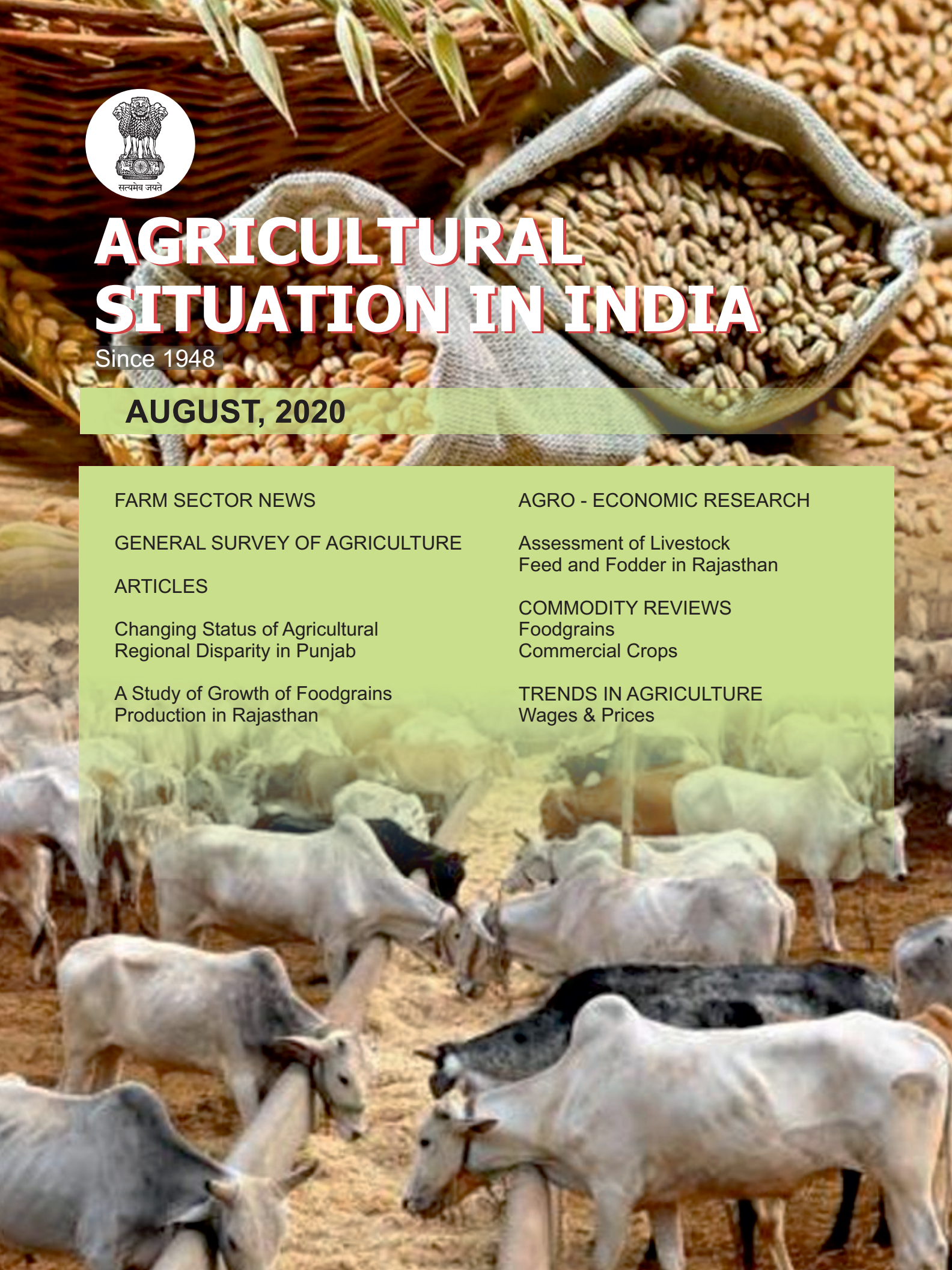

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CONTENTS — PRICES

From Editor's Desk

This issue of 'Agricultural Situation in India' is about the Government's various farmer-centric policy, recent general agriculture outlook, two incisive academic research articles, one on changing status of agricultural regional disparity in Punjab; and other on a study of growth of foodgrains production in Rajasthan and an agro-economic research study report on the assessment of livestock feed and fodder in Rajasthan.

Major farm sector news appearing in this issue are: the Union Agriculture & Farmers' Welfare Minister's appeal to farmers to adopt best agricultural practices for maximizing crop production during the kharif season; promotion of "One district–One Product" approach to increase value addition, marketing and exports; formation of ten thousand new farmers's producer organization; inauguration of new administrative and academic building of IARI, Jharkhand; Union Agriculture & Farmers Welfare Minister's stresses on the importance of Krishi Vigyan Kendras (KVKs) in agricultural progress; the Cabinet's approval on central sector scheme of financing facility under 'Agriculture Infrastructure Fund'; Shri Narendra Singh Tomar's regular meetings with states through Video Conferencing to deliberate upon recent initiatives to boost rural economy; celebration of 92nd foundation day of Indian Council of Agricultural Research; enrollment under PMFBY for kharif-2020; inauguration of world class state-of-the-art honey testing lab at Anand, Gujarat; initiatives to bring large Bihad area of Gwalior–Chambal region under agriculture; encouragement of startups in the field of agriculture for enhancing income of farmers and providing employment opportunities to youth; and operations to control locust in Rajasthan and Gujarat.

So far as the agricultural scenario is concerned, the Wholesale Price Index (WPI) of foodgrains, pulses, cereals, fruits, wheat and paddy increased by 3.99 percent, 10.10 percent, 2.72 percent, 2.31 percent, 5.17 percent and 4.48 percent, respectively, in June, 2020 as compared to that in June, 2019. The 2020 cumulative monsoon season rainfall in the country has been 1 percent higher than the long period average during 1st June, 2020 to 29th July, 2020. Current live storage in 123 major water reservoirs in the country was 69.98 BCM as against 68.26 BCM of normal storage based on the average storage of last 10 years.

In academic perspective, in the first article, the authors, interestingly, elaborate the disparity in the agricultural patterns in Punjab and in its various districts during the years 2011-12 and 2016-17 using agricultural development index (ADI). The author also identified the regions which have lagged behind in terms of agricultural development and as well as tried to probe the causes behind their backwardness. The study is based on secondary data on various indicators of agricultural development collected from Directorate of Economics & Statistics, Ministry of Agriculture and Farmers Welfare, Statistical Abstract of Punjab 2012 and 2018, and Central Statistical Office, Ministry of Statistics and Programme Implementation, Government of India.The study revealed that the central Punjab lies under more developed zone because of the adoption of modern technology in the initial stages of green revolution due to rich ecological and natural resource endowment. In contrast, the south-western region (Muktsar, Faridkot, Fazilka and Mansa) lies at the lowest level in agricultural development due to the poor land and water quality of the region. Based on the findings, the author suggested that for the districts with low ADI to increase the production by using new seeds, machinery and new technology. However, the districts with high ADI should enhance the use of new technology that will increase the income of the farmers and will make agriculture a profitable business rather than a loss trap.

In the second article, an attempt has been made to analyse the changing production trends of foodgrains crops in Rajasthan in rabi as well as in kharif season and to calculate growth coefficients of rabi and kharif seasons' cereals and pulses for sixty years (*i.e.,*from 1956-57 to 2015-16).The study is based on the time-series data from the year 1956-57 to 2015-16 collected from Directorate of Economics & Statistics, Rajasthan from the issues related to statistical abstract and agriculture statistics. Semi-log econometrics model has been used to estimate the growth rate of agricultural production of different crops. The study reveals that production of foodgrains has increased over the time but it is more in case of cereals, particularly for wheat crop, and less in case of pulses. So, the author suggested that the Government should give incentives to farmers for crop diversification in which alterntive crops may be considered under minimum support price (MSP). There is also a need to use the high yield variety (HYV) of seeds for pulses by the farmer, particularly for gram and arhar crops in the state. In addition, to improve the agriculture crop production, there is a need to increase crop-wise contract farming.

Agro-economic research included in this issue is a report on assessment of livestock feed and fodder in Rajasthan prepared by Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat. The primary objectives of the report were to examine the demand, supply, and a deficit of feed and fodder production in the Rajasthan. To realize these objectives, primary data using sample survey method and secondary level data of livestock and fodder from published sources were collected. On the basis of findings, the study suggests to increase public investment to develop infrastructures like fodder bank and fodder market; to encourage competent agencies to generate real time and time-period data on livestock feed and fodder; to work out strategies for raising production of sufficient good quality feed and fodder for efficient utilization of genetic potential of various livestock and sustainable improvement in productivity; to reduce cost of feed and fodder by increasing its productivity with high yielding fodder varieties; and to promote modern scientific farming methods suitable in different agro-climatic conditions of the area, etc.

P. C. Bodh

Farm Sector News*

The Union Agriculture & Farmers Welfare Minister, Shri Narendra Singh Tomar has appealed to farmers to adopt best agricultural practices for maximizing crop production during the kharif season

The Union Agriculture & Farmers Welfare Minister, Shri Narendra Singh Tomar has appealed to farmers to grow different varieties of crops, keeping in view the type of farmland in order to make farming a gainful activity. In a letter to the farmers of the country, Shri Tomar has said that with the onset of monsoon in most parts of the country, sowing of crops has also been completed in many places, and is in process in other areas. Shri Tomar said in his letter that he has been communicating with the farmers to exhort them to adopt best agricultural practices in order to maximize production.

Appreciating that farmers in the country have completed their agricultural work with responsibility and dedication even during the difficult time of the lockdown which affected industries and businesses, the Union Agriculture & Farmers Welfare Minister has said that under the leadership of Prime Minister Shri Narendra Modi, the country is dealing effectively with the coronavirus crisis since the past three months. The Rabi crops were harvested and selling procedure was completed without any hindrance. Agricultural production has become the pivot of the country's economy.

Shri Tomar, in his communication, has written a number of good agricultural practices such as best methods of growing paddy which is the main crop in the Kharif season, control of weeds, use of bio-pesticides, organic manure and vermi-compost, ridge and furrow method of crop planting, seed treatment of pulses with rhizobium bacteria, balanced use of nitrogenous fertilizers along with potash and phosphorus in accordance with soil health card, and using best irrigation methods. The Minister has dealt with the requirements of different regions of the country individually in great detail in his letter.

Summing up, the Minister says that by adopting better crop management practices, agricultural production can be increased manifold. It is essential to plan beforehand, make correct decisions and implement them in the field. Quoting the slogan given by Prime Minister Shri Narendra Modi - "Jai Jawan, Jai Kisan, Jai Vigyan, Jai Anusandhan", Shri Tomar has stressed that the prime minister has visualized an atmanirbhar or self-reliant India keeping agriculture and villages at the centre-stage. We must ensure an abundant Kharif crop. In the present situation, farmers are shouldering an immense responsibility of increasing agricultural production not just for their own welfare but for the welfare of the whole country.

"One district–One Product" approach to increase value addition, marketing and exports; FPOs would benefit small, marginal and landless farmers by giving access to technological inputs, finances, and better markets and prices for their crops

The Union Agriculture & Farmers Welfare Minister, Shri Narendra Singh Tomar, on 4th July, 2020, said that a new dimension is going to be added to farmers' groups with the creation of ten thousand new Farmers' Producer Organizations (FPOs). He said that 86% farmers in the country are small and marginal farmers, who would strengthen the rural economy through these FPOs, which would not only help in agricultural progress, but also create new avenues for the development of the country. The Union Agriculture & Farmers Welfare Minister was addressing a meeting of Laghu Udyog Bharati and Sahakar Bharati through video conference, in which Ministers of State for Agriculture & Farmers Welfare, Shri Purushottam Rupala and Shri Kailash Choudhary, and Union Minister of State for Water Resources, Shri Arjun Ram Meghwal were also present.

Shri Tomar said that in the beginning, the minimum number of members in the FPOs would be 300 in the plains and 100 in the North-East and hilly areas. The FPOs which are being formed for the benefit of small, marginal and landless farmers, would be managed in such a way that these farmers get access to technological inputs, finances, and better markets and prices for their crops, so as to fulfil the target of doubling farmers' incomes by the year 2022 as envisaged by Prime Minister Shri Narendra Modi. The FPOs would help to reduce the cost of production and marketing, and also help to improve production in the agricultural and horticultural

*Source: www.pib.nic.in

sectors. This would also help to increase employment opportunities.

Shri Tomar said that in the Budget 2020-21, there is a proposal to adopt cluster approach for horticultural produce through "One district – One Product" scheme so as to give a fillip to value addition, marketing and exports. This is a central scheme, whose total budget is Rs. 6,865 crores. All FPOs would be provided professional support and handholding for 5 years. 15% of the FPOs are to be constituted in aspirational districts, and would be formed on priority basis in scheduled tribal areas. This is a produce cluster based scheme. The FPOs would also boost organic and natural farming.

Further elaborating on the scheme, Shri Tomar said that it would be implemented through agencies like NABARD, SFAC and NCDC. They would be provided facility of equity grant upto Rs. 15 lakh on matching equity basis for financial stability. There would be credit guarantee fund with NABARD and NCDC, under which suitable credit guarantee up to Rs. 2 crores per FPO would be provided. Understanding the importance of capacity building, training and skill development of the stakeholders, there is a provision to provide training in organizational management, resource planning, marketing and processing through national and regional level institutions.

New administrative and academic building of IARI Jharkhand named after Late Dr. Shyama Prasad Mukherjee on his birth anniversary

The Union Minister of Agriculture & Farmers Welfare, Rural Development & Panchayati Raj, Shri Narendra Singh Tomar, has said that the Government is committed to double farmers' incomes by the year 2022 and has taken several important initiatives in this direction through various schemes and programmes. He was speaking through video conference at the inauguration of the newly constructed guest house of the Indian Agricultural Research Institute (IARI) at Gouria Karma near Barhi in Hazaribagh in Jharkhand, and naming of its new administrative and academic building after Late Dr. Shyama Prasad Mukherjee on his birth anniversary on 6th July, 2020. On this occasion, Shri Tomar said that Dr. Shyama Prasad Mukherjee dedicated his life to the unity and integrity of the country, gave the call for one nation-one law and sacrificed his life in Kashmir.

The Union Agriculture & Farmers Welfare Minister said that the 16-point action plan announced in the Budget 2020-21 and new legal provisions would help to achieve the target of doubling farmers' incomes. He stressed on the need to liberalize agricultural markets, make agriculture competitive, providing handholding to agriculture-based activities and adopt stable agricultural practices and maximum new technology. Shri Tomar said that in the Budget 2020-21, the Government has provided Rs. 2.83 lakh crores for agricultural activities, irrigation and rural development, which is the highest-ever allocation. Hon'ble Prime Minister, Shri Narendra Modi has announced several new schemes under Atma Nirbhar Bharat Abhiyaan, including Rs. one lakh crore infrastructure fund for the agriculture sector. Growth packages have also been announced for fisheries, animal husbandry, herbal farming, bee-keeping, etc., which would ensure the progress of all categories of farming activities. These initiatives would help to make possible all around national development along with development of the agriculture and rural sectors.

Emphasizing on bringing about a second green revolution to provide sufficient foodgrains for the growing population of the country, the Minister said that there are unlimited possibilities in Jharkhand and North-Eastern states to bring about such a revolution. Greater attention needs to be given to the growth of value addition, startups, small industries, etc. All possible efforts have to be made to achieve a self-reliant India through greater synergy between the hard work of the farmers and contribution from the scientists. He said that IARI, New Delhi, better known as Pusa Institute has played a leading role in the country's self-sufficiency in foodgrain production so much so that now the country has surplus production of foodgrains. Due to the presence of Pusa Institute, agricultural production has constantly grown in the neighbouring states like Punjab, Haryana and UP. Based on this, two new agricultural research institutes have been established in Jharkhand and Assam by Prime Minister Shri Narendra Modi.

Shri Tomar said that during the coronavirus crisis, the agriculture sector has emerged as a major strength. When lockdown was announced, the crop was ready for harvest, due to which the Prime Minister gave relaxation for this activity and farmers put in hard work for harvesting, sowing of summer crops and are now engaged in raising the kharif

crops. Predictions of a good monsoon have given further hope for a good crop this year.

The Union Ministers of State for Agriculture, Shri Purushottam Rupala and Shri Kailash Choudhary, Director General of ICAR, Dr. Trilochan Mahapatra, Director of IARI, Dr. A.K. Singh and other officers, scientists and farmers participated in the video-conference.

Shri Tomar stresses on important role of Krishi Vigyan Kendras in agricultural progess while laying the foundation stone of the administrative building of KVK Dataganj in Badaun

The Union Minister of Agriculture & Farmers Welfare, Rural Development & Panchayati Raj, Shri Narendra Singh Tomar has said that the Government is taking all possible measures to ensure that farmers get remunerative prices for their produce. Laying the foundation stone of the administrative building of the Krishi Vigyan Kendra (KVK) at Dataganj, Badaun in UP through video-conference, Shri Tomar said that with the implementation of the two new ordinances and other legal reforms in agriculture sector, farmers can now sell their produce anywhere in the country at remunerative prices and all restrictions on them have been removed. The Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Ordinance 2020 would serve to ensure that along with agreement with traders on purchase of agricultural produce, farmers are now assured beforehand of guaranteed return of their production costs.

The Union Agriculture Minister said that under the leadership of Prime Minister Shri Narendra Modi, efforts have been made to bridge the gap between agriculture and other sectors. The country is now not only self-sufficient but also surplus in foodgrain production. There are 86% small and marginal farmers in the country, who all should have access to government schemes, programmes and facilities. KVKs and scientists have an important role to play in ensuring this. The Minister stressed on the important role of the KVKs in ensuring that farmers give attention to soil health testing, refrain from using excessive pesticides, save water in irrigation and increase their crop production. He said that KVKs also have a leading role to play in increasing cluster farming, and development of crops for which local environment is conducive.

Shri Tomar said that there are 86 KVKs in UP, which are doing commendable work. Opening of 20 new KVKs in the state had been approved, out of which 17 are already functioning. The remaining three would be soon opened in Prayagraj, Rae Bareli and Azamgarh. Another KVK is proposed in Moradabad.

The Union Minister of State for Agriculture, Shri Kailash Choudhary, UP State Ministers and legislators, Director General (ICAR) Dr Trilochan Mahapatra, Director (IARI) Dr A.K. Singh, Vice Chancellor, Sardar Patel Agriculture University, Meerut, Dr R.K. Mittal and other officers and scientists were present in the video-conference. It was informed in the VC that there are 720 KVKs in the country and 151 climate smart villages, which present technical models under different conditions. KVKs are also giving training to about 15 lakh farmers and youth every year.

The Cabinet approves Central Sector Scheme of financing facility under 'Agriculture Infrastructure Fund'

The Union Cabinet chaired by the Prime Minister Shri Narendra Modi, on 8th July, 2020, has given its approval to a new pan India Central Sector Scheme'Agriculture Infrastructure Fund'. The scheme shall provide 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 financial support.

Under the scheme, Rs. one lakh crore would be provided by banks and financial institutions as loans to primary agricultural credit societies (PACS), marketing cooperative societies, farmer producers organizations (FPOS), self-help group (SHG), farmers, joint liability groups (JLG), multipurpose cooperative societies, agri-entrepreneurs, startups, aggregation infrastructure providers and central/ state agency or local body sponsored public private partnership project

Loans would be disbursed in four years starting with sanction of Rs. 10,000 crore in the current year and Rs. 30,000 crore each in next three financial years.

All loans under this financing facility would have interest subvention of 3% per annum up to

a limit of Rs. 2 crore. This subvention would be available for a maximum period of seven years. Further, credit guarantee coverage would be available for eligible borrowers from this financing facility under Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) scheme for a loan up to Rs. 2 crore. The fee for this coverage would be paid by the Government. In case of FPOs, the credit guarantee may be availed from the facility created under FPO promotion scheme of Department of Agriculture, Cooperation & Farmers Welfare (DACFW).

The total outflow as budgetary support from the Government of India (GoI) would be Rs. 10,736 crore. Moratorium for repayment under this financing facility may vary, subject to minimum of 6 months and maximum of 2 years. The project by way of facilitating formal credit to farm and farm processing-based activities is expected to create numerous job opportunities in rural areas.

Agri Infra fund would be managed and monitored through an online Management Information System (MIS) platform. It would enable all the qualified entities to apply for loan under the fund. The online platform would also provide benefits such as transparency of interest rates offered by multiple banks, scheme details including interest subvention and credit guarantee offered, minimum documentation, faster approval process and also integration with other scheme benefits.

The National, State and District level Monitoring Committees would be set up to ensure real-time monitoring and effective feedback. The duration of the Scheme shall be from FY2020 to FY2029 (10 years).

The Union Minister of Agriculture and Farmers Welfare Shri Narendra Singh Tomar held meeting with States through Video Conferencing to deliberate upon recent initiatives by the Government to boost rural economy

The Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar held a meeting with states through video conferencing, on 10th July, 2020, to deliberate upon the recent initiatives taken by the Government to boost rural economy. The meeting was attended by Ministers of State for Agriculture, Shri Parshottam Rupala and Shri Kailash Chaudhary, Agriculture Ministers of almost all the States and senior officers of the Department of Agriculture, Cooperation and Farmers Welfare. On the occasion, the Union Agriculture & Farmers Welfare Minister released a booklet on new operational guidelines for formation and promotion of 10,000 Farmer Producer Organizations (FPOs). The key implementation issues were discussed during interaction with the States.

Addressing the video conference, Shri Narendra Singh Tomar thanked Prime Minister Shri Narendra Modi for allocating Rs 20 lakh crore package for 'Atma Nirbhar Bharat Abhiyaan', under which Rs 1 lakh crore financing facility has been allocated for establishment of agriculture infrastructure projects at farm-gate & aggregation points (primary agricultural cooperative societies, farmers producer organizations, agriculture entrepreneurs, startups, etc.). He said that this fund would be utilized for creating post-harvest infrastructure to avoid wastage of crop produce, which is about 15-20% of total yield at present. He emphasized upon the need to utilize the agriculture infrastructure fund to mobilize a medium-long debt financing facility for investment in viable projects relating to post-harvest management.

The Minister further emphasized that Kisan Credit Card (KCC) saturation drive was initiated by the Government and target of issuing 2.5 crore KCCs by the end of year is set under the 'Atma Nirbhar Bharat' campaign. Referring to the PM-Kisan Yojana and KCC, he said that out of around 14.5 crore operational farm land holdings, data on around 10.5 crore has been collected so far under PM-Kisan. There are about 6.67 crore active KCC accounts presently. After the KCC saturation drive was started in February, 2020, about 95 lakh applications have been received out of which 75 lakh applications have been sanctioned.

The Minister further stated that total 10,000 FPOs are to be formed till 2023-24 and support to each FPO is to be continued for 5 years. The cost of proposed scheme is Rs. 6,866 crores. He assured that all the necessary help/support would be rendered to the States to accelerate agriculture infrastructure development, promotion of FPOs and extending credit facilities to the farmers through KCC.

The State Agriculture Ministers expressed their happiness that the KCC facilities have now been extended to the farmers practicing animal husbandry and fisheries. The State Agriculture Ministers further appreciated the initiatives of the Government of India

and assured to render their support to the Centre in their efforts towards strengthening agriculture infrastructure in the states, creation of FPOs and widening the coverage of KCC to enhance farmers' income and boost rural economy.

Indian Council of Agricultural Research celebrates its 92nd Foundation Day

Indian Council of Agricultural Research (ICAR) celebrated its 92nd foundation day on 16th July, 2020. On this occasion, the Union Minister of Agriculture & Farmers Welfare Shri Narendra Singh Tomar appreciated the efforts of the agricultural scientists due to which ICAR has contributed immensely in the progress of agriculture in the country during the last nine decades. He said that today India has surplus in foodgrains production due to the research contribution of the scientists and hard work of the farmers. He congratulated the farming community in the country for record production of crops even during the lockdown due to Covid-19 pandemic. Shri Tomar also expressed gratitude to Prime Minister Shri Narendra Modi for bringing in long-awaited agricultural reforms by announcing legal amendments and ordinances which would empower the farmers and help them in getting remunerative prices for their produce. He said that ICAR and KVK scientists also have to ensure that the benefits of contract farming reach the small farmers.

Exhorting the scientists to ensure that in its tenth decade, the Pusa Institute (IARI) gets upgraded from a national institute to an institute of international status, the Minister said that there is need to reduce dependence on imports, increase production of healthy foods and also increase production of pulses and oilseeds. Palm oil production needs to be increased by research and increased cultivation. Laying emphasis on developing new varieties of oilseeds, Shri Tomar said that the near self-sufficiency achieved in pulses production needs to be replicated for oilseeds production also, so that import of edible oils is reduced.

On this occasion, 8 new products and 10 publications were released. The Union Ministers of State for Agriculture, Shri Parshottam Rupala and Shri Kailash Choudhary, Director General (ICAR) Dr. Trilochan Mahapatra, a number of ICAR scientists and officials were present.

The Indian Council of Agricultural Research (ICAR) is an autonomous organization under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare, Government of India. It was established on 16th July, 1929 as a registered society under the Societies Registration Act, 1860. The Council is the apex body for co-ordinating, guiding and managing research and education in agriculture including horticulture, fisheries and animal sciences in the entire country. With 102 ICAR institutes and 71 agricultural universities spread across the country, this is one of the largest national agricultural systems in the world.

The ICAR has played a pioneering role in ushering green revolution and subsequent developments in agriculture in India through its research and technology development, thus making a visible impact on the national food and nutritional security. It has played a major role in promoting excellence in higher education in agriculture.

The Indian Council of Agricultural Research has been recognizing and rewarding the institutions, scientists, teachers, farmers and agricultural journalists every year. This year, nearly 160 awardees under 20 different categories have been selected. These comprise three Institutions, two AICRP, 14 KVKs, 94 Scientists, 31 farmers, 6 journalists and 10 staff members of various ICAR Institutes. It is heartening to note that of the 141 awarded persons 19 are women.

Among the agricultural universities and deemed universities, Govind Ballabh Pant University of Agriculture & Technology, Pantnagar has been bestowed upon the Best Agriculture University Award for the rapid strides in all spheres of teaching, research, extension and innovations, ICAR- Central Marine Fisheries Research Institute, Cochi has been awarded the Best Institution Award among the large institute category whereas, the ICAR-Central Institute for Research on Cotton Technology, Mumbai has been adjudged the best ICAR institution among smaller ICAR Institutes category.

All India Coordinated Research Project on Sorghum, Hyderabad and All India Coordinated Research Project on Maize, Ludhiana have been jointly conferred Chaudhary Devi Lal Outstanding All India Coordinated Research Project Award 2019. Deendayal Upadhyay Krishi Vigyan Protsahan Puruskar for KVKs at National Level has been

jointly bagged by Krishi Vigyan Kendra, Datia, Madhya Pradesh and Krishi Vigyan Kendra, Venkataramannagudem, Andhra Pradesh for outstanding extension/ outreach activities having significant impact in developing agriculture and allied sectors of the district. Six journalists comprising of 4 from print and 2 from electronic media have been given the Chaudhary Charan Singh Award for agricultural journalism 2019.

Enrollment of farmers under PMFBY for Kharif-2020 going on in full swing

The enrolment of farmers under Pradhan Mantri Fasal Bima Yojana (PMFBY) for Kharif-2020 season is going on in full swing in various States and UTs of the country. The Government of India has made enrollment free for all the farmers who only need to pay premium amount. Farmers can get their foodcrops (cereals and oilseeds) insured at a minimal premium rate of 2% of sum insured, and commercial and horticulture crops at 5% of sum insured in Kharif 2020. The remaining premium would be subsidised by the Central Government and States. The cut-off date for ongoing Kharif 2020 season in few States/ UTs may end by 31st July, 2020.

In order to motivate the farmers, the Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar has appealed to them through video message to get enrolled under PMFBY and requested all farmers to protect themselves against financial loss due to crop failures/damages as a result of natural disasters. The Scheme ensures protection of crop loss for entire cropping cycle, from pre-sowing to post-harvest activities. Farmers are encouraged to enroll for the Scheme at the earliest to avail the coverage against prevented sowing due to any unforeseen calamity. In addition, there is comprehensive risk coverage against drought, floods, inundation, landslides, unseasonable rainfall, hailstorm, natural fires, and cyclone for the standing crop as well as coverage against hailstorm, cyclone and unseasonal rainfall for post-harvest crop.

In February, 2020, the Government of India approved revamping of PMFBY in order to address some previous challenges in the implementation of the crop insurance scheme. The Government made the scheme voluntary for all the farmers from Kharif 2020 onwards. Earlier, the scheme was compulsory for all the loanee farmers. Now, farmers with loan dues can opt out of the scheme by submitting a simple declaration to their bank branch seven days before the cut-off date of enrolment.

Any farmer who wishes to get enrolled under PMFBY should contact his nearest Bank, Primary Agricultural Credit Society, Common Service Centre (CSC)/ Village Level Entrepreneurs (VLEs), Office of Agriculture Department, Representative of Insurance Company or directly online through the National Crop Insurance Portal (NCIP) at www.pmfby.gov.in and Crop Insurance App (https://play.google.com/store/apps/details?id=in.farmguide.farmerapp.central).

Farmers need to carry Aadhaar number, bank passbook, land record/tenancy agreement, and self-declaration certificate to complete the enrolment process. This season, all farmers enrolled under the Scheme would be intimated about the status of their application through regular SMS on their registered mobile numbers.

In a bid to ensure hassle-free enrollment of farmers, the Ministry of Agriculture and Farmers Welfare provided training to 29,275 officials from banks, insurance companies, Common Service Centres (CSC), State Level Bankers' Committee (SLBC), Village Level Entrepreneurs (VLEs), State and District level Agriculture and ATMA officials, etc. Besides this, insurance companies have also provided training to different stakeholders. The Ministry also aims at providing training to 600 executives of Kisan Call Centres.

The Ministry of Agriculture and Farmers Welfare has taken a slew of steps to create awareness among the farmers about the Scheme. Different insurance companies in cooperation with the Ministry of Agriculture and Farmers Welfare and State Agricultural Departments have launched a massive campaign across the country. Different activities such as local level awareness meetings, display of banners and posters at important locations, distribution of pamphlets, IEC Vans, advertisements in local and national newspapers, Mass Media Campaign among others, are being conducted to create awareness at the grassroots level.

The PM Fasal Bima Yojana is designed to protect farmers from natural calamities, pest or insect attack and diseases, and help them get back on their feet by providing financial support through claim settlement. All farmers are encouraged to enroll

under PMFBY to avail the benefits of crop insurance as a protection against crop loss due to unforeseen natural calamities.

World Class State-of-the-Art Honey Testing Lab inaugurated at Anand, Gujarat

The Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar, on 24th July, 2020, inaugurated the 'World Class State-of-the-Art Honey Testing Laboratory' established by National Dairy Development Board (NDDB) in Anand (Gujarat) with support of National Bee Board (NBB), through video conference in the presence of Shri Giriraj Singh, Union Minister of Fisheries, Animal Husbandry and Dairying, Shri Parshottam Rupala and Shri Kailash Choudhary, Union Ministers of State for Agriculture, Dr. Sanjeev Kumar Balyan, Union Minister of State (FAH&D) and senior officers of the Department of Agriculture, Cooperation and Farmers Welfare and Department of Fisheries, Animal Husbandry and Dairying.

On this occasion, the Union Minister of Agriculture & Farmers Welfare thanked Prime Minister Shri Narendra Modi and mentioned about his vision to bring sweet revolution in the country by encouraging large number of famers for production and marketing of honey and earn more profit in agriculture. Addressing the meeting through VC, he stated that the Government is committed towards increasing the income of farmers and the bee-keeping enterprise has to play a major role in supplementing the income of farmers. He further informed that the Ministry has taken up several activities to promote bee keeping under 'Mission on Integrated Development of Horticulture (MIDH)' and 'National Mission for Beekeeping', being implemented through National Bee Board and the States.

Shri Tomar expressed the need to focus on imparting training on scientific bee-keeping and production of high value honey and honey-bee products and creating awareness among farmers, bee-keepers and landless laborers about the scope and potential of bee-keeping enterprise as an additional source of income to them. He intimated that the Department of Agriculture, Cooperation & Farmers Welfare has approved the National Bee-keeping and Honey Mission (NBHM) for a period of 2 years. In view of the vision of Hon'ble Prime Minister for development of Gaon, Garib and Kisan, the bee-keeping enterprise would bring change in the livelihood of farmers and rural poor leading to sustainable agriculture development.

The Union Agriculture Minister complimented National Dairying Development Board, National Bee Board, Khadi & Village Industries Corporation, policy makers, farmers & bee-keepers for their significant contribution and continued support in this endeavor. The Agriculture Minister further emphasized on increasing bee colonies, honey bee production, processing, marketing and export, which would significantly contribute in GDP and boost the rural economy.

Speaking on the occasion, Shri Giriraj Singh, Union Minister of Fisheries, Animal Husbandry and Dairying said that adulteration is a major problem in honey production and honey is being adulterated with high fructose corn syrup or rice, tapioca, sugarcane and beet syrup that are cheaper and resemble honey in physico-chemical properties. He thanked the Prime Minister for shifting the focus towards bringing 'Sweet Revolution' in the country through such interventions. He further stated that the establishment of this Honey Testing Laboratory would help for quality production of honey and its export to other countries. He also suggested to promote the cultivation of flora based crops to enhance the production of honey & honey bee products.

The Union Ministers of State Shri Parshottam Rupala, Shri Kailash Choudhary and Dr. Sanjeev Balyan also expressed their views and suggested to establish more Honey Testing Laboratories in the country.

Based on the parameters notified by FSSAI, the NDDB has set-up this world class lab with all the facilities and developed the test methods/ protocols, which have been accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL). FSSAI has now notified new standards of Honey, Bee Wax and Royal Jelly.

The Union Agriculture Minister also inaugurated 'two days online training programme on scientific honey-bee production' being conducted by National Dairying Development Board (NDDB) and extended compliments to the trainees for their participation in the said programme.

The Union Minister of Agriculture & Farmers Welfare, Shri Narendra Singh Tomar held meeting with World Bank representatives to bring large Bihad area of Gwalior–Chambal region under agriculture

The Union Minister of Agriculture & Farmers Welfare, Rural Development & Panchayati Raj, Shri Narendra Singh Tomar held a meeting on 25th July, 2020 through video conference to deliberate with the representatives of World Bank, senior officers of the Department of Agriculture, Madhya Pradesh, scientists, vice-chancellor of Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior and other stakeholders to bring the large *Bihad* area of Gwalior–Chambal region under agriculture. During this meeting, it was decided that the substantive project would be prepared in collaboration and support from World Bank to accomplish this work. In this regard, a meeting was also held earlier with the representatives of World Bank and it has been decided to prepare a preliminary project report within a month.

Speaking on the occasion, the Union Agriculture & Farmers Welfare Minister informed that more than 3 lakh hectares of rugged land is not cultivable and if this area is improved, then this would help in the integrated development of the *Bihad* area in Gwalior–Chambal region. He further mentioned that the proposed reforms in this project would not only help to improve agricultural development and the environment, but it would also create employment opportunities for the people and lead to substantive development of this region.

Shri Tomar said that there is a lot of scope for development of the *Bihad* area in Gwalior–Chambal region. The Chambal Expressway would be built and would pass through this area, by which the overall development of the region would be possible. After preparing the initial report, subsequent meetings would be held with the Chief Minister of Madhya Pradesh for further course of action.

The representative of World Bank, Mr. Adarsh Kumar said that the World Bank is interested in working in the state of Madhya Pradesh. Shri Vivek Aggarwal, Joint Secretary, Ministry of Agriculture & Farmers Welfare said that all the aspects related to technology, infrastructure, capital cost, investment, etc., would be taken into consideration prior to initiating the work of the proposed project with minimum budget allocation.

Shri K.K. Singh, agricultural production commissioner said that the old project has been revived and would be undertaken under the guidance of the Union Minister of Agriculture & Farmers Welfare, Rural Development and Panchayati Raj. Dr. S. K Rao, vice-chancellor of Rajmata Vijayaraje Scindhia Agricultural University, Gwalior said that the work can be done keeping in mind the overall agricultural development of the region.

The Government of India encouraging startups in the field of agriculture for enhancing income of farmers and providing employment opportunities to youth

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, start-ups are being encouraged. The Union Minister for Agriculture and Farmers Welfare, Rural Development and Panchayati Raj, Shri Narendra Singh Tomar stated that as emphasized by the Prime Minister Shri Narendra Modi, new technology in the field of agriculture and allied sectors through start-ups and agripreneurship should be promoted. Therefore, under the Rashtriya Krishi Vikas Yojana, the innovation and agripreneurship component has been promoted. For the year 2020-21, in the first phase, 112 startups in the area of agro processing, food technology and value addition would be funded for a sum of Rs. 1185.90 lakhs which would contribute to enhance the income of farmers. This fund would be released in installments.

Shri Tomar stated that earlier in the month while reviewing the progress of agriculture research, extension and education in India, Prime Minister Shri Narendra Modi had said that startups and agri-enterpreneurs need to be promoted to ensure innovation and use of technology in agriculture and allied sectors. He had highlighted the need to leverage information technology to provide information on demand to the farmers. The Prime Minister exhorted that traditional knowledge of Indian communities should be coupled with technology and skill sets of youth and agriculture graduates to translate the full potential of Indian agriculture in transforming rural areas. He also directed that hackathons may be organized twice a year to solve identified problems

and meet design needs for tools and equipment that can reduce drudgery in farming activity.

The Union Agriculture and Farmers Welfare Minister also stressed on the need to make agriculture competitive, provide handholding to agriculture-based activities and adopt new technology at the earliest. Emphasizing on increasing private investment in the field of agriculture, Shri Tomar has drawn attention to the need for value addition and startups. His vision is to attract youth to agriculture and rejuvenate the sector. In keeping with these initiatives of the Government of India to boost agriculture and allied activities and give an impetus to the rural economy, the Rashtriya Krishi Vikas Yojna (RKVY) which aims at strengthening infrastructure in agriculture and allied areas, has been revamped.

Under the revamped scheme, a component Innovation and Agri-entrepreneurship Development programme has been launched in order to promote innovation and agripreneurship & startups by providing financial support and nurturing the incubation ecosystem. DAC&FW has selected 5 Knowledge Partners (KPs) as Centres of Excellence and 24 RKVY-RAFTAAR Agribusiness Incubators (R-ABIs) from across the country after a nation-wide advertisement and a rigorous selection process.

112 Startups selected by different knowledge partners and agribusiness incubators in the area of agro-processing, food technology and value addition would be funded in the first phase for a sum of Rs. 1185.90 lakh. 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 startups would lead to employment to youth. Besides, they directly and indirectly would contribute to enhance the income of farmers by providing opportunities to them. For more details on agri-entrepreneurship, RKVY website:https://rkvy.nic.in "https://rkvy.nic.in/"may be visited.

Till 30th July, 2020, Locust control operations have been done in more than 4.56 hectares area of 10 states

Locust control operations were carried out at 34 places in 09 districts, viz., Jaisalmer, Barmer, Jodhpur, Bikaner, Churu, Nagaur, Hanumangarh, Jalore and Sirohi of Rajasthan and 02 places in Kutch district of Gujarat against swarms and hoppers by LCOs in the intervening night of 30th-31st July, 2020. Besides this, Haryana State Agriculture Department also carried out control operation at one place in Bhiwani district in the intervening night of 30th-31st July, 2020 against small groups and scattered population of locusts.

Starting from 11th April, 2020 till 30th July, 2020, control operations have been done in 2,26,979 hectares area in States of Rajasthan, Madhya Pradesh, Punjab, Gujarat, Uttar Pradesh and Haryana by Locust Circle Offices (LCOs). Till 30th July, 2020, control operations have been done in 2,29,582 hectares area in states of Rajasthan, Madhya Pradesh, Punjab, Gujarat, Uttar Pradesh, Maharashtra, Chhattisgarh, Haryana, Uttarakhand and Bihar by State Governments.

Presently, 104 control teams with spray vehicles are deployed in the states of Rajasthan and Gujarat, and more than 200 central government personnel are engaged in locust control operations. Further, 5 companies with 15 drones are deployed at Barmer, Jaisalmer, Bikaner, Nagaur and Phalodi in Rajasthan for effective control of locusts on tall trees and in inaccessible areas through spraying of pesticides. A Bell helicopter has been deployed in Rajasthan for use in scheduled desert area as per the need. Indian Air Force is also assisting in anti-locust operation by using Mi-17 helicopter.

No significant crop losses have been reported in the States of Gujarat, Uttar Pradesh, Madhya Pradesh, Maharashtra, Chhattisgarh, Bihar and Haryana. However, some minor crop losses have been reported in some districts of Rajasthan.

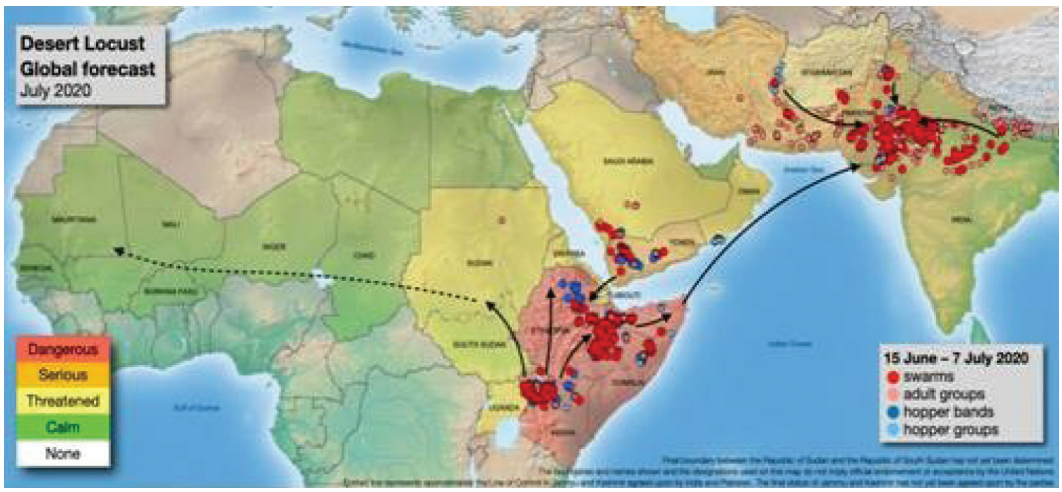
On 31st July, 2020, swarms of immature pink locusts, adult yellow locusts and / or hoppers are active in Jaisalmer, Barmer, Jodhpur, Bikaner, Churu, Nagaur, Hanumangarh, Jalore and Sirohi districts of Rajasthan, Bhiwani district of Haryana and Kutch district of Gujarat.

Food and Agriculture Organization's Locust status update of 21st July, 2020 indicates that the risk of swarm migration from Horn of Africa prevails in coming weeks. In Somalia, the swarms are moving eastwards across the north and a limited number of swarms could migrate across the Indian Ocean to the Indo-Pakistan border area during the remainder of this month.

Weekly virtual meeting on Desert Locust of

South-West Asian countries (Afghanistan, India, Iran and Pakistan) is being organized by FAO. 16 virtual meetings of the technical officers of South West Asian countries have taken place so far.

The image below depicts the desert locust global forecast for July, 2020



Source: http://www.fao.org/ag/locusts/common/ecg/75/en/200708forecastE.jpg

Total 13.92% increase in sowing area coverage of kharif crops in comparison to last year

The Department of Agriculture, Cooperation and Farmers Welfare, Government of India is taking several measures to facilitate the farmers and farming activities at field level during COVID 19 pandemic.

There has been satisfactory progress of sowing area coverage under Kharif crops, the status of which is given as under:

As on 31st July, 2020, the total Kharif crops has been sown on 882.18 lakh ha area against 774.38 lakh ha area during the corresponding period of last year, thus, increase in area coverage by 13.92 % compared to last year in the country.

The crop wise area sown is as under:

Rice: About 266.60 lakh ha area coverage under rice as compared to 223.96 lakh ha during the corresponding period of last year.

Pulses: About 111.91 lakh ha area coverage under pulses as compared to 93.84 lakh ha during the corresponding period of last year.

Coarse Cereals: About 148.34 lakh ha area coverage under coarse cereals as compared to 139.26 lakh ha during the corresponding period of last year.

Oilseeds: About 175.34 lakh ha area coverage under oilseeds as compared to 150.12 lakh ha during the corresponding period of last year.

Sugarcane: About 51.78 lakh ha area coverage under sugarcane as compared to 51.20 lakh ha during the corresponding period of last year.

Jute & Mesta: About 6.95 lakh ha area coverage under jute & mesta as compared to 7.05 lakh ha during the corresponding period of last year.

Cotton: About 121.25 lakh ha area coverage under cotton as compared to 108.95 lakh ha during the corresponding period of last year.

So, as a whole, there is no impact of COVID-19 on progress of area coverage under kharif crops as on date.

As on 30th July, 2020, actual rainfall received in the country is 447.1 mm against normal of 443.3 mm *i.e.*, departure of (+) 1% during the period from 1st June, 2020 to 30th July, 2020. Central Water Commission (CWC) has reported that the live water storage in 123 reservoirs in different parts of the country is 141% of the corresponding period of the last year.

General Survey of Agriculture

Trend in Foodgrain Prices

Based on Wholesale Price Index (WPI) (2011-12=100), WPI in case of foodgrains increased by 3.99 percent in June, 2020 over June, 2019.

Among foodgrains, WPI of pulses, fruits and cereals increased by 10.10 percent, 2.31 percent and 2.72 percent, respectively and vegetables decreased by 9.21 percent, in June, 2020 over June, 2019.

Among cereals, WPI for wheat and paddy increased by 5.17 percent and 4.48 percent, respectively, in June, 2020 over June, 2019.

Similarly, WPI in case of foodgrains increased by 1.00 percent in June, 2020 over May, 2020.

Among foodgrains, WPI of pulses, cereals and vegetables increased by 0.25 percent, 1.25 percent and 8.96 percent and WPI of fruits decreased by 0.53 percent in June, 2020 over May, 2020.

Among cereals, WPI for paddy increased by 3.76 percent and for wheat decreased by 0.75 percent in June, 2020 over May, 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 29th July, 2020 has been 1% 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 12% in East & North East India & South Peninsula each but lower than LPA by 20% in North-West India and by 2% in Central India.

Out of 36 meteorological sub-divisions, 11 meteorological sub-divisions received large excess/ excess rainfall, 18 meteorological sub-divisions received normal rainfall and 7 meteorological sub-divisions received deficient/large deficient rainfall.

Out of 685 districts for which rainfall data available, 89(13%) districts received large excess rainfall, 111(16%) districts received excess rainfall, 251(37%) districts received normal rainfall, 211(31%) districts received deficient rainfall and 23(3%) districts received large deficient rainfall.

Current live storage in 123 reservoirs (as on 30th July, 2020) monitored by Central Water Commission having Total Live Capacity of 171.09 BCM was 69.98 BCM as against 49.57 BCM on 30.07.2019 (last year) and 68.26 BCM of normal storage (average storage of last 10 years). Current year's storage is 141% of last year's storage and 103% of the normal storage.

As per latest information, around 82.4% of the normal area under Kharif crops has been sown up to 31.07.2020. Total area sown under Kharif reported at 882.18 lakh hectares as compared to 774.38 lakh hectares during the same period last year.

A statement indicating comparative position of area coverage under major crops as on 31.07.2020 during current Kharif season *vis-a-vis* the coverage during the corresponding period of last year is given in the **following table**.

TABLE: All India Crop Situation - Kharif (2020-21) as on 31.07.2020

(In lakh ha.)

Crop Name	Normal Area for whole Kharif Season (DES)	Area sown reported			Absolute Change
		This Year 2020	% of Normal for whole season	Last Year 2019	
Rice	397.29	266.60	67.1	223.96	42.6
Jowar	20.56	12.39	60.3	12.11	0.3
Bajra	72.98	54.74	75.0	48.75	6.0

TABLE: All India Crop Situation - Kharif (2020-21) as on 31.07.2020-*Contd.*

(In lakh ha.)

Crop Name	Normal Area for whole Kharif Season (DES)	Area sown reported			Absolute Change
		This Year 2020	% of Normal for whole season	Last Year 2019	
Maize	74.70	74.30	99.5	72.58	1.7
Total Coarse Cereals	184.85	148.34	80.2	139.26	9.1
Total Cereals	582.14	414.95	71.3	363.22	51.7
Tur	44.29	40.05	90.4	37.09	3.0
Urad	35.53	33.38	94.0	27.64	5.7
Moong	30.49	29.57	97.0	21.52	8.1
Kulthi	2.13	0.05	2.3	0.05	0.0
Others	16.45	8.87	53.9	7.54	1.3
Total Pulses	128.88	111.91	86.8	93.84	18.1
Total Foodgrains	711.03	526.86	74.1	457.06	69.8
Groundnut	41.41	45.45	109.8	30.53	14.9
Soyabean	110.32	116.62	105.7	107.64	9.0
Sunflower	1.64	0.76	46.4	0.73	0.0
Sesamum	16.73	10.51	62.8	9.65	0.9
Nigerseed	2.23	0.49	22.0	0.47	0.0
Castorseed	9.07	1.51	16.7	1.09	0.4
Total Oilseeds	181.39	175.34	96.66	150.12	25.2
Cotton	122.27	121.25	99.2	108.95	12.3
Sugarcane	48.46	51.78	106.9	51.20	0.6
Jute & Mesta	7.60	6.95	91.4	7.05	-0.1
All- Crops	1070.75	882.18	82.4	774.38	107.8

Source: Crops & TMOP Divisions, DAC&FW

Note: Area figures are as per eye assessment of State Agriculture Departments. Normal Area: 5 years average of the area during the period of 2014-15 to 2018-19

Articles

Changing Status of Agricultural Regional Disparity in Punjab

JASPAL SINGH[@], SHILPI KAPOOR[$], JAGDEEP SINGH[*], NIRMAL SINGH[#] AND TANIMA DUTTA[^]

Abstract

Punjab is the apex performing state since the green revolution which played a noteworthy contribution to the food self-sufficiency of the nation. But the agricultural performance has not been evenly spread throughout the state. In this study an attempt has been made to analyse the disparity in the agricultural development index (ADI) in various districts of Punjab vis-à-vis that of Punjab as a whole during the years 2011-12 and 2016-17. Furthermore, it analyse the causes for the regions which are chronically backward in terms of ADI. The findings reveal that district Firozpur has the highest ADI of 77.54, while, district Fazilka has lowest ADI of 26.60 during 2011-12. However, there was drastic fall in ADI of district Firozpur in 2016-17 due to large decline in the cropping intensity and the use of fertilizers. The south-western region (Muktsar, Faridkot, Fazilka and Mansa) lies at the lowest level in agricultural development due to poor land and water quality of the region. It is suggested for the districts with low ADI to increase the production by using new seeds, machinery and new technology. To enhance the agricultural production in the lagged regions of the state, it is very important to know the suitable cropping pattern. If the state government takes initiative to establish agro-food processing units, especially for keenow juice industry, the region would reap plenty of benefits.

Keywords: *Punjab, agriculture, region, disparity, ADI.*

1. Introduction

The development efforts of an economy should ensure that certain regions are not excluded in the growth process because it may threaten the sustainability of growth. Indian economy has come a long way of growth in agriculture since genesis of planning in 1951. The complex set of problems appeared due to the shortage of food for the population. To become the self-sufficient in foodgrains, there have been tremendous reforms in the form of policy interventions in agriculture. The significance of agriculture in India can be gauged from its contribution towards GDP which was 15.87 percent in 2019 and the share in total employment which was about 44 percent in 2017-18 (PLFS, 2019). In recent years, the declining share of agriculture is followed by improvement in the secondary and tertiary sectors. The declining share is an indication of growth in the Indian economy, although it is still higher in contrast to the developed countries of the world. India being the major exporter of foodgrains faces serious problems in the availability of foodgrains to the people of the country. The distribution aspect of this production is still a persistent issue with the state, neglecting this area in the post liberalisation era with a mad rush towards markets (Majumdar, 2006).There was opening up of the economy which transcended to agriculture as well which had its own repercussions and in the nineties and early of 21st century, there has been a lot of literature looking at the various aspects of globalisation and its impact on Indian agriculture (Gulati, 1998; Gulati *et al.*, 1999; Balakrishnan, 2000; Vaidyanathan, 2000; Mathur *et. al.*, 2006). In the post Green Revolution period, some states emerged as leaders in terms of total agricultural production and land productivity (Singh *et al.*, 2013). In a densely populated underdeveloped country like India, it is important to study the regional disparities in agriculture at the state level as a well-recognized objective in which state government play a crucial role in allocating the resources.

@ Consultant, NITI Aayog, New Delhi-110001; Email: punjabimatti82@gmail.com.
$ Research Scholar, Department of Economics, LPU, Phagwara (Punjab).
* Assistant Professor in Economics, Guru Nanak College, Budhlada.
# Research Scholar, Barkatullah University, Bhopal.
^ Associate professor, Department of Economics, LPU, Phagwara (Punjab).

Punjab became the foundation of the achievements of Intensive Agricultural District Programme (IADP) and over the years it has contributed maximum foodgrain production to the central pool. Punjab covers 1.54 percent of the total area of the country but due to its geographical features and high productivity of the land, 85 percent of the area has been covered under agriculture. Punjab, being known as "*Food Bowl of India*" by different economists and sociologists, plays an important role in the contribution of food production. In 1960, with the implementation of the programmes of Intensive Agriculture Area Programme (IAAP) and IADP to make the country self-reliant in foodgrain production, Punjab was the upcoming state where usage of high yielding variety seeds, increase in irrigation investment and utilization of intensive inputs took place with the introduction of green revolution. This led to a surprising increase in agriculture productivity (Bhalla & Singh, 1997; Hazell, 1982; Singh *et al.,* 2013). But the growth in productivity did not sustain for years and found to be stabilized in later years. This lead to agrarian crisis and moreover, became responsible for the large number of suicides of the farmers in Punjab. In addition, there has been deterioration of resources and the falling groundwater level due to the multiple cropping in the cultivation of wheat and paddy crops in Punjab (Singh *et al.,* 2016; Srivastava *et al.,* 2015). It is quite noteworthy that this has resulted in causing many parts of fertile land turning barren.

The previous studies have claimed steady state of agriculture in Punjab due to the use of modern technology. The impressive growth in agriculture during long term in Punjab has helped it in becoming the food surplus state which ensures the livelihood to the nation. Although, the food supply has been adequate for the people and accomplishment of reasonable quality has been made altogether but equitable growth of agriculture has still been an unresolved issue in Punjab. There is diversification in the activities of agriculture in Punjab which raises concern for such issues which are worth pursuing, glaring and growing in the state. There is need to bridge the gap of agriculture production in the developed and backward regions in the state as the consumption of fertilizers and other inputs is different in each district.

1.1. Objectives of the study

The following objectives have been set forth for the present study:

(i) To analyze the disparity in the level of agricultural development in terms of ADI, among various districts of Punjab *vis-à-vis* that of Punjab as a whole, between the years 2011-12 and 2016-17.

(ii) To identify the regions which have lagged behind in terms of agricultural development.

(iii) To probe the causes behind backwardness of various districts with low ADI and providing the suitable solutions.

2. Methodology

For the present study, secondary data on various indicators of agricultural development has been collected from Directorate of Economics & Statistics (DES), Ministry of Agriculture and Farmers Welfare, Statistical Abstract of Punjab 2012 and 2018, and Central Statistical Office (CSO), Ministry of Statistics and Programme Implementation, Government of India. Data has been compiled on selected agricultural development indicators for all districts of Punjab for the year2011-12 and 2016-17.

2.1. Construction of agricultural development index

It is known that the construction of index is not altogether a new idea as some researchers (Singh *et al.,* 2013; Chand & Singh, 2016; Singh *et al.,* 2018; Srivastava *et al.,* 2019) have also constructed this index in agriculture, but there is lack of such study at the district level in Punjab. ADI has been constructed to rank districts of Punjab in terms of level of agriculture development. ADI is constructed as a composite index of seven indicators reflecting different aspects of development in agriculture. The description of the selected indicators, its functional relationship with agricultural development and data source are presented in table 1.

As measurement units of different indicators of ADI are different, therefore, these are normalized and transformed into dimension-less number. For the indicator exhibiting positive relationship with agriculture development (*i.e.,* higher values are better), following formula is used for transformation:

$$Sd_i = \frac{X_i - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

TABLE 1: INDICATORS OF AGRICULTURAL DEVELOPMENT

S.No.	Indicator	Description	Relationship with ADI	Weight %	Data source
1.	Agricultural productivity (AP)	$AP = \frac{GVA_{agri\&allied}}{NCA} * 100$	Positive	15	CSO and DES
2.	Crop productivity (CP)	$AP = \frac{GVA_{crop}}{NCA} * 100$	Positive	15	CSO and DES
3.	Cropping intensity (CI) %	$CI = \frac{GCA}{NCA} * 100$	Positive	12.5	DES
4.	Irrigation coverage (IC) %	$IC = \frac{GIA}{GCA} * 100$	Positive	12.5	DES
5.	Fertilizer use (Kg/ha)	Use of fertilizer per hectare	Positive	12.5	Statistical Abstract of Punjab
6.	Electricity use (kwh/ha)	$Ect = \frac{Ectricity_{agri}}{NCA}$	Positive	12.5	DES
7.	Market area coverage (ha)	$Mrkt = \frac{NCA}{NoofRM}$	Negative	20	DES

NOTE: Noof RM stands for number of regulated markets; NCA means net cropped area (net sown area); GCA means gross cropped area (gross sown area); GIA means gross irrigated area and GVA means gross value added.

On the other hand, when a variable is negatively associated with ADI (*i.e.,* lower values are better), the normalized values were calculated as:

$$Sd_i = \frac{maximum\ value - X_i}{maximum\ value - minimum\ value}$$

After transformation, indicators are scaled between 0 and 1 with the best agricultural performing district at 1 and worst performing state at 0. These transformed indicators are used for construction of composite ADI as given below:

$$ADI = \frac{\sum Sd_i * W_i}{\sum W_i}$$

Where, Sd_i is the independent indicators multiplied with weight (W_i). Allocation of weight is presented in table 1. ADI varies between 0 and 100 and the district with higher ADI values are ranked at higher place in level of agricultural development.

3. Results and Discussion

There occurred noteworthy developments in the agricultural sector in Punjab over the time. Table 2 and 3give an overview of the various drivers of agricultural development in various pockets of the state. Interestingly, during 2016-17, district Pathankot has the highest agricultural productivity of Rs. 534723 per hectare, while,district Bathinda has lowest agricultural productivity of Rs. 173648 per hectare. However, district Pathankot occupied second place in terms of the crop productivity.

Tables 2 and 3 pertains to fluctuations in output which includes agricultural productivity, crop productivity, various inputs (which includes crop intensity, area under irrigation, fertilizer use, power consumption) and infrastructure which includes area under regulated markets in 2011-12 and 2016-17.The highest agricultural productivity per hectare estimated in 2011-12 was of district Shaheed Bhagat Singh (SBS) Nagar (398005) and lowest in Fazilka district (129253). However, in 2016-17, the agricultural productivity per hectare was highest in Pathankot district (543723) and the lowest in Bathinda district (173648). Furthermore, the highest increase in agricultural productivity was estimated to be in district Pathankot (184 percent) and the lowest in

district SBS Nagar (-24.9 percent).In 2011-12, the crop productivity was highest in SBS Nagar (143488) and the lowest in Tarn Taran district (96652). However, the largest change in crop productivity occurred in district Fazilka (39.6 percent) and the lowest in Mansa district (-7.8 percent) which was negative. Cropping intensity was more than 200 percent in five districts (Barnala, Firozpur, Kapurthala, Muktsar and Ludhiana) in 2011-12 with district Firozpur having the highest cropping intensity of 252.7 percent, but in 2016-17, there remained only two districts with cropping intensity of more than 200 percent. The highest crop intensity was estimated in Kapurthala and Ludhiana districts during 2016-17. However, Sahibzada Ajit Singh (SAS) Nagar found with lowest crop intensity of 136.8 percent in 2016-17. It implies that districts other than Kapurthala and Ludhiana have recorded a decline in the cropping intensity in Punjab. District Pathankot has 63.8 percent area under irrigation which was lowest in Punjab

TABLE 2: CHANGING STATUS OF AGRICULTURAL DEVELOPMENT DRIVERS ACROSS DISTRICTS IN PUNJAB BETWEEN 2011-12 AND 2016-17

District	AP (Rs. /ha)	CP (Rs. /ha)	CI (%)	IC (%)	Use of fertilizer (Kg. /ha)	Electricity use (kWh/ ha)	Per regulated market coverage (ha)
Amritsar	30.5	30.6	-7.2	0.0	-3.8	-34.9	0.9
Barnala	32.4	19.3	-14.5	0.0	8.8	57.0	0.4
Bathinda	1.8	-4.2	-0.6	-0.1	-9.7	100.1	-10.7
Faridkot	36.1	16.3	-5.4	0.0	-10.2	12.9	-0.3
Fatehgarh Sahib	38.7	23.6	-0.4	0.0	6.8	42.3	0.1
Fazilka	44.7	39.6	49.3	0.2	-46.5	322.4	-24.9
Firozpur	13.2	-4.4	-68.4	0.0	-15.6	21.7	2.8
Gurdaspur	32.0	27.2	13.6	1.4	-15.8	-20.4	-7.8
Hoshiarpur	18.5	10.5	-15.9	6.0	15.0	91.0	2.4
Jalandhar	35.1	20.3	-6.4	0.0	-21.1	6.2	4.8
Kapurthala	61.6	30.6	4.1	0.0	-10.5	22.5	-0.5
Ludhiana	34.9	30.2	0.9	-0.2	19.0	26.0	-0.2
Mansa	11.8	-7.8	1.3	-0.1	-12.9	84.2	-0.6
Moga	38.6	30.8	4.9	0.0	1.7	11.7	-14.4
Muktsar	41.3	14.8	-2.0	0.2	-17.3	-2.9	0.5
SBS Nagar	-24.9	10.8	3.9	41.1	103.2	-33.0	34.2
Pathankot	184.0	30.5	-6.0	-36.0	32.8	-83.8	-17.9
Patiala	-12.6	38.1	16.8	8.6	-26.0	113.2	44.2
Rupnagar	49.8	12.4	14.0	-2.4	67.2	3.5	30.7
SAS Nagar	86.3	22.2	-62.6	-2.3	3.3	34.8	-30.6
Sangrur	1.8	23.4	6.4	4.4	-45.6	136.3	-34.8
Tarn Taran	42.1	23.4	-1.5	0.9	-0.4	26.2	0.0
Punjab (overall)	29.8	18.7	-2.2	0.5	-0.8	23.4	-2.7

Source: Authors estimation.

during 2016-17. However, in 2016-17, 100 percent of area under irrigation was covered by the districts Moga, Tarn Taran, Sangrur, Ludhiana, Kapurthala, Jalandhar, Fatehgarh Sahib, Firozpur, Faridkot, Barnala and Amritsar. By analysing table 2, it is found that regulated market is highest in SBS Nagar and lowest in district Fazilka. The highest change in the use of fertilizer was in SBS Nagar (103.2 kg/ha) between 2011-12 and 2016-17. And the lowest change in use of fertilizer was made in Fazilka (-46.5kg/ha). Highest change in the use of electricity occured in district Fazilka (322.4 kWh/ha) due to more supply of electric motors. Further, the most negative change in the use of electricity is found in district Pathankot (83.8 kWh/ha). District Patiala has the highest change in the regulated market coverage (44.2 ha), although it is found negative at the state level (-2.7 percent).

Table 3 shows the descriptive statistics of the drivers of agricultural development in 2011-12 and 2016-17. As it can be seen, there is increase in the mean agricultural productivity, crop productivity, irrigation coverage, use of fertilizers and use of electricity between 2011-12 and 2016-17. However, there is minor decline in the cropping intensity and regulated market coverage. There are minor variations in coefficient of variance (CV) of these indicators between 2011-12 and 2016-17.

TABLE 3: DESCRIPTIVE STATISTICS OF SELECTED AGRICULTURAL DEVELOPMENT DRIVERS IN 2011-12 AND 2016-17

Indicator	Mean	Standard error of mean	Upper Limit	Lower Limit	CV %
2011-12					
Agricultural productivity (Rs./ha)	202688	13459	243065	162310	31.1
Crop productivity (Rs./ha)	122144	2636	130053	114236	10.1
Cropping Intensity %	191	4.5	204	177	11.0
Irrigation coverage %	96	2.1	100	90	10.5
Use of Fertilizer (Kg/ha)	254	11	286	221	20.1
Electricity use (kWh/ha)	1324	117	1677	972	41.6
Coverage (ha/regulated market)	30286	3136	39695	20877	48.6
2016-17					
Agricultural productivity (Rs./ha)	267177	18201	321780	212574	32
Crop productivity (Rs./ha)	145589	3145	155024	136155	10.1
Cropping Intensity %	187	3.4	197	177	8.4
Irrigation coverage %	97	1.8	100	92	8.5
Use of Fertilizer (Kg/ha)	259	20	319	199	36.2
Electricity use (kWh/ha)	1593	147.5	2036	1151	43.4
Coverage (ha/regulated market)	28968	2448.2	36313	21624	39.6

Source: Authors estimation.

Table 4 deals with the estimated values of ADI in Punjab during 2016-17. From table 4, it can be noted that district Firozpur has the highest ADI (77.54) and district Fazilka has the lowest ADI (26.60) during 2011-12. However, there was drastic decline in ADI of district Firozpur in 2016-17 due to large decline in the cropping intensity and the use of fertilizers.

TABLE 4: DISTRICT-WISE AGRICULTURAL DEVELOPMENT INDEX DURING 2011-12 AND 2016-17 IN PUNJAB

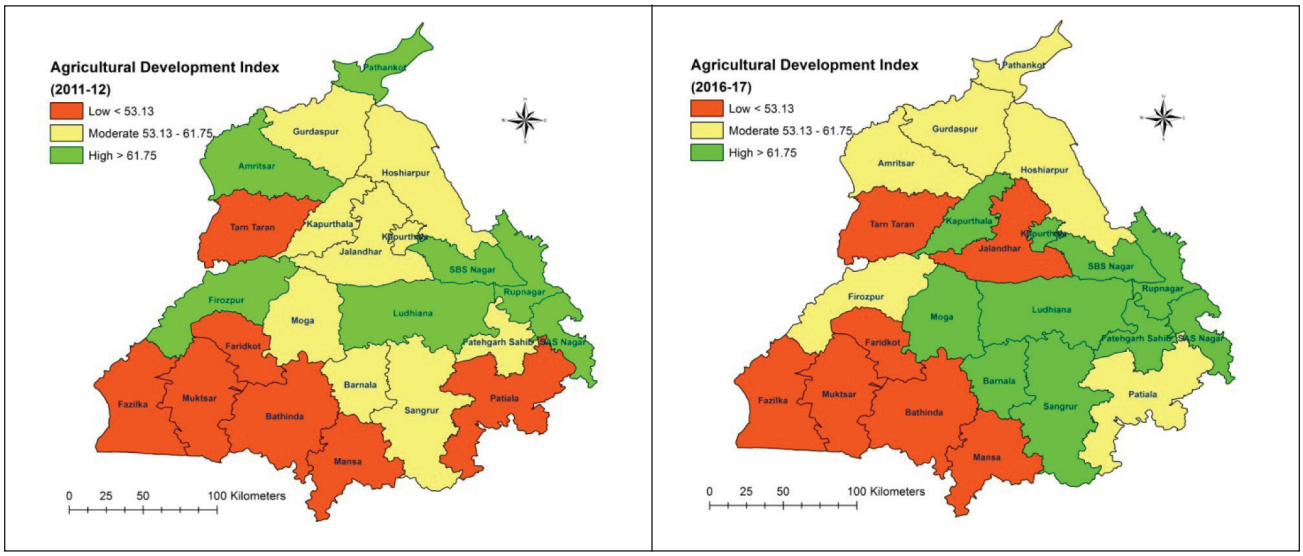
District	ADI (2011-12)		ADI (2016-17)	
	CCSD	Rank	CCSD	Rank
Firozpur	77.54	1	53.49	15
SBS Nagar	68.08	2	66.31	5
SAS Nagar	67.27	3	66.57	3
Barnala	62.32	4	66.45	4
Pathankot	61.18	5	59.33	11
Kapurthala	61.11	6	69.47	1
Ludhiana	60.44	7	67.75	2
Moga	58.87	8	65.79	6
Amritsar	58.48	9	55.37	12
Hoshiarpur	56.90	10	54.31	13
Fatehgarh Sahib	56.45	11	61.93	9
Rupnagar	55.82	12	64.31	8
Sangrur	55.34	13	64.97	7
Jalandhar	55.27	14	50.54	16
Bathinda	52.96	15	46.28	19
Patiala	52.69	16	60.31	10
Faridkot	52.37	17	50.24	17
Gurdaspur	52.08	18	54.03	14
Mansa	51.53	19	43.03	20
Tarn Taran	44.56	20	48.06	18
Muktsar	44.00	21	37.60	21
Fazilka	26.60	22	31.66	22
Punjab (overall)	**55.49**	**NA**	**56.11**	**NA**

Source: Authors estimation.
NOTE: CCSD means combined composite score of development.

There is no change in the ranking of ADI of district SAS Nagar, Barnala, Faridkot, Muktsar and Fazilka. There has been improvement in the agriculture in the districts Barnala, Kapurthala, Ludhiana, Moga, Fatehgarh Sahib, Rupnagar, Sangrur, Patiala, Gurdaspur, Tarn Taran, and Fazilka. However, it is quite discernible that some districts have experienced deterioration in the development of agriculture which includes Firozpur, SBS Nagar, SAS Nagar, Pathankot, Amritsar, Hoshiarpur, Jalandhar, Bathinda, Faridkot, Muktsar and Mansa. Interestingly, there has been an overall improvement in the ADI in Punjab between 2011-12 and 2016-17.

In order to have better understanding of the changes in the agricultural development of districts, a clear picture of regions is shown in fig. 1 which is based on the ADI. In 2011-12, the districts with ADI less than 53.13 were Tarn Taran, Patiala and the south-west region including Fazilka, Muktsar, Faridkot, Bathinda and Mansa. However, there is improvement in the index of district Patiala in 2016-17 from low to moderate ADI. Interestingly, the south-west region has not improved. Further, in 2011-

Figure 1: Changing Status of Regionalization of Districts of Punjab based on Agricultural Development Index



12, districts with ADI between 53.13 and 61.75 were Moga, north region of Punjab including the districts Gurdaspur, Hoshiarpur, Jalandhar, Kapurthala and south east region including Barnala, Sangrur and Fatehgarh Sahib. It is noticeable that among these districts only district Jalandhar has deteriorated in terms of agriculture development and there has been improvement in the other districts (shifting to high ADI) in 2016-17 while district Gurdaspur and Hoshiarpur remained at the moderate level of ADI. Some districts, namely, Amritsar, Firozpur and Pathankot are shifting from high to moderate level of ADI. The map gives some interesting insights about Punjab as it can be observed that the central Punjab lies under more developed zone because of the adoption of modern technology in the initial stages of green revolution due to ecological and natural resource endowments. In contrast, the south-western region (Muktsar, Faridkot, Fazilka and Mansa) lies at the lowest level in agricultural development due to the poor land and water quality of the region. The region is known as "*cotton belt*" of the state and attached with Rajasthan state. This area is semi-arid and eventually merges into desert and cropping pattern is too different here in comparison to other regions of Punjab. This results into lowering the agricultural and crop productivity in this region.

4. Conclusion and Suggestions

In the post green revolution period, Punjab emerged as one of the leaders in terms of total agricultural production and land productivity and came to be known as "*Food Bowl of India*". This paper analysed the disparity in the ADI among various districts of Punjab *vis-à-vis* that of Punjab as a whole during the years 2011-12 and 2016-17. Furthermore, it analysed the regions which are chronically backward in terms of ADI.

The findings and suggestions are presented as under:

(i) The estimates revealed that district Firozpur has the highest ADI of 77.54 and district Fazilka has the lowest ADI of 26.60 during 2011-12. However, there was drastic decline in ADI of district Firozpur in 2016-17 due to huge decline in the cropping intensity and the use of fertilizers.

(ii) An interesting insights about Punjab which has been observed is that the central Punjab lies under more developed zone because of the adoption of modern technology in the initial stages of green revolution due to ecological and natural resource endowment. In contrast, the south-western region (Muktsar, Faridkot, Fazilka and Mansa) lies at the lowest level in agricultural development due to the poor land and water quality of the region. The region is known as cotton belt of the state and attached with Rajasthan state. This area is semi-arid and eventually merges into desert and cropping pattern is too different in comparison to other regions of Punjab. This results into lowering

the agricultural and crop productivity in this region.

(iii) It is suggested for the districts with low ADI to increase the production by using new seeds, machinery and new technology. However, the districts with high ADI should enhance the use of new technology. Adoption of such reforms will increase the income of the farmers and will help the farmers to put an end to the thinking of suicides and make agriculture a profitable business rather than a loss trap. Another advantage of this would be that Punjab would regain its former important place in which it was believed to be far superior to the other states in terms of agricultural productivity.

(iv) To enhance the agricultural production in the lagged regions of the state, it is very important to know the suitable cropping pattern. The cotton belt is also suitable (lower ADI zone) for keenow (a variety of citrus fruits) cultivation. If the state government takes initiative to establish agro-food processing units, especially for keenow juice industry, the region would reap plenty of benefits.

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A Study of Growth of Foodgrains Production in Rajasthan

PREETI PRASAD[1], RASHMI BHARGAVA[2] AND S.K. KULSHRESTHA[3]

Abstract

The state of Rajasthan is an agrarian state as a large part of the population is dependent on agriculture sector. Water deficiency is a major problem of the state because 61 percent area of the state is under the deserts. In this study an attempt has been made to analyze the changing production trends of foodgrains crops in Rajasthan in rabi as well as in kharif season and to calculate growth coefficients of rabi and kharif seasons' cereals and pulses for sixty years (i.e., from 1956-57 to 2015-16).This study finds that the growth rate of the kharif season foodgrains production was on average 1.9 percent per annum during the year 1956 to 2016 and in the rabi season growth rate was about 2.9 percent per annum. The overall growth rate (rabi and kharif season) was 2.6 percent per annum. The growth rate of foodgrains during both the seasons was statistically significant at 1 percent level of significance. It is also found from the study that production of foodgrains (cereals and pulses) has increased over the time but it is more in case of cereals (particularly for wheat crop) and less in case of production of pulses, so there is need to give the incentives to the farmers for crop diversification in which some crop may be considered under minimum support price, and also promote the use of high yield variety of seeds for pulses by the farmer, particularly for gram and arhar crops. For improving the agriculture crop production, there is a need to increase crop-wise contract farming.

Keywords: *Rajasthan, production, foodgrains, rabi, kharif, cereals, pulses.*

1. Introduction

India's 54.6 percent population is engaged in agriculture and allied activities as per census, 2011, while, agriculture sector contributes approx 17.4 percent to the country's gross value added (GVA). The state of Rajasthan is an agrarian state since a large part of the population is dependent on agriculture sector. The major problem of the Rajasthan is that it is a water-deficient state. Since, in the state 61 percent area is desertic area, so the state is facing issues regarding irrigation facility, infrastructure and development, etc. However, the government of the state has developed some irrigation facilities, such as Indira Gandhi Main Canal, which bring water from the northern Himalayan region to the Thar Desert, the Great Indian Desert of Rajasthan, and Bhakranangal for enhancing the cropped area in the desert.

In this study, we have taken some foodgrains crops of kharif as well as rabi season, such as bajra, maize, small millet (s. millet), rice, wheat, barley, arhar, gram and other pulses. These cereals play a crucial role to meet the food demand of the population since they are the source of nutrition and calorie. Wheat crop occupies around 217 million hectares acreage among all crops and holding highest area sown under this single crop and produces approximately 731 million tonnes of the foodgrains for the country. India is the second-largest producer of wheat across the world. Rajasthan is the largest producer of bajra that is also known as a poor man's staple nourishment. Maize is also known as 'queen of cereal' as it is grown throughout year due to its photothermo insensitive character and it has the property of highest genetic yield potential. Maize is used for feed, fodder grain, green cobs, sweet corn, popcorn and for various industrial products. Role of pulses is very significant in India. The area under pulses is 23.8 million hectares, while, its production is 18.6 million tonne in the country.

1.1. Objectives of the study

The study has been undertaken with the following objectives:

(i) To analyze the changing production trends of foodgrains crops in Rajasthan in rabi as well as

[1]Research Scholar, Department of Economics, M.D.S.U. Ajmer; Email: preetiprasadskk@gmail.com
[2]Associate Professor, Samrat Prithviraj Chauhan Government College, Ajmer; Email: rashmibhargav20@gmail.com
[3] Assistant Professor in Economics, Vardhman Mahaveer Open University, Kota; Email: skulshrestha@vmou.ac.in

in kharif season.

(ii) To calculate growth coefficients of rabi and kharif seasons cereals and pulses of the state for sixty years.

2. Methodology

This paper is based on the time-series data from the year 1956-57 to 2015-16. The secondary data is collected from Directorate of Economics & Statistics, Rajasthan from the issues related to statistical abstract and agriculture statistics. Semi-log econometrics model to estimate the growth rate of agricultural production of different crops is used in this paper.

Exponential equation is given by

$$\mathbf{LnYi} = \alpha + \beta \mathbf{t} + \mathbf{Ui}$$

this is fitted using the OLS(ordinary least square) method

Here,

$\mathbf{Y_i}$ = includes crop production i^{th} year (i= 1, 2, 3…N).

α = Intercept, β = Regression coefficient, **Ui**= Residual term.

The parameters α and β are estimated by the least square method.

2.1. Literature review

Many agriculture economics based literature has calculated the production, area and productivity of different crops of Rajasthan. Compound growth rates of important crops for western Rajasthan and the rest of Rajasthan for the period from 1961-62 to 1971-72 and from 1966-67 to 1971-72 were calculated by Angrish (1981) and observed that foodgrains in western Rajasthan had negative growth rate for all crops except wheat. In the rest of Rajasthan, the growth rate of these crops was positive and significant, except for barley. Estimation of unadjusted and weather adjusted growth rates in foodgrains production using the exponential model and trends in instability using a moving period approach for different states during the period 1960 to 1985 was made by Dev (1987). The results showed that the growth rate of foodgrains production was ahead of population growth in the state of Maharashtra, Punjab, Uttar Pradesh, Haryana, and Andhra Pradesh.

The growth rates of crop output in different districts and state of Andhra Pradesh as a whole were calculated by Narander, *et al.* (1989) while analyzing inter-temporal variation in the agricultural growth of the state. The study was conducted for the period 1956 to 1981 by dividing it into four sub-periods, *viz.*, 1956-59 to 1962-65, 1962-65 to 1966-69, 1966-69 to 1972-75 and 1972-75 to 1978-81. It was revealed that the growth rates of yield, as well as crop pattern, which were highest during the second period, exhibited a steep decline during the subsequent periods for the state as a whole. The changing pattern of growth performance of different commodity crops for different districts of Punjab over the period 1965 to 1988 was examined by Singh & Singh (1991). It was revealed that among the foodgrains, the growth rates of wheat and paddy production had declined. In case of wheat, it was due to a decline in the growth rate of yield. The growth rates of production for maize, bajra and gram were negative. The growth rates of area, production, and productivity of cereals, pulses and oilseeds group of crops and for some of the important individual crops such as bajra, guar, wheat, gram, and rapeseed and mustard in the state of Rajasthan were worked out by Dhaka & Verma (1989). The study was carried out over the entire state including the two most productive agro-climatic zones, namely, irrigated north-western plain and semi-arid eastern plain, the results revealed that the productivity in all the three groups of crops, like foodgrains, pulses, and oilseeds was negative during the pre-green revolution and entire period of study in the state.

A study was conducted by Acharya & Gupta (1982) to measure the growth in the area, production and yield of pulses of Rajasthan. The results revealed that the growth rate of pulses production in the last 25 years was 1.72 percent per annum. The area and yield almost equally contributed to the growth in pulse production. The growth rate of gram production was more in the post green revolution period. It is derived that more than two-thirds of the variation in the area and more than half in the production of all pulses was due to annual rainfall. Based on linear growth model Panda (1993) examined the trends in the area, production and productivity of pulses in Orissa over the decade 1981-90. He revealed that arhar (pigeon pea) had achieved statistically significant growth in the area, production and productivity. Among the

rest of the crops, moong (green-gram) has gained considerable growth to yield but not concerning area and production. On the contrary, black gram and red gram had recorded significant growth in terms of area and production but not on productivity. Regionally, there existed vast differences in the cultivation of pulses in the state.

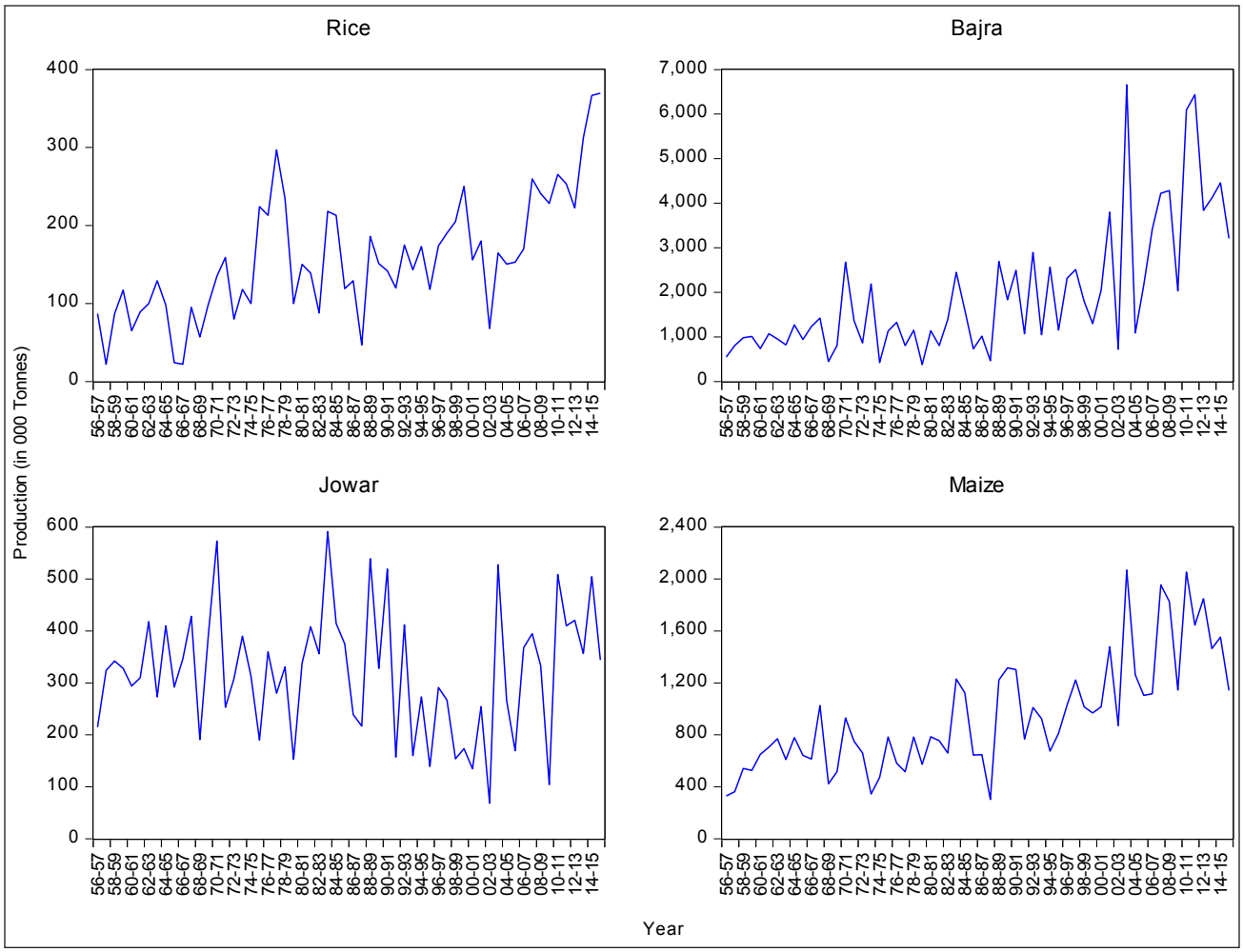
3. Results and Discussion

3.1. Kharif cereals production

The kharif season starts in June and ends in October in India. Kharif crops are usually sown with the beginning of the first rain during the south-west monsoon season and harvested at the end of the monsoon season. It is clear from figure 1.1 that kharif cereals production growth on average is positive. In case of rice crop, the figure shows that although the growth was constant in the 70s then, it had increasing tendency till the year 1977 but thereafter, it showed almost constant growth, however, after the year 2002-03, there is a growing trend in growth rate. The figure also shows the fluctuations in rice year after year which is due to many factors such as rainfall, price, demand, etc.

In case of bajra crop production, figure 1.1 shows that growth till 1988 is almost constant but after the year 1988 growth stimulates and recently it reached four times higher than its initial level. Rajasthan is the highest producer of the bajra. In case of jowar production, the figure shows that year after year production of the crop has decreased but

Figure 1.1: Rice, Bajra, Jowar and Maize Production Trends (1956-2015)



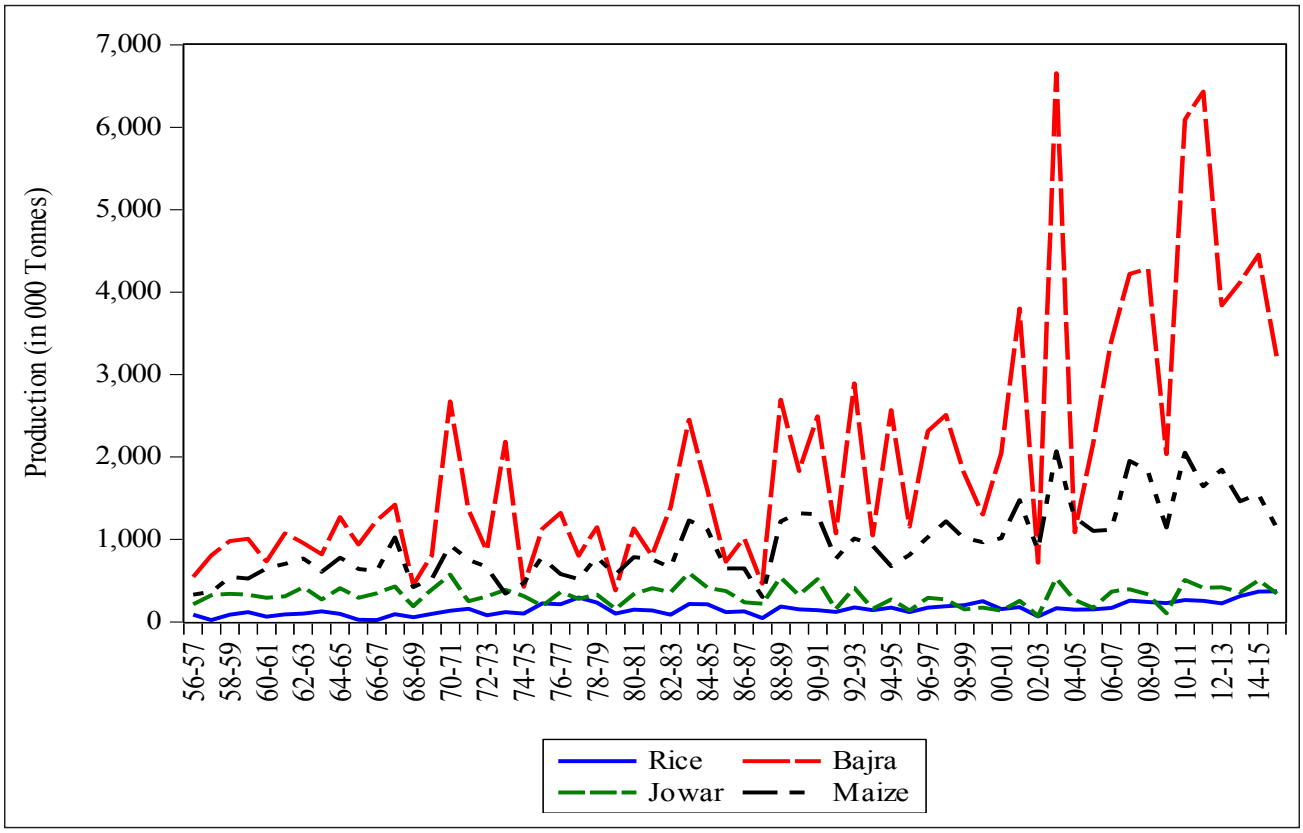
Source: Statistical Abstract of Rajasthan, 1956-57 to 2015-16.

in recent years production of the crop has enhanced which is mainly due to change in cropping pattern. Maize production figure shows that production is following an increasing tendency with the least fluctuations compared to other kharif cereal crops.

3.2. Kharif cereals production trends

Figure 1.2 shows that among all the four cereal crops of kharif season, which this study has taken into account, bajra crop has the highest contribution. The share of bajra crop is much higher than the other three crops. The percentage share of maize cereal crops is almost half of the production share of bajra. Jowar crop has the third share of total cereals production in kharif season while, rice crop has the lowest production. The figure also shows that the jowar and rice crops production was almost the same in the earlier stages, but in recent past years' production of rice has grown faster than Jowar.

Figure 1.2: Production of Kharif Cereals



Source: Statistical Abstract of Rajasthan, 1956-57 to 2015-16.

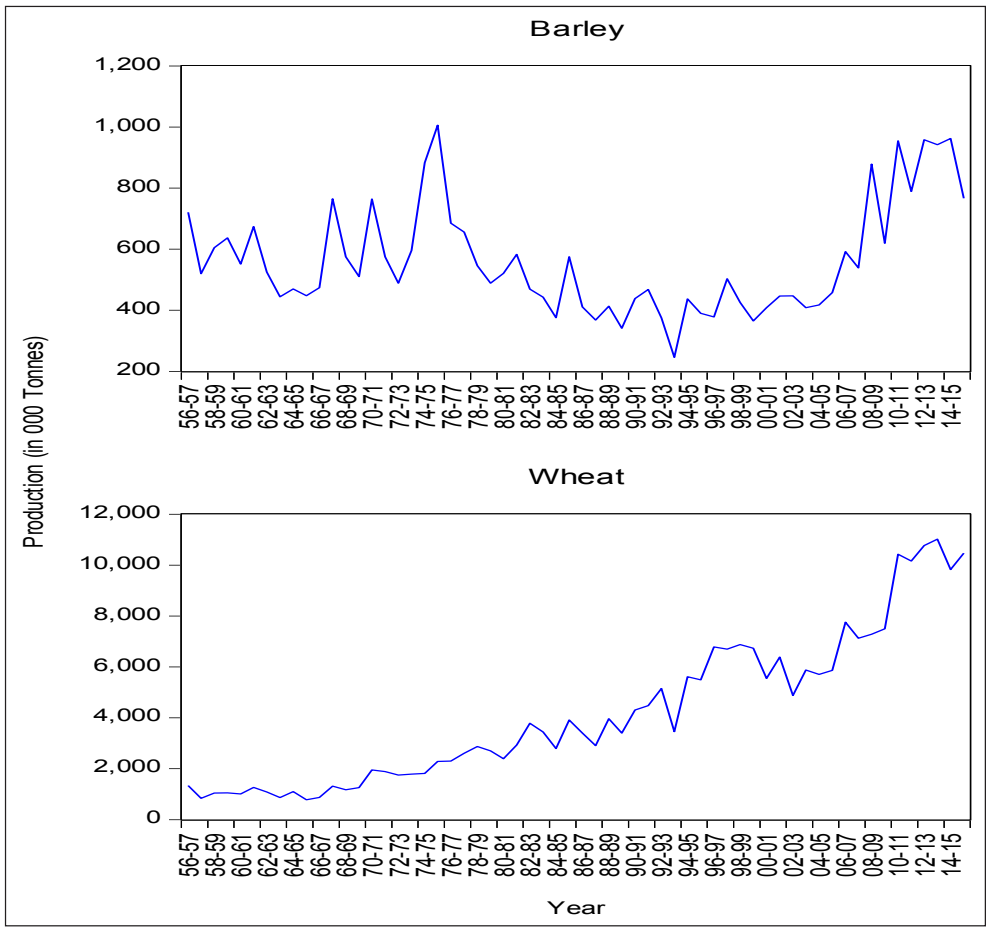
3.3. Rabi cereals production

Rabi crops are sown in winter and harvested in the spring in India. It is clear from figure 1.3 that the production of the barley crop had declined till the year 1994-95 thereafter, it has a positive growth rate. The trends of wheat production are shown in the lower part of figure 1.3. The impact of the green revolution is evident in the state from the year 1967. The growth is also affected by government initiatives such as canal projects, infrastructure development, minimum support price, etc.

3.4. Kharif and rabi cereals productions trends

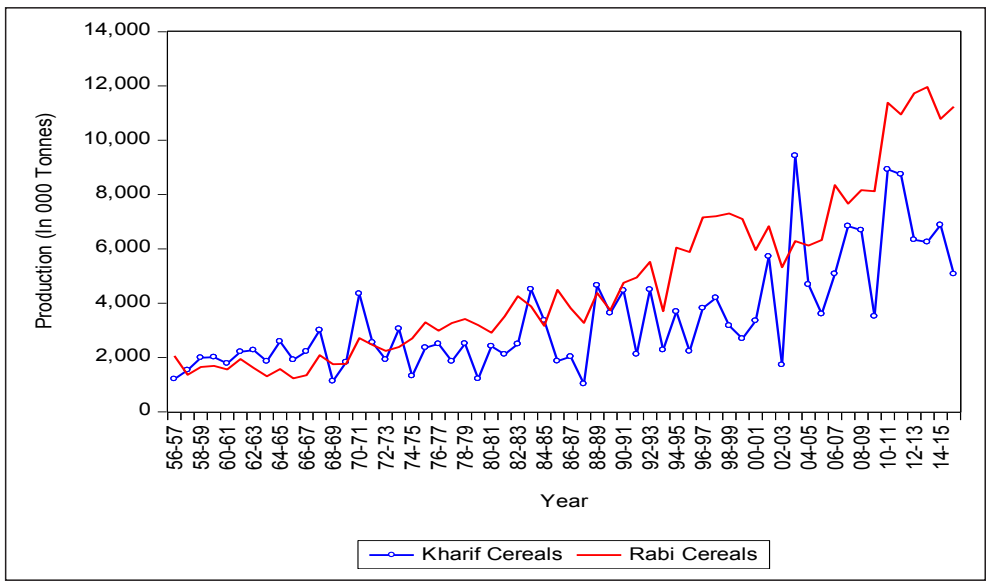
Kharif cereals crops are the predominant crop of the state, but the green revolution impacted the wheat crop significantly and rabi cereals production pass over the kharif cereals production as can be seen in Fig. 1.4. Due to the change in cropping pattern wheat become most edible cereal in the state.

Figure 1.3: Rabi Cereals Production



Source: Statistical Abstract of Rajasthan, 1956-57 to 2015-16.

Figure 1.4: Kharif and Rabi Cereals Productions Trends

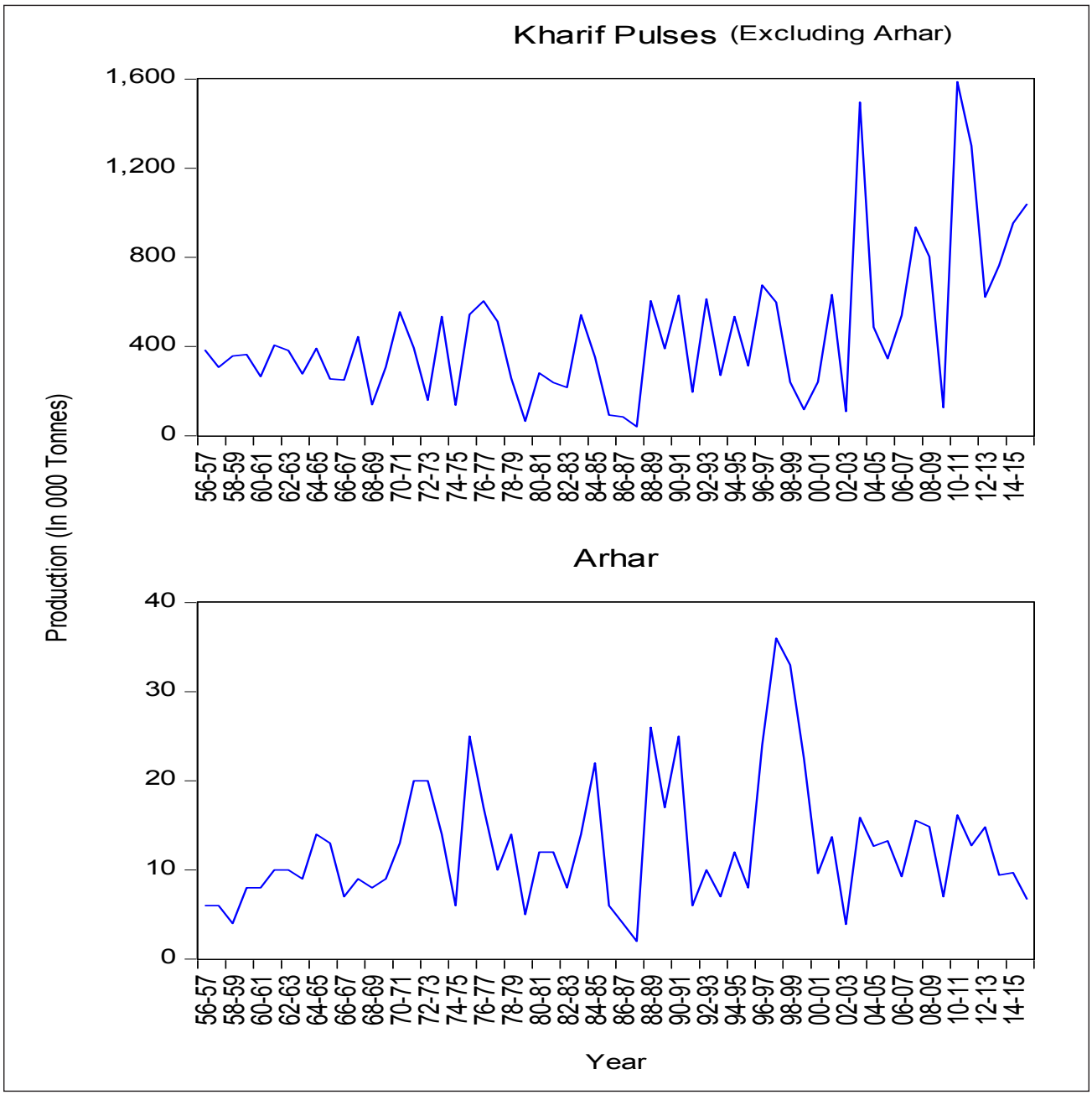


Source: Statistical Abstract of Rajasthan, 1956-57 to 2015-16.

3.5. Kharif pulses production

Arhar is the most grown pulse in the state during kharif season and fluctuations in the production of this crop can be seen in Figure 1.5, which shows that there is no such growth for arhar during the study period. So, it is evident that the green revolution not impacted this crop, although kharif pulses' (excluding arhar) production has increased significantly during the study period.

Figure 1.5: Production of Kharif Pulses

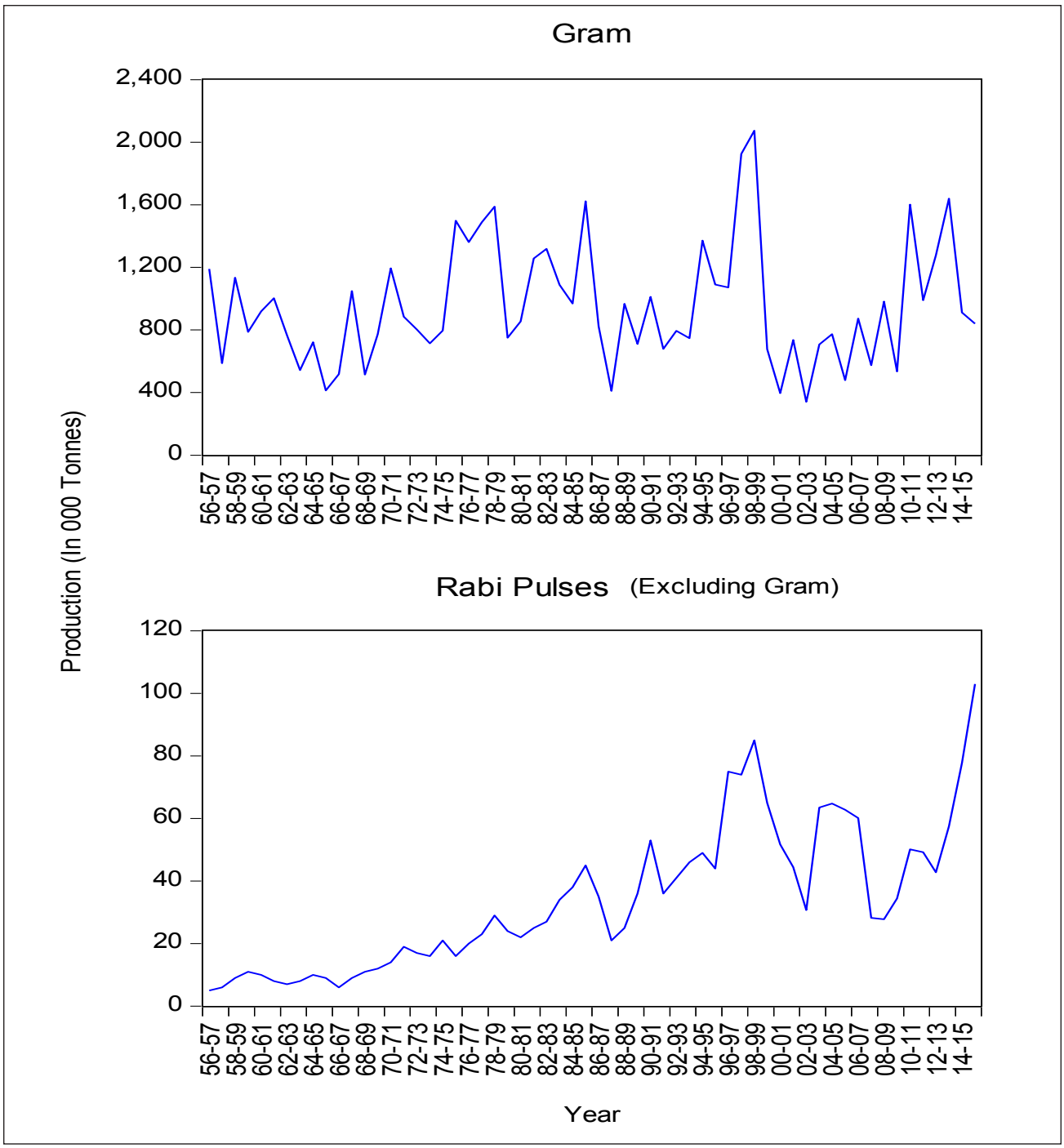


Source: Statistical Abstract of Rajasthan, 1956-57 to 2015-16.

3.6. Rabi pulses production

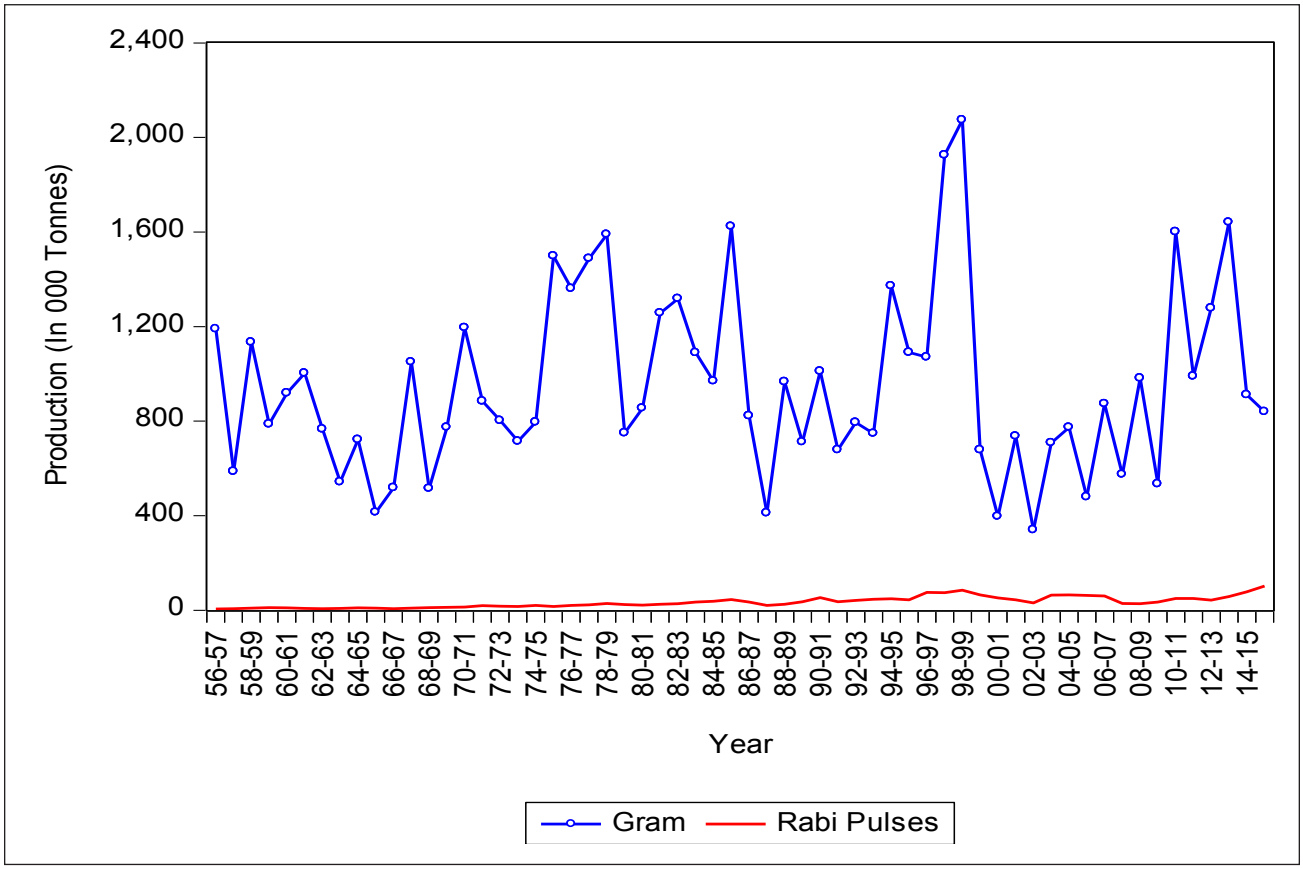
It can be seen in Figure1.6 and 1.6A that during the period of the study the production of gram, which is a vital rabi pulse, has not enhanced. Figure 1.6 clears that on average, the production of the gram is constant even it decreased in later part. The lower part of the picture shows that the production of rabi pulses (excluding gram) has increased over the years. But the contribution of other rabi pulses is meager.

Figure 1.6: Production of Rabi Pulses



Source: Statistical Abstract of Rajasthan, 1956-57 to 2015-16.

Figure 1.6A: Gram and Rabi Pulses Production



Source: Statistical Abstract of Rajasthan, 1956-57 to 2015-16.

3.7. Kharif and rabi pulses

As can be seen in figure 1.7 that in initial years the share of rabi pulses in total pulses is higher than the kharif pulses. After the year 2002-03, the percentage of rabi as well as kharif pulses is almost equal in pulses production. It also reflects that farmers are more focused on kharif pulses in recent years. It can be described by the figure 1.7 that the kharif pulses faced three significant fluctuations, but on the other hand, rabi pulses' production fluctuations on average are same. It can also be concluded from the figure that production of pulses is more in rabi season than kharif season.

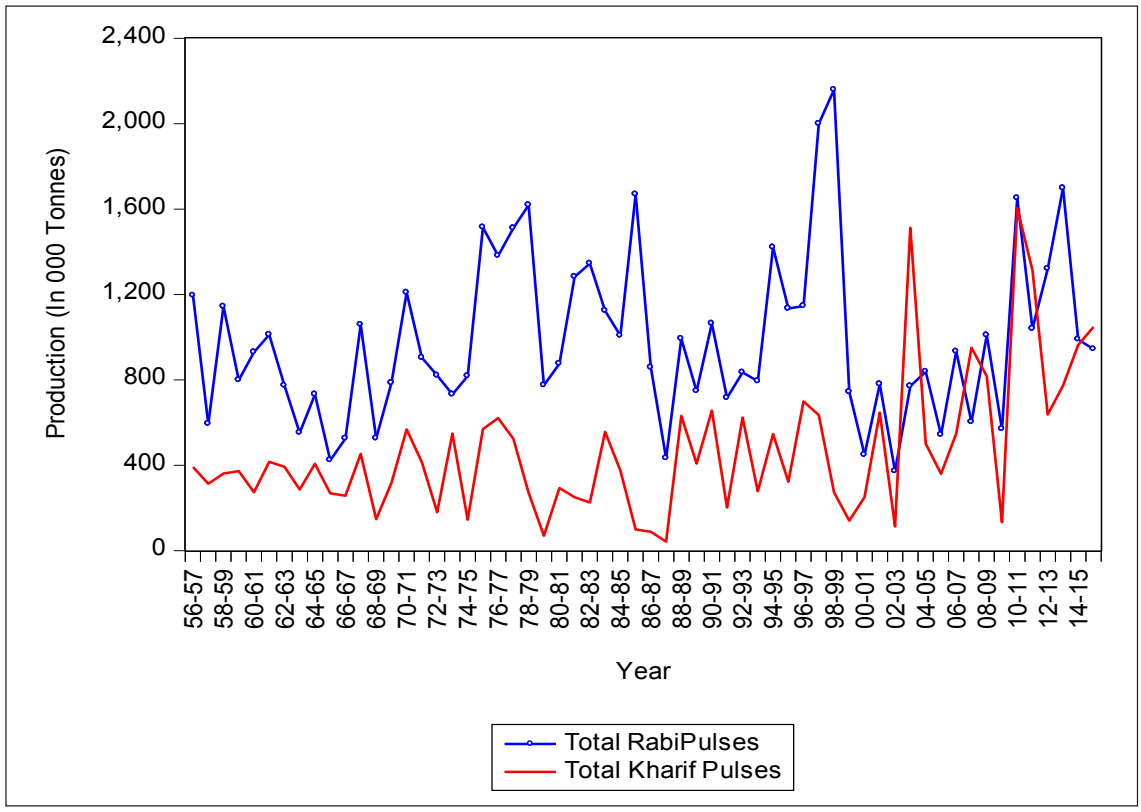
3.8. Kharif and rabi foodgrains

Sum of cereals and pulses is called foodgrains, and it can be seen from figure 1.8 that during the decade 1950s and 1960s rabi and kharif foodgrains production was almost the same. But after the 1960s, rabi foodgrains production was much higher than kharif foodgrains. Figure 1.8 also describes that rabi as well kharif foodgrains have an increasing production tendency throughout the study period.

3.9. Growth coefficients of foodgrains

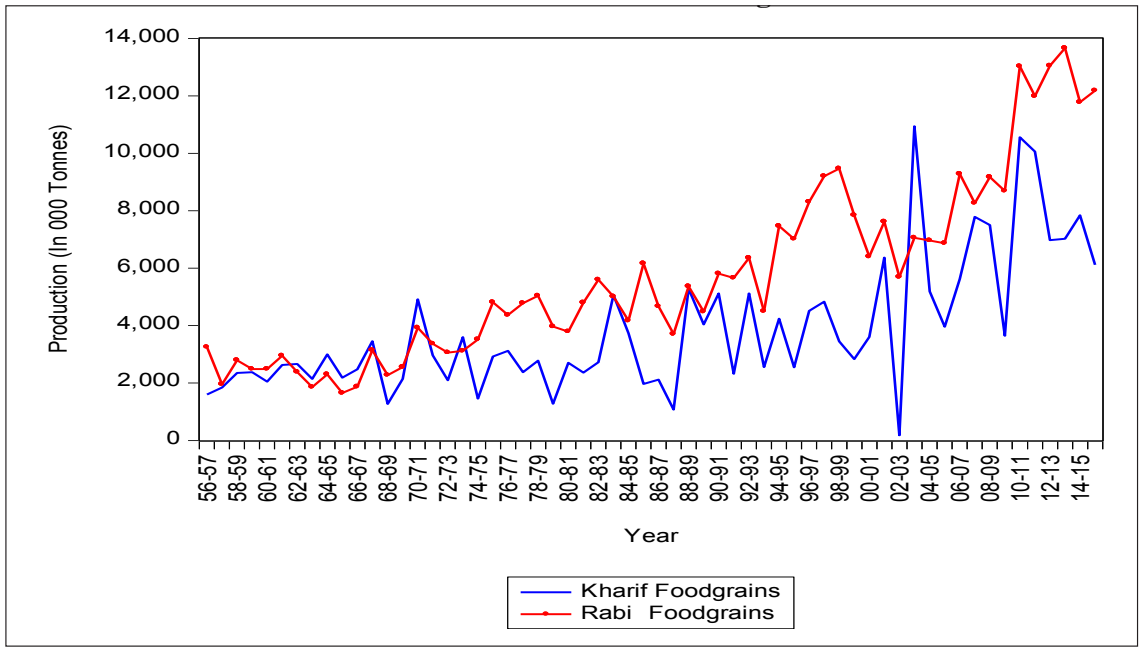
From the table 1, we can understand that the production of rabi pulses enhanced over the year 1956 to 2016 and the results of the growth coefficient shows that in foodgrains production of many crops, such as rice, bajra and maize increased over the years and the annual growth of rice production from 1956 to 2016 is 2.3 percent, and it is statistically significant. The output of jowar has declined during the same period and the rate of decline is 0.3 percent per year. The growth rate of bajra crop is also showing

Figure 1.7: Total Production of Kharif and Rabi Pulses



Source: Statistical Abstract of Rajasthan, 1956-57 to 2015-16.

Figure 1.8: Kharif and Rabi Foodgrains



Source: Statistical Abstract of Rajasthan, 1956-57 to 2015-16.

an enhancing tendency, and this is 2.7 percent per annum, and it is also statistically significant. The production of maize also shows the growing trend over the year from 1956 to 2016. It is 2 percent per annum and too statistically substantial. Kharif cereals too have an increasing tendency which is also statistically significant, on the other hand, s. millets in kharif season tend to decline over the year, but it is statistically significant. Rabi cereals play an essential role in Rajasthan's total cereals production. The growth rate of wheat production is 4.3 percent annually, which is statistically significant, and the barley crop growth rate is only 0.054 percent annually which is not statistically significant even at 10 percent level of significance. Wheat crop is the highest growing crop among cereals. Now-a-days Rajasthan is the second largest producer of the crop.

The table 1 also shows that the growth of rabi cereals (3.5 percent) is more than that of kharif cereals (2.2 percent). Barley production growth is although positive, it is increasing by and large at the sizeable constant rate, which implies that the production of the barley has not increased as expected. Growth coefficient of kharif cereals shows that the growth rate over the years 1956 to 2016 is 2.2 percent per annum. The study shows that the annual growth rate of arhar crop is only 0.6 percent that is not statistically significant. It implies that farmers of the state have less focused on this crop. Kharif pulses other than gram have the growth coefficient of 1.36 percent per year with statistical significance at a level of 5 percent. The growth of overall arhar crop and kharif pulses, shown as total Kharif pulses in the table 1, is 1.3 percent per annum and found statistically significant. In the rabi season, this study has taken gram pulse and other pulses into account. The research shows that the growth rate of gram crop is negative, which shows that over the years production is going to be declined, and it is not statistically significant. The growth rate of rabi pulses other than gram is 4 percent per year which is statistically significant at the level of 1 percent. Total rabi pulses growth rate, including gram, is statistically significant at 5 percent level. But it is deficient, *i.e.,* 0.25 percent per annum. This study found that the overall growth rate of pulses (including rabi and kharif pulses) is 0.7 percent per annum which is statistically significant at 5 percent level of significance. So it can be concluded regarding pulses that the growth rate of pulses feeble in Rajasthan. The government should take the initiative for enhancing the production of the pulses.

Rajasthan is producing many foodgrains (cereals and pulses) over the year. This study finds that the growth rate of the kharif season foodgrains production is on average 1.9 percent per annum from the year 1956 to 2016 and in the rabi season growth rate is about 2.9 percent per annum. The overall growth rate (rabi and kharif season) is 2.6 percent per annum. The rabi season, the kharif season and the overall rabi-kharif season growth rate of foodgrains are statistically significant at 1 percent level of significance.

4. Conclusion and Suggestions

Kharif season have four significant cereal crops grown in the state such as bajra, jowar, maize and rice, while, rabi season cereals crops are barley and wheat. Contribution of bajra production is highest in kharif cereals followed by maize, jowar and rice. In rabi season production of wheat is more than barley. Wheat plays an essential role among foodgrains in the state as it has the highest contribution in production among all cereals crops. Arhar and gram are two significant pulses of the state. Although in kharif season, kharif pulses other than arhar contribute more in production, but in rabi season gram crop contribute more than other pulses crops. The contribution of rabi pulses is more than the kharif pulses in the total output. In the total foodgrains, rabi season contributes more than the kharif season. The study reveals that highest growth rate in cereals crop found in wheat (4.3) crop followed by bajra (2.7), rice (2.3), maize (2.0) and barley (0.05) and all are statistically significant except barley. The growth rate of rabi pulses (4.0) is more than kharif pulses (1.36) and are statistically significant. It can be drawn from the study that gram pulses (-0.01) and arhar pulses (0.61) growth rate is not statistically significant. The growth rate of rabi foodgrains production (2.95) is higher than kharif foodgrains (1.9) and the overall foodgrains growth rate is 2.6 per annum during the period, and all foodgrains production growth is statistically significant.

It was found from the study that production of foodgrains has increased over the time but it is more in case of cereals, particularly in the wheat crop, and less in case of production of pulses, so there is need to implement following policies:

(i) The government should give the incentives to the farmers for crop diversification in which some crop may be considered under minimum

TABLE 1: GROWTH COEFFICIENT OF FOODGRAINS FROM YEAR 1956-57 TO 2014-15

Crop	Intercept (t-value)	Growth coefficient (t-value)	Growth significance	R^2
Rice	4.21(34.35)	0.023(6.493)	*	0.42
Jowar	5.78(50.23)	–0.003(–0.9267)	N.S.	0.014
Bajra	6.48(47.81)	0.027(7.196)	*	0.471
Maize	6.13(76.49)	0.020(8.816)	*	0.572
S. Millets	3.37(14.63)	–0.0445(–6.778)	*	0.44
Kharif Cereals	7.30(73.96)	0.022(7.931)	*	0.52
Wheat	6.74(136.9)	0.043(31.02)	*	0.943
Barley	6.26(78.25)	0.00054(0.2406)	N.S.	0.0009
Rabi Cereals	7.172(162.7)	0.035(28.61)	*	0.93
Total Cereals	7.94(154.3)	0.0297(20.27)	*	0.876
Kharif Pulses	5.45(28.89)	0.0136(2.535)	**	0.099
Arhar	2.19(15.17)	0.0061(1.498)	N.S.	0.037
Total Kharif Pulses	5.49(29.77)	0.0135(0.0124)	**	0.103
Gram	6.80(57.47)	–0.00012(–0.03686)	N.S.	0.00
Rabi Pulses	2.049(22.11)	0.0399(15.10)	*	0.797
Total Rabi Pulses	6.74(65.31)	0.0025(0.8534)	N.S.	0.0124
Total Pulses	6.98(66.43)	0.00696(2.323)	**	0.0851
Kharif Foodgrains	7.49(50.40)	0.0191(4.530)	*	0.261
Rabi Foodgrains	7.60(145.0)	0.0295(19.75)	*	0.87
Total Foodgrains	8.25(144.2)	0.026(15.99)	*	0.815

Source: Authors' calculation.
NOTE: * represents the 1 percent level of significance, ** represents 5 percent level of significance and N.S. stands for non significant.

support price.

(ii) There is need to use the high yield variety of seeds for pulses by the farmer, particularly for gram and arhar crops in the state.

(iii) There is a need of innovative policies for agriculture crop area in a viable way. For improving the agriculture crop production, there is a need to increase crop-wise contract farming.

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Agro-Economic Research

Assessment of Livestock Feed and Fodder in Rajasthan*

H. SHARMA, S. S. KALAMKAR & T. PARIHAR

1. Introduction

Animal husbandry in India is closely interwoven with agriculture. It plays an important role in the socio-economic development of millions of rural households, thereby contributing importantly in the national economy. Livestock rearing is one of the most important economic activities in the rural areas providing supplementary as well as stable income round the year. This sector has also emerged as a vital sector for ensuring a more inclusive and sustainable agriculture system. Evidence from the national sample survey office's (NSSO) 70th round survey (2014 & 2014a) showed that more than one-fifth (23 percent) of agricultural households with very small holdings of land (less than 0.01 hectare) reported livestock as their principal source of income. More than 70 million of the reported 147 million rural households depend on dairy, in varying degrees, for their livelihoods. Marginal, small and semi-medium farmers with average operational holdings of area less than 4 hectare own about 87.7 percent of the livestock of India. By controlling 64 percent of the bovine, 70 percent of ovine, 73 percent of caprine and 70 percent of the poultry population, the small holders contribute substantially to livestock production. Dairying has become an important secondary source of income for millions of poor and rural households and has assumed an important role in providing employment and income generating opportunities particularly for marginal and women farmers. This is the sector where the poor contribute to growth directly instead of deriving benefits from growth generated in other sectors of the economy. This sector has created a significant impact on equity in terms of employment and poverty alleviation as well. It cannot be merely a co-incidence that the level of rural poverty is significantly higher in states where livestock sector is underdeveloped.

1.1. Need for the study

Dairy Industry in the country has shown spectacular growth during the last few decades. With an expected production of about 188 million MT of milk by the end of 2018-19, it is estimated that annual requirement of green fodder will be to the tune of 1,100 million MT and dry fodder to the tune of 610 million MT. The current availability of green and dry fodder, however, is estimated at 500 million MT and 380 million MT, respectively. Efforts to increase livestock productivity/production is constrained by feed /fodder shortages. The shortages tend to be even more serious during natural calamities. To improve the availability of fodder, there is very little scope to increase the area under fodder cultivation, particularly in view of the growing demand of food, fiber and shelter for human beings. It is therefore necessary to increase the availability of fodder by increasing the productivity of available forage resources per unit area, improve the efficiency of fodder utilization and minimize the fodder wastages to increase and thereby reduce the gap between demand and supply. The present average green fodder yield of 40 MT/hectare/year of cultivated land and 0.75 MT/hectare/year for common grazing land are too low and there is huge potential to improve their productivity through adoption of latest technologies.

The country's estimated demand for milk is likely to be about 200 million tonnes in 2021-22 (NDDB, 2014 & 2014a). To meet the growing demand, there is a need to increase the annual incremental milk production from 4 million tonnes per year as was the case for the last 10 years to 7.8 million tonnes in the next 8 years. Quantum jump in milk production is possible through increase in productivity, and linking small holders to dairy cooperatives/producer groups/SHGs with forward linkages having milk processing facilities.

Adequate availability of feed and fodder to livestock is vital to increase their productivity and also to sustain ongoing genetic improvement initiatives. The supply of feeds has always remained short of normative requirement. The situation is further aggravated in Rajasthan and Gujarat where

*Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat
NOTE: Detailed report is available on the website of respective Agro-Economic Research Centres.

considerable area falls in arid and semi-arid zones. Keeping this background, the study examines demand, supply, and a deficit of feed and fodder production in the Rajasthan.

2. Data and Methodology

The study is based on both, the secondary and primary level data and statistics. The secondary data on livestock population of all selected states are compiled from published sources. To understand and analyze the demand for and supply of feed and fodder, primary data was collected from the field level through a sample survey method. As per the sampling framework, data was collected from three selected districts from three regions of the state, i.e., Ajmer, Barmer and Udaipur representing three regions of the state, viz., Central, West and South as well as three different agro-climatic zones (ACZs) of the state. The reference period of the study was 2019-20 agricultural year.

2.1. About study area

Rajasthan is the largest state having about 10.41 percent of the total geographical area of the country. It supports 5.5 percent of human population and about 11 percent of the country's livestock population. Agriculture and allied activities, however, remain the primary and major economic activity in the state providing livelihood to 66 percent of the state's population. Because of the limited water resources, most of the agriculture production is rain-fed and thus, the livestock sector assumes more importance. Animal husbandry is not only a subsidiary occupation to agriculture but it is a major economic activity, especially in the arid and semi-arid regions of the Rajasthan. Livestock sector development has a significant positive impact in generating employment and reducing poverty in rural areas.

Rajasthan is rich in agro-ecological diversity and has a wide range of unique livestock production systems that have evolved in different regions in accordance with the naturally available resources and needs of the people. This diversity is associated with the choice of species reared; breeds that have evolved, management and feeding practices, health care systems that are closely linked to the natural flora and fauna, and local marketing systems. Development of livestock sector, therefore, is a critical pathway to rural prosperity. This fact in context to Rajasthan is well established where agricultural operations offer less promising prospects due to extreme geo-climatic conditions and uncertainty of rains. As such livestock operations have expressed their superiority over crop farming in terms of growth, stability, resource conservation and uplifting the socio-economic status of the inhabitants.

Animal husbandry and livestock sector contribute a lot in state economy, and has particularly great potential in rural area. The potential of crop production depends upon huge investment, weather and meteorological conditions. In contrast, animal husbandry and livestock is more stable and requires lesser investments. Livestock and poultry have proved to be life saviour in many distressed conditions, especially in case of drought. The livestock population of the state was 577.32 lakh (2012). Rajasthan is considered as 'Denmark of India'. The total milk production in Rajasthan was 22.43 million tonnes in 2017-18, and ranked second in India. Animal husbandry is a major economic activity contributing approximately 11.19 percent to the total (gross state domestic product) GSDP of the state in 2018-19. The contribution of agriculture and livestock to total GSDP was estimated to be 35.38 percent, while contribution of livestock to agriculture and livestock together was around 32 percent. Thus, one-third of the agriculture sector output comes from livestock sector. The share of gross value added (GVA) from livestock to agriculture sector and livestock has been fluctuating over the period of last more than one and half decade and remains between 20-32 percent. However, the contribution of GVA from agriculture and livestock to total GSDP has increased from 34.55 percent in 2011-12 to 35.38 percent in 2018-19. Rajasthan accounted for 12.97 percent share in value of output from milk (at current prices) in the country during 2015-16, while its share was 11.15 percent in total value of output from livestock in the country during 2015-16 (GOI, 2018, GSDP).

The state of Rajasthan is rich in livestock wealth. State is blessed with the best breeds of cattle, sheep and camels in the country. The climatic conditions are adverse with scarcity of water for irrigation and erratic rains with very low average annual rainfall. These conditions leave a little scope for crop production and enhance the importance of animal husbandry over the crop production especially during recurrent droughts. The Nineteenth Livestock Census (2012) of India placed total

livestock population at 512.1 million, out of which, 57.73 million livestock (11.3 percent) population was in the state of Rajasthan. The state accounted for 6.98 percent share in cattle population, 11.94 percent of buffalo population, 13.95 percent sheep population and 16.03 percent goat population of the country. The district-wise share in total state livestock population figures indicate that Barmer district (9.30 percent) had the highest number of livestock population followed by Jodhpur, Jaisalmer, Nagour, Jaipur, Udaipur, Bikaner, Bhilwara and Pali. These nine districts together accounted for 49.21 percent of total livestock population in the state. Jaipur district had the highest number of in- milk crossbreds and buffaloes. Bikaner had the highest number of in-milk indigenous cattle followed by Jodhpur and Barmer district. In milk, indigenous cattle like Tharparkar cattle breed is native of Jodhpur and Jaisalmer districts in eastern region of Rajasthan whereas Rathi cattle breed is reared for dairy purposes in the northern districts of Shri Ganganagar, Bikaner and parts of Jaisalmer which are irrigated or partially irrigated arid zones. The highest livestock and bovine animal density was recorded in Bharatpur.

Rajasthan ranks second among the milk producing states in India, achieving 224.27 lakh MT in 2017-18, which has increased from the 41.46 lakh MT during 1985-86. A numbers of initiatives were taken by the government which could help in improving the milk productivity over the period. Despite increase in milk yield, there is still a wide scope for improving milk yield of milch animals. The reason cited for this, is inappropriate feeding as well as inadequate supplies of quality feeds and fodder in addition to the low genetic profile of the Indigenous breeds. It is not possible to achieve higher productivity in milch animal by merely increasing its genetic potential. Due attention needs to be given to proper feeding of milch animals. There is no shortcut to sustain livestock husbandry, without addressing the development of fodder and feed resources. As against the estimated animals' requirements, feed resources available in Rajasthan are lower. It is estimated that against the requirement of 375 lakh MT of dry fodder, state availability was of 368 lakh MT of dry fodder. It can be seen that during the last two decades (1992 to 2011), shortage of dry matter in the State increased from 29.01 percent of the requirement to 51.88 percent during corresponding years.

In Rajasthan, the livestock keepers have traditionally relied on common grazing lands "gochars", scared groves "orans" and forests. With the growth of mining industry and allocation of community wastelands for biodiesel plantation, the permanent pastures and other grazing land has reduced from 1.9 million hectare in 1990-91 to 1.7 million hectare in 2009-10. Often, layers of white marble dust choke neighbouring grazing land. Rajasthan is a leader in crops like sorghum, pearl millet (bajra), pulses, oil seeds, wheat and rice, all of which in some way or other, form parts of compound livestock feed. Rajasthan also produces non-conventional ingredients, which can be integral part of the feed raw material. Now, the dairy farmers are shifting from extensive open grazing system to semi-intensive and intensive stall feeding system. Green fodder is a comparatively economical source of nutrients. However, the availability of green fodder is lower than estimated requirement. In Rajasthan, the area under fodder crop to state gross cropped area increased from 15.93 percent in 2008-09 to 20.26 percent in 2012-13. Bikaner district had the highest area under fodder crops followed by Churu, Hanumangarh and Jaisalmer district.

3. Findings from Field Survey

i. The various socio-economic factors, for instance, size of family, education and training of dairy producer, availability of land and off-farm income, experience in dairy, etc., have direct influence on dairy farmers' decision on whether they want to expand and improve their dairy operations. Average age of the selected household head/respondent was around 47 years, of which, almost one third of them found to be illiterate. The remaining half of the household respondents was educated mostly up to the highest level of high schools except few of them were found graduate. Out of the total selected respondents, almost 62 percent were from backward classes, followed by around 18 percent from open category, 15 percent from scheduled tribe and rest of them were from scheduled caste. Most of the selected households respondents were male (93 percent) and very few (7 percent) were female respondents.

ii. The selected households had slightly higher experience in farming business (23 years) followed by dairy (22 years) and sheep and goat rearing (11 years). The average family size

was found to be 6.7 persons and the highest share of family members were found to be primarily engaged in farming business (39 percent) followed by 36 percent in dairy and rest of them were in sheep and goat farming. The main occupation of the selected households was agriculture comprising cultivation of land as a farmer along with supportive allied activity of animal husbandry and dairying. Agriculture was the primary occupation of 82 percent households followed by animal husbandry and dairy (13 percent) and very meagre share of household depends on labour activities. Own farm establishment and self-employment were other major sources of occupation. The annual average income of the selected households was estimated to be Rs. 135559/- followed by Rs. 48640/- from dairy, Rs 10102/- from sheep and goat rearing. Around 71 percent of the selected households were found be no association with any social and cooperative organizations.

iii. On an average, operational land holdings were estimated to be small to medium size of holdings having 2.12 hectare of which 82 percent land was irrigated. It was very surprising and pleasant to note that almost 19 percent of total operational holdings were devoted to fodder crops, while same was slightly higher in case of land under unirrigated condition (19 percent) as compared to 18 percent land under irrigated conditions. The groundwater, the main source of irrigation (more than 7 percent), was followed by surface sources such as canal and tank.

iv. The cropping pattern of the selected households indicates that highest area under fodder crops was recorded during kharif and rabi season. Besides, during kharif seasons, supportive crops whose by-product can be used as fodder crops such as maize, bajra, moong, urad and lucern were grown. The fodder cultivation is found to be relatively profitable than other crops.

v. The details on fodder and feed fed to the animals indicate that more than 94 percent selected buffalo and cattle had average age of more than two years while around three fifth of sheep and goats were of same age. The average value of sheep for the age of two years and above ranges as high as around Rs. 8167 in Udaipur and as low as Rs. 7100 in Barmer district, while same for goat was Rs. 6993 in Barmer and Rs. 5769 in Ajmer district, respectively.

vi. The average value of the buffalo, crossbreed cattle and indigenous cattle for the age two years and above ranges around Rs. 50000, followed by Rs. 44000 for crossbreed cattle and Rs. 32000 for indigenous cows. The lowest value of indigenous cows was reported to be in Ajmer district.

vii. The details on the fodder and feed fed to the milch animals indicate that the average feed and fodder consumption of milch animals was between 10- 12 kg of green fodder followed by 8-11 kg of dry fodder, 2-3 kg of concentrates and very few quantity of the supplements were fed to the adult animals. The quantity of feed and fodder fed to the animals were significantly high for milch animals followed by the heifer pregnant, dry animals and rest of them. Besides stall feeding, the animals were also taken out for grazing for few years on each day. The small ruminants were mostly fed outside by taking out for grazing and very few of the households had fed them with the dry fodder and some concentrates. On an average, animals were also taken out for grazing for 4-7 hours on each day.

viii. The total requirement of feed and fodder, using the standards given by the NATP database and as per the available data of livestock census of 2012, was to be 137795 tonnes of green fodder, 132525 tonnes of dry fodder and 14552 tonnes of concentrates per day. With respect to green fodder availability, the production is estimated through a potential production per unit hectare from the land classification data of the State of Rajasthan for the year 2016-17 and was estimated to be 225638 tonnes. The main crops residues available for livestock in the State are bajra, paddy, wheat, pulses, oilseeds and sugarcane. The percent gap between the requirement and availability has been computed which indicate that State is severely deficit in green fodder followed by availability of concentrates. The dry fodder availability is relatively better but short by around 12 percent of actual requirement.

ix. The major sources of livestock feed reported

by the sample households are crop residues followed by tree legumes. Half of the respondents depend on the improved forage and pastures, household left over. Very few household have reported use of grazing land and feed preserved in storages. Very few households have cattle shed and majority of them are kuccha in nature, of which, few are within house. While, in case of shed for sheep and goat, very few of them were of kaccha nature.

x. As dairy activities are carried out as complimentary activity to agriculture, the labour use pattern by the selected sample households indicate the significant involvement of female in dairy activity (buffalo, crossbred cows and indigenous cows) while in case of sheep and goats, male were engaged, may be mostly for grazing them on the field. The time spent on management of dairy business for the stall feed animals was estimated to be around 2-3 hours per day, while same was about 3-5 hours for small ruminants. The net returns realized by the sample households shows that the highest milk yield realized by the sample households was from crossbred cattle (9.52 litre/day) followed by 7.15 litre/day from buffalo and 5.83 litre/day from indigenous cows. While, the milk yield of small ruminants animals was reported to be around half a litre per day. Therefore, there is a huge scope to enhance producers' income from dairy by enhancing animals' productivity, improving management practice, and ensuing remunerative prices.

xi. The details on constraints faced by the sample households indicate that the top most constraints faced, as expected, were non availability of adequate irrigation water, high cost of cultivation/production and low return on fodder production, poor livestock extension services, less land availability, therefore, cannot afford to put more land under fodder seed/crop production and high cost of fodder seed. The other major constraints reported are non-availability of labour and no provision of quality seed by society on credit and non-availability of quality fodder seed in market.

xii. The adoption of post-harvest techniques plays important role in conservation of dry and green fodders for long period for the use during off-seasons. It was very strange to note that despite the fact that fodder availability has direct relation with milk productivity as well as health of the animals, none of the household had adopted any post-harvest technique, which indicates failure of the agricultural extension mechanism/department of animal husbandry in training the farmers for such techniques (e.g., hay making, silage, etc.). The major reasons for non-adoption of these post-harvest techniques were high expense to adopt the post-harvest techniques (28 percent), followed by considering stored fodder inferior in comparison to fresh one (28 percent), lack of awareness on production and post-harvest management (26 percent) and more laborious (18 percent)

xiii. It was strange to note that hardly 3 percent of total households have reported that they have benefited from government and dairy cooperative in availing cattle facilities, mineral mixture, fodder seed while one each household had received support of cattle shed subsidy and seed distribution kit. Around 96 percent of households reported that they did not receive any support from the government for livestock production. The top two suggestions made by the selected households were that the green fodder bank should be provided by Government and the need of irrigation facility, while 86 percent households did not provide any suggestion.

4. Conclusions and Policy Recommendations

i. Animal husbandry and livestock sector contribute a lot in state economy, and has particularly great potential in rural area. The potential of crop production depends upon huge investment, weather and meteorological conditions. In contrast, animal husbandry and livestock is more stable and requires lesser investments. Animal husbandry contributed over 11 percent to the GSDP. More than 80 percent rural families keep livestock in their households. About 35 percent of the income of small and marginal farmers came from dairy and animal husbandry. In arid areas, the contribution was as high as 50 percent. The sector has potential to create employment in rural areas with least investments as compared

to other sectors. Milk contributed to around 28 percent to the agricultural GDP of Rajasthan and is one of the biggest sectors for supporting livelihood in the state. This suggests that public investment in the livestock sector should be enhanced to help the smallholder livestock producer, which derives their larger share of income from the livestock sector.

ii. There is a lack of adequate and genuine data on production and availability of various types of fodder and feed grains. Therefore, competent agencies should be encouraged to generate real time and time-period data on fodder production, feed grain production, land availability for grassland and other pasture grounds, etc. Existing networks involved in data collection for cost of cultivation and other such established sources should be engaged and expanded to collect such real time information as well.

iii. The fodder crop cultivation was estimated to be more profitable as compared to other competitive or cereals crops grown during kharif and rabi seasons. Therefore, milk union and PDCS need to give more attention of fodder development program.

iv. Shortage of quality fodder and feed is another major constraint for dairy development. The gap between the requirement and availability of feed and fodder is increasing due to increasing livestock population as against decreasing area under fodder cultivation and reduced availability of crop residues as fodder. Besides common property resources are continuously shrinking due to over grazing of the existing grass land. Therefore, there is a need to frame strategies for sufficient availability of good quality feed and fodder for efficient utilization of genetic potential of the various livestock species and thereby sustainable improvement in productivity.

v. Fodder based cheaper feeding strategies are required to reduce the cost of production of quality livestock since feed alone constitutes 70 percent of milk production cost. To meet the current level of livestock production and its annual growth in population, the deficit in all components of fodder, dry crop residues and feed need to be met by either increasing productivity, utilizing untapped feed resources and increasing land under fodder cultivation. In parallel, appropriate veterinary research regarding the sources of cost-effective nutritious feed should also be encouraged, tested and informed to the farmers.

vi. Due to inadequate rainfall during rainy season, the quality and quantity of fodder production gets affected. Thus, there is a need to develop fodder varieties suitable to agro-climatic conditions of the area.

vii. Efforts need to be made to increase production of quality fodder seeds through necessary incentives, arranging foundation seeds of different high yielding fodder varieties and modern scientific farming procedures. Accordingly, more seed plants should be established and farmers should be incentivized and trained to participate in such programmes.

viii. Efforts are required to increase area under fodder cultivation, especially through use of barren and fallow lands and silviculture. Appropriate resources and technologies need to be made available to ensure quality fodder seed production. Fodder cultivation in degraded land and forest land need to be taken wherever possible with the help of farming community. Round the year availability of quality fodder through promotion of hay, silage and fodder banks, need to be emphasized. Non-conventional sources of feeds such as azolla, processed vegetables and fruits waste, etc., need to be promoted.

ix. While fertile lands with assured irrigation are diverted for growing high value crops, large stretches of marginal and wastelands are lying under-utilized across the country. There are also opportunities to introduce fodder as an intercrop or as a soil binder under the watershed development programme.

x. Most of the fodder varieties presently released for cultivation, are not the most ideal for cultivation on such low productive lands. Identification of suitable fodder species for such areas and developing suitable cultivation practices are necessary to boost fodder production on marginal and wastelands in the future.

xi. The role of institutions in fodder development especially district dairy cooperatives needs to be strengthened and there should be dedicated fodder officer to take up fodder development activity on large scale.

xii. Cultivation of fodder crop is not considered as main/ regular crop and therefore fodder crop mostly receives less coverage and attention in allotment of land. It is thus mostly grown on waste/inferior soil or sometime on bunds and field boundary. Farmers should be explained the benefits of growing fodder seed and fodder. Financial benefits of producing fodder and fodder seed should be explained to farmers and can be demonstrated with the help of some voluntary motivated farmer.

xiii. It was observed that a fodder market has been working in Kota city for fodder growers and fodder consumers, whereas good number of marginal as well as small farmers or fodder growers participated and earned a lot of income from fodder cultivation. This kind of market should be developed at other places which have fodder shortage or are under developed area with regards to fodder cultivation. The supply channels should also be extended.

xiv. During field visits at the selected study area, it was observed that some of the fodder growers had cultivated efficiently the fodder crop and they had keen interest for the fodder seed cultivation which is specially grown in these areas. Such good results were observed because some special variety of fodder had been cultivated in this area and had also provided higher yield.

xv. Also the support for fodder storage needs to be provided to fodder growers to minimize the fodder losses and to assure timely availability of the same even during off-season.

xvi. Rajasthan is already bestowed with crucial favourable factors related to animal husbandry and dairy business in the form of ownership of huge number of livestock and many of them are high in endurance. Livestock owners face challenges in the form of harsh climate, difficult arid desert topography, scanty rainfall and fierce summers, scarcity of water for irrigation, etc. However, the courageous farmers can perform very well in terms of producing high yields in dairy business with the support of dairy unions and PDCS.

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Commodity Reviews

Foodgrains

Procurement of Rice

The total procurement of rice during kharif marketing season 2019-20 up to 26.06.2020 is 50.03 million tonnes as against 43.36 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 26.06.2020) 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 figure 2.

TABLE 1: PROCUREMENT OF RICE

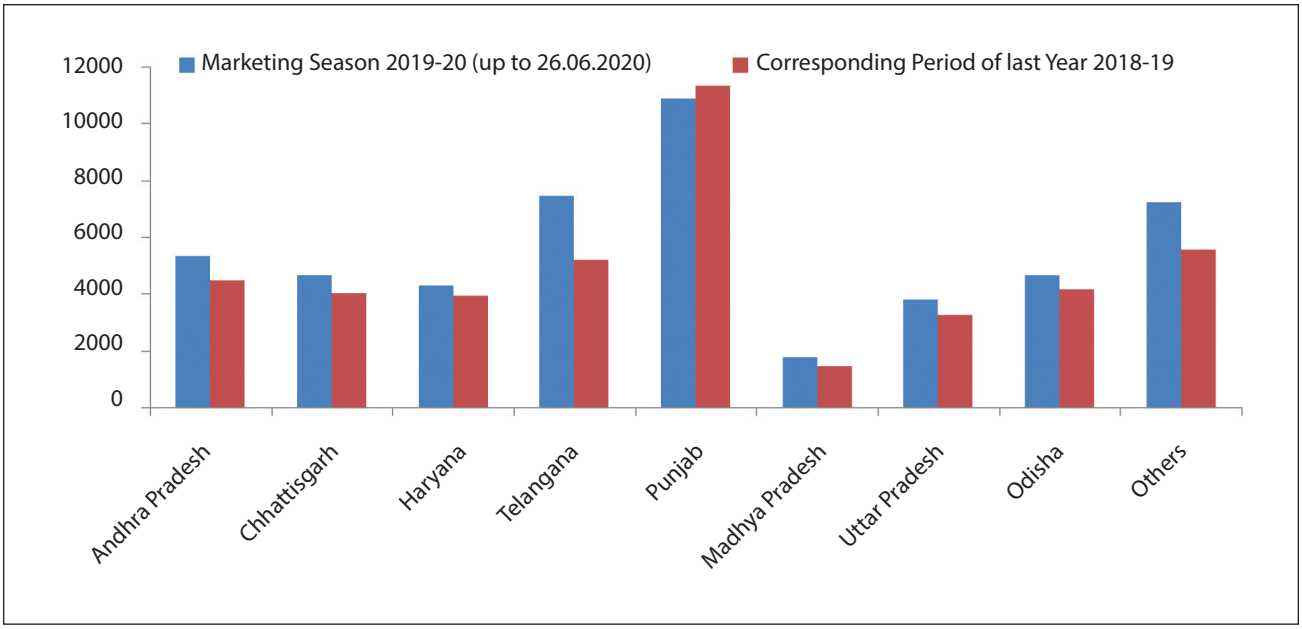
(In thousand tonnes)

State	Marketing Season 2019-20 (upto 26.06.2020)		Corresponding Period of last Year 2018-19	
	Procurement	% to Total	Procurement	% to Total
1	2	3	4	5
Andhra Pradesh	5319	10.6	4472	10.3
Chhattisgarh	4656	9.3	4020	9.3
Haryana	4303	8.6	3942	9.1
Telangana	7463	14.9	5187	12.0
Punjab	10876	21.7	11334	26.1
Madhya Pradesh	1740	3.5	1462	3.4
Uttar Pradesh	3790	7.6	3233	7.5
Odisha	4669	9.3	4158	9.6
Others	7214	14.4	5552	12.8
Total	50030	100.0	43361	100.0

Source: Department of Food & Public Distribution

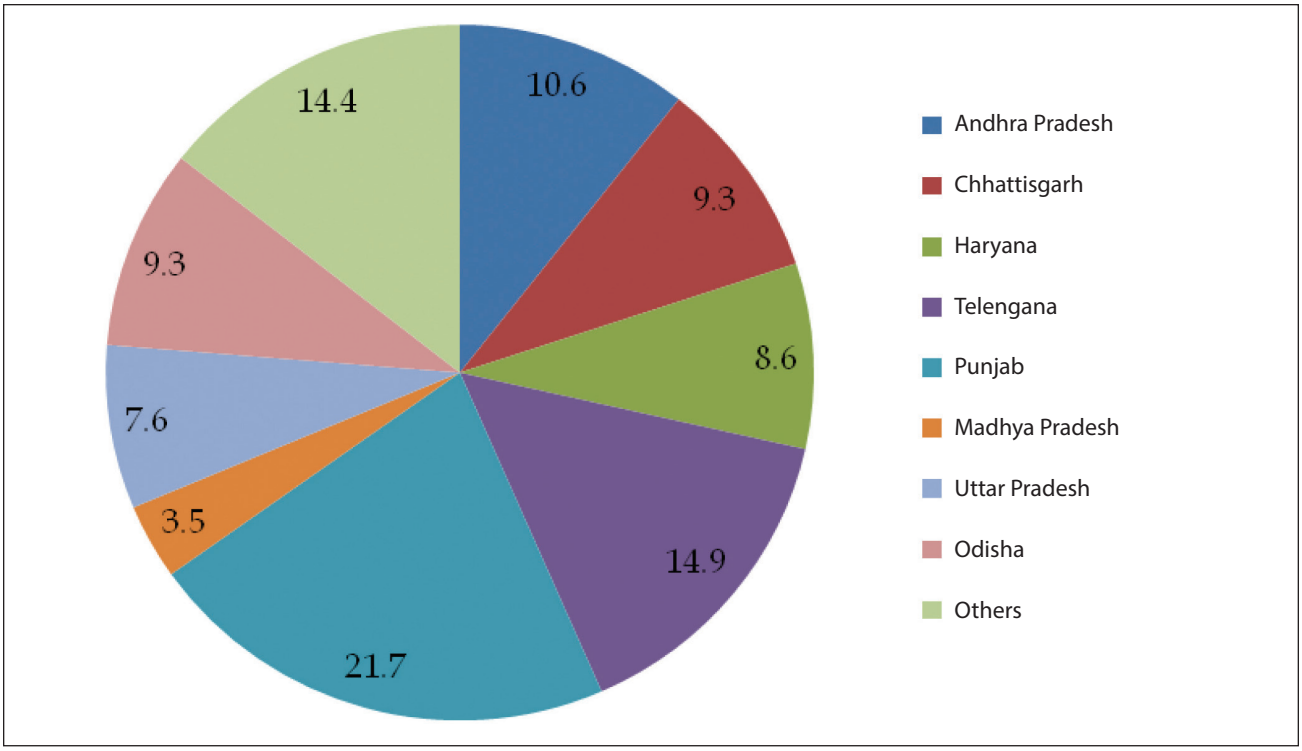
Figure 1: State-wise Procurement of Rice

(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 26.06.2020).



Source: Department of Food & Public Distribution.

Procurement of Wheat

The total procurement of wheat during rabi marketing season 2020-21 up to 26.06.2020 is 38.72 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 26.06.2020) 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

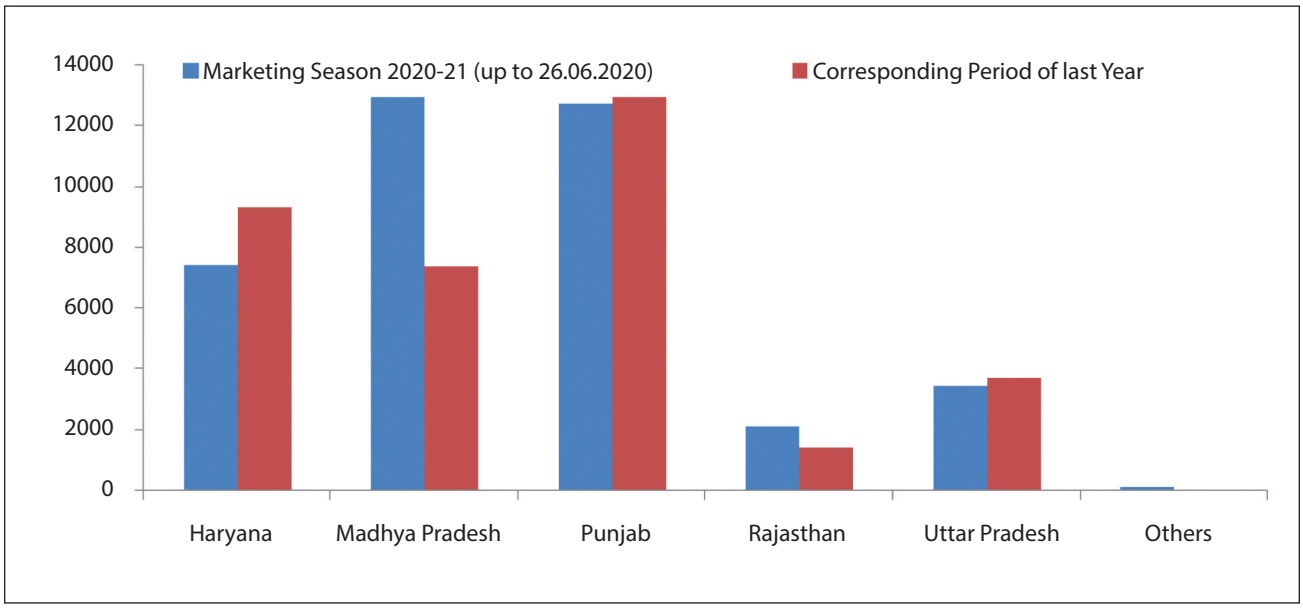
(In thousand tonnes)

State	Marketing Season 2020-21 (upto 26.06.2020)		Corresponding Period of last Year 2019-20	
	Procurement	% to Total	Procurement	% to Total
1	2	3	4	5
Haryana	7398	19.1	9320	26.8
Madhya Pradesh	12935	33.4	7370	21.2
Punjab	12712	32.8	12912	37.1
Rajasthan	2126	5.5	1408	4.1
Uttar Pradesh	3436	8.9	3700	10.6
Others	113	0.3	63	0.2
Total	38720	100.0	34775	100.0

Source: Department of Food & Public Distribution.

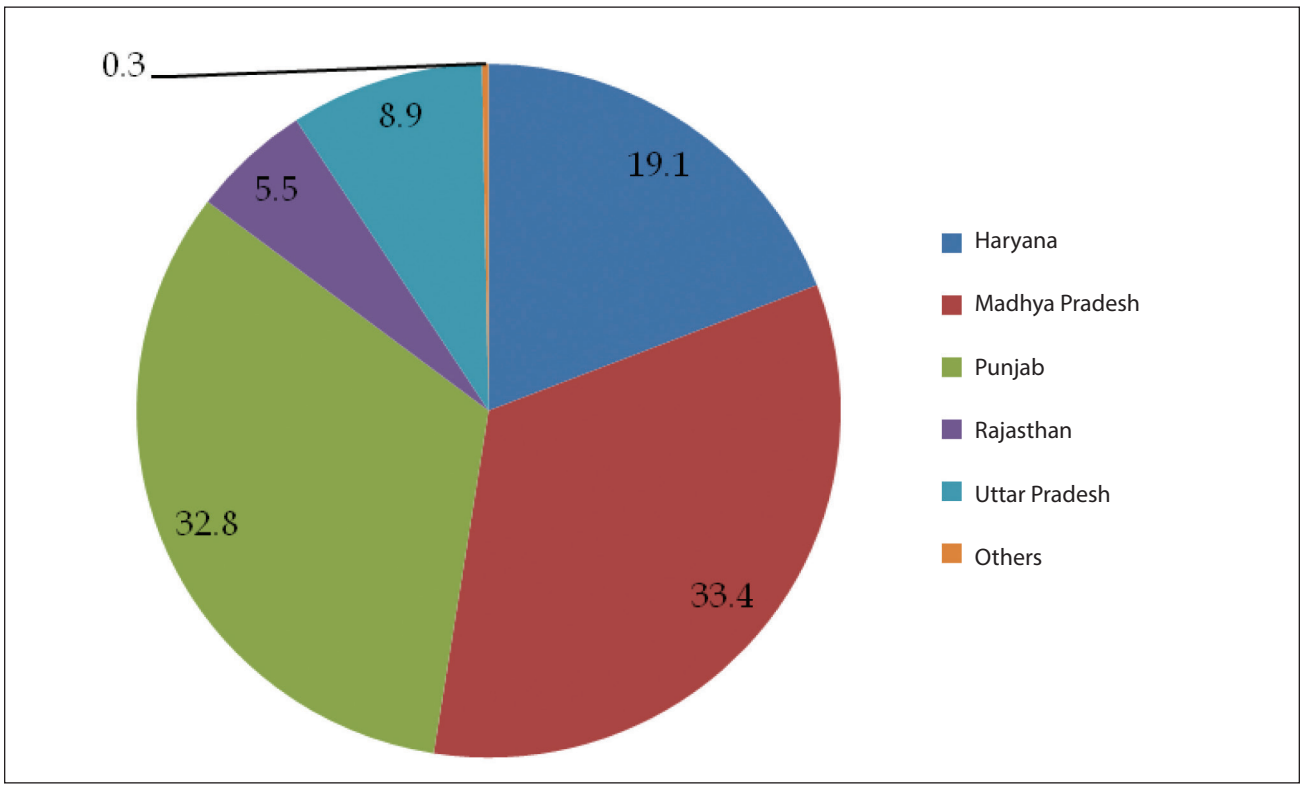
Figure 3: State-wise Procurement of Wheat

(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 26.06.2020).



Source: Department of Food & Public Distribution.

Commercial Crops

Oilseeds

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 154.8 in June, 2020 showing an increase of 0.91 percent over the previous month and increased by 3.20 percent over the previous year.

The WPI of all individual oilseeds showed a mixed trend. The WPI of groundnut seed (1.28 percent), rape and mustard seed (2.22 percent), cotton seed (3.82 percent), gingelly seed (sesamum) (0.36 percent) safflower (1.91 percent), sunflower (6.97 percent) and soyabean (0.06 percent) increased over the previous month. However, the WPI of copra (1.27 percent) and niger seed (4.55 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 128 in June, 2020 which shows an increase of 1.43 percent over the previous month. Moreover, it also increased by 13.88 percent over the corresponding months of the previous year. The WPI of mustard oil (3.83 percent), sunflower oil (1.73 percent), groundnut oil (0.36 percent), rapeseed oil (3.57 percent), copra oil (0.42 percent) and cotton seed oil (0.69 percent) increased over the previous month. However, the WPI of soybean oil (0.42 percent) decreased over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 159.3 in June, 2020 showing an increase of 4.60 percent over previous month and a decrease of 4.50 percent over the corresponding month of the previous year.

Potato

The WPI of potato stood at 265.7 in June, 2020 showing an increase of 10.52 percent over the previous month. Moreover, it also increased by 56.20 percent over the corresponding months of the previous year.

Onion

The WPI of onion stood at 133.7 in June, 2020 showing a decrease of 6.24 percent over the previous month and a decrease of 15.27 percent over the corresponding months of the previous year.

Condiments & Spices

The WPI of condiments & spices (group) stood at 145.6 in June, 2020 showing a decrease of 1.15 percent over the previous month and an increase of 8.74 percent over the corresponding months of the previous year. The WPI of black pepper increased by 0.65 percent. However, the WPI of chillies (dry) decreased by 3.13 percent and Turmeric decreased by 1.20 percent over the previous month.

Raw Cotton

The WPI of raw cotton stood at 106.1 in June, 2020 showing an increase of 1.63 percent over the previous month and a decrease of 15.05 percent over the corresponding months of the previous year.

Raw Jute

The WPI of raw jute stood at 206.6 in June, 2020 showing a decrease of 2.04 percent over the previous month and an increase of 4.77 percent over the corresponding months of the previous year.

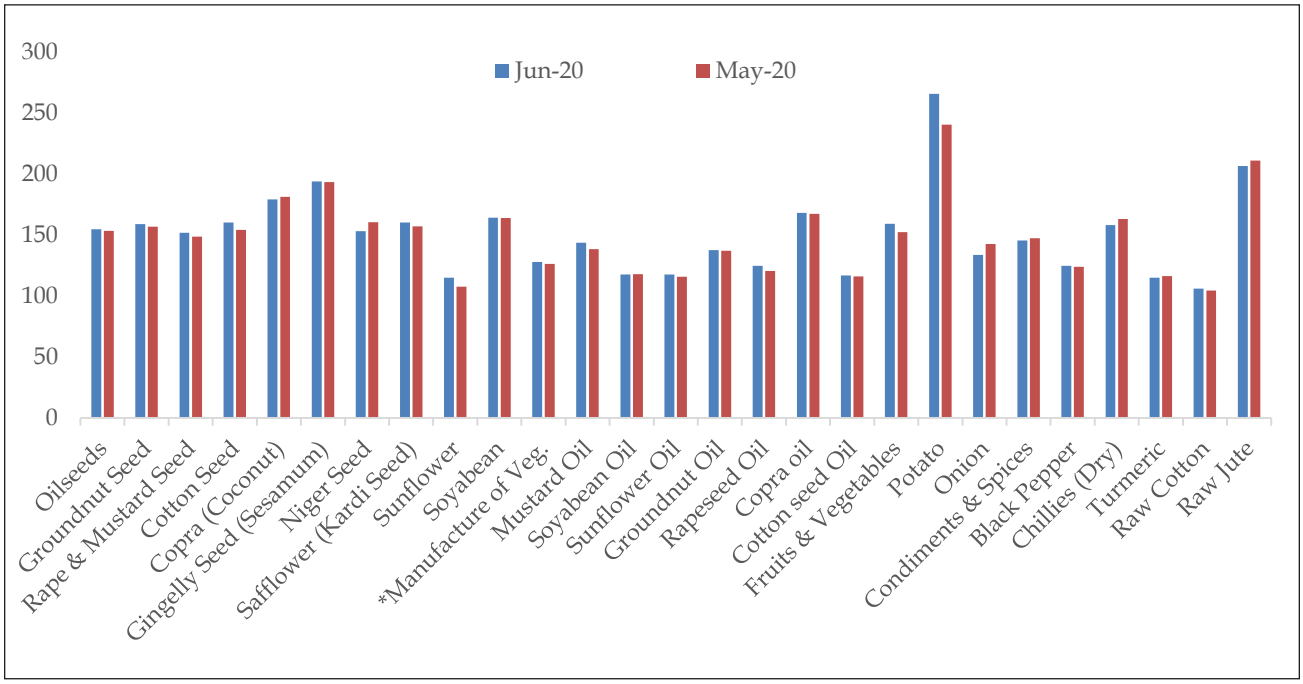
Wholesale Price Index of Commercial Crops is given in Table 3. A graphical comparison of WPI for the period of June, 2020 and May, 2020 is given in figure 5 and the comparison of WPI during the June, 2020 with the corresponding month of last year has been given in figure 6.

TABLE 3: WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

(Base Year: 2011-12=100)

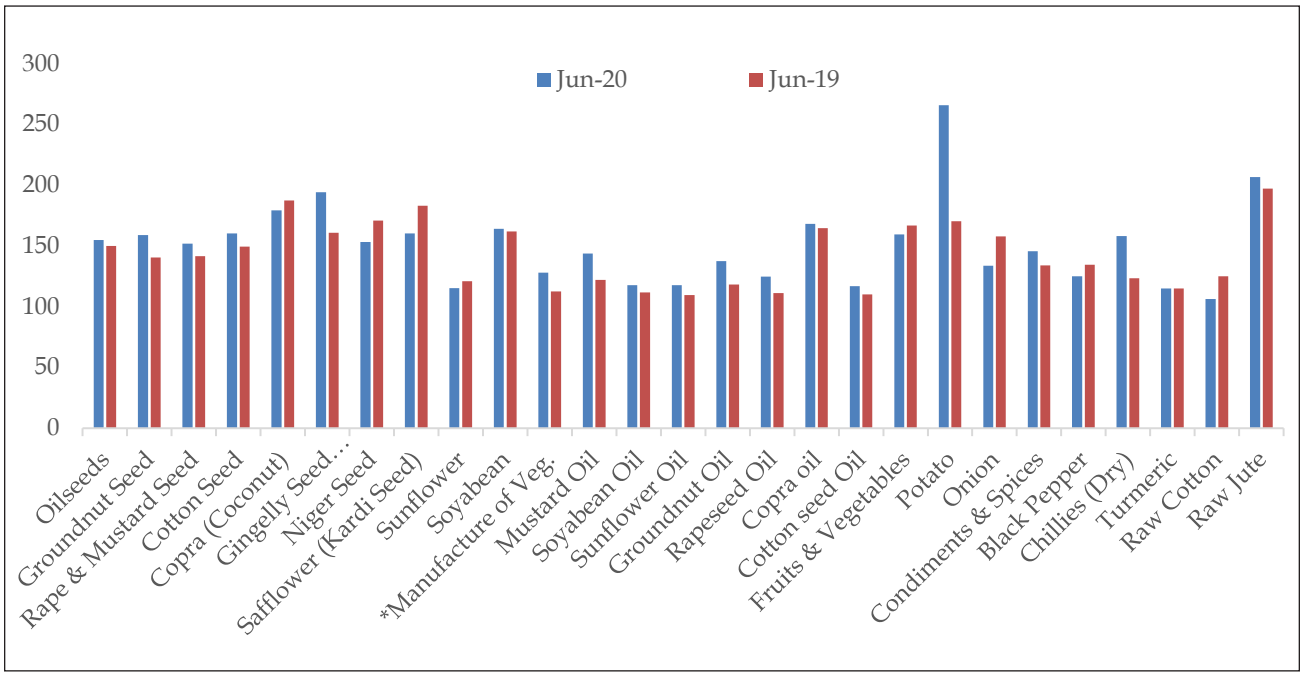
Commodity	Latest June-20	Month May-20	Year June-19	% Variation over the	
				Month	Year
Oilseeds	154.8	153.4	150	0.91	3.20
Groundnut Seed	158.8	156.8	140.3	1.28	13.19
Rape & Mustard Seed	151.9	148.6	141.5	2.22	7.35
Cotton Seed	160.2	154.3	149.2	3.82	7.37
Copra (Coconut)	179.1	181.4	187.3	-1.27	-4.38
Gingelly Seed (Sesamum)	194	193.3	160.7	0.36	20.72
Niger Seed	153.1	160.4	170.7	-4.55	-10.31
Safflower (Kardi Seed)	160.2	157.2	183	1.91	-12.46
Sunflower	115.1	107.6	120.9	6.97	-4.80
Soyabean	164.1	164	161.8	0.06	1.42
Manufacture of Vegetable and Animal Oils and Fats	128	126.2	112.4	1.43	13.88
Mustard Oil	143.6	138.3	122	3.83	17.70
Soyabean Oil	117.5	118	111.5	-0.42	5.38
Sunflower Oil	117.7	115.7	109.4	1.73	7.59
Groundnut Oil	137.5	137	118	0.36	16.53
Rapeseed Oil	124.7	120.4	111	3.57	12.34
Copra oil	168	167.3	164.4	0.42	2.19
Cotton seed Oil	116.9	116.1	110.1	0.69	6.18
Fruits & Vegetables	159.3	152.3	166.8	4.60	-4.50
Potato	265.7	240.4	170.1	10.52	56.20
Onion	133.7	142.6	157.8	-6.24	-15.27
Condiments & Spices	145.6	147.3	133.9	-1.15	8.74
Black Pepper	124.8	124	134.3	0.65	-7.07
Chillies (Dry)	158.1	163.2	123.3	-3.13	28.22
Turmeric	114.9	116.3	115	-1.20	-0.09
Raw Cotton	106.1	104.4	124.9	1.63	-15.05
Raw Jute	206.6	210.9	197.2	-2.04	4.77

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



*Manufacture of Vegetable, Animal Oils and Fats

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



*Manufacture of Vegetable, Animal Oils and Fats

Statistical Tables

Wages

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

(In Rs.)

State	District	Centre	Moth & Year	Daily Normal Working Hours	Field Labour		Other Agri. Labour		Herdsman		Skilled Labour		
											Carpenter	Black Smith	Cobbler
					M	W	M	W	M	W	M	M	M
Andhra Pradesh	Krishna	Ghantasala	Nov, 2019	8	425	283	NA	NA	300	NA	NA	NA	NA
	Guntur	Tadikonda	Nov, 2019	8	381	350	400	NA	325	NA	NA	500	NA
Telangana	Ranga Reddy	Arutala	Jan, 20	8	396	396	500	NA	NA	NA	400	400	NA
Karnataka	Bangalore	Harisandra	Dec, 19	8	360	340	300	300	340	330	500	400	NA
	Tumkur	Gidlahali	Nov, 19	8	350	320	350	350	350	320	400	360	NA
Maharashtra	Bhandara	Adyal	Feb,20	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chandrapur	Ballarpur	Feb,20	8	300	200	300	200	300	NA	500	400	250
Jharkhand	Ranchi	Gaitalsood	June, 19	8	239	239	239	239	239	239	330	330	NA

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

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily WorkingHours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Assam	Barpeta	Howly	May,19	M	8	300	NA	250	250	200	NA	275	280	NA
				W	8	NA	NA	170	170	150	NA	NA	NA	NA
Bihar	Muzaffarpur	Bhalui Rasul	June, 19	M	8	300	300	300	300	300	300	450	450	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Shekhpura	Kutaut	June, 19	M	8	NA	NA	NA	NA	NA	NA	500	500	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chhattisgarh	Dhamtari	Sihava	Jan,20	M	8	400	200	NA	180	180	160	320	300	200
				W	8	NA	175	NA	150	160	140	NA	150	NA

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

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily WorkingHours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Gujarat*	Rajkot	Rajkot	March,20	M	8	287	287	287	287	253	200	483	483	450
				W	8	NA	203	287	287	253	200	NA	NA	NA
	Dahod	Dahod	Jan, 20	M	8	300	300	150	150	150	NA	400	350	300
				W	8	NA	250	150	150	150	NA	NA	NA	NA
Haryana	Panipat	Ugarakheri	Jan, 20	M	8	400	400	400	400	400	NA	550	400	NA
				W	8	NA	300	300	350	300	NA	NA	NA	NA
Himachal Pradesh	Mandi	Mandi	Feb, 20	M	8	450	330	330	330	330	330	430	430	300
				W	8	NA	330	330	330	330	330	NA	NA	NA
Kerala	Kozhikode	Koduvally	Aug, 19	M	4-8	960	850	NA	800	980	NA	900	NA	NA
				W	4-8	NA	NA	650	650	700	NA	NA	NA	NA
	Palakkad	Elappally	Aug, 19	M	4-8	NA	600	NA	600	700	NA	750	NA	NA
				W	4-8	NA	NA	300	300	300	NA	NA	NA	NA
Madhya Pradesh	Hoshangabad	Sangarkhera	April, 20	M	8	250	NA	200	200	250	150	400	400	NA
				W	8	NA	NA	200	200	200	NA	NA	NA	NA
	Satna	Kotar	April, 20	M	8	300	300	300	300	300	300	500	500	500
				W	8	NA	300	300	300	300	300	NA	NA	NA
	Shyopurkala	Vijaypur	April, 20	M	8	NA	300	NA	NA	NA	400	NA	NA	NA
				W	8	NA	300	NA	NA	NA	400	NA	NA	NA
Odisha	Bhadrak	Chandbali	Oct, 19	M	8	400	400	400	400	425	300	500	400	350
				W	8	NA	300	300	300	317	250	NA	NA	NA
	Ganjam	Aska	Oct, 19	M	8	300	250	250	300	333	250	500	500	500
				W	8	NA	220	220	250	275	220	NA	NA	NA
Punjab	Ludhiyana	Pakhowal	Jan,20	M	8	450	500	NA	NA	400	NA	480	480	NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rajasthan	Barmer	Kuseep	Jan, 20	M	8	NA	NA	400	NA	NA	500	700	500	NA
				W	8	NA	NA	NA	NA	NA	300	NA	300	NA
	Jalore	Sarnau	Jan, 20	M	8	400	NA	300	300	NA	NA	600	400	NA
				W	8	NA	NA	250	300	NA	NA	NA	350	NA

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

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily WorkingHours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Tamil Nadu*	Thanjavur	Pulvarnatham	April,20	M	8	NA	383	NA	362	413	NA	450	500	NA
				W	8	NA	NA	187	176	195	NA	NA	NA	NA
	Tirunelveli	Malayakulam	April,20	M	8	NA	458	NA	NA	675	NA	NA	500	NA
				W	8	NA	200	206	225	NA	NA	NA	NA	NA
Tripura	State Average		Aug, 19	M	8	331	331	297	276	275	275	350	319	NA
				W	8	NA	331	250	229	225	241	NA	NA	NA
Uttar Pradesh*	Meerut	Ganeshpur	Feb, 20	M	8	300	300	300	300	300	NA	500	NA	NA
				W	8	NA	250	250	250	250	NA	NA	NA	NA
	Aurraiya	Aurraiya	Feb, 20	M	8	NA	NA	300	NA	300	NA	500	NA	.NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chandauli	Chandauli	Feb, 20	M	8	300	NA	NA	NA	300	NA	500	NA	NA
				W	8	NA	250	250	250	250	NA	NA	NA	NA

M - Man

W - Woman

NA - Not Available

NR – Not Reported

* The State reported district average daily wage 3

Prices

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

Commodity	Variety	Unit	State	Centre	Jun-20	May-20	Jun-19
Wheat	PBW 343	Quintal	Punjab	Amritsar	1940	2200	1855
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	1925	1925	1840
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1890	1930	1891
Jowar	-	Quintal	Maharashtra	Mumbai	3650	3400	3400
Gram	No III	Quintal	Madhya Pradesh	Sehore	3956	3981	3811
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1760	1800	2000
Gram Split	-	Quintal	Bihar	Patna	6050	6150	5940
Gram Split	-	Quintal	Maharashtra	Mumbai	5800	5800	5900
Arhar Split	-	Quintal	Bihar	Patna	8600	8600	7850
Arhar Split	-	Quintal	Maharashtra	Mumbai	8800	9000	7600
Arhar Split	-	Quintal	NCT of Delhi	Delhi	8050	7950	6950
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	8000	9000	7800
Gur	-	Quintal	Maharashtra	Mumbai	4700	4700	4600
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4500	4500	4500
Gur	Balti	Quintal	Uttar Pradesh	Hapur	3000	2900	2800
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	4145	4100	3525
Mustard Seed	Black	Quintal	West Bengal	Raniganj	NA	4400	4300
Mustard Seed	-	Quintal	West Bengal	Kolkata	5150	4850	4300
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	5500	5200	4300
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	5000	4800	4650
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	1900	2100	2500
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	3000	3000	2500
Castor Seed	-	Quintal	Telangana	Hyderabad	NT	NT	5100

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

Commodity	Variety	Unit	State	Centre	Jun-20	May-20	Jun-19
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	10400	10600	10430
Copra	FAQ	Quintal	Kerala	Alleppey	9950	9850	8950
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	7000	7000	6000
Groundnut	-	Quintal	Maharashtra	Mumbai	9500	9300	7600
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1414	1400	1340
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1925	1688	1400
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	2100	2140	1680
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2150	2175	1920
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1465	1455	1445
Castor Oil	-	15 Kg.	Telangana	Hyderabad	NA	NT	1770
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	1840	1840	1800
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	3500	3400	3250
Coconut Oil	-	15 Kg.	Kerala	Cochin	2175	2130	1950
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2225	2200	1875
Groundnut Cake	-	Quintal	Telangana	Hyderabad	NT	NT	3143
Cotton/Kapas	NH 44	Quintal	Andhra pradesh	Nandyal	4600	4600	5900
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	3800	NA	5100
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	4625	NA	4225
Jute Raw	W 5	Quintal	West Bengal	Kolkata	4675	NA	4275
Oranges	-	100 No	NCT of Delhi	Delhi	458	458	667
Oranges	Big	100 No	Tamil Nadu	Chennai	700	620	700
Banana	-	100 No.	NCT of Delhi	Delhi	416	416	417
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	400	400	700

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

Commodity	Variety	Unit	State	Centre	Jun-20	May-20	Jun-19
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	85000	88000	82000
Almonds	-	Quintal	Maharashtra	Mumbai	60000	65000	67000
Walnuts	-	Quintal	Maharashtra	Mumbai	66000	67000	66000
Kishmish	-	Quintal	Maharashtra	Mumbai	21000	21000	25000
Peas Green	-	Quintal	Maharashtra	Mumbai	7000	6000	6000
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	1650	850	1800
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	2000	1500	3000
Cauliflower	-	100 No.	Tamil Nadu	Chennai	2000	1500	3000
Potato	Red	Quintal	Bihar	Patna	1920	1700	1180
Potato	Desi	Quintal	West Bengal	Kolkata	2090	1840	1260
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	4747	3390	3093
Onion	Pole	Quintal	Maharashtra	Nashik	650	600	1100
Turmeric	Nadan	Quintal	Kerala	Cochin	11000	11000	11000
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	12000	12000	11200
Chillies	-	Quintal	Bihar	Patna	13150	13050	9950
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	29000	29000	31000
Ginger	Dry	Quintal	Kerala	Cochin	27000	27000	26000
Cardamom	Major	Quintal	NCT of Delhi	Delhi	131000	134000	120000
Cardamom	Small	Quintal	West Bengal	Kolkata	195000	250000	350000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	5200	5200	5200
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	73300	73300	80000
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	39000	42000	42000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	40200	40000	43000

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

Commodity	Variety	Unit	State	Centre	Jun-20	May-20	Jun-19
Fish	Rohu	Quintal	NCT of Delhi	Delhi	15500	15000	15500
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	35000	35000	45000
Eggs	Madras	1000 No.	West Bengal	Kolkata	3857	3645	4570
Tea	-	Quintal	Bihar	Patna	21950	21950	21350
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	NA	NT	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	7500	7800	7100
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	4800	4800	3850
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13200	NA	13300
Rubber	-	Quintal	Kerala	Kottayam	10500	10500	13000
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	63000	63000	58500

Crop Production

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

State	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Paddy, Jowar, Maize, Tobacco, Groundnut, Mesta And Linseed.	Paddy, Bajra, Ragi, Ground, Sesamum 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.	Paddy, Bajra, Maize, Small Millets, Pulses, Potato and chillies.
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 Milets, 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 Seasamum.
Manipur	Wheat, Potato and Rapeseed & Mustard.	Surgacane 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, Smal Millets, Tobacco And Cotton.	Kharif Paddy, Jowar,Maize, Cotton, Tapioca, Mesta and Ginger.
Tripura	Pulses and Potato.	Til.
Uttar Pradesh	Wheat, Barely, 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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N.S.—No Supply/No Stock.
R. — Revised.
M.C. — Market Closed.
N.R.—Not Reported.
Neg. — Negligible.
Kg. — Kilogram.
Q. — Quintal.
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