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AGRICULTURAL SITUATION IN INDIA

February, 2017

FARM SECTOR NEWS

GENERAL SURVEY OF AGRICULTURE

ARTICLES

Growth and instability Analysis of Coconut Area,Production and Productivity in Karnataka State

Seasonality and Exponential Smoothing models for Price Forecasting

Cotton Acreage Response to Price in Tamil Nadu - A Functional Analysis

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COMMODITY REVIEWS
Foodgrains
Commercial Crops

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Wages & Prices

Publication Division
Directorate of Economics and Statistics
Department of Agriculture, Cooperation & Farmers Welfare
Ministry of Agriculture & Farmers Welfare
Government of India
C-1, Hutments, Dalhousie Road,
New Delhi-110 011
Phone : 23012669
(Email: agri.situation@gmail.com)

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Agricultural Situation in India

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NOTE TO CONTRIBUTORS

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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

Cabinet approved MoU between India and Kenya on bilateral cooperation in the field of agriculture and allied sectors

The Union Cabinet chaired by the Prime Minister Shri Narendra Modi has approved signing of a Memorandum of Understanding (MoU) between India and Kenya on bilateral cooperation in the field of agriculture and allied sectors.

The MoU covered various activities in these fields which include agricultural research, animal husbandry and dairy, livestock and fisheries horticulture, natural resource management, post-harvest management and marketing, soil and conservation, water management, irrigation farming systems development and integrated watershed development integrated pest management, agricultural plant, machinery and implements, sanitary and phytosanitary issues.

The MoU provided for constitution of a Joint Working Group comprising of representatives from both countries, the task of which would be to develop detailed cooperation programmes and monitor implementation of the MoU.

The MoU entered into force since the day of signing and shall remain valid for a period of five years and shall automatically be renewed for a subsequent period of five years unless either Party notifies the other in writing, six months before the expiry of the validity period of the intention to terminate it.

Cabinet approved MoU between India and Portugal in the field of agriculture and allied sectors

The Union Cabinet, chaired by the Prime Minister Shri Narendra Modi had given its approval for signing of an Agreement for cooperation in the field of Agriculture and allied sectors between India and Portugal.

The Agreement covered various activities in these fields which include exchange of scientific and technical information, trade in plants and plant products, exchange of information in phytosanitary issues, training programmes, seminars and visits of experts and consultants.

The Agreement provided a constitution of a Joint Working Group comprising of representatives from both countries, the task of which would be to monitor the implementation of the present MoU and making concrete proposals for agriculture cooperation and develop guidelines and priorities for future cooperation in the field of agriculture and allied sectors.

The Agreement entered into force since the date of its signing and shall remain in force for a period of five years and shall be automatically extended for a subsequent period of five years unless either Party gives written notice through diplomatic channels to the other Party of its intention to terminate the Agreement at least six months before its expiration.

Employment opportunities generated for the skilled youth in the fields of agri-warehousing, cold chains, supply chains, dairy, poultry, meat, fisheries, horticulture, agricultural mechanization as well as micro-irrigation: Agriculture and Farmers Welfare Minister

Shri Radha Mohan Singh said that due to the sophisticated development in agriculture sector, employment opportunities have been generated for the skilled youth in the fields of agri-warehousing in agriculture, cold chains, supply chains, dairy, poultry, meat, fisheries, horticulture, and agricultural mechanization as well as micro-irrigation. The youth are benefitting from these opportunities. Shri Singh further said that self-employment opportunities also have been enhanced in these fields which require skilled youth. Shri Singh added that such a unique scenario has never been observed before in respect of overall development in the various fields of agriculture. Union Agriculture & Farmers Welfare Minister stated this on the occasion of National Workshop on Skill Development in Agriculture and the theme was "Kausal Vikas se Krishi Vikas" on 5th January, 2017.

Shri Radha Mohan Singh informed that Ministry of Agriculture & Farmers Welfare is working with fast pace to give reality to the motto raised by Hon'ble Prime Minister, Sh. Narendra Modi, as Kaushal Bharat - Kushal Bharat. Agriculture Minister said that Hon'ble Prime Minister has called for farmer focused agriculture, apart from production focused agriculture. The government realizes that the youth of the country are required to be linked with agriculture in the form of enterprise. Shri Singh further added that, in this respect operations are being conducted on four stages in Ministry of Agriculture. The Minister briefed that particular emphasis is being laid on enhancement of productivity, post harvest management, better return of farmers produce, and decrease in agriculture related risks. Shri Singh further emphasized

Source:www.pib.nic.in

that a fourth stage is being created so as to enhance the income of the farmers through the resources like those of horticulture, livestock, fisheries, bee-keeping etc.

Shri Singh briefed that the Ministry of Agriculture and farmers welfare is opening ways while formulating well planned strategy for the development of farmers as well as youth and initiatives like Pradhan Mantri Fasal Bima Yojana, e-NAM, Soil Health Card, Prampragat Krishi Vikas Yojana, Pradhan Mantri Krishi Sinchai Yojana, Skill Development would prove important in this endeavour. Shri Singh said that the Ministry has made a budget provision of Rs.3.52 crore for the year 2016-17 for implementation of the work of skill development so that training programmes may be organized through 100 Krishi Vigyan Kendras and distinguished training institutes of the Ministry.

Agriculture Minister said that various schemes had been launched to increase the income of the farmers i.e., Prampragat Krishi Vikas Yojana for bringing more area under organic farming, National Agriculture Market (e-NAM) for providing remunerative price for the farmers. The government is emphasizing on increase in milk production through White Revolution and fish production through Blue Revolution. Shri Singh said that food security is ensured through various schemes such as Pradhan Mantri Krishi Sinchai Yojana, per drop more crop for water conservation, Water Management, Water Harvesting and Micro-irrigation. Rashtriya Gokul Mission has been launched for the first time for the development and protection of bovine breeds so that bovine breed can be protected and developed. In 'Mera Gaon Mera Gaurav', Agriculture Specialists of Agricultural Universities and ICAR are making effective interventions towards scientific farming for villages. Agriculture Minister said that sowing of Rabi this year is more than 6 per cent than the previous year. Under Soil Health Card, a total of 2 crore 30 lakh soil samples have been collected in the country and from which 12 crore 65 lakh farmers would be issued Soil Health Cards. On this occasion, the Shri Singh requested Sector Skill Council established at State level to cooperate with the Central Government.

Speaking on the concluding session, The Minister of States for Agriculture and Farmers Welfare, Shri Sudarshan Bhagat said that the National Workshop on skill development in Agriculture is an important and commendable effort. Shri Bhagat said that Centre is fully committed for skill development training for the youth of rural areas. The Minister of State hoped that states would extend their full support to the centre in this effort.

Ministry of Agriculture and Farmers Welfare took Steps to Promote Cashless Transactions

Ministry of Agriculture and Farmers Welfare had taken several decisions to promote cashless transactions in the entire country. It was decided in the meeting of higher officers of DARE/ ICAR in Ministry of Agriculture and Farmers Welfare that awards would be given to the Institutes/ KVKs/ Universities for cashless transactions under specific time limits.

Ministry had decided that award of Rs. 5 lakh meant for ICAR and a sum of Rs. 1 lakh to KVK would be given for achieving 100% cashless in a week. Similarly, ICAR would be bestowed upon Rs. 3 lakh and KVK Rs. 50,000 in the form of incentives on achieving 100% cashless within two weeks and similarly for cashless within a span of 3 weeks, ICAR would be awarded Rs. 2 lakh and KVK Rs. 25,000 as prize.

India and Israel committed to strengthen bilateral relations in the field of Agriculture

Union Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh met Israeli delegation led by the Agriculture and Rural Development Minister of Israel on 11th January, 2017, Shri Uri Ariel discussed issues relating to bilateral cooperation in agriculture between India and Israel. Both sides expressed satisfaction over the progress made in cooperation in the agriculture and allied sectors between the two countries.

Both sides expressed their commitment to further strengthen bilateral relations in the field of Agriculture which is manifested by the fact that the third phase of Action Plan for 2015-18 in the field of Horticulture has recently been finalized by the two countries. Under this program, as many as 27 Centres of Excellence (CoEs) in the cultivation of various fruits and vegetables, in 21 states, are being set up, out of which 15 CoEs are complete.

Further, both sides expressed the hope that while continuing, the two countries could embark upon newer areas of cooperation at the Government to Government and Business to Business levels between the two countries so as to further enhance the relationship.

The Farmers Training Centre and Regional Office building would strengthen the coconut cultivation and industry in the State: Shri Radha Mohan Singh

Shri Radha Mohan Singh said that Central Government is bound to promote the coconut cultivation and related activities in Bihar. Shri Singh told that since 2014, a total amount of Rs 409.06 lakhs had been sanctioned for implementing the schemes on Coconut cultivation in Bihar. Union Agriculture Minister said this on the occasion of Foundation Stone laying ceremony of Farmers Training Centre and Regional Office building at Patna on the 37th Foundation day of Coconut Development Board. (CDB).Coconut Development Board was established on 12 January 1981.

Union Agriculture Minister told that Regional Office of the Coconut Development Board was shifted to

Guwahati, Assam from Patna, Bihar on the basis of recommendations of a committee constituted under the chairmanship of ICAR in 2009. A central team was constituted by the Central Government focussing on the productivity of coconut in Bihar. This team had recommended opening a new and fourth Regional Office of the Board at Patna in place of State Centre Patna which was agreed upon by the Coconut Development Board in its 119th Board meeting held on 30.01.2015.

Shri Singh said that Kosi region in North Bihar which comprises of places on either sides of the Kosi river is suitable for coconut cultivation. It is estimated that nearly 50,000 hectares of potential area in Bihar is available for coconut cultivation, mainly in North Bihar under irrigated condition. Union Agriculture Minister said that CDB aims to equip the coconut farmers in production, processing, marketing and export of coconut and its value added products thus making India the world leader in production, productivity, processing for value addition and export of coconut. Bihar belongs to nontraditional coconut cultivated area and special focus is being given for development of coconut sector in the state.

To encourage farmers for increasing milk production, it is imperative that milk collection facilities need to be upgraded and farmers should be given remunerative prices for their produce: Shri Radha Mohan Singh

Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh said that milk production has become a major economic activity amongst rural households and farmers are adopting dairying along with agriculture for augmenting their incomes. Shri Singh stated this on 13th January, 2017, during the inter-session meeting of the Parliamentary Consultative Committee of Ministry of Agriculture and farmers welfare in New Delhi. Implementation of National Dairy Plan was also discussed during the meeting.

Shri Singh informed that about 70 million rural households are engaged in milk production. The small and marginal farmers & landless labourer produce about one to three litres of milk per day and are responsible for production of most of the milk for the country. About 78 percent farmers in India are small and marginal, who own about 75 percent of female bovine but own only 40 percent farm land. Milk contributes to one third of gross income of rural households and in case of landless, its contribution is half in their gross income.

Agriculture Minister further informed that India continues to hold the number one position among milk producing nations of the world since 1998. India has largest bovine population in the world (18.4 percent share). Milk production in India has increased from 22 million tonne in 1970 to 156 million tonne in 2015-16, which shows a growth of 700 percent during last 46 years. As a result, the per capita availability of milk in India is 337 gram/day as compared to average world per capita availability of 229 gram/day.

Shri Singh said that during last two years 2014-16, milk production has registered a growth rate of 6.28 percent, which is more than last year growth rate of about 4 percent and more than three times higher than the world growth average of 2.2 percent. If wheat and paddy is combined together, even then, in Gross Value Addition (GVA) of Rs.4.92 crore in 2014-15, the contribution of milk is more than 37 percent. About 54 percent of milk produced in the country is surplus, out of which about 38 percent is handled by the organized sector. The Co-operatives and private dairy organizations have equal share in it. Shri Singh said that women participation in dairying is about 70 per cent.

Union Agriculture Minister added that in order to encourage the farmers for increasing milk production, it is imperative that milk collection facilities need to be upgraded and farmers should be given remunerative price for their produce. This is possible only when an effective management system is in place to link the farmers to the market. Shri Singh said that BPL households, small and marginal farmers would be encouraged to rear descript indigenous breeds.

Shri Radha Mohan Singh also said that the National Bovine Breeding and Dairy Development Programme (NPBBDD) has been started in 2014-15 by converging four existing programmes. The objective of this programme is to prepare a comprehensive and scientific programme to meet the increasing demand for milk. The programme has two components - National Bovine Breeding programme (NPBB) and National Dairy Development Programme (NPDD). The NPBB focusses on expanding field coverage for artificial insemination network, monitoring of programmes for indigenous breed development and conservation in the breeding areas. The NPDD is focusing on creating and strengthening of infrastructure for milk unions/federations for production, procurement, processing & marketing of milk and training of dairy farmers and extension.

India & Mauritius Signed MoU for Cooperation in the field of Cooperatives

The Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh and Minister of Business, Enterprise and Cooperatives, Govt. of Mauritius, Shri Soomilduth Bholah signed on MoU for Cooperation in the field of Cooperatives & related areas on 16th January, 2017. The MoU would enable the two countries to collaborate in this vital sector and can significantly benefit thousands of Mauritians.India offered to exchange its expertise and technology with Mauritius in agro industry, fisheries and dairy sector.

The two ministers expressed satisfaction at the historic, time-tested relationship between India and Mauritius which is anchored in linkages of culture and ancestry has grown from strength to strength over the years, adding that frequent high level visits have added significant momentum to the bilateral relationship between the two countries.

Shri Radha Mohan Singh led a delegation to Germany for participation in the Global forum for Food & Agriculture and G-20 agriculture ministers meeting

Union Minister of Agriculture & Farmers Welfare, Shri Radha Mohan Singh led a five member delegation to Germany for participation in the Global Forum for Food & Agriculture from 19-21 January,2017 and G-20 Agriculture Ministers Meeting on 22nd January,2017 in Berlin, Germany.

The Global Forum for Food and Agriculture is an International Conference organized by Germany during 19-21, January 2017 in Berlin on the subject "Agriculture and Water - Key to Feeding the World" which was attended by Agriculture Ministers of 65 countries. G-20 Agriculture Ministers meeting, scheduled for January 22, 2017 focused on the theme of "Agriculture & Water - Digitalization in the Agriculture Sector" and bring together Ministers from the world's twenty biggest economies to discuss the way ahead for the global agricultural sector.

During the visit, the Agriculture & Farmers Welfare Minister addressed the participants of the 9th Berlin Agriculture Ministers' Conference under the aegis of GFFA as well as the G-20 Agriculture Ministers meeting. The Minister also delivered the inaugural address at the Expert Panel convened as part of the GFFA meeting, apart from bilateral meetings with his counterparts from other countries including Germany, Mexico and Lithuania.

During the visit, Shri Singh highlighted India's initiatives in the areas of Agriculture and Water including such flagship programme as Soil Health Card scheme and Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) for improving soil fertility and water use efficiency to achieve 'more crop per drop' in a focused manner and extending the coverage of precision irrigation 'Har Khet Ko Pani. The Minister also showcased India's initiatives in the use of digital technology for the benefit of our farmers including the e-NAM scheme, the Kisan Call Centre, digital payment initiatives and other measures to bridge the digital divide in India's rural and agricultural sectors.

During the conference held on 21st January, 2017, Shri Singh said that water is certainly the most critical resource for agriculture, gaining primacy even on other important inputs like soil. The competing use of water for agriculture and non-agricultural purposes, inefficient irrigation practices, injudicious use of pesticides, poor conservation infrastructure, and lack of governance have lead to increasing water scarcity and pollution worldwide.

Union Agriculture & Farmers Welfare Minister also inform that distribution of water resources across the vast expanse of the country is uneven, therefore, as incomes rise the need for water also raises. Shri Singh said that as per the international norms, a country is classified as Water Stressed and Water Scarce, if per capita / year water availability goes below 1700 m3 and 1000 m3, respectively. With 1544 m3 per capita / year water availability, India is already a water-stressed country and moving towards turning water scarce.

Shri Singh further added that efficient use of irrigation water requires application of water on growing crops at appropriate times and in adequate amounts and the main task will be to (i) produce more from less water by efficient use of utilizable water resources in irrigated areas, (ii) enhance productivity of challenged ecosystems, i.e., rainfed and water logged areas, and (iii) utilize a part of grey water for agriculture production in a sustainable manner.

Agriculture & Farmers Welfare Minister informed that most of the irrigation projects are operating at levels below the achievable efficiency of more than 50 per cent and there is enormous scope to improve the productivity and efficiency of irrigation systems which can be achieved both by technological as well as social interventions. Shri Singh said that it is estimated that with 10 per cent increase in the present level of efficiency in irrigation projects, an additional 14 million hectare area can be irrigated from the existing irrigation capacities which would involve a very modest investment compared to what is required for creating equivalent potential through new schemes. Therefore, there is need to adopt an integrated approach with emphasis on greater conservation and enhanced water use efficiency.

Union Minister of Agriculture and Farmers Welfare said that though India is among the leading producers of foodgrains in the world but India's productivity vis-à-vis world average and highest yield (kg/ha) for major crops such as cereals, pulses, oilseeds, sugarcane and vegetables remains short of the highest levels achieved elsewhere in the world, except castor, an industrial oil crop. India has highest courage, production and productivity of castor in the world mainly because of hybrid technologies and water use efficiency in castor. Similarly, in livestock sector also, despite India being the top producer of milk, bovine productivity is only 1538 kg per year as compared to the world average of 2238 kg per year. The low productivity levels also indicate existence of enormous untapped potential. Shri Singh further said that efficiency-mediated improvement in productivity is the most viable option to

raise production. Development of new crop varieties with more efficient photosynthesis and shorter duration would be of immense help in increasing cropping intensity.

Shri Singh said that there are several technologies developed by our institutions that enable production of 'more crop per drop'. Adoption of Resource Conserving Technologies (RCTs) lead to an improvement in productivity compared to traditional hand transplanting at different locations. The prevailing farming situation in India calls for an integrated effort to address the emerging issues / problems. However, these integrated farming systems are required to be location specific and designed in such a manner that they lead to substantial improvement in energy efficiencies at the farm and help in maximum exploitation of synergies through adoption of close cycles. The Minister added that these systems also need to be socially acceptable, environment friendly and economically viable.

Cabinet approved MOU between India and United Arab Emirates for cooperation in the field of agriculture and allied sectors

The Union Cabinet, chaired by the Prime Minister Shri Narendra Modi, had given its approval for Signing of Memorandum of Understanding (MoU) between India and United Arab Emirates in the field of agriculture and allied sectors.

The MoU would be mutually beneficial to both countries. It would promote understanding of best agricultural practices in the two countries and will help in better productivity at farmer fields as well as improved global market access leading to equity and inclusiveness. Cooperation in agricultural technology would lead to innovative techniques for increasing production and productivity leading to strengthening of food security.

The challenges of maintaining food and nutritional security need innovative solutions through collaborative and coordinated polices- Shri Radha Mohan Singh

Union Agriculture & Farmers Welfare Minister, Shri Radha Mohan Singh addressed the G-20 Agriculture Ministers' Meeting on 22nd January, 2017 at Berlin, Germany. In his address, the Minister said that India will continue to extend their support in early implementation of past commitments made at the G20 Agriculture Ministers Meetings particularly on Research and Development, collaboration and knowledge transfer, action to combat food loss and waste, and information and communication technologies (ICT). Shri Singh also supported the proposal of strengthening of AMIS and underscores the importance of assessment of stocks and suggests sharing of best practices in this regard.

The Minister added that in India, ICT has proved to be an effective and powerful medium to disseminate information on agronomic practices, prices, fertilizer and pesticide use and weather and pest related advisories. Many new initiatives have been taken in order to develop an integrated approach for communication process in the agricultural sector. These include: launch of agricultural web portals, mobile apps and a dedicated broadcasting channel. Moreover, with the objective to reform the agriculture marketing system in the country, a National Agriculture Market (e-NAM) portal had been launched which provides a pan-India electronic trading. This e-marketing platform is expected to help farmers in facilitating better price discovery through efficient, transparent and competitive marketing platform; better marketing of agricultural produce; reducing wastages; and getting market related information and with access to large number of buyers from within and outside the State through transparent auction processes.

Shri Singh said that in order to promote efficient irrigation practices in the country, a major irrigation programme was launched by the government in 2015 with emphasis on improving water-use efficiency through, water conservation/ rainwater harvesting and use of micro-irrigation. The programme aims at providing end-to-end solutions in irrigation supply chain, viz., water sources, distribution network and farm level applications and extension services on new technologies and information. The programme is being implemented in a mission mode with aim of completing 99 major and medium irrigation projects with the capacity of 76.03 lakh hectare in a phased manner by December, 2019.

Cabinet approved Interest waiver for the two months of November and December, 2016 for farmers accessing short term crop loans from Cooperative Banks and provided interest subvention to National Bank for Agricultural and Rural Development (NABARD) on additional refinance by NABARD to Cooperative Banks

The Union Cabinet chaired by the Prime Minister Shri Narendra Modi gave its ex-post facto approval for interest waiver for the two months of November and December, 2016 for farmers accessing short term crop loans from Cooperative Banks. The decision also provided for interest subvention to National Bank for Agricultural and Rural Development (NABARD) on additional refinance by NABARD to Cooperative Banks.

Farmers in the whole of India availing short term crop loans, from Cooperative Banks will be benefitted.

The decision intends to ensure availability of resources with Cooperative Banks help farmers in easily accessing crop loans from Cooperative Banks to overcome the difficulties in view of the reduction in availability of cash for carrying out Rabi operations.

Additional resources are to be provided to Cooperative Banks through NABARD for refinance to the

Cooperative Banks on account of interest waiver of two months for November and December, 2016. This will be extended by Cooperative Banks to the farmers in the current financial year 2016-17. An additional financial liability of Rs. 1060.50 crore would be required for this purpose. A sum of Rs. 15, 000 crore allocated during 2016-17 to implement the Interest Subvention Scheme (ISS) had already been utilised.

Rabi Crops Sowing Crossed 637 Lakh Hactare

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 hectare this time in 2016.

Wheat has been sown/ transplanted in 315.55 lakh hectares, rice in 21.77 lakh hectares, pulses in 159.28 lakh hectares, coarse cereals in 56.90 lakh hectares and area sown under oilseeds is 83.84 lakh hectares.

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

(In lakh hectare)

Crop	Area sown in 2016-17	Area sown in 2015-16
Wheat	315.55	292.52
Rice	21.77	25.64
Pulses	159.28	143.05
Coarse Cereals	56.90	60.24
Oilseeds	83.84	78.58
Total	637.34	600.02

General Survey of Agriculture

Trends in foodgrain prices

During the month of December, 2016 the All India Index Number of Wholesale Price (2004-05=100) of foodgrains decreased by 0.34 percent from 290.2 in November, 2016 to 289.2 in December, 2016.

The Wholesale Price Index (WPI) Number of cereals increased by 0.83 percent from 253.5 to 255.6 and WPI of pulses decreased by 3.39 percent from 462.8 to 447.1 during the same period.

The Wholesale Price Index Number of wheat increased by 2.73 percent from 245.0 to 251.7 while that of rice decreased by 0.44 percent from 248.8 to 247.7 during the same period.

Weather, Rainfall and Reservoir Situation during January, 2017

Rainfall Situation

Cumulative Winter Season rainfall for the country as a whole during the period 1st January to 25th January, 2017 has been 3% lower than the Long Period Average (LPA). Rainfall in the four broad geographical divisions of the country during the above period has been higher than LPA by 49% in North-West India but lower than LPA by 86% in Central India, 85% in East & North East India and 15% in South Peninsula.

Out of total 36 meteorological sub-divisions, 02 sub-divisions received large excess rainfall, 05 sub-divisions received excess/normal rainfall, 04 sub-divisions received deficient rainfall, 16 sub-divisions received large deficient rainfall and 09 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 (FRL). Current live storage in these reservoirs (as on 25th January, 2017) is 80.60 BCM as against 63.47 BCM on 25.01.2016 (last year) and 80.71 BCM of normal storage (average storage of last 10 years). Current year's storage is higher than the last year's storage by 27% and equal to normal storage.

Sowing Position during Rabi 2016-17

As per latest information available on sowing of crops, total area sown under Rabi crops in the country has been reported to be 637.34 lakh hectares as compared to 600.02 lakh hectares during the same period of last year. This year's area coverage so far is higher by 37.3 lakh ha. than the area coverage during the corresponding period of last year and 21.2 lakh ha. than the normal as on date.

Economic Growth*

As per the first revised estimates of national income, consumption expenditure, savings and capital formation, released by the Central Statistics Office (CSO) on January 31, 2017, growth rate of Gross Domestic Product (GDP) at constant market prices is placed 7.9 per cent in 2015-16 and 7.2 per cent in 2014-15. The first advance estimates of national income released on 6th January 2017, based on information for the first seven to eight months of the current financial year, estimated that the growth of GDP for the year 2016-17 will be at 7.1 per cent.

The growth in Gross Value Added (GVA) at constant (2011-12) basic prices for the year 2016-17 is estimated to be 7.0 per cent (as per 1st advance estimate), as compared to 7.8 per cent in 2015-16 (first revised estimates). At the sectoral level, agriculture, industry and services sectors grew at the rate of 4.1 per cent, 5.2 per cent and 8.8 per cent respectively in 2016-17.

The share of total final consumption in GDP at current prices in 2016-17 was at 71.3 per cent (as per 1st advance estimate) as compared to 68.1 per cent (1st revised estimate) in 2015-16. The fixed investment rate ratio of gross fixed capital formation to GDP) declined from 29.2 per cent (1st revised estimate) in 2015-16 to 26.6 per cent (as per 1st advance estimate) 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 1st January - 18th January, 2017, has been 1 per cent above normal. The actual rainfall received during this period has been 10.6 mm as against the normal of 10.5 mm. Out of the total 36 meteorological sub-divisions, 3 sub-divisions received large excess rainfall, 1 subdivision received excess rainfall, 2 sub-divisions received normal rainfall, 4 sub-divisions received deficient rainfall, 17 sub-divisions received large deficient rainfall and the remaining 4 sub-divisions received no rainfall.

*www.finmin.nic.in

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

Procurement: Procurement of rice as on 17th January, 2016 was 24.9 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 November, 2016 was 29.5 lakh tonnes. This comprises 27.1 lakh tonnes under TPDS/NFSA and 2.4 lakh tonnes under other schemes. In respect of wheat, the total off-take was 23.4 lakh tonnes comprising 17.8 lakh tonnes under TPDS/ NFSA and 5.6 lakh tonnes under other schemes. The cumulative off-take of foodgrains during 2016-17 (till November, 2016) is 45.6 million tonnes (Table 5).

Stocks: Stocks of foodgrains (rice and wheat) held by FCI as on 1st January, 2017 was 43.4 million tonnes, as compared to 49.8 million tonnes as on 1st January, 2016 (Table 6).

TABLE 1: GROWTH OF GVA AT BASIC PRICES BY ECONOMIC ACTIVITY (AT 2011-12 PRICES) (IN PER CENT)

Sector	Growth Rate (%)			Share in GVA or GDP (%)		
	2014-15 (2nd RE)	2015-16 (I st RE)	2016-17 (AE)	2014-15 (2nd RE)	2015-16 (I st RE)	2016-17 (AE)
Agriculture, forestry & fishing	**-0.3**	**0.8**	**4.1**	**16.5**	**15.4**	**15.0**
Industry	**6.9**	**8.2**	**5.2**	**31.3**	**31.4**	**30.8**
Mining & quarrying	14.7	12.3	-1.8	3.2	3.3	2.8
Manujfacturing	7.5	10.6	7.4	17.4	17.8	17.5
Electricity, gas, water supply & other utility services	7.2	5.1	6.5	2.2	2.1	2.2
Construction	3.0	2.8	2.9	8.5	8.1	8.2
Services	**9.5**	**9.8**	**8.8**	**52.2**	**53.2**	**54.3**
Trade, Hotel, Transport Storage	8.6	10.7	6.0	18.5	19.0	19.0
Financial, real estate & prof. servs	11.1	10.8	9.0	21.3	21.9	22.0
Public Administration, defence and other services	8.1	6.9	12.8	12.4	12.3	13.3
GVA at basic prices	**6.9**	**7.8**	**7.0**	**100.0**	**100.0**	**100.0**
GDP	**7.2**	**7.9**	**7.1**	**—**	**—**	**—**

Source: Central Statistics Office (CSO). 2nd RE: Second Revised Estimates 1st RE: First Revised Estimates, AE: as per first advance estimates of GDP released on 6th January, 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
Agriculture, forestry & fishing	**2.3**	**2.8**	**-2.4**	**-1.7**	**2.6**	**2.0**	**-1.0**	**2.3**	**1.8**	**3.3**
Industry	**8.0**	**5.9**	**3.8**	**5.7**	**6.7**	**6.3**	**8.6**	**7.9**	**6.0**	**5.2**
Mining & quarrying	16.5	7.0	9.1	10.1	8.5	5.0	7.1	8.6	-0.4	-1.5
Manufacturing	7.9	5.8	1.7	6.6	7.3	9.2	11.5	9.3	9.1	7.1
Electricity, gas, water supply & other utility services	10.2	8.8	8.8	4.4	4.0	7.5	5.6	9.3	9.4	3.5
Construction	5.0	5.3	4.9	2.6	5.6	0.8	4.6	4.5	1.5	3.5
Services	**8.6**	**10.7**	**12.9**	**9.3**	**8.8**	**9.0**	**9.1**	**8.7**	**9.6**	**8.9**
Trade, hotels, transport, communication and services related to broadcasting	11.6	8.4	6.2	13.1	10.0	6.7	9.2	9.9	8.1	7.1

Sectors	2014-15				2015-16				2016-17	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Financial, real estate & professional services	8.5	12.7	12.1	9.0	9.3	11.9	10.5	9.1	9.4	8.2
Public administration, defence and Other Services	4.2	10.3	25.3	4.1	5.9	6.9	7.2	6.4	12.3	12.5
GVA at Basic Price	7.4	8.1	6.7	6.2	7.2	7.3	6.9	7.4	7.3	7.1
GDP at market prices	**7.5**	**8.3**	**6.6**	**6.7**	**7.5**	**7.6**	**7.2**	**7.9**	**7.1**	**7.3**

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

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

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

TABLE 4: PROCUREMENT OF CROPS IN MILLION TONNES

Crops	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Rice#	35.0	34.0	31.8	32.0	34.2	24.9[$]
Wheat@	28.3	38.2	25.1	28.0	28.1	23.0[$]
Total	63.3	72.2	56.9	60.2	62.3	47.9

#Kharif Marketing Season (October-September), @ Rabi Marketing Season (April-March), [$]Position as on 17.01.2017
Source: DFPD, M/o Consumer Affairs and Public Distribution.

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

Crops	2012-13	2013-14	2014-15	2015-16	2016-17 (Till November)
Rice	32.6	29.2	30.7	31.8	24.0
Wheat	33.2	30.6	25.2	31.8	21.6
Total (Rice & Wheat)	65.8	59.8	55.9	63.6	45.6

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

TABLE 6: STOCKS OF FOODGRAINS (MILLION TONNES)

Crops	January 1, 2016	January 1, 2017
Rice	12.7	13.5
Unmilled Paddy#	19.9	24.2
Converted Unmilled Paddy in terms of Rice	13.3	16.2
Wheat	23.8	13.7
Total (Rice & Wheat) (1+3+4)	49.8	43.4

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

Articles

Growth and Instability Analysis of Coconut Area, Production and Productivity in Karnataka State

ANANDU BHOVI*AND PUSHPA M. SAVADATTI**

Abstract

This paper is an attempt to estimate trends in area, production and productivity of coconut which is an important crop in the Karnataka State. The analysis has been done for five major coconut producing districts of Karnataka state and state as a whole based on the time series data for the period 1975-76 to 2009-10 using appropriate growth models. Results of the data analysis indicate that, area and production registered significant growth in all the sample districts and state as a whole. Growth in area is higher than that of production growth but growth rate of productivity was found to be stagnant during the study period. Decomposition analysis indicates that percentage contribution of productivity towards increasing production of coconut was very meagre in all the districts except in Chikmagalur and Dakshina Kannada districts. From the study, it is evident that there is a need to boost productivity of the coconut crop in the state in order to increase overall production.

Introduction

Sustainable growth of the Indian economy depends on the agriculture sector. Even today, agriculture plays a very important role in the economic development as nearly half of the rural population depends on agriculture for their livelihood. But over the years, Indian agriculture sector is exhibiting sluggish growth rate due to various risks challenging the sector.

As a result, government of India identified horticulture as a remedial alternative for the ailing agriculture sector. India, being blessed with diverse climatic conditions and soil, provides a vast potential for growth of the horticulture sector. Horticulture sector is gaining lot of importance in India due to its contribution to Indian economy in terms of income and employment generation to millions of people in rural areas. Horticulture crops comprise of fruits, vegetables, potato, tropical tuber crops, medicinal and aromatic plants, spices and plantation crops, etc. Among horticulture crops, plantation crops are high valued commercial crops because of their vital role in the Indian economy. These crops contribute to export earnings, provide employment to many millions of people and conserve the soil and ecosystem. Coconut is an important plantation crop and provides employment to nearly 10 million people who depend on coconut cultivation, processing and related activities and hence plays a very important role in the Indian economy.

Coconut (Cocosnucifera L) is a versatile crop. It is often referred as the'Kalpavriksha'(Tree of Paradise) in India because of its manifold uses. Coconut provides food, drink, fibre, fuel and shelter to the mankind, besides having many other end uses. It is grown in 93 countries of the world. India, Indonesia, Philiphinnes and Shrilanka together shared 77 percent of the world coconut area and 79 percent of the world coconut production.

India is the second largest coconut producer in the world contributing 15730 million nuts1 from an area of 19 lakh hectares (ha) with a maximum productivity of 8303 nuts/ha during 2008-09 (Min of Agri,GOI).

Coconut crop is grown in many parts of India. Available secondary data on the crop indicates that Kerala, Karnataka and Tamil Nadu states together accounted for 84.26 percent and 84.82 percent of the total coconut area and production, respectively in the country during 2008-09. In terms of area (4.19 lakh hectares) and production (2176 million nuts), Karnataka state ranks second next to Kerala state in the country with the yield of 5193 nuts/ha in 2008-09 (Min of Agri, GOI). Over the period, the relative contribution of Kerala state has shown a declining trend in both area and production of coconut crop. It declined from 50.85 percent(1999-00) to 41.6 percent(2008-09) and from 42.6 percent to 36.88 percent in crop acreage and production, respectively. But, during the same period, the trends in Karnataka state showed mixed picture. The coconut area increased from 18.17 percent in 1999-00 to 22.11 percent in 2008-09 and that of production remained constant at 13.8 percent (Min of Agri, GOI).

There has been an impressive growth in coconut area in Karnataka state during last four decades though year to year fluctuations were observed both in area and production of coconut. Because of the economic importance of the coconut crops and Karnataka state being one of the important states in terms of area and production

*Research (Ph.D.) Scholar, Dept. of Economics, Karnatak University Dharwad, Karnataka;

**Professor, Dept. of Economic Studies and Planning, School of Business Studies, Central University of Karnataka, Gulbarga, Karnataka.

of coconut crops, the present study is undertaken to examine the status of coconut crops over the years in terms of area, production and productivity in the Karnataka state.

The specific objectives of the study are

(i) To analyse the trends in area, production and productivity of coconut crop in major coconut producing districts of Karnataka state,

(ii) To understand the magnitude of instability of these variables for the crop in question in the study districts and the state as a whole,and

(iii) To quantify the percentage contribution of area and yield towards increasing the production of coconut in the major coconut growing districts of the state.

Materials and Methods

a. Data base and period of the study

The study is based on annual time series data covering the period of 35 years viz, 1975-76 to 2009-10. The secondary data on area, production and productivity of coconut for five major coconut growing districts, namely, Tumkur, Hassan, Chitradurga, Chikmagalur, Dakshina Kannada(DK) and Karnataka state, was collected from Directorate of Economics and Statistics, Government of Karnataka and Directorate of Economics and Statistic, Ministry of Agriculture, Government of India, Delhi. During 1981, Government of India took major initiative by setting up of Coconut Development Board (CDB) to promote coconut production and marketing in the country. In view of this, the study period (1975-76 to 2009-2010) was divided in to two sub-periods to draw meaningful conclusions with reference to the trends in area, production and yield of coconut crop, as follows :

Period I - (1975-76 to 1980-81)

Period II - (1981-82 to 2009-10)

Period III (Overall period)- (1975-76 to 2009-10)

b. Methodology

To analyse the objectives of the study, different econometric techniques have been adopted and the same are presented below.

1) Compound Growth Rates (CGR)

The compound growth rates have been calculated by fitting an exponential function in the following form (Krishnan and et.al-1991),

$$Y_t = AB^t \quad \ldots\ldots (1)$$

Where,

Y_t is dependent variable(area, production and productivity of coconut in the year 't')

A and B are constant and regression coefficients, respectively.

t = time variable which takes the value 1= 1975–76, 2 = 1977–78, 3 = 1978–79 ,……,

35 = 2009-2010

Taking natural logarithms (ln), to equation (1) we get

$$lnY_t = lnA + lnB.t \quad \ldots\ldots (2)$$

If $lnYt = \hat{y}$, $lnA = \hat{a}$, and $lnB = \hat{b}$ then equation (2) becomes

$$\hat{y} = \hat{a} + \hat{b}t \quad \ldots\ldots (3)$$

equation (3) is log-linear between y and t variables respectively, hence, this can be estimated by ordinary least square (OLS) method. The compound growth rate (r) was obtained by the following formula,

$$r = (\text{antilog } \hat{b} - 1).100$$

the significance of the growth rate was tested by applying student 't' test statistic

$$t = \frac{r}{S.E.(r)}$$

2) Coefficient of Variation (C.V.)

The Coefficient of Variation (C.V.) defined as following (Krishnan etal.-1991) was used as a measure of instability

$$C.V. = \frac{Standard Daviation}{Mean} * 100$$

3) Decomposition Technique

To measure the contribution of area and productivity towards increasing production of Coconut in the state, following simple decomposition method (Krishnan and et.al-1991) was employed.

$$P = A_0 (Y_n - Y_0) + Y_0 (A_n - A_0) + \Delta A.\Delta Y$$

Where, P is Change in Production, A_0 and Y_0 are Area and Yield in the base year, A_n and Y_n are Area and Yield in the current year, respectively, and ΔA and ΔY are changes in area and yield, respectively.

4) Relative contribution

To examine relative contribution of crop acreage and productivity to the increasing production, following method (Krishnan and et.al-1991) has been used.

*In this paper, coconut and nut are used interchangeably.

$$\left[\frac{A_0.\Delta Y}{P}\right] + \left[\frac{Y_0.\Delta A}{P}\right] + \left[\frac{\Delta A.\Delta Y}{P}\right]$$

$$\left[\begin{matrix}Productivity\\Contribution\end{matrix}\right] + \left[\begin{matrix}Area\\Contribution\end{matrix}\right] + \left[\begin{matrix}Interaction\\Effect\end{matrix}\right]$$

Where,?P,?A and ?Y are changes in production, area and yield, respectively.

Results and Discussions

a. Growth Rates of Area, Production and Productivity of Coconut

To understand the growth performance and relative contribution of basic components of coconut production in Karnataka state during the period 1975-76 to 2009-10, time series data on Area, Production and Productivity for five major coconut growing districts in Karnataka and Karnataka state as a whole were analyzed.

The results are presented in table-1. It is clear from the table-1 that there was positive growth in the production of coconut (2.9 per cent) during sub period-I (1975-76 to 1980-81) at the state level which was significant at 1 per cent level. This increase in production of coconut was mainly due to increased area under the crop (2.6 per cent) during the period. Though yield also contributed to some extent by showing positive growth but not significantly.The area expansion during this period was mainly due to implementation of crop acreage development programmes, under the 5th Five year plan by Directorate of Coconut Development. Moreover, production and supplying of hybrid and quality planting materials to the farmers at subsidized price lead to further expansion in area under coconut cultivation.

The district level results for period-I reveal that growth rate in coconut production was highest in Chitradurga District (5.079 percent) followed by Dakshin Kannada (3.85 percent), Hassan (3.1 percent), chikkamagalur (1.74 percent) and Tumkur (0.8 percent), respectively. Production growth rates are positive and significant in all the districts and at the state level. But this positive growth in coconut production in all these districts was due to significant increase in area rather than yield which was showing negative growth rate in all the districts except for chikkamagalur. During the period-I, yield suffered a lot. This was mainly due to lack of irrigation facilities, poor disease and pest management practices in coconut gardens and meagre implementation of productivity enhancement programmes in the state of Karnataka compared to other states, especially Kerala.

During the Period-II (1981-82 to 2009-10), the results show that (table-1) area and production growth rates of coconut crop are positive and highly significant in all the sample districts and at the state level also, (except Dhakshina Kannada district which show significant negative growth in area and marginal positive growth in production) evident from the very low p values. Further, it is interesting to observe that productivity growth rates were negative and significant in all the sample districts and at the state level except in case of DK and Chikkamagalur. Karnataka state witnessed remarkable increase in production (3.15percent) because of expansion in crop acreage (3.38 percent), even though declining trend in productivity (-0.216 percent) is observed. This is mainly due to rise in the supply of hybrid and quality planting materials at the subsidized prices during period-II resulted in allocation of more area under the coconut crop. So, area growth rate was significant. At the district level, Tumkur district topped the list by witnessing highest growth rate in production (3.6 percent) followed by Chikmagalur (2.79 percent), Hassan (1.6 percent) and Chitradurga (1.59 percent). This is because of increase in area under the crop. As compared to the period-I, growth rates of production of coconut in period-II are lower in all sample districts except Tumkur and chikmagalur. Further, it is important to notice that Dakshina Kannada district registered insignificant growth (0.11 percent) in production with marginal increase in productivity (0.82) which is significant at 1 percent level. This was due to significant negative growth rate (-0.7 percent) in area (at 5 percent level of significance). This was mainly due to geographical division of the district (new Udupi district created from the Dakshina Kannada district). Hence, part of the geographical area under coconut cultivation had gone to udupi district. The same production behaviour of coconut had been reflected at the state level also.

During the overall period, Tumkur district had registered highest growth in production (3.2percent), due to acreage expansion (3.9 percent) despite significant negative growth in productivity. The Chikmagalur district exhibited 2.6 percent growth in production followed by Chitradurga 2.5 percent and Hassan 1.8 percent (table-1). Further, a sharp increase in production (0.68 percent) was observed in Dakshina Kannada at 5 percent level of significance mainly due to increase in productivity (0.56 percent) rather than increase in area (0.12 percent) which was insignificant. After 1981, Coconut Development Board (CDB) came into existence for implementing the development programmes like creating higher demand for coconut, improving marketing conditions, assisting coconut growers to get better prices for the product, providing financial and other assistance for coconut cultivation. Further, an effort has been made for the development of technologies for product diversification. On the other hand, giving assistance and suggestions to expand irrigation facilities in the farm, supplying high yielding variety seeds, development of coconut based industries in the state collectively resulted in significant increase in the states' coconut production (3.13 percent) and area (3.3 percent). But during this period, coconut

palm affected by root (wilt) disease causing maximum yield loss and insufficient crop management collectively hold back the coconut productivity in the state. Hence, insignificant negative growth rate was observed in productivity (-0.2 percent) at the state level in period-III (19-76 to 2009-10) .

b. Instability in Area, Production and Productivity of Coconut

In order to assess the consistency of growth, it becomes imperative to study the instability of the variables during the study period. Table-2 depicts the instability in area, production and productivity of coconut for sample districts. In period-I, productivity was almost stable in all sample districts of the state and the same was reflected at the state level results. It is evident that the variation in production was mainly due to variation in area in all districts and the state. This happened due to less attention given in impelmetation of productivity boost programmes during this period in Karnataka state. The district level results indicated that Chitradurga witnessed highest variation in both production and area expansion under coconut in period-I, because there was not much area expansion under the crop in the beginning of this period, after 1979-80, it was observed that there had been tremendous increase in crop acreage in the state. During period-II, instability in area and production was highest in Tumkur and Chikmagalur districts. Further, the district level data shows the spread of values around their mean value is quite high in this period across all sample districts as compared to the period-I. During the period-III, instability in area influences higher than that of productivity in the total variation in production and Tumkur district recorded highest variation in area expansion (43 percent) and Chikkamagalur district witnessed highest variation in both production (50 percent) and productivity (28 percent) during this period. The state witnessed highest instability in production (38 percent) than that of area (33 percent) and productivity (12.5 percent), respectively.

c. Contribution of Area, Productivity and their interaction towards increase in Production of Coconut

With the help of appropriate decomposition model (Krishnan and et.al-1991), percentage contribution of area, productivity and their interaction effect in production of coconut in five major coconut growing districts and state as a whole was estimated and presented in table-3. Results of decomposition analysis revealed that during the period-I, percentage change in production in Karnataka state was mainly through area expansion (84 percent), because of high growth in area (2.6 percent). Productivity (14 percent) & interaction effects (2 percent) contributed meagerly to the total output in the state. The same pattern was observed for all the sample distiricts where in area contribution was the major source for production of coconuts in Period-I. In the second period, Coconut Board came into existence to promote coconut production activities, alongwith government policies and research, as a result share of productivity has been increased marginally (from 14 to 16 percent) at the state level and contribution of interaction effect increased from 2 to 23 percent. The district level analysis indicated that the contribution of area in total production decreased compared to period I and that of productivity increased. The area contribution ranged between 95 per cent (Tumkur district) to 28 per cent (Chikmagalur district) and that of productivity varied between 2 percent to 37 percent. Interaction effect also contributed significantly to the coconut production during period II ranging between 3 percent (Tumkur district) to 38 percent (Chikmagalur district). These trends occurred due to developmental activities that took place during this period that had some positive impact on the productivity though not significant. In case of DK district, a great shift had taken place in period II as compared to period I. In the first period, total change in production was solely due to area change (100 percent), but in the second period, it was shifted to the productivity (105 percent), this happened because of geographical division of the district in 1998-99. During the period-III, it may be observed that at the state level area contriubution is highest (62 percent) followed by interaction effect (25 percent) and productivity effect (13 percent). At the district level, marginal increase has been found in the contribution of productivity and their interaction effect in all districts, except Chikmagalur and Dakshin Kannada district. In Chikmagalur, area effect (29 percent) is less than that of productivity effect (34 percent) and their interaction effect (36 percent). In Dakshina Kannada district, percentage contribution of productivity (66 percent) has recorded highest in the total output of coconut. This is not because of any cultivation practices made by the farmer or CDB, but because of geographical division of district.

Conclusions

The discussion of the results reveal that in the period-I, area and production of the crop were increasing significantly but productivity experienced insignificant growth in the state. Even though after setting up of CDB and implementing many measures to increase area, production and productivity of the crop in the state; productivity witnessed insignificant negative growth rate in the period-II, though area and production showed significant growth which was higher than that of growth witnessed in period-I. Further, the percentage contribution of area (84 percent) to the change in production of coconut was higher than yield (14 percent) and their interaction effect (only 2 percent) in pre-CDB period (period-I). This phenomenon changed in the period-II. The contribution of interaction effect (15 percent) and yield share increased (15 percent) marginally. However, it is observed that the

major variation in production was due to variation in area under the crop. But in Kerala, productivity effect was very high in increasing production of coconut (Krishnan and et.al.).

The results of the study showed that in Karnataka state during 1975-76 to 2009-10; area under coconut cultivation expanded (3.3 percent) significantly and production also showed a positive trend (3.1 percent), but productivity exhibited very sluggish growth. Coconut is a plantation crop once sepal is planted, the gestation period for returns is around 6-7 years. This could be another reason for the low productivity along with insufficient attention given to implementation of productivity enhancement programmes effectively. Apart from this, high labour cost, lack of human labour for land preperation and garden maintenance and insufficient availabality of ground water are some other reasons for decline in productivity. Though area and production of coconut have shown positive trend during the study period, there is marginal increase in the productivity of coconut. Despite the establishment of CDB, not much improvement could be seen in productivity of coconut crop. Hence, it is felt that there is need to embrace the improved techonology in coconut cultivation. It is very essential to implement effectively productivity boost programmes by CDB to increase the productivity of coconut in major coconut growing distircts which are contributing to a great extent for the economic development of those districts. Hence, based on the results, the study recommends for the need to boost productivity of coconut in Karnataka state.

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TABLE: 1 COMPOUND GROWTH RATES OF AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN MAJOR COCONUT GROWING DISTRICTS OF KARNATAKA STATE

Districts		Period I (1975-76 to 1980-81)			Period II (1981-82 to 2009-10)			Period III (1975-76 to 2009-10)		
		Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Tumkur	CGR	0.810***	0.807***	-0.003**	4.523***	3.649***	-0.836***	3.936***	3.213***	-0.696***
	t stat	4.879	4.890	-2.997	28.41	14.673	-3.310	24.55	16.814	-3.985
	P value	0.008	0.008	0.040	0.000	0.000	0.003	0.000	0.000	0.000
Hassan	CGR	3.118 **	3.118 **	-0.0001 NS	2.242***	1.598***	-0.630 **	2.337***	1.853***	-0.473 ***
	t stat	3.417	3.417	-1.0307	25.97	7.071	-2.285	35.32	11.277	-2.482
	P value	0.027	0.027	0.3609	0.000	0.000	0.030	0.000	0.000	0.018
Chitradurga	CGR	5.085 ***	5.079 ***	-0.005 **	2.176***	1.590***	-0.574 **	3.004***	2.566***	-0.426 **
	t stat	3.754	3.754	-2.816	11.58	4.574	-2.058	14.23	8.304	-2.209
	P value	0.020	0.020	0.048	0.000	0.000	0.049	0.000	0.000	0.034
Chikmagalur	CGR	1.747 **	1.748 **	0.0007 NS	2.205***	2.791***	0.573 NS	2.217*	2.668*	0.442 NS
	t stat	3.590	3.588	0.5975	19.62	4.852	1.062	28.48	6.786	1.197
	P value	0.023	0.023	0.5823	0.000	0.000	0.297	0.000	0.000	0.240
Dakshina	CGR	3.864***	3.857***	-0.007 **	-0.705**	0.110 NS	0.820***	0.125 NS	0.686**	0.560 ***
Kannada	t stat	5.013	5.014	-2.777	-1.970	0.234	2.658	0.419	2.006	2.587
	P value	0.007	0.007	0.050	0.059	0.816	0.013	0.678	0.053	0.014
Karnataka state	CGR	2.623***	2.904***	0.273 NS	3.383***	3.159***	-0.216 NS	3.339***	3.133***	-0.200 NS
	t stat	5.356	6.643	1.084	54.06	11.686	-0.718	72.87	16.956	-0.973
	P value	0.006	0.003	0.339	0.000	0.000	0.479	0.000	0.000	0.338

Note: ***, ** and * refers to CGR values significant at 1 ,5 and 10 percent level of significance respectively, and NS refers to insignificant.

Source: Calculated by secondary data

TABLE 2: INDEX OF INSTABILITY OF AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN MAJOR COCONUT GROWING DISTRICTS OF KARNATAKA STATE

Districts	Period I (1975-76 to 1980-81)			Period II (1981-82 to 2009-10)			Period III (1975-76 to 2009-10)		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Tumkur	1.64	1.63	0.006	38.70	36.04	12.35	42.72	38.81	11.51
Hassan	6.791	6.791	0.0004	19.55	19.33	12.80	23.89	22.78	11.64
Chitradurga	10.87	10.85	0.012	18.50	20.56	12.58	28.34	29.02	11.42
Chikmagalur	3.742	3.744	0.004	19.46	48.86	30.15	23.10	50.30	27.88
Dakshina Kannada	7.773	7.759	0.015	17.40	21.70	19.65	18.29	22.65	18.09
Karnataka state	5.241	5.626	1.063	28.13	33.78	13.81	33.48	37.81	12.52

Source: Calculated by secondary data

TABLE 3: PERCENTAGE CONTRIBUTION OF AREA, PRODUCTIVITY AND THEIR INTERACTION TOWARDS INCREASING PRODUCTION OF COCONUT IN MAJOR COCONUT GROWING DISTRICTS OF KARNATAKA STATE

(percent)

Districts	Effect	Period -I (1975-76 to 1980-81)	Period II (1981-82 to 2009-10)	Period III (1975-76 to 2009-10)
Tumkur	ΔP	106*	6772*	6939*
	Area	100	95.12	95.22
	Yield	-0.36	1.58	1.46
	Interaction	-0.013	3.29	3.31
Hassan	ΔP	237*	2573*	2812*
	Area	100.0	61.18	64.48
	Yield	-0.0007	20.99	16.72
	Interaction	-0.0001	17.83	18.79
Chitradurga	ΔP	251*	1650*	2026*
	Area	100.1	69.94	75.56
	Yield	-0.106	15.92	9.19
	Interaction	-0.029	14.12	15.23
Chikmagalur	ΔP	36*	1557*	1593*
	Area	100.01	27.95	29.58
	Yield	-0.014	37.61	33.98
	Interaction	-0.0012	34.42	36.43
Dakshina Kannada	ΔP	111*	433*	562*
	Area	100.2	-3.22	20.27
	Yield	-0.19	105.29	66.70
	Interaction	-0.036	-2.07	13.03
Karnataka state	ΔP	1233*	21388*	22897*
	Area	84.12	61.62	61.79
	Yield	13.99	15.75	13.42
	Interaction	1.89	22.62	24.78

Note: * -indicates that the absolute change in production

Source: Calculated by secondary data

Seasonality and Exponential Smoothing Models for Price Forecasting of Rice in Selected Market of Uttar Pradesh

MEERA[1] AND HEMANT SHARMA[2]

Abstract

Analysis of price and market arrivals overtime is important for formulating a sound agricultural policy. Fluctuations in market arrivals largely contribute to price instability. Such an analysis is also useful for farmers in order to decide the suitable time to disposing off their farm produce to their best advantage. In view of this the present study was undertaken by collecting monthly prices of rice in major rice markets of Uttar Pradesh for a period of 10 years (2006 to 2015). Price of Rice was found to be highest during off season and lowest during harvest season. Although rice is mainly kharif crop but also grown in summer season, the arrivals were high during November to January. The higher seasonal indices of prices were observed during October during which the arrivals were found to be low. In the investigation, different forecasting models were considered to price forecast and to measure the forecast accuracy among selected models. The comparison of all the three Exponential Smoothing models was carried out in the process based on the MAD and MAPE values which were considered to be least. Double Exponential model for rice were found to be the most appropriate model with MAD (36.11) and MAPE (2.4). The validity of the forecasted values of rice was checked by comparing them with their actual production values during the post sample forecast period i.e. Jan.2016 to June 2016 for rice crop. The accuracy percentage between the forecasted and actual price value of rice were found to lie between 98.12 to 99.71 per cent. It was observed that the Double Exponential model was between the most suitable for forecasting the rice. This information could be used for further research in this area of production forecasting.

Keyword: Seasonality, Price Forecasting, Rice, Wholesale price. Double exponential model, Uttar Pradesh.

Introduction

The analysis of prices and market arrivals over time is important for formulating a sound agricultural price policy. Fluctuations in market arrivals largely contribute to the price instability of foodgrains in the state. In order to device appropriate ways and means for reducing the price fluctuations of foodgrains commodities, there is a need to have a thorough understanding of the price behaviour over time. More production and more arrivals adversely affect the prices. As a result, the prices usually go down. But in a mixed economy like India, a certain amount of direction is given to the market forces and this law may not always holds good. This controlled mechanism of the market forces may aim at regulating market supplies or consumption or both, particularly in the case of commodity in the short reaction among the sellers and buyers and effect of these reactions at once reflected in the supply and price position. Thus, in mixed economy, it would be necessary to study the market arrivals and prices and to know the factors influencing them. Based on the past behaviour of market arrivals and prices, the future prices can be predicted and forecasted to help the stakehoders. Rice is an important crop and consumed widely across the globe as a staple food. India is among the leading rice producers in the world and stands at 2nd position in the world. India produces rice in a large quantity and in the last financial year, rice production crossed the mark of 100 Million Tonnes. Apart from the leading rice producer, India is also the largest exporter of rice in the world and in the last financial year, India exported more than 8 Million Tonnes of rice to many countries. Some of the countries to which India exports rice are Iran, Saudi Arabia, UAE, Senegal and South Africa. Rice is grown widely across the nation in more than 20 states and in an area of over 400 Lakh Hectares. West Bengal is the leader among all rice producing states with more than 13% contribution in India's Rice Production. Uttar Pradesh is another leading rice producer in India and placed at 2nd position among the largest rice producing states in India. Rice is consumed widely in Uttar Pradesh and grown in an area of more than 59 Lakh hectares with 140.22 lakh ton production. The state also has a good yield of more than 2,300 kilograms per hectare.Uttar Pradesh contributes more than 13% in total rice production in the country. Some of the major rice growing areas are Shahjahanpur, Bareilly, Budaun, Aligarh, Saharanpur and Agra. Sarraiya, Manhar, Kalaboro, Saroj and Shusk Samrat are some of the varieties of rice grown in the state. Farmers need price forecasting for proper adjustments in cropping pattern and to decide when, where and how much to sell. Consumer need price forecasting to understand market forces for making purchases in a rational manner. Researcher requires market

[1]M.Sc Agricultural Economics, Swami Keshwanand Rajasthan Agricultural University, Sri Ganganagar Rd, Bichhwal, Bikaner, Rajasthan 334006

[2]Assistant Professor, AERC, Vallabh Vidyanagar, Anand, Gujarat

intelligence in order to assess the efficiency of the marketing system, identify the bottlenecks in marketing programme/projects and for suggesting future remedial steps and strategies. Under risk conditions and amidst price instability, forecasting is very important in helping to make decisions. Accurate price forecasts are particularly important to facilitate efficient decision making as there is time lag between making decisions and the actual output of the commodity in the market. Therefore, the objectives of this research are i) to study the seasonality in arrivals and prices of rice; and ii) to compare the forecasting performances of different time series methods or models for forecasting of rice price, namely Single, Double and Triple exponential smoothing.

Methodology

Shahjahanpur region was purposively selected for the price behaviour study as around 20 per cent rice of UP is produced in this region. Shahjahanpur market had highest arrivals of rice. The data on market arrivals and wholesale prices of rice crop was collected from Agmark portal The price behaviour of the rice in selected market over the period from Jan., 2006 to December 2015 was analysed. The various price forecasting models were tried to identify the most suitable model which suits to the actual market price of rice. The data of rice wholesale prices in Shahjahanpur regulated market for the period Jan. 2006 to December, 2015 was utilized for model fitting and data for subsequent period i.e., from Jan. 2016 to June, 2016 was used for validation. The details are as follows:

Seasonal Behaviour

(a) Computation of seasonal indices:

The seasonal price indices were computed by taking 12 months moving average of the original data with the following multiplicative model of time series analysis:

$$P = T \times S \times C \times I \quad \text{..... (1)}$$

Where,

P = Monthly price
T = Trend value
C = Cyclic component
S = Seasonal component
I = Irregular component

The ratio to moving average method was used for the construction of the seasonal price indices. The effect of trend and cyclical variations were eliminated by twelve months centered moving averages. Thereafter, the ratios of original price indices to centered twelve months moving averages were worked out. These ratios were averaged and the twelve months indices were equal to 1200.

Price Forecasting

(A) Exponential Smoothing Model:

For smoothing, the common techniques discussed by Gardner (1985) i.e. Single Exponential Smoothing (SES) and Double Exponential Smoothing (DES), are used.

(i) Single exponential smoothing (SES)

For the time series Y_1, Y_2....., Y_t, forecast for the next value, say $Y_t + 1$, $F_t + 1$, is based on the weights α and $(1-\alpha)$ to the most recent observation Y_1 and recent forecast F_1 respectively, where is a smoothing constant, the form of the model is :

$$F_{t+1} = F_1 + (Y_1 - F_1)$$

The choice of has considerable impact on the forecast. The optimum value of corresponding to minimum Mean Square Error (MSE) is then identified.

(ii) Double Exponential Smoothing (DES)

The form of the model is

$$L_t = \alpha Y_t + (1-\alpha)(L_{t-1} + b_{t-1})$$
$$b_t = \beta(L_t - L_{t-1}) + (1-\beta)b_{t-1}$$
$$F_{t+m} = L_t + b_t m$$

Where, L_t is level of series at time t

b_t is slope of the series at time t

α and β (= 0.1.0.2,.....0.9) are the smoothing and trend parameters

The pair of values of parameters, α and β, which gives minimum MSE are taken.

Selection of weights (W1, W2, W3)

Values of all three smoothing constant/weights are obtained by trial and error method. The time series are analyzed by giving different weights and the best exponential model in each case is selected, based on the minimum MAPE and MSD values under different weights.

Criteria Measurement for Forecast Error:

To measure the forecast error or accuracy of the forecast, following measures have been used.

(i) Mean Square Error (MSE):— This is similar to simple variance.

$$\text{MSE} = \sum_{t=1}^{T} \left| \text{At - Ft} \right| 2 \ / \ \text{T}$$

Where A_t = Actual value at time t

F_t = forecast value at time t

(ii) Mean Absolute Deviation (MAD):— This is average of absolute deviation or absolute forecast error.

$$MAD = \sum_{t=1}^{T} | \text{forecast error} | / T$$

$$= \sum_{t=1}^{T} | A_t - F_t | / T$$

(iii) Mean Absolute Percent Error (MAPE):- This is average value of percent absolute error.

$$MAPE = 100 \sum_{t=1}^{T} [| A_t - F_t | / A_t] / T$$

Results and Discussion

The seasonal indices of arrivals and prices of rice in Shahjahanpur regulated market for the period from 2006 to 2015 are shown in Table 1 and Fig.1. The highest index of arrivals was observed in the month of November (189.92). The lower indices of arrivals were more prominent from February to June with a lowest in April (56.89). The indices of arrivals were more than 100 from November to January indicating the peak arrival months of rice in the Shahjahanpur market. Thus, the arrivals of rice showed a definite pattern, depicting fluctuation in systematic manner.

The price index of rice was found to be the highest in the month of October (101.86) and the lowest in February (98.81) at Shahjahanpur market. The price indices of rice were more than 100 from February to April showed a definite pattern of seasonality in price according to crop season. It can, thus, be concluded that the arrivals of rice has negative relation with the price.

TABLE 1: SEASONAL INDICES OF MONTHLY ARRIVALS AND PRICES OF RICE IN SHAHJAHANPUR REGULATED MARKET
(2006 TO 2015)

S. No.	Month	Arrivals	Price
1.	January	153.04	99.14
2.	February	86.55	101.35
3.	March	62.32	101.78
4.	April	56.89	101.34
5.	May	58.30	98.81
6.	June	64.77	98.99
7.	July	94.86	99.47
8.	August	95.69	99.51
9.	September	90.31	99.89
10.	October	85.66	101.86
11.	November	189.92	99.48
12.	December	166.69	98.38
	Total	1200.00	1200.00

Figure 1: Seasonal indices of monthly arrivals and prices of Rice in Shahjahanpur market (2006 to 2015)

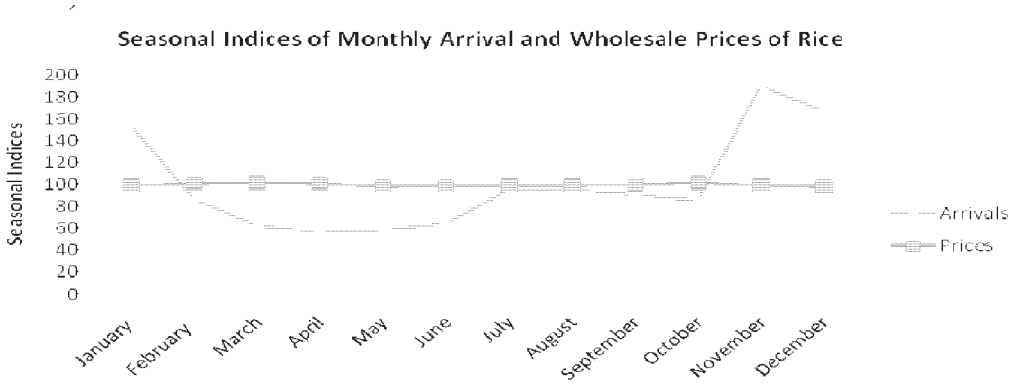

Table 2 shows the monthly wholesale price of Rice for the period 2006 to 2015 and the data revealed an increasing trend. For smoothing of the data, Double exponential smoothing technique was found to be most appropriate.

TABLE 2: ACCURACY AND FORECAST PRICE OF RICE BY DIFFERENT MODELS

(Rs./quintal)

Month & Year	Actual Wholesale price	Forecast Price of Rice (Rs./ Qtl.)		
		Single Exponential Model	Double Exponential model	Triple Exponential Model
Jan.16	2185.81	2070.2 (94.42)	2203.65 (99.19)	2100.59 (95.94)
Feb.16	2196.82	2070.2 (93.88)	2214.2 (99.22)	2113.87 (96.08)
Mar.16	2172.28	2070.2 (95.07)	2224.75 (97.64)	2132.75 (98.15)
Apr.16	2241.85	2070.2 (91.71)	2235.31 (99.71)	2136.15 (95.05)
May16	2288.08	2070.2 (89.48)	2245.86 (98.12)	2146.12 (93.39)
June16	2295.46	2070.2 (89.12)	2256.41 (98.27)	2159.44 (95.51)

Figure in parentheses are the percentages of respective actual prices

The performance of different models was measured in terms of Mean Absolute Deviation (MAD) and Mean Absolute Percentage Error (MAPE). The comparative performances of different models are presented in Table 2.

TABLE 3: DIFFERENT EXPONENTIAL SMOOTHING CRITERION FOR RICE PRICE FORECAST MODEL

Model	SES	DES	TES
MAPE	2.66	2.4	3.29
MAD	41.52	36.11	52.03
MSD	6112.48	6088.44	6157.97

From the Table 3, it can be inferred that the double exponential model was the preferred model for forecasting wholesale price of rice due to the minimum values of MAD (36.11) and MAPE (2.4) when compared to the other models. The actual wholesale price of rice from Jan.2016 to June 2016 and the predicted values for these months through various models are presented in Table 2. In order to check the validity of these forecasted values, they were compared with the actual values of rice price during the post sample forecast period i.e., from Jan.2016 to June 2016. The accuracy percentages vary from 98.12 per cent to 99.71 per cent based on double exponential model. It was observed that the accuracy percentage out of different forecasting models, the prevailing price and based on double exponential model was very close to actual value as compared to other predicted model prices. The accuracy percentage varied from 89.12 to 95.07 per cent in case of SES model and 93.39 to 95.94 per cent in case of TES. This proved that the Double exponential model was the best fit model for forecasting the rice price in Shahjahanpur regulated market during the period under study.

Conclusion

The analysis of price and market arrivals of rice crop overtime is important for formulating a sound agricultural policy. Price of rice was found to be highest during off season and lowest during harvest season. Since rice is mainly kharif crop but also grown in summer season, the arrivals were high during November to January. The higher seasonal indices of prices were observed during October during which the arrivals were found to be low. In the investigation, different forecasting models were considered to price forecast and to measure the forecast accuracy among selected models. The comparison of all the three Exponential Smoothing models was carried out in the process based on the MAD and MAPE values which were considered to be least. Double Exponential model for rice were found to be the most appropriate model with MAD (36.11) and MAPE (2.4). The validity of the forecasted values of rice was checked by comparing them with their actual production values during the post sample forecast period i.e. Jan.2016 to June 2016 for rice crop. The accuracy percentage between the forecasted and actual price value of rice were found to lie between 98.12 to 99.71 per cent. It was observed that the Double Exponential model was the most suitable for forecasting the rice. This information can be used for further research in this area of production forecasting.

Policy Implications

- Adequate and continuous efforts should be made to disseminate the market intelligence and market information, particularly of price forecast to help the stake holders.
- There is a need to establish a few processing units to create value addition to the selected commodities. These would help the farmers to get better income on the one hand and reduce price fluctuation on the other hand.

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Cotton Acreage Response to Price in Tamil Nadu - A Functional Analysis

DR. R. MEENAKSHI*

Introduction

Econometric model to study acreage response is of great importance in agricultural planning, more so, when it involves manipulation of price structure. Acreage response to price is conditioned by several factors like soil type, rainfall, irrigation, technical constraints such as crop rotational requirements etc., which affect acreage allocation among crops. These factors differ considerably from region to region. Therefore, acreage response is also expected to vary among regions. This fact has prompted to examine the acreage response to relative prices of cotton in Tamil Nadu state for the pre reform and post reform periods.

Cotton, as a commercial crop, plays an important role in transforming subsistence agriculture into a profit oriented business. India has the distinct pride of having the largest cotton growing area, namely, one-fourth of the World's cotton area and the largest producer of extra-long staple cotton. Cotton is one of the important cash crops grown in many states over an area of about 9.14 million hectares in India. Among the states of Tamil Nadu, Gujarat, Punjab and Andhra Pradesh cotton registered the highest yield in India. Recently, cotton is cultivated in an area of 1.29 lakh hectares of land and producing about 5 lakh bales (170 Kgs / bale) in Tamil Nadu. The state registered a productivity growth of 388 Kg / hectare in 2015-16. In view of predominant position occupied by cotton, the cash crop in Tamil Nadu, the response of acreage to price variation becomes significant.

The study endeavours to evaluate supply response for farm sector in case of cotton and the evidence examined covers a period of 44 years (1971-72 to 2014 -15) in the state of Tamil Nadu. For the time series analysis, the period of study is (1971-72 to 2014-15) divided into two periods, viz. pre-reform period pertaining to 1971-72 to 1989-90; post-reform period covering 1990-91 to 2014-15.

Methodology and Analysis

The study attempts to answer the following questions.

1. What are the suitable models to describe acreage response?
2. Whether the Nerlovian adjustment lag model proves to be better than the traditional model?
3. Which of the following price specifications could be said to be more relevant to the farmers' expectations behaviour with respect to their resource allocation?
    a) Twelve - month annual average price in previous year (p1).
    b) Three - month post-harvest average price in previous year (p2).
    c) Three - month pre-sowing average price in current year (p3).
    d) Average of previous year's post-harvest and current year's pre-sowing prices (p4)
    e) Three - year average of twelve - month annual average price (p5).
    f) Three - year average of three - month post-harvest average price (P6).
    g) Three - year average of three - month pre-sowing average price (p7).
    h) Three-year average of three - month post-harvest and three month pre-sowing average prices (p8).
4. What are the magnitudes of long run and short run elasticities with respect to relative price changes, yield, rainfall and substitute crop acreage?
5. What is the period taken by farmers to fully adjust to acreage to a change in its price?

Multiple regression analysis is used through Nerlove's adjustment lag model and traditional model to test the hypothesis that acreage responds to price and non-price movements positively. The study covers pre reform period and post reform period for which continuous time series data has been made available from the various publications of Government of Tamil Nadu.

The estimating model included prices, lagged acreage, yield, rainfall, time trend and substitute crop acreage as independent variables with acreage considered as a dependent variable.The effect of the above six independent variables on cotton acreage in Tamil Nadu

*Retired Head & Associate Professor, Department of Economics, Sri Sarada College for Women, Salem

has been examined because it is not only the price but the quantum of other variables which are important for acreage allocation of cotton.

The results and interpretations of the functional analysis are based on two models, the adjustment lag model and the traditional model to obtain the response relation. Non-linear (logarithmic) regression equations have been fitted to the absolute values of the variables. The logarithmic functions gave consistently better fit and therefore, for the study area, they were selected for discussion in this paper.

For the study of Tamil Nadu, a set of sixteen equations are presented. The first eight equations relate to the adjustment lag model using the first four price specifications with and without a trend value. The remaining eight are the equations based on the traditional model. In the traditional model with no recognition to past acreage, the first four prices are the same as used in the adjustment lag equations and the last four involve three-year average price specifications. On the basis of these sixteen functions, the best price expectation has been chosen for subsequent discussion.

Results and Discussion

As a preliminary analysis, simple zero order and first order partial correlations were worked out for Tamil Nadu state for the variables used in this study and are given below. In pre reform period, the correlation between area and lagged area were positive in the entire study area. This association reveals that a substantial portion of acreage allocation in cotton flows from past behaviour. It is equally surprising that a negative correlation was found between area and trend in the study region. The relationship between area and variables like rainfall, substitute crop acreage and time trend was not positive in Tamil Nadu state. However, the relationship between area and yield was found to be positive in the study region.

In the post reform period, there was positive association between area and lagged area, area and yield, and area and trend value in the entire study region. Cotton acreage and rainfall emerged with a negative sign for the state as a whole. The relationship of area with substitute crop acreage had a mixture of positive and negative signs.

It may be mentioned that no definite indication could be obtained from the zero order correlations worked out for the acreage and non-price variables as the association between them in the state came to be neither uniform nor powerful, not significant enough to suggest any definite choice.

The assessment of the extent and direction of association between the relative prices was attempted with the help of simple correlation coefficients. P_1 price showed a significant association with P_3 price in Tamil Nadu state in pre and post reform periods. All values are positively correlated in the study area. Out of the eight price variables, P3 emerges significantly correlated with remaining price variables in Tamil Nadu state as a whole.

Regressions were run for Tamil Nadu state. The estimated acreage response function based on the selection of price for this state is given below.

TABLE 1: ESTIMATION OF ZERO-ORDER AND FIRST-ORDER CORRELATIONS IN PRE-REFORM PERIOD

	A_t	A_{t-1}	Yt_{-1}	W_t	T_t	S_t
A_t	1.000	.482(*)	.011	–.017	–.310	–.172
At_{-1}		1.000	.069	–.341	–.497(*)	–.262
Yt_{-1}			1.000	–.107	.495(*)	–.204
W_t				1.000	.269	.274
T_t					1.000	–.352
S_t						1.000

** Correlation is significant at 0.01 level.* Correlation is significant at 0.05 level.

TABLE 2: ESTIMATION OF ZERO-ORDER AND FIRST-ORDER CORRELATIONS IN POST-REFORM PERIOD

	A_t	At_{-1}	Yt_{-1}	W_t	T_t	S_t
At	1.000	.916(**)	.076	–.040	.915(**)	.750(**)
At_{-1}		1.000	.063	–.050	.885(**)	.719(**)
Yt_{-1}			1.000	.006	–.017	–.134
W_t				1.000	–.120	–.017
T_t					1.000	.912(**)
S_t						1.000

** Correlation is significant at 0.01 level.* Correlation is significant at 0.05 level.

TABLE 3 ESTIMATION OF SIMPLE PRICE CORRELATION COEFFICIENTS IN PRE-REFORM PERIOD

	P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8
P_1	1.000	.987(**)	.758(**)	.931(**)	.847(**)	.843(**)	.814(**)	.829(**)
P_2		1.000	.740(**)	.928(**)	.816(**)	.814(**)	.782(**)	.798(**)
P3			1.000	.938(**)	.965(**)	.963(**)	.963(**)	.964(**)
P_4				1.000	.978(**)	.976(**)	.960(**)	.969(**)
P_5					1.000	.998(**)	.993(**)	.996(**)
P_6						1.000	.995(**)	.999(**)
P_7							1.000	.999(**)
P_8								1.000

** Correlation is significant at 0.01 level.* Correlation is significant at 0.05 level.

TABLE 4: ESTIMATION OF SIMPLE PRICE CORRELATION COEFFICIENTS IN POST-REFORM PERIOD

	P_1	P_2	P_3	P_4	P_5	P_6	P_7	P_8
P_1	1.000	.931(**)	.625(**)	.850(**)	.914(**)	.901(**)	.824(**)	.907(**)
P_2		1.000	.719(**)	.937(**)	.906(**)	.964(**)	.835(**)	.942(**)
P_3			1.000	.917(**)	.769(**)	.719(**)	.791(**)	.789(**)
P_4				1.000	.914(**)	.923(**)	.885(**)	.946(**)
P_5					1.000	.951(**)	.865(**)	.956(**)
P_6						1.000	.823(**)	.956(**)
P_7							1.000	.952(**)
P_8								1.000

** Correlation is significant at 0.01 level.* Correlation is significant at 0.05 level.

TABLE 5: ESTIMATED ACREAGE RESPONSE FUNCTIONS WITH DIFFERENT PRICE EXPECTATIONS USED FOR COTTON LINT PRICES IN TAMIL NADU IN PRE-REFORM PERIOD- LOGARITHMIC

Equation No.	Price Expectation used	Constant	P_{t_1}	A_{t_1}	Y_{t_1}	W_t	T_t	S_t	R^2	Adj. R^2
1.01	P_1	59.761	0.370 (0.328)	-0.501 (0.444)	0.707** (0.331)	0.501* (0.346)	-6.835** (3.232)	-1.604** (0.73)	0.474	0.159
1.02	P_2	49.485	0.179 (0.271)	-0.342 (0.426)	0.659* (0.341)	0.497* (0.359)	-5.269** (2.909)	-1.367** (0.715)	0.432	0.092
1.03	P_3	39.444	0.271 (0.254)	-0.14 (0.35)	0.53* (0.307)	0.323 (0.322)	-4.811*** (2.016)	-0.864* (0.585)	0.487	0.207
1.04	P_4	53.169	0.527 (0.421)	-0.317 (0.362)	0.6** (0.314)	0.325 (0.371)	-7.028*** (3.127)	-1.174* (0.597)	0.488	0.18
1.05	P_1	12.290	-0.214 (0.203)	0.255 (0.301)	0.28 (0.301)	0.294 (0.38)	-	-0.377 (0.508)	0.239	-0.106
1.06	P_2	12.268	-0.205 (0.185)	0.25 (0.3)	0.268 (0.291)	0.296 (0.376)	-	-0.372 (0.502)	0.246	-0.097
1.07	P_3	13.349	-0.12 (0.23)	0.255 (0.364)	0.193 (0.322)	0.24 (0.377)	-	-0.441 (0.658)	0.221	-0.103
1.08	P_4	16.023	-0.264 (0.271)	0.159 (0.344)	0.322 (0.338)	0.367 (0.433)	-	-0.593 (0.629)	0.229	-0.122
1.09	P_1	35.999	0.148 (0.266)	-	0.478** (0.266)	0.455 (0.348)	-3.892** (1.938)	-1.01** (0.513)	0.407	0.138
1.10	P_2	34.188	0.07023 (0.231)	-	0.492** (0.266)	0.463 (0.351)	-3.477** (1.835)	-0.977** (0.515)	0.396	0.121
1.11	P_3	34.586	0.288 (0.242)	-	0.456** (0.237)	0.295 (0.303)	-4.431*** (1.713)	-0.718* (0.441)	0.48	0.263
1.12	P_4	39.916	0.432 (0.403)	-	0.447* (0.258)	0.312 (0.367)	-5.425** (2.508)	-0.876** (0.485)	0.448	0.198
1.13	P_5	44.104	0.82** (0.389)	-	0.48** (0.225)	0.21 (0.321)	-7.466**** (2.348)	-0.703* (0.442)	0.566	0.369
1.14	P_6	45.471	0.781 ** (0.426)	-	0.526*** (0.234)	0.318 (0.319)	-7.603*** (2.716)	-0.813** (0.448)	0.533	0.321
1.15	P_7	46.706	0.885* (0.514)	-	0.565*** (0.24)	0.21 (0.347)	-8.307*** (3.244)	-0.698* (0.471)	0.52	0.302
1.16	P_8	46.213	0.839** (0.469)	-	0.545*** (0.236)	0.264 (0.33)	-7.993*** (2.97)	-0.756* (0.457)	0.528	0.314

* - Significant at 20% level ** - Significant at 10% level *** - Significant at 5% level **** - Significant at 1% level
Figures in the Parenthesis are standard errors

P_1 - Twelve - month annual average price in previous year. P_2 - Three - month post-harvest average price in previous year.

P_3 - Three - month pre sowing average price in current year.

P_4 - Average of previous years post-harvest and current year pre sowing prices.

P_5 - Three - year average of twelve - month annual average price.

P_6 - Three - year average of three - month post-harvest average price.

P_7 - Three - year average of three - month pre sowing average price.

P_8 - Three - year average of three - month post-harvest and three-month pre sowing average price

TABLE 6: FINALLY, ESTIMATED COTTON ACREAGE RESPONSE FUNCTIONS - TAMIL NADU IN PRE-REFORM PERIOD

Equation No.	Price Expectation Selected	Constant	Regression Coefficients						Coefficient of Multiple Determination on R^2	Adjusted Coefficient of Multiple Determination $\bar{R}^2$
			Relative Price P_{t-1}	Cotton Acreage in A_{t-1}	Yield Y_{t-1}	Rainfall W_t	T_t	Substitute Crop S_t		
1.03	P_3	39.444	0.271 (0.254)	-0.14 (0.35)	0.53* (0.307)	0.323 (0.322)	-4.811 *** (2.016)	-0.864 * (0.585)	0.487	0.207
1.04	P_4	53.169	0.527 (0.421)	-0.317 (0.362)	0.6** (0.314)	0.325 (0.371)	-7.028*** (3.127)	-1.174* (0.597)	0.488	0.18
1.11	P3	34.586	0.288 (0.242)	-	0.456** (0.237)	0.295 (0.303)	-4.431*** (1.713)	-0.718* (0.441)	0.48	0.263

* -Significant at 20% level ** - Significant at 10% level *** -Significant at 5% level ****-Significant at 1% level
Figures in the Parentheses are standard errors.

TABLE 7: ACREAGE ELASTICITIES AND COEFFICIENT OF ADJUSTMENT FOR COTTON LINT PRICES IN TAMIL NADU IN PRE-REFORM PERIOD

Equation No	Elasticity with respect to prices		Elasticity with respect to yield	Elasticity with respect to weather	Elasticity with respect to substitue crop	α	β	Coefficient of adjustment (γ)	Years required for 95 percent effect of price
	Short run elasticity	Long runs elasticity							
1.07	-0.069	-0.093	-0.071	-0.088	-0.174	17.92	0.1611	0.7450	2.192
1.11	0.166	0.166	0.158	0.100	0.312	34.59	0.2880	-	-

TABLE 8: ESTIMATED ACREAGE RESPONSE FUNCTIONS WITH DIFFERENT PRICE EXPECTATIONS USED FOR COTTON LINT PRICES IN TAMIL NADU IN POST-REFORM PERIOD-LOGARITHMIC

Equation No.	Price Expectation used	Constant	P_{t_1}	A_{t_1}	Y_{t_1}	W_t	T_t	S_t	R^2	Adj. R^2
2.01	P_1	36.632	0.0386 (0.291)	-0.702 (0.646)	-0.141 (0.36)	0.781** (0.393)	3.134** (1.479)	-2.681 (1.657)	0.869	0.803
2.02	P_2	36.744	0.106 (0.27)	-0.761 (0.66)	-0.118 (0.361)	0.8** (0.394)	3.269** (1.515)	-2.745 (1.646)	0.87	0.806
2.03	P_3	47.703	0.661*** (0.247)	-1.444*** (0.577)	-0.307 (0.285)	0.963*** (0.319)	4.67**** (1.301)	-3.798*** (1.37)	0.918	0.877
2.04	P_4	40.040	0.458* (0.317)	-1.11* (0.656)	-0.131 (0.326)	0.889*** (0.371)	4.003*** (1.49)	-3.195** (1.563)	0.888	0.832
2.05	P_1	-6.820	-0.03516 (0.326)	0.629**** (0.171)	0.302 (0.33)	0.13 (0.276)	-	0.701* (0.503)	0.82	0.751
2.06	P_2	-6.345	-0.04975 (0.295)	0.627**** (0.166)	0.288 (0.348)	0.132 (0.276)	-	0.68* (0.492)	0.82	0.751
2.07	P_3	-12.373	0.264 (0.306)	0.584**** (0.166)	0.345 (0.305)	0.06501 (0.274)	-	0.992*** (0.434)	0.829	0.764
2.08	P_4	-9.917	0.106 (0.351)	0.613**** (0.168)	0.35 (0.331)	0.106 (0.279)	-	0.855* (0.501)	0.821	0.752
2.09	P_1	15.749	-0.01832 (0.289)	-	0.04794 (0.882)	0.462* (0.264)	1.572**** (0.35)	-1.068* (0.742)	0.856	0.801
2.10	P_2	14.826	0.01655 (0.262)	-	0.06328 (0.329)	0.456* (0.261)	1.565**** (0.34)	-1.02* (0.696)	0.856	0.801

TABLE 8: ESTIMATED ACREAGE RESPONSE FUNCTIONS WITH DIFFERENT PRICE EXPECTATIONS USED FOR COTTON LINT PRICES IN TAMIL NADU IN POST-REFORM PERIOD-LOGARITHMIC—*CONTD.*

Equation No.	Price Expectation used	Constant	P_{t_1}	A_{t_1}	Y_{t_1}	W_t	T_t	S_t	R^2	Adj. R^2
2.11	P_3	7.881	0.359* (0.255)	-	0.09253 (0.28)	0.363* (0.249)	1.49**** (0.321)	-0.645 (0.636)	0.875	0.827
2.12	P_4	10.182	0.219 (0.303)	-	0.125 (0.309)	0.414* (0.259)	1.538**** (0.335)	-0.79 (0.694)	0.862	0.808
2.13	P^5	4.781	0.543 (0.419)	-	0.184 (0.299)	0.361* (0.254)	1.501**** (0.324)	-0.57 (0.682)	0.872	0.823
2.14	P_6	8.511	0.321 (0.394)	-	0.18 (0.33)	0.429* (0.253)	1.558**** (0.331)	-0.768 (0.685)	0.863	0.81
2.15	P_7	9.443	0.364 (0.387)	-	0.02451 (0.291)	0.414* (0.253)	1.585**** (0.329)	-0.799 (0.646)	0.865	0.813
2.16	P8	8.065	0.385 (0.419)	-	0.124 (0.3)	0.414* (0.254)	1.569**** (0.329)	-0.746 (0.675)	0.865	0.813

* - Significant at 20% level ** - Significant at 10% level *** - Significant at 5% level **** - Significant at 1% level

Figures in the Parenthesis are standard errors

P_1 – Twelve - month annual average price in previous year.

P_2 – Three - month post-harvest average price in previous year.

P_3 – Three - month pre sowing average price in current year.

P_4 – Average of previous years'post-harvest and current year pre sowing prices.

P_5 – Three - year average of twelve - month annual average price.

P_6 – Three - year average of three - month post-harvest average price.

P_7 – Three - year average of three - month pre sowing average price.

P_8 – Three - year average of three - month post-harvest and three-month pre-sowing average price

TABLE 9: FINALLY, ESTIMATED COTTON ACREAGE RESPONSE FUNCTIONS-TAMIL NADU IN POST REFORM PERIOD

Equation No.	Price Expectation Selected	Constant	Regression Coefficients: Relative Price P_{t-1}	Cotton Acreage in A_{t-1}	Yield Y_{t-1}	Rainfall W_t	T_t	Substitute Crop S_t	Coefficient of Multiple Determination $\bar{R}^2$	Adjusted Coefficient of Multiple Determination $\bar{R}^2$
2.03	P_3	47.703	0.661*** (0.247)	-1.444*** (0.577)	-0.307 (0.285)	0.963*** (0.319)	4.67**** (1.301)	-3.798*** (1.37)	0.918	0.877
2.04	P_4	40.040	0.458* (0.317)	-1.11* (0.656)	-0.131 (0.326)	0.889*** (0.371)	4.003*** (1.49)	-3.195** (1.563)	0.888	0.832
2.11	P_3	7.881	0.359* (0.255)	-	0.09253 (0.28)	0.363* (0.249)	1.49**** (0.321)	-0.645 (0.636)	0.875	0.827

* - Significant at 20% level ** - Significant at 10% level *** - Significant at 5% level **** - Significant at 1% level

Figures in the Parenthesis are standard errors

TABLE 10: ACREAGE ELASTICITIES AND COEFFICIENT OF ADJUSTMENT FOR COTTON LINT PRICES IN TAMIL NADU IN POST-REFORM PERIOD

Equation	Elasticity with respect No.to prices: Short run elasticity	Long run elasticity	Elasticity with respect to yield	Elasticity with respect to weather	Elasticity with respect to substitute crop	α	β	Coefficient of adjustment (γ)	Years required for 95 percent effect of price
2.07	0.189	0.454	0.297	0.362	0.677	29.74	0.6346	0.4160	5.570
2.11	0.257	0.257	0.168	0.205	0.383	7.88	0.3590	-	-

Estimation of Cotton Acreage Response in Tamil Nadu state

Pre Reform Period

Table 5 gives the regressions relating acreage and other variables with alternative price specifications. Equations 1.01 to 1.04 reveal that coefficient of relative price is positively significant in all equations. Added to this, past yield, rainfall have also turned out to be positive for these equations. The inclusion of past acreage, yield, trend and substitute crop acreage emerge negatively significant. R^2value is high for both P^3 and P^4 prices. With the exception of Pt_1 and St, all other variables are positively significant from equations 1.05 to 1.08. In the traditional model, Tt and St are found to be negatively significant. P5 price specification has the highest adjusted R^2 value (Table 5).

Table 6 shows acreage elasticities and coefficient of adjustment of cotton lint prices during Tamil Nadu in pre-reform period. The short run and long run elasticities with respect to price are low but positive. For the entire state, it takes nearly 2 years for full adjustment when P^3 price is taken into account (Table 7).

Post Reform Period

In the post reform period (Table Nos. from 8 to 10), P^3 price gave the best results Pt_1, Wt and Tt are found to be positive with different levels of significance. The short run and long run elasticity with respect to price are not significant. The coefficient of adjustment was very low and the state takes 6 years for full adjustment in the recent time period.

Conclusion

The main finding that could emerge from this study is that the acreage responds positively to price changes and it is very much influenced by non-price factors. The eight price specifications seldom give identical results with respect to farmer's acreage decisions. The results of the regression indicate that P^3 price is the most relevant price at the state level in explaining farmer's decisions.

In the state as a whole, though the farmers take 2 to 6 years to fully adjust the acreage to change in its price, it is quite clear from the study that price behaviour is at best a decisive factor for area allocation for cotton in Tamil Nadu state in conjunction with factors like rainfall, prices of the competing crops, yield and past acreage. The magnitude of γ varies from one price to another price variable. Higher value of γ indicates that large number of past prices are considered in acreage allocation decision. The high value of coefficient of adjustment indicates lesser rigidity in adjustment of output. The study broadly endorses the conclusion that the adjustment lag model yields better results when compared with traditional model as it yields good values for the variables considered for the present study. It is concluded that the importance of price is unquestionable from the view point of stability or the increase in cotton acreage. Price then plays an important role in acreage allocation decisions of the farmers.

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AGRO-ECONOMIC RESEARCH

Impact of National Food Security Mission (NFSM) on Input use, Production, Productivity and Income in Tamil Nadu*

K. JOTHI SIVAGNANANAM

1.1 Background of the Study

Agricultural sector plays a very vital role in the different dimensions of social, political and economic development of our nation. It is enormously important for the Indian economy as the sector is contributing 13.9 of the GDP and about 55 percent of the total employment share (Census, 2011). About half of the population still depends on agriculture as its primary source of income, while it provides raw material for a large number of industries (Government of India, 2012-13). The experience of the last three decades indicates that the growth rate of foodgrain production decreased from 2.93 percent during the period 1986-97 to 0.93 percent during 1996-2008. The declining growth of foodgrains production was partly contributed by the decline in area but largely by the decline in yield rate. The yield growth rate of foodgrains decreased from 3.21 percent to 1.04 percent during the same time period. There was also decline in growth in the production of other agricultural commodities. This is clearly reflected in the decelerated agriculture growth from 3.5 percent during the period 1981-82 to 1996-97 to around 2 percent during 1997-98 to 2004-05. Neverthless, there have been signs to improvement during the recent years (Dev and Sharma, 2010; Kumar 2013 and Government of India, 2012-13). The U-turn in agricultural production occurred mainly due to the implementation of important programs, such as Rastriya Krishi Vikas Yojana (RKVY), National Food Security Mission (NFSM), National Horticultural Mission (NHM), various sub-schemes and substantial increase in the state agricultural outlay on agriculture (Government of India, 2012-13, Kumar 2013).

The percentage share of the poor in India declined from 25.5 percent to 17.0 percent. It is noted that the low income countries have the higher prevalence of poverty than the developed and developing countries. A majority of the people, who are undernourished, are located in the Sourthern Asia followed by Sub-Saharan Africa and Eastern Asia. The countries's share has declined in Eastern Asia and South-Eastern Asia (FAO, 2014).

1.2 Objectives of the Research Study

Given the above broad objectives, the study intends to achieve the following specific objectivies listed below:

* To analyze the trends in area, production, productivity of rice, and pulses in the NFSM and non-NFSM districts in Tamil Nadu.
* To analyze the socio-economic profile of NFSM beneficiaries vis-a-vis Non-NFSM beneficiary farmers of rice in the study area;
* To assess the impact of NFSM on input use, production and income among the beneficiary farmers in the study area;
* To identify factors influencing the adoption of major interventions (im-proved technologies) under NFSM scheme; and
* To identify the constrains hindering the performance of programme

1.3 Research Methodology

The study is based on primary and secondary sources in Tamil Nadu. The secondary data obtained from Government of Tamil Nadu publications relating to area, production and productivity of rice and pulses was used. The list of the benefits obtained by the households for the whole of the 11th PLan (2007-08 to 2011-12) and two years of the 12th Plan (2012-13 and 2013-14) was prepared. The selection of households was done based on the cron development programme under which benefits pertain to only one year. Seeds, fertilizers, pesticides were distributed during 2013-14 year, but machinery and equipment was distributed from 2007-08 to 2012-13.

Primary data has been collected from two districts namely Thiruvarur and Sivagangai of Tamil Nadu. In each of the districts of Thiruvarur and Sivagangai, two representative blocks, namely, Mannarkudi, Valangaiman, Kalayairkovil and Sivagangai are taken respectively and within each block two villages are selected. In each district, 150 beneficiaries from the list of NFSM rice growing cultivators are drawn at random from household farmers with different land sizes on the basis of their proportion in the universe. In addition to the above sample, 50 non-beneficiaries from rice growers have been selected randomly from households with different land sizes. Thus, altogether,300 beneficiaries from are NFSM rice growing cultivators and 100 are non-benefciaries.

Study analyses the socio-economic profile of NFSM

*A.E.R.C., University of Madras, Channai-6000005

and Non-NFSM beneficiary farmers of paddy in Thiruvarur and Sivaganagai districts of Tamil Nadu and the impact of NFSM scheme on input use, production and income of the beneficiary farmers (paddy) in the study area of Tamil Nadu. It also deals with the factors influencing the adoption of major interventons under NFSM scheme and analyses major constraints hindering the performance of the NFSM scheme and also provides concluding remarks and policy suggestions from the study.

Major Findings

2. Impact of NFSM on Foodgrains Production in Tamil Nadu: A Time Serise Analysis.

2.1 Growth of Paddy and Pulse Crops: Impact of NFSM in Tamil Nadu

When we compare different plan periods, we find that the 10th and the 11th FYP periods showed better performance that that of the 9th FYP periods. Even though the area under paddy crop declined over different plan periods in Tamil Nadu due to urbanisation, increasing uncultivable land, the growth performance of paddy production increased specially, after the 10th and the 11th FYP periods, because of effective utilisation of land holdings and quality seeds provides by the grovernment for increasing production of paddy in Tamil Nadu. The agricultural officers in every district of Tamil Nadu effectively implemented the government schemes.

2.2 District-wise Growth of Paddy Crop and Impact of NFSM

In Tamil Nadu, the area under the Non-NFSM districts declined from 66.75 percent in 2007-08 to 64.89 percent in 2012-13. NFSM rice cultivation districts increased from 33.24 percent in 2007-08 to 35.10 percent in 2012-13. The production level of the Non-NFMS districts declined from 82.75 percent to 81.63 percent in the corresponding years. But for the NFSM districts, production in increased from 17.24 percent of18.36 percent. In the mid-period of 2011-12, production increased to 32.84 percent. The reason is that the NFSM districts had effectively implemented the scheme with the help of the government officials. It is noted that the area under the NFSM districts reflected one-third of area under cultivation. But in the non-NFSM districts, two-thirds of the area was under cultivation during the study period.

Among the NFSM districts, the percentage share of area in the total area of paddy crop was 8.61 percent and 8.48 percent in Nagapattinam and Thiruvarur, respecrively. Sivagangai's share in area was the lowest at 4.29 percent during 2007-08. Thiruvarur, Nagapattinam and Ramanathapuram had 10.65 percent, 9.52 percent and 7.80 percent of the area under paddy, respectively during 2012-13. Among the NFSM districts, Thiruvarur and Nagapattinam contributed 6.18 percent and 5.72 percent of production during 2007-08. The growth trend of area recorded 5.94 percent, 4.98 percent and 4.76 percent in Pudukottai, Nagapatainam and Thiruvarur, respectively during 2012-13.

During 2007-08, within the non-NFSM districts, Thanjavur and Villupuram districts occupied the highest share of area at 8.40 percent and 8.13 percent, respectively. Both the districts recorded 9.53 percent and 9.52 percent of paddy production, respectively. But in 2012-13, Thanjavur, Villupuram, Kanchipuram, Cuddalore and Thiruvannamalai districts witnessed the highest share of production at 10.61 percent, 9.79 percent, 8.51 percent, 8.37 percent and 8.06 percent, respectively. We find that the growth trend in production of the Non-NFSM districts reveals better production than the NFSM districts in Tamil Nadu.

2.3 Financial Allocation to the NFSM Schemes in Tamil Nadu

The financial allocation substantially increased by Rs. 1,366.64 lakh from Rs. 709.55 lakh in 2007-08 to Rs. 2,144.19 lakh in 2011-12. The unspent amount of the government considerably declined from 619.07 lakh in 2006-07 to 31.15 in 2011-12. It further declined to Rs. 17.36 lakh in 2013-14. The Total outlay for the NFSM in Tamil Nadu was Rs. 12,540.88 lakh during the 11th Five Year Plan period. But actual utilization of the fund for the NFSM scheme was Rs. 9,893.78 lakh; in terms of percentage share, the actual expenditure was 78.89 percent of the outlay and the remaining unspent money was Rs. 2,647.10 lakh (21.11 percent) during the 11th FYP period.

Thiruvarur district was allocated Rs. 4,015.53 lakh (32.02 percent) for the NFSM scheme. The highest percentage utilization of fund was 37.21 percent by the same district that is Rs. 3,681.58 lakh. Nagapattianam district was allocated Rs. 3,848.86 lakh, and that was 30.69 percent of the total allocation to Tamil Nadu under NFSM . Of that, the district utilized Rs. 2,874.08 lakh, which was 29.05 percent of the expenditure under NFSM . On the contrary, of the actual expenditure under NFSM, the Sivagangai district received the lowest allocation of found (Rs. 946.90 lakh) and that was 7.55 percent of the outlay under the scheme and the expenditure was Rs. 791.95 lakh during the 11th FYP 16.4 percent of the allocated amount was unutilized by the district.

Nagapattinam district was having the unspent money to the tune of Rs. 974.78 lakh, (25.33 percent of the outlay). Followed by this, Podukottai's unspent money under the scheme was Rs. 787.25 lakh during the 11th FYP. The percentage share of the unspent money for the NFSM in Tamil Nadu among the different districts varied from 8.58 percent (Thiruvarur) to 33.36 percent (Pudukottai). In Pudukottai district, nearly one-third of the outlay was

unspent. This may have something to do with governance at the project management level and the attitude of the cultivators.

It is inferred that the total expenditure on the NFSM allocation declined over a period of seven years in the state of Tamil Nadu. The percentage change in the expenditure on the NFSM in Tamil Nadu increased from -82.77 percent in 2007-08 to 14.21 percent in 2009-10 and it further increased to 21.27 percent in 2010-11. When compared to previous year's allocation of expenditure to the agricultural sector, it was found that there was an increase in terms of expenditure. The correlation coefficient of the value of years and expenditure on the NFSM was found to be 0.17 percent.

3. Household Characteristics, Cropping Pattern and Production Structure

3.1 Socio-economic Profile of the Sample Households

The majority of both types of farmers belonged to Other Backward Class. About 90 percent and 94 percent of the NFSM and Non-NFSM farmers belonged to the OBC category, respectively and SC and ST farmers constituted a small percentage. The average annual income of respective farmers was Rs. 70,458 and Rs. 40, 250, respectively, Small and marginal farmers are in large proportion among both the farmers. Their percentage share in 36 percent and 43 percent, respectively. It is found that the two-thirds of landholdings were cultivated by the marginal and small farmers.

The large farmers had a share 42.8 percent and 35.1 percent on the basis of the Net Operated Area in the NFSM and the Non-NFSM category of farmers, respectively.Medium size farmer has a share of 26.7 percent and 28.5 percent, respectively in both the categories. On the other hand, the lowest share of area is occupied by the marginal farmers. The average size of land holdings by the NFSM and Non-NFSM farmers was 6.36 acres and 5.01 acres, respectively.

3.2 Characteristics of Operational Holdings

The average net-operated area was 6.37 acres and 4.91 acres, respectively for NFSM and Non-NFSM farmers. It is found that the NFSM beneficiaries were having 22.6 percent more area than the Non-NFSM farmers. The NOA (per household) is 6.37 acres and 4.91 acres, respectively for the both categories. The average owned land is 5.97 acres and 4.12 acres respectively for the both categories.

The total cropping intensity was 163 percent and 192 percent for the NFSM and the Non-NFSM farmers, respectively. The Non-NFSM farmers attained more cropping intensity than the NFSM farmers. But the average irrigation intensity was 102 percent and 101 percent for both categories, respectively. The irrigation intensity of NFSM farmers is higher indicating that the land cultivated there is more than the land cultivated by Non-NFSM farmers.

3.3 Sources of Irrigation and Structure of Tenancy

The river and tube well irrigation system was adopted predominantly. It had accounted for 72 percent and 88 percent respectively. It is found that the majority of the farmer used the canal and the tube well sources as the major sources of irrigation. On the contrary, the rain fed irrigation sources accounted for a meagre propration. It is indicated that the majority of farmers is Sivagangai district were dependent upon the rain fed area, followed by tank irrigation sources. The percentage of total irrigated area for NFSM farmers is more by 22.2 percent than the Non-NFSM farmers. The NFSM farmers use more irrigated area than the Non-NFSM farmers. The rain fed area for NFSM farmers is less than that of Non-NFSM farmers. It is found that the NFSM farmers produce more output due to regular irrigation sources.

The fixed rent (in cash) for NFSM beneficiaries was the highest (41 percent) for the leased-in land holders. Within the Non-NFSM farmers, crop sharing occupied the highest share of 50.6 percent followed by fixed rent (in cash) to the tune of 47 percent in the study area. The NFSM farmers spent 2.25 percent more on fixed rent (in cash) than the Non-NFSM farmers. The NFSM farmers spent 10 percent more on fixed rent (in kind) than the Non-NFSM farmers.

3.4 Cropping Pattern, Costs and Returns

Total gross cropped area is 3,345 acres and 1,141 acres for NFSM and Non-NFSM farmers during 2012-13. It declined to 3,116 acres and 943.8 acres during 2013-14. During kharif season, paddy occupied the highest share; it accounted for 50.6 percent and 42.7 percent respectively for both categories. The NFSM farmers have more area under cultivation than the Non-NFSM farmers because of the involvement of more farmers.

Paddy occupied the largest area during the kharif season and it declined during the rabi and the summer seasons because of water shortage and there was decline in the production level during those seasons. Alternatively, they cultivated groundnuts, pulses, black gram predominately. On the other hand, sugarcane, cotton, gingili and ragi were cultivated to a small extent by both types of farmers. Groundnut, pulses and vegetables occupied the share of 5.9 percent, 4.22 percent and 2.1 percent respectively during the rabi season among the NFSM beneficiaries. But for the Non-NFSM farmers, ti accounted for 3.1 percent, 3.5 and 1.4 percent respectively, during the summer season.

The value of output for the NFSM farmers was Rs. 1,80,536, as against Rs. 1.48,381 for Non-NFSM farmers. On the contrary, the value of output (pera acre) is calculated to be Rs. 28, 342 and Rs.30,220. It is noted that the NFSM farmers got more value for their output than the Non-NFSM farmers.

The NFSM beneficiaries received more return of Rs. 1,23,637 then Non-NFSM farmers received (Rs. 68,130). The NFSM beneficiaries received more output value and net return than the Non-NFSM farmers. The NFSM farmers received subsidy from the NFSM scheme and adopted the modern technology in cultivation. Therefore, they have produced more output. The gross return for the NFSM farmers increased by 2.44 percent from Rs. 27,953 during the kharif season to Rs. 28.636 during the summer season. But for the Non-NFSM farmers, it increased from Rs. 25,942 to Rs. 27,883. It accounted for 7.48 percent.

The cost of cultivation was estimated at Rs. 18,937 per acre and Rs. 19,618 per acre during the kharif season. The NFSM farmers spent 3.60 percent lesser amount than the Non-NFSM farmers. The cost for the NFSM farmers declined from Rs. 18,937 during the kharif season to Rs. 18,208 during the summer season. It declined to 3.85 percent over the study period. But for the NFSM farmers, it declined from Rs. 19,618 to Rs. 17,096 per acre. The cost declined by 12.85 percent. The net return was estimated to be Rs. 11,645 and Rs. 9,009 per acre during the kharif season. During the rabi season, it increased to Rs. 12,337 and Rs. 9,690 per acre, respectively. The NFSM beneficiaries got more return was estimated to be Rs. 11,645 and Rs. 9,009 per acre during the kharif season. During the rabi season, it increased to Rs. 12,337 and Rs. 9, 690 per acre, respectively. The NFSM beneficiaries got more return of 21.46 percent than the Non-NFSM farmers. They received more return from the paddy cultivation because of less cost of cultivation and more output value than that of the Non-NFSM farmers.

3.5 Asset Holdings

Total asset holding per household is estimated at Rs. 13,58,917 and Rs. 13,21,401 for NFSM and Non-NFSM farmers, respectively. It is found that the NFSM farmers have 2.76 percent more asset value of than the Non-NFSM farmers in the study area. The NFSM farmers are having more asset value of 2.8 percent than the Non-NFSM farmers. Within the NFSM farmers, tractor is occpying the highest share of 23 percent, followed by drip irrigation at 20 percent. Electric pumpsets accounted for 19 percent, followed by thresher at 2.88 percent. Within the Non-NFSM farmers, drip irrigation accounted for 30.28 percent. Tractor occupies a share of 28.76 percent, followed by trolley occupying 16.67 percent.

Within the Non-NFSM farmers, the percentage share of drip irrigation sets in total assets value is calculated to be 30.3 percent. The value of tractors occupied a share of 28.76 percent folowed by trolley occupying 16.7 percent and electric pump sets with the share of 11.6 percent. It is found that both types of farmers make the highest investment in the tractor, drip irrigation, pumps set and trolley.

3.6 Sources and Purpose of Credit

About 77 percent and 80 percent of the NFSM and Non-NFSM farmers received loan from the primary agricultural co-operative societies, The commercial banks issued 20 percent and 17 percent of loans, respectively. It is found that the cooperative societies and commercial banks play a very vital role in the rural credit accessibility. It is found that co-operative institutions and commercial banks give the highest loan amount to the farmers.

The NFSM and the Non-NFSM farmers did not settle the loan amount which was very huge to the commercial banks. It accounted for Rs. 1,50,080 and Rs. 1,42,500, respectively. A majority of both categories of farmers are having outstanding liabilities of Rs. 41,293 and Rs. 32,083. It was found that they having highly outstanding loans from the commercial banks and the cooperative societies. They could not clear the loans due to the unprofitable nature of agriculture and there were no other sources for settling the debt. Sometimes, those farmers who had the ability to settle the debt, delayed repayment, with the hope that the government would waive the loan for some reason or other (e.g. drought).

4. NFSM Interventions and their Impact on Farming

4.1 Awareness of the NFSM Scheme

It is found that 71 percent of the farmers have known about the scheme and 28 percent are not aware of it. A majority of the NFSM farmers have reported that they know only the benefits of NFSM scheme such as provision of seeds, facilities or micro nutrients offered free of cost; the remaining benefits of NFSM are not known to all the sample farmers. Therefore, it is inferred that the benefits of the scheme have not reached all.

The Agricultural Department, Government of Tamil Nadu have played a vital role in spreading awareness about the scheme. About 61.33 percent of the NFSM beneficiaries are aware about the scheme through news papers and TV/ Radio. Especially, TV/Radio station is broadcasting the NFSM scheme in the concerned districts of Thiruvarur and Sivagangai.

Tamil Nadu Agricultural University's role is important in spreading awareness about the scheme. About 59 percent of the NFSM farmers are informed about the scheme benefits. It is observed a majority of the beneficiaries received information from agricultural department. This department has actively participated in spreading benefits of the NFSM scheme to the farmers.

4.2 Costs and Subsidy Particulars of Availed NFSM Benefits

About 89 percent of NFSM beneficiaries have availed of the HYV seeds. The average benefit as per household is Rs. 1,250. About 11 percent of NFSM beneficiaries used

the hybrid seeds and the average cost is computed to be Rs. 2,733. Sprayers account for the highest utilization by the farmers. About 48 percent of NFSM beneficiaries utilized the sprayers for their own use. The average cost benefit is Rs. 2,211.

About 46 percent have used it and the average cost is Rs. 48.5 Incentive for micro nutrients is another benefit. About 33 percent of NFSM beneficiaries have availed the benefit and the cost benefit is Rs. 719. About 30 and 29 percent of beneficiaries have enjoyed benefits of INM and IPM schemes respectively and the average benefit is estimated to be Rs. 475 and 500, respectively.

About 8 percent availed the benefits of pumpsets under the NFSM scheme. The average cost is Rs. 22,920. Power weeder was utilized by 5 percent of beneficiaries and 4.3 percent availed the benefits of rotavators. The average cost is Rs. 27,321 and 97,680, resepectively.

In Tamil Nadu, especially, the sample farmers have reported that they are getting subsidies for only 6 items namely seeds, sprayers, micro nutrients, IPM, INM and cono weeder. The remaining 13 materials are not available to all. Timely availability of material is very essential. Farm materials like seeds sprayers, micro nutrients, INM, IPM and cono weeder are not available to all NFSM farmers. The Government officials could not distribute the same to all those farmers. There is shortage of farm materials and that is the main problem. Equipments like pump sets, rotavators, power weeder or tiller are not distributed to all the NFSM beneficiaries. The distribution of NFSM farm material is a major challenging task. Only a few farm equipments are distributed to the farmers by the government.

The average total cost her household was Rs. 1, 59,685 during 2007-08 to 2013-14. The average subsidy distributed to the NFSM beneficiaries is Rs. 63,572. It is found that about 60 percent of the cost is spent by the farmers and remaining 40 percent is distributed by way of subsidy. It is observed that the government distributed the subsidy for the development of paddy crop.

The percentage share of subsidy to the total cost is 39.81 percent. Power weeders and sprayers account for a subsidy of 51 percent respectively. About 31 percent of the subsidy is availed of for using the rotavators purchase. Pump sets occupy the third larget share (44 percent) in the total subsidy of NFSM scheme.

Some of the costly farm materials are being distributed only to the larger farmers but not for marginal and small farmers under the scheme. The main reason behind this is borrowing capacity of the marginal and small farmers to busy costly farm equipments is rather low. Some of the materials like seeds, micro nutrients, pest and nutrient management, cono weeder are available easily; and the subsidy amount is also very low. It is distributed to all the beneficiaries randomly. It is found in the study, under the NFSM scheme, the farm materials are distributed based on availability and not for according to need at the appropriate time.

4.3 Annual Usage of Farm Equipments and their Benefits

Pumpsets are used by the NFSM beneficiaries for 17 days in a year and area coverage is 6.84 acres. The individual benefits is worth of Rs. 4,902. Rotavators are used for 15 days and each farmer benefits to the extent of Rs. 9,300. About 14 days in a year are used for power tillers by the benefited farmers and their value is Rs. 12,778.57. The sprayer is used for 14 days and the benefit is Rs. 6,773.

In reality, a majority of the farm equipments are not available to all the NFSM beneficiaries. There are shortage of farm equipments in the agricultural department. Some equipment like pump sets, power tillers, rotavators are being distributed to beneficiaries according to the background of land holding, community influence and political support. Some equipment like cono weeder and sprayers are distributed to all due to easy availability and lower cost. It is noted that the majority of NFSM beneficiaries have not availed all farm material. It is found from the study that the farm equipments offered under the NFSM scheme have not been distributed to all the needy marginal and small farmers according to their real conditions. Therefore, the real farmer for whom the scheme is designed is out of focus.

About 41 percent of the NFSM farmers reported that the weeds were controlled due to the usage of cono weeder. 39 percent of the beneficiaries reported that cono weeder replaced labour. Rotavator is another instrument used by the NFSM farmers. Abour 78 percent of the NFSM farmers have reported that it reduced the cost of cultivation.

About 86.4 percent reported that they can use water efficiently by to using pump sets. It is found that a majority of the farmers have effectively controlled water wastages in the area. About 50 percent of beneficiaries reported that cost of cultivation has continuously declined by using power tillers. 43 percent of farmers reported that is reduced post-harvest losses also. A majority of NFSM farmers have informed that the lower cost of cultivation and reduction in post-harvest losses are due to the use of power tillers.

Sprayers is one of the farm equipments distributed to NFSM farmers at subsidized price. About 37.3 percent of the NFSM farmers viewed that the good plant growth is due to the use of sprayers in the farm. About 28.4 percent reported that the weed could be controlled through this equipment. A majority of the NFSM farmers noted that the sprayers is used in the farm.

About 61 percent of the NFSM farmers reported that the improving production is due to the use of the cono weeder in the study are. About 33.6 percent noted that the fall in labour cost is due to its utilization in the

farm field. About 28 percent of farmers felt that there was an increase in price of the output because of better quality.

61 percent of the farmers viewed that there was a fall in labour cost because of the use of rotavators in the field. It is found that the rotavators reduce the labour cost. It implies that the limited supply of labour has forced them to use machinery, as a labour saving device. Impact of rotavators is in terms reduction of labour cost and increase in the profit of the NFSM farmers.

About 45 percent of farmers reported that the increase in production is due to utilization of pump sets. NFSM farmers have benefited much due to use of pump sets in the study area. About 61 percent reported that the fall in labour cost is due to the use of power tillers. A power tiller is very useful at the time of harvesting when there is scarcity of agricultural workers and high labour cost.

Owing to the use of modern farm equipment, they are getting benefits in terms of increase in production and output and fall in labour cost. The impact of NFSM scheme on farmer's life is observed in increase in production, output price and fall in labour cost. A majority of the NFSM farmers have reported that the increase in production and output price and fall in labour cost are the results of using cono weeder, rotavators, pump sets and power tillers through NFSM scheme in the study area.

4.4 Cost and Return of Paddy Crop in Kharif Season (2012-13)

The cost of cultivation per acre is Rs. 18,937 and Rs. 19,618 for NFSM beneficiaries and Non-NFSM farmers, respectively. When wer compare to the two groups of farmers, NFSM beneficiaries have incurred less cost than the Non-NFSM farmers. it is observed that the subsidy is distributed to the NFSM beneficiaries in the study area; therefore the cost of cultivation is reduced.

The cost of hired labour accounts for the highest share in the total cost. The percentage share in the total cost is more or less the same imputed for both groups (Rs. 6,902) and Rs. 6,920. Family labour occupies the next highest share. Its value is Rs. 4,017 and Rs. 4,027 for the NFSM and Non-NFSM farmers respectively. The cost of hired and family labour occupies the highest share of 56.5 percent and 55.8 percent for NFSM and Non-NFSM farmers respectively in the study area. The cost of labour is nearly half of the total cost of cultivation because of the limited supply of labour for cultivation.

The gross income received by NFSM beneficiaries and Non-NFSM farmers are Rs. 30,582 and Rs. 28,627. Among both the categories of farmers, NFSM beneficiaries received more gross income by 6.40 percent (Rs. 1955) than that of Non-NFSM farmers. It indicates that the NFSM farmers have got more income due to more production (21.38 quintal per acre) and lower cost of cultivation.

The net income received is Rs. 11,645 and Rs. 9,009 for both the categories of farmers. NFSM beneficiaries have received more income by 22.64 percent (Rs. 2,636) than that of Non-NFSM farmers in the study area. It is noted that the NFSM farmers have got more yield per acre (21.38 quintal/acre) than that of Non-NFMS farmers (19.56 quintal/acre).

The cost per quintal for NFSM beneficiaries and Non-NFSM farmers is Rs. 892 and Rs. 1,003 respectively. NFSM beneficiaries incurred 12.41 percent lower cost (per quintal) than Non-NFSM farmers. It is observed that the cost for NFSM farmers is lower than Non-NFSM farmers and it affects gross and net income of farmers.

4.5 Cost and Return of Paddy in Rabi and Summer Season (2012-13)

The cost of cultivation is Rs. 18,441 per acre and Rs. 18,512 per acre for the NFSM beneficiaries and Non-NFSM farmers respectively. The percentage share of hired labour in the total cost is accounts for 34.63 percent (Rs. 6,385) and 33.17 percent (6,139) for the two groups of farmers. NFSM beneficiaries have spent more on hired labour than that of Non-NFSM farmers. The percentage share of the cost of family labour in the total cost is the highest share. It accounts for Rs. 3,917 (21.53 percent) and Rs. 3,942 (21.29 percent) for the both categories of farmers. The cost of hired and family labour accounts for half of the total cost of cultivation.

The gross income of NFSM beneficiaries and Non-NFSM farmers is Rs. 30,779 and Rs. 28, 202 per acre. It is observed that the NFSM farmers got more income by 8.37 percent (Rs. 2,576) than Non-NFSM farmers in the study area. It is indicated that the NFSM farmers produce more output (21.24 quintal) than that of Non-NFSM farmers (19.46 quintal). It is observed that the cost of cultivation for NFSM farmers is less than that of Non-NFSM farmers. Therefore, it leads to more gross income to the NFSM beneficiaries in the study area. The net income of both types of farmers is estimated at Rs. 12,337 and Rs. 9,690. NFSM beneficiaries get more income by 21.45 percent (Rs. 2,646) than Non NFSM farmers. It is observed that the NFSM beneficiaries received subsidy and farm equipment for cultivating paddy in the study area. Therefore, they earn more income by proper utilisation of farm equipment, seeds, micro nutrients and cono weeder in the study area.

From a comparative study of kharif and rabi/summer season during 2012-13, we find that the NFSM beneficiaries received subsidy to cultivate the paddy crop in the study area. Therefore, they earned more income with lower cost of cultivation from this scheme than that of Non-NFSM farmers. This scheme has created confidence among the farmers in the study area for generating more income. A comparative study of tables 4.7 and 4.8 reveals that NFSM beneficiaries who cultivate paddy earn more net income than the non-NFSM farmers during kharif as well as rabi/summer seasons. The former earn 29 percent and 27 percent

more net income than the latter during the kharif and rabi/ summer seasons, respectively. The cost per quintal of paddy is lower by 12.4 percent and 9.6 percent for the NFSM beneficiaries and non-NFSM farmers during kharif and rabi/ summer seasons, respectively.

4.6 Marketed Surplus and Marketing Channels

About 48 percent and 42 percent of the NFSM and Non-NFSM farmers sell their agricultural produce of paddy in the regulated markets. The remaining 16 percent and 21 percent of farmers sell their produce in the co-operative society in a village. About 95 percent of the NFSM farmers sell their quantity produced in the co-operative society and 94 percent of beneficiaries sell their quantity produces in the regulated markets. Among Non-NFSM farmers, 94 percent sell their marketable surplus in the wholesale market and 92.4 percent of farmers sell their quantity in the regulated markets.

5. Participation Decision, Constraints and Suggestions for Improvement of NFSM Scheme

5.1 Factors Influencing Participation of Farmers in NFSM Scheme

In the case of NFSM scheme in Tamil Nadu, nearly 25 percent of the districts (8 districts) have implemented the scheme and it is successfully going on. To analyze and understand the role of NFSM scheme in determining factors which influence participation, the study has used logistic regression model. The logistic regression model pertains to examining the impact of farmer's participation in NFSM schemes in Tamil Nadu. One of the main objectives of the study is to find out the factors influencing the beneficiaries in NFSM schemes in Tamil Nadu with regard to their livelihood.

As expected B3, B4 and B6 have negative sign, and Bl, B2, B5, B7, B8 and B9 have positive sign. Therefore the above set regression results clearly show that when ratio of irrigated to the total operational area increases, it will lead to increase in credit availed (per acres) and farm asset value (in rupees) and also other factors such as age, education, caste are also positively influencing the NFSM beneficiaries. But except education (illiterate), caste and farm asset value (in rupees) all others factors are not statistically significant. It means that education, caste and farm assets are not major factors determining the beneficiaries in NFSM scheme, whereas income from farming, family size or number of family members dependent on farming, operational holding and education (higher secondary) negatively influenced the beneficiaries of NFSM scheme. But except family size, all other factors are not statistically significant.

So the above result clearly explains that except education (illiterate), family size, caste (SC/ST) and credit availed (per acre), all other factors are not statistically significant and also education (higher secondary), operational holdings (acres), family size or number of family members dependent on farming, and income from farming negatively influenced the beneficiaries in NFSM scheme in Tamil Nadu on farmer's livelihood.

5.2 Constraints faced in Availing the NFSM Benefits

About 77 percent of beneficiaries informed that the eligibility criteria for availing the subsidy are provided to the households and they are correctly followed by the government officials in the study area. In the eligibility conditions for availing of the benefits, the Government of Tamil Nadu has adopted significant criteria. The official asked land documents for availing such benefits.

About 64 percent of farmers informed that the information about the NFSM scheme reached correctly to the households. The Government of Tamil Nadu informed about the scheme through newspapers, TV/ Radio. Still, a sizable section of the farmers are not aware of the scheme even though the scheme is a decade old.

About 32 percent of the beneficiaries answered that they knew about the procedure for the subsidies to avail those benefits. Of these, majority of the beneficiaries were of the opinion that the procedure for availing such benefits was rather difficult. Each farmer is asked to produce the land records with attestation from Village Administrative Officer. Sometimes, the VAO has to be bribed for signing the land document. Otherwise, the selected farmers will not get the benefits easily.

Every farmer is submitting his land records to the Government of Tamil Nadu. They asked verification from VAO for authentification of land records in a village. VAO takes a lot of time for issuing certificate of land records. It is observed that the majority of the farmers are faced with difficulties for availing those documents from VAO. Therefore, the Government of Tamil Nadu has simplified the method of procedure for selection of beneficiaries. Otherwise, farmers will be put to unnecessary hardship.

The beneficiaries have not received the subsidy in time. There is time gap in availing the subsidy issued to the farmers; often, they get it after the cultivation of the crop. That is major problem in the study area. Therefore, seeds and other inputs have to be distributed to the beneficiaries in time; otherwise, efficiency of their production process gets wasted. About 63.3 percent of the farmers have informed that the subsidy distribution after the purchase of inputs is the major problem. So, Government has to distribute farm material in time.

Generally, subsidy is not distributed in time. This is a impediment in the NFSM scheme in Tamil Nadu. About 81 percent of beneficiaries are of the opinion that it takes a long-time for availing such benefits in the study area. Therefore, subsidy is to be distributed in time for plantation. Otherwise, farmers will suffer as they have to spend their own money for purchasing seeds and other inputs during that time.

About 50 percent of farmers informed that the large farmers are enjoying more subsidy than the marginal and small farmers in the study area. The government officials mainly support the large farmers and distribute more subsidies to them. This affects the small and marginal farmers. Another constraint is the quality of seeds. About 57 percent of farmers reported that the quality of seed is poor in the study area. A majority of beneficiaries reported that they are supplied poor quality seed. This is another major problem faced by the farmers in the study area. Thus, distribution of quality seeds is a main issue in the scheme.

In conclusion, we may say that the poor quality of seeds is a major problem. Secondly, subsidy is not distributed in time and a long time is taken for distribution of seeds and inputs. Third, procedure for giving subsidy is not easy and it takes much time. Certificate from VAO is very essential for subsidy distribution. Fourth, delay in payment of subsidy is another problem in the study area. A majority of them reported that they were not receiving the subsidy even after completion of farm process.

5.3 Suggestions for Improvement of the NFSM Scheme

About 22 percent of the NFSM beneficiaries suggested that there is need for simplifying the procedure for availing the benefit of the NFSM scheme in the study area. A majority of the farmers are asked to submit the land (chitta documents) documents and certificate from VAO for availing the benefits. The present system is time-consuming. 20 percent of farmers have informed that the subsidy should be increased. A majority of the farmers do not receive all the subsidies. Only a few farm subsidies are distributed to the farmers. It is observed that the cost of cultivation has increased over period of time. Therefore, farmers have increased huge losses. To solve this problem, subsidy is to be increased.

Only about 16 percent of farmers reported that quality material is distributed in time. That means, quality inputs like seeds, micro nutrients, 1PM and 1NM are not distributed by the Government of Tamil Nadu. The farmers reported that quality inputs are very essential for increasing the production of paddy. Any scheme of the government is mainly dependent upon the effective participation of the farmers. About 14.3 percent of farmers reported that government support was needed for the success of the scheme. Some farmers reported that the subsidy should be increased and quality material be distributed in time to the farmers. Some said that the NFSM benefits are to be extended to all the farmers in a village. Simplifying the scheme is one of the suggestions given by the farmers.

Some of the suggestions for improvement of the NFSM scheme among Non-Beneficiaries are shown in Table 5.4. About 25.8 percent of the Non-Beneficiaries reported that the benefits should be given to the poor farmers (marginal and small farmers) in the study area. It is found that the majority of the benefits are enjoyed by the large landholders in the study area. They have links with government officials and they get information about the scheme and subsidy immediately after it is announced and work to receive the benefits.

About 25.4 percent replied that they are not aware of the scheme. Therefore, they suggested that advertisement might be given about the NFSM scheme. It is found that advertisement is given through mass media and newspapers in the state as the scheme is very essential for benefits of the farmers.

About 21 percent replied that they are informed about the importance of NFSM scheme's in the study area. It is found that one-fourth of the non-beneficiary farmers did not have awareness about the importance of the scheme. Therefore, Government Officials should inform about the importance of NFSM scheme to all the farmers.

5.4 Reasons for Non-Participation in the NFSM Scheme

The reasons for non-participation in the NFSM Scheme for Non-beneficiaries in the study area are given in Table 5.5. About 35 percent of non-beneficiaries informed about the lack of information about the NFSM scheme, as the reason for non-participation in NFSM scheme. It is also found that a majority of the non-beneficiaries are either illiterate or possess minimum level of education. Therefore, they are in partial ignorance about the scheme.

About 19 percent of non-beneficiaries reported that the political and community influence is the main reason for non-participation in the NFSM scheme. Political support and community influence play a major role in the determination for availing the benefits and funds to the NFSM farmers. They expressed the opinion that local leaders and panchayat presidents decide who should benefit from the NFSM scheme in the study area.

About 18 percent of farmers reported that the government official did not inform about scheme and that was the reason for their non-participation in the scheme. Government officials informed landlords and farmers with political clout.

5.5 Suggestions for the inclusion of Non- Beneficiaries for availing Benefits under NFSM Scheme

About 32 percent of the non-beneficiaries reported that the government officials did inform about the NFSM scheme for inclusion of all farmers. It is found that government official's support is needed for inclusion in the scheme.

About 30 percent of non-beneficiaries informed that the government needs to extend the scheme to all the farmers in the study area. It is found that only select few farmers are benefited regularly and not all the farmers.

About 22 percent reported that the awareness camp is needed for inclusion of all farmers in the NFSM scheme. It is found that the awareness camp is necessary for the

development of farmers at the village level. Therefore, awareness campaign at the village level in the study area is very essential one.

6.1 Policy Implications

Though the scheme as a whole has succeeded, the study has come out with many implications. The NFSM and Non-NFSM farmers have suffered a lot to avail the benefits of any such scheme. Over a period of time, a number of schemes have been launched by the Union and State Governments in India. However, there is not much improvement in the farmers' level of living. Against such backdrop, the following are some of the specific policy suggestions.

- The state government needs to simplify the selection process for the NFSM scheme. Otherwise, farmers have to face much hardship and many of them would miss the scheme.
- The state government must take all the necessary steps to ensure the distribution of the quality inputs like seed and farm materials with subsidy in time without any delay so that the farmers can make use of them before cultivation.
- The state government needs to ensure the adequate financial support to the farmers for the purchase of farm material within the prescribed time.
- The government should make arrangements to provide farming and harvesting machines for hire during the seasons.
- The due subsidies must be given to all those selected beneficiaries in a village.
- Subsidy for seed and farm inputs needs to be increased for the benefits of the farmers given the escalation of the cost of cultivation.
- The procedures of the NFSM scheme needs to be simplified and the scheme must be expanded to cover all the farmers in a village.
- In addition to the advertisement through mass media and newspapers about the scheme, government officials should inform about the NFSM scheme. Their support is the most critical one for the inclusion of the farmers in the scheme.
- The awareness camp is needed for the development of farmers in a village.
- Preference will be given to traditional and modern seed varieties. Subsidy should be continued to those who have already availed such benefits.
- Amount of subsidy should be increased for the seed, fertilizers, pesticides and other farm material.
- MSP should be revised periodically based on the experts view and not by political decisions which is always driven by the contingencies of deficit cutting.
- Hundred percent subsidies are to be given for the purchase of quality seed by all the deserving farmers.
- NFSM subsidy material like seed, input and farm material to be given to all the selected beneficiaries in a village.
- The Government should ensure the quality of farm equipments given under the scheme.
- Urgent efforts need to be made to improve the quality of farm equipments/ implements to all the beneficiaries.
- Government should eliminate intra-district inequality in the distribution of farm equipments.
- Agricultural Officer should make regular visits to the selected villages.
- Certified seed to be issued for increasing rice production in the state.

The findings suggest that after the implementation of the NFSM scheme, there has been significant improvement in the farmer's life in the study area. NFSM beneficiaries are in a better position with improved performance in terms of input use, production, productivity in comparison with that of the Non-NFSM farmers. Further, many of the selected villages in the study area are yet to satisfy the existing coverage norms. The farmers in the study area are not well equipped with adequate farm materials like cono weeder, multiple planters, power weeder, pump sets, sprayers and power tillers as they have not been provided these equipments under the scheme. They have been given only a limited support like the provision of seeds and inputs. Besides, there is widespread intra-district disparity in terms of subsidy and benefits distributed.

The shortages are not only in farm equipments, but also in seeds, other inputs and farm implements in the study area; but they have not been given for the areas with shortages of such inputs. Sometimes, the Agricultural Officers do not visit the farm field in the village. There is need for monitoring. Even the available farm equipments under the NFSM scheme are not distributed equally to all the beneficiaries; only select materials are provided. The quality of farm material and equipments given to the beneficiaries is yet another concern. However, if the state government is more proactive to strengthen and expand this scheme in Tamil Nadu, it will certainly help the farmers as well as the economy as whole in increasing the input use, production, productivity and income.

COMMODITY REVIEWS

Foodgrains

During the month of December,2016 the Wholesale Price Index (Base 2004-05=100) of pulses decreased by 3.39%, cereals increased by 0.83% & foodgrains decreased by 0.34% respectively over the previous month.

All India Index Number of Wholesale Prices

(*Base: 2004-2005=100*)

Commodity	Weight (%)	WPI for the Month of December 2016	WPI for the Month of November 2016	WPI A year ago	Percentage change during	
					A month	A year
1	2	3	4	5	6	7
Rice	1.793	247.7	248.8	237.3	-0.44	4.38
Wheat	1.116	251.7	245.0	223.1	2.73	12.82
Jowar	0.096	302.4	293.4	293.6	3.07	3.00
Bajra	0.115	298.0	293.2	270.0	1.64	10.37
Maize	0.217	277.0	277.9	267.1	-0.32	3.71
Barley	0.017	290.6	286.8	243.9	1.32	19.15
Ragi	0.019	464.3	445.2	328.6	4.29	41.30
Cereals	3.373	255.6	253.5	237.8	0.83	7.49
Pulses	0.717	447.1	462.8	378.5	-3.39	18.12
Foodgrains	4.09	289.2	290.2	262.4	-0.34	10.21

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

Procurement of Rice

5.03 million tonnes of rice (including paddy converted into rice) was procured during December 2016 as against 3.69 million tonnes of rice(including paddy converted into rice) procured during December 2015.The total procurement of rice in the current marketing season i.e 2016-2017, up to 28.12.2016 stood at 21.28 million tonnes, as against 17.65 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 28.12.2016		Corresponding Period of last Year 2015-16		Marketing Year (October-September) 2015-16		2014-15	
	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5	6	7	8	9
Andhra Pradesh	828	3.89	740	4.19	4326	12.65	3591	11.17
Chhatisgarh	2803	13.17	2177	12.33	3442	10.06	3423	10.64
Haryana	3570	16.77	2861	16.21	2861	8.36	2015	6.27

1	2	3	4	5	6	7	8	9
Maharashtra	101	0.47	51	0.29	230	0.67	199	0.62
Punjab	11044	51.89	9349	52.96	9350	27.33	7786	24.21
Tamil Nadu	8	0.04	40	0.23	1191	3.48	1049	3.26
Uttar Pradesh	544	2.56	725	4.11	2910	8.50	1698	5.28
Uttarakhand	299	1.40	229	1.30	598	1.75	465	1.45
Others	2085	9.80	1480	8.38	9301	27.19	11936	37.11
Total	21282	100.00	17652	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 :

(*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	%to Total	Procurement	% age to Total	Procurement	%age to Total	Procurement	%age 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 211.1 in December, 2016 showing an increase of 2.0% over the previous month and a decrease of 3.3% over the year. The WPI of copra (coconut) increased by 6.4%, groundnut seed by 6.3%, gingelly seed by 1.9%, soybean by 1.3%, safflower (kardi seed) by 0.7% and cotton seed by 0.1% over the previous month. The WPI of sunflower decreased by 3.2%, rape & mustard seed by 1.6% and niger seed by 0.7% over the previous month.

The WPI of edible oils as a group stood at 157.2 in December, 2016 showing an increase of 0.4% and 4.9% over the previous month and year respectively. The WPI of groundnut oil increased by 2.3%, copra oil by 2.0% and soybean oil by 0.8% over the previous month. The WPI of gingelly oil decreased by 0.8%, sunflower oil by 0.6%, mustard & rapeseed oil by 0.6% and cotton seed oil by 0.4%, over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 223.7 in December, 2016 showing a decrease of 9.2% & 17.4% over the previous month and year respectively.

Potato

The WPI of potato stood at 219.6 in December, 2016 showing a decrease of 20.2% over the previous month and an increase of 26.4% over the previous year.

Onion

The WPI of onion stood at 256.8 in December, 2016 showing an increase of 4.8% over the previous month and a decrease of 37.2% over the previous year.

Condiments & Spices

The WPI of condiments & spices (group) stood at 351.4 in December, 2016 which shows an increase of 0.6% over the previous month and a decrease of 5.7% over the year. The WPI of black pepper increased by 1.7% & chillies (dry) by 1.5% over the previous month. The WPI of turmeric decreased by 0.6% over the previous month.

Raw Cotton

The WPI of raw cotton stood at 218.5 in December, 2016 showing an increase of 1.5% and 16.4% over the previous month & year respectively.

Raw Jute

The WPI of raw jute stood at 403.5 in December, 2016 showing a decrease of 4.1% & 11.0% over the previous month and year respectively.

Wholesale Price Index of Commercial Crops

COMMODITY	LATEST	MONTH	YEAR	% VARIATION OVER	
	December, 2016	November, 2016	December, 2015	MONTH	YEAR
OIL SEEDS	211.1	206.9	218.3	2.0	-3.3
Groundnut Seed	250.9	236.0	244.2	6.3	2.7
Rape & Mustard Seed	235.2	239.1	246.9	-1.6	-4.7
Cotton Seed	229.2	228.9	202.7	0.1	13.1
Copra (Coconut)	130.1	122.3	139.1	6.4	-6.5
Gingelly Seed (Sesamum)	317.9	312.0	291.4	1.9	9.1
Niger Seed	319.8	321.9	402.4	-0.7	-20.5
Safflower (Kardi Seed)	160.2	159.1	150.0	0.7	6.8
Sunflower	163.8	169.3	200.0	-3.2	-18.1
Soyabean	175.4	173.1	212.7	1.3	-17.5
EDIBLE OILS	157.2	156.6	149.9	0.4	4.9
Groundnut Oil	213.5	208.8	192.8	2.3	10.7

COMMODITY	LATEST	MONTH	YEAR	% VARIATION OVER	
	December, 2016	November, 2016	December, 2015	MONTH	YEAR
Cotton Seed Oil	203.5	204.3	195.2	-0.4	4.3
Mustard & Rapeseed Oil	185.2	186.3	191.1	-0.6	-3.1
Soyabean Oil	156.7	155.4	150.6	0.8	4.1
Copra Oil	140.3	137.6	145.1	2.0	-3.3
Sunflower Oil	132.8	133.6	133.8	-0.6	-0.7
Gingelly Oil	183.9	185.3	158.3	-0.8	16.2
FRUITS & VEGETABLES	223.7	246.3	270.8	-9.2	-17.4
Potato	219.6	275.3	173.7	-20.2	26.4
Onion	256.8	245.1	408.9	4.8	-37.2
CONDIMENTS & SPICES	351.4	349.2	372.6	0.6	-5.7
Black Pepper	731.3	719.1	740.7	1.7	-1.3
Chillies(Dry)	396.0	390.3	396.7	1.5	-0.2
Turmeric	242.9	244.4	267.1	-0.6	-9.1
Raw Cotton	218.5	215.3	187.7	1.5	16.4
Raw Jute	403.5	420.9	453.4	-4.1	-11.0

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	June,, 16	8	375	305	400	305	400	305	600	400	NA
	Tumkur	Gidlahali	Nov, 15	8	180	170	180	NA	NA	NA	200	190	NA
Maharashtra	Nagpur	Mauda	Sep, 14	8	100	80	NA	NA	NA	NA	NA	NA	NA
	Ahmednagar	Akole	Sep, 14	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jharkhand	Ranchi	Gaitalsood	March,14	8	120	120	100	100	75	75	200	200	NA

1.1 Daily Agricultural Wages In Some States (Operation-wise)

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily Working Hours	Ploughing	Sowing	Weeding	Harvesting	Other Agri-Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Assam	Barpeta	Laharapara	May, 16	M	8	300	250	250	250	250	200	350	300	250
				W	8	NA	200	200	200	200	NA	NA	NA	NA
Bihar	Muzaffarpur	Bhalui Rasul	June,16	M	8	300	300	300	300	300	300	400	400	NA
				W	8	NA	300	NA	NA	300	NA	NA	NA	NA
	Shekhpura	Kutaut	June,16	M	8	250	NA	225	100	NA	NA	500	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chhattisgarh	Dhamtari	Sihava	July,16	M	8	NA	NA	170	NA	150	150	250	200	250
				W	8	NA	NA	150	NA	100	100	NA	NA	150
Gujarat*	Rajkot	Rajkot	Sep, 15	M	8	215	205	163	180	150	188	450	450	360
				W	8	NA	175	150	175	135	117	NA	NA	NA
	Dahod	Dahod	Sep,15	M	8	180	160	160	160	130	NA	260	210	210
				W	8	NA	160	160	160	130	NA	NA	NA	NA
Haryana	Panipat	Ugarakheri	Mach, 16	M	8	400	400	400	400	400	NA	NA	NA	NA
				W	8	NA	300	300	300	300	NA	NA	NA	NA
Himachal 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	March,16	M	4-8	1290	675	NA	675	1008	NA	825	NA	NA
				W	4-8	NA	NA	475	575	550	NA	NA	NA	NA
	Palakkad	Elappally	March,16	M	4-8	NA	500	NA	500	467	NA	600	NA	NA
				W	4-8	NA	NA	300	300	300	NA	NA	NA	NA
Madhya 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	July, 16	M	8	300	300	300	NA	300	300	400	350	250
				W	8	NA	NA	200	NA	200	200	NA	NA	NA
	Ganjam	Aska	July, 16	M	8	350	300	250	300	300	NA	350	380	300
				W	8	NA	200	200	200	200	200	NA	NA	NA
Punjab	Ludhiyana	Pakhowal	Nov, 15	M	8	395	NA	395	395	380	100	400	400	200
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rajasthan	Barmer	Kuseep	Aug,15	M	8	NA	NA	300	NA	NA	300	700	500	NA
				W	8	NA	NA	200	NA	NA	200	NA	NA	NA
	Jalore	Sarnau	Aug,15	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tamil 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

Prices

2. Month End Wholesale Prices of Certain Agricultural Commodities and Animal Husbandry Products at Selected Centres in India

Commodity	Variety	Unit	State	Centre	Dec-16	Nov-16	Dec-15
Wheat	PBW 343	Quintal	Punjab	Amritsar	1800	1800	1600
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1840	2050	1590
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1950	2000	1580
Jowar	-	Quintal	Maharashtra	Mumbai	2400	2350	2300
Gram	No III	Quintal	Madhya Pradesh	Sehore	8460	8201	4286
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	-	-	1355
Gram Split	-	Quintal	Bihar	Patna	13000	8550	6040
Gram Split	-	Quintal	Maharashtra	Mumbai	12150	11900	6150
Arhar Split	-	Quintal	Bihar	Patna	10000	11000	14800
Arhar Split	-	Quintal	Maharashtra	Mumbai	7500	8750	13250
Arhar Split	-	Quintal	NCT of Delhi	Delhi	8300	9775	13350
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	9400	11200	12800
Gur	-	Quintal	Maharashtra	Mumbai	3850	4000	3100
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4600	4600	4000
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2450	2450	2350
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	4250	4300	4385
Mustard Seed	Black	Quintal	West Bengal	Raniganj	4500	4500	5000
Mustard Seed	-	Quintal	West Bengal	Kolkata	4750	5050	5300
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	6050	6120	4425
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	4780	4680	4250
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	2200	2300	1900
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	2750	2500	2300
Castor Seed	-	Quintal	Telangana	Hyderabad	3200	3500	3500
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	8290	8470	13550
Copra	FAQ	Quintal	Kerala	Alleppey	7450	6700	6650
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	5500	5500	4500
Groundnut	-	Quintal	Maharashtra	Mumbai	6800	6400	5900
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1425	1480	1515
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1565	1560	1710
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	1500	1500	1335
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1950	1935	1725
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1523	1545	1455
Castor Oil	-	15 Kg.	Telangana	Hyderabad	1118	1155	1125
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	1500	1500	1385
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2220	2250	1725
Coconut Oil	-	15 Kg.	Kerala	Cochin	1635	1515	1350
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2375	2300	2450
Groundnut Cake	-	Quintal	Telangana	Hyderabad	3357	3429	3429
Cotton/Kapas	NH 44	Quintal	Andhra Pradesh	Nandyal	5000	4800	4100
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	4556	4000	3000

Commodity	Variety	Unit	State	Centre	Dec-16	Nov-16	Dec-15
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	3900	3850	5290
Jute Raw	W 5	Quintal	West Bengal	Kolkata	3900	3850	5230
Oranges	-	100 No	NCT of Delhi	Delhi	542	625	650
Oranges	Big	100 No	Tamil Nadu	Chennai	450	450	480
Banana	-	100 No.	NCT of Delhi	Delhi	350	350	267
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	498	501	495
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	76000	80000	82000
Almonds	-	Quintal	Maharashtra	Mumbai	70000	70000	95000
Walnuts	-	Quintal	Maharashtra	Mumbai	70000	70000	82000
Kishmish	-	Quintal	Maharashtra	Mumbai	11000	11000	23000
Peas Green	-	Quintal	Maharashtra	Mumbai	3400	3500	4200
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	600	1170	1400
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	1500	550	4000
Cauliflower	-	100 No.	Tamil Nadu	Chennai	1600	1500	2000
Potato	Red	Quintal	Bihar	Patna	1300	1250	820
Potato	Desi	Quintal	West Bengal	Kolkata	650	1200	860
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	1600	2370	2303
Onion	Pole	Quintal	Maharashtra	Nashik	550	500	1250
Turmeric	Nadan	Quintal	Kerala	Cochin	15500	15500	13000
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	8200	8400	9000
Chillies	-	Quintal	Bihar	Patna	8000	9500	10250
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	62000	64000	64000
Ginger	Dry	Quintal	Kerala	Cochin	16000	15000	19500
Cardamom	Major	Quintal	NCT of Delhi	Delhi	125000	130500	131500
Cardamom	Small	Quintal	West Bengal	Kolkata	125000	150000	100000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	3800	3800	3600
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	34684	34017	34017
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	46000	46000	46000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	36200	36400	35650
Fish	Rohu	Quintal	NCT of Delhi	Delhi	13000	12000	10000
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	35000	34500	32000
Eggs	Madras	1000 No.	West Bengal	Kolkata	4200	3900	4250
Tea	-	Quintal	Bihar	Patna	21200	21200	21100
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	34000	34000	33000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	26000	26500	28000
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	17500	16000	14500
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	-	4600	4650
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	-	3500	3500
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13400	13000	
Rubber	-	Quintal	Kerala	Kottayam	11500	11500	9100
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	32700	32700	31500

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

Commodity	Variety	Country	Centre	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CARDAMOM	Guatmala Bold Green	U.K.	-	Dollar/MT	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00	9000.00
				Rs./Qtl	61281.00	61542.00	60210.00	59796.00	60255.00	60516.00	60309.00	60309.00	60138.00	60210.00	61875.00	61056.00
CASHEW KERNELS	Spot U.K. 320s	U.K.	-	Dollar/MT	8350.09	8143.20	8333.00	9184.69	9568.85	9560.20	9620.02	8629.11	10342.18	10479.17	10724.82	10295.36
				Rs./Qtl	56855.76	55683.20	55747.77	61023.08	64063.45	64282.78	64463.75	57823.67	69106.45	70105.65	73733.14	69843.72
CASTOR OIL	Any Origin ex tank Rotterdam	Nether-lands	-	Dollar/MT	1374.00	1244.70	1244.70	1244.70	1274.70	1249.90	1249.90	1335.00	1439.70	1439.00	1438.40	1433.00
				Rs./Qtl	9355.57	8511.26	8327.04	8269.79	8534.12	8404.33	8375.58	8945.84	9620.08	9626.91	9889.00	9721.47
CHILLIES	Birds eye 2005 crop	Africa	-	Dollar/MT	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00	4100.00
				Rs./Qtl	27916.90	28035.80	27429.00	27240.40	27449.50	27568.40	27474.10	27474.10	27396.20	27429.00	28187.50	27814.40
CLOVES	Singapore	Madagascar	-	Dollar/MT	8650.00	8650.00	8650.00	8700.00	8750.00	8750.00	8900.00	8250.00	8250.00	8000.00	7850.00	7850.00
				Rs./Qtl	58897.85	59148.70	57868.50	57802.80	58581.25	58835.00	59638.90	55283.25	55126.50	53520.00	53968.75	53254.40
COCONUT OIL	Crude Phillipine/ Indonesia, cif Rotterdam	Netherlands	-	Dollar/MT	1155.00	1255.00	1545.00	1535.00	1430.00	1600.00	1500.00	1610.00	1475.00	1515.00	1575.00	1785.00
				Rs./Qtl	7864.40	8581.69	10336.05	10198.54	9573.85	10758.40	10051.50	10788.61	9855.95	10135.35	10828.13	12109.44
COPRA	Phillipines cif Rotterdam	Phillipine	-	Dollar/MT	687.50	714.50	811.00	813.00	767.00	798.50	797.00	818.00	789.00	795.50	813.00	867.00
				Rs./Qtl	4681.19	4885.75	5425.59	5401.57	5135.07	5369.11	5340.70	5481.42	5272.10	5321.90	5589.38	5881.73
CORRIANDER		India	-	Dollar/MT	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	1650.00	1650.00	1650.00	1650.00	1650.00
				Rs./Qtl	13618.00	13676.00	13380.00	13288.00	13390.00	13448.00	13402.00	11056.65	11025.30	11038.50	11343.75	11193.60
CUMMIN SEED		India	-	Dollar/MT	2200.00	2200.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00	2500.00
				Rs./Qtl	14979.80	15043.60	16725.00	16610.00	16737.50	16810.00	16752.50	16752.50	16705.00	16725.00	17187.50	16960.00
GROUNDNUT OIL	Crude Any Origin cif Rotterdam	U.K.	-	Dollar/MT	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	1200.00	-
				Rs./Qtl	8170.80	8205.60	8028.00	7972.80	8034.00	8068.80	8041.20	8041.20	8018.40	8028.00	8001.60	-
MAIZE		U.S.A.	Chicago	C/56 lbs	369.25	359.75	368.50	380.75	404.75	393.00	335.75	327.50	329.25	354.00	350.75	347.25
				Rs./Qtl	988.09	966.77	968.85	994.17	1064.95	1038.52	884.20	862.47	864.62	930.73	947.68	925.81
OATS		CANADA	Winni-peg	Dollar/MT	283.14	250.42	250.99	247.92	244.91	263.38	314.33	221.77	214.72	281.80	297.14	300.97
				Rs./Qtl	1927.90	1712.37	1679.12	1647.18	1639.67	1770.97	2106.33	1486.08	1434.76	1885.24	2042.84	2041.78
PALM KERNAL OIL	Crude Malaysia/ Indonesia, cif Rotterdam	Netherlands	-	Dollar/MT	890.00	1030.00	1320.00	1285.00	1200.00	1410.00	1350.00	1505.00	1410.00	1390.00	1525.00	1685.00
				Rs./Qtl	6060.01	7043.14	8830.80	8537.54	8034.00	9480.84	9046.35	10085.01	9421.62	9299.10	10484.38	11431.04
PALM OIL	Crude Malaysian/ Sumatra, cif Rotterdam	Netherlands	-	Dollar/MT	575.00	637.50	705.00	710.00	717.50	710.00	655.00	775.00	740.00	750.00	760.00	810.00
				Rs./Qtl	3915.18	4359.23	4716.45	4717.24	4803.66	4774.04	4389.16	5193.28	4944.68	5017.50	5225.00	5495.04
PEPPER (Black)	Sarawak Black lable	Malaysia	-	Dollar/MT	10000.00	10000.00	10000.00	10000.00	10200.00	10200.00	10200.00	10200.00	8200.00	8200.00	7900.00	7900.00
				Rs./Qtl	68090.00	68380.00	66900.00	66440.00	68289.00	68584.80	68350.20	68350.20	54792.40	54858.00	54312.50	53593.60
RAPESEED	Canola	CANADA	Winni-peg	Can Dollar/MT	481.20	460.70	469.50	499.50	524.80	480.00	453.90	468.80	464.20	510.20	528.00	511.60
				Rs./Qtl	2334.78	2298.89	2378.02	2643.85	2707.97	2515.20	2312.62	2432.60	2358.14	2549.98	2690.69	2574.37
	UK delivered rapeseed, delivered Erith(buyer)	U.K.	-	Pound/MT	247.00	247.00	245.00	245.00	245.00	232.00	252.00	252.00	255.00	250.00	315.00	329.00
				Rs./Qtl	2415.66	2352.43	2314.03	2378.22	2405.66	2271.05	2222.39	2227.93	2208.81	2035.75	2696.72	2741.89

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
RAPESEED OIL	Refined bleached and deodorised ex-tanks,broker price	U.K.	-	Pound/MT	660.00	614.00	615.00	658.00	602.00	602.00	594.00	594.00	670.00	726.00	820.00	826.00
				Rs./Qtl	6454.80	5847.74	5808.68	6387.21	5911.04	5892.98	5238.49	5251.55	5803.54	5947.39	7020.02	6883.88
SOYABEAN MEAL	UK produced 49% oil & protein ('hi-pro') ex-mill seaforth UK bulk	U.K.	-	Pound/MT	248.00	255.00	249.00	291.00	342.00	325.00	331.00	314.00	295.00	322.00	312.00	309.00
				Rs./Qtl	2425.44	2428.62	2351.81	2824.74	3358.10	3181.43	2919.09	2776.07	2555.29	2622.05	2671.03	2575.21
SOYABEAN OIL		U.S.A.	-	C/lbs	30.87	30.92	33.36	33.62	31.34	31.55	29.53	33.57	32.64	35.72	36.85	36.00
				Rs./Qtl	4632.67	4659.94	4918.85	4923.10	4624.46	4675.61	4361.29	4957.95	4806.93	5266.83	5583.70	5382.70
	Refined bleached and deodorised ex-tanks, broker price	U.K.	-	Pound/MT	618.00	639.00	650.00	616.00	590.00	596.00	653.00	714.00	714.00	786.00	769.00	824.00
				Rs./Qtl	6044.04	6085.84	6139.25	5979.51	5793.21	5834.24	5758.81	6312.47	6184.67	6400.40	6583.41	6867.22
SOYABEANS		U.S.A.	-	C/60 lbs	883.00	867.50	905.25	1019.00	1085.50	1137.50	1010.50	1030.75	945.50	1010.00	1034.25	1006.75
				Rs./Qtl	2206.53	2177.03	2222.60	2484.68	2667.14	2807.02	2485.09	2534.89	2318.64	2479.78	2609.54	2506.53
	US NO.2 yellow	Netherlands	Chicago	Dollar/MT	377.20	372.90	385.60	409.20	426.00	456.40	412.00	420.90	397.10	407.90	391.80	412.30
				Rs./Qtl	2568.35	2549.89	2579.66	2718.72	2852.07	3068.83	2760.81	2820.45	2653.42	2728.85	2693.63	2797.04
SUNFLOWER SEED OIL	Refined bleached and deodorised ex-tanks, broker price	U.K.	-	Pound/MT	674.00	720.00	720.00	720.00	720.00	720.00	746.00	748.00	781.00	838.00	813.00	822.00
				Rs./Qtl	6591.72	6857.28	6800.40	6989.04	7069.68	7048.08	6578.97	6613.07	6765.02	6839.76	6960.09	6850.55
Wheat		U.S.A.	Chicago	C/60 lbs	476.50	442.75	463.00	474.25	466.00	458.75	414.75	404.00	403.25	411.50	401.50	399.50
				Rs./Qtl	1190.73	1111.10	1136.77	1156.39	1144.99	1132.06	1019.98	993.54	988.89	1010.33	1013.03	994.65

Source - Public Ledger

Foreign Exchange Rates

Currency	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CanDollar	48.52	49.90	50.65	52.93	51.60	52.40	50.95	51.89	50.80	49.98	50.96	50.32
UKPound	97.80	95.24	94.45	97.07	98.19	97.89	88.19	88.41	86.62	81.43	85.61	83.34
USDollar	68.09	68.38	66.90	66.44	66.95	67.24	67.01	67.01	66.82	66.90	68.75	67.84

Crop Production

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

State	Sowing	Harvesting
1	2	3
Andhra Pradesh	Summer	Winter rice, Summer rice, Jowar (R), Maize (R), Ragi (R), Wheat, Barley, Small Millets (R), Gram, Tur (K) other Kharif Pulses Urad (R), Mung (R), Other Rabi Pulses, Sugarcane, Chilies (Dry), Castorseed, Linseed, Cotton, Turneric, Onion (2nd crop), Tapioca
Assam	Small Millets (R), Summer Potato (Hills), Sugarcane, jute, Mesta	Wheat Gram,Tur(K), Urad (R), Tobacco, Rapeseed and Mustard, Linseed
Bihar	Jute	Wheat, Barley, Gram, Tur(K), Winter Patato (Plains), Sugarcane, Rapeseed and Mustard, Linseed Wheat, Barley, Gram, Tur (K), Winter Potato.
Gujarat	Sugarcane	Sugarcane, Chillies (Dry), Castorseed, Rapeseed and Mustard, Cotton, Onion
Himachal Pradesh	Sugarcane, Cotton	Rapeseed and Mustard, Linseed Winter Rice, Jowar (R), Wheat, Gram, Urad (R), Mung (R), Winter Potato (Plains), Summer Potato
Karnataka	Sugarcane	(Plains), Sugarcane, Linseed, Cotton, Turmeric, Cardiseed, Onion
Kerala	Sugarcane, Sesamum (1st crop), Tapioca (2nd crop)	Summer Rice, Sesamum (3rd crop), Cotton, Sweet Potato Jowar (R), Wheat, Barley Small Millets (R), Gram, Tur, Urad (R), Mung (R), Other Rabi
Madhya Pradesh	Sugarcane	Pulses, Winter Potato, Sugarcane, Chillies (Dry), Tobacco, Castorseed, Rapeseed & Mustard, Linseed, sannhemp Cardiseed, Onion Jowar (R), Maize (r), Wheat Barley, Gram, Tur (K), Other Rabi Pulses, Chillies (Dry), Tobacco, Catorssed,
Maharashtra	Sugarcane	Rapeseed and Mustard, Linseed, Cotton, Cardiseed, Onion,
Manipur	Maize, Jute	Wheat, Gram, Castorseed, Rapeseed and Mustard, Linseed,
Orissa	Sugarcane	Bajra, Ragi, Wheat, Barley, Urad (R), Mung (R), Rapeseed and Mustard,
Punjab and Haryana	Winter Potato (Hills), Summer Potato (Hills), Sugarcane, Ginger, Chillies (Dry), Tobacco, Turmeric, Onion	Gram, Tur(K), Summer Potato, Sugarcane, Castorseed, Rapeseed and Mustard, Linseed, Turmeric
Rajasthan	Small Millets (R), Sugarcane	Wheat, Barley, Gram, Tur (K), Urad (R), Mung (R), Other Rabi Pulses, winter Potato (Plains), Castorseed, Rapeseed and Mustard, Linseed
Tamil Nadu	Summer Rice, Jowar (R), Sugarcane, Groundnut (Early), Sesamum, Onion	Winter Rice, Jowar (R), Bajra, Ragi, Small Millets (K), Mung (K), Other Rabi Pulses (Kulthi), Winter Potato, Sugarcane, Tobacco, Castorseed, Sesamum (Late), Cotton, Onion

4. Sowing and Harvesting Operations Normally in Progress During March, 2016—*Contd*.

1	2	3
Tripura	Autumn Rice, Sugarcane, Sesamum, Cotton Jute	Summer Rice, Urad (R), Mung (R), Other Rabi Pulses, Winter Potato (Plains), Sugarcane, Chillies (Dry), Rapeseed and Mustard, Wheat Barley, Small Millets (R) Gram, Tur (K),
Uttar Pradesh	Small Millets(R), Sugarcane, Ginger, Jute, Mesta, Tapioca	Winter Potato (Hills), Ginger, Tobacco, Casterseed, Rapeseed and Mustard, Linseed, Sweet Potato, Onion, Tapioca Wheat, Barlery, Gram, Tur (K), Urad (R), Other Rabi
West Bengal	Autumn Rice, Sugarcane, Ginger, Sesamum, Jute	Pulses, Winter Potato (Plains, Sugarcane, Ginger, Tobacco, Sesamum, Rapeseed and Mustard, Chillies (Dry)
Delhi	Sugarcane, Tobacco, Jute	Barley, Gram, Sugarcane, Tobacco

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