AGRICULTURAL SITUATION IN INDIA

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Directorate of Economics and Statistics
Ministry of Agriculture and Farmers Welfare
Government of India

India Agricultural Outlook Forum 2020

Webinar: 15-16 October, 2020

Special Address
Shri Parshottam Rupala
Hon'ble Minister of State
Agriculture and Farmers Welfare

Keynote Speech
Mr. Sanjay Agarwal
Secretary
DAC&FW

Distinguished Speakers
Dr. Ramesh Chand
Member
NITI Aayog

Dr. Robert Johannson
Chief Economist
USDA

About the Forum

The Department of Agriculture, Cooperation & Farmers Welfare (DAC&FW) has been organizing 'India Agricultural Outlook Forum' regularly since 2017 to discuss emerging national and international agricultural scenarios and issues.

The "4th India Agricultural Outlook Forum 2020" is scheduled for October 15-16, 2020. The Forum would focus on major agricultural reforms initiated by the Government of India for better managing agriculture sector in the present pandemic situation.

Key Themes

- Agricultural Outlook
- Global Supply chain amid COVID-19 Pandemic
- Game-Changer Initiatives in Farm Sector
- Converging Domestic Agriculture Policy with International Commitments on Sustainable and Inclusive Farm Growth
- Decoding Agri-tech potential in India
- Exploring new channels including financial derivatives in rationalising the cost structure of Government Procurement Agencies
- Capacity building and Decent Employment Opportunity in Agriculture Sector

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From Editor's Desk

The 'Agricultural Situation in India' this month brings to you the Government's different farm-oriented policy initiatives; recent updates on the general agricultural scenario; two academic research articles dealing with analysis of determining factors and effectiveness of arecanut marketing channels in Kasaragod district of Kerala; and diffusion and economics of Bt cotton cultivation in Haryana; and an agro-economic research study report on the sugarcane transportation and harvesting cost in Uttar Pradesh.

The major initiatives and releases by the Government shared in the farm sector news are: the launch of "Sahakar Cooptube NCDC Channel" for guidance videos on formation and registration of a cooperative; funding startups under the innovation and agripreneurship component of Rashtriya Krishi Vikas Yojana; inaugural run of Devlali-Danapur Kisan Rail; various initiatives taken by Agriculture Mechanization and Technology Division for farmers' welfare under Atma Nirbhar Bharat Abhiyaan; launch of Krishi Megh, emphasis of Prime Minister Shri Narendra Modi on the "Atma Nirbhar Krishi/Kisan" to achieve the goal of "Atma Nirbhar Bharat" in his message to the Nation on the 74th Independence Day; comprehensive action plan for promotion of agri trade and export, Union Minister of Agriculture & Farmers Welfare, Shri Narendra Singh Tomar's discussions with chief ministers and state agriculture ministers on recent agriculture market reforms and implementation of the agriculture infrastructure fund; locust status update; increase in area coverage of kharif crop and inauguration of college and administration buildings of Rani Lakshmi Bai Central Agricultural University, Jhansi.

So far as the agricultural scenario is concerned, the Wholesale Price Index (WPI) of foodgrains, pulses, cereals, vegetables, wheat and paddy increased by 2.35 percent, 10.24 percent, 0.75 percent, 8.20 percent, 2.67 percent and 3.75 percent, respectively, in July, 2020 as compared to that in July, 2019. The 2020 cumulative monsoon season rainfall in the country has been 8 percent higher than the long period average during 1st June, 2020 to 26th August, 2020. Current live storage in 123 major water reservoirs in the country was 131.17 BCM as against 109.84 BCM of normal storage based on the average storage of last 10 years.

In the academic columns, in the first article, the authors examine the factors determining arecanut marketing and identify the effective marketing channels in the Kasaragod district of Kerala. The study is based on both primary and secondary data. Primary data was collected from two Panchayaths, namely, Manjeshwar and West Eleri of Kasaragod district with a sample of 60 farmers each. While, secondary data was collected from various published and unpublished reports related to arecanut marketing. In order to determine the factors affecting the quantity marketed of arecanut and extent of actual impact of each factor, multiple linear function models have been used. Estimate of marketing channels and its determinants, like sales price, farming experience and quantity marketed revealed that marketing channel I (Producer → local market) is most effective. Among farmers studied, channel I received higher sales price per quintal. Determinants of quantity marketed like family size, land holding, sales price, family consumption, non-farming income and farming experience are very important. Based on the findings, the author suggested that farmers should adopt modern practices and techniques to increase production and productivity of the crop. Agriculture department should provide better education to the farmers on arecanut production and marketing. It is recommended that the production related problems of the farmers should be addressed and solved. Development of infrastructure, such as roads and transport facilities for the strengthening of the effectiveness of arecanut marketing channels should be done by the Government.

The authors, in the second article, attempt to analyze the trend in area, production and yield of Bt cotton in major cotton growing districts of Haryana and to work out the economics of Bt cotton cultivation in the state over the time period 2005 to 2019. The study is based on the secondary data collected from various issues of Statistical abstract of Haryana, Department of Agriculture and Farmers Welfare, Govt. of Haryana and from the data presented in Agricultural Officers Workshops (AoWs) held at CCS Haryana Agricultural University, Hisar during 2011-2019. The analysis reveals that 79.80 percent of total cotton cultivated area is concentrated in five districts, *viz.*, Bhiwani, Fatehabad, Hisar, Jind and Sirsa in 2019. More interestingly, the area under Bt cotton is as high as 6.89 lakh ha in 2018-19, highlighting a near complete dominance of it with 98 percent of total cotton area in the state. The area, production and yield of cotton in Haryana unveiled CGR of 2.24 and -0.10 percent per annum, respectively, during the time period 2005-2019. It is suggested that there is an urgent need to focus on the cost cutting technology (mechanization of farm operations especially picking, hoeing/weeding) to enhance farm income and to reduce dependence on human labour. In addition, awareness should be created among cotton growers for adoption of recommended hybrids of Bt cotton to reduce the chances of recurrence of whitefly incidence in future and farmers should be trained for proper and timely application of plant protection chemicals for effective control of insect-pests and diseases.

In agro-economic research section, we are sharing a report on sugarcane transportation and harvesting cost in Uttar Pradesh prepared by Agro-Economic Research Centre, University of Allahabad, Prayagraj. The primary objective of the report is to estimate the harvesting cost / transportation cost of sugarcane; to estimate various factor/ input costs in the overall harvesting and transportation cost. For this purpose, the primary data was collected by using multi (three) stage stratified random sampling from Lakhimpur Khiri and Bijnor districts. Based on the findings, the study recommends for the provision of mechanized harvesting as well as mechanized loading/unloading facilities, efficient management of flow of trucks/tractor trollies and unloading operations by sugar mills towards lowering down the cost of production of sugar. It is also suggested that the good quality and early maturing variety sugarcane (seed) may be provided by the Government to the sugarcane growers for better sugarcane cultivation.

P. C. Bodh

Farm Sector News*

Union Minister of Agriculture & Farmers Welfare, Shri Narendra Singh Tomar launched the Sahakar Cooptube NCDC Channel

Union Minister of Agriculture & Farmers Welfare, Shri Narendra Singh Tomar, on 4th August, 2020, launched the Sahakar Cooptube NCDC Channel, a new initiative by National Cooperative Development Corporation (NCDC). Speaking on the occasion, Shri Narendra Singh Tomar said that the Ministry of Agriculture and Farmers Welfare is in the forefront of operationalizing different aspects of Atma Nirbhar Bharat call given by Prime Minister Shri Narendra Modi. Cooperatives have a major role in the country in realizing the Prime Minister's dreams. Shri Tomar also launched guidance videos produced by NCDC on formation and registration of a cooperative for eighteen different states in Hindi and regional languages.

Shri Tomar said that the Union Government under Atma Nirbhar Bharat has recently announced a series of transformative measures and sector specific financial packages to help agriculture. The initiatives are steps towards One Nation One Market with the objective for India to become food factory of the world. The gamut of exhaustive reforms and measures are intended to strengthen all activities and services in agriculture, horticulture and allied sectors through creation and development of agriculture infrastructure, micro food enterprises, value chains and logistics for fishery and animal husbandry, medicinal and herbal plants, bee keeping and Operation Green. Significant legislative amendments have been made to create conducive environment for agriculture.

Appreciating the efforts of NCDC, the Minister said that a key strategy in the ecosystem is to facilitate involvement of youth in cooperatives. Formation of new cooperatives is a pre-requisite for bringing new life and dedication in the realm of cooperative movement. The guidance videos in different languages covering 18 states would also strengthen and deepen the major initiatives of our government to promote and form 10,000 FPOs. NCDC has a major role in formation of FPOs in cooperative mode. More states would be added to the collection of guidance videos on NCDC Sahakar Cooptube Channel in due course of time.

NCDC as an apex level statutory institution under the Ministry of Agriculture & Farmers Welfare has achieved tremendous success with cumulative financial assistance to cooperatives to the tune of Rs. 1,54,000 crore. Beginning with meager disbursement of Rs. 2.36 crores in 1963, NCDC disbursed around Rs. 28,000 crore during 2019-20. NCDC has made unprecedented progress in the last six years. It has achieved 83% of the cumulative financial assistance calculated since 1963, during these last six years alone.

Cooperatives in India have come a long way and have proven their success in improving the condition of farmers and economic development. Largely as association of small and marginal farmers and rural poor, the cooperatives have acquired a huge network of over 8.50 lakh organizations and 290 million members. They have substantially contributed in raising the income of their members and achieving rural prosperity. Cooperatives lend strength to farmers to minimize risks in agriculture and allied sector and act as a shield against exploitation.

Ministry of Agriculture funding startups under the innovation and agripreneurship component of Rashtriya Krishi Vikas Yojana in 2020-21

The Union Government accords very high priority to the agriculture sector. In order to contribute directly and indirectly to enhance the income of farmers by providing opportunities to them and to provide employment to youth, startups are being encouraged. A component, Innovation and Agri-entrepreneurship Development programme has been launched under Rashtriya Krishi Vikas Yojana in order to promote innovation and agripreneurship by providing financial support and nurturing the incubation ecosystem. These startups are in various categories such as agro-processing, artificial intelligence (AI), digital agriculture, farm mechanisation, waste to wealth, dairy, fisheries, etc.

DAC&FW has selected 5 Knowledge Partners (KPs) as centres of excellence. These are:

*Source: www.pib.nic.in

i. National Institute of Agricultural Extension Management (MANAGE), Hyderabad,

ii. National Institute of Agricultural Marketing (NIAM) Jaipur,

iii. Indian Agricultural Research Institute (IARI), Pusa, New Delhi,

iv. University of Agriculture Science, Dharwad, Karnataka, and

v. Assam Agriculture University, Jorhat, Assam.

24 RKVY-RAFTAAR Agribusiness Incubators (R-ABIs) from across the country have also been appointed.

The following are the components of this scheme:

i. Agripreneurship Orientation - Two months duration with a monthly stipend of Rs. 10,000/- per month. Mentorship is provided on financial, technical, intellectual property issues, etc.

ii. Seed Stage Funding of R-ABI Incubatees – Funding upto Rs. 25 lakhs (85 percent grant & 15 percent contribution from the incubatee).

iii. Idea/Pre-Seed Stage Funding of Agripreneurs – Funding up to Rs. 5 lakhs (90 percent grant and 10 percent contribution from the incubatee).

The institutes issue calls for application for their programmes and based on a rigorous process of selection through various stages and a training of two months, the final list of startups that are to be funded through grants-in-aid are finalised. Training on technical, finance, intellectual property, statutory compliance issues, etc., is provided. Mentoring of startups through monitoring of milestones and timelines is part of the programme.

Some startups that are being incubated offer the following solutions:

i. Activx Animal Health Technologies branded as Vetzz, is a network of veterinary doctors which provides immediate connect with customers, *i.e.*, animal owners via real time tele-consultation and doorstep visits.

ii. SNL Innovations - InnoFarms provides fruit and vegetable pulp processed directly at the farm using an in-house developed monoblock fruit processing platform (on-wheels) to convert fruits to pulp with shelf life of up to one year with complete traceability from farm to customer.

iii. EF Polymer developed an Eco-Friendly Water Retention Polymer with an aim to solve the water scarcity crisis for farmers. This startup made a super absorbent polymer designed to absorb water in the soil, retain it for a long time, and supply to the crops as required.

iv. Among the startups that have been selected are several startups led by women such as A2P Energy Solution that uses AI to track waste biomass and then works with farmers to collect it. On one side it generates additional income for farmers and on the other side A2P converts the collected biomass into next-generation biofuels like energy pellets, green coal and bio oil.

v. Kyari Innovations is working on mitigating human wildlife conflict around pan India and internationally. They have created an innovative product called ANIDERS- Animal Intrusion Detection and Repellent System. This device works like a mechanized scarecrow that can protect farm lands from animal intrusions.

vi. Agsmartic Technologies has a vision to improve crop yield by precise irrigation and disease management though a data driven approach by using AI, internet of things (IoT) and computer vision. Their product Croplytics® is a combination of hardware and software solution that integrates ground sensor data and satellite imagery to translate data into actionable information for creating a precise model for irrigation.

Apart from the above mentioned 6 startups, there are many more with innovative solutions to improve the farming ecosystem and augment farm household incomes.

In all, a total of 346 startups in the agriculture and allied sectors are being funded for a sum of Rs. 3671.75 lakhs in this phase. This fund would be released in installments. These startups were trained for two months at 29 agribusiness incubation centres

(KPs & RABIs) spread across India. These start-ups would lead to employment to youth. Besides, they, directly and indirectly, would contribute to enhance the income of farmers by providing opportunities to them.

Inaugural run of 'Devlali-Danapur Kisan Rail' flagged off

Union Minister of Agriculture & Farmers Welfare, Shri Narendra Singh Tomar, flagged off the inaugural run of 'Devlali-Danapur Kisan Rail' on 7th August, 2020, through video conference in the presence of Union Minister of Railways, Commerce & Industry, Shri Piyush Goyal, who presided over the function. Union Minister of Finance, Smt. Nirmala Sitharaman, had made an announcement in the Union Budget 2020-21 to build a seamless national cold supply chain for perishables, inclusive of milk, meat and fish and it was also stated that the Indian Railways would set up a Kisan Rail through PPP arrangements.

Speaking on the occasion, Shri Narendra Singh Tomar said that Kisan Rail would help transport the produce of farmers to different parts of the country at a nominal cost, thus the farmer would benefit. This would help in achieving the vision of the Prime Minister for doubling farmers' incomes by 2022. Shri Tomar thanked Prime Minister Shri Narendra Modi for his vision of strengthening the transportation network across the country with a special emphasis on the transportation of perishable goods in a time bound manner. He said that due to non-availability of transportation, the farmers are not getting remunerative price for their farm produce and appreciated the efforts of Ministry of Railways to start Kisan Rail in the wake of the difficult COVID pandemic situation. Addressing the gathering through video conference, the agriculture minister stated that the government is committed towards the welfare of farmers by building a seamless national cold supply chain for perishable products in agriculture and animal husbandry sector. Mentioning that basic needs of farmers are being fulfilled by Kisan Rail, he expressed happiness that farmers' activities have not been affected even during the COVID lockdown and all the activities related to harvesting of rabi crops and sowing of summer and kharif crops have progressed in a satisfactory manner.

Shri Piyush Goyal mentioned that the first rail was run in 1853 from Bori Bundar to Thane and now first Kisan Rail is being run in 2020 by Government of India under the leadership of Prime Minister Shri Narendra Modi. The government has launched PM KISAN scheme in which Rs. 6000/- are being given to farmers' families and other many schemes/ programmes in order to double the farmers' income. Ministry of Railways is also working for increasing food chain supply so that farmers could get higher prices for their crops.

The flagging off ceremony was held in the presence of Shri Suresh Angadi, Union Minister of State for Railways, Shri Raosaheb Danve, Union Minister of State for Consumer Affairs, Food & Public Distribution, Shri Purshottam Rupala and Shri Kailash Choudhary, Union Ministers of State for Agriculture & Farmers Welfare, Shri Devendra Fadnavis, Leader of Opposition, Maharashtra Legislative Assembly, Shri Chhagan Bhujbal, Minister of Food, Civil Supply and Consumer Protection, Government of Maharashtra. The Secretary (AC&FW), Member Traffic (Ministry of Railways), and other officers of Ministry of Agriculture & Farmers Welfare and Ministry of Railways were present during the event.

In order to serve the purpose of the farming community of the country, Kisan Rail should be trains with multi commodities, multi-consignors and multi consignees. These trains shall run between fixed origin–destination pairs with en-route stoppages, and loading/ unloading shall be permitted at any of the en-route stoppage. The origin–destination pairs, routes, stoppages, and frequency of the train shall be decided jointly by the Ministry of Agriculture & Farmers Welfare (MoA&FW) and Ministry of Railways. Indian Railways would plan to run the trains accordingly.

The first-mile arrangements including aggregation of consignments through FPOs, warehousing, setting-up of temperature-controlled storages, etc., shall be coordinated by the Ministry of Agriculture & Farmers Welfare. MoA&FW would also promote startups in agri-infrastructure, promotion of new FPOs and strengthening of existing FPOs for backward integration. The Ministry would provide details of production centres on the Kisan Special Routes along with seasonality of produce. MoA&FW should also ensure that information regarding Kisan Rail is duly disseminated among all the stake-holders, such as mandis, farmers' co-operatives, NGOs, etc. Action required for ensuring that adequate back-end infrastructure is available

shall also be ensured by the Ministry of Agriculture & Farmers Welfare.

Agriculture Mechanization and Technology Division takes various initiatives for farmers' welfare under Atma Nirbhar Bharat Abhiyaan/ Krishi

Agricultural mechanization is one of the key drivers for sustainable development of agriculture sector which helps in increasing production by timely farm operations, reducing losses, reducing the cost of operations by ensuring better management of costly inputs. Mechanization also enhances the productivity of natural resources and reduces drudgery associated with various farm operations. Under the hash-tag #*AtmaNirbharKrishi*, created by Ministry of Agriculture and Farmers Welfare, Government of India, initiatives taken by Agriculture Mechanization and Technology Division are:

In order to lay special emphasis towards promotion of agricultural mechanization in the country and to bring more inclusiveness, Sub-Mission on Agricultural Mechanization (SMAM) had been initiated since April, 2014. In the year 2020-21, budget of Rs. 1033 crores have been provided for the scheme, out of which Rs. 553 crores have been released to the state governments.

Paddy straw burning is one of the major problems in the northern region of the country, causing environmental pollution. Paddy straw burning is currently practiced on a large scale in Punjab & Haryana to clear the fields for rabi crop sowing because the time window available between the harvesting of paddy crop and the sowing of next crops is very short (2-3 weeks). With an objective to wean away farmers of this region from crop residue burning, the scheme of CRM (Crop Residue Management) was initiated since 2018 by Ministry of Agriculture & Farmers Welfare, wherein, farmers are provided machinery for in-situ management of crop residue through establishment of CHCs (Custom Hiring Centres). Individual farmers are also provided subsidy for procurement of machinery. Total funds of Rs. 1178.47 crores were provided in the year 2018-19 & 2019-20 to the states of Punjab, Haryana, UP and NCT. In the year 2020-21, Rs. 600 crores has been provided in the budget for the scheme and Rs. 548.20 crores have been released to the states well before time to ensure that they can take up the activities in advance.

Ministry of Agriculture and Farmers Welfare has also developed a multilingual mobile app "CHC- Farm Machinery" which connects the farmers with custom hiring service centers situated in their locality. This app is facilitating agricultural mechanization in the country by encouraging small & marginal farmers to take machines on rental basis for agriculture practices without purchasing such high priced machines. The app has been further modified and now has been given the acronym of "FARMS-app" (Farm Machinery Solutions-app). The revised version is more user friendly and the scope of the app has also been enhanced.

Pandemic of COVID has influenced the lives of people across the globe and India is no exception to that. Farming activities and farmers also experienced the impact of this pandemic as the COVID resulted in lock-down, thereby, influenced the movement of farm inputs including farm machinery from one location to other. Lockdown came as a sudden shock for the farming community when harvesting season for rabi crops had just commenced. Migration of agricultural labourers to their native places during the lockdown, suddenly created a shortage of farm labourers. To mitigate the effect of shortage of farm labourers and to ensure the timely harvesting of rabi crops and uninterrupted supply of farm implements and machinery, Agriculture and Farmers Welfare Ministry in coordination with Ministry of Home Affairs, Government of India, relaxed the following activities in agricultural machinery sector:

i. Provision in the government guidelines that farming operations by farmers and farm workers in the field would continue during lock-down.

ii. Operations of Custom Hiring Centres (CHCs) related to farm machinery were relaxed.

iii. Shops of agricultural machinery and its spare parts (including supply chain) and repairs remained open.

iv. Seamless, intra and inter-state movement of harvesting and sowing related machines like combine harvesters and other agriculture/ horticulture implements was ensured.

v. Under the government subsidy programmes, agricultural manufactures were exempted from essential testing related activities like,

random selection of test samples, subsequent batch testing after the expiry validity of test reports, updating of CMVR, COP & type approval applicable to tractors, power tillers, combine harvesters and other self-propelled agricultural machinery till 31.12.2020. Testing of tractors as per revised BIS Standard IS 12207-2019 and implementation of new technical critical specifications of 51 agricultural machineries has also been deferred till 31.12.2020.

vi. Due to lock-down, closing out of borders and quarantine measures, disrupted the cross border movements of agricultural machines like combine harvesters & other agricultural machines across districts & states. The timely intervention of the M&T division of the Agriculture and Farmers Welfare Ministry and coordination with the state nodal officers of agricultural machineries, district administration and agricultural machinery manufacturers ensured the free movement of agricultural machines across the borders.

Pandemic of COVID has ramifying effects even in the lives of migrant labourers who basically migrate temporarily to urban agglomerates in search of jobs. Migrant labourers in large numbers migrated back to their native places due to lock-down and also due to the fear of future uncertainties. Ministry of Agriculture and Farmers Welfare rose to the occasion to help such migrant workers. With an objective to enhance their employment opportunities in their local areas, a special drive for skilling the migrant labourers in the field of agricultural machinery under "Aatm Nirbhar Bharat Abhiyan/ Krishi" has been initiated. Under this campaign, in-house skilling training programmes in 8 identified job roles/qualification packs is being organized at Farm Machinery Training and Testing Institutes (FMTTIs) at Budni in Madhya Pradesh and Hisar in Haryana. The first batch of the training has already been started with 56 trainees from Madhya Pradesh at CFMTTI, Budni and 68 trainees from Rajasthan and Uttar Pradesh at NRFMTTI, in Hisar. It was also crucial to institutionalize such initiative, therefore, necessary guidelines for skilling programmes of migrant labourers have also been incorporated in the operational guidelines of Sub Mission on Agricultural Mechanization (SMAM). The copy of operational guideline is available on the web portal *"http://farmech.dac.gov.in/"*.

Union Minister of Agriculture & Farmers Welfare Shri Narendra Singh Tomar launches Krishi Megh

Union Minister of Agriculture & Farmers Welfare, Shri Narendra Singh Tomar, on 11th August, 2020, virtually launched the Krishi Megh (National Agricultural Research & Education System -Cloud Infrastructure and Services) along with the KVC ALUNET (Krishi Vishwavidyalaya Chhatr Alumni Network) and online accreditation system for Higher Agricultural Educational Institutions (HEI).

The union minister emphasized that the Government of India-World Bank funded National Agricultural Higher Education Project is designed for strengthening the national agricultural education system in the country with the overall objective to provide more relevant and high-quality education to the agricultural university students that is in tune with the New Education Policy-2020. Shri Tomar accentuated the need to save and preserve the important research based data in a prompt digitalized form to enable its access anywhere in any corner of the country and the world. He also stressed on enabling private investments in agriculture. The Minister regarded the Krishi Megh as a step forward towards digital agriculture of new India as has been envisaged by Prime Minister Shri Narendra Modi.

Shri Parshottam Rupala, Union Minister of State for Agriculture & Farmers Welfare said that 2-3 ICAR Institutes should be made research centres of international repute. He also stressed on providing the real time data to the researchers.

Shri Kailash Choudhary, Union Minister of State for Agriculture & Farmers Welfare complimented ICAR for establishing the Krishi Megh that integrates the ICAR-Data Centre at ICAR-Indian Agricultural Statistics Research Institute, New Delhi with the Disaster Recovery Centre at the ICAR-National Academy of Agricultural Research Management, Hyderabad. The Minister regarded the initiative as a revolution in agriculture.

Dr. Trilochan Mohapatra, Secretary (DARE) & Director General (ICAR) underlined about 58 universities which have been supported in various categories under the ICAR National Agricultural Higher Education Project (NAHEP). The Director General highlighted about 377 students (UG, PG and Ph.D.) who have received international training / internships along with the training

provided to around 120 faculty members in the various international universities. He also stressed on maximizing the use of internet technology/ digitalization. Dr. Mohapatra highlighted the main features of the Krishi Megh that is equipped with the latest AI/deep learning software/tools kits for building and deploying of deep learning based applications through image analysis, disease identification in livestock, etc. He stressed that the Krishi Megh is a new chapter in digital India enabling the farmers, researchers, students and policy makers more equipped with updated and latest information regarding agriculture, research, education and extension in digital form generated by ICAR institutes and state agriculture universities.

Earlier, in his welcome address, Dr. R.C. Agrawal, Deputy Director General (Agricultural Education), ICAR briefed about the main objective of the programme. He highlighted the development of the KVC ALUNET that has been a result of an idea of social networking for the alumnus of the agricultural universities. He stressed that this shall enable the alumni of all the 74 agricultural universities in connecting with each other and making it possible to assist the students in internship, placements and to provide support to their alma maters.

Mr. Edward William Bresnyan, Task Team Leader, World Bank regarded the ICAR's initiative as a game changer that would bring a major transformation in the agricultural education system. The senior officials of ICAR and its institutes also virtually participated in the programme.

Key Features of Krishi Megh

i. For meeting the services and infrastructure needs of Digital Agriculture of National Agricultural Research and Education System (NARES), the existing data centre (ICAR-DC) built during 2012 shall be strengthened with cloud computing infrastructure.

ii. NARES-Cloud Infrastructure and Services with its constituents ICAR-DC and ICAR-Krishi Megh provide a robust and dynamic platform to meet the growing IT needs of the NARES system with the deployment of mission critical applications such as e-Office, ICAR-ERP, education portal, KVK portal and mobile apps, ICAR institute websites, academic management system, alumni portal, e-Courses of UG and PG level, etc.

iii. Under NAHEP, the outreach of existing ICAR data center is broadened to cover the agriculture universities enabling them to host their websites and IT solutions.

iv. In the present COVID-19 situation, 24x7 availability of IT applications though have made it possible to work from home as well as to collaborate with fellow scientists through video conferencing.

v. ICAR-Krishi Megh at NAARM Hyderabad, synchronized with ICAR-Data Center at ICAR-IASRI, New Delhi has been built to mitigate the risk, enhance the quality, availability and accessibility of e-governance, research, extension and education in the field of agriculture in India.

vi. NAARM, Hyderabad has been chosen as it lies in different seismic zone w.r.t. ICAR-Data Center at ICAR-IASRI, New Delhi. Hyderabad is also suitable as skilled IT manpower is available along with other suitable climatic conditions such as low humidity level which is controllable in the data center environment.

vii. This new centre has latest AI/deep learning software/tools kits for building and deploying of deep learning based applications such as disease and pest identification using image analysis, detection of maturity and ripening of fruits through image analysis, disease identification in livestock, etc.

Atma Nirbhar Krishi and Atma Nirbhar Kisan are important to achieve the goal of Atma Nirbhar Bharat – Prime Minister Shri Narendra Modi, in his address to the Nation on the 74th Independence Day

The ongoing COVID-19 pandemic and India's simultaneous graded and pro-active approach that made the country "Atma Nirbhar" found a place in Prime Minister Shri Narendra Modi's address to the Nation on the 74th Independence Day, as he highlighted the strides made by the country in the field of agriculture. Following is the extract regarding agriculture from the Prime Minister's Independence Day address from the ramparts of the Red Fort:

"My dear countrymen,

The priority of a self-reliant India is a self-reliant farming sector and self-reliant farmers. And we cannot ignore them. We have seen the condition of farmers. Various reforms have been undertaken since independence. We have to free them of all the shackles and we have done that.

You can't even imagine this. If you make soap, fabric or sugar in one corner you can sell it in any part of the country. But not many people know that our farmers could not sell their produce anywhere in the country and according to their will. He had to sell his produce at a notified area. We have eliminated all those restrictions.

Now India's farmer would be able to breathe free by selling his produce in any part of the country or the world according to his own terms. We have emphasized on several alternative measures to increase the income of the farmer. We are constantly working to reduce the input cost of the farming. How can he be provided a solar pump instead of a diesel pump, how can the producer of food become an energy producer? We are working in a direction so that avenues like bee farming, fisheries, poultry, etc., should be made available to him so that his income gets doubled.

Time demands that our agriculture sector becomes modern and there should be value addition, there should be food processing, food packaging. And it needs better infrastructure.

You must have seen that the Indian government has sanctioned 1,00,000 crore rupees for agriculture infrastructure even during the Corona pandemic. This infrastructure would be for the welfare of the farmers and they would be able to get better prices of their produce, and would be able to sell their produce in foreign markets. They would have greater reach to foreign markets.

There is a need to strengthen rural industries. Special economic zones would be created in the rural areas. A web of agriculture and non-agriculture industries would be created. We have tried to create FPO (Farmer Product Association) which would go a long way in their economic empowerment."

In keeping with the vision and priorities of Prime Minister Shri Narendra Modi, the Union Ministry of Agriculture & Farmers Welfare has taken several initiatives and spearheaded key reforms in agriculture in the recent past, which is reflected in the performance of India's agricultural sector.

India's agriculture sector presently contributes around 15.9% of the country's GDP and 49% of the total employment (2018-19). COVID-19 pandemic and subsequent lockdowns have affected most of the sectors of the economy. However, agricultural sector has performed better with 2.9% growth rate during 2019-20, as against 2.74% achieved during 2018-19. Farmers have toiled against all adversities during COVID and provided food security, ensuring continuous supply of agriculture commodities, especially staples like rice, wheat, pulses and vegetables. They have been our COVID warriors and their silent efforts, coupled with timely intervention by the Central and State Governments, ensured that there was no disruption to harvesting activities.

While COVID-19 pandemic has been challenging around the world, because of the reforms over the last 6 years, India's agricultural systems have been able to cope. Government has continued to appreciate the need for reform to pave the way for long lasting changes in the sector for the benefit of the farming community. Towards this end, two major ordinances have been passed recently to empower the farmers, namely, the Farming Produce Trade and Commerce (Promotion and Facilitation) Ordinance, 2020 and the Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Ordinance, 2020, both promulgated on 5th June, 2020.

In line with the continued commitment and resolve of the Government towards improving the agriculture and the financial status of farmers funds have been released under two major initiatives - Pradhan Mantri Kisan Samman Nidhi Yojna (PM-KISAN) and Agriculture Infrastructure Fund. Under the PM-KISAN Scheme, financial benefit of Rs. 6000/- per year is provided to the eligible beneficiary farmers, payable in three equal four monthly instalments of Rs. 2000/- each. On 9th August, 2020, with the push of a button, an amount of more than Rs. 17,000 crores have been transferred to about 8.5 crore beneficiary farmers' families. Post this huge transfer of funds in the sixth quadrimester of the scheme, more than Rs. 90,000 crores have been transferred to more than 10 crore beneficiaries since its inception.

In addition to the direct cash support under PM-KISAN, to create an ecosystem for farmer welfare and support them to build community farming assets

and drive greater investment in the agriculture value chain, a new central sector scheme of financing facility of Rs. one lakh crore under "Agriculture Infrastructure Fund" has been approved by the government. The objective is to drive investment across the agriculture value chain. The scheme would benefit farmers by improving marketing infrastructure and for building community farming assets that would allow them to store their produce till they can get a better price, reduce wastage and access affordable post harvest infrastructure.

The scheme provides farmers collectives and entrepreneurs access to Rs. 1,00,000 crore over next 4 years with Rs. 10,000 crore in the first year and Rs. 30,000 crore each over next 3 years. Farmers and other ecosystem stakeholders would now have access to financing with 3% interest subvention and credit guarantee from government This would enable them to invest more profitably in assets that enhance the value of their produce.

Farmer Welfare Programme Implementation Society under Department of Agriculture Cooperation & Farmers Welfare would lead the administration of the fund. State Level Monitoring Committee would steer the implementation in state. District Level Monitoring Committee would identify the beneficiaries, prepare project reports, and monitor progress. NABARD has taken a lead in facilitating agri-infra projects through grass-root level cooperative institutions.

Within one month of launching of the fund, more than Rs. 1,000 crore have been sanctioned to more than 2,280 farmer societies. In addition to fast track implementation, all public sector banks and financial institutions have been on-boarded by signing MoUs to increase uptake.

Ministry of Agriculture has prepared a comprehensive action plan towards promotion of agri trade; the twofold approach focuses on boosting Agri Export with emphasis on value addition and action plan for Import Substitution

Self-reliant agriculture is critical for the goal of an Atma Nirbhar Bharat. For this, agricultural export is extremely important as besides earning precious foreign exchange for the country, the exports help farmers/producers/exporters to take advantage of wider international market and increase their income. Exports have also resulted in increased production in agriculture sector by increasing area coverage and productivity.

As per WTO's trade statistics, share of India's agricultural exports and imports in the world agriculture trade in 2017 was 2.27 percent and 1.90 percent, respectively. Even during the difficult time of pandemic lockdown, India took care to not to disturb the world food supply chain and continued to export. The exports of Agri-commodities during March, 2020 to June, 2020 were Rs. 25552.7 crore against an export of Rs. 20734.8 crore during the same period in 2019, showing a sharp increase of 23.24 percent.

The agricultural exports as a percentage of India's agricultural GDP has increased from 9.4 percent in 2017-18 to 9.9 percent in 2018-19. While the agricultural imports as a percentage of India's agricultural GDP has declined from 5.7 percent to 4.9 percent indicating export surplus and decreased dependence on import of agricultural products in India.

Giant strides have been made in agri-export since independence. In 1950-51, India's agri-export was about Rs. 149 crores which has risen to the level of Rs. 2.53 lakh crores in 2019-20. There has been substantial increase in export of almost all the agricultural items in the last 15 years, but despite being one of the top producers of agricultural products, India does not figure among top exporters of agricultural produce. For example, India holds second rank in the world wheat production but ranks 34th in export. Similarly, despite being world No. 3 in production of vegetables, the export ranking of India is only 14th. Same is the case for fruits, where India is the second largest producer in the world but export ranking is 23rd. To reach the ranks of top exporting nation in agriculture, commensurate with the production, there is a clear and categorical need to take proactive interventions.

In view thereof, DAC&FW has prepared a comprehensive action plan/strategy towards promotion of agri trade. A detailed exploration of data and issues of pre-production, production, and post-harvest has been undertaken to evolve an end to end approach for developing a holistic strategy. An analysis of product groups and then specific commodities has been done with regard to present status of production & exports, strengths, challenges and thereafter interventions have been identified

after consultations with stakeholders. The twofold approach addresses boosting agri-export with emphasis on value addition and focused action plan for import substitution. The interventions so identified have been converted into a timed action plan.

To mention a few, the export strategy focuses on export promotion of fast evolving niche markets of wellness food/health conscious food/nutraceuticals; development of "Brand India" in campaign mode to help penetration into new foreign markets and of new products which automatically translates into higher value realisation; Gulf countries have been identified as focus destination to increase the market share which is a strong market for India, though presently India caters to only 10-12% share of their total imports. A product market matrix has been made containing list of products of strength which could be expanded in new geographies and list of known markets which can be introduced with new products.

It is also noted that horticulture is a growing sub-sector. India holds second position in production of fruits and vegetables. It exports 8.23 lakh MT (LMT) of fruits worth Rs. 5,638 crores and 31.92 LMT of vegetables worth Rs. 5,679 crores annually. Grapes occupy the premier position in fresh fruit exports followed by mango, pomegranate, banana, and oranges. In fresh vegetable export basket, onions, mixed vegetables, potatoes, tomatoes, and green chilly are the major items. However, world trade of fruits and vegetables is US$ 208 billion and India's share is miniscule. There is huge potential to increase export in fruits and vegetables. As such, specific strategy for export promotion has also been evolved for fresh fruits & vegetables with specific emphasis on grapes, mango, pomegranate, onion, potato & cucumber-gherkin.

It is also emphasised that the existing agri-clusters are required to be strengthened and more product clusters to be developed to fulfil the gap of bulk quantity and quality of supplies. A time bound action plan has also been prepared for import substitution with particular focus upon edible oils, cashew, fruits and spices, thereby making India self –reliant.

At the behest of Department of Agricultural Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, product specific export promotion forums have been created to lead agri-exports to new heights. Export Promotion Forums (EPFs) for eight agri & allied products, *viz.*, grapes, mango, banana, onion, rice, nutri-cereals, pomegranate and floriculture have been constituted under the aegis of Agricultural and Processed Food Products Export Development Authority (APEDA), Department of Commerce.

Each export promotion forum shall be having exporters of the related commodity as its members along with official members representing concerned ministries/departments of the central and state governments. Chairman APEDA shall be the chairman of each of these forums. The forums would meet at least once in every two months, to discuss/ make recommendations on issues pertaining to export of the respective commodity and invite experts, etc., to the meeting for interaction, as required.

The Forums would constantly monitor and identify/anticipate developments in the external/ internal situation pertaining to the production and export of their respective commodity and recommend /intervene for taking the necessary policy/ administrative measures. They would be in active touch with the producers, exporters and other relevant stakeholders of respective commodities and hear their problems, and facilitate, support and provide solutions to them. They would regularly study the market for respective commodities on a global basis, and identifying opportunities and developments /implications for domestic entities, and disseminate the same expeditiously to domestic producers and exporters.

The recommendations of the forum would be placed in the product committee/authority of APEDA. The forum would keep in close contact with the concerned organisation of Ministry of Agriculture such as MIDH, Extension, NPPO, DGFT, Ministry of Civil Aviation, MoFPI, etc., to further the interest of agricultural export.

Union Minister of Agriculture & Farmers Welfare, Shri Narendra Singh Tomar holds discussions with Chief Ministers and State Agriculture Ministers on recent agriculture market reforms and implementation of the Agriculture Infrastructure Fund

Union Minister of Agriculture & Farmers Welfare, Rural Development & Panchayati Raj, Shri Narendra

Singh Tomar on 21st and 27th August, 2020, held detailed discussions with chief ministers and state agriculture ministers on recent agriculture market reforms and the new central sector scheme of financing facility under the agriculture infrastructure fund of Rs. one lakh crore. The event was conducted through video conference and the Chief Ministers of Haryana, Madhya Pradesh, Uttarakhand and Agriculture Ministers of Bihar, Himachal Pradesh, Gujarat and Union Ministers of State for Agriculture Shri Purshottam Rupal and Shri Kailash Chaudhry participated in the discussion on the first day. Chief Minister of Uttar Pradesh, Shri Yogi Adityanath, Chief Minister of Maharashtra, Shri Uddhav Thackeray, and Agriculture Ministers of Rajasthan, Kerala, Chhattisgarh and Telangana also discussed the same on next meeting.

During the discussions, Shri Tomar emphasized that it has to be ensured that full benefit of the Rs. one lakh crore Agri Infrastructure Fund reaches the small and medium farmers who comprise more than 85 percent of the total farmers in the country. He said that the Prime Minister has allocated such a large fund for the farmers, which is a historical step. The Union Agriculture Minister said that the new ordinances brought in by the government are totally farmer-welfare oriented and there is no need to get misled on the issue of minimum support price. Procurement from farmers on the basis of MSP would continue as before. The chief ministers and state agriculture ministers gave full assurance that no stone would be left unturned in ensuring utilization of the Rs. one lakh crore fund, and new infrastructure would be created in all the villages.

The union minister shared the aspirational vision for agriculture under "Atma Nirbhar Bharat", highlighting the focus on transforming farmers into entrepreneurs and doubling farmers' incomes. He noted the various reforms and schemes launched by the government to strengthen the vision for the agriculture sector, including the agriculture infrastructure fund, the scheme for facilitation and promotion of 10,000 FPOs, three recent ordinances, and benefits released under PM-KISAN and KCC for the farmers.

Shri Tomar said that farmers are going to benefit greatly from the ordinances of the central government. Contract farming and cluster farming would increase the income of farmers. For formation of 10,000 FPOs under the scheme, a provision of 6865 crore has been made under which 85 percent small farmers would be benefited. These FPOs would have a big role in terms of increasing the production and productivity of small farmers. Collective facilities like irrigation, fertilizer and seeds, etc., would reduce the cost of cultivation. Discussions would be held with states in the next round of meetings.

The union minister and chief ministers/ ministers discussed the benefits of the scheme and how it would help states can drive growth in investment, create new jobs in the agriculture and allied sectors, and improve farmers' income. There was a detailed deliberation on the opportunity across states to invest in post-harvest management solutions and community farming assets like modern silos, cold chains, integrated pack-houses, and IoT/ precision agriculture. The group also exchanged views on how different groups, including FPOs, PACS, and startups, can avail the benefits under the scheme, thereby creating an ecosystem that reaches farmers in every corner of the country. The union minister emphasized how states should explore convergence with multiple central and state schemes to improve the economics of the investments under the Agriculture Infrastructure Fund.

Finally, the union minister discussed the implementation of the scheme with the chief ministers/ministers, highlighting the importance of comprehensively identifying projects that can address current infrastructure gaps, and assuring them full cooperation of the Centre for fast-track implementation. The chief ministers assured expeditious implementation of the scheme in the states to enable farmers to realize benefits.

Madhya Pradesh Chief Minister, Shri Shivraj Singh Chauhan, disclosed that a state level monitoring committee has been constituted to ensure full utilization of the allotted fund. The state government is also taking up formation of new farmer producer organizations on mission mode. At least two proposals would be sent from each block. One District - One Product scheme is also being implemented, which would give a boost to products unique to these districts. Startups are being promoted and mandis are being modernized in the state. Haryana Chief Minister, Shri Manohar Lal Khattar, said that the state has formulated projects for the fund allocated to the state under agri infrastructure fund. He said that there are 500 FPOs in the state, and 500 more would be formed. 17000 Kisan Mitra would

help to create awareness among 17 lakh farmers about the provisions in the ordinances. Uttarakhand Chief Minister, Shri Trivendra Singh Rawat said that infrastructure would be created in accordance with local requirements, so that farmers get facilities at their doorsteps.

In next meeting, assuring that the UP Government will work with full dedication for welfare of farmers under the Atma Nirbhar Bharat package, Chief Minister of Uttar Pradesh, Shri Yogi Adityanath informed that more than 2.14 crore farmers have benefitted under the PM-KISAN scheme in the state. 12 lakh new KCCs are being given in addition to the 1.44 crore KCCs already issued. One FPO is being formed in each of the 825 blocks in the state. Chief Minister of Maharashtra, Shri Uddhav Thackeray expressing gratitude towards the Prime Minister and Union Agriculture Minister for formulating and implementing a national scheme for agricultural development at a fast pace. He said that to make the farmers self-reliant, it is essential to create basic facilities for them, for which provision has been made in the Agri Infrastructure Fund.

Mr. Vivek Agrawal, Joint Secretary, Ministry of Agriculture and Farmers Welfare made a presentation of the plan, and suggested to create a project management unit in the states. The Agriculture Infrastructure Fund is a medium-long term debt financing facility for investment in viable projects for post-harvest management infrastructure and community farming assets through interest subvention and credit guarantee. The duration of the scheme shall be from FY2020 to FY2029 (10 years). Under the scheme, Rs. one lakh crore would be provided by banks and financial institutions as loans with interest subvention of 3% per annum and credit guarantee coverage under CGTMSE for loans up to Rs. 2 crore. The beneficiaries would include farmers, FPOs, PACS, marketing cooperative societies, SHGs, joint liability groups (JLG), multipurpose cooperative societies, agri-entrepreneurs, startups, and central/ state agency or local body sponsored public-private partnership projects.

The Agriculture Infrastructure Fund is one of the latest steps in a series of reforms undertaken by the Government of India in the agriculture sector. The scheme would support farmers, PACS, FPOs, agri-entrepreneurs, etc., in building community farming assets and post-harvest agriculture infrastructure. These assets would enable farmers to get greater value for their produce as they would be able to store and sell at higher prices, reduce wastage, and increase processing and value addition. The guidelines of the scheme have been issued. A portal has also been launched.

Agriculture ministers of Bihar, Himachal Pradesh, Gujarat, Chairman of NABARD, and Union Ministers of State for Agriculture Shri Kailash Choudhary and Shri Parshottam Rupala also expressed their views.

As per Food and Agriculture Organization's latest Locust Status Update, the risk of swarm migration to the Indo-Pakistan summer breeding area has nearly subsided

Starting from 11th April, 2020 till 25thAugust, 2020, control operations have been done in 2,79,066 hectares area in States of Rajasthan, Madhya Pradesh, Punjab, Gujarat, Uttar Pradesh and Haryana by Locust Circle Offices (LCOs). Till 25th August, 2020, control operations have been done in 2,87,374 hectares area in States of Rajasthan, Madhya Pradesh, Punjab, Gujarat, Uttar Pradesh, Maharashtra, Chhattisgarh, Haryana, Uttarakhand and Bihar by State Governments.

No locust adults or hoppers were spotted in any of the affected areas on 25th August, 2020. However, adequate manpower is on vigil for survey and control with sufficient vehicles and spray equipment in the State/s of Rajasthan, and Gujarat. Intensive survey operations are continued by LCOs to locate and eliminate locust population, if any.

As per the Food and Agriculture Organization's Locust Status Update of 24th August, 2020, the risk of swarm migration to the Indo-Pakistan summer breeding area has nearly subsided. Weekly virtual meeting on Desert Locust of South-West Asian countries (Afghanistan, India, Iran and Pakistan) is being organized by FAO. 23 virtual meetings of the technical officers of South West Asian countries have taken place so far.

Kharif crops sown on 1082.22 lakh ha area till now; increase in area coverage by 7.15% compared to corresponding period of last year

There has been satisfactory progress of sowing area coverage under kharif crops. Sowing area coverage of kharif crops, as on 28.08.2020, the total kharif

crops has been sown on 1082.22 lakh ha area against 1009.98 lakh ha area during the corresponding period of last year, thus, increase in area coverage by 7.15% compared to corresponding period of last year in the country. The crop wise area sown is as under:

i. Rice: About 389.81 lakh ha area coverage under rice as compared to 354.41 lakh ha during the corresponding period of last year. Thus, 35.40 lakh ha more area has been covered compared to last year.

ii. Pulses: About 134.57 lakh ha area coverage under pulses as compared to 128.65 lakh ha during the corresponding period of last year. Thus, 5.91 lakh ha more area has been covered compared to last year.

iii. Coarse Cereals: About 176.89 lakh ha area coverage under coarse cereals as compared to 172.49 lakh ha during the corresponding period of last year. Thus, 4.40 lakh ha more area has been covered compared to last year.

iv. Oilseeds: About 193.29 lakh ha area coverage under oilseeds as compared to 170.99 lakh ha during the corresponding period of last year. Thus, 22.30 lakh ha more area has been covered compared to last year.

v. Sugarcane: About 52.29 lakh ha area coverage under sugarcane as compared to 51.68 lakh ha during the corresponding period of last year. Thus, 0.61 lakh ha more area has been covered compared to last year.

vi. Jute & Mesta: About 6.97 lakh ha area coverage under jute & mesta as compared to 6.86 lakh ha during the corresponding period of last year. Thus, 0.11 lakh ha more area has been covered compared to last year.

vii. Cotton: About 128.41 lakh ha area coverage under cotton as compared to 124.90 lakh ha during the corresponding period of last year. Thus, 3.50 lakh ha more area has been covered compared to last year.

PM inaugurates College and Administration Buildings of Rani Lakshmi Bai Central Agricultural University, Jhansi through video conferencing

The Prime Minister, Shri Narendra Modi, on 29th August, 2020, inaugurated the college and administration buildings of Rani Lakshmi Bai Central Agricultural University, Jhansi, UP through video conferencing. He also interacted with the students of the university.

PM congratulated everyone and expressed hope that students after graduating from this university will actively contribute in empowering the country's agriculture sector. He hoped that new facilities provided due to the new building would encourage and motivate students to work harder.

Invoking Rani Lakshmi Bai's quote that "I will not give my Jhansi", the Prime Minister urged the people of Jhansi and Bundelkhand to make Atma Nirbhar Bharat Abhiyan a success.

The prime minister noted that agriculture has a major role to contribute in Atma Nirbhar Bharat Abhiyan. He said self-reliance in agriculture targets at making farmers both-producer as well as entrepreneur. PM said in line with this spirit, several historic agricultural reforms were taken. Just like other industries, now farmers can also sell their produce anywhere in the country, wherever they fetch better prices. He said a special dedicated fund of Rs. one lakh crore has been set up for providing better facilities and promoting industries in a cluster based approach.

Saying that steady efforts are continuing to connect farming with modern technology, the Prime Minister noted that research institutions and agricultural universities have a vital role to play. He said now there are three central agricultural universities in the country, compared to just one central university 6 years ago. Besides this, three more national institutions, *viz*., IARI Jharkhand, IARI Assam and Mahatma Gandhi Institute for Integrated Farming in Motihari, Bihar are also being established. He remarked that these institutes will not only give new opportunities to the students, but will also help in increasing their capacity, in providing technology benefits to the local farmers.

Speaking about use of modern technology in meeting agriculture related challenges, the prime minister gave an example of recent locust attack. He said that the government worked on war foot to control the spread of the attacks and to reduce the damage. He mentioned that dozens of control rooms were set up in several cities, arrangements

were made to alert farmers in advance, drones to spray, dozens of modern spray machines used to kill locusts were procured and provided to farmers.

The PM said that in the last six years, the government has endeavoured to establish a link between research and farming, and to provide scientific advice to the farmers, at the ground levels in the villages. He sought the cooperation of the universities in developing the ecosystem to streamline the flow of knowledge and expertise from campus to agriculture fields.

Stressing on the need to take knowledge related to agriculture and its practical application to school level, the prime minister said efforts are to introduce the agriculture subject at middle school level in villages. It will have two benefits one, it will develop agriculture related understanding in the students and secondly, it will enable the students to give information about agriculture, its modern farming techniques and marketing, to their family members. This will promote agro-entrepreneurship in the country, he added.

Earlier in his welcome address, Union Minister of Agriculture & Farmers Welfare, Shri Narendra Singh Tomar said that along with the mantra of Sabka Saath Sabka Vikas, the efforts to correct the imbalances in the country under the leadership of Prime Minister Shri Narendra Modi since 2014 have now started showing results. Work on the Rani Laxmibai Central Agricultural University started in the year 2014 and now it has three affiliated colleges and students from 22 states are studying here. When it becomes fully operational, the whole country will benefit. Shri Tomar said that there is unlimited potential for organic farming in Bundelkhand areas for which central government and UP government are working together.

Speaking about the priority being given to expansion of agricultural education, Shri Tomar said that agricultural colleges are being opened all over the country including in the north east. Indian Agricultural Research Institutes have been opened in Jharkhand and Assam and have started functioning. Central Agricultural University, Imphal has been expanded by affiliating 6 new colleges with it. Giving importance to agriculture in bringing about development and security of livelihood in the north east, farming activities there are being strengthened by agricultural education and research. Scholarships for Ph.D. students have been increased to Rs. 31000 per month.

Chief Minister of Uttar Pradesh, Shri Yogi Adityanath expressed gratitude for establishment of Central Agricultural University in the backward Bundelkhand region. He appreciated the efforts being taken under the Hon'ble Prime Minister for doubling farmers' incomes, connecting farmers to technology, providing them basic infrastructure and good quality seeds.

Shri Parshottam Rupala and Shri Kailash Choudhary, Union Ministers of State for Agriculture, Shri Anurag Sharma, Jhansi MP, Dr. Trilochan Mohapatra, DG (ICAR) and other eminent persons and scientists were also present during the function.

General Survey of Agriculture

Trends in Foodgrain Prices

Based on Wholesale Price Index (WPI) (2011-12=100), WPI in case of foodgrains increased by 2.35 percent in July, 2020 over July, 2019.

Among foodgrains, WPI of pulses, vegetables and cereals increased by 10.24 percent, 8.20 percent and 0.75 percent, respectively and fruits decreased by 3.03 percent, in July, 2020 over July, 2019.

Among cereals, WPI for wheat and paddy increased by 2.67 percent and 3.75 percent, respectively, in July, 2020 over July, 2019.

Similarly, WPI in case of foodgrains decreased by 0.25 percent in July, 2020 over June, 2020.

Among foodgrains, WPI of pulses and vegetables increased by 0.13 percent and 25.15 percent and WPI of fruits and cereals decreased by 0.13 percent and 0.37 percent in July, 2020 over June, 2020.

Among cereals, WPI for paddy increased by 0.24 percent and for wheat decreased by 0.69 percent in July, 2020 over June, 2020.

Rainfall and Reservoir Situation, Water Storage in Major Reservoirs

Cumulative monsoon season, 2020 rainfall for the country as a whole during the period 1st June, 2020 to 26th August, 2020 has been 8% higher than the Long Period Average (LPA). Rainfall in the four broad geographical divisions of the country during the above period has been higher than LPA by 23% in South Peninsula, by 15% in Central India and by 4% in East & North East India but lower than LPA by 13% in North-West India. Out of 36 meteorological sub-divisions, 12 meteorological sub-divisions received large excess/excess rainfall, 20 meteorological sub-divisions received normal rainfall and 4 meteorological sub-divisions received deficient/large deficient rainfall.

Out of 685 districts for which rainfall data available, 67(10%) districts received large excess rainfall, 142(21%) districts received excess rainfall, 332(48%) districts received normal rainfall, 130(19%) districts received deficient rainfall and 14(2%) districts received large deficient rainfall.

Current live storage in 123 reservoirs (as on 27th August, 2020) monitored by Central Water Commission having Total Live Capacity of 171.09 BCM was 131.17 BCM as against 129.03 BCM on 27.08.2019 (last year) and 109.84 BCM of normal storage (average storage of last 10 years). Current year's storage is 102% of last year's storage and 119% of the normal storage.

As per latest information, around 101.1% of the normal area under Kharif crops has been sown up to 28.08.2020. Total area sown under Kharif reported at 1082.22 lakh hectares as compared to 1009.98 lakh hectares during the same period last year.

A statement indicating comparative position of area coverage under major crops as on 28.08.2020 during current Kharif season *vis-a-vis* the coverage during the corresponding period of last year is given in the table 1.

TABLE 1: All India Crop Situation - Kharif (2020-21) as on 28.08.2020

[In lakh ha.)

Crop name	Normal area for whole kharif season IDES)	Area sown reported			Absolute change
		This year 2020	% of Normal for whole season	Last year 2019	
Rice	397.29	389.81	98.1	354.41	35.40
Jowar	20.56	16.29	79,2	16.18	0.11
Bajra	72.98	67.18	92.1	65.46	1.72
Maize	74.70	80.03	107.1	78.86	1.18
Total Coarse Cereals	184.85	176.89	95.7	172.49	4.40
Total Cereals	582.14	566.70	97.3	526.90	39.80
Tur	44.29	47.10	106.3	44.55	2.55
Urad	35.53	37.52	105.6	37.09	0.43
Moong	30.49	34.85	114.3	30.19	4.66
Kulthi	2.13	0.17	7.8	0.10	0.07
Others	16.45	14.93	90,8	16.73	-1.80
Total Pulses	128.88	134.57	104.4	128.65	5.91
Total Foodgrains	711.03	701.26	98.6	655.55	45.71
Groundnut	41.41	50.36	121.6	37.07	13.29
Soyabean	110.32	120.53	109.3	112.70	7.84
Sunflower	1.64	1.11	68.0	0.86	0.25
Sesamum	16.73	13.48	80,6	12.72	0.76
Nigerseed	2.23	1.28	57,5	1.18	0.10
Castorseed	9.07	6.52	71.9	6.45	0.07
Total Oilseeds	181.39	193.29	106.55	170.99	22.30
Cotton	122.27	128.41	105.0	124.90	3.50
Sugarcane	48.46	52.29	107.9	51.68	0.61
Jute & Mesta	7.60	6.97	91.7	6.86	0.11
All- Crops	1070.75	1082.22	101.1	1009.98	72.24

Source: Crops & TMOP Divisions, DAC&FW

Articles

Arecanut Marketing Channels: Determining Factors and Effectiveness in Kasaragod District of Kerala

DR. N. KARUNAKARAN * AND SHILPA. V K **

Abstract

Arecanut is an important commercial crop in India and finds a place in all religious, social and cultural functions. Cultivation of arecanut is mostly confined to the states of Karnataka, Kerala and Assam, but its consumption spread all over the country. India is considered as the largest arecanut producing country in the world. The share of Karnataka, Kerala and Assam in terms of total area under cultivation and production of arecanut is around 88 percent. In Kerala, the area under arecanut is spread in almost all districts and the Kasaragod district ranks first. Arecanut marketing is the systematic performance of business activities related to processing, grading, standardizing, assembling, transporting, storing, financing, selling and distributing to make it available to the ultimate consumers. Market is a means or a channel for the free flow of products to the consumers, where the traders and consumers are actively participated. Marketing channels are the routes through which arecanut produce moves from the hands of producers to the ultimate consumers and so, in this study we analysed the factors determining arecanut marketing and identified the effective marketing channels in the Kasaragod district of Kerala. Estimate of marketing channels and its determinants, like sales price, farming experience and quantity marketed revealed that marketing channel I (Producer → local market) is most effective. The regression coefficients of land holding, farming experience and sales price were positively associated with quantity marketed. It is suggested that farmers should adopt modern practices and techniques to increase production and productivity of the crop. Agriculture department should provide better education to the farmers on arecanut production, and marketing. It is recommended that the production related problems of the farmers should be addressed and solved.

Keywords: *Kasaragod, arecanut, marketing channels, effectiveness.*

1. Introduction

India ranks first in the world in terms of production of arecanut. In the country, share of Karnataka, Kerala and Assam is very high compared to other states. In Kerala, the area under arecanut is spread in almost all districts. Kasaragod, Malappuram and Wayanad districts stands on top positions in area under cultivation. Kasaragod district ranks first in arecanut production in the state. Still, most of the farmers in the district are facing problems mainly related to marketing of the crop. In marketing, existence of various intermediaries leads to decrease in farmers share in consumer rupee. Arecanut farmers' share in consumer rupee is far lower compared to other crops like cereals, pulses, oilseed, vegetable and fruits, where farmers have higher percentage of consumer rupee.

1.1. Objectives of the study

The main objectives of the study are:

(i) To identify the different marketing channels.

(ii) To analyse the determining factors and effective marketing channel of arecanut in the Kasaragod district of Kerala.

1.2. Review of literature

Ramappa (2013), Karunakaran & Gangadharan (2013) and Karunakaran (2013) examined the trend, cost of production and method of sale of arecanut in Kerala and other states of India. Naagarajan & Meenakshi (2016) examined the production and export of arecanut in India. Gupta *et al.* (2018) also

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examined perspectives on arecanut with some global implications. Adejo *et al.* (2011), Anand *et al.* (2012) and Bhagat & Dhar (2013) conducted study on dynamics of arecanut supply chain. Karunakaran (2014) analyzed the arecanut marketing in Kerala with special focus on Chennagiri and Central Arecanut and Cocoa Marketing and Processing Co-operative (CAMPCO) Limited, Mangalore. Kirankumar R. Patil *et al.* (2012) and Karunakaran (2014) studied the degree of supply response of arecanut with respect to price and non-price factors.

2. Methodology

The study is based on both primary and secondary data. Primary data was collected from two Panchayaths, namely, Manjeshwar and West Eleri of Kasaragod district. From both the Panchayaths, a sample of 60 farmers was selected to collect data. The data related to marketing aspect of arecanut was collected using specially designed pre-tested schedule. Secondary data was collected from various published and unpublished reports related to arecanut marketing.

In order to determine the factors affecting the quantity marketed of arecanut and the extent of actual impact of each factor, multiple linear function models have been used.

$$Y=b_0+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+b_6X_6+b_7X_7 \ldots\ldots (1)$$

Where, Y = Quantity marketed of arecanut;

X_1 = Total production (in quintal),

X_2 = Family size (in number),

X_3 = Land holding (in acre),

X_4 = Sales price (in Rs./quintal),

X_5 = Family consumption (in Rs.),

X_6 = Farming experience (in years),

X_7 = Non-farming income (in Rs),

b_0 = Regression constant or intercept; b_1, b_2, b_3..... b_7 are regression coefficients.

3. Results and Discussion

Arecanut is an important plantation crop grown in India mainly by the small and marginal farmers. India is one among the leading producers of arecanut with an area of 4.97 lakh hectares and a production of 8.33 lakh tonne (Table 1). The cultivation of arecanut is mostly confined to Karnataka, Kerala and Assam and to a smaller extent in Tamil Nadu, West Bengal, Maharashtra, Andhra Pradesh, Meghalaya, Goa, Tripura, Puducherry, Mizoram, Andaman and Nicobar Islands..

3.1. Arecanut marketing and processing scenario

Arecanut production is location-specific and its consumption is wide spread. Prior to 1980s, it was consumed mostly in the raw form to prepare either traditional Tambulam or Beeda. The production was not sufficient to meet even the internal demand up to the year 1965. Emergence of value added products, such as Scented Supari and Gutkha have given a real boost to the arecanut economy in India Gupta *et al.*, 2018).

TABLE 1: AREA, PRODUCTION AND PRODUCTIVITY OF ARECANUT IN INDIA

Year	Area (in '000 hectare)	Production (in '000 metric tonne)	Productivity (in metric tonne/hectare)
2001-02	221.8	251.0	1.1
2002-03	334.8	409.3	1.2
2003-04	334.8	409.3	1.2
2004-05	365.0	439.2	1.2
2005-06	364.3	452.7	1.2
2006-07	381.1	483.1	1.3
2007-08	382.7	483.3	1.3

TABLE 1: AREA, PRODUCTION AND PRODUCTIVITY OF ARECANUT IN INDIA-*CONTD.*

Year	Area (in '000 hectare)	Production (in '000 metric tonne)	Productivity (in metric tonne/hectare)
2008-09	386.6	476.0	1.2
2009-10	387.1	481.3	1.2
2010-11	400.1	478.0	1.2
2011-12	400.1	478.1	1.2
2012-13	463.9	680.7	1.5
2013-14	446.4	608.7	1.4
2014-15	452.0	622.0	1.4
2015-16	450.2	746.7	1.6
2016-17	474.4	713.8	1.5
2017-18	454.7	722.9	1.6
2018-19	496.7	833.0	1.7

Source: Agricultural Statistics (2018-19), Government of India.

There are more than 15 Arecanut co-operative marketing societies among whom Malnadu Areca Marketing Co-operative Society (MAMCOS) Limited in Shivamogga district, South Kanara Agricultural Produce Co-operative Marketing Society (SKACMS) in Mangalore, the Totagaras' Co-operative Sales Society (TCSS) in Sirsi, Mangalore Agriculturist Sahakara Sangha (MASS) Limited, Thotada Uthpanna Maarata Co-operative Society (TUMCOS), Chennagiri and Central Arecanut and Cocoa Marketing and Processing Co-operative (CAMPCO) Limited, Mangalore are notable. Consumption of arecanut in India has increased tremendously since 1991-92 with an annual growth rate of around six percent (Gupta *et al.*, 2018).

TABLE 2: PRODUCTION OF ARECANUT IN VARIOUS STATES IN INDIA

S. No.	State	Production (in 000' Tonne)	Percentage share
1.	Karnataka	517.35	63.16
2.	Kerala	130.10	15.88
3.	Assam	77.90	9.51
4.	Meghalaya	24.99	3.05
5.	West Bengal	22.85	2.79
6.	Tripura	20.41	2.49
7.	Tamil Nadu	10.14	1.24
8.	Mizoram	7.27	0.89
9.	Maharashtra	3.41	0.42
10.	Andhra Pradesh	2.37	0.29
11.	Nagaland	2.30	0.28

Source: National Horticulture Board (NHB).

3.2. Arecanut cultivation in Kerala

In Kerala, the area under the crop is spread in almost all districts with a total of approx 94.580 thousand hectare. Kasaragod (21.35 percent), Malappuram (18.96 percent) and Wayanad (12.84 percent) districts stands top in the total area under cultivation as shown in table 3.

TABLE 3: DISTRICT-WISE CULTIVATION OF ARECANUT IN KERALA

S. No.	District	Area (in hectare)
1.	Kasaragod	20192
2.	Malappuram	17929
3.	Wayanad	12147
4.	Kannur	9493
5.	Kozhikkode	9445
6.	Palakkad	7283
7.	Trissur	5925
8.	Ernakulam	3946
9.	Idukki	1928
10.	Kollam	1635
11.	Kottayam	1409
12.	Alappuzha	1304
13.	Pathanamthitta	1053
14.	Thiruvananthapuram	891

Source: Agricultural Statistics (2018-19), Government of India.

3.3. Method of sale of arecanut in Kerala

In Kerala, arecanut growers followed different methods of sale. It includes short-term contract sale of garden, long-term contract sale of garden, sale to the traders in the village after harvest, sale to the wholesalers in the market by the producers, sale to the co-operative societies and direct sale to the consumers by the producers (Karunakaran, 2018).

3.4. Marketing channels for arecanut

Market is a means or a channel for the free flow of products to the consumers, where the traders and consumers actively participate. Marketing channels are the routes through which arecanut produce moves from the hands of producers to the ultimate consumers (Karunakaran, 2014). Operations involved in the movement of arecanut from the producer to the consumers is grouped under two main phases, namely, assembling (primary and secondary market) and distribution (terminal market). The practice of consuming raw arecanut both in their fresh and processed form is prevalent in the entire producing regions but the processed form of value based arecanut is consumed more and more out of the production belt. The prevailing marketing channels from the place of production to the place of consumption can be identified as:

(I) Producer → Itinerant trader → Retail traders → Secondary market traders → Bulk or wholesale traders

(II) Producer → Retail traders → Village merchants → Secondary market traders → Wholesale trader

(III) Producer → Traders → Cooperative Institutions → Selling representatives → Wholesale traders

(IV) Producer → Locally settled outside traders

(V) Producer → Secondary market traders

(VI) Producer → Co-operative institution

(VII) Producer → Outside traders settled in the secondary market

(VIII) Producer → Wholesale traders → Retail traders → Panwalas → Consumer

(IX) Producer → Processing unit → Household and purchase → Line sales through bicycles → Panwalas

(X) Producer → Panwalas → Consumer

3.5. Intermediaries in the marketing channels for arecanut

The role of market intermediaries occupied a significant part in the market of arecanut. They were involved at primary, secondary and terminal marketing process.

(i) Primary Market: It is an arrangement for the marketing of arecanut where produce of arecanut flows from the grower to the

trader of primary market with the help of intermediaries, like itinerant village traders, primary wholesaler, retail trader, primary co-operative society, like CAMPCO.

(ii) **Secondary Market:** It is working as media between the primary markets and terminal markets and it is an arrangement of wholesale market where arecanut produce is handled in large quantities with the help of specialized market functionaries to transport the arecanut over to the terminal point. It includes wholesalers, service co-operatives, selling representatives, and the brokers.

(iii) **Terminal Market:** In this market, arecanut is assembled for further intra and inter-state distribution and for exports. The terminal marketing channel for arecanut is associated with number of main functionaries like sales representatives, brokers, wholesale traders, CAMPCO sales departments, retail traders processing units, line sales, panwalas and pan shop owners.

3.6. Area (land holdings) and production of arecanut in percentage

Table 4 indicates that 26.7 percent of farmers are having land above 4.50 acre, about 53 percent have above 3.50 acre, only 3.3 percent of farmers having land below 0.5 acre. About 15 percent of farmers produce above 40 quintals of arecanut and 30 percent produce above 35 quintals. The remaining farmers produce below 35 quintals of arecanut.

TABLE 4: AREA AND PRODUCTION OF ARECANUT

Area		Production	
Land holdings (in Acre)	**Percentage**	**Quantity (in Quintal)**	**Percentage**
Below 0.5	3.3	Below 1	5.0
0.5 – 1	5.0	1 – 5	6.7
1.01 – 1.50	5.0	5.1 – 10	6.7
1.51 – 2	6.7	10.1 – 15	8.3
2.01 – 2.50	8.3	15.1 – 20	8.3
2.51 – 3	8.3	20.1 – 25	10.0
3.01 – 3.50	10.0	25.1 – 30	11.7
3.51 – 4	13.3	30.1 – 35	13.3
4.01 – 4.50	13.3	35.1 – 40	15.0
Above 4.50	26.7	Above 40	15.0
Total	100.0	Total	100

Source: Primary data.

3.7. Marketing channels of arecanut in the study area

The Three main marketing channels identified in the area of study are:

(i) Channel I: Producer → Local market;

(ii) Channel II: Producer → CAMPCO;

(iii) Channel III: Producer → Village merchants → Consumer.

TABLE 5: MARKETING CHANNELS OF ARECANUT IN THE STUDY AREA

Marketing channel	Number of farmers	Percentage
Channel I	42	70.0
Channel II	11	18.3
Channel III	7	11.7
Total	60	100.0

Source: Primary data.

Among the three, in the marketing channel I, there is the existence of local market. In marketing channel II, no local market exists and producer directly sells to CAMPCO. In channel III producer sells arecanut to consumer through village merchants. 70 percent of the farmers selling arecanut directly to the local market, 18.3 percent are selling directly to the CAMPCO and 11.7 percent sell to the consumers through village merchants (Table 5).

TABLE 6: DETERMINING FACTORS OF ARECANUT MARKETING IN THE STUDY AREA

Sales price (Rs./Quintal)	**Channel I***	**Channel II***	**Channel III***	**Total***
30000.00	70	18	0	88
25000.00	0	0	12	12
Total	70	18	12	100
Farming experience (in Years)	**Channel I***	**Channel II***	**Channel III***	**Total***
Below 10	0	0	12	12
11-20	0	13	0	13
21-30	17	5	0	22
31-40	22	0	0	22
Above 40	31	0	0	31
Total	70	18	12	100
Quantity marketed (in Quintal)	**Channel I***	**Channel II***	**Channel III***	**Total***
Below 1	0	0	5	5
1-5	0	0	7	7
5.1-10	0	7	0	7
10.1-15	0	8	0	8
15.1-20	5	3	0	8
20.1-25	10	0	0	10
25.1-30	12	0	0	12
30.1-35	13	0	0	13
35.1-40	15	0	0	15
Above 40	15	0	0	15
Total	70	18	12	100
Regression results for determinants				
R	**R square**	**Adjusted R square**	**Standard error**	
0. 997	0.993	0.992	0.26031	

TABLE 6: DETERMINING FACTORS OF ARECANUT MARKETING IN THE STUDY AREA-*CONTD.*

Coefficients					
Model	Un-standardized coefficients		Standardized coefficients	t	Significance
	B	Standard error	Beta		
Constant	-0.179	0.342	-	-0.524	0.602
Total production	0.944	0.047	0.967	20.017	0.000
Family size	-0.008	0.041	-0.003	-0.187	0.853
Area of land holding (acre)	0.023	0.039	0.021	0.588	0.559
Sales price (Rs./qt)	0.009	0.068	0.003	0.131	0.896
Family consumption	0.142	0.117	0.024	1.207	0.233
Non-farming income	-0.068	0.039	-0.026	-1.732	0.089
Farming experience (year)	0.049	0.045	0.021	1.087	0.282

Source: Primary data; Output from regression analysis.
NOTE: *indicates percentage of farmers in marketing channels.

3.8. Determining factors of arecanut marketing

There are many determining factors of arecanut marketing, like sales price, farming experience, type of land, rainfall, source of irrigation, variety of crops, usage of machinery, total production and quantity marketed. Among these sales price, farming experience and quantity marketed are very important. Most of the farmers followed marketing channel I (70 percent). Table 6 indicates the comparison between marketing channels and the determining factors like sales price, farming experience and quantity marketed. It is observed from table 6 that among the 3 marketing channels, marketing channel I is most effective. Table 6 also indicates the regression results and the analysis showed that the coefficient was 0.944 showing positive relationship. The regression coefficients of land holding and sales price were positively associated with quantity marketed. The regression coefficient of farming experience was also positively associated with quantity marketed indicating that farmers with higher experience in farming marketed more arecanut output.

4. Conclusion and Suggestions

Arecanut cultivation is mainly confined to Karnataka, Kerala and Assam and the share of these states in the country's total area under arecanut cultivation and production is tremendously high. In Kerala, Kasaragod ranks first in arecanut production. There are many intermediaries in the marketing of arecanut which include local market, CAMPCO and village merchants. Three marketing channels identified are: channel I (Producer → local market), channel II (Producer → CAMPCO) and channel III (Producer → village merchant → consumer). Estimate of marketing channels and its determinants, like sales price, farming experience and quantity marketed revealed that marketing channel I (Producer → local market) is most effective. Among farmers studied, channel I received higher sales price per quintal. Determinants of quantity marketed like family size, land holding, sales price, family consumption, non-farming income and farming experience are very important. The regression coefficients of land holding, farming experience and sales price were positively associated with quantity marketed.

Based on above analysis following suggestions can be given:

i. Farmers should adopt modern practices and techniques to increase production and productivity of the crop.

ii. Research and development in evolving suitable high yield variety of the crop should be improved.

iii. Agriculture department should provide better education to farmers on arecanut production.

iv. Development of infrastructure, such as roads and transport facilities for the strengthening of the effectiveness of arecanut marketing channels, should be done by the Government.

v. Subsidies, grants, financial support, fertilizers and other inputs to farmers should be ensured and increased.

vi. Market and production related problems of the farmers should be addressed and solved.

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Diffusion and Economics of Bt Cotton Cultivation in Haryana

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Abstract

Bt cotton production in India has grown exponentially since its introduction in 2002. The major reasons behind this growth are heavy crop loss in cultivation of non-Bt cotton due to occurrence of American Bollworm (an insect-pests and diseases) and increased use of plant protection chemicals. The area under cotton in Haryana is around 6.89 lakh ha with a share of 97.31 percent of Bt cotton during 2018-19. About 80 percent of total cotton area falls in five districts, viz., Bhiwani, Fatehabad, Hisar, Jind and Sirsa in 2019. The present study attempted to examine the trend in area, production and yield of Bt cotton in major cotton growing districts of Haryana and to work out the economics of Bt cotton cultivation in the state over the time period 2005 to 2019. The findings reveal that area and production of cotton in Haryana divulged compound growth rate (CGR) of 2.24 and -0.10 percent per annum, respectively, during the time period 2005-2019. The negative growth rate of production occured due to poor performance of cotton during four years, i.e., 2005, 2015, 2017 and 2018. The growth rate was negative for production and yield of cotton in Fatehabad, Hisar and Sirsa districts, while, it was positive in case of Bhiwani and Jind districts for area and production. The cotton production was reduced to the level of 9.95 lakh bales in 2015-16 due to outbreak of whitefly. Further, the economic analysis of Bt cotton cultivation reveals that about 20 percent of total expenses were incurred on picking of cotton crop. The expenses on individual items like fertilizers, seed, hoeing and preparatory tillage was around 8 to 12 percent of total cost. The cost of production worked out was Rs. 4699 per quintal in 2018-19 with return of Rs. 5337 per quintal. It is suggested that there is an urgent need to focus on the cost cutting technology (mechanization of farm operations especially picking, hoeing/weeding) to enhance farm income and to reduce dependence on human labour. Farmers should be encouraged for adoption of integrated pest management (IPM) practices to protect cotton crops from biotic stresses. In addition, awareness should be created among cotton growers for adoption of recommended hybrids of Bt cotton to reduce the chances of recurrence of whitefly incidence in future and farmers should be trained for proper and timely application of plant protection chemicals for effective control of insect-pests and diseases.

Keywords: *Bt cotton, CGR, economics, net returns.*

1. Introduction

Cotton is an important fibre crop of global significance, which is cultivated in tropical and sub-tropical regions of more than seventy countries in the world. The major producers of cotton are USA, China, India, Pakistan, Uzbekistan, Argentina, Australia, Greece, Brazil, Mexico and Turkey. These countries shared about 85 percent of global cotton production. India has become the top most global exporter of cotton and second largest in world next to China in terms of cotton production (28.71 million bales, 2018-19). Though, the productivity of cotton has increased over years in India, but it is still very low in comparison (decadal-2009-19, average 506.79 kg. lint ha^{-1}) to other cotton growing countries like China (1794 kg. lint ha^{-1}), Brazil (1673 kg. lint ha^{-1}) and USA (968 kg. lint ha^{-1}).

Cotton is the major commercial crop among all cash crops in India and provides livelihood to more than 60 million people through its cultivation, processing and textile industries. It is grown on 12.65 million ha covering different agro-climatic zones of the country in 2018-19. About 73.96 percent of the total area and production of cotton in the country is shared by four states of Gujarat, Andhra Pradesh, Maharashtra and Telangana. The other states like Madhya Pradesh, Rajasthan, Haryana, Karnataka, Tamil Nadu and Rajasthan contribute the rest of

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the cotton produce to the country. However, in the northern part of India, Haryana is the main producer of cotton followed by Punjab and Rajasthan. The share of Haryana in total area and production of cotton in the country was about 5.59 and 7.01 percent, respectively, in 2018-19. Cotton in the state is cultivated under irrigated condition in the districts like Bhiwani, Fatehabad, Jind, Hisar and Sirsa which together account for 85 percent of the state's output of cotton.

1.1. Bt cotton cultivation in India

India embarked upon commercial deployment of genetically modified crops in the form of Bt (Bacillus thuringenesis) cotton in 2002 to address the various pests causing significant yield losses, to reduce pesticide consumption, to increase productivity and to reduce agrarian and ecological distress with the belief that its' resistance against the most devastating American bollworm (*Helicoverpaarmigera*) will provide a great help to cotton growers. Later, it is found that this certainly helped in containing colossal yield loss, reducing the burgeoning consumption of expensive, toxic and environment damaging pesticides as well as assuring better yield, income and health to farm families, though there have been mounting claims and counter claims with respect to beneficial and adverse impacts of Bt cotton. Indiscriminate use of pesticides has adversely affected pest control and profit to the farmers. Under these circumstances, Bt cotton has emerged as an attractive option for the cotton growing farmers (Singh & Kaushik, 2007).

The area under Bt cotton hybrids was 0.29 lakh ha in country during 2002-2003 and it increased abruptly and reached to 3.46 million ha in 2006-2007 and thereafter, continuous increase in Bt cotton acreage extended to 11.96 million lakh ha (93.14%) in 2014-15 and in the year 2017-18, the acreage under Bt cotton was 11.08 million ha showing more than 89 percent of adoption within 14 years period. Maharashtra leads in Bt cotton cultivation with an area of 3.78 million ha followed by Gujarat and Telangana with 2.25 and 1.88 million ha, respectively, in 2017-18. This continuous increase in area under Bt cotton is attained due to several advantages like increase in yield, protection from bollworms and reduction in pesticide use and cost of cultivation, environmental pollution, etc.

In order to make proper policy decisions to improve production, productivity and ensuring stability, the decision has to be guided by certain decision elements like area coverage, production, yield levels and economic performance of the crop. The cotton industry has experienced series of policy interventions, technological progress, pests and disease infestation and climate variations over the years (Agarwal *et al.*, 2007; Tripathi & Prasad, 2009; Choudhary & Gaur, 2010; Khadi, 2012; Suresh *et al.*, 2013). Hence, it becomes important to focus on the above mentioned decision elements. These decision elements though constantly varying but have greater effects on the crop improvement as well as marketing of produce.

1.2. Objectives of the study

The present study was undertaken with following objectives:

i) To examine trend in area, production and yield of Bt cotton in major cotton growing districts of Haryana state.

ii) To work out economics of Bt cotton cultivation in state over the time period.

2. Methodology

The present study is based on information collected from published sources. The data pertaining to harvest area, production and yield of cotton crop for various districts and state as whole was scanned from various issues of Statistical abstract of Haryana, Department of Agriculture and Farmers Welfare, Govt. of Haryana. The data for production and yield were taken for cotton crop as production and yield figures for Bt cotton were not available separately. The information on cost of cultivation of cotton was based on the data presented in Agricultural Officers Workshops (AoWs) held at CCS Haryana Agricultural University, Hisar during 2011-2019. The descriptive statistics analytical tools like average, percentage, etc., were applied. The annual compound growth rates for area, production and yield were estimated using the following model as under.

$$Y = ab^t$$

Where, Y = harvest area / production/ yield of oilseed crops,

a = intercept,

b = regression coefficient of Y on time t,

ACGR in (%) = antilog (B -1) X 100.

The various analytical techniques were used to draw meaningful inferences from information gathered from various sources.

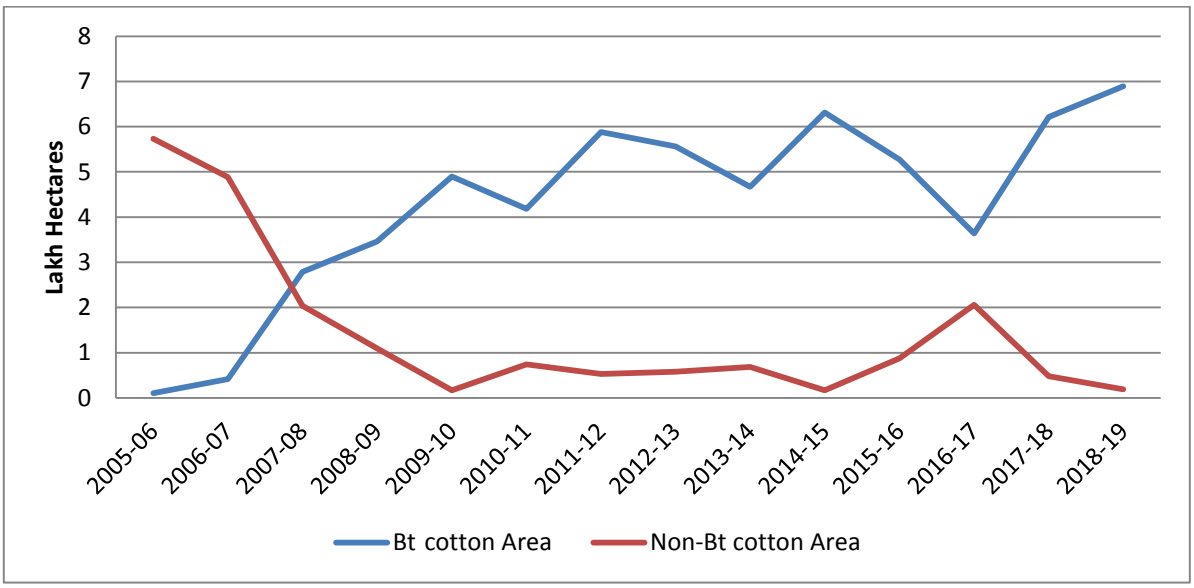
3. Result and Discussion

Haryana's economy is consistently influenced by cotton through its production and processing sectors, and by generating direct and indirect employment. The rippling benefits of cotton cultivation not only influence state's economy but the economy of country as well. The continuous reliance of the cotton industry in Haryana will imply that increase in the production and productivity levels of the crop is assured. Likewise, it also implies maintaining stability in the economic performance (*i.e.*, area, production and productivity) while, prioritising sustainability to feed the growing markets of the local and national economy.

3.1. Cotton cultivation scenario in Haryana

The seed sale of Bt cotton hybrids was introduced in the state in 2002-03.The cultivation of Bt cotton in Haryana was commenced in the year 2005-06 with an area of 0.11 lakh ha and increased to 3.46 lakh ha in 2008-09 (Figure 1). There was sharp decline in Bt cotton production in the year 2016-17 due to severe incidence of whitefly during the kharif season in 2014-15. The increase in area was again noticed when it reached to 6.89 lakh ha in 2018-19 sharing 97.31 percent of total cotton area in the state. The trend in area coverage of Bt cotton during the period 2006-2019 indicated vast variation. As a result of fast spread of Bt cotton hybrids seeds in the state, production touched a high level of 20.41 lakh bales with average yield of 608 kg. lint ha^{-1} in 2016-17. However, there was slight decline in production in 2017-18 and then again it reached to the level of 20.13 lakh bales in 2018-19 (Appendix II).

Figure 1: Area under Bt cotton and Non-Bt cotton in Haryana



Source: Department of Agriculture and Farmers Welfare, Government of Haryana.

The area under cotton was 5.84 lakh ha in 2005-06 which increased upto 7.08 lakh ha in 2018-19 within a time span of 14 years (Table1). The cotton production in the state increased from 15.02 lakh bales in 2005-06 to 26.0 lakh bales in 2011-12 and it decreased slightly to 23.78 lakh bales in 2012-13 and further declined to 19.93 lakh bales in 2014-15 (Table 1). The worst situation in cotton production was in year 2015-16 when it was only 9.95 lakh bales. The cotton production again showed increasing trend when it touched to 20.13 lakh bales in 2018-19. The production figures also indicated increase of 5.11 lakh bale (one bale of 170 kg.) during 2005-2019.

TABLE 1: AREA, PRODUCTION AND YIELD OF COTTON IN HARYANA DURING 2005 TO 2019

Year	Area (lakh ha)						
	Major cotton growing districts					State	
	Sirsa	Fatehabad	Hisar	Bhiwani	Jind	Cotton	Bt cotton
2005-06	1.93 (33.06)	0.95 (16.27)	1.46 (25.16)	0.60 (10.36)	0.49 (8.51)	5.84 (100)	0.11 (0.02)
2010-11	1.89 (38.31)	0.84 (17.03)	1.24 (25.20)	0.35 (7.07)	0.47 (9.59)	4.93 (100)	4.11 (83.53)
2015-16	1.74 (28.41)	0.72 (11.80)	1.30 (21.21)	0.93 (15.12)	0.72 (11.70)	6.15 (100)	5.27 (85.69)
2016-17	1.79 (31.27)	0.67 (11.78)	1.14 (19.98)	0.87 (15.34)	0.59 (10.33)	5.71 (100)	3.64 (63.85)
2017-18	1.99 (29.75)	0.71 (10.61)	1.32 (19.73)	1.14 (17.04)	0.63 (9.42)	6.69 (100)	6.21 (82.85)
2018-19	1.93 (27.26)	0.66 (9.32)	1.42 (20.05)	1.03 (14.55)	0.61 (8.62)	7.08 (100)	6.89 (97.31)
	Production (lakh bales)						
2005-06	5.81 (38.68)	3.06 (20.37)	3.15 (20.97)	1.05 (6.99)	1.29 (8.59)	15.02	
2010-11	7.06 (40.41)	3.08 (17.63)	4.31 (24.67)	1.06 (6.07)	1.61 (9.22)	17.47	
2015-16	3.03 (30.45)	0.89 (8.94)	2.12 (21.31)	1.83 (18.39)	0.75 (7.54)	9.95	
2016-17	7.31 (35.82)	2.70 (13.23)	4.17 (20.43)	2.65 (12.98)	1.75 (8.57)	20.41	
2017-18	3.76 (23.12)	1.90 (11.69)	3.80 (23.37)	2.49 (15.31)	1.74 (10.70)	16.26	
2018-19	6.34 (31.52)	2.29 (11.40)	4.22 (20.94)	2.63 (13.05)	1.62 (8.04)	20.13	
	Yield (kg. lint ha^{-1})						
2005-06	511.76 (17.00)	547.58 (25.19)	364.53 (-16.66)	295.04 (-32.55)	441.25 (00.88)	437.38	
2010-11	635.03 (5.60)	623.33 (3.53)	589.46 (-2.10)	516.33 (-14.24)	578.65 (-3.89)	602.05	
2015-16	294.68 (7.17)	208.40 (-24.21)	276.17 (00.44)	334.52 (21.66)	177.08 (-35.40)	274.95	
2016-17	695.80 (11.45)	682.02 (12.27)	621.30 (2.28)	514.27 (-15.34)	504.24 (-16.99)	607.44	
2017-18	321.21 (-22.23)	454.93 (10.15)	489.39 (18.49)	371.32 (-10.10)	469.52 (13.68)	413.00	
2018-19	558.97 (15.62)	591.39 (22.33)	504.85 (4.42)	433.58 (-10.32)	450.92 (-6.73)	483.44	

Source: Department of Agriculture and Farmers Welfare, Government of Haryana.
NOTE: Figures in parenthesis indicates percentage share to total for area and production, While, in case of yield it indicates increase (+)/decrease (-) over state average.

The cotton yield in state was 438 kg. ha^{-1} in 2005-06 which increased to 741 kg.ha^{-1} in 2011-12 and declined to 523 kg. ha^{-1} in 2014-15 and 275 kg. ha^{-1} in 2015-16. The cotton yield again increased and reached to 608 kg. ha^{-1} in 2016-17. The increase in yield was again recorded in the year 2016-17 in almost all cotton growing districts. The cotton yield revealed vacillating trend over the period. Barring the four years (2005-06,2015-16, 2017-18, 2018-19), the cotton yield level attained was more than 500 kg. ha^{-1}. The decline in cotton yield in these four years was mainly due to infestation of large area by whiteflies, long dry spell, delay in sowing, etc.

3.2. District-wise area, production and yield of cotton

Haryana state is broadly divided into two agro-climatic zones, *i.e.,* eastern and western zones based on soil types, cropping pattern, rainfall, etc. Cotton is mainly cultivated in western zone and cotton-wheat has most prevalent cropping system in semi-arid areas of the state. It is mainly cultivated in districts of Bhiwani, Fatehabad, Hisar, Jind and Sirsa falling in the western zone of the state. The medium-staple cotton crop is planted in the month of April-May and picking starts from mid of September to November. About 93.15 percent of total cotton area was shared by five districts in year 2005-06 (Table 1). The contribution of traditional cotton growing districts, *vis.,* Hisar, Fatehabad and Sirsa in total state cotton area showed declining trend since 2011-12 onwards. This may be due to diversion of area towards basmati rice as higher market price of super fine rice, expanded irrigation facilities and various incentives for cultivators for lying underground pipe lines to bring water from distant water sources, etc., has attracted farmer for rice cultivation. However, cotton area in the state exhibited increase over the last 14 years as acreage augmented in Bhiwani, Mahendergarh, Rewari, Palwal districts replacing less remunerative crops like pulses, pearlmillet, cluster bean. Large adoption of sprinkler irrigation system has also helped in increasing cotton area in the state.

The table 1 shows that all five districts constituted 95.61 percent of total cotton production (15.02 lakh bales) in 2005-06 and it dwindled to 84.19 percent in 2018-19.The cotton production in identified districts is the consequential of area coverage and yield attained. The cotton yield in the state was varying from 274.95 kg. ha^{-1} in 2015-16 to 740.40kg.ha^{-1} in 2013-14, however, on average it was around 500-600 kg.ha^{-1} after introduction of Bt cotton (Appendix 1). The cotton yield in Sirsa, Fatehabad, Hisar and Jind districts was found higher than the state average over the period (Table 1). The cotton yield in Bhiwani district was lower than the state average during study period due to less use of nutrients and chemicals, poor fertility land, long dry spell, inadequate availability of irrigation water.

TABLE 2: CGR OF AREA, PRODUCTION AND YIELD OF COTTON IN HARYANA DURING 2005 TO 2019

(In percent)

District	Area	Production	Yield
Sirsa	0.02	-2.91	-2.93
Fatehabad	-2.47	-5.38	-2.98
Hisar	0.36	-1.14	-1.49
Bhiwani	8.96	10.11	1.06
Jind	3.56	0.94	-2.54
Haryana	**2.31**	**-0.10**	**-2.35**

NOTE: CGR computed based on data collected from Department of Agriculture and Farmers Welfare, Government of Haryana.

The growth rate for area, production and yield for major cotton growing district Fatehabad exhibited negative sign for the period 2005-2019 (Table 2). The cotton production in Fatehabad district was condensed (-5.38 percent annually) due to sharp decline in area (-2.47%) and yield (-2.98%). The potential cotton area in the district was averted towards basmati paddy due to its profitability. The cotton area in Sirsa district even with increase of 0.02 percent per annum revealed reduction in production (-2.91%) due to comparatively higher rate of decline in yield (-2.93 %). The production reduced in all three major cotton growing districts, *i.e.,* Fatehabad, Hisar and Sirsa due to higher rate of decline in yield. This might be attributed to huge loss of crops due to severe attack of whitefly in years 2015-16 and 2017-18. However, the districts Bhiwani, Jind indicated positive growth rate for area and production of cotton and negative growth rate for yield (-2.54%) for Jind district.

The cotton acreage in state registered positive growth during 2005-2019 and increased at the rate of 2.31 percent per annum. The overall cotton production in state weakened slightly (0.10 percent per annum) during 2005-2019, while yield declined

(-2.35 percent annually) due to sharp increase in area under crop with the inception of Bt cotton. The decline in cotton yield was occurred due to severe incidence of white fly in certain years.

The tremendous increase in area under crop took place after adoption of Bt cotton due to non-availability of protection technologies for American bollworm. Bt cotton cultivation contributed significantly in raising yield level and resulted in quantum increase in total cotton production. This increase in yield was achieved as result of introduction of Bt cotton, balanced use of nutrients, timely planting and adoption of improved agronomic practices. However, the production and yield level of cotton was low in some years due to severe outbreak of whitefly and wilt disease. The sudden variations in production and yield of cotton are attributed to delay in planting, long dry spell, occurrence of whitefly, untimely rains during picking, etc.

The sincere efforts were made by scientists of State Agriculture University and extension functionaries of State Department of Agriculture for timely delivery of advisories regarding cultivation of specific hybrids of Bt cotton, production and protection technologies. In addition, they also imparted training, conducted demonstrations, organized awareness campaigns for cotton growers to improve cotton yield. The regular monitoring of cotton crop by joint team of scientists and development officials was done during crop season for timely adoption of good agriculture practices (GAP).

3.3. Economics of Bt cotton cultivation

The cotton crop is grown as commercial crop in the state. The valuation of cost inputs like seed, fertilizers, plant protection chemicals, irrigation water used, farm machinery, labour use, etc., and income received from cultivation of cotton is necessary for rational use of various inputs and sustainable cultivation of cotton crop in the state. The information pertaining to cost and return of crops guide farmers to take appropriate decisions for area allocation for cotton, use of resources, adoption of technologies, arrangement of credit, etc. Keeping in view various parameters, economic analysis of cotton cultivation was done based on the information collected by District Extension Specialist (Farm Management) posted in different district headquarters of the state. The relevant information was gathered by scientists through interviewing large number of cotton growers from major cotton growing districts, namely, Bhiwani, Fatehabad, Hisar, Mahendergarh and Sirsa for the period 2011-2019.

The expenses incurred on various operations like preparatory tillage, seed, fertilizers, irrigation, plant protection chemicals and picking in cultivation of Bt cotton constituted about 60 percent of total cost. The total cost was Rs. 61875 ha^{-1} in 2011, which increased to Rs. 88941 ha^{-1} in 2019 indicating an increase of about one and half times over a decade. About 20 percent of total expenses were incurred on picking of cotton as it is a labour intensive operation and there is no mechanical device available for picking of crop. The expenses on individual items like fertilizers, seed, hoeing and preparatory tillage were around 8 to 12 percent of total variable cost. The rental value of land alone shared around 20-30 percent of total expenses incurred in cultivation of cotton. The rental value of land increased over the period in absolute term due to increase in value of land and increase in market price and MSP of crop. The increase in various variable input cost and increased rental value of land over the period escalated total cost of cultivation and cost of production. The gross return received from the sale of cotton produce was Rs. 101318 ha^{-1} in 2008 and it was more or less same (Rs. 101030 ha^{-1}) in 2019. The net return worked out over variable cost was Rs. 62980 ha^{-1} in 2008 reduced to Rs. 47540 ha^{-1} in 2019 as yield declined from 23.30 to 19.83 quintals ha^{-1}. The decline in returns variable expenses may be attributed to escalated prices of agro-chemicals, fuel, higher labour wages, increased hiring machinery charges, etc.

The analysis of cost and return reveals that farmers should continue cultivation of cotton crop particularly in limited irrigation area. The farm income can be further enhanced by adoption of latest production technologies, use of quality seeds, regular monitoring of crop, use of recommended doses of agro-chemicals, integrated pests management (IPM) practices, mechanization of farm operations (hoeing/ weeding and picking), etc.

4. Conclusion and Suggestions

The analysis reveals that 79.80 percent of total cotton cultivated area exists in five districts, *viz.*, Bhiwani, Fatehabad, Hisar, Jind and Sirsa in 2019. The area under Bt cotton was about 6.89 lakh ha in 2018-19

TABLE 3: ECONOMICS OF BT COTTON CULTIVATION IN HARYANA DURING 2008 TO 2019

(Rs. ha^{-1})

S. No.	Items	2011	2014	2018	2019
A. Variable expenses					
1.	Field preparation	4570(7.39)	5968(7.45)	6303(7.71)	6965(5.48)
2.	Seed cost	4603(7.44)	4560(5.69)	3643(4.46)	3068(3.45)
3.	Fertilizer investment	3925(6.34)	6495(8.11)	7193(8.80)	7353(8.27)
4.	Irrigation	2588(4.18)	3573(4.46)	4725(5.78)	4950(5.56)
5.	Plant protection	7993(12.92)	9408(11.75)	9468(11.58)	9878(11.11)
6.	Picking*	12748(20.60)	13570(16.94)	16330(19.97)	16638(18.70)
7.	Miscellaneous*	1913(3.09)	2320(2.90)	2390(2.92)	2390(2.92)
	Total	38338(61.96)	45892(57.30)	50050(61.22)	53490(60.14)
B. Fixed expenses					
8.	Management and risk charges	7670(12.40)	9180(11.46)	10010(12.24)	10700(12.02)
9.	Rental value of land	15225(24.61)	23868(29.80)	20570(25.16)	23548(26.47)
10.	Transportation charges	643(1.04)	1155(1.44)	1120(1.37)	1215(1.36)
	Total	23538(38.04)	34203(42.70)	31700(37.78)	31700(37.78)
C. Total cost		61875(100.00)	80095(100.00)	81750(100.00)	88945(100.00)
D. Gross returns					
11.	(a) Production ** (Main)(quintals)	98675(23.30)	69848(16.70)	94650(17.98)	99008(18.93)
12.	(b) By-product	2640	3000	2190	2022
	Total	101318	72848	96840	101030
13.	Returns over variable expenses	62980	26956	46790	47540
14.	Cost of production (per quintal)	2655	4796	4546	4699
15.	Total returns (per quintal)	4348	4362	5386	5337

Source: Based on data presented in agricultural officers' workshop at CCS Haryana Agricultural University, Hisar in various years.
NOTE: Figure in parentheses indicates percentage share to total cost;* includes interest on working capital and ** indicates yield ha^{-1}.

and constituted 98 percent of total cotton area in the state. The area, production and yield of cotton in Haryana unveiled CGR of 2.24 and -0.10 percent per annum, respectively, during the time period 2005-2019. The cotton production in Fatehabad, Hisar and Sirsa districts revealed negative growth rate however, it indicated positive growth in Bhiwani and Jind districts. The cotton production was lowest in 2015-16 due to outbreak of whitefly. Further, the economic analysis of Bt cotton cultivation reveals that about 20 percent of total expenses were incurred on picking of cotton crop. The returns over variable cost worked out to be Rs. 47540 ha^{-1} in 2018-19.

Based on the above analysis following suggestion may be given:

i. There is an urgent need to focus on cost cutting technology (mechanization of farm operations especially picking, hoeing/weeding) for realizing higher returns and to reduce dependence on human labour.

ii. Farmers should be encouraged for adoption of integrated pest management (IPM) practices to protect cotton crops from biotic stresses.

iii. The cotton cultivation may also be promoted in new areas, *i.e*, Southern Haryana by expanding sprinkler and drip irrigation system.

iv. Awareness should be created among cotton growers for adoption of recommended hybrids of Bt cotton to reduce the incidence of whitefly.

v. Farmers should be trained for proper and timely application of plant protection chemicals for effective control of insect-pests and diseases.

vi. More research needs to be done to develop Bt cotton hybrids having resistance against insects like pink bollworm and whitefly.

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APPENDIX I: AREA, PRODUCTION AND YIELD OF COTTON IN HARYANA DURING 2005 TO 2019

District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Area (lakh ha)														
Sirsa	1.93	1.9	1.81	1.72	1.93	1.89	2.11	1.98	1.78	1.89	1.74	1.78	1.99	1.93
Fatehabad	0.95	0.9	0.86	0.84	0.85	0.84	0.9	0.85	0.77	0.79	0.72	0.67	0.71	0.66
Hisar	1.46	1.29	1.18	1.12	1.32	1.24	1.53	1.45	1.42	1.55	1.3	1.14	1.32	1.42
Bhiwani	0.6	0.48	0.37	0.29	0.32	0.34	0.59	0.62	0.6	0.96	0.93	0.87	1.14	1.03
Jind	0.49	0.45	0.44	0.45	0.46	0.47	0.63	0.66	0.73	0.76	0.72	0.59	0.63	0.61
Other dist.	0.4	0.25	0.16	0.14	0.17	0.15	0.25	0.36	0.37	0.52	0.74	0.66	0.9	1.42
State	5.83	5.27	4.82	4.56	5.05	4.93	6.01	5.92	5.67	6.47	6.15	5.71	6.69	7.08
Production (lakh lint bales)														
Sirsa	5.81	7.45	7.34	7.54	8.01	7.06	9.56	8.99	7.34	6.95	3.03	7.31	3.76	6.35
Fatehabad	3.06	3.73	3.79	3.78	3.74	3.08	4.39	3.58	3.48	3.07	0.89	2.7	1.9	2.3
Hisar	3.15	3.96	4.66	4.68	4.77	4.31	6.67	5.28	4.19	3.4	2.12	4.17	3.8	4.22
Bhiwani	1.05	1.03	0.99	0.74	0.88	1.06	2.16	2.31	1.85	2.52	1.83	2.65	2.49	2.63
Jind	1.29	1.37	1.65	1.53	1.41	1.61	2.55	2.44	2.31	2.14	0.75	1.75	1.74	1.62
Other districts	0.66	0.51	0.39	0.35	0.37	0.35	0.88	1.18	1.08	1.85	1.33	1.83	2.57	3.03
State	15.02	18.05	18.82	18.62	19.18	17.47	26.21	23.78	20.25	19.93	9.95	20.41	16.26	20.13
Yield (kg. lint ha^{-1})														
Sirsa	511.8	664.8	687.1	743.9	705.2	635	769.1	769.1	699	623.8	294.7	695.8	321.2	559
Fatehabad	547.6	697.6	749.2	762.3	741	623.3	821.9	711.8	763.4	654	208.4	682	454.9	591
Hisar	364.5	519.4	670.8	709.1	610.6	589.5	738.7	616.5	501.3	372.4	276.2	621.3	489.4	505
Bhiwani	295	360.3	451.2	422.1	456.1	516.3	616.1	627.3	518.1	444.4	334.5	514.3	371.3	433.6
Jind	441.2	508.5	633.2	576.7	521.1	578.6	688.1	621	537.2	476.2	177.1	504.2	469.5	450.9
State	437.4	581.5	663.1	694	645.5	602	740.4	682.2	606.3	523.5	275	607.4	413.2	483.4

Source: Department of Agriculture and Farmers Welfare, Government of Haryana.

APPENDIX II: AREA UNDER BT COTTON AND NON-BT COTTON IN HARYANA DURING 2005-06 TO 2018-19

(Lakh ha)

Year	Area under		Total cotton area
	Bt cotton	Non-Bt cotton	
2005-06	0.11	5.73	5.84
2006-07	0.42	4.88	5.30
2007-08	2.79	2.04	4.83
2008-09	3.46	1.10	4.56
2009-10	4.90	0.17	5.07
2010-11	4.18	0.74	4.92
2011-12	5.88	0.53	6.41
2012-13	5.56	0.58	6.14
2013-14	4.67	0.69	5.36
2014-15	6.31	0.17	6.48
2015-16	5.27	0.88	6.15
2016-17	3.64	2.06	5.7
2017-18	6.21	0.48	6.69
2018-19	6.89	0.19	7.08

Source: Department of Agriculture and Farmers Welfare, Government of Haryana.

Agro-Economic Research

Sugarcane Transportation and Harvesting Cost in Uttar Pradesh*

PROF. G.C. TRIPATHI

1. Introduction

India has achieved a marked record in respect of crop sugarcane with 4.73 million hectare area, 376.90 million tonnes production and 796.50 quintal/ha yield in the year 2017-18 against that of 1.71 million hectare area, 57.05 million tonnes production and 334.22 quintal/ha yield in 1950-51. Global-wise as well, India is the second largest producer of sugarcane in the world and comes only next to Brazil. As per statistics for the year 2016, India contributed 18.72 percent of total sugarcane production in the world against that of 41.29 percent of Brazil. As such sustaining cultivation of sugarcane is not only essential but also most inevitable in India. Among three main factors for sustainability of sugarcane cultivation in the interest of farming community in particular and the entire agricultural-cum-national economy in general, *viz.*, (i) timely payment of dues to sugarcane growers by sugar mills, (ii) remunerative prices to cane growers for their sugarcane produces and (iii) harvesting and transportation aspects of sugarcane. The third one still has to be taken care of. The estimation of "transportation and harvesting costs" of sugarcane is to be explored with, on the basis of strong data base and scientific research methodology. It is with this prime motto, that the present study was initiated by our national government towards finding out sugarcane transportation and harvesting costs, in eight states of the country, including Uttar Pradesh.

1.1. Objectives of the study

The present study, as a step forward in this direction, aims to estimate and analyze the transportation and harvesting costs of sugarcane, incurred by the cultivators (cane growers) of different size of farms and /or sugar mills, in the state of Uttar Pradesh as per following set forth objectives:

(i) To estimate the harvesting cost of sugarcane using different modes of harvesting.

(ii) To estimate the transportation cost of sugarcane, from the farmers' field to the sugar mill and other selling points using different modes of transportation.

(iii) To estimate the various factor/input costs in the overall harvesting and transportation costs.

2. Methodology of Study

A field survey has been conducted using a multi (three) stage stratified random sampling, as per CACP (Commission for Agricultural Costs and Prices) sampling design frame, with district as the first stage, village as the second stage and the farmer (cane grower) as the third stage or the ultimate unit of sampling for the sugarcane season 2018-19.

As per sampling method of the present study, in each state, two districts were selected using CACP sampling frame. Adopting the following criteria for selecting the districts, Lakhimpur Khiri and Bijnor districts were selected.

(i) The districts should have large proportion of area under sugarcane to the total area under sugarcane in the state.

(ii) In each district, two sugarcane growing villages were selected, making a total of four villages in the state.

(iii) From each selected village, a total of 50 farmers were selected for primary survey, giving representation to each size-group (on the basis of owned land) *i.e.*, marginal (<1ha), small (1-2ha), medium (2-4ha) and large (>4ha) farmers, using stratified random sampling and probability proportional to size (PPS) methodology.

(iv) The aggregate sample size of study in the state of Uttar Pradesh, thus works out to be of 200

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NOTE: Detailed report is available on the website of respective Agro-Economic Research Centres.

farmers under study and thereby collecting the primary data by personal interview of the sample respondents by the AERC Prayagraj research team. The related data were also collected from the associated sugar mills, *viz.*, Balrampur Chini Mill and DCM Shriram Mill in district Lakhimpur Khiri and Kisan Sahkari Chini Mill in district Bijnor for the sugarcane season 2018-19.

3. Major Findings of the Study

The major findings of the present study are as follows:

i. The state of Uttar Pradesh is the largest producer of sugarcane in the country. During the year 2017-18, it (U.P.) contributed 46.98 percent of total sugarcane production in the country against that of 22 percent of Maharashtra. But, it lagged behind Maharashtra in respect of yield, with 792.55 quintal/ha in Uttar Pradesh against that of 921.66 quintal/ha in Maharashtra.

ii. Also, as per time-series (1990-91 to 2016-17) data of Uttar Pradesh, there have not been much variations in the three basic crop parameters, *i.e.,* area, production and yield of sugarcane, during the entire period of 1990-91 to 2016-17.

iii. In the state of Uttar Pradesh, harvesting operations of sugarcane are totally borne by cane growers themselves and sugar mills are not particapting to it at all.

iv. As per records for the year 2019-20, out of 119 sugar mills in the state, majority of them (77.31 percent) belonged to private sector, followed by the cooperative (20.17 percent) and the corporate, *i.e.,* Nigam (2.52 percent), respectively.

v. During the period 2014-15 to 2018-19, in the state of Uttar Pradesh (a) there has been a continuous rise in quantum of sugarcane crushed, sugar production and also in sugar recovery rate, (b) as compared to 744.54 lakh tonnes sugarcane crushed, 71.01 lakh tonnes sugar production and 9.54 percent sugar recovery rate in 2014-15; the corresponding figures in 2018-19 are 1031.67 lakh tonnes sugarcane crushed, 118.22 lakh tonnes sugar produced and 11.46 percent sugar recovery rate.

vi. The recorded data with respect to main features of three sugar mills under the study revealed that (a) installed capacity of the sugar mill varied from 3000 TCD (Tonne Capacity Day) to 10500 TCD, (b) capacity utilization ranged from 85.72 percent to 100 percent, (c) total cane crushed by factory during sugar season 2018-19 has been in the range of 475393.86 tonnes to 1770891.40 tonnes, (d) total sugar production in a factory had been to the tune of 59510.00 tonnes to 217690.00 tonnes, (e) sugar recovery rate ranged from 12.29 percent to 12.52 percent, which was higher than the state average (11.46 percent), and (f) the average cost of sugarcane transportation incurred by the sugar mill for transporting sugarcane from mill purchase centre to mill gate ranged from Rs. 16.54 per quintal to Rs. 20.48 per quintal.

vii. On overall sample basis, the sale percentage of sugarcane from its total produce has been 87.95 percent; while category-wise the sale percentage has been highest (89.59 percent) in case of marginal farmers and lowest (85.42 percent) in case of medium category farmers. Maximum quantity of sugarcane was sold to sugar mill (55.82 percent), followed by gur manufacturer (27.48 percent), sugar mill purchase centre (15.20 Percent) and to khandasari unit (1.50 percent).

viii. Among various modes of transportation like manual carts, trucks, tractor trollies, the only mode of transport used by all the sample respondents has been tractor trolley.

ix. Destination wise, average distance covered by a cane grower, has been (i) 12.96 kilometers to reach sugar mill gate, (ii) 2.08 kilometers to reach sugar mill purchase centre, (iii) 4.06 kilometers to reach gur manufacturer, and (iv) 4.87 kilometers to reach khandasari unit.

x. It may be mentioned that manual transportation mode has not at all been reported by any of the sample respondent; while in case of mechanized transportation in the present study, it has been exclusively tractor trolley.

xi. While, machine mode of loading/unloading was not prevailing in case of any of the sample respondent, the details of manual mode has been (a) wage rate (males) of Rs. 278.00 per

day for loading and Rs. 244.00 per day for unloading.

xii. In case of sugarcane harvesting, (i) machine mode of harvesting is not at all in practice in the study area (ii) under manual mode of harvesting, the prevailing contract rate of harvesting, in the region of study, is in general Rs. 30.00 per quintal including cleaning and loading charges. It may also be mentioned that the prevailing contract rate of Rs. 30.00 per quintal of sugarcane harvesting, Rs. 25.00 is towards harvesting and loading; and Rs. 5.00 towards cleaning.

4. Policy Suggestions

Based on major findings of this study, the following suggestions are recommended towards policy implications:

i. Provision of mechanized harvesting as well as mechanized loading/unloading facilities to all sugarcane growers of the study area in general and marginal and small farmers in particular (who both combinedly form majority of cane growers and also cane suppliers to sugar mills) by the concerned sugar mills for timely, quick and efficient harvesting as well as loading/unloading operations. This facility of course will be on repayment basis by cane growers in terms of deduction of amount so incurred by mills from the payments they will receive from sugar mills for their respective cane supplies.

ii. More efficient management of flow of trucks/tractor trollies and unloading operations by sugar mills towards lowering down the cost of production of sugar; which in turn in one way or the other will certainly be benefiting the mill owners as well as the cane growers. This is so, since at the beginning of the season, the sugar mills face problem of inadequate supply of cane while during peak season they get cane supply even more than their crushing capacity and on account of this, the cane suppliers also have to wait for much longer time due to unending queues of vehicles in terms of tractor trollies and trucks.

iii. The following factors influence the damage to sugarcane as a transit loss and also resulting into increased fuel consumption to a great extent during its transportation, irrespective of mode of transport like tractor trolly/truck, must be checked to all possible extent to minimize such losses. (i) over-loading in the vehicle, (ii) speed of the vehicle, (iii) condition of the road used for transportation.

iv. Provision of transport facility by sugar mills for transporting sugarcane, right from the farmers field to sugar mill gate, to marginal and small farmers in particular and all such farmers (cane growers) who are desirous of such facility on repayment basis.

v. The harvesting and transportation charges for the services, whenever so provided by the sugar mills to the farmers (cane growers) for entire harvesting operations (including cleaning and loading) and transportation of sugarcane from their (cane growers) fields to mill gate on repayment basis, be crystal clear and made public, so that farmers may decide accordingly, which mill to sell their cane produce.

vi. Good quality and early maturing variety sugarcane (seed) be provided for sowing to sugarcane growers by Government for better sugarcane cultivation to result (i) enhanced sugarcane aggregate production through higher crop productivity as well as (ii) higher sugar recovery rate.

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Commodity Reviews

Foodgrains

Procurement of Rice

The total procurement of rice during kharif marketing season 2019-20 up to 31.07.2020 is 50.52 million tonnes as against 43.99 million tonnes during the corresponding period of last year. The details are given in Table 1. A comparative analysis of procurement of rice for the period of marketing season 2019-20 (up to 31.07.2020) and the corresponding period of last year is given in figure 1. The percentage share of different states in procurement of rice has been given in figure2.

TABLE 1: PROCUREMENT OF RICE

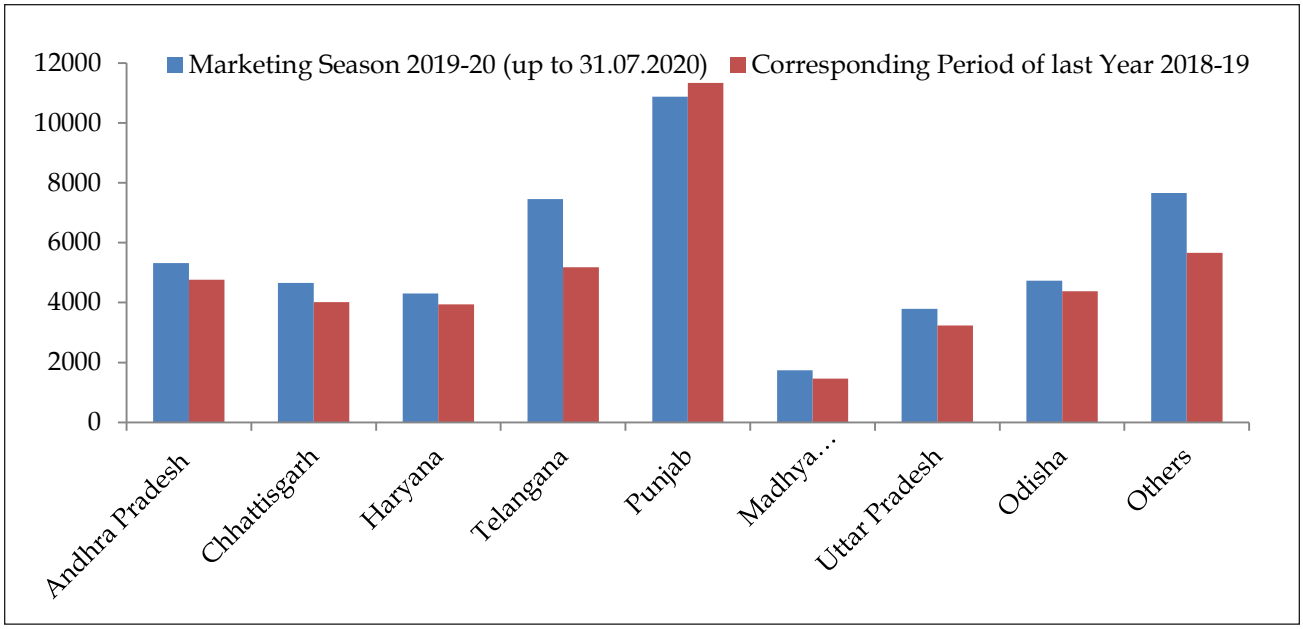
(In thousand tonnes)

State	Marketing season 2019-20 (up to 31.07.2020)		Corresponding period of last year 2018-19	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Andhra Pradesh	5318	10.5	4768	10.8
Chhattisgarh	4656	9.2	4020	9.1
Haryana	4303	8.5	3942	9.0
Telangana	7454	14.8	5186	11.8
Punjab	10876	21.5	11334	25.8
Madhya Pradesh	1740	3.4	1462	3.3
Uttar Pradesh	3790	7.5	3233	7.3
Odisha	4728	9.4	4382	10.0
Others	7656	15.2	5660	12.9
Total	50521	100.0	43987	100.0

Source: Department of Food & Public Distribution.

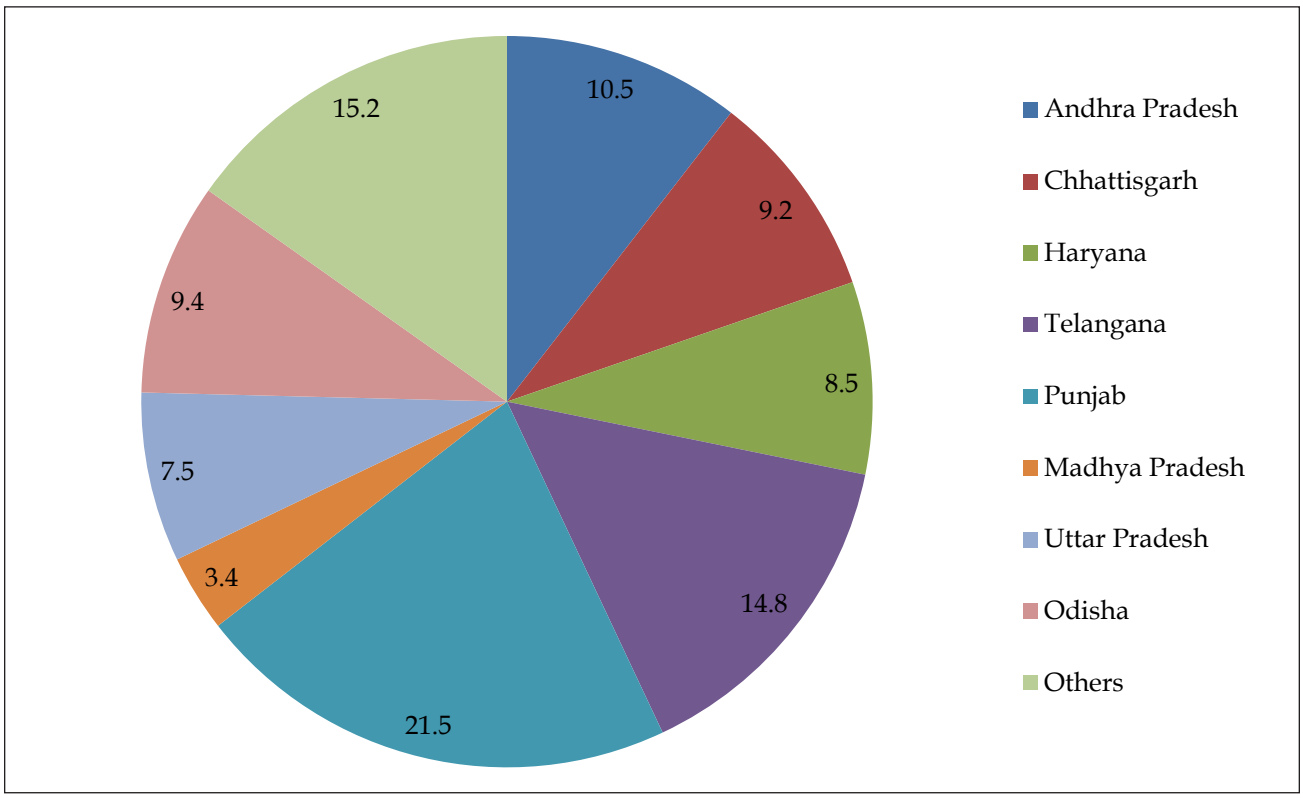
Figure 1: State-wise Procurement of Rice

(In thousand tonnes)



Source: Department of Food & Public Distribution.

Figure 2: Percentage Share of Different States in Procurement of Rice during Marketing Season 2019-20 (up to 31.07.2020).



Source: Department of Food & Public Distribution.

Procurement of Wheat

The total procurement of wheat during rabi marketing season 2020-21 up to 31.07.2020 is 38.98 million tonnes as against 34.78 million tonnes during the corresponding period of last year. The details are given in Table 2. The figure 3 depicts the comparison of procurement of wheat during the marketing season 2020-21 (up to 31.07.2020) with the corresponding period of last year. The percentage share of different states in procurement of wheat has been given in figure 4.

TABLE 2: PROCUREMENT OF WHEAT

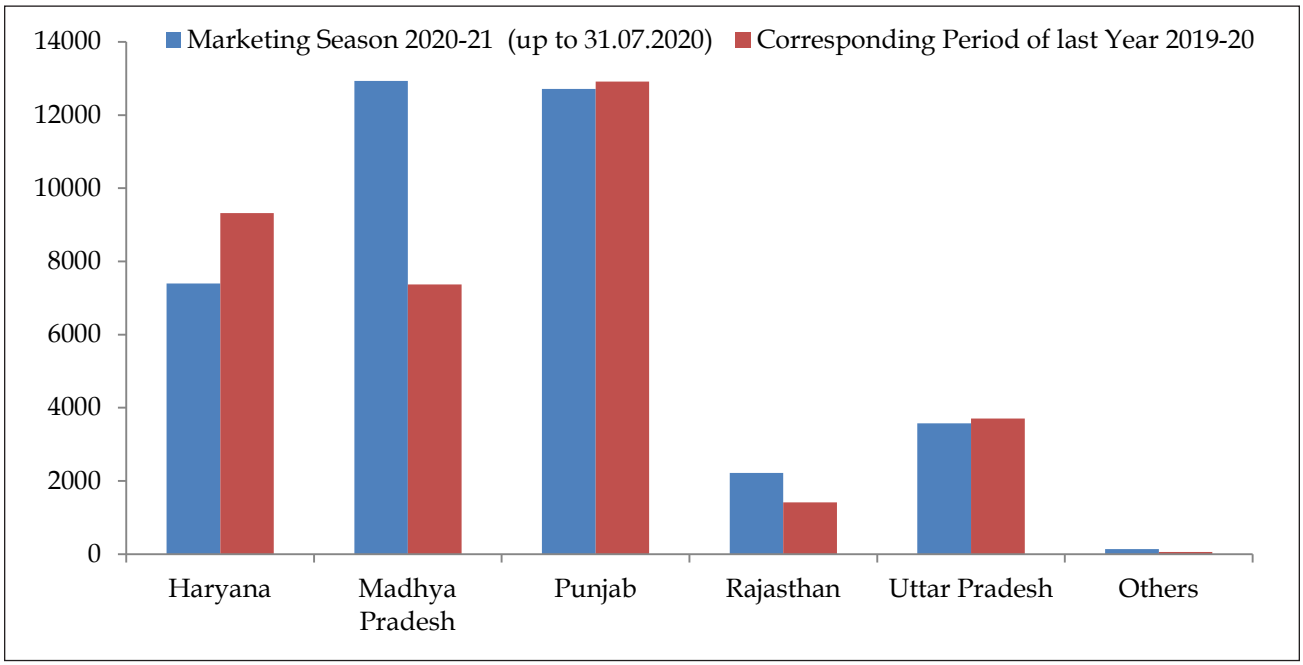
(In thousand tonnes)

State	Marketing season 2020-21 (up to 31.07.2020)		Corresponding period of last year 2019-20	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Haryana	7398	19.0	9321	26.8
Madhya Pradesh	12935	33.2	7370	21.2
Punjab	12712	32.6	12912	37.1
Rajasthan	2220	5.7	1411	4.1
Uttar Pradesh	3576	9.2	3704	10.7
Others	135	0.3	63	0.2
Total	38976	100.0	34781	100.0

Source: Department of Food & Public Distribution.

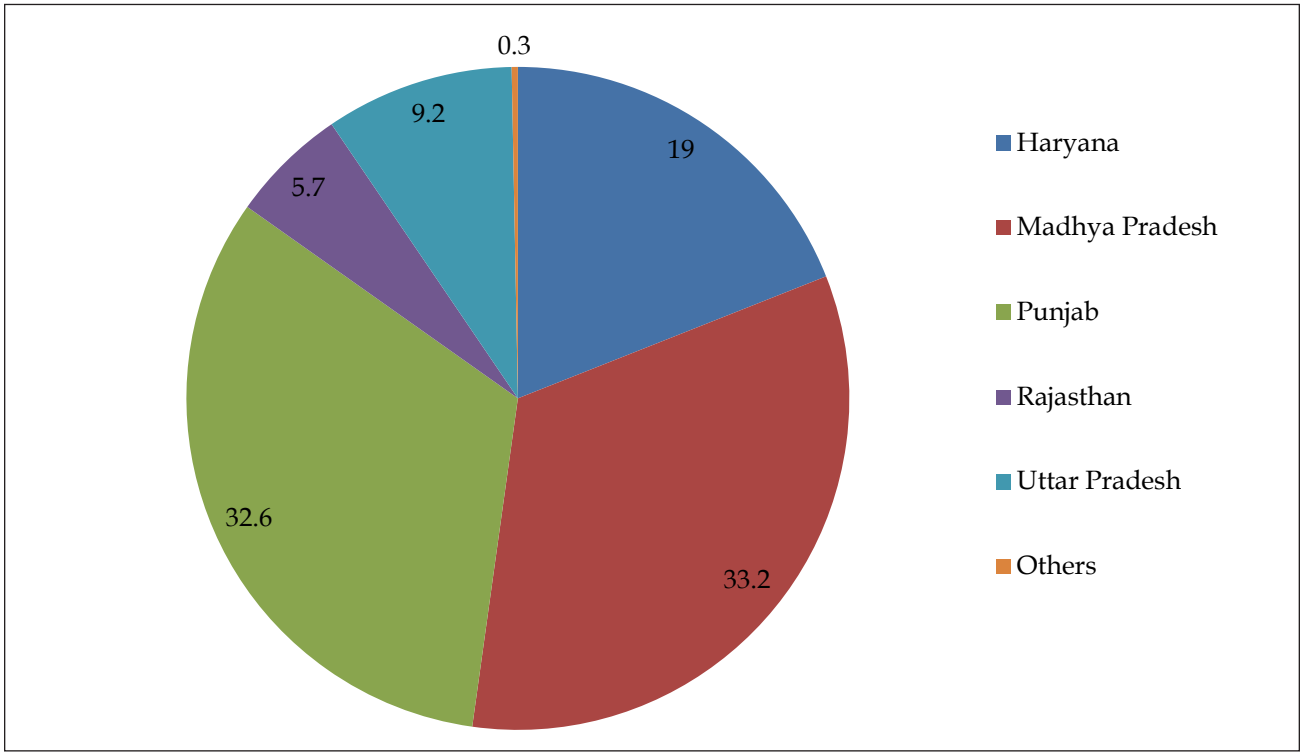
Figure 3: State-wise Procurement of Wheat

(In thousand tonnes)



Source: Department of Food & Public Distribution.

Figure 4: Percentage Share of Different States in Procurement of Wheat during Marketing Season 2020-21 (up to 31.07.2020).



Source: Department of Food & Public Distribution.

Commercial Crops

Oilseeds

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 154 in July, 2020 showing a decrease of 0.52 percent over the previous month and increased by 2.60 percent over the previous year.

The WPI of all individual oilseeds showed a mixed trend. The WPI of rape and mustard seed (1.78 percent), copra (0.34 percent), safflower (1.37 percent) and sunflower (0.78 percent) increased over the previous month. However, the WPI of groundnut seed (1.45 percent), cotton seed (0.56 percent), gingelly seed (sesamum) (1.19 percent), niger seed (0.39 percent) and soyabean (1.95 percent) decreased over the previous month.

Manufacture of Vegetable and Animal Oils and Fats

The WPI of vegetable and animal oils and fats as a group stood at 130.1 in July, 2020 which shows an increase of 1.64 percent over the previous month. Moreover, it also increased by 15.85 percent over the corresponding months of the previous year. The WPI of mustard oil (2.86 percent), soybean oil (0.51 percent) sunflower oil (1.61 percent), groundnut oil (0.15 percent), rapeseed oil (9.46 percent) and cotton seed oil (1.28 percent) increased over the previous month. However, the WPI of copra oil (0.12 percent) decreased over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 181.8 in July, 2020 showing an increase of 14.12 percent over previous month and an increase of 3.59 percent over the corresponding month of the previous year.

Potato

The WPI of potato stood at 297.9 in July, 2020 showing an increase of 12.12 percent over the previous month. Moreover, it also increased by 69.07 percent over the corresponding months of the previous year.

Onion

The WPI of onion stood at 135.4 in July, 2020 showing an increase of 1.27 percent over the previous month and a decrease of 25.56 percent over the corresponding months of the previous year.

Condiments & Spices

The WPI of condiments & spices (group) stood at 143 in July, 2020 showing a decrease of 1.79 percent over the previous month and an increase of 5.15 percent over the corresponding months of the previous year. The WPI of black pepper decreased by 1.12 percent, chillies (dry) decreased by 7.02 percent and turmeric decreased by 1.48 percent over the previous month.

Raw Cotton

The WPI of raw cotton stood at 106.4 in July, 2020 showing an increase of 0.28 percent over the previous month and a decrease of 13.64percent over the corresponding months of the previous year.

Raw Jute

The WPI of raw jute stood at 208.4 in July, 2020 showing an increase of 0.87 percent over the previous month and an increase of 8.88 percent over the corresponding months of the previous year.

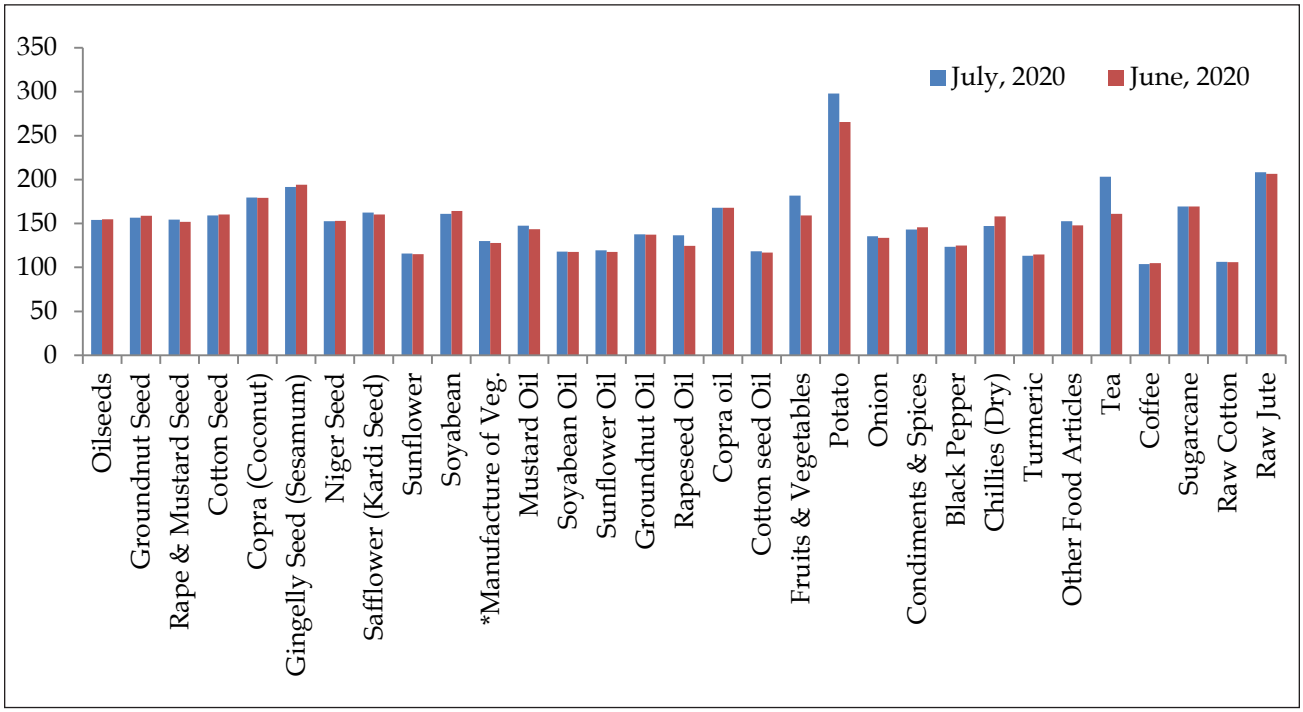
Wholesale Price Index of Commercial Crops is given in Table 3. A graphical comparison of WPI for the period of July, 2020 and June, 2020 is given in figure 5 and the comparison of WPI during the July, 2020 with the corresponding month of last year has been given in figure 6.

TABLE 3: WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

(Base Year: 2011-12=100)

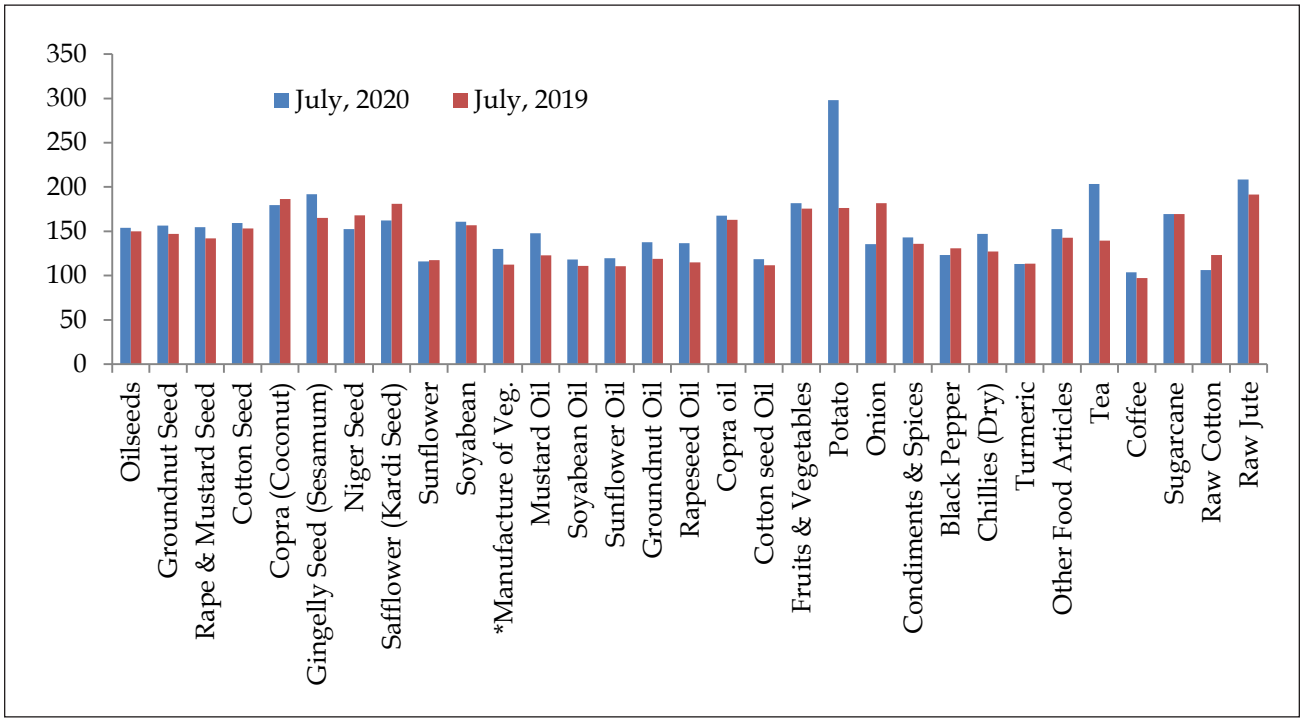
Commodity	Latest Jul-20	Month Jul-19	Year Jun-20	% Variation over the	
				Month	Year
Oilseeds	154	150.1	154.8	-0.52	2.60
Groundnut Seed	156.5	147.1	158.8	-1.45	6.39
Rape & Mustard Seed	154.6	141.9	151.9	1.78	8.95
Cotton Seed	159.3	153.1	160.2	-0.56	4.05
Copra (Coconut)	179.7	186.6	179.1	0.34	-3.70
Gingelly Seed (Sesamum)	191.7	165	194	-1.19	16.18
Niger Seed	152.5	168	153.1	-0.39	-9.23
Safflower (Kardi Seed)	162.4	181.2	160.2	1.37	-10.38
Sunflower	116	117.5	115.1	0.78	-1.28
Soyabean	160.9	156.9	164.1	-1.95	2.55
Manufacture of Vegetable and Animal Oils and Fats	130.1	112.3	128	1.64	15.85
Mustard Oil	147.7	122.8	143.6	2.86	20.28
Soyabean Oil	118.1	110.8	117.5	0.51	6.59
Sunflower Oil	119.6	110.5	117.7	1.61	8.24
Groundnut Oil	137.7	118.9	137.5	0.15	15.81
Rapeseed Oil	136.5	115	124.7	9.46	18.70
Copra oil	167.8	163	168	-0.12	2.94
Cotton seed Oil	118.4	111.8	116.9	1.28	5.90
Fruits & Vegetables	181.8	175.5	159.3	14.12	3.59
Potato	297.9	176.2	265.7	12.12	69.07
Onion	135.4	181.9	133.7	1.27	-25.56
Condiments & Spices	143	136	145.6	-1.79	5.15
Black Pepper	123.4	130.8	124.8	-1.12	-5.66
Chillies (Dry)	147	127.2	158.1	-7.02	15.57
Turmeric	113.2	113.4	114.9	-1.48	-0.18
Other Food Articles	152.5	142.6	147.8	3.18	6.94
Tea	203.4	139.5	161	26.34	45.81
Coffee	103.9	97.3	105	-1.05	6.78
Sugarcane	169.5	169.5	169.5	0.00	0.00
Raw Cotton	106.4	123.2	106.1	0.28	-13.64
Raw Jute	208.4	191.4	206.6	0.87	8.88

Figure 5: WPI of Commercial Crops during July, 2020 and June, 2020



*Manufacture of Vegetable, Animal Oils and Fats

Figure 6: WPI of Commercial Crops during July, 2020 and July, 2019



*Manufacture of Vegetable, Animal Oils and Fats

Statistical Table

Prices

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

Commodity	Variety	Unit	State	Centre	Jul-20	Jun-20	Jul-19
Wheat	PBW 343	Quintal	Punjab	Amritsar	1940	1940	2000
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1870	1925	1880
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1897	1890	1985
Jowar	-	Quintal	Maharashtra	Mumbai	3500	3650	3600
Gram	No III	Quintal	Madhya Pradesh	Sehore	3800	3956	3886
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1550	1760	1980
Gram Split	-	Quintal	Bihar	Patna	6080	6050	5920
Gram Split	-	Quintal	Maharashtra	Mumbai	5700	5800	5600
Arhar Split	-	Quintal	Bihar	Patna	8650	8600	7950
Arhar Split	-	Quintal	Maharashtra	Mumbai	8500	8800	8100
Arhar Split	-	Quintal	NCT of Delhi	Delhi	8100	8050	7200
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	9000	8000	7700
Gur	-	Quintal	Maharashtra	Mumbai	4500	4700	4700
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4500	4500	4500
Gur	Balti	Quintal	Uttar Pradesh	Hapur	3300	3000	3100
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	4500	4145	3570
Mustard Seed	Black	Quintal	West Bengal	Raniganj	NA	NA	4200
Mustard Seed	-	Quintal	West Bengal	Kolkata	5200	5150	4350
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	4900	5500	4370
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	5100	5000	4550
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	1900	1900	2500
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	3000	3000	2500
Castor Seed	-	Quintal	Telangana	Hyderabad	NT	NT	5100
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	9800	10400	10315
Copra	FAQ	Quintal	Kerala	Alleppey	10250	9950	9450
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	7000	7000	6200

1. WHOLESALE PRICES OF CERTAIN AGRICULTURAL COMMODITIES AND ANIMAL HUSBANDRY PRODUCTS AT SELECTED CENTRES IN INDIA-*Contd.*

Commodity	Variety	Unit	State	Centre	Jul-20	Jun-20	Jul-19
Groundnut	-	Quintal	Maharashtra	Mumbai	8700	9500	8500
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1460	1414	1345
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	2025	1925	1365
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	1900	2100	1650
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2250	2150	2000
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1460	1465	1448
Castor Oil	-	15 Kg.	Telangana	Hyderabad	NT	NA	1785
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	1880	1840	1800
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	3800	3500	3500
Coconut Oil	-	15 Kg.	Kerala	Cochin	2235	2175	2040
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2160	2225	1830
Groundnut Cake	-	Quintal	Telangana	Hyderabad	NT	NT	3572
Cotton/ Kapas	NH 44	Quintal	Andhra pradesh	Nandyal	4700	4600	6000
Cotton/ Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	3800	3800	4800
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	4750	4625	4375
Jute Raw	W 5	Quintal	West Bengal	Kolkata	4800	4675	4425
Oranges	-	100 No	NCT of Delhi	Delhi	458	458	667
Oranges	Big	100 No	Tamil Nadu	Chennai	1000	700	1000
Banana	-	100 No.	NCT of Delhi	Delhi	416	416	417
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	500	400	700
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	80000	85000	77000
Almonds	-	Quintal	Maharashtra	Mumbai	60000	60000	65000
Walnuts	-	Quintal	Maharashtra	Mumbai	64000	66000	63000
Kishmish	-	Quintal	Maharashtra	Mumbai	18000	21000	19500
Peas Green	-	Quintal	Maharashtra	Mumbai	6000	7000	6500
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	3900	1650	2260
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	1400	2000	2500

1. WHOLESALE PRICES OF CERTAIN AGRICULTURAL COMMODITIES AND ANIMAL HUSBANDRY PRODUCTS AT SELECTED CENTRES IN INDIA-*Concld.*

Commodity	Variety	Unit	State	Centre	Jul-20	Jun-20	Jul-19
Cauliflower	-	100 No.	Tamil Nadu	Chennai	1500	2000	2500
Potato	Red	Quintal	Bihar	Patna	2400	1920	1270
Potato	Desi	Quintal	West Bengal	Kolkata	2350	2090	1300
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	4510	4747	3483
Onion	Pole	Quintal	Maharashtra	Nashik	550	650	1100
Turmeric	Nadan	Quintal	Kerala	Cochin	NA	11000	11000
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	12000	12000	12000
Chillies	-	Quintal	Bihar	Patna	13500	13150	10080
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	NT	29000	30000
Ginger	Dry	Quintal	Kerala	Cochin	NT	27000	26000
Cardamom	Major	Quintal	NCT of Delhi	Delhi	127000	131000	127000
Cardamom	Small	Quintal	West Bengal	Kolkata	205000	195000	400000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	5200	5200	5200
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	70000	73300	80000
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	40000	39000	40000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	40400	40200	41000
Fish	Rohu	Quintal	NCT of Delhi	Delhi	15500	15500	16500
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	32000	35000	45000
Eggs	Madras	1000 No.	West Bengal	Kolkata	4285	3857	4250
Tea	-	Quintal	Bihar	Patna	22100	21950	21350
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	NT	NA	39000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	40000	40000	38200
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	29500	29500	26500
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	8500	7500	8300
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	5200	4800	4300
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13000	13200	13300
Rubber	-	Quintal	Kerala	Kottayam	10800	10500	12800
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	65000	63000	56500

Crop Production

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING THE MONTH OF OCTOBER, 2020

State	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Paddy, Jowar, Maize, Tobacco, Groundnut, Mesta and Linseed.	Paddy, Ragi, Groundnut, Seasmum and Ginger.
Assam	Paddy, Gram, Pulses, Potato and Linseed.	Paddy and Mesta.
Bihar	Wheat, Barley, Gram, Rapeseed & Mustard, Linseed and Potato.	Paddy, Jowar, Bajra,Maize, Ragi and Sesamum.
Gujarat	Paddy, Gram, Pulses and Potato.	Paddy, Jowar, Groundnut, Bajra and Cotton.
Himachal Pradesh	Wheat, Barley, Gram, Rapeseed & Mustard and Linseed.	Paddy, Bajra, Maize, Pulses, Potato and Groundnut.
Jammu & Kashmir	Wheat, Barley, Rapeseed & mustard and Onion.	Paddy, Bajra, Maize, Small Millets Pulses, Potato and Chillies.
Karnataka	Jowar, Potato, Tobacco, Linseed, Sweet Potato and Onion.	Kharif, Jowar, Ragi, Small Millets, Chillies and Groundnut.
Kerala	Paddy, Pulses and Sesamum.	Paddy, Sweet Potato and lemongrass.
Madhya Pradesh	Wheat, Barley, Gram, Jowar, Rabi Pulses, Potato, Chillies, Rapeseed & Mustard and Onion.	Paddy, Ragi, Kharif Pulses Potato, Ginger, Chillies and Groundnut.
Maharashtra	Wheat, Gram, Jowar, Barley and Pulses.	Kharif Paddy, Jowar, Bajra, Maize, Groundnut and Sesamum.
Manipur	Wheat, Potato and Rapeseed & Mustard.	Sugarcane and late Paddy.
Orissa	Wheat, Jowar, Gram, Rapeseed & Mustard and Linseed.	Paddy, Kharif, Jowar and Sesamum.
Punjab	Wheat and Gram.	Paddy, Cotton, Pulses and Early Sugarcane.
Rajsthan	Wheat, Barley, Rapeseed & Mustard and Linseed.	Jowar, Bajra, Maize, Cotton and Sannhemp.
Tamil Nadu	Paddy, Jowar, Groundnut, Small Millets,	Kharif Paddy, Jowar, Maize, Cotton, Tapioca, Mesta and Ginger.
Tripura	Pulses and Potato.	Til.
Uttar Pradesh	Wheat, Barley, Gram, Linseed and Rapeseed & Mustard.	Paddy, Jowar, Bajra, Sesamum and Groundnut.
West Bengal	Wheat, Barley, Rapeseed & Mustard, Tobacco, Chillies, Til, Potato and Pulses.	Paddy, Jute and Red Chillies.
Delhi	Wheat, Barley and Pulses.	Paddy Jowar, Bajra, Maize and Sugarcane.

(K) – Kharif (R) – Rabi

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Note to Contributors

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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.
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