ISSN 0002-1679
Regn.No.:840

P. Agri. 21-10-2017
450

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PRINTED BY THE GENERAL MANAGER GOVERNMENT OF INDIA PRESS, MINTO ROAD, NEW DELHI-110002
AND PUBLISHED BY THE CONTROLLER OF PUBLICATIONS, DELHI-110054-2016

AGRICULTURAL SITUATION IN INDIA

OCTOBER, 2017

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Directorate of Economics and Statistics
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Annual	: ₹400.00	£ 29 or $ 45

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Agricultural Situation in India

VOL. LXXIV **October, 2017** No. 7

Contents

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

NOTE TO CONTRIBUTORS

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

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An honorarium of Rs. 2000/- per article of atleast 2000 words for the regular issue and Rs. 2500/- per article of at least 2500 words for the Special/Annual issue is paid by the Directorate of Economics & Statistics to the authors of the articles accepted for the Journal.

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STATISTICAL TABLES

Abbreviations used

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

Plus (+) indicates surplus or increase.

Minus (–) indicates deficit or decrease.

We are pleased to inform that our monthly journal *Agricultural Situation in India* has been accredited by the National Academy of Agricultural Sciences (NAAS) and it has been given a score of 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,

The journal *Agricultural Situation in India* has been included in the UGC approved list of journals for promotion and recruitment in academic and non-academic posts.

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

Farm Sector News

Building a new India: Pledge to Double Farmers Income by 2022 Seven-point Strategy

To improve the economic condition of the farmers, Prime Minister Shri Narendra Modi has set a target. The goal is to double the income of farmers by 2022. For the first time, a Prime Minister has put such a target in front of the nation for the welfare of farmers. Under the leadership of the Prime Minister, the Agriculture Ministry is working to achieve the target by 2022. The Ministry is working sincerely and honestly to fulfill our Prime Minister's dream. To double the farmer income, a large number of officials and farmers have been taking a pledge at events organized by the KVK since August 16, 2017.

Seven-point Strategy

1. Increase in Production

It is important to improve irrigation efficiency to increase production. Therefore, our government has increased the irrigation budget. 'Per Drop More Crop' is our motto. Pradhan Mantri Krishi Sinchai Yojana has been launched to mitigate the drought effect and to ensure 'water to every farm'. Hence, pending medium and large projects have also been expedited. Watershed development and water harvesting & management projects have been put on the fast track.

2. Effective use of Input Cost

For the first time, our government has introduced Soil Health Card Scheme to inform farmers about nutrients status of the soils. This is reducing the cultivation cost as farmers are following the recommendations and going for balanced use of fertilisers. In addition, the Government has curbed illegal use of urea and ensured adequate supply through Neem Coated Urea scheme. The government is also encouraging organic farming. The adoption of new technologies in agriculture such as space technology is helping in better planning through forecasting of crop production, agricultural land-use mapping, drought prediction, and utilisation of fallow paddy fields for Rabi crops. Apart from this, farmers are getting timely information and advisory services through online and telecom mediums such as Kisan Call Centre and Kisan Suvidha App.

3. Reduction of Post-harvest Losses

One of the biggest problems of the farmers is storage after harvesting, as a result, they are forced to sell their products at a lower cost. Therefore, the government is encouraging farmers to use warehouses and avoid distressed sales. Loans against negotiable warehouse receipts are being provided with interest subvention benefits. To protect farmers from losses, the government is focusing on storage facilities and integrated cold chains in rural areas.

4. Value Addition

The government is also promoting quality through food processing. Pradhan Mantri Kisan Sampada Yojana has been started and Rs.6, 000 crore has been allocated for this project. Under *Source*:www.pib.nic.in this scheme, food-processing capabilities would be developed by working on the forward and backward linkage of agro processing cluster, which would benefit 20 lakh farmers and create employment opportunities for about five lakh persons.

5. Reforms in Agriculture Marketing

The Central Government is emphasizing on the need of reforms in agriculture marketing. e-NAM was launched with three reforms and so far, 455 mandis have been linked to this platform. Online trading has begun on various mandis. In addition, the government has circulated model Agricultural Produce Market Committee (APMC) Act, which includes private market yards and direct marketing. In addition, the Government is also working on a Model Act to promote contract farming.

6. Risk, Security and Assistance

The Government has initiated Pradhan Mantri Fasal Bima Yojana (PMFBY) to reduce the possible risks. The scheme creates a security shield. The lowest rate has been fixed for Kharif and Rabi crops. Maximum rate is 2% and 1.5%, respectively. The scheme covers standing crops as well as pre-sowing to post-harvesting losses. Not only that, 25% of the claim is settled immediately online. New technologies like Smartphones, satellite imagery and drones facilities are being utilised to carry out faster assessments of crop loss under PMFBY. From this Kharif season, the farmers can also avail customer service centre and online banking facilities to deposit their premium. The Government has revised the norms for assistance from SDRF and NDRF. Now, the government is providing compensation if at least 33% of the crop is damaged. Compensation amount has been increased to 1.5 times.

Source: www.pib.nic.in

7. Allied Activities

I. Horticulture: The Mission for Integrated Development of Horticulture (MIDH) scheme is playing an important role in doubling the income of farmers. For this, we are providing better planting materials, improved seed and protected cultivation, high-density plantation, rejuvenation, and precision farming.

II. Integrated Farming: Our government is also using Integrated Farming System (IFS). In addition to agriculture, the focus is also on horticulture, livestock, and bee keeping. This scheme would not only increase farmers' income, it would also mitigate the effect of drought, flood, and other natural disasters.

III. White Revolution: Indigenous breeds of cows are being conserved under Rashtriya Gokul Mission. The genetic makeup is improving and increasing the production of milk. The government is set to establish Dairy Processing and Infrastructure Development Fund. In addition, Dairy Entrepreneurship Development Scheme is generating self-employment opportunities. White Revolution has been expedited to increase the income of the farmers.

IV. Blue Revolution: Blue Revolution: Integrated Development and Management of Fisheries is a new initiative and it includes activities such as inland fisheries, Aquaculture, Mariculture undertaken by National Fisheries Development Board (NFDB). Apart from this, Deep Sea Fishing scheme has also been initiated.

V. Sub-Mission on Agro-forestry: For the first time, Sub-Mission on Agroforestry has been initiated with an aim to promote inter-cropping. Under this scheme, "Med Per Ped" campaign has also been included.

VI. Bee-keeping: A large number of farmers/beekeepers are being trained for bee keeping. The bee keepers and honey societies/companies/firms are being registered. Integrated Bee Keeping Development Centres (IBDC) are being established in the states.

VII. Rural Backyard Poultry Development: Under this scheme, supplementary income and nutritional support are provided to poultry farmers. Awareness program sensitizing sheep, goat, pig and duck farmers about opportunities to enhance income through Rural Backyard Poultry Development mission is being carried out.

Cabinet Approved Implementation of the Scheme, Namely, "Dairy Processing & Infrastructure Development Fund"

The Cabinet Committee on Economic Affairs, chaired by Prime Minister Shri Narendra Modi approved a Dairy Processing & Infrastructure Development Fund" (DIDF) on 12th September,2017 with an outlay of Rs 10,881 crore during the period from 2017-18 to 2028-29.

Consequent to the Union Budget 2017-18 announcement, Dairy Processing & Infrastructure Development Fund would be set up as a corpus of Rs 8004 crore with National Bank for Agriculture and Rural Development (NABARD), the Expenditure Finance Committee has given approval for; Initiation and setting up of Dairy Processing and Infrastructure Development Fund (DIDF) at a total scheme outlay of Rs 10881 crore. Out of Rs 10881 crore of financial outlay for project components of DIDF, Rs 8004 crore should be loan from NABARD to National Dairy Development Board (NDDB) and National Dairy Development Cooperation (NCDC), Rs 2001 crore should be end borrowers contribution, Rs 12 crore would be NDDB/NCDC's share and Rs 864 crore would be contributed by DADF towards interest subvention. NABARD would disburse Rs 2004 Cr, Rs 3006 Cr and Rs 2994 Cr during the year 2017-18, 2018-19 and 2019-20, respectively.

Allocation of Rs 864 Crore for meeting interest subvention would be released to NABARD over a period of 12 years covering the entire loan repayment period from 2017-18 to 2028-29.

The Major Activities of DIDF:

The project would focus on building an efficient milk procurement system by setting up of chilling infrastructure & installation of electronic milk adulteration testing equipment, creation/modernization/expansion of processing infrastructure and manufacturing faculties for Value Added Products for the Milk Unions/ Milk Producer Companies.

Management of DIDF:

The project would be implemented by National Dairy Development Board (NDDB) and National Dairy Development Cooperation (NCDC) directly through the End Borrowers such as Milk Unions, State Dairy Federations, Multi-state Milk Cooperatives, Milk Producer Companies and NDDB subsidiaries meeting the eligibility criteria under the project. An Implementation and Monitoring Cell (IMC) located at NDDB, Anand, would manage the implementation and monitoring of day-to-day project activities.

The end borrowers would get the loan @ 6.5% per annum. The period of repayment would be 10 years with initial two years moratorium.

The respective State Government would be the guarantor of loan repayment. Also, for the sanctioned project, if the end user is not able to contribute its share; State Government would contribute the same.

Rs 8004 crore should be loan from NABARD to NDDB/NCDC, Rs 2001 crore should be end borrowers contribution, Rs 12 crore would be jointly contributed by NDDB/NCDC and Rs 864 crore would be contributed by DADF towards interest subvention.

Benefits from DIDF:

With this investment, 95,00,000 farmers in about 50,000 villages would be benefitted. Additional Milk processing capacity of 126 lakh litre per day, milk drying capacity of 210 MT per day, milk chilling capacity of 140 lakh litre per day, installation of 28000 Bulk Milk Coolers (BMCs) along with electronic milk adulteration testing equipment and value added products manufacturing capacity of 59.78 lakh litre per day of milk equivalent would be created.

Initially, 39 MUs, of the Department would start the project with 39 profit making milk unions of 12 States, other Milk Cooperatives which become eligible on the basis of their net worth and profit levels, in subsequent years, to apply for loan under DIDF.

Employment Generation Potential:

The implementation of DIDF scheme would generate direct and indirect employment opportunities for skilled, semi-skilled and unskilled manpower. Direct employment opportunities for about 40,000 people would be created under the scheme through project activities like expansion & modernisation of existing milk processing facilities, setting up of new processing plants, establishment of manufacturing facilities for value added products and setting up of Bulk Milk Coolers (BMCs) at village level.

About 2 lakh indirect employment opportunities would be created on account of expansion of milk and milk product marketing operations from existing Tier I, II & III to Tier IV, V & VI cities/towns etc. This would lead to deployment of more marketing staff by Milk Cooperatives, appointment of distributors and opening of additional milk booths/retail outlets in urban/rural locations.

With the increase in milk procurement operations of the Milk Cooperatives, there would be generation of additional manpower employment for supervision of increased milk procurement operations, transportation of milk from villages to processing units, and increased input delivery services like Artificial Insemination (AI) services, Veterinary Services, etc.

The Fourth Estimates Revealed Record Production of Foodgrain, Paddy, Wheat, Pulses and Coarse Cereal: Shri Radha Mohan Singh

Union Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh said that the fourth Estimates revealed record food grain production at 275.68 million tonnes comprising of 110.15 mn tonnes paddy, 98.38 mn tonnes wheat, 22.95 mn tonnes pulses and 44.19 mn tonnes coarse cereal. Shri Singh was speaking at the 13th General Council meeting of NFSM on 12th September, 2017. All the three MoS Shri Parshottam Rupala, Shri Gajendra Singh Shekhawat, and Smt. Krishna Raj– were present at, the meeting.

Shri Radha Mohan Singh shared activities of NFSM, which are as follows:

- In 2016-17, 638 districts of 29 states grew pulses against 468 districts of 16 states in 2012-13.
- Coarse cereals were included in 12th scheme. NFSM-coarse cereal is being implemented in 265 districts of 28 states since 2014-15.

Shri Singh said that during the meet on 17th January 2017 decisions taken in the 12th meeting were reviewed and plans were approved by the council.

The council took following decisions at the meeting:

- Allocation of additional funds to target pulse cultivation in the rice fallow areas of Eastern States; and allocate additional funds for the pulses & oilseeds cultivation to tackle wheat blast disease in the West Bengal.
- Allocation of funds by the Indian Council of Agricultural Research (ICAR) institutes for Frontline Demonstration of rice, wheat, pulses and coarse cereals by various Krishi Vigyan Kendras.
- Distribution of seeds mini kits and assistance to the central agencies for the production of certified seeds of pulses.
- Experiment of TL seeds developed by the ICAR, under seed hub program during 2016-17 and their implementation during Frontline Demonstration in 2017-18.
- Under NFSM pulse program, promotion of beekeeping with arhar dal during Frontline Demonstration.
- Approval for extension of all the projects approved under NFSM till 2016-17.
- Additional fund allocation for production of breeder seeds of pulses and creation of seed hubs.
- Funds approved for the year 2015-16 agricultural awards.
- Presentations by states like Andhra Pradesh, Maharashtra, Odisha and Uttar Pradesh.

In the end, the Union Agriculture Minister said that increased expenditure has led to increase in production of the food grains.

Media Reports regarding Drought in 225 Districts in 17 States, are Factually Incorrect: Ministry of Agriculture & Farmers Welfare

Recently, some news reports which have been published regarding drought warning for 225 districts in 17 States, were found to be factually incorrect. The Ministry of Agriculture & Farmers Welfare has been monitoring

regularly the agricultural situation in the States. During the current monsoon season, the monsoon rains have been normal i.e., 738.8 mm against the normal of 782.2 mm as on 10.09.2017. The overall rainfall in the country is in the category of normal (-6%). The monsoon season in the country is from 1st June to 30th September. Many States particularly, North-Eastern States are receiving heavy monsoon rains.

The kharif crops coverage in almost all the States have been satisfactory and the rains during the period from 1-10 September, 2017 in Kerala, Karnataka, Maharashtra, Telangana, Odisha and Jharkhand have improved moisture in the soil. This wide distribution of rainfall has brightened the prospects of kharif production in current season. During 2017-18, the area sown under all kharif crops is 1041.17 lakh hectares against the normal of corresponding period of 1014.00 lakh hectares as on 08.09.2017. However, some areas experienced deficit rains after sowing of kharif crops. The States have already started assessment of impact of less rain in such areas. The Ministry of Agriculture & Farmers Welfare has already given advisories to the States for life saving irrigation, in case of moisture stress. Though, there is deficit rainfall reported in 95 districts but sowing is normal and satisfactory. The current rainfall in first fortnight of September in many States will improve the situation. The yield is expected to be same as of last year. There is no drought like situation.

Union Agriculture and Farmers Welfare Minister addressed a Seminar on Role of Animal Husbandry in Doubling Farmers' Income

Union Agriculture and Farmers Welfare Minister Shri Radha Mohan Singh addressed a gathering at a seminar on Role of Animal Husbandry in Doubling Farmers' Income, organized by Compound Livestock Feed Manufacturers Association (CLFMA) on 15th September, 2017, in. Maharashtra. Chief Minister Shri **Devendra Fadnavis**, Finance Minister Telangana Shri Etela Rajender and Maharashtra AHD&F Minister Shri Mahadev Jagannath Jankar were also present at the event.

Speaking on the occasion, he said that the ministry is working to double farmers' income by 2022, and this can be accomplished only by encouraging farmers to adopt other sources of income like Animal Husbandry, which has immense potential in the state of Maharashtra. He also said that in the absence of sufficient agricultural lands due to the natural geographical terrain of the state, farmers got many opportunities in other fields like poultry, dairy, fishery, bee keeping and Animal Husbandry. Identifying strengths and weaknesses of Animal Husbandry sector is important to understand pro-poor policy steps and drawing up a comprehensive policy and its implementation plan. We should appreciate the need to double the farmers' income and understand the vision of livestock and Animal Husbandry sector.

Shri Radha Mohan Singh added that we have to encourage farmers to diversify in allied sectors like horticulture, fisheries and livestock farming as it can help them in increasing their income. In addition, farmers should be technologically sound to understand the reforms introduced for their welfare. We also have to provide support to encourage them to adopt alternative farming. He also said that agriculture and Animal Husbandry are interdependent and they grow together. The states like Chhattisgarh have benefited from diversification and other states have great potential too, and we should learn from those states and adopt their processes. It is the dream of our Prime Minister Shri Narendra Modi to double the farmers' income by 2022. In order to promote agriculture sector, the Government has set up an ambitious target of doubling the farmers' income by 2022. Several policies ranging from irrigation to crop insurance have been devised to accomplish the goal. However, if we have to change the food value chain, then we need to shift from production-oriented system to demand-oriented system, which quickly connects consumers with products.

The Minister informed that to accomplish this goal, new approach and innovation would be necessary. In addition, food value chain would have to enhance the cooperation between private sector and other stakeholders. To make it work, an integrated value chain linking farm to the table is needed; Competitive markets are required to provide better value to the farmers; and a transitive environment to support innovation and action. He also said that considering climate change and increasing pressure on land and water resources, it is not possible for a single stakeholder – be it governmental, corporate or from civil society – to accomplish it alone. We can make a difference by combining the competencies of diverse organizations and stakeholders and creating a better alignment through public private partnership platforms.

Government has accorded Top Priority to the Agriculture Sector and Finance Ministry has announced Rs. 62,376 Crore Fund Allocation for the Sector in 2017-18: Shri Radha Mohan Singh

The Union Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh said that considering its importance, the Government has accorded top priority to the agriculture sector and Finance Ministry announced Rs.62,376 crore fund allocation for the sector in 2017-18. The government's aim is to increase the productivity and ensure farmers can get the remunerative price of their produce. The Government is also ensuring that along with special focus on dairy/animal husbandry/fishery, the agriculture education, research, and expansion system is further extended. Shri Radha Mohan Singh said that it is our responsibility to make special efforts to improve the agricultural sector so that it provides strong trade opportunities. Shri Singh said this on 19th September, 2017

at the Two-Day Rabi Conference – 2017-18 organized at Vigyan Bhawan, New Delhi.

Shri Radha Mohan Singh said at the Rabi Conference, that crop wise target is fixed and arrangement of supplies to different states is decided in consultation with the officials of various state governments. The use of recent technologies and new practices in the agriculture sector is also reviewed. At the conference, strategy for the upcoming Rabi season is discussed, ideas and experiences are exchanged and a roadmap is prepared.

Shri Singh further said that the Prime Minister, Shri Narendra Modi has a dream of doubling farmers' income by 2022 and to make his dream come true, we have launched several schemes. Pradhan Mantri Gram Sadak Yojana, Pradhan Mantri Krishi Sinchai Yojana, Pradhan Mantri Fasal Bima Yojana, Paramparagat Krishi Vikas Yojana, Soil Health Card scheme, Neem Coated Urea and e-NAM are some of the major schemes which have been launched to increase production and farmers' income.

On the occasion, the Union Agriculture Minister said that he has written to the State Governments to devise a strategy and focus on production to post-production activities while strategizing. Shri Singh said that to improve crop production, the Ministry has started the National Food Security Mission (NSFM), National Horticulture Mission (NHM), Rashtriya Krishi Vikas Yojana (RKVY), National Mission on Agricultural Extension and Technology and Direct Benefit Transfer (DBT).

Shri Radha Mohan Singh added that there is a special emphasis to increase the production and productivity of oilseed crops. For this, the National Mission on Oilseeds and Oil Palm (NMOOP) has been started in 2014-15, which has three Mini Missions (MM) namely – MM on Oilseeds, MM on Oil Palm and MM on tree-borne oilseeds.

Expressing his happiness, Shri Singh informed that various schemes of the Ministry have been converted into special missions, schemes, and programs to achieve of 4% targeted annual development in agriculture and allied sectors. The joint efforts of stakeholders resulted in a record food grain production in the country estimated to be 275.68 million tonnes in 2016-17. The production of the current year is 18.67 million tonnes, which is more than the average production of food grains in the last five years (2011-12 to 2015-16). The production is 24.11 million tonnes more than the production of food grains in 2015-16.

The total production of rice in the country is estimated at 110.15 million tonnes in 2016-17. This is 4.73 million tonnes more than the average rice output of 105.42 million tonnes in the last five years. During the year 2016-17, the production of rice had increased substantially to 5.74 million tonnes compared to 104.41 million tonnes in the year 2015-16.

Production of wheat is also estimated at 98.38 million tonnes, a record. Wheat production in 2016-17 is 6.09 million tonnes more than 92.29 million tonnes during 2016. Union Agriculture Minister said that the government is also protecting the interests of farmers by announcing the minimum support price for major agricultural commodities.

Hon'ble Agriculture and Farmers Welfare Minister Shri Radha Mohan Singh addressed Representatives at e-NAM Review Meeting at Krishi Bhawan, New Delhi.

Significant progress has been made by most of the states with regards to implementation of e-NAM. Uttar Pradesh and Madhya Pradesh deserve appreciation for their work in this regard. Chhattisgarh and Telangana are already making headway.

The officials should run awareness campaign among farmers and sensitize both farmers and traders about the benefits of online bidding. Hon'ble Agriculture and Farmers Welfare Minister Shri Radha Mohan Singh appreciated the progress made by the states in implementation of e-NAM. He said that Uttar Pradesh and Madhya Pradesh deserve appreciation for their work. Chhattisgarh and Telangana are already making headway. Several other states are also making progress in this regard. He said it on 20th September, 2017 during the e-NAM review meeting held at Krishi Bhawan, New Delhi.

The Minister said that the officials should run awareness campaign among farmers and sensitize both farmers and traders about the benefits of online bidding. The Government is also doing this through the strategic partner. He said that the laboratories need basic facilities to boost inter-mandi trading and interstate trading. A workshop was organized on 13th Sept 2017 at Krishi Bhawan and all the states who have implemented e-NAM participated along with those who will implement e-NAM. Equipment manufacturers exhibited their products and spoke about the technologies available in the market for quick and reliable testing of agricultural produce.

To incentivize online trading and participation in e-NAM, some States like Himachal Pradesh and Uttarakhand have reduced user/market fee for online traders. Rajasthan has instituted Upahar award to encourage for the same. Talking about model APLM Act, 2017, the Minister said that the states should adopt unified single market to boost inter-state trading. Under the act, a cap is levied on market fees to reduce the burden on the consumers. Apart from this, there is a provision for an alternative market so that farmers can access liberal agricultural market and get better value for their produce.

Production of Foodgrains Increased from 265 Million Tonnes to 273.38 Million Tonnes in 2016-17: Agriculture Minister

The Union Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh said that the various development and welfare schemes launched by the Ministry of Agriculture and Farmers Welfare in the last three years helped farmers to reap a record production of food grains during 2016-17. The production of pulses increased to 22.40 million tonnes in 2016-17 from 16.35 million tonnes in the previous years. Similarly, the production of food grains increased from 265 million tonnes to 273.38 million tonnes in 2016-17; and horticulture production increased from 244 million tonnes to 295 million tonnes. Shri Singh said it on 22nd September, 2017 at the inaugural function of four-day Pandit Deen Dayal Upadhyay Centenary Krishi Unnati Mela organized by National Horticulture Board of Ministry of Agriculture and Farmers Welfare Ministry in Mathura.

Shri Radha Mohan Singh further said that the government is committed to the development and welfare of the farmers and is rubbing shoulders with them under the guidance of the Prime Minister, Shri Narendra Modi. The government is trying to make farmers economically stable and increase their income by 2022 through various schemes like Pradhan Mantri Fasal Bima Yojana, Soil Health Card Scheme, Pradhan Mantri Krishi Sinchai Yojana, National Agriculture Development Programme, Pradhan Mantri Kisan Sampada Yojana launched in the last three years.

Shri Singh said farmers from 18 states and the entrepreneurs from various fields like horticulture, agriculture, livestock, dairy, fisheries etc. would be demonstrating and selling their products at the fair. What makes the fair more significant is the fact that it was organized to mark the Birth Centenary Celebrations of Pandit Deendayal Upadhyay ji who desired for farmers' prosperity and welfare. Keeping his ideology under consideration, the Ministry is striving for the welfare and growth of the farmers.

Agriculture Minister said the Government is making constant efforts for development and welfare of horticulture, agriculture, and farmers. That is why the Central and the Uttar Pradesh Governments are organizing various programmes for the farmers. The farmers and the entrepreneurs demonstrated and sold their best horticultural and agricultural products at the 70 stalls at the fair. And farmers were also learning about recent technologies used in the fields of horticulture and agriculture etc and getting expert advice from scholars from different agricultural fields.

Shri Singh further said that horticulture helps farmers in earning a profit and creating self-employment opportunities. The country has witnessed higher horticultural production than food grains which is contributing to nutrition security of the country. Apart from this, horticultural plays a significant role in the changing climate scenario.

Shri Singh suggested that the horticulture sector should adopt improved techniques used by developed nations. The farmers should use sophisticated techniques and machinery used by the developed nations to grow horticultural crops of international standards. The Government organizes demonstrations of sophisticated machines and technologies to encourage farmers to use the equipment and giving subsidy for the same.

On the occasion, the Union Agriculture Minister inaugurated an eco-friendly sewerage treatment plant of 75,000 liters capacity, developed by the Indian Agricultural Research Institute using indigenous technology. Wastewater (sewage water) will be recycled at the plant and will be reused for irrigation. This treatment would reduce 75 to 85 percent heavy metal pollution from the wastewater and such treated water is used for irrigation. The use of treated water for wheat and paddy cultivation helps in reducing the health risks by 44 to 58 percent.

Total Production of kharif Foodgrains during 2017-18 is Estimated at 134.67 Million Tonnes

The 1st Advance Estimates of production of major Kharif crops for 2017-18 had been released on 25th September, 2017 by the Department of Agriculture, Cooperation and Farmers Welfare. The assessment of production of different crops is based on the feedback received from States and validated with information available from other sources. The estimated production of various crops as per the 1st Advance Estimates for 2017-18 vis-à-vis the comparative estimates for the years 2003-04 onwards is enclosed.

As per 1st Advance Estimates, the estimated production of major crops during Kharif 2017-18 is as under:

Foodgrains – 134.67 million tonnes.

- Rice – 94.48 million tonnes.
- Coarse Cereals – 31.49 million tonnes.
- Maize – 18.73 million tonnes.
- Pulses – 8.71 million tonnes.
- Tur – 3.99 million tonnes.
- Urad – 2.53 million tonnes (record).

Oilseeds – 20.68 million tonnes.

- Soyabean – 12.22 million tonnes
- Groundnut – 6.21 million tonnes
- Castorseed – 1.40 million tonnes

Cotton – 32.27 million bales (of 170 kg each)

Jute & Mesta -10.33 million bales (of 180 kg each)

Sugarcane – 337.69 million tonnes

The cumulative rainfall in the country during the monsoon season i.e., 01st June to 06th September, 2017 had been 05% lower than Long Period Average (LPA). Thus, monsoon rainfall conditions have been normal in the country. The estimated production of most of the crops during current Kharif season is estimated to be higher as compared to their normal production of the last five years. However, these are preliminary estimates and would undergo revision based on further feedback from the States.

As per the First Advance Estimates, total production of Kharif foodgrains during 2017-18 is estimated at 134.67 million tonnes. This is lower by 3.86 million tonnes as compared to last year's Kharif foodgrains record production of 138.52 million tonnes (4th Advance Estimates). However, kharif foodgrain production is 6.43 million tonnes more than the average production of five years (2011-12 to 2015-16) of 128.24 million tonnes.

Total production of Kharif rice is estimated at 94.48 million tonnes. This is lower by 1.91 million tonnes than the last year's record production of 96.39 million tonnes. However, it is higher by 2.59 million tonnes over the average production of Kharif rice during the last five years.

The total production of coarse cereals in the country has decreased to 31.49 million tonnes as compared to 32.71 million tonnes during 2016-17 (4th Advance Estimates). Production of Maize is expected to be 18.73 million tonnes which is marginally lower by 0.52 million tonnes than that of last year's record production. Further, this is higher by 2.15 million tonnes than the average production of maize during the last five years.

The total production of Kharif pulses is estimated at 8.71 million tonnes which is lower by 0.72 million tonnes than the last year's record production of 9.42 million tonnes. However, kharif pulses estimated production is 2.86 million tonnes more than the last five years average production.

The total production of kharif oilseeds in the country is estimated at 20.68 million tonnes as compared to 22.40 million tonnes during 2016-17, i.e., a decrease of 1.72 million tonnes. However, it is higher by 0.69 million tonnes than the average production of last five years.

Production of Sugarcane is estimated at 337.69 million tonnes which is higher by 30.97 million tonnes than the last year's production of 306.72 million tonnes. Despite higher area coverage, lower productivity of Cotton has resulted in reduced estimated production of 32.27 million bales (of 170 kg each) as compared to 33.09 million bales during 2016-17. Production of Jute & Mesta estimated at 10.33 million bales (of 180 kg each) is marginally lower than its production of 10.60 million bales during the last year.

The Country is the World's Largest Milk Producer for the Past Two Decades and its Credit goes to the Farmers of the Country: Shri Radha Mohan Singh

Union Minister for Agriculture and Farmers' Welfare, Shri Radha Mohan Singh said that the National Dairy Project (NDP) aims to increase the productivity of milch animals which would lead to increase in milk production for meeting growing demand for milk. Shri Singh said this on 26th September, 2017 in the TK Patel Auditorium, NDDB Anand, Gujarat. In this program, Chief Minister of Gujarat Shri Vijaybhai Rupani and Union Minister for State, Agriculture and Farmers Welfare, Shri Purushottam Rupala were also present.

Shri Radha Mohan Singh said that the productivity of milch animals is increasing through artificial insemination using high-quality semen taken from high genetic bulls and by proving balanced food to the animals of the farmers. To promote balanced diet for the effective use of input, NDP initiatives are helping farmers to increase production by lowering dietary (Ration) costs.

Shri Singh further said that the country has been the world's largest producer of milk for the last two decades and its credit goes to the farmers of the country. Since more than two-thirds of our nation's citizens live in rural areas, therefore, there is a need to make the farmers more prosperous, for which dairy sector is important.

The Union Agriculture Minister informed that NDDB has implemented several major dairy development programs including 'Operation Flood' from its inception in the country. India is at number one in milk production and contributes 19 percent of the world's total milk production. Dairy farmers' income has increased by 13.79 percent in the year 2014-17 compared to the year-ago period. Milk production, which was 155.49 million tonnes during 2015-16, is planned to increase it to 200 million tonnes in 2019-20. Presently, NDDB is in the leading role for the implementation of the National Dairy Plan (NDP) and the recently announced Dairy Infrastructure Development Fund (DIDF). The Central Government has established dairy infrastructure development fund (DIDF) at the cost of Rs.10,881 crore for the period from 2017-18 to 2028-29.

The purpose of the DIDF is to establish an effective mechanism for creating a basic structure for milk cooling at village level and installing electronic equipment for milk adulteration, manufacturing/modernization/processing facilities and for procuring milk. Educational institutes would set up for value-added products for milk unions/ milk producers companies.

The purpose of NDP-1 is to help in increasing the productivity of milch animals and thereby increase the milk production to meet the growing demand of milk and to provide more assistance to rural milk producers for more market access, including organized milk processing sector. During the year 2015-16, NDP-1 has been expanded into four states (Chhattisgarh, Jharkhand, Telangana, and Uttarakhand) and its implementation period has been extended to 2018-19.

Shri Radha Mohan Singh added that under the able leadership of the Prime Minister, on the 75th anniversary of the Quit India Movement, under the 'Sankalp se Siddhi Mission', the Central Government has set a target to double the income of farmers by 2022. For this, recently, a seven-point strategy has been unveiled. Ministry of Agriculture is working in this direction through various schemes in the dairy sector.

Shri Singh said that his experience indicates that producer-centric institutions are very important for dairy development. Union Agriculture Minister said that the selection of Dairy Excellence Awards has been done fairly and the producer-centric institution which has achieved excellence in operation, administration, and inclusion have been honoured with Dairy Excellence Award where the winners will be encouraged to maintain their performance, it is expected that by learning from these role models, others will be motivated to achieve excellence. Shri Radha Mohan Singh gave his best wishes to the award winners.

The Government has taken Initiatives to Spread Information related to Modern Technology among the Farmers in the shortest Possible Time: Shri Singh

Indian Council of Agricultural Research (ICAR) for the first time organised, a national level workshop organized to prepare a roadmap for agricultural knowledge management on September 27-28, 2017. The Union Agriculture and Farmers Welfare Minister, Shri Radha Mohan Singh addressed the workshop. More than 300 eminent agricultural scientists and information technology experts from all over the country participated in the workshop.

Shri Singh said that 58 percent population of the country still relies on agriculture for livelihood. Irrespective of industrial and services sectors progress, the agriculture sector is still the top employer. He said there is a steady increase in the number of small and marginal farmers in the agrarian sector. Due to traditional farming and low productivity, they are unable to achieve higher yield despite hard work. In the absence of information related to modern and scientific agricultural systems, this situation persists throughout the country.

Union Minister informed that a vast network of agricultural research and education thrives in the country under the leadership of ICAR. More than 102 Agricultural Research Institute, 73 Central and State Agricultural Universities and more than 690 Krishi Vigyan Kendras are working under it and researching for the development of agricultural techniques, high-yielding crops and development of livestock and other activities. The network is constantly generating useful information. However, due to ineffective mechanisms to spread information most of the benefits of farmer-oriented research take a long time to reach the agrarian community.

Shri Singh further said that the government has taken several initiatives in recent times to bring such useful information through the help of modern information technology to the farming community in the shortest possible time. It includes Farmers Portal, Kisan Call Center, Fasal Bima Portal, Rice Export App, Pusa Krishi App, Agro Collect- Krishi Gyan App, e-NAM Portal, etc.

The two-day workshop organised by the Directorate of Knowledge Management in Agriculture, ICAR, at Pusa, New Delhi, had been divided into four sessions where Scientists and IT experts exchanged views on topics like current Status of Agricultural Knowledge Management, Data Management and Information Storage for Higher Agricultural Profits, and the Role of Media in Knowledge Management.

General Survey of Agriculture

Trends in Foodgrain Prices

During the month of August, 2017 the All India Index Number of Wholesale Price (2011-12=100) of foodgrains decreased by 0.21 percent from 142.8 in July, 2017 to 142.5 in August, 2017.

The Wholesale Price Index (WPI) Number of Cereals decreased by 0.14 percent from 142.7 to 142.5 while WPI of pulses decreased by 0.49 percent from 143.1 to 142.4 during the same period.

The Wholesale Price Index Number of wheat increased by 0.59 percent from 136.3 to 137.1 while WPI of paddy decreased by 0.47 percent from 149.2 to 148.5 during the same period.

Weather, Rainfall and Reservoir situation during September, 2017

Rainfall Situation

Cumulative Monsoon Season rainfall for the country as a whole during the period 1st June to 27th September, 2017 has been 5% lower than the Long Period Average (LPA). Rainfall in the four broad geographical divisions of the country during the above period has been lower than LPA by 9% in North-West India, 6% in Central India, 4% in East & North East India and by 1% in South Peninsula.

Out of total 36 meteorological Sub-divisions, 05 subdivisions received excess rainfall, 25 subdivisions received normal rainfall and 06 Sub-divisions received deficient rainfall.

Out of 630 districts for which rainfall data is available, 25(4%) districts received large excess rainfall, 76(12%) received excess rainfall, 313(50%) received normal rainfall, 209(33%) districts received deficient rainfall and 7(1%) received large deficient rainfall.

Water Storage in Major Reservoirs

Central Water Commission monitors 91 major reservoirs in the country which have total live capacity of 157.80 Billion Cubic Metre (BCM) at Full Reservoir Level (FRL). Current live storage in these reservoirs (as on 28th September, 2017) was 103.43 BCM as against 116.59 BCM on 28.09.2016 (last year) and 119.02 BCM of normal storage (average storage of last 10 years). Current year's storage is 89% of last year's storage and 87% of the normal storage.

Sowing Position during Kharif 2017

1. As per 1st Advance Estimates for 2017-18, area coverage under all Kharif crops taken together has been 1054.16 lakh hectares at All India level as compared to 1072.71 lakh hectares during 2016-17.
2. Area coverage under Rice has been 387.16 lakh ha. which is lower by 2.3 lakh ha. than its area coverage of 389.49 lakh ha. during the year 2016-17.
3. Area coverage under Pulses 132.8 lakh ha. which is lower by 10.6 lakh ha. than the last year's area of 2016-17 of 143.44 lakh ha.
4. Area coverage under Kharif Coarse Cereals has been 183.52 lakh ha. which is lower by 7.7 lakh ha. as compared to their area coverage of 191.26 lakh ha. during 2016-17.
5. Area coverage under Kharif Oilseeds has been 174.24 lakh ha. which is lower by 14.3 lakh ha. than the last year's area 2016-17 of 188.52 lakh ha.
6. In case of Sugarcane and Cotton, area coverage during the current year has been higher by 2.8 lakh ha. and 13.9 lakh ha. respectively as compared to their corresponding area coverage of 43.89 lakh ha. and 108.45 lakh ha. during 2016-17.

Economic Growth

- The growth rate of Gross Domestic Product (GDP) at constant market prices in first quarter (April- June) (Q1) of 2017-18 was 5.7 per cent as compared to 7.9 per cent in the corresponding period of previous year.
- The growth of Gross Value Added (GVA) at constant basic prices for Q1 of 2017-18 was 5.6 per cent as compared to 7.6 per cent in the corresponding period of previous year. At the sectoral level, GVA of agriculture, industry and services sectors grew at 2.3 per cent, 1.6 per cent and 8.7 per cent respectively in Q1 of 2017-18.
- As per the provisional estimates of national income for the year 2016-17, the growth of GDP at constant (2011-12) prices was 7.1 per cent in 2016-17 and the growth rate of GVA at constant basic prices for 2016-17 was 6.6 per cent (Table 1).
- The share of total final consumption in GDP at current prices in Q1 of 2017-18 is estimated at 70.7 per cent,

as compared to 69.6 per cent in Q1 of 2016-17. The fixed investment rate (ratio of gross fixed capital formation to GDP) declined from 29.2 per cent in Q1 of 2016-17 to 27.5 per cent in 2017-18.

- The saving rate (ratio of gross saving to GDP) for the year 2015-16 was 32.3 per cent, as compared to 33.1 per cent in 2014-15. The investment rate (rate of gross capital formation to GDP) in 2015- 16 was 33.3 per cent, as compared to 34.4 per cent in 2014-15.

Agriculture and Food Management

- **Rainfall:** The cumulative South West Monsoon rainfall received for the country as a whole, during the period 1" June - 20th September 2017, has been 5 per cent below normal. The actual rainfall received during this period has been 794.8 mm as against the normal at 839.0 mm. Out of the total 36 meteorological subdivisions, 6 subdivisions received excess rainfall, 24 subdivisions received normal rainfall and 6 subdivisions received deficient rainfall.
- **All India Production of Foodgrains:** As per the 1st Advance Estimates released by Ministry of Agriculture, Cooperation & Farmers Welfare on 22nd September 2017, production of kharif foodgrains during 2017-18 is estimated at 134.7 million tonnes, as compared to 138.5 million tonnes (4111 advance estimates) in 2016-17 (Table 3).
- **Procurement:** Procurement of rice as on 1st September 2017 was 38.7 million tonnes during kharif marketing season 2016-17, whereas procurement of wheat as on 31st August 2017 was 30.8 million tonnes during Rabi Marketing Season 2017-18 (Table 4).
- **Off-take:** Offtake of rice during the month of July 2017 was 29.4 lakh tonnes. This comprises 26.5 lakh tonnes under TPDS/NFSA and 2.8 lakh tonnes under other schemes. In respect of wheat, the total offtake was 21.8 lakh tonnes comprising 19.8 lakh tonnes under TPDS/NFSA and 2.1 lakh tonnes under other schemes.The cumulative offtake of foodgrains during 2017-18 is 24.2 million tonnes (Table 5).
- **Stocks:** Stocks of foodgrains (rice and wheat) held by FC1 as on 1st September, 2017 was 48.2 million tonnes, compared to 42.8 million tonnes as on 1st September, 2016 (Table 6).

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

Sectors	Growth Rate (%)			Share in GVA or GDP (%)		
	2014-15	2015-16	2016-17 PE	2014-15	2015-16	2016-17 PE
Agriculture, forestry & fishing	-0.2	0.7	4.9	16.5	15.4	15.2
Industry	7.5	8.8	5.6	31.2	31.5	31.2
Mining & quarrying	11.7	10.5	1.8	3.0	3.1	3.0
Manufacturing	8.3	10.8	7.9	17.4	17.8	18.1
Electricity, gas, water supply & other utility services Construction Services	7.1	5.0	7.2	2.2	2.1	2.2
Construction	4.7	5.0	1.7	8.6	8.4	8.0
Services	9.7	9.7	7.7	52.2	53.1	53.7
Trade, Hotel, Transport Storage	9.0	10.5	7.8	18.5	19.0	19.2
Financial, real estate & prof services	11.1	10.8	5.7	21.4	21.9	21.7
Public Administration, defence and other services	8.1	6.9	11.3	12.4	12.2	12.8
GVA at basic prices	7.2	7.9	6.6	100.0	100.0	100.0
GDP at market prices	7.5	8.0	7.1	—	—-	—-

Source: Central Statistics Office (CSO). PE: as per Provisional estimates of GDP released on 31st May 2017.

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

Sectors	2015-16				2016-17				2017-18
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q 1
Agriculture, forestry & fishing	2.4	2.3	-2.1	1.5	2.5	4.1	6.9	5.2	2.3
Industry	7.3	7.1	10.3	10.3	7.4	5.9	6.2	3.1	1.6
Mining & quarrying	8.3	12.2	11.7	10.5	-0.9	-1.3	1.9	6.4	-0.7
Manufacturing	8.2	9.3	13.2	12.7	10.7	7.7	8.2	5.3	1.2
Electricity, gas, water supply & other utility services	2.8	5.7	4.0	7.6	10.3	5.1	7.4	6.1	7.0
Construction	6.2	1.6	6.0	6.0	3.1	4.3	3.4	-3.7	2.0

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

Sectors	2015-16			2016-17				2017-18
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q 1
Services	9.3	10.1	9.6	10.0	9.0	7.8	6.9	7.2	8.7
Trade, hotels, transport, communication services and related to broadcasting	10.3	8.3	10.1	12.8	8.9	7.7	8.3	6.5	11.1
Financial, real estate & professional services	10.1	13.0	10.5	9.0	9.4	7.0	3.3	2.2	6.4
Public administration, defence and Other Services	6.2	7.2	7.5	6.7	8.6	9.5	10.3	17.0	9.5
GVA at Basic Price	7.6	8.2	7.3	8.7	7.6	6.8	6.7	5.6	5.6
GDP at market prices	7.6	8.0	7.2	9.1	7.9	7.5	7.0	6.1	5.7

Source: Central Statistics Office (CS0).

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

Crops	Production (in Million Tonnes)					
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Total Foudgrains	257.1	265.0	252.0	251.6	275.7	134.7
Rice	105.2	106.7	105.5	104.4	110.2	94.5
Wheat	93.5	95.9	86.5	92.3	98.4	...
Total Coarse Cereals	40.0	43.3	42.9	38.5	44.2	31.5
Toral Pulses	18.3	19.3	17.2	16.4	23.0	8.7
Total Oilseeds	30.9	32.8	27.5	25.3	32.1	20.7
Sugarcane	341.2	352.1	362.3	348.4	306.0	337.7
Cottor#	34.2	35.9	34.8	30.0	33.1	32.3

Source: DES, DAC&FW, M/o Agriculture & Farmers Welfare, 3rd 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	2017-18
Rice#	35.0	34.0	31.8	32.0	34.2	38.7*	0.0
Wheat@	28.3	38.2	25.1	28.0	28.1	23.0	30.8$
Total	**63.3**	**72.2**	**56.9**	**60.2**	**62.3**	**61.7**	**30.8**

Kharif Marketing Season (October-September), @ Rabi Marketing Season (April-March,), $ Position as on 20.06.2017
Source: FCI and 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	2017-18*
Rice	32.6	29.2	30.7	31.8	32.8	14.4
Wheat	33.2	30.6	25.2	31.8	29.1	9.8
Total (Rice & Wheat)	**65.8**	**59.8**	**55.9**	**63.6**	**61.9**	**24.2**

Source: DFPD, M/o Consumer Affairs and Public Distribution. P: Provisional, *up to July 2017

TABLE 6: STOCKS OF FOODGRAINS (MILLION TONNES)

Crops	September 1, 2016	September 1, 2017
1. Rice	16.5	18.2
2. Unmilled Paddy #	3.2	3.3
3. Converted Unmilled Paddy in terms of Rice	2.1	2.2
4. Wheat	24.2	27.8
Total (Rice & Wheat) (1+3+4)	**42.8**	**48.2**

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

Articles

Minimising Post-harvest Loss is Catalyst to Agricultural Development in Andhra Pradesh

DR. SURJYANARAYAN TRIPATHY*

Abstract

In the state of Andhra Pradesh, a sizable population (62%) for their livelihood depend on agriculture related activities, which contributes only 27.84 percent to the state Gross Domestic Product (GSDP) and exhibits a growth rate of 5.9 percent (2014-15). The state has tremendous scope for the expansion of agricultural sector through elimination of intermediaries in trade, ensuring remunerative prices to farmers, ensuring availability of crops, fruits & vegetables at location convenient for both farmers & consumers at reasonable prices. Market innovations and market reforms are essential strategy for minimising the food waste, post-harvest losses, along with adequate facilities of warehouses, cold storages and post-harvest effective management.

Key words: Food security, Post -harvest loss, Marketing, Storage and Transportation.

Backdrop:

The State of Andhra Pradesh, known as the ''rice bowl of India" bestowed with a total geographical area of 1, 60,200 sq km spread over in 13 districts, six agro-climatic zones and broadly five different soil types to cultivate a wide range of crops. In the state of Andhra Pradesh, while majority of the population (62percent) depends, on agriculture related activities for their livelihood, it contributes only 27.84 percent to the state Gross Domestic Product (GSDP) and is growing at 5.9 percent (2014-15). The state has a total population of 49.83 million (Census 2011), with density of 308 per sq km and literacy level of 67.41 per cent.

The state is endowed with a long coastal line (974 km) and high percentage of talented entrepreneurial people in both rural and urban areas, which has resulted in large number of innovative activities in agricultural sector. With this confirmation, the state has gained first rank in terms of fish production, fish exports, and egg production.

Objective of the Study:

In the light of the above, the objectives of this paper are:

1. To examine with the help of secondary sources of data/ materials accumulated; the factors responsible for post-harvest losses in India in general and Andhra Pradesh in particular.
2. Secondly, to provide policy paradigms/ measures need to be initiated to tackle the grim situation of post-harvest losses so as to make agriculture profitable.

The contribution of agriculture and allied activities as a primary sector to the Andhra Pradesh economy can be enumerated from the following facts:

i) Primary sector in Andhra Pradesh accounts for 27 percent of the State GSDP.

ii) Contribution from primary sector was expected to increase to Rs. 1.69 lakh crore in 2015-16 compared to Rs. 1.43 lakh crore in 2014-15 (a growth of 18.2 percent).

iii) Agriculture is the largest contributor to the primary sector accounting for over 30 percent of the primary sector followed by livestock at 26 percent, horticulture at 25 percent and fisheries at 15 percent. The sector had witnessed a compounded annual growth rate of 13 percent during 2005-06 to 2014-15.

iv) Horticulture sector is identified as one of the growth engines which contributes approximately 5.16 percent to the State GSDP; is the fastest growing component of the primary sector growing at a CAGR of over 19.3 percent between 2005-06 and 2014-15 followed by livestock at 14.7 percent.

v) Primary sector provides employment to 46 lakh farm families or around 62percent of the state's population.

vi) Andhra Pradesh has a total cultivation area of 63.54 lakh ha covering rice, oilseeds, pulses, cotton, maize, tobacco, vegetables, fruits, oil palm and others.

vii) The Agriculture sector contributed an estimated amount of Rs. 1.43 lakh crore to the State GSDP in 2014-15 registering an annual increase of 11 percent from Rs. 1.29 lakh crore in 2013-14.

Crop productivity in Andhra Pradesh:

Though Andhra Pradesh has a total cultivated area of 6.35 million ha, crop productivity is low (see Table- 1) and stagnant and the cost of cultivation has increased.Annual

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growth rates of agricultural sector in Andhra Pradesh in comparison with other states are shown in Table -2. It is seen from the table that Andhra Pradesh has recorded percentage of negative growth rate in Agriculture and allied sectors at constant price during 2005-06 (-1.54), 2008-09 (-1.78), 2010-11(- 1.14) and there was marginal increase in growth rate during 2006-07 (3.22) & 2011- 12 (1.36).

TABLE- 1 YIELD GAP (KG/HA) IN DIFFERENT CROPS ACROSS DIFFERENT STATES (TE 2011-12)

Crop	Andhra Pradesh	Highest	Second Best	Percentage gap
Rice	3116	3918 (TN)	3741 (PUN)	20.0
Jowar	1887	2011 (MP)	-	6.6
Bajra	1704	2452 (TN)	2040 (HAR)	43.9
Maize	7012	7012 (AP)	6042 (TN)	-
Redgram	402	1693 (KER)	1514 (BIH)	321.0
Bengal gram	1142	1295 (BIH)	-	13.4
Groundnut	640	2751 (TN)	1938 (WB)	329.8
Sunflower	713	1857 (PUN)	1809 (TN)	160.4
Soybean	1615	2000 (KER)	1694 (MEG)	23.8
Castor	381	1988 (GUJ)	1530 (RAJ)	421.7
Sugarcane	82000	102837 (TN)	90251 (KAR)	25.4
Cotton	386	703 (HAR)	698 (PUN)	82.1
Tobacco	1805	3069 (UP)	1899 (GUJ)	70.0

Source: DES, Government of Andhra Pradesh, 2015

TABLE- 2: ANNUAL GROWTH RATE (%) IN PRIMARY SECTOR IN DIFFERENT STATES

States	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Gujarat	23.10	-0.73	8.73	-7.17	-0.74	21.64	5.02	-6.96
Tamil Nadu	13.26	13.24	-4.41	-0.29	6.35	7.47	9.51	10.22
Karnataka	9.92	-2.84	12.37	2.27	4.07	16.17	-1.95	2.30
Maharashtra	9.20	14.03	13.76	-15.45	1.02	17.75	4.58	-2.14
Andhra Pradesh	-1.54	3.22	17.92	-1.78	6.84	-1.14	1.36	7.69

Source: Department of Agriculture & Cooperation, Government of India

Problems of the Farmers and the Prospects:

The poor farmers of Andhra Pradesh have been in the grip of numerous problems; which are outlined below:

i) The agricultural sector of the state is confronted with serious problems such as the growing number of farmer suicides, rising costs of production, declining farm profits, deteriorating quality of soil and water resources, and growing number of smallholders.

ii) The income of the farmers in Andhra Pradesh is not being commensurated with production cost due to high labour cost, supplemented by a series of factors like fluctuations in market prices and undue dependence on the middle men who exploit them, out-migration to nearby urban areas and inflationary pressures etc. have added to the plight of farmers' livelihoods.

iii) Further, distress sale of commodities, absence of adequate storage and processing facilities and non-remunerative prices have also added to distress of farmers over the years.

To tackle the above-stated problems, Gout of Andhra Pradesh has designed a strategy to transform the agriculture and allied sectors in collaboration with International Crops Research Institute (ICRISAT). As part of this strategy, the emphasis is on: (a) growing productivity of the primary sector; (b) mitigating the impact of droughts through water conservation and micro- irrigation; (c) postharvest management to reduce the wastage; and (d) creation of processing, value addition capacity and supply chain of the identified crops.

Post-harvest Losses:

Post-harvest losses dangerously affect farmers and consumers in the lowest income groups with the tragic loss of farmer income, and detrimental to economic growth. Because 'food loss and waste reduction is one of the most effective ways of improving food supply, thus contributing to enhanced food and nutrition security', without further specification of the relationship itself (FAO 2013).

TABLE -3 POST-HARVEST LOSSES (%) OF SELECTED FRUIT AND VEGETABLE CROPS AT THE ALL-INDIA LEVEL AND AT VARIOUS STAGES IN ANDHRA PRADESH

Name of major Fruits	Extent of Post-harvest losses at all-India level	Extent of Post-harvest losses at diffrerent stages in Andhra Pradesh	Name of majot Food gains	Average loss as reported in Millennium study 2004* (%) at all-India level	Average losses as reported in ICAR study, 2010** (%) at all-India level
Banana	20-80	Field level= 10	Wheat	8.00	6.0
Mango	17-36	Transport= 5	Rice	11.00	5.2
Citrus	20-95	Packing= 2	Maize	7.50	4.10
Guava	10-15	Storage =9	Jowar	10.00	3.90
Papaya	40-100	Processing= 4	Bajra	6.00	4.80
Apple	14	Total = 30	Gram	9.00	4.30
Grape	20-25		Other Pulses	9.50	5.67
Tomato	5-50				

Source: National Horticultural Board, 2004

*State of Indian Farmer-Post Harvest Management-A Millennium Study, 2004 **Estimation of Quantitative Harvest and Post-Harvest Losses of Major Agricultural Produce in India All India Coordinated Research Project on Post-Harvest Technology, CIPHET (ICAR), Ludhiana, 2010

India's post-harvest fruit and vegetable losses are over Rs. 2 lakh crore annually, owing to inadequate cold storage facilities and lack of proper food processing units. Among the states which witness maximum of post-harvest losses, West Bengal ranks at first position with losses worth Rs.13600 crores each year, followed by Gujarat with losses to the tune of about Rs. 11400 crores, Bihar at more than Rs.10700 crores, Uttar Pradesh at Rs. 10300 crore and Maharashtra at Rs. 10100 crores (Business-standard 2013, The Economic Times 2013). Therefore, reducing the scale of losses and waste throughout the whole food system is an essential step towards improving country's food security.

The numerous factors responsible for post- harvest losses are enlisted below:

i) Agricultural commodities produced on the farmers' field have to undergo a series of operations such as harvesting, threshing, winnowing, bagging, transportation, storage, processing and exchange before they reach the consumer and there are appreciable losses in crop output at all these stages. Due to the glaring gaps in marketing infrastructure, existing markets operate very inefficiently and the transaction costs are high. Multiple handling by various players in the fragmented supply chain and the lack of warehouse and cold storage facilities also result in high post-harvest losses. It has been found that about 75 percent of the total post-harvest losses occur at the farm level and about 25 percent at the market level (GoI, 2013, P.18)

ii) Factors that contribute to food loss range from mechanization of practices such as harvesting to handling, processing and others, to climate change, unfavourable production environments, production practices, management decisions, transportation facilities, grading issues, infrastructure, consumer preferences/attitudes, poor institutional support and poor access to post harvest technology and resources as consequence of poor governance systems and availability of functional markets (Sharma et al. 2013).

iii) Significant losses also occur during processing, where the number of mills is insufficient to meet demand, and most processing units are small and use outdated technologies. Moreover, adequate attention has not been paid to quality, hygiene and packaging huge. Post-harvest losses of fruits and vegetables are a matter of grave concern for India's agriculture sector. Fruits and vegetables are highly perishable commodities and about 30% of them produced in the country are rendered unfit for consumption due to spoilage after harvesting such as lack of proper storage facilities, absence of proper handling, transportation, pre- and post-harvest treatment and processing.

iv) The quality of high value crops (HVC) is adversely affected when transported over long distances in the absence of appropriate transportation. The post-

harvest losses of fruits and vegetables are high (Tables-3). Moreover, driven by supply and demand factors, HVC prices fluctuate considerably across seasons and also within a given season. Secondly, cold storages are essential to preserve product quality over a longer period. Proper curing, sorting and grading, transportation and storage are essential to minimize these loses. Cold storages provide an opportunity for producers to store their products and sell them when the market conditions are more favorable. Dry and cold storage facilities provide farmers and growers with more market flexibility (e.g. not having to sell grain as soon as it is harvested) and economic benefit (e.g. decreasing losses and refining overall produce quality). The processing sector in the agricultural field in India is at the backward stage because only 2% of the total agricultural productions are being processed (Corporate Catalyst 2015). But the processing in India is mainly taking place through unorganized sector using the traditional methods and primitive equipment leading to substantial quantitative and qualitative losses.

A High Level Expert Committee on Cold Storage constituted by Department of Agriculture and Co-operation has estimated that 25 to 30 % of fruit and vegetables and 8 to 10 % of food grains are wasted annually due to lack of post-harvest technology and non-existence of integrated transport, storage and marketing facilities, etc. (NABARD, 2003). The Ministry of Agriculture conducted a Millennium Study, State of the Indian farmers in the year 2004. It was estimated that about 7 % of food grains and 30 % of fruit and vegetables are lost due to inadequate handling facilities (GoI, 2004). Approximately, 10 % of valuable spices are also lost due to lack of proper post-harvest infrastructural facilities (GoI, 2013, P.18).

v) Because of inadequate cold storage facilities and lack of proper food processing units, India's post-harvest fruit and vegetable losses are over Rs 2 lakh crore annually. Fruits and vegetables are highly perishable commodities and about 30 per cent of them produced in the country are rendered unfit for consumption due to spoilage after harvesting (ASSOCHAM, 2013).

vi) A study titled 'Horticulture Sector in India: State Level Experience,' conducted by ASSOCHAM reveals that with about 9.6 percent share, Andhra Pradesh is India's second major horticulture producing state with over 24,700 tonne of fruits and vegetables produced across the state annually, and the same study pointed out that Andhra Pradesh incurs post-harvest fruit & veggie losses worth over Rs 5,600 crore annually owing to significant dearth of on-farm processing facilities. As per the said study by ASSOCHAM, 2013, there is a need for an additional cold storage of about 370 lakh tonnes for fruits and vegetables. At present, the country's total storage capacity is over 300 lakh tonnes.

Suggestions:

Minimizing post-harvest losses of agricultural produces is an imperative strategy needed to be adopted in the present scenario to meet the requirement of increasing demand for food and nutritional security in a sustainable way.

i) To avoid these losses and add benefits to the small and marginal farmers, a massive improvement in the existing marketing system and structure has been suggested. Since public investment in Agriculture as a share of GDP has been declining/ stagnating over the years, and is, therefore, unlikely to solve the problem effectively, enhanced role of private sector is identified as the need of the hour.Reducing post-harvest losses in India requires both public- and private-sector investment in agricultural research, development, and extension, including appropriate storage technologies and improved infrastructure to better connect small-holder farmers to local, regional, and international markets. Also, a cost-benefit analysis to determine the return on investment in the recommended post-harvest technologies is essential because it is important to select the technologies that are appropriate for the size of each post-harvest enterprise by different farmers.

ii) The removal of the inter-state barriers would facilitate the internal trade on one hand, while indirectly facilitating the foreign trade on the other. This would lead to welfare gains to all parties concerned including the farmers, processing and exporting firms as well as the final consumers (Government of India, 2005).

iii) Infrastructure services such as roads, electricity supply and telecommunication and others are limited in rural areas. Apart from strengthening the road network, attention should be paid to the mode of transportation of agricultural produce. Railways are an efficient means of transport of goods over long distances, but most railway wagons in India are not designed to carry agricultural and food products in bulk. Products have to be generally transported in gunny bags in either open or closed wagons which do not have any facility for mechanical loading or unloading.

iv) With regard to minimizing post-harvest losses, it has been aptly remarked, "Market-driven solutions can

transform post-harvest loss from an enormous problem for farmers, suppliers and consumers to a multi-beneficiary opportunity that would significantly increase the quantity and quality of food supplies at a time of growing demand and need, grow local economies and create new family and national wealth, and provide new and expanding sources of supply for buyers and end-users (Daniel Runde et al, 2013)".

v) "While improved regulatory systems that support markets, facilitate trade, and ensure stable land ownership for smallholders can mitigate some of the risks often associated with lending to and investing in small-scale agricultural businesses, but without a comprehensive, multi-stakeholder approach, market-expanding opportunities will be wasted and losses - in produce, in food and income, and in nutrition and economic stability - will certainly not diminish (ibid)"

vi) Market innovations and market reforms are essential for the food waste reduction campaign. Direct selling markets would create more loyalty among consumers toward the producers and it would create a situation in which producers are having more shares on consumer's price. Some of these models are Rythu Bazaar (AP), State Horticulture Corporation Ltd (GOA), VFPCK-Vegetable and Fruits Promotion Council Keralam (KL) and Vegetable Growers Association of India-VGAI (MH). In each of these models, the implementing agency of the respective state government ensures the collection of produce from primary producers along with their post-harvest management, distribution logistics to various points of sales, management of facilities and retail selling prices for consumers. Extension personnel have the responsibility of effective documentation of successful marketing models and disseminate it into different regions with suitable upgradations. Marketing companies are crucial for handling produce and reducing post-harvest losses by providing facilities for accumulating, preparing and transporting produce to markets; by coordinating marketing activities; and by distributing profits equitably to members in regions where less empowered producers and consumers are existent. Agricultural Production, Processing and Marketing- are three pillars of the agricultural economy. Agricultural marketing infrastructure plays a pivotal role in fostering and sustaining the tempo of rural economic development. Marketing is critical for better performance of the agriculture sector as a whole. Effective marketing infrastructure is indispensable for cost effective marketing and to minimize post-harvest losses. Successful marketing requires learning new skills, new techniques and new ways of obtaining market price information.

vii) The common features manifested with regard to agricultural markets in India comprise of poor competitiveness, fragmentation, inefficiency, presence of excessive middlemen, and frequent price manipulations. Secondly, the electronic trading portal for national agricultural market can provide an alternative to use modern technology for transforming the system of agricultural marketing. Finally, the optimum benefit from linking agricultural markets in the country and putting them on electronic platform can be ensured only when a single trading licence is allowed as legal/ lawful/ valid across the country and when a farmer gets the liberty to sell his produce throughout the country in any market.

viii) In order to provide dynamism and efficiency into the marketing system, large investments are required for the development of post-harvest and cold chain infrastructure nearer to the farmers' field. A major portion of these investments is expected from private sectors, for which Model Act of the Govt. of India was adopted in Andhra Pradesh which provides scope for establishment of private markets.

ix) In view of the above consideration, it is suggested for investment in market infrastructure development for perishables fruit and vegetables. It is also recommended to promote contract farming and direct marketing expeditiously while suggesting setting up independent market regulatory authority to attract private investment in the sector. Integrated markets for staple foods provide a mechanism for reducing the adverse impacts of imbalance and shocks in demand and supply by allowing food to move quickly from surplus to deficit areas. Wholesale markets play a crucial role in vertical co-ordination of markets, equilibrating supply with demand and facilitate price formation. Besides, their role reduces per unit marketing costs, promote stable markets for local produce and encourage increased output and productivity.

x) The magnitude of post-harvest loss in fruits and vegetables can be minimized by proper cultural operations, harvesting, transportation, storage, pre and post-harvest treatments and other such significant measures. There is an urgent need to create more cold storage facilities to different regions and for different commodities. Governments in differentially affected states need to put more emphasis on FDI and capital investment in this regard. There should be an effort to make awareness about all the possible facilities available in the country to reduce post- harvest loss.

xi) Reducing both post-harvest losses and food waste requires multiple strategies, including increasing consumer awareness, changing consumption behaviour, and refining incentives among supply chain participants in the private sector. The strategies for reducing wastage and loss will necessarily be different in developed and developing countries because the underlying causes are different, but curbing wastage and loss in both developed and developing countries will yet be critical to reducing hunger and nutritional security in developing countries and meeting future food demand.

Conclusion:

A perusal of the above discussion made it clear that Andhra Pradesh is one of the leading foodgrain producing states in India, as well as one of the top three rice producing states, besides Uttar Pradesh & West Bengal. Availability of trained manpower, suitable climate, and affordable land prices are some of the major factors that make Andhra Pradesh a favourable place for large scale agriculture. But reducing post-harvest losses by adopting various modern techniques and effective post -harvest management including pre-and post-harvest operations, assembling, grading, storage, transportation and distribution can minimise the losses and thereby to emerge as enabling the state an energetic state with enhanced agricultural productivity and marketable surplus; - which are a pre-requisite for capital formation and industrialization.

In brief, to attain the goals of food security, food availability also needs to be increased through reductions in the post-harvest losses at farm, retail and consumer levels through maintaining proper infrastructure, cold storage and proper dissemination of technologies and market information.

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Input-Output Prices, their Parity and Income from Major Cash Crops in Maharashtra

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Abstract

This study analyses changes in input and output prices and incomes for major cash crops (sugarcane and cotton) in Maharashtra using time series data for the period 1996-97 to 2013-14 and evaluates the parity in costs, prices and incomes. The study reveals that the indices at current and constant prices of major inputs for cash crop had shown tremendous increase during the period under consideration. The current price indices of Minimum Support Price (MSP) of sugarcane and cotton had shown an increasing trend and it increased by 357.52 and 189.86 percent. The parity indices between Farm Harvest Price (FHP) and input prices were not favourable to the cotton growers. This indicated relatively lower increase in farm harvest prices of cotton as compared to rise in the prices of inputs used by the farmers in its production. It implies that level of harvest prices of cotton crop were not sufficient to cover the increased prices of inputs during most of the study year. Compound growth rates (CGR) of input prices were more than the prices of output at MSP and FHP, except for sugarcane. However, the rate of growth in FHP is higher than MSP. The study has suggested that the increase of 189.86 percent in MSP of cotton during 1996-97 to 2013-14 was not enough to cover 476.87 percent increase in the inputs prices. Therefore, it is recommended that there is a need to maintain the parity between Minimum Support Prices and input prices or there is a need to give adequate compensation through incentives to the producers, so as to safeguard the interest of cotton growers in Maharashtra.

Key words: Cash crops, input-output prices, parity, minimum support price, farm harvest price.

Introduction

The relative levels of costs, prices and income of agricultural commodities influence the allocation of production resources and ultimately the level and pattern of agricultural production. The cost-price relationship of different commodities affects the relative profitability and economic incentives to produce. In planned development, when certain objectives and targets of production of different commodities is to be achieved, one of the function of the price policy is to maintain the parity in costs, prices and income of different commodities so that the producers of various crops are not at undue advantage or at a disadvantageous position.

The Minimum Support Price (MSP) is an important policy instument of the Union Government to determine floor price of major agricultural produces every year for protecting the farmers from the middlemen and fluctuating market conditions as it provides them an assured market in addition to a minimum assured return. This makes it possible for the farmer to have an idea about the extent of price insurance cover provided by the Government for the crop (Anonymous, 2016).

There has been a lot of controversy about the costs and prices of agricultural commodities. Doubts have been expressed that the prices of agricultural commodities fixed by the Government are not in harmony with increase in the cost of production, which has been rising at a very high rate due to increase in the inputs prices. Among the different crops, the major producing states have often accused the price policy to be in favour of their major produced crops. The producers have always been alleging that the increase in the prices of their produce were not in proportion to increase in the input prices. A sound price policy is one that ensures remunerative prices to the producers and also reasonable prices to the consumers and which reduces the regional imbalances in agricultural income by maintaining parity between costs, prices and income of different agricultural commodities. Maharashtra is a state where no adequate marketable surpluses of foodgrains exist. But, the state has large number of cash or commercial crops which enter into marketing system. Hence, their costs and prices are of vital importance to all the concerned stakeholders. It was, therefore, felt necessary to conduct a study on trends in input-output prices of and income from major cash crops in the state

In view of the above, it was decided to take up parity studies on input-output prices and income from major cash crops in Maharashtra. Thus, the focused objectives of this study are:

1. To study the changes in input-output prices and income from major cash crops.
2. To evaluate the parity in the costs, prices and income from major cash crops.

Methodology

The study is based on the time series data on cost of production and input output prices of major cash crops

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viz., sugarcane and cotton the data was collected under the Comprehensive Scheme in Maharashtra (CACP Reports and Directorate of Economics and Statistics website) for the period of 18 years i.e., from 1996-97 to 2013-14. The Simple Index Numbers (SIN) of input-output prices and income were computed by considering 1996-97 as a base year. The parity between input costs, output prices and income of major cash crops were judged by using the computed indices.

I) The parity indices between output prices of major cash crops and inputs as a whole were obtained for each crop separately by using the following formulae (Patel et.al, 1997).

$$RPIjt = \frac{FHPIjt}{AIPjt} \times 100$$

Where,

RPIjt = Parity index between prices of inputs and output of j^{th} crop in t^{th} year

FHPIjt = Index of farm harvest prices for j^{th} crop in t^{th} year and

AIPjt = Index of average inputs prices of j^{th} crop in t^{th} year

II) The parity indices between output prices and per quintal cost of production of cash crops were worked out as under,

$$RCIjt = \frac{FHPIjt}{CPIjt} \times 100$$

Where,

RCIjt = Parity index between output prices and per quintal cost of production of j^{th} crop in t^{th} year

FHPIjt = Index of farm harvest prices for j^{th} crop in t^{th} year and

CPIjt = Index of per quintal cost of production for j^{th} crop in t^{th} year.

III) Parity indices of gross income from cash crops (RGII) and per quintal cost of production (CP) were worked out by dividing the gross income index (GII) for the particular crop by per quintal cost of production.

$$RCIjt = \frac{GIIjt}{CPIjt} \times 100$$

Where,

RGIIjt = Parity index between gross income and per quintal cost of j^{th} crop in t^{th} year

GIIjt = Gross income index of j^{th} crop in t^{th} year and

CPIjt = Index of per quintal cost of production for j^{th} crop in t^{th} year

In addition, usual statistical formulae such as compound growth rates, coefficient of variation and price-cost ratios were also employed for judging the parity.

Results and Discussion

Prices of Agricultural Inputs

The decision of farmers about allocation of resources are guided more by the prices of variable inputs, particularly for the inputs like human, bullock and machine labour, seeds, manures, fertilizers, irrigation and plant protection, etc. and it would be important to examine the changes in the prices of these inputs used in the production of sugarcane and cotton and these changes are judged by working out the price indices for each input and average of all inputs for the period from 1996-97 to 2013-14 at current as well as constant prices. Thus, the price indices have been worked out to know the fluctuations, if any during the period of 18 years. The prices of all the inputs used for sugarcane and cotton are given in Table 1 and 2, respectively.

In case of sugarcane, the prices have sharply increased by 237.09 percent during the period 1996-97 to 2013-14 at current prices. The maximum increase was noticed for bullock labour use and it was about seven times higher at current prices, followed by manure, machine labour, human labour and seed showing an increase of 774.03, 716.34, 508.77, 449.49 and 289.20 percent, respectively, during the entire period. However, irrigation prices have increased only by 232.59 percent. The input prices of all the resources used in sugarcane production showed a upward rising trend with few exceptions. Though, the indices of input prices inceased more than double at current prices, in the real sense, it increased by 38.23 percent only at constant prices. The maximum increase was noticed for bullock labour use and it has shown an increase of 258.40 percent at constant prices. The comparison of average input indices at current and constant prices of sugarcane revealed that the input indices experienced almost six times sharp rise at current prices.

Table 2 presents the prices of major inputs of cotton crop, it increased by 476.87 percent during the period from 1996-97 to 2013-14 at current prices. The maximum increase in index number was noticed for irrigation. This may be attributed due to increase in irrigated area under cotton. The maximum increase was noticed in seed, showing more than seven times rise at current prices, followed by bullock labour, manure and machine labour showing an increase of 629.03, 526.20 and 508.77 percent, respectively during the period. The input prices of all the resources used in cotton production showed an upward trend (Kumbhar and Deshmukh, 2013) and Hina Ali et.al, 2014)

TABLE 1: INDICES OF INPUT PRICES USED IN THE PRODUCTION OF SUGARCANE IN MAHARASHTRA

Item Year	Human Labour	Animal Labour	Machine Labour	Seed	Manure	Fertilizer	Plant Protection	Irrigation charges	Average
	₹. /Man hrs.	₹. /Pair rs.	₹. / hrs.	₹./q.	₹./q.	₹./kg.	₹./lit./kg.	₹./hrs.	
					At Current prices				
1996-97	100	100	100	100	100	100	100	100	100
1997-98	108.01	113.14	113.77	125.69	100.6	98.29	101.35	118.24	117.02
1998-99	111.7	117.27	117.49	115.84	132.04	101.17	101.95	113.75	113.23
1999-2000	141.68	142.7	144.94	126.36	176.73	109.61	102.54	116.99	117.48
2000-01	151.75	169.44	175.28	139.3	235.43	110.68	104.15	134.22	134.22
2001-02	162.22	255.00	158.53	143.46	176.53	120.2	110.58	176.3	171.14
2002-03	163.45	212.68	197.7	139.33	237.97	118.22	110.83	212.77	204.33
2003-04	150.1	209.4	186.79	140.04	256.2	111.58	109.98	218.99	209.48
2004-05	174.33	230.86	219.48	145.29	230.14	107	111.25	216.21	208.11
2005-06	167.97	281.67	286.68	159.17	294.12	120.11	113.28	309.03	292.33
2006-07	195.28	365.55	269.55	171.68	299.25	121.27	114.55	267.16	255.82
2007-08	204.11	358.44	358.32	177.69	324.41	120.29	118.75	228.4	224.86
2008-09	241.89	328.72	294.69	204.75	335.03	147.85	131.18	291.33	279.61
2009-10	291.79	384.72	288.88	194.19	438.27	125.22	148.23	345.22	328.28
2010-11	354.83	452.25	418.87	292.13	656.3	128.28	158.63	334.3	326.44
2011-12	486.45	644.84	523.85	327.5	542.35	153.86	164.74	379.25	370.21
2012-13	513.55	800.61	567.08	314.52	553.86	228.64	173.48	286.44	291.23
2013-14	549.49	874.03	608.77	389.2	816.34	281.06	188.42	332.59	337.09
					At Constant prices				
1996-97	100	100	100	100	100	100	100	100	100
1997-98	101.25	106.07	106.66	117.83	94.31	92.15	95.02	110.85	109.71
1998-99	95.97	100.75	100.94	99.53	113.44	86.92	87.59	97.73	97.28
1999-2000	116.06	116.89	118.73	103.51	144.77	89.78	83.99	95.83	96.23
2000-01	112.84	126	130.34	103.58	175.06	82.3	77.44	99.81	99.81
2001-02	114.92	180.65	112.3	101.63	125.06	85.15	78.33	124.89	121.24
2002-03	110.65	143.98	133.83	94.32	161.09	80.03	75.03	144.04	138.32
2003-04	94.66	132.05	117.8	88.32	161.57	70.37	69.36	138.1	132.11
2004-05	101.26	134.1	127.48	84.39	133.68	62.15	64.62	125.58	120.88
2005-06	92.33	154.82	157.58	87.49	161.67	66.02	62.27	169.86	160.68
2006-07	100.36	187.87	138.53	88.23	153.8	62.33	58.87	137.31	131.48
2007-08	99.19	174.19	174.13	86.35	157.65	58.45	57.71	110.99	109.27
2008-09	116.2	157.91	141.56	98.35	160.94	71.02	63.02	139.95	134.32
2009-10	137.65	181.5	136.28	91.61	206.76	59.08	69.93	162.86	154.87
2010-11	160.14	204.11	189.05	131.85	296.21	57.89	71.59	150.88	147.33
2011-12	211.07	279.79	227.29	142.1	235.32	66.76	71.48	164.56	160.63
2012-13	215.9	336.58	238.4	132.22	232.84	96.12	72.93	120.42	122.43
2013-14	225.32	358.4	249.63	159.59	334.75	115.25	77.26	136.38	138.23

TABLE 2: INDICES OF INPUT PRICES USED IN THE PRODUCTION OF COTTON IN MAHARASHTRA

Item Year	Human Labour	Animal Labour	Machine Labour	Seed	Manure	Fertilizer	Plant Protection	Irrigation charges	Average
	₹. /Man hrs.	₹. /Pair rs.	₹. / hrs.	₹./q.	₹./q.	₹./kg.	₹./lit./kg.	₹./hrs.	
					At Current prices				
1996-97	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1997-98	112.76	128.30	113.77	113.24	86.82	92.06	101.35	132.95	107.81
1998-99	116.17	136.94	117.49	117.05	103.39	93.92	101.95	193.35	111.13
1999-2000	120.05	158.78	144.94	147.67	139.19	108.11	102.54	273.37	130.03
2000-01	121.18	153.59	175.28	94.86	166.50	111.40	104.15	532.34	118.37
2001-02	120.73	274.52	158.53	100.03	175.65	115.12	110.58	698.25	122.40
2002-03	122.10	338.94	197.70	116.00	193.45	114.19	110.83	1154.27	138.10
2003-04	128.47	317.65	186.79	176.03	221.63	114.27	109.99	1018.96	158.47
2004-05	127.33	385.71	219.48	259.11	182.60	119.43	111.25	1232.50	195.31
2005-06	133.26	414.01	286.68	179.67	265.82	122.64	113.28	513.20	182.91
2006-07	145.33	395.81	269.55	296.78	280.19	121.45	116.07	260.05	223.65
2007-08	172.21	394.36	358.32	351.47	250.75	119.93	140.40	1674.78	269.27
2008-09	202.96	514.47	294.69	711.36	245.78	126.60	150.12	1971.13	395.38
2009-10	270.16	517.38	288.88	676.25	324.03	131.76	181.47	1716.10	396.44
2010-11	400.00	526.57	418.87	693.53	305.25	137.42	194.42	1436.01	431.64
2011-12	478.13	557.78	523.85	1010.39	365.39	169.26	241.09	1939.91	588.75
2012-13	521.87	686.90	567.08	962.22	515.15	245.69	246.59	2399.41	592.51
2013-14	551.03	729.03	608.77	877.38	626.20	258.70	250.11	2648.03	576.87
					At Constant prices				
1996-97	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.53	100.00
1997-98	105.71	120.28	106.66	106.16	81.39	86.30	83.15	125.30	101.07
1998-99	99.81	117.66	100.94	100.57	88.83	80.69	76.65	167.01	95.48
1999-2k	98.33	130.06	118.73	120.97	114.01	88.56	73.50	225.12	106.51
2000-01	90.11	114.21	130.34	70.54	123.81	82.84	67.77	397.96	88.02
2001-02	85.53	194.48	112.30	70.86	124.43	81.55	68.55	497.29	86.71
2002-03	82.65	229.45	133.83	78.53	130.96	77.30	65.66	785.56	93.49
2003-04	81.02	200.32	117.80	111.01	139.77	72.07	60.70	646.02	99.94
2004-05	73.96	224.04	127.48	150.51	106.06	69.37	56.55	719.72	113.45
2005-06	73.25	227.57	157.58	98.76	146.11	67.41	54.49	283.59	100.54
2006-07	74.69	203.43	138.53	152.53	144.00	62.42	52.20	134.37	114.94
2007-08	83.69	191.64	174.13	170.80	121.85	58.28	59.71	818.21	130.85
2008-09	97.50	247.14	141.56	341.72	118.07	60.82	63.11	951.93	189.93
2009-10	127.45	244.08	136.28	319.03	152.87	62.16	74.92	813.91	187.02
2010-11	180.53	237.65	189.05	313.01	137.77	62.02	76.79	651.56	194.81
2011-12	207.46	242.02	227.29	438.40	158.54	73.44	91.54	846.21	255.45
2012-13	219.39	288.77	238.40	404.52	216.57	103.29	90.72	1014.09	249.08
2013-14	225.95	298.94	249.63	359.77	256.78	106.08	89.75	1091.63	236.54

Though, the indices of input prices increased more than four times at current prices, in the real sense, it increased by 136.54 percent at constant prices (Table 2).

Cost of Production

The per quintal cost of production of cash crops viz., sugarcane and cotton during the period of 18 years i.e., from 1996-97 to 2013-14 along with their indices at current and constant prices revealed that the indices of per quintal cost of production at current prices for sugarcane and cotton had considerably increased during the period of 18 years.

TABLE 3: COST OF PRODUCTION AND INDICES OF MAJOR CASH CROPS

Year	Cost of production (₹./q.)		Indices Cost of production at Current prices		Indices Cost of production at Constant prices	
	Sugarcane	Cotton	Sugarcane	Cotton	Sugarcane	Cotton
1996-97	42.14	1703.69	100.00	100.00	100.00	100.00
1997-98	48.95	1852.00	116.16	108.71	108.90	101.91
1998-99	52.75	1765.00	125.18	103.60	107.55	89.01
1999-2k	56.36	2093.82	133.74	122.90	109.55	100.67
2000-01	63.49	2495.71	150.66	146.49	112.03	108.93
2001-02	70.88	2425.07	168.20	142.34	119.16	100.84
2002-03	77.68	2630.96	184.34	154.43	124.79	104.54
2003-04	86.14	2367.70	204.41	138.97	128.91	87.64
2004-05	83.03	2360.24	197.03	138.54	114.45	80.47
2005-06	105.39	2365.13	250.09	138.82	137.47	76.31
2006-07	90.04	2257.13	213.67	132.48	109.82	68.09
2007-08	84.76	2211.55	201.14	129.81	97.74	63.08
2008-09	118.56	2793.42	281.35	163.96	135.15	78.76
2009-10	134.28	2938.83	318.65	172.50	150.33	81.38
2010-11	137.30	3975.88	325.82	233.37	147.05	105.33
2011-12	153.69	4383.56	364.71	257.30	158.25	111.64
2012-13	167.85	4532.30	398.32	266.03	167.45	111.84
2013-14	167.78	4440.13	398.15	260.62	163.26	106.87

Source: Directorate of Economics and Statistics

The maximum increase in indices of cost of production was noticed in case of sugarcane (Table 3). The indices of cost of production of sugarcane increased by 298.15 percent. The indices of per quintal cost of production of cotton had shown an increase of 160.62 percent during the period under study.

In real sense, i.e., at constant prices, increase in indices of per quintal cost of production were noticed in sugarcane and cotton except the years 2004-05,2006 to 2008, 1998-99 and 2007-08. It may be largely due to decline in productivity of this crop. The highest increase in the indices of per quintal cost of production of sugarcane and cotton were noticed during the year 2012-13. The decline in the cost of production indices of cotton is due to introduction of Bt cotton cultivation in the recent years. However, no specific trend was observed in the cost of production indices.

Growth in Prices of Cash Props

The Minimum Support Prices are announced by the Government of India at the beginning of the sowing season for certain crops on the basis of the recommendations of the Commission for Agricultural Costs and Prices (CACP). MSP is price fixed by Government of India to protect the producer - farmers - against excessive fall in price during bumper production years. The minimum support prices are a guarantee price for their produce from the Government. The major objectives are to support the farmers from distress sales and to procure foodgrains for public distribution. The current price indices of Minimum Support Prices of major cash crops announced by the Government of India had shown an increasing trend and it increased by 357.52 percent in case of sugarcane during the period 1996-97 to 2013-14. On the contrary, the procurement prices of cotton had shown an increase of 189.86 percent only during the above mentioned period (Table 4).

TABLE 4: MINIMUM SUPPORT PRICES AND INDICES OF MSPS OF MAJOR CASH CROPS

Year	Minimum Support Price (₹./q.)		Indices at			
			Current prices		Constant prices	
	Sugarcane	Cotton	Sugarcane	Cotton	Sugarcane	Cotton
1996-97	45.9	1380.00	100.00	100.00	100.00	100.00
1997-98	48.45	1530.00	105.56	110.87	98.96	103.94
1998-99	52.70	1650.00	114.81	119.57	98.65	102.73
1999-2k	56.10	1775.00	122.22	128.62	100.12	105.36
2000-01	59.50	1825.00	129.63	132.25	96.39	98.34
2001-02	62.50	1875.00	136.17	135.87	96.46	96.25
2002-03	69.50	1875.00	151.42	135.87	102.50	91.98
2003-04	73.00	1925.00	159.04	139.49	100.30	87.97
2004-05	74.50	1960.00	162.31	142.03	94.28	82.50
2005-06	79.50	1980.00	173.20	143.48	95.20	78.86
2006-07	80.25	1990.00	174.84	144.20	89.86	74.11
2007-08	81.18	2030.00	176.86	147.10	85.95	71.48
2008-09	81.18	3000.00	176.86	217.39	84.96	104.43
2009-10	129.84 *	3000.00	282.88	217.39	133.45	102.56
2010-11	139.12*	3000.00	303.09	217.39	136.79	98.11
2011-12	145.00*	3300.00	315.90	239.13	137.07	103.76
2012-13	170.00*	3900.00	370.37	282.61	155.70	118.81
2013-14	210.00*	4000.00	457.52	289.86	187.61	118.86

Note:*Fair and remunerative price.

Source: Directorate of Economics and Statistics.

Even though, the Minimum Support Prices (MSP) had shown an increase of nearby or more than 2-3 times at current prices, the real increase (Constant prices) in prices was 87.61 percent in case of sugarcane and 18.86 percent in case of cotton during 1996-97 to 2013-14(Table 4). Since the year 2009-10 sugar seasons, the concept of Statutory Minimum Price (SMP) was replaced by Fair and Remunerative Price (FRP), and there has been a gradual effort to align FRP more closely to the value of sugar and it's by products from one quintal of cane. But due to different costs of production in different states, the Maharashtra state continues to advice Sugar Mills to pay higher prices than FRPs to farmers (CACP Report 2014).

Parity in Prices and Income

The results presented in earlier part revealed the changes in prices of inputs and also in prices and gross income from cash crops over a period of time. These changes do not give true picture of the level of relative profitability. Thus, in order to examine the impact of changes in input prices on profitability, parity indices between farm harvest prices to average input prices, farm harvest prices to cost of production and income to cost of production of major cash crops were worked out and are presented in Table 5.

The parity indices between FHP of sugarcane and average input prices of cash crops were more than 100 except for years 2000-01 to 2003-04, 2005-06 to 2008-09 out of 18 years of study period. This indicated relatively higher increase in farm harvest prices of sugarcane as compared to rise in the prices of inputs used by the farmers in its production. The parity indices between FHP's and average input prices of cotton were less than 100 in cotton during 18 years of study period. This indicated relatively lower increase in farm harvest prices of cotton as compared to rise in the prices of inputs used by the farmers in its production. It implies that level of harvest prices of cotton crop was not sufficient to cover the increased prices of inputs during most of study year (Deshpande 2003 and Murthy etal.2015).

It is also observed that parity indices of farm harvest prices and per quintal cost of production of sugarcane was less than 100 for 9 years out of 18 years of study. The parity ratio of FHP to cost of production of cotton crop was favorable during 2009-10 and 2010-11. In the remaining years, ratio was not favorable i.e. it was less than 100. It is inferred from the parity ratio that increase in farm harvest price is less than its cost of production.

TABLE: 5 Parity Indices Between Farm Harvest Prices to Input Prices, Farm Harvest Price To Cost Of Production and Income to Cost of Production of Major Cash Crops in Maharashtra.

Year	Parity Index between					
	FHP and Input price		FHP and Cost		Gross income and Cost	
	Sugarcane	Cotton	Sugarcane	Cotton	Sugarcane	Cotton
1996-97	100.00	100.00	100.00	100.00	100.00	100.00
1997-98	109.71	57.53	110.52	57.05	115.54	32.79
1998-99	122.41	78.04	110.73	83.72	124.18	68.24
1999-2000	111.09	89.09	97.58	94.26	119.41	97.00
2000-01	89.12	96.89	79.39	78.29	89.26	63.14
2001-02	82.62	84.77	84.06	72.90	92.52	73.17
2002-03	69.79	84.49	77.36	75.56	103.48	85.53
2003-04	70.95	87.65	72.71	99.95	74.45	125.20
2004-05	113.85	56.40	120.25	79.52	151.99	102.31
2005-06	73.58	59.64	86.01	78.58	102.05	98.17
2006-07	76.69	49.80	91.82	84.07	114.19	114.15
2007-08	72.23	46.44	80.75	96.33	102.38	150.22
2008-09	94.21	39.64	93.63	95.58	98.95	160.06
2009-10	138.52	43.64	142.71	100.29	198.74	172.69
2010-11	119.87	57.89	120.10	107.07	165.07	200.66
2011-12	111.42	38.93	113.09	89.08	158.64	177.64
2012-13	177.77	39.30	129.98	87.52	188.48	193.88
2013-14	142.46	45.57	120.61	100.86	179.16	234.94

It is further revealed from the above table that, the parity indices of gross income at MSP to per quintal cost of production for sugarcane (13 years) and cotton (10 years) were greater than 100 for most of the years under study. This indicates, over the period of time, the gross income of sugarcane increased at a higher rate as compared to per quintal cost of production. In the remaining years, ratio was not favorable i.e., it was less than 100, this indicates that over the period of time, the per quintal cost of production increased at a higher rate as compared to the gross returns of cash crops and thereby adversely affecting the level of profitability(Shayequa et.al,2012).

The Growth Rates of Input and Output Prices

The rates of compound growth along with its coefficient of variation in average input prices, cost of production, output prices and income (both at MSP and FHP) for major cash crops are presented in Table 6. Table 6 shows that, for the entire period (1996-97 to 2013-14), the average input costs of sugarcane and cotton, had significantly increased at the rate of 7.92 and 12.79 percent per annum, respectively and thereby the costs of production of these crops significantly increased at the rate of 8.25 and 5.30 percent per annum, respectively (Thakare and Shende, 2017).

TABLE 6: Compound Growth Rates And Coefficient Of Variation In Input And Output Prices

(1996-97 to 2013-14)

Particulars	Sugarcane		Cotton	
	CV %	CGR%	CV %	CGR%
Average input cost	57.04	7.92***	67.45	12.79***
Cost of production	54.53	8.25***	55.74	5.30***
Minimum Support Prices MSP)	57.70	8.36***	56.00	5.86***
Farm Harvest Prices (FHP)	61.65	9.92***	58.24	6.79***
Gross income at MSP	67.31	10.44***	70.95	13.25***
Gross income at FHP	70.16	11.94***	73.48	14.20***

***indicates significance at 1 percent level.

The rate of increase in cost of production of sugarcane is much higher than the cotton due to decline in productivity of sugarcane as compared to cotton over a period of time. The output prices of sugarcane and cotton at MSP were also increased significantly at the rate of 8.36 and 5.86 percent per annum, respectively (Murthy et.al, 2015 and Shing et.al, 2002) and at FHP also, it increased by 9.92 percent and 6.79 percent per annum, respectively. The rate of increase in MSP and FHP of

sugarcane is higher than the cotton .This has reflected in gross income at MSP and FHP of sugarcane and cotton. The gross income at MSP of sugarcane and cotton have increased at the rate 10.44 and 13.25 percent per annum significantly, while at FHP it increased significantly by 11.94 and 14.20 percent per annum, respectively (Singh et.al, 2002).The rates of compound growth of prices of output at MSP and FHP were higher than input prices.

The coefficients of variation in average input prices of cash crop were 57.04 to 67.45 percent. However, the coefficients of variations of income at farm harvest prices and minimum support prices of sugarcane and cotton were relatively more than the average input cost.

Above results have clearly indicated that, compound growth rates of average input cost, minimum support prices, farm harvest prices, cost of production, gross income at MSP and gross income at FHP of all crops were positive and highly significant. The similar findings were noticed by Patel (1994).

Price-cost Ratios

The price-cost ratio of sugarcane and cotton at MSP and FHP are computed and presented in Table 7.The price-cost ratio of sugarcane and cotton during period under study at MSP was less than unity except for the year 1996-97,1998-99 to 1999-2000 ,2010-11 , 2012-13 to 2013-14 and 2008-09 to 2009-10, respectively indicated thereby increase in MSP should not cover the increase in cost of production. The price-cost ratio of sugarcane during 1996-97 to 1999-2000,2004-05 and 2008-09 to 2013-14 at FHP was greater than unity, expect for the year 2000-01 to 2003-04 and 2007-08 indicating thereby increase in output prices is more than the increase in cost of production. The price-cost ratio of cotton during 1996-97, 2003-04 , 2008-09 to 2009-10 and 2013-14 at FHP was greater than unity, expect for the year 1997-98 to 2002-03 and 2004-05 to 2008-09 indicating thereby increase in output prices is more than the increase in cost of production.

TABLE 7 :Price-cost Ratio of Major Cash Crops in Maharashtra

Year	Price-cost-ratio MSP		Price-cost-ratio FHP	
	Sugarcane	Cotton	Sugarcane	Cotton
1996-97	1.09	0.81	1.09	1.02
1997-98	0.99	0.83	1.21	0.58
1998-99	1.00	0.93	1.21	0.86
1999-2k	1.00	0.85	1.07	0.96
2000-01	0.94	0.73	0.87	0.80
2001-02	0.88	0.77	0.92	0.75
2002-03	0.89	0.71	0.85	0.77
2003-04	0.85	0.81	0.80	1.02
2004-05	0.90	0.83	1.31	0.81
2005-06	0.75	0.84	0.94	0.80
2006-07	0.89	0.88	1.00	0.86
2007-08	0.96	0.92	0.88	0.99
2008-09	0.68	1.07	1.02	0.98
2009-10	0.97	1.02	1.56	1.03
2010-11	1.01	0.75	1.31	1.09
2011-12	0.94	0.75	1.24	0.91
2012-13	1.01	0.86	1.42	0.90
2013-14	1.25	0.90	1.32	1.03

Conclusions

The indices at current and constant prices of major inputs for cash crop had shown tremendous increase during the period under consideration. The current price indices of MSP of sugarcane and cotton had shown an increasing trend and it increased by 357.52 and 189.86 percent. The parity indices between FHP and input prices were not favourable to the cotton growers. This indicated relatively lower increase in farm harvest prices of cotton as compared to rise in the prices of inputs used by the farmers in its production. It implies that level of harvest prices of cotton crop not sufficient to cover the increased prices of inputs during most of the study year.Compound growth rates (CGR) of input prices were more than the prices of output at MSP and FHP, except sugarcane. However, the rate of growth in FHP is higher than MSP.

The price-cost ratio of cash crop were less than unity, indicating that output prices were not covering the costs of production and price-cost ratio of cash crop greater than unity indicating thereby the increase in output prices was more than the increase in cost of production, with few exceptional years in both the cases. The study suggested that, the increase of 189.86 percent in Minimum Support Prices of cotton during 1996-97 to 2013-14 was not enough to cover 476.87 percent increase in the inputs prices. Therefore, it is recommended that there is need to maintain the parity between Minimum Support Prices and input prices or there is need to give adequate compensation through incentives to the producers, so as to safeguard the interest of cotton grower in Maharashtra in future.

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Study of Post Harvest Losses and Marketing Channels of Fresh Mangoes in Uttar Pradesh

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Abstract

In this paper a survey was conducted to assess the post harvest losses during the post harvest operations of mango in two major mango growing districts (Lucknow and Saharanpur) of Uttar Pradesh at farm, wholesale and retail level and Delhi phal mandi during the year 2015. The predominant harvesting practices adopted by the farmers of Uttar Pradesh comprised of i) Shaking the tree and using a notched bamboo stick (laggi); ii) irrigating the orchard before harvesting and shaking the tree as well as harvesting with laggi; and iii) using pouched pole harvesters. The overall loss at farm level was estimated as 6.42 percent, which include 0.78, 4.91 and 0.87 percent due to necrosis, fruit cracking and bruising, respectively. Average loss of 10.02 and 12.62 percent of the fruits was observed during ripening process in Uttar Pradesh and Delhi, respectively. The maximum loss at ripening level was due to physiological loss in weight, which was 9.72 percent in Uttar Pradesh and 10.17 percent in Delhi. The losses at retailer level were estimated at 2.83 and 2.94 percent in Uttar Pradesh and Delhi, respectively. The losses at each level were pooled to arrive at total loss in the entire post harvest system of fruits within Uttar Pradesh and from Uttar Pradesh to Delhi. Pooled post harvest losses within Uttar Pradesh were estimated at 19.27 percent; with an aggregate loss of 18.63 percent and 80.73 percent fruits were in sound marketable condition. The losses in the supply chain from Uttar Pradesh to Delhi were observed to be 20.63 percent, with an aggregate loss of 19.99 percent.

Keywords: Mango, post harvest loss, farm level, retail level, marketing.

Introduction

Fruits are important sources of vitamins and minerals and their role in improving nutritional status needs no emphasis. India is the largest producer of mango in the world accounting for 45.10 percent of total production (National Horticulture Database, 2015). The per capita availability of fruits, even with higher production is lower at 107 g/day than the recommended level of 120 g/day (Murthy et al., 2009). One of the main reasons attributed to lower availability of fruits is the large quantity of post-harvest losses that occurs at various stages of post harvest operations, which ranges from 15 to 50 percent (FAO, 1981; Roy, 1989). It is understood that post-harvest losses are draining away the results of hard work of all stakeholders of fruit industry. The post-harvest losses are not only quantitative, but also qualitative, which affects the marketability of perishable commodities like fruits. Post harvest losses not only reduce the availability of mango but also result in increase in per unit cost of transport and marketing (Subrahmanyam, 1986). This affects both the producers and consumers. There have been very few systematic attempts to estimate the post harvest losses in mango at each stage of handling and study of its causal factors. Although, few studies have been conducted to estimate losses at each stage of marketing in banana (Murthy et al., 2002), grape (Ladaniya et al., 2005), mango cvs. Alphanso and Totapuri (Sreenivas et al., 1997) and Banganpalli (Murthy et al., 2002) but post harvest losses in cv. Dashehari at each stage of handling has not yet been estimated so far.

Uttar Pradesh is the leading producer of mango accounting for 23.3 percent of country's total production. Dashehari is a leading commercial variety of Uttar Pradesh and one of the best varieties of our country. Dashehari is vulnerable to post harvest losses because it is ripened at onset of monsoon and is mainly used for table purpose. Therefore, the assessment of post-harvest losses at various stages of handling would help in identifying the factors responsible for losses. This in turn would help in developing proper measures required at different stages to prevent or reduce such losses and to increase the availability of mango for domestic consumption and for export purposes. Thus, the objectives of this study are; (i) to identify the major channels and practices of harvesting, packing, transport and marketing, (ii) to estimate and quantify the magnitude of post harvest losses at various stages of handling.

Methodology

A survey was conducted to assess the post harvest losses (PHL) during the harvesting, packaging, transportation, ripening and marketing of mangoes at Lucknow, Saharanpur districts and Delhi market during the year 2015 under the sub-project "Assessment of Post Harvest Losses in Mango".

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Stages for Estimation of Post Harvest Losses and Sampling Design

The different stages of post-harvest losses during handling were identified as farm level, wholesale level and retail level. Data from different stakeholders involved in these stages was collected during mango harvesting season in year 2015. The sampling procedure is given below:

Farm level: Multistage purposive and random sampling techniques were used for estimation of PHL at farm level. The details are presented in Table 1. At first stage, two districts, viz. Lucknow and Saharanpur were selected on the basis of area under mango in respective districts. Thereafter, two distantly located blocks were selected in each of the districts to get representative estimates for the districts. Similarly five villages were selected randomly from each of the development blocks. Finally, five final sampling stage units, i.e., mango orchardists, were selected from each of the selected villages. Therefore, 50 orchardists from each of the districts were selected making a total of 100 sampling units at farm level. The farm level observations at Lucknow and Saharanpur districts were recorded from farmers or Pre-Harvest Contractors (PHCs). At farm level, the observations were recorded for diseased (necrosis), cracked and bruised fruits from randomly selected 1000 fruits. For this purpose, all the observations were taken in peak of the season (June-July, 2015).

Market level: For selection of markets, the major assembly markets and wholesale markets in the production and consumption chain were identified. The sampling units at trader/ripening level in Lucknow, Saharanpur and Delhi mandies and the retailer level at each of the location were selected randomly. The post-harvest losses and the practices of marketing were analyzed by using data collected from the wholesalers, commission agents, retailers and other market participants. The details on sampling units for selection of market intermediaries are given in Table 1.

TABLE 1: Sampling Structure for Estimation of Post-harvest Losses during Harvesting, Transport and Marketing of Mango

Level	District	Block	Villages	Sample size
Farm level	Lucknow	Malihabad	Mithey Nagar, Mohamadnagar Talukedari, Guanda Muzzam Nagar, Bhatoiya, Haffis Khera	50 Farmers/PHC
		Kakori	Amethia, Bhalia, Gulabkhera, Sarsanda, Saidpur Mahri	50 Farmers/PHC
	Saharanpur	Rampur	Rampur, Sadheili, Dholagar, Panhasu, Nandpur	50 Farmers/PHC
		Muzaffarabad	Meergar, Babeil Bujurg, Merva, Maathki, Randol	50 Farmers/PHC
Wholesale market	Lucknow	Dubagga Phal Mandi		10 Wholesalers
		Sitapur Road Phal Mandi		10 Wholesalers
	Saharanpur	Saharanpur City Phal Mandi		10 Wholesalers
	Delhi	Azadpur Phal Mandi		10 Wholesalers
Retail market	Lucknow	Budheswar Temple fruit market		15 Retailors
		Munshipulia, Indira Nagar		15 Retailors
		Nishatganj market		15 Retailors
	Saharanpur	Saharanpur city market		25 Retailors
	Delhi	Inderpuri market		15 retailors
		Shankar market, Karol Bagh		10 retailors
		Chandni Chowk		10 retailors
		Sarojani Nagar		10 retailors

Harvesting Practices

Harvesting of fruits is done by pre-harvest contractors (PHCs) or farmers themselves. The harvesting practices in each of the district were found distinctly different from each other. Main harvesting practices which were observed were comprised of i) shaking the tree and using a notched bamboo stick (laggi); ii) irrigating the orchard before harvesting and shaking the tree as well as harvesting with laggi; and iii) using pouched pole harvesters. In Lucknow district, 44 percent of the farmers irrigated the field and harvested fruits by shaking the tree along with laggi, while 50 percent farmers did not irrigate the field and harvested fruits by shaking the tree along with laggi. Only 6 percent orchardists used pouched pole harvester. On the other hand, only 42 percent orchardist in Saharanpur district irrigated the field and harvested fruits by shaking the tree along with laggi, while only 28 percent farmers did not irrigate the field and harvested fruits by shaking the tree along with laggi. An increased proportion of 30 percent orchardists used pouched pole harvester in Saharanpur (*See Appendix Table* A1).

Losses at Farm Level

The harvesting by shaking the tree along with laggi in un-irrigated fields in Lucknow district resulted into cracking of 8.44-9.45 percent of the harvested fruits due to impact sustained during falling of the fruits on branches and dry ground which had to be discarded later (*See Appendix Table* A-1). The situation in irrigated fields was observed somewhat better as cracking was markedly less i.e., 6.35-6.5 % of the harvested fruits. However, only 0.95 to 1.10 percent of the fruits got cracked during harvesting with pouched pole harvester. The average situation in Lucknow district indicated that only 91.83 percent fruits were harvested in sound marketable condition, while 0.72 percent had to be discarded due to disease incidence, mainly necrosis. A total of 6.52 percent of the fruits got cracked and 0.93 percent fruits were bruised during the harvesting operations. Therefore, the total damaged fruits were 8.17 percent during the harvesting operations. Accounting for complete discards and degree of damage, the aggregate loss in Lucknow district was worked out as 7.33 percent. The situation in Saharanpur district was similar, when the orchardists resorted to harvesting of fruits by shaking the trees along with conventional laggi, albeit the proportion was lower. Significantly higher number of farmers used pouched pole harvester, hence the losses in the postharvest system in Saharanpur district was considerably low. Only about 0.84 and 3.30 percent of the fruits had to be discarded due to disease incidence and cracking, while 0.80 percent fruits sustained bruising. Therefore, a total of 4.66 percent of the fruits got damaged. Accounting for intensity of damage, the aggregate loss in Saharanpur district was worked out as 4.22 percent. The average loss scenario over the two representative districts indicated that a total of 93.58 percent fruits were harvested in sound condition, while 0.78 and 4.91 percent fruits had to be discarded because of disease and cracking. Thus a total of 6.42 percent fruits got damaged at farm level. The aggregate loss was worked out as 5.78 percent. The results were indicated that harvesting of fruits with the help of harvester is more efficient but orchardists harvest the fruits by shaking the trees to save time and labour. Nanda et al., (2010) reported the highest loss (10.64%) in farm operations like harvesting (4.11%), sorting & grading (2.80%) and transportation (2.53%) in mango. In Banganpalli mango, Murthy et al., (2002) reported 15.60 percent losses at farm level mostly due to harvesting of immature and small fruits, Srinivas et al., (1997) observed 3.5 percent loss in Banganpalli and 1.9 percent loss in Alphonso mango at farm level.

Transportation and Marketing Channels

The orchardists harvested the fruits in the morning and assembled the fruits on ground under the shade of the tree. They did sorting and/or grading in the orchard itself and either transported it loose or packed in pigeon pea baskets, CFB boxes or plastic crates locally. However, for Delhi market, it was mainly in CFB boxes or plastic crates. The transportation of fruits to local market of Lucknow and Saharanpur was on tractor trolley, tanga or mini trucks, while for the Delhi market, it was on conventional trucks. Pre-harvest contract was observed as the most common marketing practice followed by the farmers. Pre-harvest contractors (PHC)/ farmers transported the mango to assembly market. Auctioning of fruits was occured by open type and the payments to the seller were made immediately. The commission agents provided space for selling fruits and charged 10 percent commission. Four major channels of marketing in both Lucknow and Saharanpur districts, which together accounted for most of trade, are depicted below.

Channel-1 Farmers → PHC → Wholesaler (Local) → Wholesaler (Distant) → Consumer

Channel-2 Farmers → PHC → Wholesaler (Distant) → Retailer → Consumer

Channel-3 Farmers → PHC → Wholesaler (Local) → Retailer → Consumer

Channel-4 Farmers → Wholesaler (Distant) → Retailer → Consumer

Murthy *et. al.*, (2009) also reported these marketing channels for Totapuri, Banganpalli and Swarnrekha varieties in Karnataka.

Ripening of Fruits

The pre-harvest contractors and trader ripened the fruits with the help of calcium carbide away from the market place, which could even be in the orchard itself. Some of

the traders dug the fields and put loose mangoes or crates in the pit along with carbide and covered them with gunny bag/tarpaulin. The fruits were taken out after 3-4 days and sorted. In Delhi mandi, the required number of pouches of calcium carbide were put in the crate/box itself. The ethylene/ethrel ripening chambers were non- existent in all the market place.

Losses at Ripening Level

The ripening losses were estimated in Lucknow, Saharanpur market place and Delhi mandi. A total of 10.85 percent of the fruits were lost including 9.72 percent due to cumulative physiological loss in weight (CPLW) which was observed in Lucknow as against 9.19 percent at Saharanpur (8.01 percent CPLW) (see appendix table A2). The rest got discarded due to rotting, which could have been owing to bruising and latent infections. The overall recovery of sound fruits in both the districts was 89.98 percent, and rest comprised of CPLW of 8.87 percent as well as discard of 1.16 percent. In Delhi, the recovery of sound fruits was 87.38 percent and CPLW and rotting discards of 10.17 and 2.45 percent, respectively. The increased proportion of losses in Delhi market could be because of longer transportation distance and time involved. Murthy et al. (2002) observed 8.8 percent CPLW losses in Banganpalli; Srinivas et al. (1997) reported 9.10 percent and 7.15 percent CPLW losses in Totapuri and Alphonso, respectively.

Losses at Retail Level

The highest proportion of discards due to rotting at retailer level i.e., 3.28 percent was observed in Lucknow followed by Delhi (2.94 percent) and Saharanpur (2.38 percent) (see appendix table A3). It may be mentioned that the retailer received the fruits in the morning and sold it throughout the day. Small quantities were sometimes left for the next day also. The loss in quality was also observed at the retailer level, which was sold at the reduced rate entailing the economic loss and not postharvest loss per se. The sound fruits at retailer level were 96.72, 97.62 and 97.05 percent obtained at Lucknow, Saharanpur and Delhi markets, respectively. The major cause for the loss was pressing injury, which caused about 51 percent of the total fruit damage. Murthy et al. (2002) reported 5.25 percent losses at retail level in Banganpally mango in Andhra Pradesh, Srinivas et al. (1997) reported 5.4 percent losses in Totapuri and 5.3 percent losses in Alphonso at retail level in Karnataka.

Total Pooled Losses

The losses at each level were pooled to arrive at total loss in the entire post harvest system of mango from within Uttar Pradesh and from Uttar Pradesh to Delhi. Pooled post harvest losses within Uttar Pradesh indicated that 19.27 percent fruits lost; with an aggregate loss of 18.63 percent and 80.73 percent fruits were in sound marketable condition (see appendix table A4). On the other hand the losses in the supply chain from Uttar Pradesh to Delhi was 20.63; with an aggregate loss of 19.99 percent. A total post harvest loss of 17.90 percent and 14.40 percent, respectively were observed by Srinivas et al. (1997) in Totapuri and Alphonso mango in Karnataka. A similar survey by IIHR, Bangalore in Tamil Nadu, Andhra Pradesh and Karnataka carried out during the peak harvesting months of May, June and July revealed 20-30 percent fruit loss in Totapuri, Banganpalli and Neelum varieties. Ladaniya et al. (2005) also reported 17.75-24.65 percent total post harvest loss for grapes in Maharashtra.

Conclusion

Estimation of post harvest losses is important as it helps in identifying the factors which influence the PH losses and provides ways and means to reduce the losses. About 33.31 percent losses of total post harvest loss were attributed to cracking and bruising due to faulty harvesting practices of fruits at farm level. Therefore, efforts should be made to educate the farmers regarding the optimum maturity index for harvest. Use of mechanical harvesters should be encouraged instead of present harvesting by shaking the tree along with laggi. Proper packing in CFB boxes or wooden boxes with cushioning material should be used for local as well as long transportation. Specialized transport vehicles meant exclusively for fruit transportation need to be encouraged to reduce the transit loss. Ripening chambers, pack house facility and mango based processing industry should be developed in major mango growing areas This helps in reducing the post harvest losses and an increase in income of farmers.

Summary and Policy Implications

Estimation of post harvest losses is important as it helps in identifying the factors which influence the PH losses and provides ways and means to reduce the losses. In the present study the losses at various stages of handling were estimated for mango in two major mango growing districts (Lucknow and Saharanpur) of Uttar Pradesh. The impact of post harvest losses on availability and its implications on the farmer's income has also been studied. The policy implications emerging from the results are given below-

1. In mango, nearly 33.31 percent losses of total post harvest loss were attributed to cracking and bruising due to faulty harvesting practices of fruits at farm level. Therefore, efforts should be made to educate the farmers regarding the optimum maturity index for harvest. Use of mechanical harvesters should be encouraged instead of present harvesting by shaking the tree along with laggi. Proper placement and packaging of fruits prior to transportation would help to reduce the losses to some extent.
2. For local marketing, no proper sorting and/or grading and packing practices were followed and

fruits were transported loosely on tractor trolley, tanga or mini trucks. Proper packing in CFB boxes or wooden boxes with cushioning material should be used for local as well as long transportation. Specialized transport vehicles meant exclusively for fruit transportation need to be encouraged to reduce the transit loss.

3. Mango fruits are ripened with the help of calcium carbide which is banned by government of India long back. Therefore, ripening chambers and packing house facility should be developed at phal mandi.

4. There is no processing unit established in mango growing area of Uttar Pradesh. Therefore, possibilities of establishing mango processing unit either in production centre or near assembly markets in mango need to be explored. Many processing units are established in states of Maharashtra, Gujarat, Tamil Nadu and Andhra Pradesh, this need to be replicated in Uttar Pradesh. This also helps in reducing the post harvest losses and increase in income of farmers.

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Appendix

TABLE- A1. LOSSES AT FARM LEVEL IN POST HARVEST OPERATIONS OF MANGO IN UTTAR PRADESH

District	Block	Harvesting Practice	Sample size		Sound Fruits		Disease		Cracking		Bruised		Total Damage		Aggre-gate (%)
			Weight (Kg)	No. of Fruits	(%)	Wt. (Kg)	(%)	Wt. (Kg)	(%)	Wt. (Kg)	(%)	Wt. (Kg)	(%)	Wt. (Kg)	
Lucknow	Malihabad	Irrigation + Shaking + laggi (44 %)	194.27	1000	92.26	179.23	0.61	1.19	6.35	12.34	0.78	1.52	7.74	15.04	7.04
		Shaking + laggi (52 %)	185.08	1000	88.42	163.65	0.82	1.52	9.45	17.49	1.32	2.44	11.58	21.43	10.40
		Harvester (04%)	224.00	1000	98.40	220.42	0.20	0.45	1.10	2.46	0.30	0.67	1.60	3.58	1.33
	Kakori	Irrigation + shaking + laggi (44 %)	190.55	1000	91.97	175.25	0.79	1.51	6.50	12.39	0.74	1.41	8.03	15.30	7.36
		Shaking + laggi (48 %)	194.50	1000	90.16	175.36	0.71	1.38	8.44	16.42	0.69	1.34	9.84	19.14	9.22
		Harvester (08 %)	189.00	1000	97.30	183.90	0.70	1.32	0.95	1.80	1.05	1.99	2.70	5.10	1.85
		DISTRICT AVERAGE	191.01	1000	91.83	175.40	0.72	1.38	6.52	12.45	0.93	1.78	8.17	15.61	7.33
Saharanpur	Rampur	Irrigation + shaking + laggi (60 %)	194.80	1000	94.51	184.10	0.91	1.77	4.09	7.97	0.49	0.96	5.49	10.70	5.05
		Shaking + laggi (24 %)	193.30	1000	93.52	180.78	0.87	1.68	4.95	9.57	0.67	1.30	6.48	12.52	5.89
		Harvester (16 %)	192.75	1000	97.73	188.35	0.70	1.35	1.35	2.60	0.23	0.44	2.28	4.40	2.07
	Muzaffarabad	Irrigation + shaking + laggi (24 %)	194.67	1000	94.40	183.77	0.90	1.75	3.53	6.87	1.17	2.28	5.60	10.90	4.55
		Shaking + laggi (32%)	194.38	1000	94.70	184.08	0.84	1.63	3.35	6.51	1.11	2.16	5.30	10.30	4.30
		Harvester (44 %)	194.91	1000	97.17	189.39	0.81	1.58	0.89	1.74	1.13	2.20	2.83	5.52	1.81
		DISTRICT AVERAGE	194.14	1000	95.34	185.09	0.84	1.63	3.30	6.41	0.80	1.55	4.66	9.05	4.22
		OVER ALL STATE AVERAGE	192.57	1000	93.58	180.21	0.78	1.50	4.91	9.46	0.87	1.68	6.42	12.36	5.78

Note: Figures in parenthesis indicate proportion of orchardists adopting a particular harvesting practice

TABLE- A2. Losses at Wholesaler/ripening Level in Post Harvest Operations of Mango

Districts	Sound fruits (%)	CPLW loss (%)	Discards (%)	Total loss (%)	Aggregate loss (%)
Lucknow	89.15	9.72	1.13	10.85	10.85
Saharanpur	90.81	8.01	1.18	9.19	9.19
Over all UP	89.98	8.87	1.16	10.02	10.02
Delhi	87.38	10.17	2.45	12.62	12.62

TABLE- A3. Losses at Retailer level in Post Harvest Operations of Mango in Uttar Pradesh and Delhi

Districts	Total Fruits Purchased (Kg)	Sound fruits sold (Kg)	Rejection during retailing process (Kg)	Sound fruits (Kg)	Fruits discarded (%)	Aggregate loss (%)
Lucknow	521.41	503.66	17.75	96.72	3.28	3.28
Saharanpur	183.15	178.85	4.30	97.62	2.38	2.38
Over all UP	352.28	341.26	11.03	97.17	2.83	2.83
Delhi	343.10	333.00	10.10	97.05	2.94	2.94

TABLE A4. Pooled Losses in the Post Harvest Operations of Mango in Uttar Pradesh and Delhi

S.No.	Levels	Uttar Pradesh			Delhi		
		Sound fruits (%)	Over all loss (%)	Aggregate loss (%)	Sound fruits (%)	Over all loss (%)	Aggregat loss (%)
1	Farm level	93.58	6.42	5.78	93.58	6.42	5.78
2	Ripening level	83.56	10.02	10.02	81.77	11.81	11.81
3	Retailer level	80.73	2.83	2.83	79.37	2.40	2.40
	Total	80.73	19.27	18.63	79.37	20.63	19.99

Agro-Economic Research

Adoption of Recommended Doses of Fertilizers on Soil Test Basis by Farmers for Paddy and Groundnut in Tamil Nadu*

K. Jothi Sivagnanam

Introduction

Fertilizers are one of the major inputs of agriculture. They are used to increase crop production. We are in the second place in fertilizer consumption, next to China. In India, fertilizer consumption had increased over a period of four decades. We are one of the large producers and consumers of fertilizers in the world. There is an increase in production because of efficient technologies used in the agricultural sector leading to economic and social development. The fertilizers play crucial role in the agricultural sector. During 2010, Egypt (368.7 kg/ha.), Korea (269.7 kg/ha.), Malaysia (265.4 kg/ha.), Vietnam (223.9 kg/ha.), Japan (212.5 kg/ha.) and India (156.3 kg/ha.) were the leading consumers of fertilizer in agriculture in the world. Among them, Egypt topped the list. On the other hand, India is consuming the lowest level of fertilizers compared to other large consumers in the world.

In India, there is an increase in demand for food and this in turn increases the demand for fertilizers. The increase in food production is due to use of proper inputs like fertilizers, quality seeds and pesticides. The fertilizer consumption in India increased from 65.6 thousand tonnes in 1950-51 to 25.54 million tonnes in 2012-13. The consumption of fertilizers has increased from 2.18 MT in 1970-71 to 12.54 MT in 1990-91. After the economic reform period, it increased to 28.12 MT in 2010-11; but it declined to 25.53 MT in 2012-13. It implies that the rapid expansion of irrigation, introduction of HYV seeds, introduction of Retention Price Scheme, distribution of fertilizers to farmers at an affordable price, expansion of dealers network, improvement in fertilizer availability and virtually no change in farm gate fertilizer prices were the major reasons for the increase in fertilizer consumption (Department of Agriculture and Cooperation, Government of India, 2013).

The average fertilizer consumption (per hectare) was very meagre amounting to 2 kg in 1950; it increased to 5 kg in 1965-66. After the Green Revolution, the consumption pattern increased from 7 kg in 1980-81 to 128 kg in 2012-13. Fertilizer consumption increased to 121 kg/ha. due to the development of technology in agriculture. But in the meantime, the consumption fell down to 1973-74 because of oil crisis in the international market. After the economic reform period, the second oil crisis affected the fertilizer industry. The Government of India decontrolled phosphates and potassic fertilizers and increased fertilizer prices significantly.

Background of the Study

India's agricultural sector has undergone considerable change since the introduction of high yielding varieties in the mid-1960s. The Green Revolution technology has increased crop output and farmers' income. With the improvement in production, India's position has turned from the state of net importer of agricultural products to exporter of certain commodities like rice, wheat and sugar. At farm household level, the green revolution technology helped to improve the livelihood pattern, nutrition and education of children. However, the technology has brought some negative aspects as well. Since it proved successful in irrigated areas, the dry land regions and the crops grown therein were left out of the process and hence had created regional disparity in rural incomes (Krishnaji 1975; Rao 1996; Vaidyanathan, 1988). Further, the technology has also altered the traditionally followed cropping pattern, which comprised growing multiple crops every season, to mono-cropping for example, cultivation of only rice in some parts of south India. This practice put the land and other resources under severe strain resulting in depletion of soil nutrients, decline in water table, build up of pest and diseases, and micro-nutrient deficiency (Murgai et al. 2001; Pingali and Shah 2001).

Chemical fertilizers are the important source of nutrients for plant growth. With the advent of fertiliser responsive crop varieties, total consumption of nitrogenous (N), phosphatic (P) potassic (K) fertilizers increased from about 1.1 million tonnes in 1966-67 to 27.8 million tonnes in 2011-12. The all-India average consumption of fertilizers increased from 6.9 kg per ha of gross cropped area to 139.7 kg per ha during the same period (Fertiliser Statistics 2013). However, the level of consumption of fertilizers highly varied within as well as between states. The consumption varied from 243 Kg/ha in Punjab to 54 Kg/ha in Himachal Pradesh during 2011-12. The variability in consumption of fertilizers can be

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attributed to different cultivation methods, type of crops and subsidy on fertilizers. Further, the consumption of fertilizers also varied across farm size groups with the highest amount of consumption recorded among small farmers.

There are concerns about the indiscriminate use of chemical fertilizers by farmers with a view to increase the crop yield. This has led to deterioration of soil structure, wastage of nutrients, and destruction micro-organisms in the soil and scorching of plants at the extreme cases. A combination of factors such as intensive cultivation of crops, differential pricing of fertilizers and subsidy, might have contributed to excessive use of fertilizers by the farmers. At the same time, it is reported that many parts of India have shown deficiency of not only primary nutrients (N, P, K) but also secondary nutrients (Sulphur, Calcium and Magnesium) and micro nutrients (Boron, Zinc, Copper and Iron). The Government of India had undertaken initiatives to ameliorate the situation and encouraged the farmers for balanced use of fertilizers. These initiatives among others, included decontrol of phosphatic and potassic fertilizers, promotion of integrated nutrient management, production and promotion of organic manures and bio-fertilizers, National Project on Management of Soil Health and Fertility (NPMSF), and nutrient based subsidy (NBS) policy. Attempts were also made to strengthen and revamp soil testing laboratories in various districts under NPMSF. Farmers were encouraged to test their soil periodically and apply fertilizers based on the deficiency of nutrients in soil. This was intended to ensure a balanced supply of nutrients for maintaining soil health and improving crop productivity.

Need for the Study

In the light of increased degradation of natural resources due to intensive cultivation and injudicious use, their sustainable management holds the key for ensuring sustainable food production. Due to lack of awareness among the farmers, there are widespread problems related to the indiscriminate use of chemical fertilizers, mismanagement of surface water and over-exploitation of ground water. The over-use of chemical fertilizers in most parts of India for nutrient management in farming in the last few decades has led to several problems affecting soil health, nutrient flow and natural environment. There is a need for promoting, among others, balanced use of fertilizers for increasing productivity of crops and for better absorption of nutrients from the applied fertilizers.

It is suggested that farmers should go for regular soil testing and use recommended doses of fertilizers as advised by the agricultural scientists. In this connection, the Task Force on Balanced Use of Fertilizers recommended formulating a centrally sponsored scheme entitled, "National Project on Management of Soil Health and Fertility (NPMSF)". Accordingly, this scheme has been implemented since 2008-09 and it encompasses three components viz., strengthening of soil testing laboratories (STLs), and promoting use of integrated nutrient management and strengthening of fertiliser quality control laboratories. There is no systematic study undertaken so far for evaluating the effectiveness of the programme on crop productivity, extent of soil testing for nutrient deficiency and adoption of recommended doses of fertilizers by farmers based on the soil tests. Therefore, the present study examines the level of adoption and constraints in the application of recommended doses of fertilizers, impact on crop productivity and relevant institutional problems.

Objectives of the Study

The objectives of the study are as follows:

- To examine the level of adoption and constraints in the application of recommended doses of fertilizers based on soil test reports by the farmers.
- To analyse the impact of adoption of recommended doses of fertilizers on crop productivity and income of farmers.

Data and Methodology

The data for the study was collected from primary and secondary sources in Tamil Nadu. The secondary data relating to area, production and productivity of rice and ground nuts and fertiliser consumption was obtained from Government of Tamil Nadu publications. Primary data was collected from two districts, namely, Thiruvannamalai and Thanjavur of Tamil Nadu. In each of the districts of Thiruvannamalai and Thanjavur, two representative blocks, namely, Cheyyar, Kalasapakkam, Thanjavur and Orrathanadu were taken respectively and within each block two villages were selected.

In each district, 120 farmers from the list of soil tested farmers in that district were drawn at random from households with different land sizes on the basis of their proportion in the universe. In addition to the above sample, 60 control (non-soil tested) farmers were selected in each district randomly from households with different land sizes amongst general rice and groundnut growing cultivators following the same method. Thus, altogether, 120 soil tested farmers were selected from each district (Thiruvannamalai and Thanjavur). In 7 all, 240 soil tested farmers among two districts form the selected sample size in the study.

For the primary survey, the reference year is 2013-14. Accordingly, kharif, rabi and summer seasons for the rice and groundnut crops were covered. The random sample methods adopted at the district, block and village level for the primary survey are given in the following table.

Sample Distribution of Thiruvannamalai and Thanjavur Districts of Tamil Nadu

Block Level	Soil Tested Farmers	Control Farmers	Total Farmers
Thiruvannamalai District			
Cheyyar	60	30	90
Kalasapakkam	60	30	90
Thanjavur District			
Thanjavur	60	30	90
Orathanadu	60	30	90
Total Sample Size	240	120	360

The reference period of the study was 2013-14. The list of farmers who got their soil tested were collected from the State Department of Agriculture for the year 2012-13 to assess the adoption of recommended doses of fertilizers. Two major crops, namely, paddy and groundnut were selected from each district. From each district, two taluks were selected again based on the crop area share.

The survey also involved 30 control (non-soil test) farmers, for each reference crop from each district, selected purposively from the chosen cluster for differentiating the effect of the application of the recommended dose off fertilizers on crop productivity and income. Thus, a total of 120 soil test farmers and 60 control farmers for each crop were interviewed.

Summary of Findings

The socio-economic conditions of the sample households provide a background for our study. Among the soil tested farmers, the small and the marginal farmers cultivate three-fourths of landholdings and only a small proportion of the land is cultivated by the large farmers. A majority of the farmers belonged to OBC category and meagre percent of the farmers belonged to SC category. The marginal and the small farmers have fourth-fifths of share of the landholdings and the large farmers constitute a small proportion. Among the soil tested farmers, the average owned landholding per household is 6.1 acres and total leased-in- land is 1.3 acres. The large farmers have the highest average landholding of 12.9 acres followed by the medium farmers with 6.4 acres of own land in the average. The average net operated area is 7.4 acres. The large farmers are having the highest average area of 16.4 acres followed by the mediums farmers who have an average net operated area of 7.5 acres. But the average size of the net operated area by the marginal farmer is 1.69 acres. The average own landholdings is 6.5 acres for the non-soil tested farmers. The large farmers have 15.3 acres and the marginal farmers have 1.6 acres. It implies that the majority of them have large own land and smaller proportion of leased-in-landholdings. The average net operated area is 7.1 acres, but the figure for households with large farmers is 15.6 acres. The average size of the owned land holdings of the non-soil tested farmers is more than that of the soil tested farmers. But the average net operated area is more for the soil tested farmers than the control farmers due to more of leased-in-landholdings among the soil tested farmers.

Bore wells are the main source of irrigation for the soil tested farmers. They are drilled upto 700-1000 feet in the land for getting water in Thiruvannamalai district. But for Thanjavur district, they are using river based irrigation system; during the dry seasons, the bore wells are very useful and they are nearer to river beds. Sometimes, farmers incur losses when water is not found when bore wells are dug. The bore wells account for two-thirds of the total irrigation among the small, the medium and the large farmers. Canal irrigation accounts for one-third of the total irrigation among the medium and the large farmers. The marginal farmers mainly depend upon bore wells, river and open wells as major source of irrigation. Bore wells are the major source of irrigation for non-soil tested farmers. Quite a sizeable number of them mainly depend upon the bore wells alone. The main reason is that the large farmers are financially capable of digging the bore wells but, the marginal farmers have to borrow for digging them. The bore wells account for two-thirds of the total irrigation among the large, the medium and the small farmers. Canal irrigation forms one-third of the total irrigation. Paddy and groundnut arepredominantly cultivated by the soil tested farmers. A majority of them cultivate paddy as major crop during kharif and rabi seasons. The cultivation of paddy is minimal during summer season. Alternately, the farmers cultivate pulses, gingili and cotton during summer season. In Thanjavur district, a majority of the farmers cultivate paddy on a regular basis and in the Orathnadu, the farmers cultivate groundnut in a larger area. The main reason for the cultivation of groundnuts is the relative scarcity of water. Therefore, they have cultivated groundnut, cotton and pulses as a alternate crops. But in Thiruvannamalai district, a majority of the farmers have adopted groundnut as a major crop and sugarcane, cotton and paddy are also cultivated. Due to non-availability of water in palar river and sathanur dam, a large number of farmers mainly depend upon the bore wells.

A majority of the non-soil tested farmers cultivate paddy as the principal crop in the kharif as well as rabi season. They cultivate groundnuts and sugarcane only on a small scale. About 60 percent of the Gross Cropped Area is covered under the paddy crop among different categories of farmers during kharif and rabi seasons put together. During summer season, they cultivate pulses, cotton, sugarcane, and groundnut as alternate crops. The percentage share of HYV seeds used in paddy cultivation in GCA is higher for control farmers than that of the soil tested farmers. But for groundnut crop, the percentage

share of HYV seeds in GCA among the soil tested farmers is higher compared to non-soil tested farmers. The total area under HYV seeds of paddy and groundnuts among non-soil tested farmers is more when compared with the soil tested farmers. The average household asset value of the non-soil tested farmers is more than that of the soil tested farmers. The tractor value for non-soil tested household is comparatively higher than the soil tested farmers. The motor value of non-soil tested farmers is higher than that of the soil tested farmers and the reason for that is they buy relatively new motors. But soil tested farmers buy pump sets which are nearly 10-15 year old. The estimated value has declined. For the soil tested farmers, land development banks provide a large proportion of credit. The large and the small farmers receive a lot of credit facilities. The marginal and medium farmers availed of low credit facilities. The commercial banks are leading banks providing agricultural credit facilities on a regular basis. The large farmers receive larger amount of credit facilities from banks, whereas the small and marginal farmers received smaller amount of credit. The large and the marginal farmers received the lowest amount of credit from the cooperative societies. The farmers have access to cooperative societies because they are located within the rural area. Thus the cooperative banks, commercial banks and land development banks provide credit facilities to the soil tested farmers as crop loans and for land development purposes.

Among the non-soil tested farmers, commercial banks provide the largest amount of agricultural credit to the farmers. The small and large farmers receive from the cooperative societies average credit of Rs. 23,362 and Rs.21, 556 per household, respectively. It is found that the cooperative societies and commercial banks provide credit facilities to the farmers in an easy manner. The procedure followed by these banks for giving crops loans facilities availing of loans without much difficulty by the farmers. Among the soil tested farmers, one-fourth of them reported that they availed the loan for seasonal crop cultivation purposes. One-tenth of them reported that they availed the loan for land development and consumption purposes. Very meagre percentage of farmers used their loan for land development purposes. Nearly, half of the soil tested farmers did not avail of the agricultural credit facilities. The remaining 50 percent of the farmers used their loan for seasonal crop development purposes. It is found that the large and medium farmers cover larger area for soil test purposes. But the marginal farmers cover only a small piece of land. All farmers have to travel long distance for soil test incurring sizable transportation cost. Generally, in Thanjavur district, soil test farmers have been travelling long distance from their farm to Aduthurai, where the soil test laboratory is located, at a distance of 50-60 km. There is no soil test laboratory in Thanjavur district. Hence, the farmers have to travel to the neighbouring district of Trichirapalli. The large farmers have to bear high soil test cost than others. All farmers had to travel long distance to test the soil. In Thiruvannamalai district, the soil testing laboratory is located in headquarters. The soil tested farmers travel from Vembakkam and Mamandur to Thiruvannamalai where the laboratory is located and the average distance is about 80-100 km. The Agricultural department, Government of Tamil Nadu collect the soil from the farmers for soil testing purposes. Cent percent of soil test is done by the Department for the farmer's welfare. The soil testing process is not an easy task; only a few soil samples are analysed by the experts. Therefore, only limited facilities are available in the laboratory. Agricultural Department, Government of Tamil Nadu have given valuable information about the soil test uses and how to collect the sample soil from the field. But, still a large of number of farmers could not be informed about the purpose of soil tests. Some of them in the village are not interested to get information about soil tests. Only educated, interested and knowledge farmers are using this kind of information. But, a large number of the sample farmers are not interested to get information about the soil testing process. Nearly half of the paddy cultivators expressed the view that the soil test has an important role in increasing crop yield. Nearly, two-thirds of the groundnut cultivators said that soil test was important for increasing crop yield. Almost a half of the paddy cultivators informed that they did not how to take soil samples from their farm land, whereas, another half of them reported that they did not know whom to approach in this regard. One-third of the groundnut cultivators did not know how to take soil samples and more than one-third of them did not know whom to contact for details on testing. In rural areas, the farmers did not know much about the soil test. For instance, they do not know about location of the laboratory, officials involved with it and how to take soil samples from the farm land. The soil testing laboratories are located far away from their farms. These are the major reasons cited for non-participation in the soil test process. No one seems to be guiding the farmers for conducting the soil test in the village in a proper manner. The negative attitude of the farmer's mindset in the rural areas could be another reason. The adverse weather conditions restricted them to follow traditional farming methods instead of experimenting with new methods of cultivation. Unawareness was also a reason for non-adoption of recommended doses of fertilizer on the basis of soil tests. Among the paddy cultivators, nearly half of them said that the nitrogen content in the soil was at a low level and only meagre percentage was at normal level. High content of phosphorus and potassium is recorded in the soil health status cards. Only a few cards reported that the soil status was normal in the case of NPK ratio.

Among the groundnut cultivators, one-third of them reported that the soil status was low and medium in the

case of nitrogen and only meagre percent reported that it was normal. Two-fifths of cultivators said that there was high level of phosphorus content in their soil. About one-third of farmers expressed the view that it was normal. More than the two-thirds of the farmers reported that there was high level of potassium in their soil and only small number of farmers reported that it was normal. The groundnut cultivator's use more urea compared to paddy cultivators as the government officials recommended the use of more urea for groundnuts. Paddy cultivators apply more DAP fertilizers compared to groundnut cultivations. The recommended doses of potash are higher for paddy cultivators than groundnut cultivators. These inferences are drawn from the details health cards based on the soil tests. But in reality, a majority of paddy and groundnut cultivators did not adopt recommended doses of fertilizers. Only a small proportion of them followed recommended doses of fertilizers. The doses of fertilizers applied can be accessed through health card alone, not through the actual recommended doses of fertilizers' used by the farmers. The main reason for not adopting fertilizers is the practice of conservative method of cultivation. They feel that whenever they used more fertilizers they could get more production and they do not pay much attention to the soil fertility.

The split dose of urea recommended by the officials for paddy crop is larger in quantity than for the groundnut crop during basal application. The average quantity of split dose of urea recommended for groundnut crop per acre is larger than for paddy crop during inter-cultivation, vegetative growth and flowering stage. The average doses of DAP recommended are more or less the same for both the farmers. The dose of potash recommended is larger for groundnut than the paddy crop during basal application. The doses of potash recommended for groundnut crop are larger in quantity than for paddy during inter-cultivation through flowering stage. The impact of application of recommended doses of fertilizers on production of paddy and groundnut production in Tamil Nadu is positively related in the study area. Among the soil tested farmers, the marginal farmers had obtained considerable benefits than the non-soil tested marginal farmers. The average value of output paddy cultivators earned was larger than the non-soil tested farmers. The higher percentage of value is reported by soil tested farmers to the tune of 5.9 percent as compared with non-soil tested farmers. Among the soil tested paddy cultivators, the highest difference in value of output is registered by small farmers (8.6 percent) as compared with the non-soil tested small farmers. On the other hand, the percentage difference in the value of output of marginal non-soil tested farmers is only 1.3 percent compared with the value of output of soil tested farmers. Among the groundnut cultivators, the average yield obtained by soil tested farmers is larger than that of the non-soil tested farmers. The average value of output, soil tested farmers obtained was more than the one obtained by the non-soil tested farmers. The large soil-tested farmers had obtained higher yield and the lowest yield was reported by marginal farmers. Among the non-soil tested farmers, the small farmers have recorded higher yield and minimum yield was obtained by marginal farmers. The percentage difference in average yield (quintal/acre) by large soil tested farmers and non-soil tested farmers was 24 percent. On the other hand, the difference in average output by marginal farmers was 7 percent.

The average yield per acre obtained by paddy cultivators, before and after applying recommended doses of fertilizers is estimated to be 20.9 quintal and 22 quintal. The percentage increase in yield is 5.1 percent. The averages yield (quintal/acre) before and after applying recommended doses of fertilizers by soil tested farmers are 20.4 quintal /acre and 21.8 quintal/acre, respectively. The percentage change in the yield for marginal farmers among paddy cultivators was the highest at 6.9 percent and for large farmers, the change was 3.4 percent. The marginal farmers apply the recommend doses of fertilizers in the small piece of land in a correct manner. The medium farmers got more yield than the marginal farmers before applying recommended doses of fertilizers. But after applying the recommended doses of fertilizers, marginal farmers got relatively higher yield than medium farmers. The marginal and small farmers enjoyed higher yield of paddy due to adoption of recommended doses of fertilizers in the study area. Among the groundnut cultivators, the average yield for all the soil tested farmers who applied the recommended doses of fertilizers is 10.3 quintal/acre and 11 quintal/acre before and after applying the recommended doses of fertilizers. The marginal farmers have achieved larger output by 8.6 percent output after applying the recommended doses of fertilizers. On the contrary, the large farmers have recorded the lowest increase in 5.5 percent. It is observed that the small farmers have produced the highest average yield per acre when compared with the marginal farmers before the application of recommended doses. After the application of the recommended doses, we find that in terms of percentage change the marginal farmers have recorded higher yield than the medium farmers. About two-thirds of the paddy cultivators reported improvement in grain filling as an important impact and three-fifths of them considered increase in crop yield as an important impact. A half of the farmers reported improvement in soil texture and improvement in crop growth as the most important changes. It shows that application of recommended doses based on soil test is essential to increase the productivity of land. We find that increase in crop yield, improvement in soil texture, improvement in crop growth and improvement in grain filling are significant positive changes observed after the application of recommended doses of fertilizers on the basis of soil test in the cultivation

of paddy. A large number of groundnut cultivators reported the improvement in crop growth, increase in crop yield and improvement in grain filling as important changes observed after the application of recommended doses of fertilizers. There is no doubt that adoption of recommended doses of fertilizers on the basis of soil tests had a positive impact in increasing the productivity of soil and production of crops, namely paddy and groundnuts in the area of study.

Conclusions and Policy Recommendations

Though the scheme as a whole has succeeded, a few drawbacks that can be remedied have been observed. The soil-tested and non-soil tested farmers have undergone faced hardships in availing of the benefits of the scheme. The following are some of the specific policy suggestions:

The state government needs to simplify the soil testing process. Otherwise, farmers have to face much hardship and many miss the scheme.

The state government must take all the necessary steps to ensure that soil testing is done free of cost to all the farmers.

The state government needs to ensure the adequate financial support to the farmers for the purchase of farm inputs within the prescribed time. It needs to reduce the fertiliser's prices like urea, DAP, potash and others.

The state government must create awareness about the soil testing scheme among the farmers.

The state government should start the village level demonstration programme for soil testing at the village level.

The state government needs to ensure the cultivation of various crops based on the soil tests.

The government should conduct training programme for the farmers about the soil testing process and the recommended doses of fertilizers at the panchayat level by conducting camps.

The state government must create separate section for the soil testing laboratories at least at the taluk level.

The government should update the technology for soil testing in the existing district level laboratories.

The government should provide mobile soil testing laboratories at the block level and soil tests to be conducted at the village level. The result of the tests is to be given in a day.

The government should depute separate officer for soil testing purpose at the taluk level.

As private dealers charge exorbitant prices during the season. The state government should take steps to increase the supply of fertilizers and meet the demand of the farmers.

The government should oversee whether recommended doses of fertilizers of split doses are applied at least once in a month.

The government should instruct the follow farmers recommended doses of fertilizers as to majority of farmers are not following the recommended split doses.

All the farm inputs are to be given in time by the Agricultural Department of the Government of Tamil Nadu and cooperative societies.

The state government should educate the farmers about the benefits of soil testing through the media.

The results of the soil testing analysis are to given in time for the farmers. The majority of them could not get the results in time.

The soil testing laboratories are to be created within 15 kms for easy access.

The government should appoint separate Agricultural Officers for soil testing in every block for organising soil test process.

There is urgent need for filling up all vacant positions in the soil testing laboratories.

Tamil Nadu Agricultural University may establish Soil Management Centre in every district.

The government should take more steps to create awareness about the importance of recommended doses of fertilizers and set at regular intervals whether the recommended doses of fertilizers are used.

The results of soil testing are to be given authentic value of soil health status in particular soil. The results are to be given within a month.

Agricultural Official should be given guidelines about the soil testing process and application of split doses of fertilisers.

The Government official should provide information about the importance of the soil test to the farmers.

The Government Official should be trained relating how to apply to soil testing and split doses of fertilizers in every village.

The soil testing officials should really collect the soil and originally test it and given correct results to the farmers

The Government Official should avoid to provide the general results of the particular soil in a locality.

The Agricultural Official should check whether farmers adopted the recommended doses of fertilizers and its application in their farm field.

COMMODITY REVIEWS

Foodgrains

During the month of August, 2017 the Wholesale Price Index (Base 2011-12=100) of pulses decreased by 0.49%, cereals decreased by 0.14% & foodgrains decreased by 0.21% respectively over the previous month.

ALL INDIA INDEX NUMBER OF WHOLESALE PRICES

(Base: 2004-2005=100)

Commodity	Weight (%)	WPI for the Month of August, 2017	WPI for the Month of July, 2017	WPI A year ago	Percentage change during	
					A month	A Year
1	2	3	4	5	6	7
Paddy	1.793	148.5	149.2	144.6	-0.47	2.70
Wheat	1.116	137.1	136.3	139.1	0.59	-1.44
Jowar	0.096	124.5	126.3	121.4	-1.43	2.55
Bajra	0.115	143.8	145.4	159.3	-1.10	-9.73
Maize	0.217	127.7	129.2	139.3	-1.16	-8.33
Barley	0.017	139.1	139.3	155.5	-0.14	-10.55
Ragi	0.019	261.9	247.0	167.1	6.03	56.73
Cereals	3.373	142.5	142.7	142.2	-0.14	0.21
Pulses	0.717	142.4	143.1	203.9	-0.49	-30.16
Foodgrains	4.09	142.5	142.8	153.6	-0.21	-7.23

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

The following Table indicates the State wise trend of Wholesale Prices of Cereals during the month of August, 2017.

Commodity	Main Trend	Rising	Falling	Mixed	Steady
Rice	Mixed	Jharkhand	A.P.	Kerala	Gujarat
			West Bengal	Karnataka	Orissa
				U.P.	
Wheat	Mixed	U.P.	Haryana	Gujarat	Jharkhand
			Karnataka	M.P.	Maharashtra
				Rajasthan	
Jowar	Rising	Gujarat		Karnataka	Maharashtra
		Rajasthan			
Bajra	Rising	Maharashtra	Karnataka	Gujarat	
		Rajasthan			
Maize	Steady	Rajasthan	Gujarat	U.P.	Haryana
			Punjab		Karnataka
					M.P.

Procurement of Rice

0.013 million tonnes of Rice (including paddy converted into rice) was procured during August 2017 as against 0.047 million tonnes of rice (including paddy converted into rice) procured during August 2016.The total procurement of rice in the current marketing season i.e 2016-2017, up to 31.08.2017 stood at 38.74 million tonnes, as against 34.14 million tonnes of rice procured, during the corresponding period of last year. The details are given in the following table :

PROCUREMENT OF RICE

(*In Thousand Tonnes*)

State	Marketing Season 2016-17 upto 31.08.2017		Corresponding Period of last Year 2015-16		Marketing Year (October-September) 2015-16		2014-15	
	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5	6	7	8	9
Andhra Pradesh	3719	9.60	4326	12.67	4326	12.65	3591	11.17
Chhatisgarh	4662	12.03	3442	10.08	3442	10.06	3423	10.64
Haryana	3583	9.25	2861	8.38	2861	8.36	2015	6.27
Maharashtra	309	0.80	230	0.67	230	0.67	199	0.62
Punjab	11052	28.53	9350	27.38	9350	27.33	7786	24.21
Tamil Nadu	144	0.37	1167	3.42	1191	3.48	1049	3.26
Uttar Pradesh	2354	6.08	2910	8.52	2910	8.50	1698	5.28
Uttarakhand	706	1.82	597	1.75	598	1.75	465	1.45
Others	12209	31.52	9260	27.12	9301	27.19	11936	37.11
Total	38738	100.00	34143	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 2017-2018 up to August, 2017 is 30.83 million tonnes against a total of 22.96 million tonnes of wheat procured during last year. The details are given in the following table :

PROCUREMENT OF WHEAT

(In Thousand Tonnes)

State	Marketing Season 2017-18 (upto 31.08.2017)		Corresponding Period of last Year 2016-17		Marketing Year (April-March) 2016-17		2015-16	
	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5	6	7	8	9
Haryana	7432	24.11	6752	29.41	6722	29.32	6778	24.13
Madhya Pradesh	6725	21.82	3992	17.39	3990	17.40	7309	26.02
Punjab	11706	37.98	10649	46.38	10645	46.42	10344	36.83
Rajasthan	1245	4.04	762	3.32	762	3.32	1300	4.63
Uttar Pradesh	3699	12.00	797	3.47	802	3.50	2267	8.07
Others	18	0.06	10	0.04	9	0.04	90	0.32
Total	30825	100.00	22962	100.00	22930	100.00	28088	100.00

Commercial Crops

Oil Seeds: The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 127.1 in August, 2017 showing a increase of 1.9% over the previous month and a decrease of 43.5% over the previous year. The WPI of safflower (kardi seed) increased by 3.9%, copra (coconut) by 23%, rape & mustard seed by 1.8%, soyabean by 1% and gingelly seed by 1.9% over the previous month. WPI of groundnut seed decreased by 2.5%, sunflower by 2.4%, cotton seed by 0.6% and niger seed by 0.9% over the previous month.

Manufacture of Vegetable and Animal Oils and Fats: The WPI of manufacture of vegetable and animal oils and fats as a group stood at 106.9 in august, 2017 showing an increase of 1.2% over the previous month and a decrease of 30.8% over the year. The WPI of cotton seed oil increased by 3.1%, copra oil by 36.8%, rapeseed oil by 0.7%, soybean oil by 1.6% and mustard oil by 0.4% over the previous month. The WPI of groundnut oil decreased by 3.5% and sunflower oil by 0.4% over the previous month.

Fruits & Vegetable: The WPI of fruits & vegetable as a group stood at 191.5 in august, 2017 showing an increase of 8.3% over the previous month and a decrease of 35.5% over previous year respectively.

Potato: The WPI of potato stood at 132.3 in august, 2017 showing an decrease of 0.2% over the previous month and a decrease of 52.6% over the year.

Onion: The WPI of onion stood at 220.5 in august, 2017 showing an increase of 88.1% over the previous month and a decrease of 14.9% over the year.

Condiments & Spices: The WPI of condiments & spices (group) stood at 122.9 in august, 2017 showing an increase of 2.8% over the previous month and a decrease of 65% over the year. The WPI of chillies (dry) increased by 4.1%, black pepper by 1.6% and turmeric by 5.8% over the previous month.

Raw Cotton: The WPI of raw cotton stood at 110.1 in august, 2017 showing a decrease of 0.5% and 54.8% over the previous month and year respectively.

Raw Jute: The WPI of raw jute stood at 154.6 in august, 2017 a decrease of 2.2% and 70.6% over the previous month and year respectively.

WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

Commodity	Latest August, 2017	Month July, 2017	Year August, 2016	% Variation Over Month	% Variation Over Year
OIL SEEDS	127.1	124.7	224.8	1.9	-43.5
Groundnut Seed	124.4	127.6	285.6	-2.5	-56.4
Rape & Mustard Seed	133.3	131.0	236.9	1.8	-43.7
Cotton Seed	142.6	143.5	229.1	-0.6	-37.8
Copra (Coconut)	168.5	137.0	109.8	23.0	53.5
Gingelly Seed (Sesamum)	115.9	113.7	293.7	1.9	-60.5
Niger Seed	205.4	207.2	332.6	-0.9	-38.2
Safflower (Kardi Seed)	139.3	134.1	154.2	3.9	-9.7
Sunflower	94.5	96.8	187.3	-2.4	-49.5
Soyabean	122.8	121.6	216.3	1.0	-43.2
Manugacture of Veg and Animal Oils & Fat	106.9	105.6	154.5	1.2	-30.8
Groundnut Oil	107.4	111.3	216.4	-3.5	-50.4
Cotton Seed Oil	101.2	98.2	190.9	3.1	-47.0
Rapeseed Oil	112.2	111.4	123.9	0.7	-9.4
Mustard Oil	116.5	116.0	128.4	0.4	-9.3

WHOLESALE PRICE INDEX OF COMMERCIAL CROPS—CONTD.

Commodity	Latest	Month	Year	% Variation Over	
	August, 2017	July, 2017	August, 2016	Month	Year
Soyabean Oil	103.9	102.3	154.3	1.6	-32.7
Copra Oil	157.0	114.8	137.0	36.8	14.6
Sunflower Oil	101.5	101.9	133.7	-0.4	-24.1
FRUITS & VEGETABLES	191.5	176.8	296.9	8.3	-35.5
Potato	132.3	132.6	279.3	-0.2	-52.6
Onion	220.5	117.2	259.0	88.1	-14.9
CONDIMENTS & SPICES	122.9	119.6	351.4	2.8	-65.0
Black Pepper	162.1	159.5	754.5	1.6	-78.5
Chillies(Dry)	106.9	102.7	396.5	4.1	-73.0
Turmeric	116.9	110.5	252.6	5.8	-53.7
Raw Cotton	110.1	110.7	243.8	-0.5	-54.8
Raw Jute	154.6	158.1	525.7	-2.2	-70.6

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	March, 17	8	366	300	500	NA	300	NA	NA	NA	NA
	Guntur	Tadikonda	March, 17	8	258	225	NA	NA	275	NA	NA	NA	NA
Telangana	Ranga Reddy	Arutala	Jan, 17	8	800	NA	375	NA	NA	NA	400	300	NA
Karnataka	Bangalore	Harisandra	Nov, 16	8	360	340	400	350	400	300	600	450	NA
Tumkur	Gidlahali		Nov, 16	8	250	200	250	200	250	NA	300	280	NA
Maharashtra	Nagpur	Mauda	Sep, 14	8	100	80	NA	NA	NA	NA	NA	NA	NA
	Ahmednagar	Akole	Sep, 14	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jharkhand	Ranchi	Gaitalsood	June, 16	8	179	179	179	179	179	179	227	227	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	Nov, 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	April, 17	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gujarat*	Rajkot	Rajkot	Dec, 16	M	8	254	254	241	229	211	208	500	475	488
				W	8	NA	200	241	229	211	198	NA	NA	NA
	Dahod	Dahod	Dec, 16	M	8	300	300	150	150	150	NA	400	350	300
				W	8	NA	250	150	150	150	NA	NA	NA	NA
Haryana	Panipat	Ugarakheri	April, 17	M	8	400	400	400	400	400	NA	NA	NA	NA
				W	8	NA	300	300	350	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	Nov,16	M	4-8	945	785	NA	785	735	NA	885	NA	NA
				W	4-8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Palakkad	Elappally	Nov,16	M	4-8	NA	500	NA	500	500	NA	600	NA	NA
				W	4-8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Madhya Pradesh	Hoshangabad	Sangarkhera	May, 17	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Satna	Kotar	May, 17	M	8	200	200	200	200	200	200	300	300	300
				W	8	NA	200	200	200	200	200	NA	NA	NA
	Shyopurkala	Vijaypur	May, 17	M	8	NA	300	NA	NA	300	NA	400	400	NA
				W	8	NA	NA	NA	NA	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	Skilled Labours			
											Herdsman	Carpenter	Black Smith	Cobbler
Odisha	Bhadrak	Chandbali	April,17	M	8	300	250	300	200	350	350	400	300	250
				W	8	NA	200	250	180	300	250	NA	NA	NA
	Ganjam	Aska	April, 17	M	8	300	250	250	250	250	250	500	450	400
				W	8	NA	200	200	NA	200	200	NA	NA	NA
Punjab	Ludhiyana	Pakhowal	Aug, 17	M	8	480	480	NA	NA	400	NA	480	480	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rajasthan	Barmer	Kuseep	Jan, 17	M	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Jalore	Sarnau	Jan, 17	M	8	NA	NA	300	400	NA	NA	500	200	NA
				W	8	NA	NA	300	300	NA	NA	NA	100	NA
Tamil Nadu*	Thanjavur	Pulvarnatham	Feb, 17	M	8	800	368	NA	365	250	NA	NA	NA	NA
				W	8	NA	138	139	132	NA	NA	NA	NA	NA
	Tirunelveli	Malayakulam	Feb, 17	M	8	NA	263	NA	NA	387	NA	NA	NA	NA
				W	8	NA	166	200	157	NA	NA	NA	NA	NA
Tripura	State Average	July, 16	M	8	290	255	267	270	268	290	307	283	283	
			W	8	NA	203	198	199	203	220	NA	NA	NA	
Uttar Pradesh*	Meerut	Ganeshpur	May, 17	M	8	275	265	264	271	264	NA	398	NA	NA
				W	8	NA	205	211	208	211	NA	NA	NA	NA
	Aurraiya	Aurraiya	May,17	M	8	170	175	150	235	171	NA	400	NA	.NA
				W	8	NA	NA	150	235	171	NA	NA	NA	NA
	Chandauli	Chandauli	Feb,17	M	8	NA	200	NA	NA	200	NA	400	NA	NA
				W	8	NA	200	NA	NA	200	NA	NA	NA	NA

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

Prices

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

Commodity	Variety	Unit	State	Centre	Aug-17	July-17	Aug-16
Wheat	PBW 343	Quintal	Punjab	Amritsar	1650	1630	1600
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1540	1550	1625
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1655	1672	1740
Jowar	-	Quintal	Maharashtra	Mumbai	2400	2300	2350
Gram	No III	Quintal	Madhya Pradesh	Sehore	5390	4850	7181
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1275	1300	1360
Gram Split	-	Quintal	Bihar	Patna	7000	6950	8550
Gram Split	-	Quintal	Maharashtra	Mumbai	6900	6850	9500
Arhar Split	-	Quintal	Bihar	Patna	7680	7650	11000
Arhar Split	-	Quintal	Maharashtra	Mumbai	5700	5400	8600
Arhar Split	-	Quintal	NCT of Delhi	Delhi	5450	5300	12150
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	6200	5300	11500
Gur	-	Quintal	Maharashtra	Mumbai	4000	3950	4400
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4200	4200	3800
Gur	Balti	Quintal	Uttar Pradesh	Hapur	3200	3050	NA
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	3700	3350	4400
Mustard Seed	Black	Quintal	West Bengal	Raniganj	4000	4000	4850
Mustard Seed	-	Quintal	West Bengal	Kolkata	4300	4200	5100
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	4600	4800	6500
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	4350	4430	4435
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	2000	1900	2500
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	2750	2750	2500
Castor Seed	-	Quintal	Telangana	Hyderabad	4400	4150	3450
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	6000	5850	10500
Copra	FAQ	Quintal	Kerala	Alleppey	10150	9600	6400
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	5000	5000	5500
Groundnut	-	Quintal	Maharashtra	Mumbai	5200	5500	8300
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1355	1290	1474
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1375	1380	1650
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	1280	1350	2100
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1800	1875	2070
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1445	1350	1553
Castor Oil	-	15 Kg.	Telangana	Hyderabad	1500	1440	1170
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	1540	1555	1490
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2385	2445	2205
Coconut Oil	-	15 Kg.	Kerala	Cochin	2190	2100	1395
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	1855	1800	2240
Groundnut Cake	-	Quintal	Telangana	Hyderabad	2786	2857	4143
Cotton/Kapas	NH 44	Quintal	Andhra Pradesh	Nandyal	5100	5050	5800
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	4300	4250	NT
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	3640	3345	3730

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

Commodity	Variety	Unit	State	Centre	Aug-17	July-17	Aug-16
Jute Raw	W 5	Quintal	West Bengal	Kolkata	3690	3375	3680
Oranges	-	100 No	NCT of Delhi	Delhi	NA	NA	NA
Oranges	Big	100 No	Tamil Nadu	Chennai	NA	NA	750
Banana	-	100 No.	NCT of Delhi	Delhi	400	400	400
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	610	610	497
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	100000	100000	80000
Almonds	-	Quintal	Maharashtra	Mumbai	65000	55000	69000
Walnuts	-	Quintal	Maharashtra	Mumbai	80000	75000	55000
Kishmish	-	Quintal	Maharashtra	Mumbai	12000	11000	11000
Peas Green	-	Quintal	Maharashtra	Mumbai	3250	3250	4200
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	3080	5000	1385
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	2000	2500	1500
Cauliflower	-	100 No.	Tamil Nadu	Chennai	1500	2000	1200
Potato	Red	Quintal	Bihar	Patna	820	820	1550
Potato	Desi	Quintal	West Bengal	Kolkata	750	750	1710
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	2057	2673	2293
Onion	Pole	Quintal	Maharashtra	Nashik	1800	1000	550
Turmeric	Nadan	Quintal	Kerala	Cochin	14000	14000	15500
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	8300	8500	9100
Chillies	-	Quintal	Bihar	Patna	11600	11800	9800
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	45500	45000	67000
Ginger	Dry	Quintal	Kerala	Cochin	13500	11500	16000
Cardamom	Major	Quintal	NCT of Delhi	Delhi	119000	119000	129500
Cardamom	Small	Quintal	West Bengal	Kolkata	135000	110000	100000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	5000	4000	3800
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	53360	50025	34351
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	46000	46000	46000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	39000	38600	36350
Fish	Rohu	Quintal	NCT of Delhi	Delhi	13500	13000	8000
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	34500	34500	35000
Eggs	Madras	1000 No.	West Bengal	Kolkata	4350	4080	4100
Tea	-	Quintal	Bihar	Patna	21300	21250	21200
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	36000	36000	34000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	26000	27000	26500
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	19000	22000	15700
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	3350	3250	4800
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	2600	2450	3600
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13300	12800	13000
Rubber	-	Quintal	Kerala	Kottayam	11400	11500	10500
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	32700	32700	32600

3. Month end Wholesale Prices of Some Important Agricultural Commodities in International Markets during Year, 2017

Commodity	Variety	Country	Centre	Unit	Jan.	Feb.	Mar.	Arp.	May	Jun	Jul	Aug
CARDAMOM	Guatmala Bold Green	U.K.	-	Dollar/MT	9000.00	9000.00	17500.00	17500.00	17500.00	17500.00	17500.00	17500.00
				Rs./Qtl	61335.00	60219.00	113382.50	112105.00	112927.50	112060.00	113137.50	112000.00
CASHEW KERNELS	Spot U.K. 320s	U.K.	-	Dollar/MT	10612.51	10691.56	11205.67	11662.24	11816.40	11716.89	11883.43	11543.61
				Rs./Qtl	72324.26	71537.23	72601.54	74708.31	76251.23	75363.04	76826.37	73879.10
CASTOR OIL	Any Origin ex tank Rotterdam	Netherlands	-	Dollar/MT	1453.70	1498.40	1883.90	1859.00	1834.80	1834.80	1834.80	1790.00
				Rs./Qtl	9906.97	10025.79	12205.79	11908.75	11839.96	11801.43	11861.98	11456.00
CHILLIES	Birds eye 2005 crop	Africa	-	Dollar/MT	4100.00	4100.00	7500.00	7500.00	7500.00	6800.00	6800.00	6800.00
				Rs./Qtl	27941.50	27433.10	48592.50	48045.00	48397.50	43737.60	43962.00	43520.00
CLOVES	Singapore	Madagascar	-	Dollar/MT	7500.00	8400.00	8800.00	8800.00	8750.00	9500.00	9500.00	9850.00
				Rs./Qtl	51112.50	56204.40	57015.20	56372.80	56463.75	61104.00	61417.50	63040.00
COCONUT OIL	Crude Phillipine/ Indonesia, cif Rotterdam	Netherlands	-	Dollar/MT	1840.00	1590.00	1610.00	1600.00	2100.00	1810.00	1810.00	2005.00
				Rs./Qtl	12539.60	10638.69	10431.19	10249.60	13551.30	11641.92	11701.65	12832.00
COPRA	Phillipines cif Rotterdam	Phillipine	-	Dollar/MT	905.00	838.00	800.00	831.50	840.00	838.00	838.00	836.50
				Rs./Qtl	6167.58	5607.06	5183.20	5326.59	5420.52	5390.02	5417.67	5353.60
CORRIANDER		India	-	Dollar/MT	1650.00	1650.00	1650.00	1650.00	1650.00	1650.00	1650.00	1650.00
				Rs./Qtl	11244.75	11040.15	10690.35	10569.90	10647.45	10612.80	10667.25	10560.00
CUMMIN SEED		India	-	Dollar/MT	2500.00	2500.00	2900.00	3500.00	3500.00	2900.00	2900.00	3300.00
				Rs./Qtl	17037.50	16727.50	18789.10	22421.00	22585.50	18652.80	18748.50	21120.00
MAIZE		U.S.A.	Chicago	C/56 lbs	366.25	371.00	358.50	359.00	371.25	384.75	384.75	342.00
				Rs./Qtl	980.93	975.57	912.83	903.80	941.50	972.56	977.55	860.20
OATS		CANADA	Winnipeg	Dollar/MT	336.74	332.74	311.98	304.24	323.14	345.23	331.15	301.26
				Rs./Qtl	2294.88	2226.36	2021.32	1948.96	2085.22	2220.52	2140.88	1928.06
PALM KERNAL OIL	Crude Malaysia/ Indonesia, cif Rotterdam	Netherlands	-	Dollar/MT	1820.00	1330.00	1190.00	1080.00	1200.00	1075.00	1075.00	1255.00
				Rs./Qtl	12403.30	8899.03	7710.01	6918.48	7743.60	6914.40	6949.88	8032.00
PALM OIL	Crude Malaysian/ Sumatra, cif Rotterdam	Netherlands	-	Dollar/MT	822.50	760.00	705.00	710.00	760.00	715.00	715.00	710.00
				Rs./Qtl	5605.34	5085.16	4567.70	4548.26	4904.28	4598.88	4622.48	4544.00

Commodity	Variety	Country	Centre	Unit	Jan.	Feb.	Mar.	Arp.	May	Jun	Jul	Aug
PEPPER (Black)	Sarawak Black lable	Malaysia	-	Dollar/MT	7900.00	7700.00	7700.00	7700.00	7200.00	6200.00	6200.00	5000.00
				Rs./Qtl	53838.50	51520.70	49888.30	49326.20	46461.60	39878.40	40083.00	32000.00
RAPESEED	Canola	CANADA	Winnipeg	Can Dollar/MT	522.40	518.30	493.80	530.40	523.70	509.50	509.50	504.70
				Rs./Qtl	2719.61	2634.52	2399.87	2493.41	2510.09	2430.32	2546.48	2584.06
	UK delivered rapeseed, delivered Erith(buyer)	U.K.	-	Pound/MT	330.00	334.00	336.00	328.00	290.00	295.00	295.00	310.00
				Rs./Qtl	2832.72	2783.22	2716.56	2709.28	2394.82	2416.64	2463.55	2547.58
RAPESEED OIL	Refined bleached and deodorised ex-tanks, broker price	U.K.	-	Pound/MT	827.00	765.00	763.00	738.00	742.00	725.00	725.00	766.00
				Rs./Qtl	7098.97	6374.75	6168.86	6095.88	6127.44	5939.20	6054.48	6294.99
SOYABEAN MEAL	UK produced 49% oil & protein (‘hi-pro’) ex-mill seaforth UK bulk	U.K.	-	Pound/MT	325.00	329.00	310.00	310.00	271.00	284.00	284.00	278.00
				Rs./Qtl	2789.80	2741.56	2506.35	2560.60	2237.92	2326.53	2371.68	2284.60
SOYABEAN OIL		U.S.A.	-	C/lbs	34.87	32.72	32.21	31.91	32.28	31.36	31.36	34.00
				Rs./Qtl	5237.56	4825.21	4599.50	4505.32	4590.99	4445.63	4468.44	4795.90
	Refined bleached and deodorised ex-tanks, broker price	U.K.	-	Pound/MT	807.00	709.00	750.00	682.00	680.00	696.00	696.00	728.00
				Rs./Qtl	6927.29	5908.10	6063.75	5633.32	5615.44	5701.63	5812.30	5982.70
SOYABEANS		U.S.A.	-	C/60 lbs	1055.25	1022.75	969.00	945.75	948.25	930.75	930.75	936.00
				Rs./Qtl	2639.29	2511.46	2304.08	2223.46	2245.69	2197.08	2208.35	2198.48
	US NO.2 yellow	Netherlands	Chicago	Dollar/MT	425.60	425.60	-	386.20	387.10	380.70	380.70	392.70
				Rs./Qtl	2900.46	2840.88	-	2474.00	2497.96	2448.66	2461.23	2513.28
SUNFLOWER SEED OIL	Refined bleached and deodorised ex-tanks, broker price	U.K.	-	Pound/MT	796.00	786.00	791.00	766.00	760.00	756.00	756.00	793.00
				Rs./Qtl	6832.86	6549.74	6395.24	6327.16	6276.08	6193.15	6313.36	6516.87
Wheat		U.S.A.	Chicago	C/60 lbs	424.50	441.25	425.50	407.75	432.50	444.75	444.75	409.00
				Rs./Qtl	1061.72	1083.53	1011.75	958.62	1024.27	1049.85	1055.24	960.66

Source—Public Ledger

	CURRENCY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
Foreign	Can Dollar	52.06	50.83	48.6	47.01	47.93	47.7	49.98	51.2
Exchange	UK Pound	85.84	83.33	80.85	82.6	82.58	81.92	83.51	82.18
Rages	US Dollar	68.15	66.91	64.79	64.06	64.53	64.32	64.65	64

Crop Production

4. Sowing and Harvesting Operations Normally in Progress during the Month of November, 2017

State	Sowing	Harvesting
1	2	3
Andhra Pradesh	Paddy, Jowar (In some areas), Bengal Gram, horsegram, condiment, spices and potato	Kharif paddy, ragi, other Kharif cereals ginger and groundnut
Assam	Rabi paddy, gram, mustard, winter vegetables and potato	Kharif paddy, jute, tea and winter potato
Bihar	Wheat, Barley, Gram, rapeseed & mustard & sweet potato	Kharif paddy and Potato
Gujarat	Paddy, wheat, gram pulses and potato	Paddy, Kharif, jowar, groundnut, bajra and cotton
Himachal Pradesh	Wheat, barley and gram	Winter paddy, rabi kharif, sugarcane, ginger (dry), chillies (dry), tobacco, cotton, tumeric and sannhemp
Jammu & Kashmir	Wheat (in Kashmir), barley, Linseed, rapeseed and mustard	Maize (in Jammu)
Karnataka	Bengal gram, potato and rabi paddy	Kharif paddy, jowar, bajra, ragi, groundnut and sweet potato
Kerala	Paddy, pulses & Sweet Potato	Kharif paddy, sugarcane, ginger and tapioca
Madhya Pradesh	Wheat, barley, gram, rabi pulses, potato, rapeseed, mustard and castored	Kharif paddy, jowar, bajra, ragi, kharif, pulses, potato, chillies, tobacco, cotton sweet potato and turmeric
Maharashtra	Wheat, gram, barley, jowar and pulses	Kharif paddy, jowar, groundnut, bajra, cotton and sugarcane
Manipur		Winter paddy, tur, groundnut, sesamum, sweet potato and tumeric
Orissa	Wheat, sugarcane, tobacco, mustard gram and linseed	Kharif paddy, groundnut, sugarcane, cotton and sannhemp
Punjab	Wheat, Barley, gram & linseed	Jowar, bajra, maize, cotton and sugarcane
Rajasthan	Wheat, Barley, gram, potato, tobacco, rapeseed, mustard and lineseed.	Paddy, jowar, bajra, sugarcane and cotton
Tamil Nadu	Rabi paddy, jowar, cotton tobacco, horsegram, chillies, rapeseed and mustard	Kharif paddy, kharif jowar, cumbu ragi, maize, groundnut (unirrigated), cotton varagu, samai, tapioca & ginger
Tripura	Pulses, potato, rapeseed and mustard	Winter rice
Uttar Pradesh	Wheat, barley, gram, lineseed and cotton	Kharif paddy, jowar, bajra, sugarcane, Groundnut, cotton, tobacco and sannhemp
West Bengal	Wheat paddy, wheat, barley, linseed, rapeseed, mustard and potato	Winterpaddy, sugarcane, sesamum and cotton
Delhi	Wheat, barley, gram, pulses, tobacco, lineseed, rapeseed and mustard	Jowar, Kharif pulses, sugarcane, Sesamum and sweet potato

(K)-Kharif (R)-Rabi

GMGIPMRND—2426AGRI—26.10.2017.