Backward Communities (OBC), Scheduled Caste (SC), Scheduled Tribes (ST) and women. In this direction, the paper intends to investigate the status of Small and Marginal Dalit Farmers in Karnataka.

Methodology of the Study

Karnataka was purposively selected as the study area. The study employed rigorous field work and collected the data for both qualitative and quantitative analysis. The study is based on the interdisciplinary approach to understand the

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persisting socio-economic conditions of the Dalit community. Secondary data was used to obtain background information on the Dalit community in Karnataka. The sample respondents were selected by using the multi-stage random sampling technique and the simplest form of the entire sampling procedure is presented in Table1. In the first stage, the entire state was divided into three main regions, namely, North, Central, and South Karnataka. In the second stage, according to Census 2011, two districts with the highest SC population in each region were selected as the study areas. The selected districts are Belagavi (Belgaum) and Kalaburagi (Gulbarga) in North Karnataka, Chitradurga and Davanagere in Central Karnataka and Mysuru and Tumakuru in South Karnataka. In the third stage, in each district two villages with highest SC farmers households in Karnataka.

population were selected. The selected villages are: Harugeri (Population 5,846) and Mugalkhod (5,579) in Belagavi district; Srinivas saradgi (4,374) and Ravoor(3,794) in Kalaburagi; Naikanahatti (2,759) and Adivala (2,692) in Chitradurga; Towdur (3,387) and Uchangidurga (2,823) in Davanagere; Sosale (5,084) and Muguru (2,995) in Mysuru; Madalur (1,951) and Kodigenahalli (1,764) in Tumakuru (Table1) (Maruthi and Busenna:2015a; Maruthi and Busenna 2015b; Maruthi and Busenna 2016). The primary survey conducted during 2013-14. Finally, in each village, 150 households were selected randomly. The total sample size is 1,800. The objectives of the paper are: firstly, to investigate the land size of the farmers in selected households in Karnataka, and Secondly, to investigate socio-economic profiles of

TABLE 1: VILLAGE-WISE POPULATION IN KARNATAKA STATE

Name of the Region	Name of the District	Name of the Village	Village total Population	Total-SC Population	Share of SC population in total village Population	Village share in District Population
North Karnataka	Belagavi	Harugeri	28,754	5,846	20.3	1.30
		Mugalkhod	25,835	5,579	21.6	1.24
	Kalaburagi	Srinivas saradgi	7,523	4,374	58.1	0.89
		Ravoor	12,117	3,794	31.3	0.77
Central Karnataka	Chitradurga	Naikanahatti	15,545	2,759	17.7	0.83
		Adivala	7,550	2,692	35.7	0.81
	Davanagere	Towdur	6,113	3,387	55.4	1.07
		Uchangidurga	9,781	2,823	28.9	0.89
South Karnataka	Mysuru	Sosale	7,260	5,084	70.0	1.34
		Muguru	8,393	2,995	35.7	0.79
	Tumakuru	Madalur	6,518	1,951	29.9	0.45
		Kodigenahalli	7,075	1,764	24.9	0.41

Source: Census 2011.

Occupation of Head of the Households

The important occupations in rural areas are Self employment in agriculture, business, govt. employment, private employment, agriculture labour, non-agriculture labour, pensioner, dependent, household work, and others. Gang et al (2012) expressed that Dalits economic status is still very pathetic and their share is highest in below poverty in India. The authors also examined determinants of occupational diversification with multinomial logit models and a pooled data-set combined which the five waves of the Consumer Expenditure Surveys (CES) of the NSSO. The study period was from 1983-84 to 1999-2000. The authors compared SC/ST population to that of general population, and by religion. The authors stressed the poverty and occupational category, and they found that there is a strong correlation between poverty incidence and occupation in rural India. The agricultural labours are most likely to be in poverty. The poverty incidence declined from 1983-84 to 2004-05 in all social groups but there was little variation among the groups. The study found that during 1983-2004, SC occupations were shifting from agricultural labour to other occupations due to significant improvement in education sector. Second reason is that SC households have been able to move away from menial occupation, whereas ST households still in same condition. The empirical study identified the direct effect of caste/tribe identity on occupational segregation over course of time.

According to the survey results, most of the Dalit head of the household's main occupations during 2013-14 is presented in Table2. If overall agriculture and non-agriculture labour are pooled together, nearly 66 per cent of the Dalits are found to be still working as labours. Here, Dalit's capabilities are very less. Government has to distribute the barren/uncultivated Government and private land to the Dalits. This leads to improve the socio-economic conditions of Dalits. In addition, most of the agricultural

labours comes from Mugualkhod village (64%), followed by Uchangidurga (55%), Harugeri (54%) and last place occupied by Muguru (13%). The Muguru and Sosale villages are very few where Dalits are mainly working as agricultural labour. These two villages have good irrigation sources and Dalit capabilities are more in those village compared to other villages.

TABLE 2: MAIN OCCUPATION OF THE HEAD OF THE HOUSEHOLDS (2013-2014) (PERCENTAGE)

Village/District	Self-employed	Business	Govt. employment	Private employment	Agricultural labour	Non-agricultural labour	Pension	Dependent	House hold work	Others
Harugeri	1.33	1.33	3.33	4.00	52.67	35.33	1.33	0.00	0.00	0.67
Mugalkhod	1.33	0.67	2.67	3.33	62.67	26.67	0.67	0.67	0.00	1.33
Belagavi	1.33	1.00	3.00	3.67	57.67	31.00	1.00	0.33	0.00	1.00
Ravoor	8.67	8.67	1.33	4.00	29.33	44.67	1.33	0.00	0.00	2.00
Srinivas saradgi	12.67	4.67	5.33	5.33	44.00	19.33	2.00	6.00	0.00	0.67
Kalaburagi	10.67	6.67	3.33	4.67	36.67	32.00	1.67	3.00	0.00	1.33
Adivala	17.33	0.00	2.00	2.00	55.33	22.00	0.00	0.67	0.00	0.67
Nayakanahatti	26.67	1.33	4.00	3.33	53.33	8.67	1.33	0.67	0.00	0.67
Chitradurga	22.00	0.67	3.00	2.67	54.33	15.33	0.67	0.67	0.00	0.67
Uchangidurga	2.67	3.33	1.33	8.00	39.33	44.67	0.00	0.00	0.00	0.67
Towdor	8.00	4.00	3.33	11.3	45.33	16.67	1.33	7.33	1.33	1.33
Davanagere	5.33	3.67	2.33	9.67	42.33	30.67	0.67	3.67	0.67	1.00
Muguru	41.33	0.00	2.00	4.00	12.00	14.67	12.0	13.3	0.67	0.00
Sosale	17.33	2.00	4.00	4.00	15.33	26.00	13.3	11.3	6.67	0.00
Mysuru	29.33	1.00	3.00	4.00	13.67	20.33	12.7	12.3	3.67	0.00
Kodigenahalli	18.00	8.00	0.67	6.00	30.67	32.00	2.00	0.00	0.67	2.00
Madalur	7.33	24.67	1.33	4.00	34.00	22.67	4.00	0.00	1.33	0.67
Tumakuru	12.67	16.33	1.00	5.00	32.33	27.33	3.00	0.00	1.00	1.33
Total	13.56	4.89	2.61	4.94	39.50	26.11	3.28	3.33	0.89	0.89

Source: Primary data, 2014.

Households Income

Income is very important for the households To meet day to day expenses. According to our survey, the average income of Dalits is .43,998 in 2013-14. The average income of Muguru Dalit is .1, 09,770 and it is the highest among the villages, followed by Adivala (.56,363), Towdor (.52,925) and last place is occupied by Kodigenahalli (.15,901) (Table3). The income increased tremendously in Muguru village as compared to other villages as it is clearly depicted in Figure1. Most of the Muguru households are having irrigated land as compared to other villages. And also they cultivated two crops during the study period; due to this reason, their average income is higher as compared to other villages.

TABLE 3: INCOME OF THE HOUSEHOLDS (IN₹.)

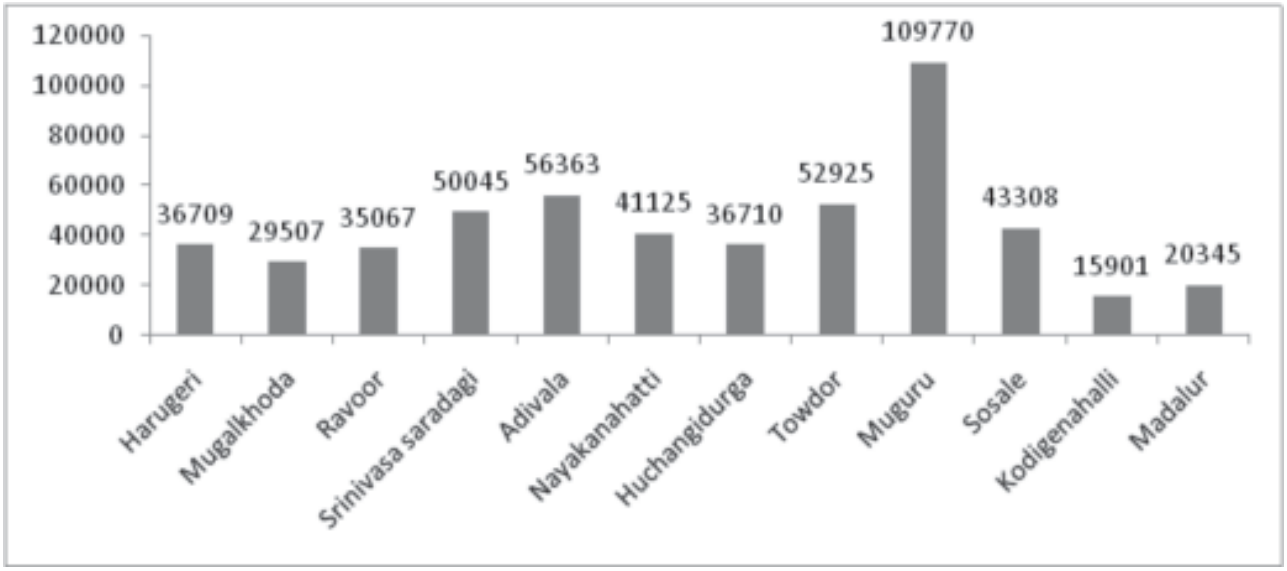
Village/District	Total Households	Total Income	Average Income
Harugeri	148	5433000	36709
Mugalkhod	149	4396600	29507
Belagavi	297	9829600	33096
Ravoor	150	5260000	35067
Srinivas saradgi	149	7456700	50045
Kalaburagi	299	12716700	42531
Adivala	150	8454500	56363
Nayakanahatti	148	6086500	41125
Chitradurga	298	14541000	48795

TABLE 3: INCOME OF THE HOUSEHOLDS (IN₹.)—CONTD.

Village/District	Total Households	Total Income	Average Income
Uchangidurga	149	5469800	36710
Towdor	149	7885800	52925
Davanagere	298	13355600	44817
Muguru	148	16246000	109770
Sosale	147	6366300	43308
Mysuru	295	22612300	76652
Kodigenahalli	147	2337400	15901
Madalur	148	3011000	20345
Tumakuru	295	5348400	18130
Total	1782	78403600	43998

Source: Primary data, 2014.

Figure-1: Average Income of the Households in Selected Villages in Karnataka State (in₹.)

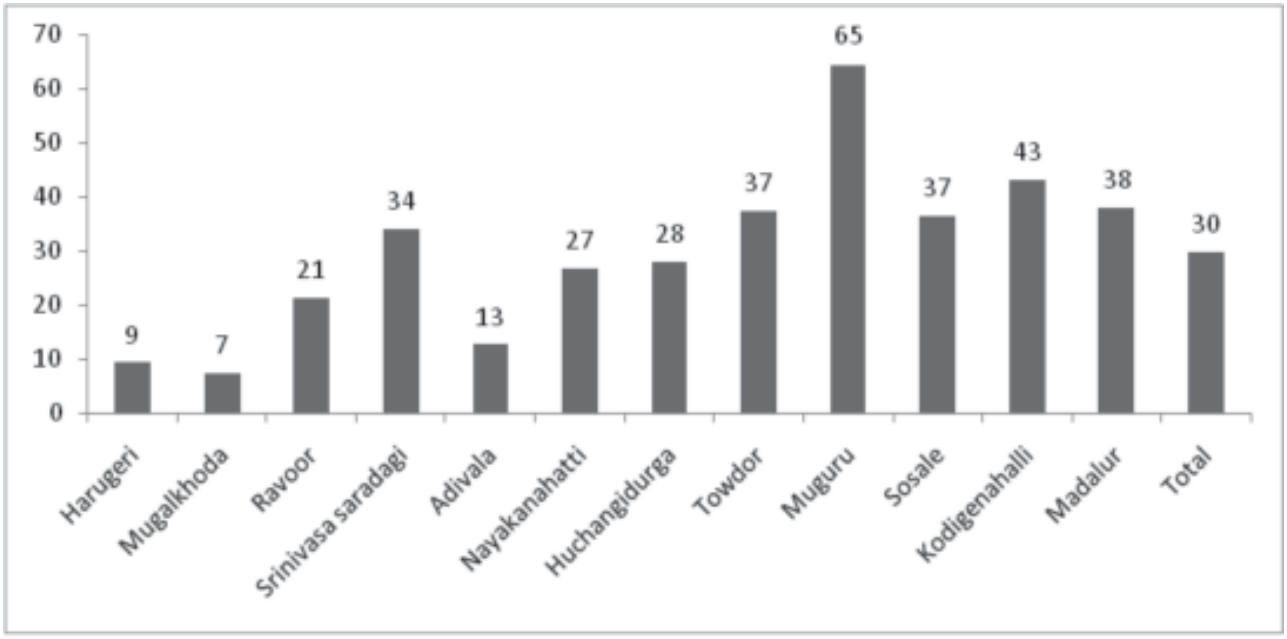


Source: Primary data, 2014.

Land and Dalits

Land is an important asset and livelihood for rural people in general and the Dalits in particular. Without land survival is very difficult in rural areas. According to fact sheet (2006), Dalits suffered from displacement from land through ages. The government of India abolished tenancy system and Karnataka and Maharashtra states implemented the tenancy system, whereas other states have not. The Bhoodan movement was introduced in Telangana region of Andhra Pradesh and its success was on paper only. Overall, the study reveals that inequalities are high between Dalit and non-Dalits. The study analyzed the SC, STs and others in land holdings and land sizes in different places of India. But there exists high inequalities among the social groups particularly among the Dalits. They work in their small land holdings and they also work as agricultural labour and non agricultural workers. Labour occupation is the main income sources of Dalits. Our primary survey data reveals that majority (70%) of the Dalits do not have own land. Among the landless people, Mugalkhod (93%) Dalits are highest followed by Harugeri (91%), Adivala (87%) and last places is occupied by Muguru (35%). Due to lack of land, superstition and illiteracy; Mugalkhod and Harugeri villages Dalits women are still practicing Devadasi system. As against this, 30 per cent of the Dalits have own land. Among the villages, nearly 65 per cent of the Muguru villages Dalits are having own land, followed by Sosale (37%) and Towdor (37%) villages. The details are presented in Table4 and Figure2.

Figure2: Land Ownership Pattern Among Dalit in Selected Villages in Karnataka State (Percentage)



Source: Primary data, 2014.

TABLE 4: EXTENT OF OWNING LAND

Village/District	Owning Land	Not Owning Land	Total
Harugeri	14(9.33)	136 (90.67)	150
Mugalkhod	11 (7.33)	139 (92.67)	150
Belagavi	25 (8.33)	275 (91.67)	300
Ravoor	32(21.33)	118 (78.67)	150
Srinivas saradgi	51(34.00)	99 (66.00)	150
Kalaburagi	83 (27.67)	217 (72.33)	300
Adivala	19(12.67)	131(87.33)	150
Nayakanahatti	40(26.67	110 (73.33)	150
Chitradurga	59 (19.67)	241(80.33)	300
Uchangidurga	42 (28.00)	108 (72.00)	150
Towdor	56(37.33)	94 (62.67)	150
Davanagere	98(32.67)	202(67.33)	300
Muguru	97(64.67)	53(35.33)	150
Sosale	55(36.67)	95(63.33)	150
Mysuru	152(50.67)	148 (49.33)	300
Kodigenahalli	65(43.33)	85 (56.67)	150
Madalur	57 (38.00)	93 (62.00)	150
Tumakuru	122(40.67)	178 (59.33)	300
Total	539(29.94)	1261(70.06)	1800

Source: Primary data, 2014.

Land Holdings

Land size is also very important for the people. The study results revealed that 94 per cent of the Dalits' land size is less than five acres and within this, many of the Dalit's land size is less than one acre. Among the selected villages, highest small and marginal farmers are found in Muguru (97), followed by Kodigenhalli (61) and Madalur (55). Only 28 farmers are having more than five acres and less than 10 acres of land (they come under medium farmers) in selected villages. Among the villages, in Ravoor village, land size is more than five acres (9 members) followed by Srinivas saradgi (5) and Towdor (4) and Kodigenahalli (4). At the same time, out of 1800 households, large farmers are only two members and one belongs to Srinivas saradgi and the other is in Towdor village and the details are presented Table5 and Figure3.

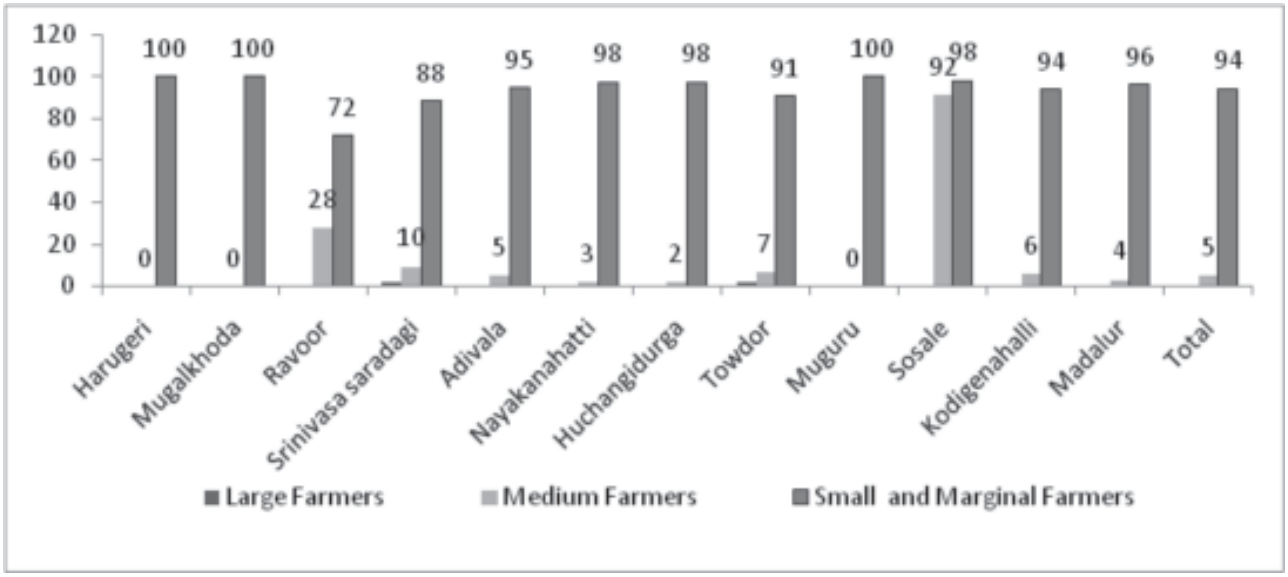
If we observe Table5, it indicates that most of the Dalits are landless labour and very few of them are small and marginal farmers. According to our primary survey, it can be suggested that the Government should distribute the Government and private land for improvement of the Dalit capabilities. If Government distributes at least five acres of land to each Dalit household, then Dalit capabilities would improve appreciably. According to Wahane (2012), nearly 80 per cent of the Dalits live in rural areas and they depend on agriculture and allied activities to earn their livelihood. Land is a very important asset for Dalits and it is a medium to overcome the caste discrimination in the rural society. Vinoba Bhave brought Bhoodan movement in Maharashtra state. Under this movement, Maharashtra state distributed 88,462 acres of land. The study found that this land distribution movement stopped migration of nearly 76 per cent families. At the same time, after receiving land from the government, nearly 85 per cent of the families felt economic independency. According to the above study, the socio-economic status become better after receiving the land in the study villages.

TABLE 5: LAND PARTICULARS OF DALITS IN SELECTED VILLAGES IN KARNATAKA

Village/ District	Large Farmers	Medium Farmers	Small and Marginal Farmers	Total
Harugeri	0 (0)	0 (0.00)	14 (100)	14
Mugalkhod	0 (0)	0 (0.00)	11 (100)	11
Belagavi	0 (0.00)	0 (0.00)	25 (100)	25
Ravoor	0 (0.00)	9 (28.13)	23 (71.88)	32
Srinivas saradgi	1(1.96)	5 (9.80)	45 (88.24)	51
Kalaburagi	1(1.20)	14 ((16.87)	68 (81.93	83
Adivala	0 (0.00)	1 (5.26)	18 (94.74)	19
Nayakanahatti	0 (0.00)	1 (2.50)	39 (97.50)	40
Chitradurga	0 (0.00)	2 (3.39)	57 (96.61)	59
Uchangidurga	0 (0.00)	1 (2.38)	41 (97.62)	42
Towdor	1 (1.79)	4 (7.14)	51 (91.07)	56
Davanagere	1 (1.02)	5 (5.10)	92 (93.88)	98
Muguru	0 (0.00)	0 (0.00)	97 (100)	97
Sosale	0 (0.00)	1 (91.82)	54 (98.18)	55
Mysuru	0 (0.00)	1 (0.66)	151 (99.34)	152
Kodigenahalli	0 (0.00)	4 (6.15)	61(93.85)	65
Madalur	0 (0.00)	2 (3.51)	55 ((96.49)	57
Tumakuru	0 (0.00)	6 (4.92)	116 (95.08)	122
Total	2 (0.37)	28 (5.19)	509 (94.43)	539

Source: Primary data, 2014.

Figure3: Land Particulars of Dalits in Selected Villages in Karnataka (Percentage)



Source: Primary data, 2014.

Neighbour Farmers

We enquired from the Dalit farmers about their neighbor farmers and a large part of the Dalits reported that same caste (425) farmers are their neighbor, followed by OCs (31), BCs (30) and STs (7). The details are presented in Table6. Here, the behaviors of the other communities are presented. In general, farmers are co-operating while they are cultivating their land. But, sometimes caste factor may be taking place among the farmers. According to our study, data reveals that 30 members treated well and another eight members reported that OCs and BCs were helping Dalits agricultural development and a small number of Dalits reported that OCs and BCs (8) were not helping the Dalits, rather they created problems and seven Dalits members said that other community and BCs were not happy with Dalit agriculture development. The details are presented in Table7.

Treatment of Dalits

We enquired about behavior of OCs and BCs towards Dalits in their respective villages. They reported that OCs and BCs treated them well and a few (5) of Dalits reported that their treatment was very bad. At the same time, four Dalits reported that OCs and BCs do not treat Dalits well. And also same Dalits reported that casteism prevails in their villages. According to the field data some of Dalits felt very happy with OC and BCs treatment. However, Dalit were unable to talk about their rights before the public and other places due to fear and the details are presented in Table7.

TABLE 6: DALITS NEIGHBOUR FARMERS

Village/District	SC	ST	BC	OC	Total
Harugeri	11	0	0	3	14
Mugalkhod	7	0	0	3	10
Belagavi	18	0	0	6	24
Ravoor	22	0	2	3	27
Srinivas saradgi	24	2	0	3	29
Kalaburagi	46	2	2	6	56
Adivala	13	0	1	0	14
Nayakanahatti	35	1	2	1	39
Chitradurga	48	1	3	1	53
Uchangidurga	31	0	5	4	40
Towdor	46	0	4	6	56
Davanagere	77	0	9	10	96

TABLE 6: DALITS NEIGHBOUR FARMERS—CONTD.

Village/District	SC	ST	BC	OC	Total
Muguru	89	0	1	2	92
Sosale	49	0	1	0	50
Mysuru	138	0	2	2	142
Kodigenahalli	55	4	3	3	65
Madalur	43	0	11	3	57
Tumakuru	98	4	14	6	122
Total	425	7	30	31	493

Source: Primary data, 2014.

TABLE7: PARTICULARS OF ATTITUDE AND TREATMENT OF DALITS

Village/District	Agriculture Development					Treatment of Dalits by OCs and BCs			
	Good	Helping	Not Happy	Not Helping	Total	Good	Casteism Exists	Helping	Total
Harugeri	2	0	1	0	3	2	1	1	3
Mugalkhod	0	0	2	0	2	1	0	1	2
Belagavi	2	0	3	0	5	3	1	2	5
Ravoor	4	0	0	0	4	3	0	0	3
Srinivas saradgi	2	0	0	0	2	3	0	1	3
Kalaburagi	6	0	0	0	6	6	0	1	6
Adivala	1	0	0	1	2	1	0	0	2
Nayakanahatti	1	1	1	0	3	2	1	1	3
Chitradurga	2	1	1	1	5	3	1	1	5
Uchangidurga	1	2	2	3	9	7	2	2	9
Towdor	1	3	0	3	7	4	0	0	7
Davanagere	3	5	2	6	16	11	2	2	16
Muguru	1	1	0	0	2	1	0	0	1
Sosale	1	0	0	0	1	2	0	0	2
Mysuru	2	1	0	0	3	3	0	0	3
Kodigenahalli	5	1	1	1	8	8	0	0	8
Madalur	10	0	0	0	10	10	0	0	10
Tumakuru	15	1	1	1	18	18	0	0	18
Total	30	8	7	8	53	44	4	6	53

Source: Primary data, 2014.

Irrigation

For cultivating any crop, irrigation source is very important. According to our field observation, nearly 62 per cent of the Dalits depend upon rain water for their agriculture. Among the villages 60 Dalit households depend on rain water in Kodigenahalli followed by Towdor (53) and Madalur (51). The second major water source is River/ Canal water (30%) used by Dalits in selected villages in Karnataka. Among the study villages, in Muguru village 81 Dalits main source was river/ canal water followed by Sosale (47) and Harugeri (7) (Table8). Muguru and Sosale villages are receiving Cauvery River water for drinking and irrigation purpose. At the same time, open well (7), Multiple source (8), others (6) and Tanks (5) are other irrigational sources of Dalits in selected villages in Karnataka (Table8).

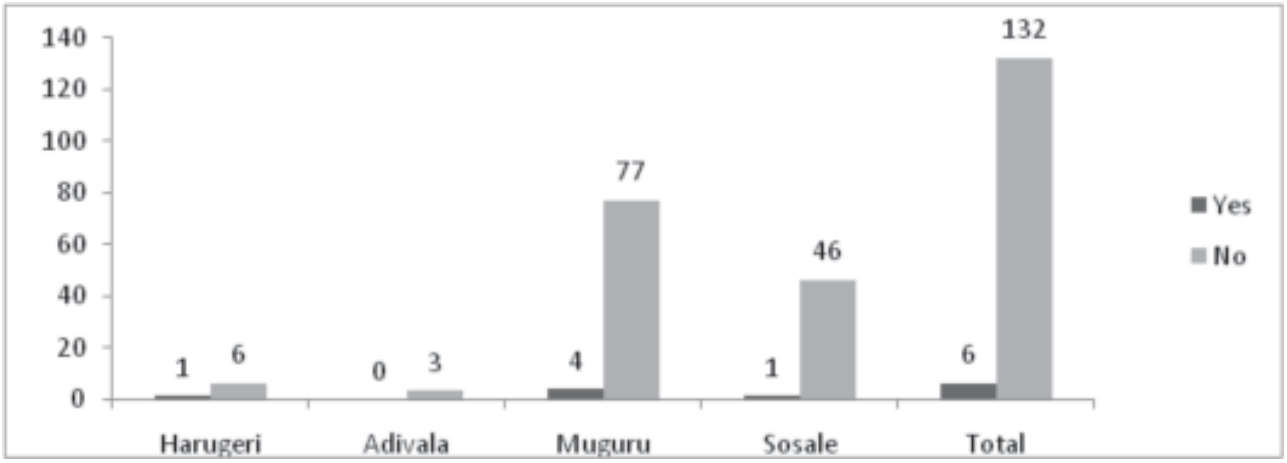
TABLE 8: SOURCES OF IRRIGATION WATER

Village/District	Tanks	Open wells	River/ Canals	Bore wells	Others	Multiple Sources	Rain Water	Total
Harugeri	1 (7.7)	1 (7.7)	7 (53.8)	0 (0.08)	0 (0.08)	1 (7.7)	3 (23.1)	13
Mugalkhod	0 (0.0)	0 (0)	0 (0.0)	2 (40.0)	0 (0.0)	0 (0.0)	3 (60.0)	5
Belagavi	1 (5.6)	1 (5. 6)	7 (38.8)	2 (11.1)	0 (0.0)	1 (5.6)	6 (33.3)	18
Ravoor	0 (0.0)	0 (0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	26 (100)	26
Srinivas saradgi	2 (8.0)	5 (20.0)	0(0.00)	3 (12.0)	3 (12.0)	1 (4.0)	11 (44.0)	25
Kalaburagi	2 (3.92)	5(9.8)	0(0.0)	3(5.8)	3(5.8)	1 (1.9)	37 (72.6)	51
Adivala	0 (0.00)	0 (0)	3 (21.4)	0 (0.0)	0 (0.0)	0 (0.0)	11 (78.6)	14
Nayakanahatti	0 (0.0)	0 (0)	0 (0.00)	2 (5.4)	3 (8.11	0 (0.00)	32 (86.5)	37
Chitradurga	0 (0.0)	0 (0)	3 (5.8)	2 (3.9)	3 (5.8)	0 (0.0)	43 (84.3)	51
Uchangidurga	0 (0.0)	0 (0)	0(0.0)	0 (0.0)	0 (0.0)	0 (0.0)	40 (100)	40
Towdor	0 (0.00)	0 (0)	0 (0.0)	2 (3.6)	0 (0.0)	0 (0.0)	53 (96.3)	55
Davanagere	0 (0.00)	0 (0)	0(0.0)	2 (2.1	0 (0.0)	0 (0.0)	93 (97.8)	95
Muguru	1 (1.1)	0 (0)	81 (91)	1 (1.1)	0 (0.0)	6 (6.7)	0 (0.0)	89
Sosale	1 (2.0)	1 (2.0)	47 (94)	1 (2.0)	0 (0.0)	0 (0.0)	0 (0.0)	50
Mysuru	2 (1.4)	1 (0.7)	128 (92.1)	2 (1.4)	0 (0.0)	6 (4.3)	0 (0.0)	139
Kodigenahalli	0 (0.0)	0 (0)	0 (0.0)	2 (3.2)	0 (0.0)	0 (0.0)	60 (96.7)	62
Madalur	0 (0.0)	0 (0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	51 (100)	51
Tumakuru	0 (0.0)	0 (0)	0 (0.0)	2 (1.7)	0 (0.0)	0 (0.0)	111 (98.2)	113
Total	5 (1.1)	7 (1.5)	138 (29.6)	13 (2.7)	6 (1.3)	8 (1.7)	290 (62.1)	467

Source: Primary data, 2014.

In general, while using canal/ river water, farmers face some problems. In our study villages, we enquired about problems faced by them while using canal/river water and nearly four per cent of the Dalits reported that they faced problems. But majorities of the Dalits have not faced any problem in their respective villages and details are depicted in Figure4. According to our observation, irregular canal repairs, scarcity of river water are the two major problems while using canal/ river water.

Figure4: Problem Faced While Using the Canal/River/Tank Water?



Source: Primary data, 2014.

A greater part of the Dalits land is ancestral (97%) and a few Dalits purchased land from different people. Among the villages of Harugeri (100%), Ravoor (100%), Adivala (100%), Nayakanahatti (100%) and Madalur (100%) villages, Dalits lands were ancestral (Table9) and in Mugalkhod (2), Srinivas saradgi (3), Uchangidurga (2), Towdor (2), Muguru (2), Sosale (2), and Kodigenahalli (3), Dalits had purchased land from different income source like Govt. jobs (1), Own money (7), retired amount (1), through loan (1), loan from friends (1) and details are presented in Table11. Majority of the Dalits have purchased land from OC (5) followed by SC (3), BC (2) and ST (1) and details are presented in Table10.

TABLE 9: ANCESTRAL OR PURCHASED YOUR LAND

Village/District	Ancestral	Purchased	Total
Harugeri	12 (100)	0 (0.00)	12
Mugalkhod	6 (75.00)	2 (25.00)	8
Belagavi	18 (90.00)	2 (10.00)	20
Ravoor	31 (100.00)	0 (0.00)	31
Srinivas saradgi	24 (88.89)	3 (11.11)	27
Kalaburagi	55 (94.83)	3 (5.17)	58
Adivala	14 (100.00)	0 (0.00)	14
Nayakanahatti	38 (100.00)	0 (0.00)	38
Chitradurga	52 (100.00)	0 (0.00)	52
Uchangidurga	38 (95.00)	2 (5.00)	40
Towdor	54 (96.43)	2 (3.57)	56
Davanagere	92 (95.83)	4 (4.17)	96
Muguru	90 (97.83)	2 (2.17)	92
Sosale	50 (96.15)	2 (3.85)	52
Mysuru	140 (97.22)	4 (2.78)	144
Kodigenahalli	62 (95.38)	3 (4.62)	65
Madalur	57 (100)	0 (0.00)	57
Tumakuru	119 (97.54)	3 (2.46)	122
Total	476 (96.75)	16 (3.25)	492

Source: Primary data, 2014.

TABLE 10: PARTICULARS OF FINANCE AND LAND INFORMATION

	Source of Finance for Purchase of Land						Details of Purchase of Land by Dalits				
Village/ District	Govt. Job	Own Money	Retired amount	Through loan	Friends	Total	OC	BC	SC	ST	Total
Mugalkhod	0	2	0	0	0	2	0	0	2	0	2
Belagavi	0	2	0	0	0	2	0	0	2	0	2
Srinivas saradgi	0	1	0	0	0	1	2	0	0	0	2
Kalaburagi	0	1	0	0	0	1	2	0	0	0	2
Uchangidurga	0	1	0	1	0	2	0	2	0	1	3
Towdor	1	1	0	0	0	2	1	0	0	0	1
Davanagere	1	2	0	1	0	4	1	2	0	1	4
Sosale	0	0	1	0	0	1	2	0	0	0	2
Mysuru	0	0	1	0	0	1	2	0	0	0	2
Kodigenahalli	0	2	0	0	1	3	0	0	1	0	1
Tumakuru	0	2	0	0	1	3	0	0	1	0	1
Total	1	7	1	1	1	11	5	2	3	1	11

Source: Primary data, 2014.

Land Distribution

Land is an important asset for Dalit households. Government of India and state government distributed barren/ excess land among poor and needy people. Every household needs some piece of land for their livelihood. According to Guru (1997), a piece of land is important for understanding of agrarian empowerment of Dalits and its implication on the social relations in the rural Maharashtra society. He focused on Dalit land issues, and its importance to the societies and Mahar watan land. The author stressed that Dalits who have invested on their labour power, have to depend on the rich peasantry for other requirements. To overcome their poverty, government must distribute land to landless Dalits. According to our primary data, 60 Dalit households received land from Karnataka Government. Among the villages, the percentage of extent of allotment were the highest among Srinivas sardgi village Dalits (29) compared to other villages followed by Uchangidurga (8) and Nayakanahatti (6). The details are presented in Table11. Majority of the Dalits received land before 1980s followed by the period 1981 to 2009 (Table11). Large part of the Dalits' water source is rain water (83.3%) followed by river (6.6%), bore well (5%), Canal (3.3%) and open well (1.6%) (Table12). Government has allotted land for Dalits. O an average, nearly 1.8 acres of land has been received by the beneficiaries in the state in Karnataka. According to beneficiaries opinion, 29 Dalits reported that their land is suitable for cultivating crops (Table12). According to our primary survey, 31 Dalits reported that the Government allotted land is not suitable for cultivation. The main reasons for unsuitability for cultivation are: Land is full of stones (27) and water problem (4) (Table12).

TABLE 11: EXTENT OF ALLOT BY GOVERNMENT LAND

Village /District	Extent of Allotment by Government Land			Year of Land Allotted by Government				
	Yes	No	Total	Before 1970	1971-1980	1981- 2000	2001-2009	Total
Harugeri	0 (0.00)	150 (100)	150	NA	NA	NA	NA	NA
Mugalkhod	1 (0.67)	149 (99.33)	150	0	1	0	0	1
Belagavi	1 (0.33)	299 (99.67)	300	0	1	0	0	1
Ravoor	2 (1.33)	148 (98.67)	150	0	1	1	0	2
Srinivas saradgi	29 (19.33)	121 (80.67)	150	3	11	10	5	29
Kalaburagi	31 (10.33)	269 (89.67)	300	3	12	11	5	31
Adivala	6 (4.00)	144 (96.00)	150	1	3	2	0	6
Nayakanahatti	3 (2.00)	147 (98.00)	150	1	1	0	1	3
Chitradurga	9 (3.00)	291 (97.00	300	2	4	2	1	9
Uchangidurga	8 (5.33)	142 (94.67)	150	6	1	1	0	8
Towdor	0 (0.00)	150 (100.0)	150	0	0	0	0	0
Davanagere	8 (2.67)	292 (97.33)	300	6	1	1	0	8
Muguru	3 (2.00)	147 (98.00)	150	0	0	3	0	3
Sosale	3 (2.00)	147 (98.00)	150	0	1	1	1	3
Mysuru	6 (2.00)	294 (98.00)	300	0	1	4	1	6
Kodigenahalli	4 (2.67)	146 (97.33)	150	1	2	1	0	4
Madalur	1 (0.67)	149 (99.33)	150	0	0	1	0	1
Tumakuru	5 (1.67)	295 (98.33)	300	1	2	2	0	5
Total	60 (3.33)	1740 (96.67)	1800	12	21	20	7	60

Source: Primary data, 2014.

TABLE 12: SOURCES OF IRRIGATION WATER

Village/ District	Sources of Irrigation						Suitability of the Land			Reasons for not Suitability of the Land		
	Bore well	Canal	Open well	River	Rain water	Total	Yes	No	Total	Land is full of stones	Water problem	Total
Mugalkhod	0	0	0	0	1	1	0	1	1	1	0	1
Belagavi	0	0	0	0	1	1	0	1	1	1	0	1
Ravoor	0	0	0	0	2	2	0	2	2	1	1	2
Srinivas saradgi	2	0	1	0	26	29	8	21	29	18	3	21
Kalaburagi	2	0	1	0	28	31	8	23	31	19	4	23
Adivala	0	0	0	0	6	6	2	4	6	0	6	6
Nayakanahatti	1	0	0	0	2	3	3	0	3	NA	NA	NA
Chitradurga	1	0	0	0	8	9	5	4	9	0	6	6
Uchangidurga	0	0	0	0	8	8	6	2	8	2	0	2
Davanagere	0	0	0	0	8	8	6	2	8	2	0	2
Muguru	0	0	0	3	0	3	3	0	3	NA	NA	NA
Sosale	0	2	0	1	0	3	3	0	3	NA	NA	NA
Mysuru	0	2	0	4	0	6	6	0	6	NA	NA	NA
Kodigenahalli	0	0	0	0	4	4	4	0	4	NA	NA	NA
Madalur	0	0	0	0	1	1	0	1	1	1	0	1
Tumakuru	0	0	0	0	5	5	4	1	5	1	0	1
Total	3	2	1	4	50	60	29	31	60	27	4	31

Source: Primary data, 2014.

Summary and Findings of Study

The Cauvery River is located in Mysuru district and provides water supply to the two villages (Sosale and Muguru) in the whole year. In addition, Dalits are able to get full employment in their villages in Khariff and Rabi seasons. According to our primary survey result, most of the Dalit head of the households' main occupation is agricultural labour. Land is an important asset and livelihood for rural people.

The main findings of the study are: Firstly, majority (70%) of the Dalits do not have their own land. Among the landless people, Mugalkhod Dalits are the highest followed by Harugeri, Adivala and last place occupied by Muguru. Lack of land, superstition and illiteracy in lead to the Mugalkhod and Harugeri village's women for practicing Devadasi system. Secondly, in the overall study villages, nearly 30 per cent of the Dalits are having own land. Among the land households, many of the Dalit's land size is less than one acre. For cultivating any crop, irrigation is very important for rural people. Thirdly, according to our field observation, nearly 62 per cent of the Dalits depend upon rain water for their agriculture. And, finally, our primary data reveals that 60 Dalit households received land from the Government. Among the villages, Srinivas sardgi village Dalits received the most as compared to other villages. At the same time, 31 Dalits reported that whatever the Government allotted land, it was not suitable for cultivation. The main reason for unsuitability for cultivation is that land is full of stones and has a water problem.

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AGRO-ECONOMIC RESEARCH

Estimation of Losses to Pulse Crops by Blue-Bulls in Uttar Pradesh

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1. Introduction

The country has attained self sufficiency in the production of wheat, rice, maize and jower but it is well behind in the production of pulses and oilseeds. The country is in a position to export wheat while pulses are being imported from pulse growing countries to meet the consumption need of the people. The bumper production of wheat and rice has created problems for its proper storage. Since advent of Green Revolution in the country followed by extension of irrigation networks and availability of quality inputs, the area under wheat and rice has been increasing at the cost of pulses. The area under pulses was 37.25 lakh hectares in 1970-71 in U.P. which had decreased to 24.16 lakh hectares in 2012-13, showing 35.14 per cent decrease over the period. The production of pulses in U.P. was 24.30 lakh M. Tonnes during 2004-05 which had decreased to 23.97 lakh M. Tonnes during 2011-12 thereby showing 1.36 per cent decrease over the period. There was a fall in area under pulses in U.P. However, the productivity of pulses has been increasing year by year due to impact of different sponsored central schemes. The reasons for shortfall in the production of pulses in U.P. are shrinkage in area of pulses, frequent occurrence of drought, excess rains, hail-storm, attack of pests/insects, diseases etc. Besides these, attack of blue-bulls to pulse crops is major cause of low production of pulses in U.P. Out of 75 districts of U.P., 43 districts are in grip of blue-bulls. More than 40 per cent of total areas of pulses are destroyed by blue-bulls alone.

The total population of blue-bulls was estimated at about 2,54,449 in U.P. in 2008-09. The population of blue-bulls has been increasing the at rate of 14 per cent per annum. There is no approach by forest department to check the growth of population of blue-bulls. They were only confined and localized in particular tracks in past two decades. They were found in river valleys and dense forests but at present, they are found in villages across the state. They are fearless and visible in day also. On account of these, the farmers have been giving-up the cultivation of pulses on their farms. If this situation prevails in years to come, the pulse crops would not be grown by the farmers. All developmental programmes related to increase in the production of pulses of U.P. cannot produce fruitful result until the attack of blue-bulls is prevented. Seeing the gravity of situation created by blue-bulls to pulses, the Ministry of Agriculture and Farmers Welfare, Govt. of India entrusted Agro-Economic Research Centre, Allahabad to undertake a study titled "Estimation of Losses to Pulses by Blue-Bulls in Uttar Pradesh".

2. Objectives of the Study

The objectives of the study are mentioned below:

I. To assess the extent of damage to pulse crops by blue bulls.

II. To determine adopted measures undertaken by government and farmers in reducing the losses by blue bulls.

III. To identify the constrains in the implementation of measures by state government to reduce the losses to pulse crops due to blue bulls.

IV. To suggest suitable remedial measures to reduce and prevent the damage to pulses by blue bulls.

3. Proposed Coverage of Crops

The study was conducted in Uttar Pradesh. Hence, all pulse crops, namely, gram, pea, lentil, arhar, urd and moong been covered under this study to know the quantum of losses of production of pulses due to attack by blue-bulls.

4. Collection of Data

The study is based on primary as well as secondary data. The primary data was collected from sample pulse growers of selected villages. The collection of primary data had been done by personal interview method for reference year 2014-15. The secondary data was collected from Directorate of Agriculture, Krishi Bhawan, Lucknow and other relevant sources.

5. Research Methodology

This study is confined to the state of Uttar Pradesh as a whole. A multistage stratified mixed sampling technique was used to cover the stated objectives. Since, state is

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divided into four regions, namely, Eastern, Central, Bundelkhand and Western and also covered by NFSM, therefore, one district from one region had been covered based on NFSM subject to maximum area of pulses during 2014-15. From each selected district, two blocks were selected on same criteria as cited above. From each block, a cluster of suitable number of village had been undertaken. A list of pulse growers, thereafter from selected villages had been collected and categorized into various size groups prevalent under study areas. The ultimate sample pulse growers had been undertaken according to probability proportion to total number in each category restricting the total number of sample growers to 40 in each district. The procedure of selection of district, blocks, villages and pulse growers are illustrated in Table-I.

TABLE-1 Details of Sample Selected

Name of regions	Nos. of district selected	Nos. of blocks selected	Nos. of villages selected	Nos. of sample farms selected
Eastern	1	2	4	40
Central	1	2	4	40
Bundelkhand	1	2	4	40
Western	1	2	4	40
U.P.	4	8	16	160

6. Reference Year

Reference year of study is 2014-15. Application of different statistical tools have been applied to get scientific result.

7. Area, Production and Productivity of Pulses in Uttar Pradesh

7.1. Area

Uttar Pradesh is most populous state of India. More than 16 per cent of total population of the country resides in this state while percentage share of geographical area of U.P. to total geographical area of country was only 7.33 per cent in 2011. The density of population in U.P. was 818 per sq. km. Agriculture is the main ocupation of the state. Agriculture is still a gamble of monsoon, therefore, hundred percent risk is involved in this occupation. The cropping intensity was only 154.77 per cent during 2011-12. The per capita availability of net area sown was estimated at 0.08 hectare in 2011-12. Out of GCA, foodgrains accounted for 78.29 per cent followed by 9.39 per cent pulses in 2011.12. The cropping pattern was always in favour of wheat and rice. Of the GCA, wheat accounted for 38.06 per cent followed by 22.94 percent for rice during 2012.13. The share of pulse crops in total GCA was 16.05 per cent in 1970-71 which went down to 9.39 per cent in 2012-13, showing 41.49 per cent decrease over the period. The maximum fall in area under pulses is witnessed during post Green Revolution period.

Six pulse crops, namely, arhar, moong, urad, gram, pea and masoor are grown across the state. Out of total area under pulses being 24.16 lakh hectares in 2011-12 in U.P., rabi pulses (gram, pea and masoor) accounted for 59.83 per cent, while kharif pulses (arhar, moong and urd) accounted for 40.17 per cent. It has been observed from data that area under rabi pulses had been decreasing from year to year while the area under kharif pulses had been increasing during corresponding period. The maximum shortfall in area under pea was witnessed while area under gram and masoor was more or less stagnant. Among the six pulses, gram, masoor, urad are important pulses. Arhar and pea, which are largely consumed by people of U.P. had experienced negative growth in areas during study period. On account of these, the price of arhar had gone up beyond the control during 2014-15.

7.2. Production of different pulse crops in Uttar Pradesh

The total production of all six pulses in state was only 23.97 lakh M. Tonnes during 2011-12 against 24.30 lakh M. Tonnes during 2004-05. The production of pulses in U.P. had been Showing a decreasing trend from 2004-05 to 2011-12. There is a huge gap between availability of pulses and requirement. The growth rate of production of pulses in U.P. was negative and insignificant. Out of total production of pulses being 23.97 lakh M. tones during 2011-12, the contribution of gram was 29.63 per cent followed by 19.88 per cent and 18.60 per cent of masoor and pea, respectively. The contribution of urad, arhar and moong was 15.94 per cent, 13.81 per cent and 2.14 per cent, respectively during the same period. The production of arhar, pea and gram was not found encouraging during study period. Over all, the production of pulses in U.P. was not sufficient to meet the consumption need of ever growing population. More than 40 per cent of total production of pulses are being damaged by blue-bulls alone.

7.3 Average Yield of Pulses in Uttar Pradesh

The per hectare yield of pea was 14.31 qtls followed by 11.83 qtls., 10.70 qtls, 8.94 qtls., 6.72 qtls. and 6.31 qtls. of gram, arhar, masoor, urd and moong, respectively during 2011-12. There was a positive growth in average yield of all six pulse crops in U.P. during the study period. However the growth in yield of pulses was marginal in U.P. during the study period.

TABLE-2 AREA, PRODUCTION AND PRODUCTIVITY OF DIFFERENT PULSE CROPS IN DIFFERENT YEARS IN U.P. (FROM 2004-05 TO 2011-12)

(Area in lakh hectares, Production in lakh M.T., Productivity in qtle./hect.

Years	Area	% change over base year	Production	% change over base year	Productivity	% change over base year
2004-05	28.17	100.00	24.30	100.00	8.75	100.00
2005-06	26.40	93.72	22.05	90.74	8.63	98.63
2006-07	24.68	87.61	18.14	74.65	8.35	95.43
2007-08	22.70	80.58	16.27	66.95	7.35	84.00
2008-09	23.20	82.36	20.84	85.76	7.17	81.94
2009-10	25.50	90.52	19.06	78.43	8.99	102.74
2010-11	24.48	86.90	20.16	82.96	7.47	85.37
2011-12	24.16	85.76	23.97	98.64	8.24	94.17

8. Background of selected districts of Uttar Pradesh

The four districts, namely, Badaun, Fatehpur, Allahabad and Jhansi were selected from Western, Central, Eastern and Bundelkhand regions of U.P., respectively for the study. the profile of the selected districts has been analyzed in the following sequence.

8.1. Badaun district

Badaun district belongs to western region of Uttar Pradesh. It is one the agriculturally advanced disricts of western region of state. The total population of the district was 36.83 lakh in 2011. The average holding of the district was 0.82 hectare. The per capita availability of land was estimated at 0.09 hectare. Wheat and bajra were dominant crops of the district in 2011-12. The pulses and oil seeds accounted for 6.87 per cent and 4.49 per cent of the GCA during the same period. Urad and masoor were main pulse crops which accounted for 86.01 per cent and 9.97 per cent of total area under pulses in 2011-12. The moong, gram, pea and arhar accounted from 0.66 per cent, 0.17 per cent, 1.58 per cent and 1.61 per cent of total area under pulses in 2011-12, respectively. The growth in area under pulses was insignificant during study period i.e., 2004-05 to 2011-12.

The total production of six pulse crops was 2.96 lakh M. Tonnes in 2004-05 which decreased to 43,759 M. tones in 2011-12, there by showing 47.60 per cent decrease over the period. The production of six pulses drastically decreased in 2011-12 as compared to production of 2004-05. Urad was an important pulse of the district as far as production is concerned.

8.2. Fatehpur district

Fatehpur is an important district of central region of U.P. The total population of the district was 26.33 lakh in 2011. The per capita availability of land in the district was only 0.11 hectare. Most of cultivated areas is under irrigation network. The cropping intensity of this district was only 142.56 per cent in 2011-12. The wheat and rice were important cereals which accounted for 41.16 per cent and 19.37 per cent of the GCA in 2011-12. The shares of pulses and oilseeds were 18.54 per cent and 6.02 per cent of the GCA, respectively during the corresponding year. It shows that area under pulses was next to area, urad rice. Among the pulses, gram and arhar were important crops which occupied 54.99 per cent and 25.48 per cent of the total area under pulses, respectively during 2011-12. The position of arhar was found discouraging becauseits area had been continuously decreasing in alternative years.

The production of arhar was 29,593 qtls during 2004-05 which decreased to 21,279 qtls during 2011-12, showing 28.09 per cent decrease over the period. Out of total production of all pulses during 2011-12, the share of gram was 62.58 per cent followed by 23.65 per cent of arhar. Thus, gram and arhar were dominant pulses in Fatehpur district.

8.3. Allahabad district

Allahabad is agriculturally very advanced district of Eastern region of U.P. The population of this district was 59.54 lakh in 2011. The density of population of the district was very high being 1066 per dq. More than 55 per cent of reporting area was under cultivation. The cropping intensity was worked-out to be 155.71 per cent in 2011-12. The wheat and rice were dominant crops in Allahabad district. Out of GCA of 4.80 lakh hectares, wheat accounted for 44.85 per cent followed by 30.58 per cent and 10.47 per cent of rice and pulses, respectively during 2011-12.

Of the total area under pulses during 2011-12 in Allahabad district, the gram accounted for maximum share being 31.38 per cent followed by 31.07 per cent of arhar. Both jointly accounted for 62.45 per cent of total area under pulses during 2011-12. Next to these pulses, masoor accounted for

15.74 per cent followed by 8.28 per cent, 6.81 per cent and 6.72 per cent of pea, moong and urd respectively. The area under arhar and gram had been decreasing across the study period.

The total production of all pulses was 51,707 qtls. during 2011-12 of which gram had contributed 33.14 per cent followed by 32.52 per cent arhar. Thus, arhar and gram were important crops of the district. However, a drastic down fall in arhar was witnessed from the records during the study period.

8.4 Jhansi District

Jhansi district belongs to Bundelkhand region of U.P. Most of the cultivated area of this district is un-irrigated. The total population of this district was 19.99 lakh in 2011. The density of population was only 398 sq. km. against 828 sq. km. of the state as a whole. The cropping intensity was only 154.16 per cent. The per capita availability of land worked out to be 0.16 hectare against 0.08 hectare of the state as a whole. The pressure of population on land was insignificant. The irrigation intensity was only 105.82 per cent against 144.12 per cent of the state. The pulses and wheat were dominant crops in the district in 2011.12. Out of GCA of 5.12 lakh hectares, pulses accounted for 37.29 per cent followed by 32.92 per cent wheat. The urad was important pulse of kharif season while pea. gram and masoor were main pulse crops of rabi season. Out of total area under all pulses during 2011-12 urd accounted for higher share being 28.40 per cent followed by 26.66 per cent, 23.44 per cent, 17.68 per cent 3.07 per cent of gram, pea, masoor and moong, respectively.

The total production of pulses was 20.20 lakh tones during 2011-12, of which pea accounted for 35.50 per cent share followed by 32.33 per cent, 15.49 per cent and 14.69 per cent of gram, urd and masoor, respectively. It is a surplus district of the state as far as production of pulses is concerned.

9. Findings Based on Primary Data

Out of 160 sample pulse growers, 51.25 per cent was marginal followed by 26.25 per cent and 22.50 per cent of medium and large pulse growers. Of the total head of households 15.00 per cent head of households were illiterate. The educational status of head of households were upto mark. Out of 160 sample households. 41.88 per cent were OBC followed by 41.87 per cent of general caste, while 16.25 per cent of total sample households belonged to SC category. The agriculture was man occupation of all the sample households. The per farm of owned land holding of all the sample farms was 2.92 hectares. The per farm operational holding was a little bit higher than that of owned land. Almost all owned land was fully irrigated across the size of sample farms.

Out of 810.19 hectares of GCA of 160 sameple farms, kharif season crops accounted for 51.50 per cent against 47.33 per cent of rabi seasons crops. Among the kharif season crops urad paddy and arhar we important crops which occupied 14.64 per cent, 12.12 per centr and 8.98 per cent of the GCA, respectively. As far as rabi seasons crops are concerned, wheat, gram, pea and masoor were important crops which occupied 20.24 per cent, 14.17 per cent, 4.10 per cent and 7.96 per cent of the GCA, respectively.

Out of total area under all pulses of 422.46 hectares of the sample farms, urad, gram and arhar accounted for 28.08 per cent, 27.8 per cent and 17.22 per cent, respectively. Thus these crops joint accounted for 72.48 per cent of total area under pulses on the sample farms. The masoor , pea and moong accouted for 15.27 per ent, 7.87 per cent and 4.38 per cent of total area under pulses on the sample farms out of total area under all pulses being 422.46 hectares on the 160 sample farms, 51.42 per cent had been destroyed blue-bulls during reference year. Of the total area under kharif pulses on all sample farms 47.64 per cent had been damaged by blue-bulls against 55.11 per cent of rabi pulse crops. Among the kharif pulses, thye maximum, area under arhar being 61.82 per cent followed by 41.95 per cent and 28.38 per cent of urad and moong, respectively had been destroyed by blue-bulls respectively in the reference year. Among the rabi pulses, the maximum area of gram being 62.38 per cent followed by 49.17 per cent and 45.40 per cent of pea and masoor, respectively had been damaged by blue-bulls in the reference year. Thus arhar, gram and pea had been damaged extensively by blue-bulls in comparison to masoor, moong and urad. Table-3

TABLE-3 AREA OF PULSE CROPS DAMKAGEKD BY BLUE-BULLS ON THE SAMPLE FARMS (2014-15)

Name of pulse crops	Area in pulses (Hect.)	Damage area (Hect.)	% of damaged area
Arhar	72.73 (17.22)	44.96	61.82
Moong	18.50 (4.38)	5.25	28.38
Urad	118.62 (28.08)	49.76	41.95
Total Kharif pulses	209.85 (49.67)	99.97	47.64
Gram	114.83 (27.18)	71.63	62.38
Pea	33.25 (7.87)	16.35	49.17
Masoor	64.53 (15.27)	29.30	45.40
Total rabi pulses	212.61 (50.33)	117.28	55.16
All pulses	422.46 (100.00)	217.25	51.42

Note: Figures in brackets are percentage to area under all pulses

The production of all pulses on the sample farms in reference year was below the average production of state as a whole. Thye per hectare production of urad was 3.27 qtls. followed by 2.37 qtls. and 2.06 quts of moong and arhar, respectively. The per hectare yield was maximum of pea being 3.41 qtls followed by 3.23 quts and 2.48 qtls of masoor and gram, respectively. Thye cause of low yield of pulses on thye sample farms was due to attack of blue-bulls to pulse crops in the reference year.

The sample pulses growers had done best efforts to save their crops from attack of blue-bulls. The eight preventive measures, namely, use of dung/neem solution, use of materials use of effigy, wiring crackers, stricks/ stones, gun, ringing bells, louding, shining taps etc. were adopted by samle farmers to check the attack of blue-bulls. Among these 8 preventive measures, the use of crackers strick/stones, louding and rining bells etc. had been adopted maximum by the sample farmers. On account of use of preventive measures, the sample farmers had saved the production of gram of 66.47 per cent followed by 63.05 per cent, 56.14 per cent, 44.98 per cent, 40.02 per cent and 40.52 per cent of masoor, urad, pea, moong and arhar, respectively.

10. Reasons for shifting of Area under Pulses to other Crops on the Sample Farms

The drought, excess rains, occurrence of hailstorm, attack of pests/disease and blue-bulls were major reasons for shifting of area under pulses to wheat, rice, potato, sugarcane etc. The low profitability of pulses as compared to its alternative crops is also a reason of giving up the cultivation of pulse crops. At present, the attack of blue-bulls to pulses is also a major cause of shifting of area of pulses to its alternative crops. One of the most important reasons for shifting areas of pulses is the terror of blue-bulls. The attack of blue-bulls are generally performed in midnight. The frequency of attack of blue-bulls was more than ten times, however it differs from crop to crop. The blue-bulls are in groups which ranges 10—20 numbers at the time of attack.

11. Estimation of Losses by Blue-bulls to Pulses on the Sample Farms

The total losses in production of all pulses by attack of blue-bulls was 1.23 qtls. per hectare against production of 2.81 qtls. per hectare. It shows that the losses in production of all pulses was 43.80 per cent due to attack by blue-bulls on the sample farms in 2014-15. The losses in production of different pulses varied from each other. The maximum losses being 59.98 per cent was witnessed in moong followed by 59.48 per cent in arhar by attack of blue-bulls. Next to these pulses, the losses in production of pea, urad, masoor and gram were 55.02 per cent, 43.86 per cent, 36.95 per cent and 33.53 per cent, respectively due to attack of blue-bulls. The maximum losses in production of pulses was witnessed on large sample farms. The losses in production of pulses due to attack of blue-bulls on medium sample farms was only 25.23 per cent against 32.02 per cent and 61.34 per cent on small and large sample farms, respectively. It shows that about 44.00 per cent of total production of pulses goes waste in every year on the sample farms across the state due to attack of blue-bulls to pulses. The real culprit of losses in production of pulses was blue-bulls across the study areas. There has been no progress in terms of equipment and technology to take preventive measures. No preventive work was done by Government to prevent the attack of blue-bulls to pulse crops in the study areas. The need for policy makers is to implement stringent laws that would preserve the pulses from attack of blue-bulls. There is need for guidelines that would integrate the local villages seamlessly into conservation programme to control the attack of blue-bulls across the state. The attack of blue-bulls is generally performed at podding, ripping and flowering stage of plants of pulses (table-4).

TABLE-4 Losses in Production of Pulses by Blue-Bulls on all Sample Farms (2014-2015)

Name of Crops	Size of Farms											
	Small			Medium			Large			All farms		
	Production Qtl.	Quantity lost qtls.	% Loss to production	Production Qtl. qtls.	Quantity lost production	% Loss to qtls.	Production Qtl. production	Quantity lost qtls.	% Loss to production	Production Qtl.	Quantity lost Qtls.	% Loss to Production
Arhar	33.35 (2.12)	20.11 (1.28)	60.30	39.19 (2.17)	9.45 (0.52)	24.10	77.40 (1.99)	59.63	77.04	149.94 (2.06)	89.19 (1.23)	59.48
Moong	1.80 (1.80)	1.33 (1.33)	74.00	20.20 (4.49)	10.90 (2.42)	53.96 (1.63)	21.80	14.04	64.40	43.80 (2.37)	26.27 (1.42)	59.98
Urad	147.45 (4.97)	41.73 (1.41)	28.30	98.20 (2.89)	36.67 (1.08)	37.34	141.85 (2.58)	91.56	64.55	387.50 (3.27)	169.96 (1.43)	43.86
Gram	42.00 (2.30)	6.84 (0.37)	16.25	89.52 (2.95)	6.52 (0.22)	7.28	153.58 (2.32)	82.23	53.54	285.10 (2.48)	95.59 (0.83)	33.53
Pea	19.00 (5.07)	8.65 (2.31)	45.53	34.75 (3.86)	8.31 (0.92)	28.82	59.69 (2.91)	45.45	76.15	113.44 (3.41)	62.41 (1.88)	55.02
Masoor	57.25 (4.62)	20.68 (1.61)	36.12	59.30 (3.16)	14.22 (0.76)	23.98	91.84	42.11	45.85	208.39 (3.23)	77.01 (1.19)	36.95
All Pulses	300.85 (3.70)	99.34 (1.22)	33.02	341.16 (2.98)	86.07 (0.75)	25.23	546.16 (2.41)	335.02	61.34	1188.17 (2.81)	520.43 (1.23)	43.80

Note: Figures in brackets are per hectare

12. Constraints faced by sample farmers during adoption of Preventive measure to check the attack of blue-bulls to Pulses.

The major share of production of pulses are going waste every year because of attack of blue-bulls. The losses in production ranged between 16.28 per cent to 64.00 per cent across the pulses on the sample farms. The sample farmers across the selected districts of U.P. had not used the scientific approach to tackle the situation. The lack of good infrastructure facilities, poor economic condition of farmers, lack of proper awareness among the farmers, strict rules about hunting blue-bulls, attachment with religious sentiment etc. were major hurdle in way of reducing the infestation of blue-bulls. The role of forest, animal husbandry, agriculture and revenue departments in reducing the attack of blue-bulls to pulses were found unsatisfactory in the districts of sample study. The constraints faced by the sample farmers during adoption of preventive measure to control the attack of blue-bulls to pulses were non availability of resistant varieties, very high prices of raw material, deforestation, attack of blue-bulls in the night, religious attachment to ban on hunting blue-bulls etc. Among these constraints, the attack of blue-bulls in night followed by ban on hunting blue-bulls were most important constraints as had been reported by majority sample farmers. Apart from these two constraints, lack of availability of preventive measures, lack of awareness and not availability of resistance varieties of pulses were also important constraints as had been reported by sample farmers.

The increase in the population of blue-bulls is main headache as had been reported by the sample farmers across the state. Since, the attack of blue-bulls to crops is generally performed in the night and farmers are not generally equipped with good quality of weapons to encounter the blue-bulls during attack to pulses. The farmers do not have proper woollen clothes, good quality torch to face blue-bulls in the night.

13. Suggestions

The attack of blue-bulls to pulses has been increasing day by day across the state. Most of the sample farmers were economically poor and unable to inconporate preventive measures to reduce the attack of blue-bulls to pulses.

They had suggested a number of remedies to check the attack of blue-bulls to pulses. These suggestions are totally based on their perception. The opinions of forests officials and NFSM have also been incorporated in the suggestions.

13.1. Agriculture scientists should evolve such type of varieties of pulses which are against consumption by blue-bulls. It is much required in case of arhar and pea crops. These crops are mostly targeted by blue-bulls.

13.2. NFSM should provide financial help to needy pulse growers to purchase raw materials to use the biological and chemical methods in pulse crops. Separate budget should be allocated under NFSM for this purpose.

13.3. These is a need to give proper awareness and training to the farmers for the application of proper protective measures to check attack of blue-bulls to pulse crops. They should be equipped with required knowledge and training to curb infestation of blue-bulls.

13.4. The use of crackers during attack by blue-bulls was found to be very effective preventive measures. Therefore, the financial help should be provided to the poor pulse growers to purchase the crackers from markets.

13.5. The attack of blue-bulls is performed in the night. Therefore, they need woollen clothes, raincoat, umbrella, torch, good quality weapons to check the attack of blue-bulls. This type of arrangement could be made at panchyat level.

13.6. The permission for killing blue-bulls followed by castration of blue-bulls were most important suggestion as had been reported by 35.30 per cent of small size of sample farmers, respectively.

13.7. The extension of indigenous techniques, availability of resistance varieties and castration of blue-bulls were also important suggestions as had been reported by 31.71 per cent, 18.22 per cent and 26.83 per cent of small size of sample farmers, respectively.

13.8. As far as medium size of sample farmers are concerned, they suggested that farmers should be allowed to kill blue-bulls at the time of attack to crops. The castration of blue-bulls was most attractive suggestion to check the growth of population of blue-bulls.

Overall, the permission for killing of blue-bulls, provision of subsidy on biological and chemicals etc. were most important suggestions as had been reported by majority of sample farmers of four sulected districts of Uttar Pradesh.

14. Policy Implications

14.1. First of all, it is required to check the population of blue-bulls. The population of blue-bulls has been increasing at the rate of geometrical propagation in the state. The forest and animal husbandry department should made joint efforts to check the growth of population of blue-bulls by use of castration techniques.

14.2 Forest department should take the responsibility to stop deforestation. This would provide better shelter for blue-bulls in the forest.

14.3. There is a need for amendment in Wildlife Act to provide the right to farmers for killing blue-bulls as and when the blue-bulls destroy their crops.

14.4. The Government should make a policy to kill blue-bulls and to declare them vermin in Uttar Pradesh.

14.5. In a bid to curb the blue-bulls infestation on pulses, the State Government should ask its various concerned departments to visit the affected areas regularly to monitor the situation and act accordingly.

14.6. Free medical treatment should be given to injured farmers to safeguard their interest.

14.7. The pulse growers should be advised by the area of staff of NFSM and agriculture departments to barricade the area of pulses by fencing with wire of iron/plastic. This system was found very useful to control the attack of blue-bulls to pulses. In this context, it is suggested to NFSM and forest department to provide financial help to active pulse growers to use this type of preventive measures.

14.8. The use of biological materials such as broadcasting of cow dung/solution of Neem products etc. are also helpful in reducing the attack of blue-bulls to pulse crops. This type of preventive measures should be propagated among the farmers across the state.

14.9. It should be propagated among the people that blue-bulls do not come under cow breed. The physical appearance of blue-bulls is totally different from features of cow. It is totally a wild animal. Then the sentiments of Hindus will not be hurt if blue-bulls are killed by the people.

14.10. Farmers are also advised to barricade the area of pulses by use of bamboo which are easily available in the villages. This type of fencing will also be helpful to protect infestation of blue-bulls on crops.

14.11. The use of Solar Fence Guard System has been found very effective preventive measure to control the attack of blue-bulls to crops in Gujarat State. The U.P. Government should guide the farmers to install Solar Fence Guard System on their fields to protect the attack of blue-bulls. In this context, it is suggested that State Government should provide the financial assistance to intested growers for the installation of the system. This system could save million tonnes of production of pulses in the state. This system should be propogated across the state to get rid from attack of blue-bulls to crops.

COMMODITY REVIEWS

Foodgrains

During the month of January, 2017 the Wholesale Price Index (Base 2004-05=100) of pulses increased by 12.10%, cereals decreased by 0.27% & foodgrains decreased by 3.46% respectively over the previous month.

ALL INDIA INDEX NUMBER OF WHOLESALE PRICES

(Base: 2004-2005=100)

Commodity	Weight (%)	WPI for the Month of January, 2017	WPI for the Month of December, 2016	WPI A year ago	Percentage change during	
					A month	A Year
1	2	3	4	5	6	7
Rice	1.793	246.0	247.7	238.9	-0.69	2.97
Wheat	1.116	250.3	251.7	228.6	-0.56	9.49
Jowar	0.096	317.4	302.4	280.7	4.96	13.07
Bajra	0.115	296.1	298.0	279.1	-0.64	6.09
Maize	0.217	280.1	277.0	269.1	1.12	4.09
Barley	0.017	291.6	290.6	248.1	0.34	17.53
Ragi	0.019	484.9	464.3	335.8	4.44	44.40
Cereals	3.373	254.9	255.6	240.6	-0.27	5.94
Pulses	0.717	393.4	447.1	370.4	-12.01	6.21
Foodgrains	4.09	279.2	289.2	263.3	-3.46	6.04

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

Procurement of Rice

5.94 million tonnes of rice (including paddy converted into rice) was procured during January 2017 as against 6.82 million tonnes of rice (including paddy converted into rice) procured during January 2016. The total procurement of rice in the current marketing season i.e 2016-2017, up to 31.01.2017 stood at 27.22 million tonnes, as against 24.47 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 31.01.2017		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	1785	6.56	1926	7.87	4326	12.65	3591	11.17
Chhatisgarh	4451	16.35	3881	15.86	3442	10.06	3423	10.64
Haryana	3570	13.11	2861	11.69	2861	8.36	2015	6.27
Maharashtra	176	0.65	106	0.43	230	0.67	199	0.62
Punjab	11044	40.56	9349	38.20	9350	27.33	7786	24.21

PROCUREMENT OF RICE — CONTD.

(In Thousand Tonnes)

1	2	3	4	5	6	7	8	9
Tamil Nadu	9	0.03	103	0.42	1191	3.48	1049	3.26
Uttar Pradesh	1400	5.14	2154	8.80	2910	8.50	1698	5.28
Uttarakhand	585	2.15	569	2.33	598	1.75	465	1.45
Others	4206	15.45	3523	14.40	9301	27.19	11936	37.11
Total	27226	100.00	24472	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 20116-17 (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 211.3 in January, 2017 showing an increase of 0.3% over the previous month and a decrease of 1.7% over the year. The WPI of copra (coconut) increased by 7.3%, sunflower by 4.5%, safflower (kardi seed) by 2.6%, soybean by 1.5% and groundnut seed by 0.8% over the previous month. The WPI of gingelly seed decreased by 4.0%, cotton seed by 2.8%, rape & mustard seed by 1.8% and niger seed by 1.0% over the previous month.

The WPI of edible oils as a group stood at 158.2 in January, 2017 showing a decrease of 0.1% over the previous month and an increase of 6.2% over the year. The WPI of soybean oil and copra oil increased by 0.5% and by 0.9% over the month respectively. The WPI of mustard & rapeseed oil decreased by 0.5%, cotton seed oil by 0.4% sunflower oil by 0.4%, groundnut oil by 0.2% and gingelly oil by 0.1% over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 220.3 in January, 2017 showing an increase of 0.5% over the previous month and a decrease of 14.7% over the year.

Potato

The WPI of potato stood at 151.2 in January, 2017 showing a decrease of 21.9% and 0.2% over the previous month and year respectively.

Onion

The WPI of onion stood at 252.4 in January, 2017 showing a decrease of 1.7% and 28.9% over the previous month and year respectively.

Condiments & Spices

The WPI of condiments & spices (group) stood at 357.4 in January, 2017 which shows an increase of 1.7% over the previous month and a decrease of 1.6% over the year. The WPI of chillies (dry) increased by 0.4% over the previous month. The WPI of turmeric decreased by 0.8% and black pepper by 0.6% over the previous month.

Raw Cotton

The WPI of raw cotton stood at 234.3 in January, 2017 showing an increase of 7.2% and 23.0% over the previous month and year respectively.

Raw Jute

The WPI of raw jute stood at 403.4 in January, 2017 showing a no change over the previous month and decrease of 16.5% over the year.

WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

Commodity	Latest	Month	Year	% Variation Over	
	January, 2017	December, 2016	January, 2016	Month	Year
OIL SEEDS	211.1	211.3	209.6	-0.1	0.7
Groundnut Seed	248.7	251.3	236.9	-1.0	5.0
Rape & Mustard Seed	226.0	230.6	227.5	-2.0	-0.74
Cotton Seed	224.2	222.8	211.5	0.6	6.0
Copra (Coconut)	151.6	139.6	125.0	8.6	21.3
Gingelly Seed (Sesamum)	311.4	305.3	276.8	2.0	12.5
Niger Seed	316.5	314.5	356.8	0.6	-11.3
Safflower (Kardi Seed)	165.6	164.3	159.1	0.8	4.1
Sunflower	168.7	171.1	199.3	-1.4	-15.4
Soyabean	174.4	178.1	207.8	-1.9	-15.9
EDIBLE OILS	157.6	158.2	149.1	-0.4	5.7
Groundnut Oil	210.7	213.0	190.3	-1.1	10.7
Cotton Seed Oil	203.3	204.5	192.3	-0.6	5.7
Mustard & Rapeseed Oil	180.4	183.5	180.4	-1.7	0.0

WHOLESALE PRICE INDEX OF COMMERCIAL CROPS — CONTD.

Commodity	Latest June, 2016	Month May, 2016	Year June, 2016	% Variation Over Month	% Variation Over Year
Soyabean Oil	162.5	162.3	150.6	0.1	7.9
Copra Oil	153.4	142.2	143.3	7.9	7.0
Sunflower Oil	132.4	133.4	135.0	-0.7	-1.9
Gingelly Oil	182.4	183.7	162.1	-0.7	12.5
FRUITS & VEGETABLES	230.9	220.3	229.7	4.8	0.5
Potato	137.1	151.2	150.4	-9.3	-8.8
Onion	251.4	252.4	309.8	-0.4	-18.9
CONDIMENTS & SPICES	334.6	357.4	357.2	-6.4	-6.3
Black Pepper	694.8	726.7	702.4	-4.4	-1.1
Chillies(Dry)	357.2	397.6	408.5	-10.2	-12.6
Turmeric	237.9	240.9	262.1	-1.2	-9.2
Raw Cotton	240.3	234.3	184.8	2.6	30.0
Raw Jute	404.1	403.4	493.8	0.2	-18.2

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	Sep, 15	8	360	340	400	350	400	300	600	450	NA
	Tumkur	Gidlahali	Sep, 15	8	250	200	250	200	250	NA	300	280	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	Harvesting	Other Agri-Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Assam	Barpeta	Laharapara	Aug, 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	BhaluiRasul	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	Oct,16	M	8	NA	NA	NA	120	200	150	250	200	250
				W	8	NA	NA	NA	110	150	100	NA	100	NA
Gujarat*	Rajkot	Rajkot	Oct, 16	M	8	248	254	235	223	203	197	488	475	463
				W	8	NA	200	229	216	197	178	NA	NA	NA
	Dahod	Dahod	Oct,16	M	8	279	279	164	164	150	NA	371	321	286
				W	8	NA	243	164	164	150	NA	NA	NA	NA
Haryana	Panipat	Ugarakheri	Oct, 16	M	8	400	400	400	400	400	NA	NA	NA	NA
				W	8	NA	300	300	300	300	NA	NA	NA	NA
Himachal Pradesh	Mandi	Mandi	June,16	M	8	NA	182	182	182	182	182	300	300	NA
				W	8	NA	182	182	182	182	182	NA	NA	NA
Kerala	Kozhikode	Koduvally	July,16	M	4-8	1345	685	NA	685	1040	NA	885	NA	NA
				W	4-8	NA	NA	485	585	485	NA	NA	NA	NA
	Palakkad	Elappally	July,16	M	4-8	NA	500	NA	500	466	NA	600	NA	NA
				W	4-8	NA	NA	300	300	300	NA	NA	NA	NA
Madhya Pradesh	Hoshangabad	Sangarkhera	Sep,16	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				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	Harvesting	Other Agri-Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Odisha	Bhadrak	Chandbali	August, 16	M	8	300	300	300	250	300	300	350	300	250
				W	8	NA	200	200	220	250	200	NA	NA	NA
	Ganjam	Aska	August, 16	M	8	300	200	200	250	200	200	400	400	400
				W	8	NA	150	150	150	150	150	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 Nadu*	Thanjavur	Pulvarnatham	June, 16	M	8	NA	343	NA	355	344	NA	NA	NA	NA
				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	270	250	261	250	256	NA	381	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
				W	8	NA	200	200	NA	200	NA	NA	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	Feb. 2017	Jan. 2017	Feb. 2016
Wheat	PBW 343	Quintal	Punjab	Amritsar	1800	1800	1600
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1825	1870	1590
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1872	1980	1675
Jowar	-	Quintal	Maharashtra	Mumbai	2200	2400	2300
Gram	No III	Quintal	Madhya Pradesh	Sehore	4476	5500	3968
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur		1440	1425
Gram Split	-	Quintal	Bihar	Patna	13000	13200	5850
Gram Split	-	Quintal	Maharashtra	Mumbai	7600	8700	5750
Arhar Split	-	Quintal	Bihar	Patna	9200	9800	14735
Arhar Split	-	Quintal	Maharashtra	Mumbai	6200	6400	10850
Arhar Split	-	Quintal	NCT of Delhi	Delhi	6450	7200	12500
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	7000	8000	11900
Gur	-	Quintal	Maharashtra	Mumbai	3850	3850	3100
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4300	5300	3800
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2720	2800	2375
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	4175	4175	4250
Mustard Seed	Black	Quintal	West Bengal	Raniganj	4500	4500	4700
Mustard Seed	-	Quintal	West Bengal	Kolkata	3800	4200	4500
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	5500	5875	4460
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	4900	4730	4250
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	2300	2300	2100
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	2750	2750	2500
Castor Seed	-	Quintal	Telangana	Hyderabad	3450	3400	3250
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	7770	8160	11300
Copra	FAQ	Quintal	Kerala	Alleppey	8300	8850	6050
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	5500	5500	4500
Groundnut	-	Quintal	Maharashtra	Mumbai	6200	6000	5700
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1365	1400	1485
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1475	1535	1485
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	1470	1510	1335
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1860	1950	1725
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1440	1470	1455
Castor Oil	-	15 Kg.	Telangana	Hyderabad	1200	1163	1050
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	1515	1510	1435
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2200	2175	1695
Coconut Oil	-	15 Kg.	Kerala	Cochin	1845	1935	1305
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2325	2325	2250
Groundnut Cake	-	Quintal	Telangana	Hyderabad	3000	2929	3393
Cotton/Kapas	NH 44	Quintal	Andhra Pradesh	Nandyal	5350	5500	4000

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

Commodity	Variety	Unit	State	Centre	Feb. 2017	Jan. 2017	Feb. 2016
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	5200	5266	4100
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	3810	3720	5460
Jute Raw	W 5	Quintal	West Bengal	Kolkata	3860	3770	5400
Oranges	-	100 No	NCT of Delhi	Delhi	542	542	500
Oranges	Big	100 No	Tamil Nadu	Chennai	550	500	400
Banana	-	100 No.	NCT of Delhi	Delhi	350	350	292
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	501	500	499
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	80000	80000	82000
Almonds	-	Quintal	Maharashtra	Mumbai	70000	70000	95000
Walnuts	-	Quintal	Maharashtra	Mumbai	95000	95000	82000
Kishmish	-	Quintal	Maharashtra	Mumbai	11000	11000	23000
Peas Green	-	Quintal	Maharashtra	Mumbai	3250	3200	4200
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	475	560	700
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	4000	2700	2300
Cauliflower	-	100 No.	Tamil Nadu	Chennai	1500	1500	1400
Potato	Red	Quintal	Bihar	Patna	1000	1000	780
Potato	Desi	Quintal	West Bengal	Kolkata	380	475	950
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	1793	1270	2219
Onion	Pole	Quintal	Maharashtra	Nashik	500	600	550
Turmeric	Nadan	Quintal	Kerala	Cochin	15000	15500	14500
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	8600	8300	9000
Chillies	-	Quintal	Bihar	Patna	8000	8000	10500
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	55000	58000	61000
Ginger	Dry	Quintal	Kerala	Cochin	14000	15000	18500
Cardamom	Major	Quintal	NCT of Delhi	Delhi	125000	124000	130500
Cardamom	Small	Quintal	West Bengal	Kolkata	140000	140000	100000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	3800	3800	3600
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	36685	34017	33017
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	46000	46000	46000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	37000	36400	35650
Fish	Rohu	Quintal	NCT of Delhi	Delhi	14500	14500	12000
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	33000	35000	33000
Eggs	Madras	1000 No.	West Bengal	Kolkata	4000	3900	4500
Tea	-	Quintal	Bihar	Patna	21250	21250	21150
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	35000	35000	33000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	26000	26000	25000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	17500	17500	12000
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	—	4500	4600
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	—	3600	3450
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13800	13800	—
Rubber	-	Quintal	Kerala	Kottayam	13000	12600	9000
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	32700	32700	32000

3. MONTH END WHOLESALE PRICES OF SOME IMPORTANT AGRICULTURAL COMMODITIES IN INTERNATIONAL MARKETS DURING YEAR, 2017

Commodity	Variety	Country	Centre	Unit	Jan.
1	2	3	4	5	6
CARDAMOM	Guatmala Bold Green	U.K.	-	Dollar/MT	9000.00
				Rs./Qtl	61335.00
CASHEW KERNELS	Spot U.K. 320s	U.K.	-	Dollar/MT	10612.51
				Rs./Qtl	72324.26
CASTOR OIL	Any Origin ex tank Rotterdam	Netherlands	-	Dollar/MT	1453.70
				Rs./Qtl	9906.97
CHILLIES	Birds eye 2005 crop	Africa	-	Dollar/MT	4100.00
				Rs./Qtl	27941.50
CLOVES	Singapore	Madagascar	-	Dollar/MT	7500.00
				Rs./Qtl	51112.50
COCONUT OIL	Crude Phillipine/ Indonesia, cif Rotterdam	Netherlands	-	Dollar/MT	1840.00
				Rs./Qtl	12539.60
COPRA	Phillipines cif Rotterdam	Phillipine	-	Dollar/MT	905.00
				Rs./Qtl	6167.58
CORRIANDER		India	-	Dollar/MT	1650.00
				Rs./Qtl	11244.75
CUMMIN SEED		India	-	Dollar/MT	2500.00
				Rs./Qtl	17037.50
MAIZE		U.S.A.	Chicago	C/56 lbs	366.25
				Rs./Qtl	980.93
OATS		CANADA	Winnipeg	Dollar/MT	336.74
				Rs./Qtl	2294.88
PALM KERNAL OIL	Crude Malaysia/Indonesia, cif Rotterdam	Netherlands	-	Dollar/MT	1820.00
				Rs./Qtl	12403.30
PALM OIL	Crude Malaysian/Sumatra, cif Rotterdam	Netherlands	-	Dollar/MT	822.50
				Rs./Qtl	5605.34
PEPPER (Black)	Sarawak Black lable	Malaysia	-	Dollar/MT	7900.00
				Rs./Qtl	53838.50
RAPESEED	Canola	CANADA	Winnipeg	Can Dollar/MT	522.40
				Rs./Qtl	2719.61
	UK delivered rapeseed, delivered Erith(buyer)	U.K.	-	Pound/MT	330.00
				Rs./Qtl	2832.72
RAPESEED OIL	Refined bleached and deodorised ex-tanks, broker price	U.K.	-	Pound/MT	827.00
				Rs./Qtl	7098.97
SOYABEAN MEAL	UK produced 49% oil & protein ('hi-pro') ex-mill seaforth UK bulk	U.K.	-	Pound/MT	325.00
				Rs./Qtl	2789.80
SOYABEAN OIL		U.S.A.	-	C/lbs	34.87
				Rs./Qtl	5237.56
	Refined bleached and deodorised ex-tanks, broker price	U.K.	-	Pound/MT	807.00
				Rs./Qtl	6927.29

MONTH END WHOLESALE PRICES OF SOME IMPORTANT AGRICULTURAL COMMODITIES IN INTERNATIONAL MARKETS DURING YEAR, 2017 — CONTD.

1	2	3	4	5	6
SOYABEANS		U.S.A.	-	C/60 lbs Rs./Qtl	1055.25 2639.29
	US NO.2 yellow	Netherlands	Chicago	Dollar/MT Rs./Qtl	425.60 2900.46
SUNFLOWER SEED OIL	Refined bleached and deodorised ex-tanks, broker price	U.K.	-	Pound/MT Rs./Qtl	796.00 6832.86
Wheat		U.S.A.	Chicago	C/60 lbs Rs./Qtl	424.50 1061.72

Foreign Exchange Rates

Currency	Jan
Can Dollar	52.06
U.K. Pond	85.84
US Dollar	68.15

Crop Production

4. Sowing and Harvesting Operations Normally in Progress during April, 2017

State	Sowing	Harvesting
1	2	3
Andhra Pradesh	Autumn Rice, Sugarcane.	Summer rice, Jowar (R), Ragi (R), Small Millets (R), Other Rabi Pulses, Sugarcane, Cotton.
Assam	Autumn Rice, Maize, Small Millets (R), Tur (R), Sugarcane, Cotton, Mesta.	Wheat, Tur (R), Sown during previous year.
Bihar	Jowar (K), Bajra, Jute.	Wheat, Barley, Gram, Tur (K), Castorseed, Linseed.
Gujarat	Sugarcane.	Castorseed, Onion.
Himachal Pradesh	Maize, Summer Potato (Hills), Sugarcane, Ginger Chillies (Dry), Sesamum, Cotton, Turmeric.	Wheat, Barley, Gram, Other Rabi Pulses, Rapeseed and Mustard, Linseed.
Jammu & Kashmir	Autumn Rice, Jowar (R), Maize, Ragi, Small Millets (K), Summer Potato, chillies (Dry), Tobacco, Sannhemp, Onion.	Wheat, Barley, Small Millets (R), Gram, Sesamum, Linseed, Onion.
Karnataka (Plains)	Maize, Urad (K) Mung (K), Summer Potato (Hills) Tobacco, Castorseed, Seasamu, Sweet Potato (Hills), Sannhemp, Onion (2nd Crop).	Summer Rice, Gram, Urad (R), Summer Potato, Cotton, Turmeric, Onion (1st Crop). Tapioca.
Kerala	Autumn Rice, Ragi, Ginger, Turmeric, Tapioca.	Summer Rice, Tur (R), Other Rabi Pulses, Sesamum,
Madhya Pradesh	Sugarcane, Onion	Wheat, Barley, Tur (K), Winter Potato (Plains), Castorseed, Linseed, Onion.
Maharashtra	Sugarcane.	Maize (R), Wheat Gram, Other Rabi Pulses, Cotton, Onion.
Manipur	Maize, Turmeric	Gram.
Orissa	Sugarcane, Chillies (Dry)	Wheat, Barley, Urad (R), Mung (R), Chillies (Dry).
Punjab and Haryana	Tur (K), Potato, Sugarcane, Ginger, Chillies (Dry), Sweet Potato, Turmeric.	Wheat, Barley, Small Millets (R), Gram, Tur (K), Other Rabi Pulses, Potato, Castorseed, Rapeseed and Mustard, Linseed, Onion.
Rajasthan	Sugarcane.	Wheat, Barley, Urad (R), Mung (R), Other Rabi Pulses, Tobacco, Castorseed, Rapeseed and Mustard, Linseed.
Tamil Nadu	Summer Rice, Jowar (R), Summer Potato, Sugarcane, Pepper (Black), Chillies (Dry), Groundnut (Late), Sesamum Cotton, Onion Sannhemp.	Winter Rice, Jowar (R), Tur (R), Mung (K), Winter Potato (Hills), Sugarcane, Chillies, (Dry), Tobacco, Groundnut (Early), Cotton, Onion.
Tripura	Autumn Rice, Maize, Sugarcane, Ginger, Chillies, (Dry), Sesamum, Cotton, Jute.	Summer Rice, Chillies (Dry), Tobacco.
Uttar Pradesh	Sugarcane, Chillies (Dry), Cotton, Jute, Mesta.	Summer Rice, Wheat, Barley, Gram, Tur (K), Tobacco, Castorseed, Rapeseed and Mustard, Linseed, Onion, Sugarcane.
West Bengal	Autumn Rice, Maize, Tur (K), Sugarcane, Ginger Chillies (Dry), Sesamum, Jute, Mesta.	Summer Rice, Wheat, Barley, Gram, Tur (K), Urad (R), Other Rabi Pulses, Winter Potato (Plains), Chillies (Dry).
Delhi	Jowar (K), Sugarcane, Tobacco, Onion.	Wheat, Gram, Tur (K) Rapeseed and Mustard, Linseed.

(K)-Kharif (R)-Rabi.:

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