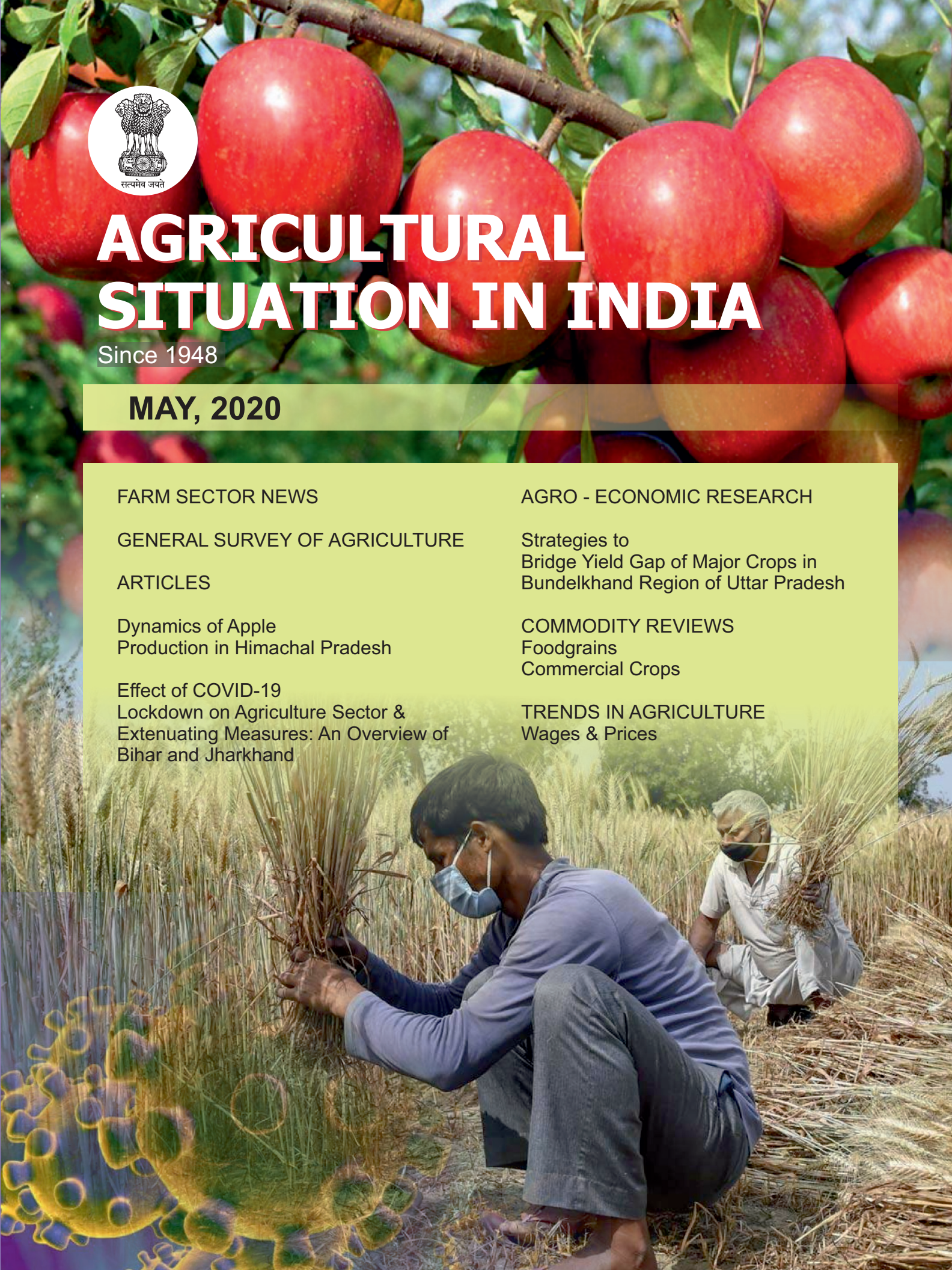

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CONTENTS — PRICES

From Editor's Desk

This issue of 'Agricultural Situation in India' offers our readers an overview of recent agricultural policy initiatives and schemes of the Government in the farm sector, current agricultural outlook; two intriguing research articles, one on dynamics of apple production in Himachal Pradesh; and, second, on the effects of COVID-19 lockdown on agriculture sector & extenuating measures: an overview of Bihar and Jharkhand and an agro-economic research study report on strategies to bridge yield gap of major crops in Bundelkhand region of Uttar Pradesh.

Major farm sector news shared in this issue are; various initiatives of institutions under the agriculture ministry in order to tackle Covid-19 threat, *i.e.,* steps taken for smooth harvesting of the rabi crop and sowing of summer crop, timely review meetings of union minister with states' agricultural ministers on relief steps for farmers amid lockdown, direction for making efforts to take advantage of parcel special trains for perishable commodities, etc.; exemption to shops of agricultural machinery, spare parts & repair, truck repair on highways during lockdown; uninterrupted sowing of summer crops amid coronavirus pandemic; issuance of permits by Central Insecticide Board & Registration Committee for import-export or manufacture of various chemicals; Government's initiatives to resurrect agricultural sector exports in the aftermath of current COVID-19 crisis; review of ICAR's activities during lockdown; inauguration of Pusa decontamination & sanitizing tunnel; and distribution of pulses under PMGKY.

Other important news covered in this issue are: the organization of national conference on kharif crops 2020 and the meeting of G-20 extraordinary agriculture ministers on the issue of COVID-19 impacts on food security, safety and nutrition through video conferencing; extension of relaxation of mandatory requirement of Aadhaar seeding of data of beneficiaries of PM-KISAN in some hilly states; an updated status of several measures of Government of India to facilitate the farmers and farming activities at field level; technological interventions by the Government, *i.e.,* introduction of improved features of e-Nam to help fight the covid-19 pandemic, launch of "KisanRath" mobile app to facilitate transportation of foodgrains and perishables, launch of All India Agri Transport Call Centre numbers, etc. and call for enhancing technologies amongst farmers through ICAR-KVK network.

So far as the agricultural scenario is concerned, the Wholesale Price Index (WPI) of foodgrains, pulses, cereals, wheat, paddy and vegetables increased by 9.18 percent, 10.63 percent, 8.92 percent, 10.13 percent, 2.62 percent and 24.05 percent, respectively, in March, 2020 as compared to that in March, 2019. The cumulative pre-monsoon season, 2020 rainfall in the country has been 26 percent higher than the long period average during 1st March, 2020 to 1st April, 2020. Current live storage in 123 major water reservoirs in the country was 70.51 BCM as against 44.42 BCM of normal storage based on the average storage of last 10 years.

In academic column's first article, Assistant Professor Chander Mohan Negi analyses the dynamics of apple crop in the Himachal Pradesh from the very inception of the statehood in the early 1970's. Using secondary data for the period 1971-72 to 2017-18, the author estimates compound growth rate and instability index to examine the growth and extent of instability in area, production and yield of apple in Himachal Pradesh and the districts in the state. On the basis of research done, the author concludes that apple production is shifting to high altitude districts, like Kinnaur and Lahul-Spiti, while, production and productivity of apple in the low height districts follow a consistent decline. Hence, author suggests that the Government should build up the basic infrastructure in these districts so that the produce can be transported to the markets in adjoining states. In addition, basic training and extension services should be provided to the apple growers in these districts. Specially, in low altitude districts, new varieties of apple, conducive to the changing weather conditions should be promoted and farmers should be motivated to grow the other off-season vegetables and fruits also.

In the second article, Dr. Rajiv Kumar Sinha and Dr. Bishnu Deo Singh evaluate the effects of lockdown on crop-raising and allied activities in Bihar and Jharkhand states. The research paper estimates loss in the form of areas shrinkage under different summer crops due to lockdown. It briefly expound weather and other constraints faced by farmers & extirpating measures by Government of Bihar and Jharkhand states to take out poor from gloomy period of no economic activity. Using primary data for the period 7th to 12th April, 2020 and secondary data for the period March 24th to May 5th, 2020, collected through online survey and state level daily newspapers, respectively, the study gives a clear manifestation that steps taken by the Government of Bihar (*i.e.,* support through MSP Procurement; farm inputs, like seed, plants, chemicals, Plant Preservative Mixture (PPMs), etc., made available through Krishi Vigyan Kendra (KVKs); employment provided to migrated labourers in agriculture sector; input subsidies; etc.) are remarkable for poor people of state. While, the government of Jharkhand has taken steps to make available foodgrains free of cost/or at lower prices to the people holding priority (PHH) & Antyodaya (AAY) categories of National Food Security Act (NFSA) ration cards. In addition, both types of card holders will be provided 5 kgs of grains free of cost. It reveals genuine concerns of the state government for the poor people of Jharkhand. The author suggests that the government should concentrate on determining and chalking out short, medium and long-term inclusive and contingent plans for sustaining, developing and strengthening agriculture and all its allied activities. Emphasis should also be given on confiding and working sincerely on the already devised and determined seven point's strategy of doubling farmers' income (DFI) by the year 2022 which will enable Indian economy to come out of this havoc of COVID-19 and its impacts on agriculture sector.

Agro-Economic Research shared in this issue is a report on strategies to bridge yield gap of major crops in Bundelkhand region of Uttar Pradesh prepared by Agro-Economic Research Centre, University of Allahabad, Prayagraj. The primary objective of the report is to analyze the yield gap of major crops grown by the cultivators of different sizes of farms; to identify the factors affecting the productivity of crops, along with various socio-economic, technological constraints and its possible policy implications. To realize these objectives, primary data using a multi stage stratified random sampling was collected pertaining to the year 2018-19. On the basis of major findings, the study suggests to enhance awareness on soil testing; provide information to farmers for enhancing aggregate production; and to impart training and field trials for proper seed treatment, source of seed, varietal improvement, soil health card (SHC) based recommendations in adopting cropping schemes and the need based fertilizer (Urea/DAP) application.

P. C. Bodh

Farm Sector News*

Institutions under the Agriculture Ministry regularly helping to tackle COVID-19 threat

On the appeal of the Prime Minister Shri Narendra Modi, the National Cooperative Development Corporation (NCDC) and Indian Potash Limited have jointly contributed a sum of Rs. 11 crore towards the PM CARES Fund in order to tackle the COVID-19 threat. NCDC Managing Director, Shri Sundeep Kumar Nayak, presented a cheque of Rs. 11 crore to the Union Minister for Agriculture &Farmers Welfare, Rural Development and Panchayati Raj, Shri Narendra Singh Tomar on 1st April, 2020.

NCDC extends financial assistance to villagers through the cooperatives. In the last financial year, it has extended loans to farmers and rural population to the tune of Rs. 30,000 crore.

Companies and Institutions under the Ministry of Agriculture & Farmers Welfare have been making contributions in crores of Rupees to Shri Tomar towards the PM CARES Fund.

The Minister has himself contributed Rs. 1 crore from the MPLADS Fund and one month of his salary. Besides, he has contributed Rs. 50 lakh for related works in his constituency, Morena-Sheopur.

New features of e-NAM are important steps in our fight against COVID-19

The Union Minister of Agriculture & Farmers Welfare, Rural Development and Panchayati Raj, Shri Narendra Singh Tomar, here on 2nd April, 2020, launched new features of National Agriculture Market (e-NAM) platform to strengthen agriculture marketing by farmers which would reduce their need to physically come to wholesale mandis for selling their harvested produce, at a time when there is critical need to decongest mandis to effectively fight against COVID-19. These software modules are namely (i) Warehouse based trading module in e-NAM software to facilitate trade from warehouses based on e-NWR (ii) FPO trading module in e-NAM whereby FPOs can trade their produce from their collection centre without bringing the produce to Agricultural Produce Market Committee (APMC). In addition to facilitate inter-mandi and inter-state trade at this juncture, enhanced version of logistic module has been released whereby aggregators of transport logistic platform have on boarded which helps users to avail trackable transport facilities for transporting their produce.

Speaking on the occasion, Shri Narendra Singh Tomar reiterated that e-NAM was launched on 14th April, 2016 as a pan-India electronic trade portal linking APMCs across the States. Already 585 mandis in 16 States and 02 Union Territories have been integrated on e-NAM portal. He also said that e-NAM would be soon expanded to cover additional 415 mandis, which would take the total number of e-NAM mandis to 1,000. Further, he said e-NAM provides contactless remote bidding and mobile-based any time payment for which traders do not need tovisit either mandis or banks for the same. This helps improve social distancing and safety in the APMC markets to fight against COVID-19. He further added that these new features are being launched as important steps towards our fight against COVID-19, to help farmers at this juncture to effectively sell their produce at better prices from near to their farm gate thus helping them at this time.

The minister said that the mandis play a critical role in maintaining the supply chain of grains, fruits & vegetables. e-NAM is well poised to play a critical role during the period of COVID-19 to decongest mandis while helping the farmers at same time. For this purpose following three modules have been launched for enhancing the effectiveness of e-NAM.

1. Launch of Negotiable Warehouse Receipt (e-NWRs) module in National Agriculture Market (e-NAM) software

i. Warehouse (Registered with WDRA) trading module with payment feature was launched to enable small & marginal famers to directly trade their stored produce from selected WDRA registered warehouses which are declared deemed market by the State.

ii. Farmers would be able to place their produce in WDRA accredited warehouses.

*Source: www.pib.nic.in

iii. Already States of Telangana (14 warehouses) & Andhra Pradesh (23 warehouses) declared designated warehouses in the State as deemed market.

Benefits of eNWRs integration with e-NAM

i. Depositor can save the logistics expenses and would have better income.

ii. Farmers can sell the produce across the nation to get better price and at the same time can save himself from hassle of mandi.

iii. Farmers would be able to place their produce in WDRA accredited warehouses to avail the benefit of pledge loan if required.

iv. Price stabilization by matching supply and demand through time and place utility.

2. FPO trading module

i. FPO trading module was launched to enable FPOs to upload their produce from their premise/collection centres for bidding. They can upload the picture of the produce and quality parameters from their premises to help distant bidders to visualise the produce before bidding. FPOs have the option for delivery of produce either from their premises or by bringing to mandi premise after successful bidding. This will not only decongest the mandis but also reduce the logistics cost for the FPOs.

ii. Facility provided to FPO to upload assaying report / photo of their produce from their premise to enable traders to visualise the produce before bidding.

Benefits

i. This would not only decongest the mandis but also reduce the hassle of FPOs to deal with mandis.

ii. This would help FPOs by reducing transaction costs (transportation) and enhancing their bargaining power.

iii. Facilitates FPOs to avail online payment facility with ease of doing business

3. Launch of Logistic Module

i. Presently, e-NAM provides a database of individual transporters to the traders. However, as a quantum response to logistic need by traders, provision has been made for linking large logistic aggregator platforms, which would provide choices to users. Traders would be able to use the link to navigate to the logistics provider's website and select appropriate services. With these additions, more than 3,75,000 number of trucks from large logistic providers would be added for logistic purpose.

Benefits

i. This would help in seamless transportation of agricultural produce.

ii. This would promote inter-state trade under e-NAM by providing online transport facilities for distant buyers.

Shri Tomar further added that these programs would help farmers to sell their produce at remunerative prices near to their farm gate without coming to mandis. He added further that mandis have been advised to adopt utmost sanitary and social distancing measures for the safety of farmers and other stakeholders. States are also being encouraged to facilitate direct buying by bulk buyers/processors and big retailers without going through mandis to decongest them.

Steps taken by the Department of Agriculture Cooperation and Farmers Welfare for smooth harvesting of rabi crop and sowing of summer crop

For ensuring that the farmers do not suffer from any adverse fall out during the lockdown period, the Department of Agriculture Cooperation and Farmers Welfare, Government of India is taking several measures for smooth harvesting of rabi crop and sowing of summer crop.

Video conference was conducted with all states and insurance companies to review the payment of claims, status of conduct of Crop Cutting Experiments (CCEs) for Rabi 2019-20 crops, crop loss survey and implementation of Smart Sampling Technique.

For facilitating farm insurance, letters issued

to all states to issue passes to representatives of concerned insurance companies for co-witnessing CCEs and to relax the norms for conducting field level survey for intimation received for post-harvest crop losses due to unseasonal rainfall and hailstorm.

Phytosanitary Certification (PSC) for export consignments and import releases of plant and plant products are continuing. From the date of lockdown, *i.e.*, 24th March, 2020 to 2nd April, 2020, a total of 3776 PSCs have been issued for export consignments and 1074 import consignments have been released.

For providing support to horticulture crops necessary coordination is being done with growers, aggregators, wholesalers, mandi associations, state horticulture missions, for smooth transport of the commodities and to sort out all difficulties.

In lockdown period, Kisan Call Centres (KCC) at all 21 locations are being operated by diverting calls to individual mobile numbers of Farm Tele Advisors, who are now operating from homes. All 454 KCC seats are being operated daily between 6 AM to 10 PM. Call flow is about 15,000 to 20,000 per day.

Shops of agricultural machinery, spare parts & repair, truck repair shops on highways exempted

The Union Government has granted a slew of exemptions and relaxations for agriculture and allied sectors with respect to the 21-day lockdown over the COVID-19 pandemic outbreak so as to ensure that the farmers do not suffer from any adverse fall out. In this regard, the Union Ministry of Home Affairs has issued the fourth addendum to its notification invoking the Disaster Management Act.

As per the addendum, shops of agricultural machinery, its spare parts (including its supply chain) & repairs and shops for truck repairs on highways, preferably at fuel pumps, can remain open in order to facilitate transportation of farm produce. Besides this, tea industry including plantations can function with maximum of 50% workers.

The Home Ministry has underlined that the head of the organization/establishment would ensure the practice of social distancing norms and proper hygiene. The district authorities have been directed to ensure strict enforcement of the orders.

Shri Narendra Singh Tomar chairs meeting with State Agriculture Ministers to review relief steps for farmers

The Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar held a meeting with the states through video conferencing on 8th April, 2020. The crucial issues related to farming operations and harvesting, agriculture marketing and Mandi operations, procurement at MSP, provision of inputs (seeds and fertilizers) and issues related to logistics and movement of agriculture/ horticulture produce were discussed in the interaction held through video conference with Agriculture Ministers of the States, Secretaries and other senior officers of the states.

The Union Minister appreciated the efforts of states for their proactive role in undertaking agriculture activities even during the challenging time in wake of COVID-19 pandemic. He talked about the measures taken by the Ministry to facilitate the activities related to agriculture and allied sector during the lockdown period. Also, the exemptions notified by the Government of India for agricultural operations in view of harvesting and sowing season were discussed in length. The states were again informed about the various exemptions which were as follows:

i. Agencies engaged in procurement of agriculture products, including MSP operations;

ii. Farming operations by farmers and farm workers in the field;

iii. 'Mandis' operated by the Agriculture Produce Market Committee or as notified by the State Government;

iv. 'Mandis' include direct marketing, facilitated by the State Government/UT Administration, directly from the farmers/groups of farmers, FPOs, Cooperatives, etc.;

v. Shops for seeds, fertilisers and pesticides;

vi. Manufacturing and packaging units of seeds, fertilisers and pesticides;

vii. Custom Hiring Centres (CHC) related to farm machinery;

viii. Intra and inter-state movement of harvesting and sowing related machines like combined harvester and other agriculture/ horticulture implements;

ix. Cold storage and warehousing services;

x. Manufacturing units of packaging material for food items;

xi. Transportation for essential goods;

xii. Shops of agriculture machinery, its spare parts (including its supply chain) and repairs.

xiii. Tea industry, including plantation with maximum of 50% workers.

A presentation was made and states were requested for the following:

i. To sensitize their field agencies for facilitating smooth farming operations including sowing, harvesting and marketing.

ii. To ensure expeditious permission for movement of staff, labour, goods, machines and materials of agencies engaged in these exempted categories of activities.

iii. To issue authorization letters to companies/ organizations having nation-wide supply chain of essential goods, allowing them to issue regional passes for easy movement of critical staff and workers in order to maintain their national supply chain.

iv. While undertaking these activities the norms of 'social distancing' should be followed and proper hygiene and sanitation should be ensured at all public places.

Overcoming lockdown restrictions, sowing of Summer Crops continued uninterrupted

Sowing of the summer crops has progressed satisfactorily despite the difficulties experienced due to the outbreak of the corona virus pandemic and the 21-day lockdown effective since 24th March midnight to fight the COVID-19 disease. Statistics compiled by the Department of Agriculture, Cooperation and Farmers Welfare as on 10th April, 2020 reveal that the total area under the summer crops (including rice, pulses, coarse cereals and oil seeds) cultivation has jumped significantly, registering 11.64 lakh hectare increase over last year, overcoming the restrictions and social distancing norms witnessed since last month, particularly after the lockdown w.e.f. 25th March, 2020. As against a total cultivated area of 37.12 lakh hectare in the year 2018-19, the summer crops have been sown in an area of 48.76 lakh hectare this year, 2019-20. The normal area of corresponding week in the last year was 41.81 lakh hectare as on 10th April.

Among the summer crops, the main driver of this growth in cultivable area is rice, clocking a robust 8.77 lakh hectare increase in sown area. All other crops have registered increase in sown area below 1 lakh hectare, barring ragi coarse cereal which has registered a marginal decline of 0.06 lakh hectare over the last year. About 32.58 lakh hectare area coverage under summer rice has been reported compared to 23.81 lakh hectare during the corresponding period of last year. The area has been reported mainly from the States of West Bengal (11.25 lakh hectare), Telangana (7.45 lakh hectare), Odisha (3.13 lakh hectare), Assam (2.73 lakh hectare), Karnataka (1.64 lakh hectare), Chhattisgarh (1.50 lakh hectare), Tamil Nadu (1.30 lakh hectare), Bihar (1.22 lakh hectare), Maharashtra (0.65 lakh hectare), Madhya Pradesh (0.59 lakh hectare), Gujarat (0.54 lakh hectare) and Kerala (0.46 lakh hectare).

As regards Pulses, about 3.97 lakh hectare area

coverage has been reported compared to 3.01 lakh hectare during the corresponding period of last year. The area has been reported mainly from the States of Tamil Nadu (1.46 lakh hectare), Uttar Pradesh (0.73 lakh hectare), West Bengal (0.59 lakh hectare), Gujarat (0.51 lakh hectare), Chhattisgarh (0.24 lakh hectare), Bihar (0.18 lakh hectare), Karnataka (0.08 lakh hectare), Punjab (0.05 lakh hectare), Maharashtra (0.04 lakh hectare), Madhya Pradesh (0.03 lakh hectare), Jharkhand (0.03 lakh hectare), Telangana (0.02 lakh hectare) and Uttarakhand (0.01 lakh hectare).

Among coarse cereals, about 5.54 lakh hectare area coverage has been reported compared to 4.33 lakh hectare during the corresponding period of last year. The area has been reported mainly from the States of Gujarat (2.27 lakh hectare), West Bengal (1.21 lakh hectare), Maharashtra (0.63 lakh hectare), Bihar (0.41 lakh hectare), Karnataka (0.39 lakh hectare), Chhattisgarh (0.29 lakh hectare), Tamil Nadu (0.26 lakh hectare), Madhya Pradesh (0.08 lakh hectare) and Jharkhand (0.01 lakh hectare).

While among Oilseeds, about 6.66 lakh hectare sown area has been reported as compared to 5.97 lakh hectare during the corresponding period of last year. The area has been reported mainly from the States of West Bengal (1.33 lakh hectare), Karnataka (1.30 lakh hectare), Gujarat (1.09 lakh hectare), Odisha (0.62 lakh hectare), Maharashtra (0.58 lakh hectare), Tamil Nadu (0.53 lakh hectare), Andhra Pradesh (0.41 lakh hectare), Uttar Pradesh (0.28 lakh hectare), Telangana (0.21 lakh hectare), Chhattisgarh (0.18 lakh hectare), Haryana (0.06 lakh hectare), Punjab (0.04 lakh hectare), Bihar (0.03 lakh hectare) and Madhya Pradesh (0.02 lakh hectare).

Department of Agriculture, Cooperation and Farmers Welfare asks Mission Directors of Horticulture and Concerned Secretaries of States/UTs to mobilize all their resources to take advantage of parcel special trains

Indian Railways has identified 67 routes (134 trains) for parcel special trains since the start of the lockdown for perishable commodities including fruits, vegetables, milk and dairy products and seeds for agriculture purpose.

Till 10th April, 62 routes have been notified and 171 time tabled trains are being run on these routes. The parcel specials have been planned to connect all the major cities of the country, *viz.*, Delhi, Mumbai, Kolkata, Chennai, Hyderabad, and Bengaluru. In addition, proper connectivity has also been ensured to Guwahati, to ensure supplies in the north-eastern region of the country. Other important cities connected via these trains are Bhopal, Allahabad, Dehradun, Varanasi, Ahmedabad, Vadodara, Ranchi, Gorakhpur, Thiruvananthapuram, Salem, Warangal, Vijayawada, Vishakhapatanam, Rourkela, Bilaspur, Bhusawal, Tatanagar, Jaipur, Jhansi, Agra, Nasik, Nagpur, Akola, Jalgaon, Surat, Pune, Raipur, Patna, Asansol, Kanpur, Jaipur, Bikaner, Ajmer, Gwalior, Mathura, Nellore, Jabalpur, etc.

Trains are being run even on those routes where demand is less, so that no part of the country remains unconnected. Trains have been given en-route stoppages at all feasible locations, so that maximum possible clearance of parcels may be done.

A video conference (VC) has been organized with Secretaries and Mission Directors of Horticulture of all State/ UTs regarding availability of special trains for transport of perishable commodities including fruits, vegetables, milk and dairy products and seeds for agriculture purpose. The VC was attended by 76 officers from all over the country and addressed by Additional Secretary, DAC&FW, Additional Member (Commercial) Railway Board, EDs of Railway Board and CONCOR, SFAC, NHB and majority of senior officers of department.

All the State Mission Directors and Concerned Secretaries of States/UTs were requested to mobilize all their resources to take advantage of these trains being run by Railways.

Additional Member (Commercial) Railway Board has offered that if they receive any demand from states regarding new routes or stoppage, they would immediately take necessary action to do needful.

CIB&RC issued 33 Nos. of Import Permits for more than 1.25 lakh MTs of various chemicals using CROP software during the Lockdown period

During the lockdown period, the efforts have been made to use CROP software of Sectt. of Central Insecticide Board & Registration Committee (CIB&RC) through Virtual Private Network (VPN) to facilitate issuance of certificates, etc., through work from home by the experts/ officials. This endeavour has contributed significantly in the issuance of certificate of

registration related to indigenous manufacturing and import of chemicals/intermediates/raw materials, etc., required for smooth functioning of industrial units/plant, etc., involved in the production of crop protection chemicals and thereby ensuring the timely availability of the pesticides and crop protection chemicals to the famers.

During the period till 11th April, 2020, CIB&RC have issued 33 Nos. of import permits for import of more than 1.25 lakh metric tons of various chemicals. 189 certificates for exports have also been issued to facilitate exports of pesticides. 1263 certificates of registration have been issued in various categories to facilitate indigenous manufacturing of pesticides.

National Agriculture Market portal e-NAM Completed four years on 14th April, 2020; helped in realizing the vision of "One Nation, One Market" for Agri-produce

The pan-India Agriculture trading portal e-NAM had completed four years of implementation on 14th April, 2020. On this occasion, Union Minister for Agriculture, Cooperation and Farmers Welfare Shri Narendra Singh Tomar said that e-NAM was an innovative initiative in agricultural marketing to enhance farmers accessibility digitally to multiple number of markets & buyers and to bring transparency in trade transactions with the intent to improve price discovery mechanism, quality commensurate price realization and also to develop the concept of One Nation One Market for agriculture produce. Keeping in view the need of making marketing of commodities easier for farmers, e-NAM was envisioned and launched by Prime Minster in 21 mandis on 14th April, 2016 which has now reached 585 mandis across 16 States and 02 UTs.

He also said that e-NAM is being expanded to cover additional 415 mandis which will take the total number of e-NAM mandis to 1000 soon. He also added that this online platform will prove to be a giant leap in reforming the agriculture market in India.

He further said that we have more than 1.66 crore farmers and 1.28 Lakh traders registered on e-NAM platform. Farmers are free to register on e-NAM portal and they are uploading their produce for sale online to the traders across all e-NAM mandis and traders can bid for the lots available for sale on e-NAM from any location.

In order to debottleneck Logistics of Agri Produce and providing adequate and timely transportation facility to the farmers/traders during lockdown period, e-NAM platform has created an Interface with large transport aggregators like Blackbuck, Rivigo, Mavyn, Truck Suvidha, Truck Guru, Transin Logistics, Elastic Run, etc. This would help traders to find and arrange timely movement of produces from mandi to various other locations. With this interface, Traders would be able to access more than 7.76 lakh trucks through eNAM Platform.

Union Minister for Agriculture said that during this current COVID-19 lockdown, Ministry has initiated several steps to decongest wholesale markets & to make supply chain agile that includes recently launched modules under e-NAM namely:

Warehouse based trading module enabling farmers to sell their produce from WDRA registered warehouses notified as deemed market &FPO trading module, enabling FPOs to upload produce from collection centers with picture/ quality parameter and also avail bidding facility without going to mandis, which will reduce their logistic costs and hassle to sell their produce. Shri Tomar said that these efforts will provide relief to farmer/ FPOs/ Cooperatives during the COVID-19 lockdown.

On this occasion, Secretary, Department of Agriculture Cooperation & Farmer's Welfare, Shri Sanjay Agarwal said that e-NAM is not just a scheme but it's a journey which aims to benefit the last mile farmer and transform the way they sell their agricultural produce. This intervention brings immense benefits to our farmers in augmenting their incomes by enabling them to realize competitive & remunerative prices in a transparent manner without incurring additional costs.

The online and transparent bidding system is encouraging farmers to increasingly trade on e-NAM platform. Total trade volume of 3.39 Crore metric tonnes of bulk commodities & 37 Lakh numbers of Bamboo & Coconut worth approximately Rs. One Lakh crore has been recorded on e-NAM platform. The compound average growth rate (CAGR) in the last four years has been an impressive 28% & 18% in value and volume terms respectively.

Average number of bids per lot across India has increased from 2 bid per lot in 2016-17 to nearly 4 bid per lot in 2019-20. During peak harvest season,

in some of the Mandis like Adoni, Andhra Pradesh -primarily cotton market has seen more than 15 bids/lot, helping Farmers to get more buyers in a transparent and competitive way.

Initially started with 25 commodities, e-trade facilities provided on 150 commodities with tradable parameters on e-NAM portal. Quality assaying testing facilities is being provided in e-NAM mandis which helps famers in getting prices commensurate with quality of their produce. No. of lots assayed has increased from 01 lakh in 2016-17 to nearly 37 lakh lots in 2019-20.

e-NAM platform/ mobile app. has been further strengthened with "Farmers friendly" features such as advance registration of the lot through app which in turn will reduce waiting time for farmers at gate entry of the mandi and will bring huge efficiency and will facilitate smooth arrival recording at Gate, farmers can now see the assaying report. On The Go (OTG), farmers can see the progress of bids for their lot being traded, through mobile and farmers can also get the real time information on prices in nearby mandis. Electronic weighing scales have been provided to accurately weigh the commodities of farmers after bidding on e-NAM platform to bring transparency in weighing, payment to farmers by traders now can be done through mobile phone using BHIM payment facility.

For traders the additional OTG (On the Go) features have been added such as buyers bidding from anywhere even without physically present in the mandi, e-NAM shopping cart facility in trader login, single e-payment transaction features for multiple invoices/ bunching of multiple invoices, automatic discount/ rebate on e-Payment/ discount to traders during e-payment, online registration for unified trading license, etc., to name a few. To build confidence among the traders for assaying, the Department has launched new features related to assaying like:

- 360 degree image capturing of the commodity heap through e-NAM mobile app,
- Assayer can upload 2/3 2D image of laboratory with equipment and
- Also upload 2D image of commodity sampling process for the lot for better confidence of trader on e-NAM.

In order to enhance the e-NAM ecosystem & to build up direct link between traders &farmers, 977 Farmer Producer Organizations from 16 States have been on-boarded on e-NAM platform.

States like Jharkhand has initiated farm gate trading through National Agriculture Market (e-NAM) platform whereby farmers are uploading the details of their produce along with picture for online bidding without reaching to the APMC. Similarly, FPOs are also uploading their produce from their collection centres for trading under e-NAM.

The platform has seen a pick-up in inter-mandi trade both within and, more recently, between states. So far, 13 States/ UT have participated in inter-state trade (Uttar Pradesh, Uttarakhand, Andhra Pradesh, Telangana, Rajasthan, Gujarat, Maharashtra, Madhya Pradesh, Chandigarh, Himachal Pradesh, Haryana, Jharkhand& Tamil Nadu). Inter-state trade has been recorded in 20 commodities (which include vegetables, pulses, cereals, oilseeds, spices, etc.)

Government initiates dialogue to resurrect agricultural sector exports in the aftermath of current COVID-19 crisis

Government had initiated a dialogue with the exporters of agri. and allied commodities to address issues affecting the sector as a fall out of the lockdown to check the COVID-19 disease. Shri Narendra Singh Tomar, the Union Minister of Agriculture and Farmers Welfare, Shri Sanjay Agarwal, the Secretary, Department of Agriculture, Cooperation & Farmers Welfare, held a video conference on 13th April, 2020 to gain a first-hand account of the problems faced by the exporters of agri and allied commodities and initiate necessary steps by making meaningful interventions for early redressal of their problems to help them sustain though the current COVID-19 crisis. Exporters, representatives of associations of producers/exporters of agri-commodities namely, fruits, vegetables, basmati and non-basmati Rice, seeds, flowers, plants, organic produce, agriculture equipment and machinery participated in the meeting.

Several common and sector specific issues were raised by the participants. The common issues highlighted by exporters of all agricultural commodities related to availability and movement of labour, inter-state transport bottlenecks, shortage of raw materials due to closure of mandis, phytosanitary

certification, closure of courier services thereby hampering movement of shipping documents, availability of freight services, access to ports/yards and clearance of goods for imports/exports.

The representatives of industries relating to food processing, spices, cashew nuts and machine & equipment (M&E) sectors requested permission to open/operate at least on 25-30% strength and offered to commit their industries to proper health advisory in their functioning.

The issue of internal transport is being addressed by the Ministry of Home Affairs and necessary directives were issued. Instructions were also issued for continuous/regular issuance of phytosanitary certificates and acceptance of online certificates.

Shri Agarwal said the issues pertaining to port, ocean freight services, courier services would be considered for necessary resolution. The request of industry to open functioning and sector specific issues would be taken up with the Minister, Shri Narendra Singh Tomar and resolved appropriately, he assured.

India is a net exporter of agricultural & allied commodities. India's agricultural and allied exports during 2018-19 were Rs. 2.73 lakh crores and this sector has always been positive in balance of trade. Export is very important as besides earning precious foreign exchange for the country, the agricultural exports help farmers/producers/exporters to take advantage of wider international market and increase their income. Exports have also resulted in increased production in agriculture sector by increasing area coverage and productivity.

Agriculture Minister Shri Narendra Singh Tomar reviews ICAR activities during lockdown

The Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar reviewed activities of the Indian Council of Agricultural Research (ICAR) in helping farmers overcome the problems arising due to the outbreak of COVID-19 and the nationwide lockdown to check the spread of the pandemic. While three ICAR institutes are engaged in COVID-19 testing on humans, ICAR has undertaken several efforts to help farmers during lockdown and given advisories to crores of farmers across the country. Shri Tomar directed all Agricultural Universities to conduct online classes.

During the review meeting, ,Dr. Trilochan Mohapatra, Director General, ICAR informed that the ICAR has issued national and state-specific advisory for farmers, translated into 15 regional languages and widely communicated through digital platforms adequately informing the farmers about the exemptions granted to farming related activities during lockdown and important agricultural operations to be carried out following all precautions.

On the directions of the Agriculture Minister, Shri Narendra Singh Tomar, more than 5.48 crore farmers have already been reached through the issue of 1,126 advisories across the states by Krishi Vigyan Kendras (KVKs) through mKisan portal. Dissemination of advisory was also made through WhatsApp groups (4893 KVK WhatsApp groups covering 5.75 lakh farmers) and other digital platforms (reaching 8.06 lakh farmers). 936 news items on advisories issued by KVKs appeared in newspapers; messages were disseminated through broadcast of 193 radio talks and 57 TV programmes.

Research institutes used ICT tools including Expert Systems and Mobile Apps, and provided advisories on appropriate crop management technologies in wheat, rice, maize, pulses, millets, oilseeds, sugarcane, fibre crops, mango, citrus, banana, pomegranate, grapes, litchi, spices, flowers, vegetables, melons and plantation crops such as coconut, arecanut, cocoa and tuber crops.

Advisories to various stakeholders and technologies for processing, value addition and marketing of flower, vegetables and fruit produce have been extended to entrepreneurs, private firms and state governments.

Fisheries Research Institutes under ICAR prepared information, education and communication materials in fisheries production for dissemination to various stakeholders engaged in fisheries. Dairy, livestock and poultry research institutes of ICAR are creating awareness regarding feeding, breeding and health care of animals as well as minimum processing of milk, eggs and chicken for boosting immunity to fight corona virus.

On the advice of Shri Tomar, the ICAR issued advisory to all vice-chancellors of Agricultural Universities for taking classes through online mode and most of them are doing so using online tools. ICAR has notified three of its research

institutes; NIHSAD, Bhopal, IVRI, Izatnagar, and NRC on Equines, Hisar for COVID-19 testing in humans. These institutes have also been designated for COVID testing of samples from zoo animals by the Ministry of Environment and Forests. The NIHSAD, Bhopal has tested 23 suspected COVID-19 samples and all of them were found negative. Dr. Mohapatra said the ICAR would commission studies in climate change, virology and other diseases and undertake research on the transmission of virus from animals and birds in zoos and in the nature to humans and vice versa and whether crops can help fight such challenges.

ICAR institutes and KVKs have prominently disseminated the message for use of Aarogya Setu mobile application to fight COVID-19 pandemic. As a result, 25.04 lakh farmers have been reached of which 2.92 lakh farmers have already downloaded the application for their use.

On the directions of Shri Tomar, the ICAR has provided its Guest Houses at various establishments across the country for setting up quarantine facilities besides providing RT-PCR equipment and operating staff for COVID-19 investigation. Dr. Mohapatra said the ICAR is also extending help to affected poor people by providing free food while the DARE/ICAR family has contributed about Rs. 6.06 crores to the PM-CARES Fund.

Agriculture Minister Shri Narendra Singh Tomar launches All India Agri Transport Call Centre numbers 18001804200 and 14488 to facilitate inter-state movement of perishables during lockdown

The Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar launched the All India Agri Transport Call Centre at a function in Krishi Bhavan on 15th April, 2020, to facilitate inter-state movement of perishables in the current situation of lockdown due to the COVID-19 threat. The Call Centre numbers are 18001804200 and 14488. These numbers can be called from any mobile or landline phones any time of the day or night.

The 24x7 service All India Agri Transport Call Centre is an initiative of the Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW), Government of India for coordination between states for inter-state movement of perishables - vegetables &fruits, agri inputs like seeds, pesticides and fertilizer, etc.

Truck drivers and helpers, traders, retailers, farmers, manufacturers or any other stakeholder who is facing problems in inter-state movement of agricultural, horticultural or any other perishable commodities besides seeds and fertilizers may seek help by calling at the call centre. Call centre executives would forward the vehicle & consignment details along with the help needed, to state government officials for resolution of issues.

Operated by the IFFCO Kisan Sanchar Limited (IKSL) from their offices in Faridabad, Haryana, the Call Centre lines would initially be manned by 10 customer executives round the clock in 3 shifts of 8 hour each. The Call Centre service may be escalated to full capacity of 20 seats based on requirements. The Call Centre executives would also maintain records and verify the disposal of problem as the case may be.

The Ministers of State (Agriculture and Farmers Welfare) Shri Parshottam Rupala and Shri Kailash Choudhary, Secretary (AC&FW), Shri Sanjay Agarwal, and senior officers of the Ministry were present during the launch function of the All India Agri Transport Call Centre. The 24x7 Call Centre service is part of several measures undertaken by the DAC&FW to facilitate the farmers and farming activities at field level during the lockdown period.

Union Agriculture Minister chairs the National Conference on Kharif crops 2020 through video conference

The Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar has said that all states should aim to achieve the kharif target and doubling of farmers' income should be taken up in mission mode. Addressing the national conference on Kharif crops 2020 through video conference, he assured the States that the Government of India would remove any obstacles that the States are facing.

The main aim of the national kharif conference was to discuss various issues and list out steps in consultation with the States about preparedness for Kharif cultivation in view of the lockdown situation.

Shri Tomar said that the extraordinary situation due to the Coronavirus has to be met with a fighting spirit by the agriculture sector and everyone has to rise to the occasion and perform. He said that the

Prime Minister Shri Narendra Modi has ensured that "Goan, Garib aur Kisan" (Village, Poor and Farmers) do not suffer during this crisis. Shri Tomar urged the states that the two schemes, - PM Fasal BimaYojana and Soil Health Card scheme, should be explained to each farmer.

The Minister informed the states that the All India Agri Transport Call Centre has been started to ensure that agriculture is not affected due to the lockdown. He also asked them to use e-NAM extensively. Shri Tomar called upon the states to implement the Union Home Ministry exemptions and relaxations for agriculture sector while ensuring social distancing and social responsibility norms.

The target of foodgrains production for the year 2020-21 has been fixed at 298.0 million tonnes. During the FY 2019-20, against the foodgrain production target of 291.10 million tonnes, higher production of about 292 million tonnes is anticipated mainly due to enhancement of area coverage and productivity of various crops.

The Minister of State for Agriculture, Shri Parshottam Rupala, while addressing participants of National Conference, said that benefits of the PM Fasal BimaYojana should be explained to the farmers. Shri Rupala said that agriculture and horticulture sector in our country has become a key driving element for economic development in many states. Besides having record foodgrains production last year (2018-19), country has also produced about 313.85 million metric tonnes of horticulture produce from an area of about 25.49 million hectare, which accounts for about 13 percent of the total world production of fruits. India is the second largest producer of vegetables, after China, he said.

In his address, the Minister of State for Agriculture, Shri Kailash Choudhary said that in the present situation of climatic change along with change in rainfall pattern, achieving record foodgrains production of about 285 million tonnes in 2018-19 which is further likely to increase to 292 million tonnes during 2019-20 is remarkable. All these were possible due to various technological advancements including varietal improvement as well as dedicated and coordinated efforts of Central and State Governments, he said.

Shri Sanjay Aggarwal, Secretary (Agriculture, Cooperation and Farmers Welfare), in his concluding remarks, said that although our country has become food surplus, but still we have to accelerate the production and productivity of agriculture and horticulture sectors for ensuring food and nutritional security in the rural areas. He apprised the participants about major new initiatives taken by the Ministry for increasing production of crops and income of the farmers like intensification of "Per Drop More Crop" under flagship Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) by promotion of drip and sprinkler irrigation systems for improving water and fertilizer use efficiency, Paramparagat Krishi Vikas Yojana (PKVY), revised farmer friendly "Pradhan Mantri Fasal Bima Yojana (PMFBY)", e-NAM initiative to provide farmers an electronic online trading platform, intensification of Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) Yojana, introduction of central sector scheme of Pradhan Mantri Kisan Pension Yojana (PM-KPY), launching of PM-AASHA scheme to ensure MSP to farmers for oilseeds, pulses and crops, and Minimum Support Price (MSP) at a level of at least two times the cost of production along with various provisions for direct marketing in view of COVID-19 and advisory/ guidelines for agriculture management in the event of lockdown to ensure better economic return to the farmers.

Making a detailed presentation on the strategies for crop management in Kharif season especially during the pandemic lockdown, Dr. S. K. Malhotra, Agriculture Commissioner said that cultivable/ agriculture land has reduced by about 2.74 million hectare during the last two decades (1988-89 to 2018-19). However, during the same period the gross cropped area has increased from 182.28 million hectare to 196.50 million hectare, with net area sown remaining largely unchanged at 140 million hectare. He further cited that production of foodgrains has increased from 169.92 million tonnes to 284.96 million tonnes in the corresponding period due to various technological and policy interventions.

As regards the Rabi crops, it has been decided that all states would ensure procurement at village/ block levels as farmers are not allowed to move out of block due to lockdown position. In addition, all states are taking steps for direct marketing/purchasing of crop produce from farmers.

Despite several efforts in past decades, large agriculture area is still dependent on the monsoons and in the event of failure of monsoons, farmers

have been facing hardship for survival of their crops. In view to resolve these problems "Prime Minister Krishi Sinchayee Yojana" (PMKSY) is being implemented with aim to expand cultivable area under assured irrigation, improve on-farm water use efficiency to reduce wastage of water, enhance the adoption of precision-irrigation and other water saving technologies.

The format of State Action Plan (SAP) for advance planning and implementation of the National Food & Nutritional Security Mission (NF&NSM) has been simplified and reduced to about one page, so that states can get the SAPs prepared and submit the same to Government of India after approval of competent authority with bare minimum efforts. NF&NSM is mainly a mandate for production of foodgrains and is implemented on projectised mode through State Agriculture Departments across the country.

Once SAPs are received, the same would be examined in a week's time and approval would be conveyed to implementing agencies. Project Monitoring Team exists at Central and State levels for guiding in formulation of SAPs and also for monitoring through field visit and farmers' interaction. Geo-tagging of various interventions are also undertaken to ensure transparency in the programme implementation.

Special Secretaries, Additional Secretary (Agriculture) and senior officers from DAC&FW, ICAR and officers of different State Governments participated in the National Conference through video conferencing. An interaction session was also organized with Agriculture Production Commissioners and Principal Secretaries of all the states in five groups to share the achievement, challenges and strategies to be adopted in respective states for increasing area coverage, production and productivity during Kharif season in agriculture sectors.

MoS Agriculture, Shri Kailash Choudhary inaugurates Pusa Decontamination & Sanitizing Tunnel

Pusa Decontamination and Sanitizing Tunnel, developed by Division of Agricultural Engineering, ICAR- Indian Agricultural Research Institute, New Delhi, was inaugurated by the Union Minister of State for Agriculture and Farmers Welfare, Shri Kailash Choudhary on 16th April, 2020 in the presence of Dr. Trilochan Mohapatra, Secretary (DARE) and Director General (ICAR) and Dr. A K Singh, Director, ICAR-IARI, New Delhi.

The sanitization protocol includes hand washing with foot-operated soap and water dispenser and fogging in a sanitizing tunnel for twentys econds. In this tunnel, Quaternary Ammonium Compounds (QAC) are used at concentration of 0.045%, which is recommended by the health department.

Agriculture Minister Shri Narendra Singh Tomar launched "KisanRath" Mobile App to facilitate transportation of foodgrains and perishables during lockdown

The Union Minister of Agriculture &Farmers Welfare, Shri Narendra Singh Tomar launched a farmer friendly mobile application in Krishi Bhavan on 17th April, which is developed by the National Informatics Centre (NIC) to facilitate farmers & traders in searching transport vehicles for primary and secondary transportation for movement of agriculture & horticulture produce. Primary transportation would include movement from farm to mandis, FPO collection centre and warehouses, etc. Secondary transportation would include movement from mandis to intra-state & inter-state mandis, processing units, railway station, warehouses and wholesalers, etc.

Speaking on the occasion Agriculture Minister, Shri Tomar said that agricultural activities have to go on amidst the lockdown. He said concessions have been given to the agriculture sector on the directions of Prime Minister Shri Narendra Modi. While harvesting and sowing is going on, transportation would become easier with the KisanRath app as it would help farmers and traders for transporting produce from farm gate to mandi and mandi to mandi all over the country. At this juncture, while the country is passing through the COVID-19 situation, this 'KisanRath' App would greatly facilitate farmers, FPOs and Cooperatives in the country to have the choice to find a suitable transport facility to transfer their agriculture produce from farm gate to markets.

The Mobile Application named "KisanRath" facilitates farmers and traders in identifying right mode of transportation for movement of farm produce ranging from foodgrain (cereal, coarse cereal,

pulses, etc.), fruits &vegetables, oil seeds, spices, fiber crops, flowers, bamboo, log & minor forest produce, coconuts, etc. This App also facilitates traders in transportation of perishable commodities by Reefer (Refrigerated) vehicles.

Transportation of agricultutal produce is critical and indispensable component of supply chain. Under the extraordinary situation prevailing in the country currently due to lockdown, "KisanRath" would ensure smooth and seamless supply linkages between farmers, warehouses, FPOs, APMC mandis and intra-state & inter-state buyers and help in reduction of food wastage by providing timely services. All these would contribute in better prices for perishable commodities.

The consignors (farmer, FPOs, buyer/ trader) places a requirement for transportation on this app which is disseminated to transport aggregators in the market, who in turn interface with various truckers and fleet owners for obtaining a competitive quote against the requirement and passes back the quote and trucker details to the consignor. Thereafter, the consignor directly negotiates off line with the trucker and finalizes the deal. Once the trip is completed, the user can provide a rating/ feedback for the trucker in the App which, over a period of time, becomes feedback mechanism for the transporter to improve their services. This would also help the consignors in the selection process of Logistics Service Providers in future.

Shri Tomar, speaking on the occasion, further said that 'KisanRath' mobile App. would also help in giving boost to inter-mandi and inter-state trade of agriculture and horticulture produce in the country. The Minister said that this app, with the tagline "Kisank aapna Vahan", is an important milestone in agri-produce transportation.

Shri Parshottam Rupala and Shri Kailash Choudhary, the Ministers of State for Agriculture and Farmers Welfare, Shri Sanjay Agarwal, Secretary (AC&FW), Shri Ajay Prakash Sawhney, Secretary (Electronics and IT), Dr. Neeta Verma, Director General, NIC and senior officers of the Ministry participated in the KisanRath mobile app launch ceremony through video conference.

This Mobile App. would be made available in 08 languages in Android version initially, and is ready for pan-India use.

Agriculture Minister discusses various business continuity measures to facilitate farming activities during the lockdown

The Union Minister of Agriculture &Farmers Welfare Shri Narendra Singh Tomar along with Ministers of State, Shri Parshottam Rupala and Shri Kailash Choudhary discussed with senior officers on various actions to be taken by the Department of Agriculture, Cooperation &Farmers Welfare for business continuity and ensuring that farmers and agricultural operations are not inconvenienced in this critical time.

In order to ensure the uninterrupted supply of agricultural machinery to the farmers under subsidy programmes, the Government has exempted random selection of test samples, subsequent batch testing after the expiry validity of test reports, updating of CMVR, COP & Type approval applicable to tractors, power tillers, combine harvesters and other self-propelled agricultural machinery till 31.12.2020. Testing of tractors as per revised BIS Standard IS 12207-2019 and implementation of new technical critical specifications of 51 agricultural machinery has also been deferred till 31.12.2020.

In order to facilitate the seed sector during lockdown period, the Government has agreed to extend the license of seed dealers which are expired or going to be expired till 30.09.2020. It has also been decided to extend the validity of import permissions till September, 2020 after consideration of the requirement of seed/planting material of the importing parties.

Under Plant Quarantine system, it has been decided to extend the validity of all pack-houses, processing units and treatment facilities whose validity is expiring up to 30th June, 2020 for a period of one year without physical inspection of such facility through a simplified procedure to facilitate export of agriculture products.

Timely intervention by Central and State Governments help attain the silent efforts of farmers and agriculture labour sweating and toiling in the fields braving all adversities

Amidst the uncertainty prevailing in wake of COVID-19, the one activity giving hope is agricultural activity, which is also providing the reassurance of food security. All throughout India numerous

farmers and agriculture labour are sweating and toiling against all adversities. Their silent efforts, coupled with timely intervention by the Central and State Governments, have ensured that there is minimal or no disruption to harvesting activities and the continued sowing of summer crops.

While the Ministry of Home Affairs issued the consolidated guidelines on the measures to be taken for containment of COVID-19, it also ensured smooth functioning of agricultural operations. Timely interventions and exemptions have resulted in optimistic results. The Standard Operations Procedures (SOPs) have been communicated to farmers for their safety and keeping social distancing while undertaking farm related activities. As a result of the proactive steps taken, both harvesting activities of the Rabi crop, and sowing activities of summer crops are being undertaken in a systematic manner.

Sowing Area Coverage of Summer Crops

Rice: About 34.73 lakh hectare area coverage under summer rice as compared to 25.22 lakh hectare during the corresponding period of last year.

Pulses: About 5.07 lakh hectare area coverage under pulses as compared to 3.82 lakh hectare during the corresponding period of last year.

Course Cereals: About 8.55 lakh hectare area coverage under coarse cereals as compared to 5.47 lakh hectare during the corresponding period of last year.

Oilseeds: About 8.73 lakh hectare area coverage under oilseeds as compared to 6.80 lakh hectare during the corresponding period of last year.

Sugarcane: As reported by the states, 100% harvesting of sugarcane has been completed in Maharashtra, Karnataka, Gujarat, Andhra Pradesh, Telangana and Punjab. About 92-98% of harvesting is completed in Tamil Nadu, Bihar, Haryana and Uttarakhand whereas 80-85% harvesting has been completed in Uttar Pradesh.

Potato: Harvesting of potato is completed and storage is under process.

Onion: Harvesting of Rabi onion in the field of small farmer units is almost completed. Harvesting in larger farmers plots is in progress and may extend up to second week of May.

Harvesting Status as on 24.04.2020

Wheat: As reported by the States about 98-99 % of wheat crop has been harvested in Madhya Pradesh, 90-92 % in Rajasthan, 82-85 % in Uttar Pradesh, 50-55 % in Haryana, 45-50 % in Punjab and 86-88 % in other States.

Growing of summer crops is an old practice in India particularly for meeting the additional domestic requirement of foodgrains and feeding livestock. The Ministry of Agriculture and Farmers Welfare has taken new initiatives for scientific cultivation of summer crops such as pulses, coarse cereals, nutri-cereals and oilseeds. Besides this, the farmers also cultivate summer paddy crops in some states of Eastern India and Central India based on water availability.

About 19.50 crores households to be distributed pulses under PMGKY

The Department of Agriculture, Cooperation and Farmers Welfare, in order to provide food security during the prevailing situation due to COVID-19 pandemic, the Government has decided to distribute pulses to the eligible households under Pradhan Mantri Garib Kalyan Yojana (PM-GKY). About 107,077.85 metric tonne pulses have so far been issued to the States/UTs.

Under PMGKY, the States/UTs namely A&N, Andhra Pradesh, Chandigarh, Chhattisgarh, Daman & Diu, Goa, Gujarat have commenced the distribution of pulses to the beneficiaries. Other States like Madhya Pradesh, Punjab, Rajasthan, Telangana, West Bengal, Uttar Pradesh, and Delhi have received the partial stock and would commence the distribution to the beneficiaries in phased manner as per their plan. The distribution of pulses under PMGKY is to benefit around 19.50 crore household spread across 36 States and Union territories.

Shri Narendra Singh Tomar participates in the G-20 Extraordinary Agriculture Ministers Meeting through Video Conferencing on the issue of COVID-19 impacts on food security, safety and nutrition

Shri Narendra Singh Tomar, Union Agriculture Minister, participated in an extraordinary virtual meeting of G-20 Agriculture Ministers on 21st April, 2020 to address the issue of COVID-19 impacts

on food security, safety and nutrition. He shared the decision of Government of India to exempt all agriculture operations during lockdown period and ensuring continued availability of essential agriculture produce and supply, while adhering to protocol of social distancing, health and hygiene. Shri Tomar highlighted that the Prime Minister Shri Narendra Modi has been at the forefront of supporting countries to tide over this crisis in various ways and that agriculture would not lag behind, consistent with the needs of our citizens.

The G-20 Agriculture Ministers virtual meeting was organized through video conferencing by the Saudi Presidency to deliberate on the ways and means of ensuring continuity of food supply value chain including livelihood of farmers. It was attended by Agriculture Ministers of all G-20 members, some guest countries and International organizations. Shri Tomar welcomed the initiative taken by Saudi Arabia to bring the G-20 countries together.

Later, a declaration of G-20 agriculture ministers was accepted. The G-20 nations resolved to have international cooperation in the backdrop of COVID-19 pandemic, to avoid food wastages and losses, maintain the continuity of food supply value chain across borders. They also resolved to work together for food security and nutrition, share best practices and lessons learnt, promote research, responsible investments, innovations and reforms that would improve the sustainability and resilience of agriculture and food systems. The G-20 nations also agreed to develop science based international guidelines on stricter safety and hygienic measures for zoonosis control.

Cabinet approves extension of relaxation of mandatory requirement of Aadhaar seeding of data in respect of beneficiaries of the States of Assam and Meghalaya and UTs of J&K and Ladakh for one year w.e.f. 1st April, 2020 under the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) Scheme

The Union Cabinet chaired by the Prime Minister, Shri Narendra Modi has given its approval to relax the mandatory requirement of Aadhaar seeding of beneficiaries data of the States of Assam and Meghalaya and UTs of Jammu & Kashmir and Ladakh for release of benefits to them under PM-Kisan Scheme upto 31st March, 2021.

The Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) Scheme was launched by the Hon'ble Prime Minister on 24th February, 2019. The Scheme aims to provide income support to all landholder farmer families across the country with cultivable land, subject to certain exclusions. Under the Scheme, an amount of Rs. 6000/- per year is released in three 4-monthly instalments of Rs. 2000/- each directly into the bank accounts of the beneficiaries. The Scheme is effective from 1st December, 2018. From 1st December, 2019, release of benefits is done only through Aadhaar seeded data of beneficiaries uploaded by the State / UT Governments on the PM-KISAN portal, except in case of the States of Assam and Meghalaya and the UTs of J&K and Ladakh, which have been given exemption from this requirement till 31st March, 2020, as Aadhaar penetration there has been miniscule.

It has been assessed that it would take much more time for the States of Assam and Meghalaya and the UTs of J&K and Ladakh to complete the work of Aadhaar seeding of data of beneficiaries and the beneficiaries of these States / UTs may not be able to avail the benefits of the Scheme w.e.f. 1st April, 2020 onwards, if the relaxation from mandatory requirement of Aadhaar seeding of data is not extended.

The total number of beneficiary farmers in these States and UTs who have been paid at least one installment as on 8.4.2020 are 27,09,586 beneficiaries in Assam, 98,915 beneficiaries in Meghalaya and 10,01,668 beneficiaries in J&K, including Ladakh.

Several measures of Department of Agriculture, Cooperation and Farmers Welfare, Government of India to facilitate the farmers and farming activities at field level during the lockdown period: An updated status of agricultural activities

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 the lockdown period. The updated status of activities is given below:

1. Out of 2587 Principal/main Agricultural Markets in the country, 1091 markets were functional at the beginning of the lockdown period on 26.03.2020, which has increased to 2069 markets as on 21.04.2020.

2. Arrival of vegetables such as onion, potato

and tomato in mandis has increased by 622%, 187% and 210%, respectively on 21.04.2020 as compared to 16.03.2020.

3. During Rabi season 2020, the procurement of pulses & oilseeds on MSP is currently in progress in twenty States. A quantity of 1,73,064.76 metric tonne of pulses and 1,35,993.31 metric tonne of oilseeds has been procured by NAFED and FCI valued at Rs. 1447.55 crores through which 1,83,989 farmers have been benefited.

4. States have commenced activities under the National Bamboo Mission to take advantage of the ensuing monsoon. Bamboo nursery preparation has started in Pithoragarh district of Uttarakhand with provision of masks, food, etc., to the workers. Nurseries have been raised in Sabarkantha and Vansada districts of Gujarat. Farmer Producer Organizations have started plantation in 585 hectare target area involving 520 farmers in Dimoria block of Kamrup district in Assam.

5. The National Horticulture Board (NHB) collected information on "Available Planting Material" of fruits and vegetables from 618 NHB-accredited nurseries across the country. This information has been disseminated to Confederation of Indian Horticulture (CIH), Commodity-based Growers' Associations, State Horticulture Missions, NHB State Offices and all the related stakeholders. In order to facilitate the farmers to procure choice planting material for the ensuing planting season, the NHB has uploaded this information on the website *(www.nhb.gov.in)*.

6. To ensure supply of seeds to the states under National Food Security Mission, the subsidy pertaining to seeds under the scheme shall be for varieties less than 10 years. It has also been decided to allow Truthful Label seeds for subsidy component for the North East, Hilly regions and the UTs of Jammu & Kashmir only, for all crops under NFSM.

7. In Punjab, organic products are being delivered at doorstep in the specially designed electric van under Paramparagat Krishi Vikas Yojana (PKVY)

8. In Maharashtra, 21,11,171 quintals of fruits and vegetables have been sold by 27,797 FPOs in 34 districts by online/direct sale method.

Shri Narendra Singh Tomar calls for enhancing technologies amongst farmers through ICAR-KVK network

The Union Minister for Agriculture &Farmers Welfare, Shri Narendra Singh Tomar took a review meeting of the Department of Agricultural Research & Education (DARE) and Indian Council of Agricultural Research (ICAR) on 23rd April, 2020. He emphasised on enhancing the reach of technologies amongst farmers and reach out to maximum number of farmers through the network of ICAR and Krishi Vigyan Kendras (KVKs).

ICAR has developed 1234 crop varieties and 345 horticultural varieties during 2014-19. Many of the ICAR varieties and technologies are earning foreign exchange and contributing towards food security of the country. ICAR and KVKs have contributed positively in implementation of different Government Special campaigns like Krishi Kalyan Abhiyan (KKA), Jalshakti Abhiyan and tree plantation campaign.

The Krishi Kalyan Abhiyan (KKA) is being implemented in 112 Aspirational districts of the country. So far two phases of KKA have been completed in which 11.05 lakh farmers were trained by KVKs and over 5000 frontline demonstrations at farmer's field were conducted. In the third phase of KKA training of about 17 lakh farmers on diversified farming practices for doubling farmers' income is planned. ICAR also sensitised and mobilised the farmers for water conservation measures during Jalshakti Abhiyan through 466 melas organised by 243 KVKs in which about 3.14 lakh farmers and school children participated in the two phases of the Abhiyan. More than 7.1 lakh tree saplings were planted under tree plantation campaign in which public leadership took active part with the participation of 34 MPs, 50 MLAs and 2000 other VIPs and Officials.

While developing new technologies is an ongoing process and priority of the ICAR system, special efforts are made to reach out to maximum farmers through quality planting materials and seeds of improved varieties of crops as well as fish fingerlings and quality semen and strains of indigenous animal breeds. More than 14 lakh quintals of seed and 2425 lakh planting materials were

produced by KVKs. Another 512 lakh quality planting materials of fruits and vegetables were produced by other institutes. These seeds and planting materials are provided to farmers on a very nominal cost. The KVKs provided 26.85 crore mobile agro advisories during 2014-19.

ICAR has developed 66 vaccines & diagnostics during 2014-19 for the diagnosis and control of diseases of animals. For the first time in India, gazette notification of 184 registered indigenous breeds was done in 2019 that would help in the protection and promotion of indigenous breeds. Open-sea cage culture technology was extended for fish production in more than 2500 cages in east and west coast during last five years and 22 cost effective feeds were developed for different life stages of important fish/ finfish species. ICAR in a joint effort with States and Department of Agriculture, Cooperation & Farmers Welfare helped in distribution of machines to farmers and Custom Hiring Centres for in-situ management of crop residues. The number of burning incidences has reduced by 52% in 2019 compared with the incidences in 2016.

ICAR proactively worked for the prevention of stress to farmers due to COVID-19. Advisory to farmers in 15 regional languages were communicated to over 5.48 crore farmers. About 42.7 lakh farmers were sensitized for use of Aarogya Setu mobile application to fight COVID 19 pandemic and 4.33 lakh farmers have downloaded the application. ICAR's three institutes NIHSAD Bhopal, IVRI Izatnagar, and NRC on Equines, Hisar were notified for COVID-19 testing in humans and Zoo animals. Till 23rd April, 2020, 1561 samples had been tested by these institutes.

The Union Minster, while appreciating the works of ICAR, emphasised to strengthen the research and extension system to reach to the maximum number of farmers and solving the problems in farming. He particularly stated to concentrate on diverse commodities, undertake intensive research on water science and technology, development of processable and export oriented varieties in potato, organise a conference on agri-startup to select the best and promote them and popularization of KVK-SHG model through print and social media to create awareness and scale out the model. The Union Agriculture Minister also emphasized for the maximum use of the IT tools in Agriculture including the higher education and promote e-publications. Shri Tomar emphasized the use of strength of KVK in creating awareness amongst farmers about soil health management and soil testing. Recognizing that seed is the prime input, he suggested preparing a roadmap for seed availability.

The Ministers of State, Shri Parshottam Rupala and Shri Kailash Choudhary were present in the review meeting. Dr. Trilochan Mohapatra, Secretary (DARE) & DG(ICAR), along with top officials of DARE and ICAR attended the meeting. The meeting was held following the norms of social distancing and face masks. ICAR is an umbrella organisation under which 102 institutes and 718 KVKs, one in each district function. Over the years the ICAR and KVKs reach to the farmers has increased manifold.

Impact of Direct Marketing

Rajasthan has issued more than 1,100 direct marketing licences to processors during lockdown period wherein farmers have already started selling directly to the processors. Out of more than 550 Primary Agriculture Credit Societies (PACS) declared as market-yards in rural areas, 150 PACS have become functional for direct marketing and village traders are performing trade transactions successfully. Due to market fee waiver in Tamil Nadu, it was observed that traders have preferred to buy the produce from farmers from their farm gate/ villages. In Uttar Pradesh direct linkages have been established by FPOs with farmers and traders thereby supplying their produce to consumers in cities which saved wastages and directly benefitted the farmers. Further, the State has facilitated in establishing linkages with FPOs and Zomato Food Delivery App thereby ensuring smooth distribution of veggies to consumers.

As per the report received from the States, the Direct Marketing has facilitated the farmer groups, FPOs, Cooperatives and all the stakeholders in effective and timely marketing of farm produce.

Union Agriculture Minister says the Government accords highest priority to agriculture sector even during the lockdown period

The Union Minister of Agriculture and Farmers Welfare, Shri Narendra Singh Tomar has said the Government has accorded highest priority to the farming and agriculture sector even during the lockdown period. As a result, he said, there has been no shortage of foodgrains and pulses across the country while the Government has also

ensured availability of vegetables and milk supplies. Addressing a press conference on 29th April, 2020, Shri Tomar said the Prime Minister Shri Narendra Modi has given primacy to the progress of 'Gaon, Garib, Kisan' (Villages, Poor and Farmers). Shri Tomar further said that no previous Government has paid as much attention to Agriculture & Farmers Welfare as this Government. The pathbreaking schemes launched by Shri Modi include the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN), Pradhan Mantri Fasal Bima Yojana and the Kisan Credit Card (KCC) saturation drive recently undertaken.

The Agriculture Minister said all these efforts have resulted in record foodgrain production. From 285.20 million tonnes in 2018-19, this FY the estimated foodgrain production is set to reach 291.95 million tonnes and for the next fiscal a target of 298.3 million tonnes is fixed. He said protein revolution was achieved through increase in production of pulses of 28.3%, which witnessed a growth from 17.20 metric tonnes in 2014-15 to 23.02 metric tonnes in 2019-20. Focus on summer crops resulted in area sown of 57.07 lakh hectares this year against 41.31 lakh hectares last year. Similarly, the horticulture crops is also headed for an estimated record production of 313.35 million MT this FY as against 310.74 million MT in 2018-19.

Shri Tomar said the Government is encouraging technology driven solutions to minimize human interface in the farming sector especially in view of social distancing norms to fight the COVID-19 pandemic.

Shri Tomar said the PM-KISAN scheme has benefited farmers immensely even during this COVID season as the Government has transferred Rs. 17986 crore to farmer since 24th March, 2020. Till date 9.39 crore farmer families have been benefitted and a sum of Rs. 71000 crores has been transferred. Installment due for the period of 1st April to 31st July, 2020 has been paid to 8.13 crores beneficiaries within the first fortnight of April itself. In view of the success of the scheme, the Prime Minister approved extension of the year-old-scheme to all farming families, since the original scheme covered only small and marginal farmers.

Shri Tomar said the Government also launched the Kisan Credit Card (KCC) Saturation Drive in February, 2020 for ensuring benefits of KCC to PM-KISAN beneficiaries. More than 75 lakh applications from PM-KISAN beneficiaries have been received by banks since then while nearly 20 lakh applications have been sanctioned with a total sanction amount of nearly Rs 18,000 crores.

Shri Tomar said the PM Fasal Bima Yojana has been made voluntary for all farmers considering the demand of farmers while there is no change in farmers' share of premium. Government of India would now bear 90% of premium subsidy liability for North Eastern States instead of 50% earlier. Flexibility has been given to states to choose the risk covers and sum insured for benefit of farmers. Shri Tomar said during 2017-19 while farmers' contribution has been over Rs. 9,000 crores, the crop insurance claims worth over Rs. 50,000 crore has been dispensed to affected farmers. Total claims paid during the lockdown period stand at Rs. 5,326.7 crores, he said.

Shri Tomar said this year's budget also underlined Government's thrust towards doubling farmer's income by 2022. Rs. 2.83 lakh crores has been allocated in the budget for 2020-21 for all agriculture related activities and 1.6 lakh crore for just agriculture, allied and irrigation. This is more than 5 years agricultural budget of UPA between 2009 and 2014 which was Rs. 1.1 lakh crore, he said. The Government has also launched a scheme to set up 10,000 Farmer Producer Organizations (FPOs) by 2024-25 with a provision of Rs. 6866 crore. This would help in collective procurement of inputs and technology and market the produce better, he said.

Speaking on the occasion, Shri Ramesh Chand, Member, NITI Aayog said the Agriculture sector would be the mainstay of India's economy and the Government aims to keep the GDP growth buoyant during the current fiscal despite the lockdown bringing almost 60% industrial activity to a standstill. A normal monsoon prediction and with 50-60% water available in reservoirs, agriculture sector is expected to do exceedingly well, he said. Fertilizer off take of 13.5 lakh metric tonnes this month upto 28th April, 2020 is 5% more than 12.86 lakh tons in April last year while Krishi Vigyan Kendras have sold 20% more seeds in the four months this year as compared to the same period last year, he said. He further added that with higher prices of crops assured, this would encourage farmers and contribute to agriculture growth estimated at 3% of long term average.

General Survey of Agriculture

Trends in Foodgrain Prices

Based on Wholesale Price Index (WPI) (2011-12=100), WPI in case of foodgrains increased by 9.18 percent in March, 2020 over March, 2019.

Among foodgrains, WPI of pulses, cereals and vegetables increased by 10.63 percent, 8.92 percent and 24.05 percent, respectively, in March, 2020 over March, 2019.

Among cereals, WPI for wheat and paddy increased by 10.13 percent and 2.62 percent, respectively, in March, 2020 over March, 2019.

Similarly, WPI in case of foodgrains increased by 4.17 percent in March, 2020 over February, 2020.

Among foodgrains, WPI of pulses, cereals and vegetables increased by 12.12 percent, 2.67 percent and 11.90 percent in March, 2020 over February, 2020.

Among cereals, WPI for wheat and paddy increased by 4.76 percent and 1.72 percent, respectively, in March, 2020 over February, 2020.

Rainfall and Reservoir Situation, Water Storage in Major Reservoirs

Cumulative pre-monsoon season, 2020 rainfall for the country as a whole during the period 1st March, 2020 to 29th April, 2020 has been 26% 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 192% in Central India, by 40 % in North-West India and by 15% in South Peninsula but lower than LPA by 14% in East & North East India.

Out of 36 meteorological sub-divisions, 26 meteorological sub-divisions received large excess/ excess rainfall, 03 meteorological sub-divisions received normal rainfall and 07 meteorological sub-divisions received deficient/large deficient rainfall.

Current live storage in 123 reservoirs (as on 30th April, 2020) monitored by Central Water Commission having Total Live Capacity of 171.09 BCM was 70.51 BCM as against 43.38 BCM on 30.04.2019 (last year) and 44.42 BCM of normal storage (average storage of last 10 years). Current year's storage is 163% of last year's storage and 159% of the normal storage.

Articles

Dynamics of Apple Production in Himachal Pradesh

CHANDER MOHAN NEGI*

Abstract

Himachal Pradesh, which lies in the western Himalayas, is considered as model state for the development of mountain/hill states. Agriculture contributes around 9 percent of state gross domestic product (SGDP) and about 40 percent of the agricultural GDP is contributed by the horticulture alone. Horticulture is thus, considered as the backbone of state economy. The area under fruits, which was 792 hectares in 1950-51 with total production of 1200 tones increased to 1,12,634 hectares by 2017-18. The total fruit production in 2017-18 was 4.46 lakh tones. Apple is the most important fruit crop of Himachal Pradesh, which constitutes about 49 percent of the total area under fruit crops and about 79 percent of the total fruit production. An estimated 3500 crore apple economy has strong backward and forward linkages generating employment to lakhs of people. Shimla district leads in terms of area, production and productivity of apple in Himachal Pradesh. Chamba and Kinnaur districts register maximum increase in area and production since the inception of state in 1972. Production and productivity of apple in the low height districts follow a consistent decline, whereas, the bordered, high altitude districts depict a progressive increase over the period of time. The apple production is shifting to the higher altitude in the state. Shimla and Kinnaur districts record positive and more than unit growth rate in area, production and productivity among nine apple producing districts in the state. All the apple producing districts show various degrees of instability in production, productivity and area under the crop except Kinnaur, which is the only district where we found a consistent decline in instability in area, production and productivity during the period under study. It came out from the analysis that apple production is shifting to high altitude and districts, like Kinnaur, Lahul-Spiti are emerging as prominent apple producers. So, it is important for the government to lay the basic infrastructure in these districts and provide basic training and extension services to apple producers. In addition, climate change would be major factor determining the production and productivity of apple in the hill state, so it requires immediate steps to mitigate the effect of climate change.

Keywords: *Apple, GDP, economy, instability index, yield.*

1. Introduction

Agriculture is the main occupation of the people of Himachal Pradesh (H.P.) and has an important place in the economy of the state. H.P. is the only state in the country whose 89.96 percent population (Census, 2011) lives in rural areas. Therefore, dependency on agriculture/ horticulture is eminent as it provides direct employment to about 62 percent of total workers of the state. Agriculture happens to be the premier source of state income (SGDP). About 9 percent of the total SGDP comes from agriculture and its allied sectors. Out of the total geographical area of state 55.67 lakh hectare, the area of operational holdings is about 9.55 lakh hectares and is operated by 9.61 lakh farmers. The average holding size is about 1.00 hectare[1]. The state of H.P. is considered as the model state for the development of hill states in India (Chand, 1995; Sen & Dreze, 2010). An analysis of development of the state, especially the agriculture in the state owes much the diversification of cropping pattern from low valued cereal crops to high valued commercial crops; prominent among them is horticultural fruit crops. The diversification towards the commercial crops in the state started with the large scale plantation of potato and later by the fruits, especially the apple and the pace of diversification paced up in 1990's when districts lying on the middle and low height also started growing offseason vegetables and fruits (Sharma, 2010). The rich diversity of agro-climatic conditions, topographical variations and altitudinal

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NOTE: Views expressed in the article are of the author only.
[1]Economic survey, H.P. (2018-19), Page 41.

differences coupled with fertile, deep and well drained soils favor the cultivation of temperate to sub-tropical fruits in H.P. The region is also suitable for cultivation of ancillary horticultural produce, like flowers, mushroom, honey and hops. This particular suitability of H.P. has resulted in shifting of land use pattern from food grains to fruits. Apple is so far the most important fruit crop of H.P., which constitutes about 49 percent of the total area under fruit crops and about 79 percent of the total fruit production. Area under apple has increased from 400 hectares in 1950-51 to 3,025 hectares in 1960-61 and 1,12,634 hectares in 2017-18[2]. Apple crop has emerged as the most important crop in the state in terms of area and production relative to other fruits. The 3,500 crore apple economy was not only the state's backbone but also involved thousands of stakeholders, such as transporters, carton manufacturers, controlled atmosphere store/cold chain owners, wholesale fruit dealers, fruit processing unit owners, etc. from other states[3]. Apple cultivation provides gainful employment to millions of people of the region and the living standards of the people have improved enormously and state of H.P. has come to be known as 'Apple bowl' of India. H.P. is the largest producer of apple next only to Jammu and Kashmir in India. Against this background, this paper is an attempt to analyze the dynamics of apple crop in the state from the very inception of the statehood in the early 1970's.

2. Methodology

The study is based on secondary data, on the area and production of apple crops in H.P., collected from Department of Horticulture, and various other publications of state government. The growth was examined by estimating compound growth rate for area, production and yield of apple in H.P. and the districts in the state. The reference period for the state as a whole is 1971-72 to 2017-18; while for the districts it is 1971-72 to 2016-17. The extent of instability in area, production and productivity is estimated by instability index.

2.1. Estimation of compound growth rate

Several methods are available to estimate growth rates. In this study, exponential function was used to estimate compound growth rate by making time as the independent variable and area /production / productivity as dependent variable. This exponential trend equation gives constant rate of increase or decrease per unit of time and they are termed as 'Geometric' or Compound Growth Rate.

Compound growth rates were estimated by fitting exponential trend equation of the following type:

$$\mathbf{Y = ab^t} \quad \text{..... (1)}$$

Where,

Y = area / production / yield

t = time variable in years

a = constant and

b = (1+r)

where, **r** = Compound growth rate

The equation (1) takes the linear form by taking logarithms of both sides of the equation,

$$\mathbf{\log y = \log a + t \log b}$$

Compound growth rate is computed using the following formula:

$$\mathbf{\text{Compound Growth Rate (CGR)} = \text{Antilog}(\log b - 1) \times 100}$$

2.2. An analysis by component elements

The production of any crop will be increased by way of increasing either area under the crop or yield of crop or both. The relative contribution of area, yield and their interactions in increasing the production of crop can be estimated using the following measure.

$$\mathbf{Q_0 = A_0 Y_0}$$

$$\mathbf{Q_n = A_n Y_n}$$

Also, $Q_n = Qo + AQ$, $A_n = A_0 + dA$ and $Yn = Y_0 + dY$, where d is change.

Therefore, $Q_n = (Q_0 + dQ) = (A_0 + dA)(Y_0 + dY) = A_0Y_0 + A_0dY + Y_0dA + dAdY$

[2] Ibid, page 51.
[3] Business line, The Hindu, July18,2016.

Since $Q_o = A_0Y_0$

$AQ = A_0Y_0 + A_0dY + Y_0dA + dAdY$

$AQ = A_0dY + Y_0dA + dAdY$

The first term (A_0dY) can be considered as the yield effect, the second term (Y_0dA) as the area effect and the third (dAdY) as the interaction effect. The total change in production can thus be decomposed into three effects, *viz.*, yield effect, area effect and the interaction effect.

2.3. Measure of instability

Co-efficient of variation (CV) is the most commonly used index for measuring instability. CV has an easy interpretation in the context of measuring an overall variation in the data of a variable not showing any trend. But usually when we have a time series data of a variable showing some kind of trend which may be linear or non-linear, CV does not take into account any such time trend and over estimates instability. Thus, it is desirable to use an index of instability which should adjust the data for trend and measure instability around the trend. In this paper, we opted the methodology proposed by Ray (1983b) and applied by Ray (1983a), Mahendra Dev (1987), Rao *et al.* (1988) and Chand *et al.*, (2009) to estimate instability in agricultural production. This method is given as,

Instability Index = Standard Deviation of Natural Logarithm (Y_{t+1}/Y_t).

where, Y_t is the area/production/yield in the current year and, Y_{t+1} is for the next year. This index is unit free and very robust and it measures deviations from the underlying trend. When there are no deviations from trend, the ratio of Y_{t+1}/Y_t is constant and thus, standard deviation is zero. As the series fluctuates more, the ratio of Y_{t+1} and Y_t also fluctuates more, and standard deviation increases.

3. Results and Discussion

The state of H.P. is known for the production of apple and large varieties of apple are planted in the state. In addition to apple other temperate and sub temperate fruits also find their place in the basket. The data available for 2017-18 shows 49 percent of area under the fruits consist of apple orchards followed by other sub-temperate fruits (O.S.T.F.) 24 percent and other temperate fruits (O.T.F.) 12 percent. Thus, the importance of apple can be derived from the fact that half of the area under the fruits in state remains under the apple orchards. At the same time, apple makes 79 percent of total production of fruits, followed by other sub-temperate and temperate fruits sharing equal weight in the production (8% each).

TABLE 1: AREA, PRODUCTION AND PRODUCTIVITY OF FRUITS IN H.P. IN 2017-18

Variable	Apple	O.T.F.*	Nuts & Dry (N&D)	Citrus	O.S.T. F.**	Total
Area (hectare)	112634	28369	10301	24649	54899	230852
Production (000′ tones)	446570	45150	3380	26850	43350	565300
Productivity (Kg/Hec.)	3964.79	1591.53	328.123	1089.29	789.632	2448.76

Source: Horticulture Department, H. P.
*O.T.F. – Other Temperate fruit, *** O.S.T.F. – Other Sub-Temperate Fruits.

Further, apple contains not only upper hand in the area and production of fruits in the state but also the productivity of apple is highest among the major fruits grown in the state. At the state level, the yield of apple is highest and around 4 metric tons per hectare next in the line is distant other temperate fruits (O.T.F.) around 1.6 metric tons per hectare (Table 1). Apple crop has a dominant position in terms of area, production and yield per hectare in the state and no other fruit seems close to the apple. A closer look at the contribution of districts in the area under orchards and production of crops over the period of time since the inception of state in 1971 would shed a light on the relative changes taking place in the area and production of apple crop in spacio-temporal horizon.

TABLE 2: RELATIVE SHARE OF DISTRICTS IN THE AREA AND PRODUCTION OF APPLE IN H.P. (IN PERCENTAGE)

Districts	Area						Production					
	1971-72	1980-81	1990-91	2000-01	2010-11	2016-17	1971-72	1980-81	1990-91	2000-01	2010-11	2016-17
Chamba	2.57	3.65	7.02	10.58	12.02	11.19	2.00	1.47	0.79	1.19	1.21	2.51
Mandi	13.82	15.53	7.02	15.33	15.46	14.82	14.00	3.55	4.59	4.41	2.50	8.19
Kinnaur	2.59	4.68	7.59	7.05	9.85	10.03	2.50	6.06	0.59	5.78	7.15	12.86
Lahul-Spiti	-	0.11	0.23	0.59	1.30	1.50	-	0.00	0.01	0.03	0.02	0.07
Kullu	23.91	23.69	25.31	21.87	23.65	23.82	25.01	24.62	21.16	15.64	21.43	19.13
Shimla	48.11	43.59	44.46	38.80	34.11	35.92	47.98	62.29	72.58	72.74	67.56	56.82
Sirmaur	7.16	6.69	6.39	4.50	3.10	2.29	7.02	0.99	0.14	0.10	0.08	0.36
Solan	0.75	1.11	0.93	0.61	0.09	0.04	0.51	0.43	0.02	0.03	0.00	0.00
Kangra	1.09	0.96	1.04	0.67	0.42	0.39	0.98	0.59	0.13	0.08	0.05	0.06
H.P.	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Authors calculation using data from the Horticulture Department, H.P.

At the inception of state in 1971, eight out of the twelve districts had planted apple trees in different proportion. Shimla, Kullu and Mandi are the district where a considerable area was under apple orchards. District Shimla led among all and around 50 percent of areas under apple trees in the state were in Shimla alone. Shimla along with two districts, Kullu and Mandi, in decreasing order, contained 85 percent of area under the orchards in the state. Other prominent districts, like Sirmaur, Kangra, Kinnaur and Solan have less than ten percent of total area under the apple. Interestingly, district Lahul- Spiti had not a single hectare under the apple at the advent of the statehood and together with Kinnaur districts, these two high altitude border districts were not considered suitable for the apple cultivation owing to excessive cold and dryness (Gautam *et al.*, 2014). Over the period of time, we found that drastic changes took place in the relative proportion of area under the crop in the state. Shimla district still leads among all but its relative share has declined by 12 percent and now the district contains about 36 percent of total area under the crop in the state. The relative area under Mandi increased one percentage point, whereas, Kullu remained same over the studied period. The most noticeable changes took place in the districts, like Chamba, Kinnaur, Sirmaur and Lahul-Spiti, where the area under apple production in Chamba and Kinnaur registered 8-7 percentage point increase while Sirmaur showed 4 percentage point decrease. District Lahul-Spiti's share registered positive growth from negligible in 1971-72 to 1.50 percent in 2016-17. Thus, it has come out from the analysis of districts over the period of time that the area under the apple crop is consistently declining in the low-lying districts, like Kangra, Solan and Sirmour. While the relative share of districts lying on high altitude has increased over the period of time; prominent among them are Chamba, Kinnuar and Lahul-Spiti. Districts, like Mandi, Kullu and Shimla which falls under the medium height range has retained their relative share in area under the apple fruit with the exception of Shimla, the low height areas of Shimla are replacing apple with other crops due to falling production owing to the climate change and vagaries of weather in the hill state. Due to climate change the required chilling hours are declining in the low altitude areas and increasing in the high-altitude areas resulting in

shifting of apple cultivation in higher altitudes (Rana *et al.,* 2008, 2011).

In production too, district Shimla led the table at the time of full statehood and the district contributed 48.98 percent to states' pool. Together with districts Kullu and Mandi, Shimla constituted about 87 percent of total production of the crop in the state. Most other districts contributed less than ten percent of total production with Lahul-Spiti contributing nothing to the states' kitty. Over the period of time, significant changes have been taken place in the relative share of districts in the production of crop in state. The relative share of Shimla district increases consistently and reaches its maximum in 2000-01 and declines thereafter. Shimla district contributes 57 percent of total production in the state. District Kullu which once contributed one fourth of total production of crop in the state now contributes little less than one fifth of total share and its share declines continuously over the studied period. Mandi which had share of 14 percent in states' output suddenly drops to 3.55 percent in 1980-81 rises little over 4 percent in next two decades and falls further to 2.50 percent in subsequent decades and again rises to 8.15 percent in 2016-17. Likewise, in the area the low-lying districts, like Kangra, Solan and Sirmaur show consistent fall in their share in total production and Solan district having no contribution at all in 2016-17. While the high-altitude districts, with the exception of district Chamba, which has maintained the constant share to total production, the share of Kinnaur and Lahul-Spiti register positive and significant rise over the period of time. District Lahul-Spiti which had no production in the year 1971-72, now contributes about one percent of total production. Most important and noticeable change has been registered by district Kinnaur, the districts which contributed just 2.50 percent of total production in 1971-72, now contributes 12.86 percent to states' basket; a 10 percentage point increase over the studied period. Thus, three districts, namely Shimla, Kullu and Kinnaur together hold 70 percent of area under the orchards in the state and contribute 89 percent of total production in the state.

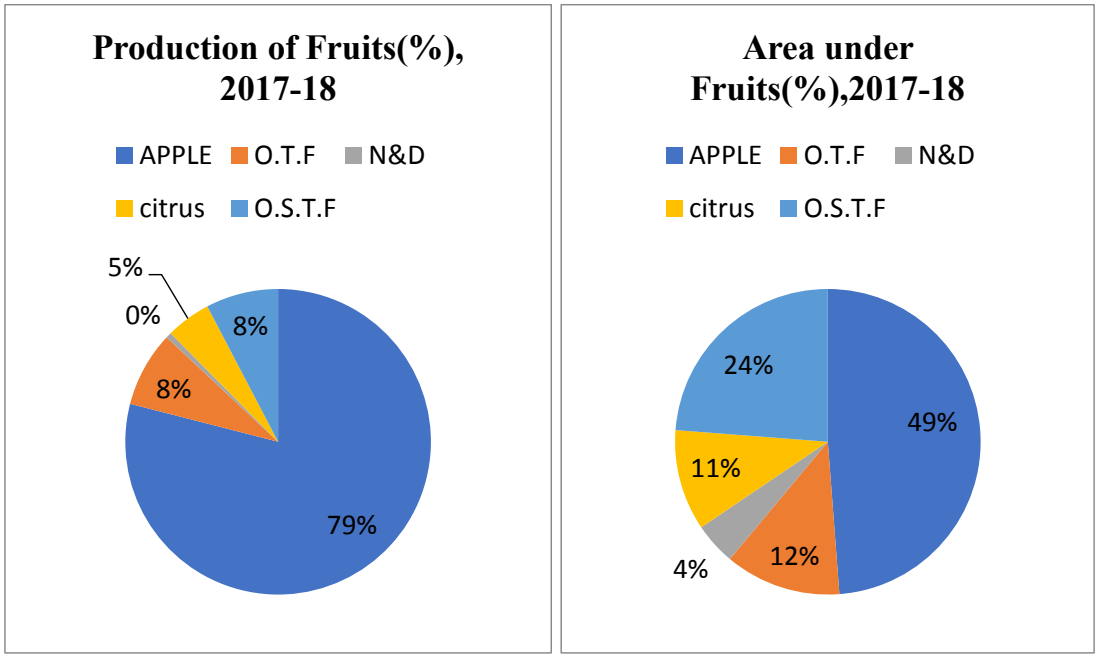
TABLE 3: PRODUCTIVITY OF APPLE PER HECTARE (IN KG) IN THE DISTRICTS OF H.P.

Period	Chamba	Mandi	Kinnaur	Lahul-Spiti	Kullu	Shimla	Sirmaur	Solan	Kangra	H.P.
1971-72	3438.79	4474.32	4272.85		4621.07	4405.61	4329.39	3033.18	3961.04	4417.83
1980-81	1097.35	622.77	3529.62	0.00	2831.06	3892.68	403.52	1043.48	1668.27	2723.75
1990-91	668.59	3859.05	455.37	206.11	4940.52	9647.97	130.83	132.58	716.47	5909.56
2000-01	468.91	1199.16	3421.73	210.82	2982.69	7818.56	89.01	179.02	489.22	4170.06
2010-11	884.63	1422.52	6378.74	146.97	7966.50	17412.57	214.06	321.84	986.08	8791.08
2016-17	937.97	2314.34	5366.79	181.33	3363.12	6623.18	657.83	311.11	638.25	4186.56

Source: Authors calculation using data from the Horticulture Department, H.P.

An analysis of yield per hectares (Table 3) reveals that the productivity of crop is highest in the district Shimla, around 7 metric tons is produced per hectares. The district has once touched the 10 metric ton per hectares in 1990-91 which can be taken to international standard. Second in line is district Kinnaur which has registered a productivity of 5.4 metric tons per hectare, followed by districts of Kullu and Mandi with 3.3 and 2.3 metric tons per hectares, respectively. Rest of the districts display a very low productivity and have less than one metric ton per hectare. District Lahul-Spiti has a yield of 181 kg per hectares and is least productive in the state; which may be owing to its late entry in apple (business) plantation as apple trees have a gestation period of 8 to 10 years and trees in the district may be young and at non-fruit bearable stage. Same is also true with the Kinnaur district where new plantation has come and will contribute to production in due course of time.

Figure 1: Shares of Different Fruits in Total Production in H.P. in 2017-18



Source: Horticulture Department, H.P.

3.1. Area, production and productivity of Apple in H.P.

From the table 4 and figure 1, we may understand that apple dominates the area and production of fruits in H.P. Apple has highest productivity among the all the fruits in the state as well.

At the time of full statehood, H.P. produced 125 thousand metric tons of fruit from 28 thousand hectare of land and 446 thousand metric tons from 112 thousand hectare of land in 2017-18 recording 297 percent increase in area and 298 percent in production, respectively (Table 4). Among all the districts, the maximum increase in area is registered by district Chamba; it has recorded a 1621 percent rise in the area under orchards since the inception of state in early 1970's and district Kinnaur has topped the table in the production of apple, the production in district has marked a record 1822 percent increase over 1971 production. Out of nine apple producing districts, three prominent low-lying districts, namely, Kangra, Solan and Sirmaur recorded negative growth in area and production relative to base year 1971 by various magnitudes in the range of 65 percent to 95 percent. Three districts, Chamba, Mandi and Kinnaur have recorded more than state average increase in area under the crop while the rest recorded less than that of state average. Whereas districts, like Chamba, Kinnaur and Shimla performed better than state average in the production of apple.

3.2. Temporal changes in area, production and productivity

The compound growth rate of area, production and productivity of apple in H.P. is given in Table 5. The long run rate of growth of area, production and yield of apple is 3.4 percent, 4.5 percent and 1.3 percent, respectively, in the state. Among the districts, the maximum compound growth rate in area is achieved by Lahul-Spiti (10.61%) followed by chamba (6.9%), Kinnaur (5.8%), Kullu (2.7%) and Shimla (2%); Sirmaur and Kangra show no growth at all while, Solan has witnessed (4%) negative growth rate in area . Lahul-Spiti (8.2%) and Kinnaur (7.5%) leads the table in terms of maximum rate of growth of output followed by Chamba (4.9%), Shimla (4.4%) and Mandi (2.6%), While, Solan and Sirmaur depict the negative trend rate of output to the extent of -7.5 percent and -3.3 percent. Interestingly, only two districts record positive growth rate in productivity, namely Shimla (2.3%) and Kinnaur (2%), while rest of districts show negative growth rate of yield over the years and state as a whole register positive and significant rate of 1.3 percent per annum. From the

TABLE 4: AREA AND PRODUCTION OF APPLE IN HIMACHAL PRADESH AND PERCENTAGE CHANGE SINCE 1971

Name of State/ District	Variable		Year		
			1971-72	1990-91	2017-18
H.P.	Area (hectares)		28308	62828	112634
	Production (metric ton)		125060	342071	446574
	Increase over 1971 (%)	Area	-	121.94	297.89
		Production	-	173.53	257.09
Kangra	Area (hectares)		308	589	434
	Production (metric ton)		1220	422	277
	Increase over 1971 (%)	Area	-	91.23	40.91
		Production	-	-65.41	-77.3
Lahul-Spiti	Area (hectares)		-	131	1682
	Production (metric ton)		-	27	305
	Increase over 1971 (%)	Area	-	-	-
		Production	-	-	-
Chamba	Area (hectares)		727	3980	12510
	Production (metric ton)		2500	2661	11734
	Increase over 1971 (%)	Area	-	447.46	1620.8
		Production	-	6.44	369.36
Mandi	Area (hectares)		3913	3980	16568
	Production (metric ton)		17508	15359	38344
	Increase over 1971 (%)	Area	-	1.71	323.41
		Production	-	-12.27	119.01
Kinnaur	Area (hectares)		733	4302	11219
	Production (metric ton)		3132	1959	60210
	Increase over 1971 (%)	Area	-	486.9	1430.6
		Production	-	-37.45	1822.4
Kullu	Area (hectares)		6769	14342	26633
	Production (metric ton)		31280	70857	89570
	Increase over 1971 (%)	Area	-	111.88	293.46
		Production	-	126.52	186.35
Shimla	Area (hectares)		13619	25191	40160
	Production (metric ton)		60000	243042	265987
	Increase over 1971 (%)	Area	-	84.97	194.88
		Production	-	305.07	343.31
Sirmaur	Area (hectares)		2028	3623	2566
	Production (metric ton)		8780	474	1688
	Increase over 1971 (%)	Area	-	78.65	26.53
		Production	-	-94.6	-80.77
Solan	Area (hectares)		211	528	45
	Production (metric ton)		640	70	14
	Increase over 1971 (%)	Area	-	150.24	-78.67
		Production	-	-89.06	-97.81

Source: Authors calculation using data from the Horticulture Department, H.P.

Table 5, important inferences can be drawn regarding the potential and prospects of apple cultivation in the hill state of H.P. Lahul-Spiti and Chamba districts have recorded the maximum growth rate in area and production but at the same negative growth rate in the yield since the plants are new and are in non-fruits bearing stage. The higher mountain districts promise a future prospect of higher production and productivity through new area under the crop and increase in productivity, whereas, the lower part of state is losing its share as apple producing districts. Lower districts' loss is opening opportunities for high altitude district (Meena *et al.*, 2014). If the present trend continues, the high-altitude districts can emerge as new center of apple production in the state and new policy initiatives requires taking these developments in mind. Thus, at the state level, increase in production can be attributed mainly to increase in area under the crop, which is also true as far the districts are concerned.

TABLE 5: TREND GROWTH RATE OF AREA, PRODUCTION AND PRODUCTIVITY IN H.P. (PERCENT)

Variables	Parameters	H.P.*	Chamba	Mandi	Kinnaur	L&S$	Kullu	Shimla	Sirmour	Solan
Area	Growth Rate	3.4	6.9	3.5	5.8	10.61	2.7	2	0	-4
	R^2	0.92	0.95	0.63	0.94	0.98	0.94	0.9	0.15	0.38
Output	Growth Rate	4.5	4.9	2.6	7.5	8.2	3	4.4	-3.3	-7.5
	R^2	0.86	0.81	0.37	0.96	0.82	0.66	0.52	0.29	0.9
Yield	Growth Rate	1.3	-2	-0.9	2	-2.26	0.3	2.3	-3.7	-3.6
	R^2	0.4	0.35	0.17	0.63	0.26	0	0.21	0.27	0.33

Source: Authors calculation using data from the Horticulture Department, H.P.
* Trend growth rate for year 1965/66 to 2017/18.
$ Trend growth rate for year 1974/75 to 2016/17 and for the rest of the districts it is for the year 1971/72 to 2016/17.

3.3. Instability in area, production and productivity

The apple production in the state is divided into four phases since the full statehood in 1971 as given in Table 6 showing phase wise instability index for the production, area and yield along with the years of negative growth in the production recorded in that phase. From the table 6, it comes out that out of 45 years of reference period, the state witnessed 21 years of negative growth in production relative to the preceding year. Maximum negative growth years are recorded by district Kangra and Shimla wherein about 50 percent of the coverage years have registered negative growth. At the state level, the instability in area shows a trend of increase in second phase and decline in third and final phase, while in case of both production and yield, the instability increases in the second phase and declines thereafter. Kinnaur district is the only district among the major apple producing districts, wherein the instability has shown constant decline over the period of time and the value of standard deviation is decreasing for all variables, *viz.*, area, production and productivity. While other districts show a mix pattern, for example, in Kullu district, the area under the apple depicts decline in instability over the period of time while, production and yield show increase in the second phase and then decline in subsequent phase. Shimla, most important from the view point of area and production of the crop also records decline in instability in area in second phase and then increase thereafter, whereas in the case of production and productivity, the instability records increase in second phase compare to first phase and then declines in last phase.

3.4. Decomposition analysis

The analysis of the factors affecting the total production of the fruit in the state reveal that around 45 percent of growth in apple was due to increase in area under apple, and around 6 percent due to increase in yield, the remaining change in the production can be explained by interaction between

TABLE 6: NUMBER OF NEGATIVE GROWTH PERIOD (YEAR) AND INSTABILITY INDEX

Districts	Period	Area	Production	Yield	Number of negative growth year
Chamba	I	0.06	1.08	1.09	6
	II	0.04	0.91	0.91	8
	III	0.06	0.80	0.80	7
	IV	0.06	0.91	0.91	21
Mandi	I	0.31	1.61	1.62	7
	II	0.16	0.69	0.70	6
	III	0.01	0.81	0.81	7
	IV	0.20	1.06	1.07	20
Kinnaur	I	0.05	1.21	1.20	8
	II	0.02	0.74	0.75	7
	III	0.02	0.19	0.18	6
	IV	0.04	0.80	0.80	21
Lahul-Spiti	I	-	-	-	-
	II	0.06	0.52	0.50	7
	III	0.20	0.53	0.59	8
	IV	0.13	0.58	0.59	15
Kullu	I	0.90	0.95	1.41	7
	II	0.02	1.25	1.25	7
	III	0.02	0.83	0.83	7
	IV	0.49	0.93	1.09	21
Shimla	I	0.02	0.78	0.80	9
	II	0.01	1.12	1.12	9
	III	0.07	0.59	0.62	6
	IV	0.05	0.84	0.85	24
Sirmaur	I	0.03	1.45	1.48	6
	II	0.00	1.33	1.33	8
	III	0.07	0.69	0.72	4
	IV	0.05	1.10	1.12	18
Solan	I	0.18	1.41	1.37	5
	II	0.01	1.15	1.15	9
	III	0.41	0.35	0.62	8
	IV	0.27	1.03	1.05	22

TABLE 6: NUMBER OF NEGATIVE GROWTH PERIOD (YEAR) AND INSTABILITY INDEX-*CONTD.*

Districts	Period	Area	Production	Yield	Number of negative growth year
Kangra	I	0.04	0.63	0.64	11
	II	0.02	0.84	0.83	5
	III	0.12	0.28	0.29	8
	IV	0.08	0.63	0.64	24
H.P.	I	0.02	0.83	0.84	7
	II	0.01	0.92	0.92	8
	III	0.04	0.65	0.59	6
	IV	0.03	0.79	0.78	21

Source: Authors calculation using data from the Horticulture Department, H.P.
NOTE: Phase 1 refers to 1971-72 to 1984-85, Phase II refers to 1985-86 to 2000-01; Phase III refers to 2001-02 to 2016-17 and phase IV refers to 1971-72 to 2016-17.

area and yield of apple (Table 7). It seems, therefore, the area under apple rather than productivity appears to have played dominant role in increasing production of apple during the reference period (1965-66 and 2017-18).

At the district level, analysis of decomposition of growth shows that in some districts change in yield has contributed into the growth of production of apple, while in other districts, change in production was brought about by change in area under apple. With the help of additive decomposition model (as explained in methodology) relative contribution of area and productivity in the change in production between 1971-72 to 2016-17 is calculated for the major apple producing districts and the same is presented in the Table 7.

TABLE 7: DECOMPOSITION OF GROWTH (IN PERCENT)

Variables	Chamba	Mandi	Kinnaur	Lahul-Spiti	Kullu	Shimla	Sirmour	Solan	Kangra	H.P.
Area Effect	438.81	271.75	78.50	48.39	-14.61	56.77	104.99	80.43	-52.93	44.65
Yield Effect	-19.69	-40.56	1.40	1.72	157.48	14.66	-32.84	91.75	108.53	6.25
Interaction Effect	-319.12	-131.19	20.10	49.89	-42.87	28.57	27.85	-72.18	44.40	49.11

Source: Authors calculation using data from the Horticulture Department, H.P.

The Table shows that in Kullu, Kangra, Solan districts yield has major contribution to change in production during the reference period. The yield has increased by about 1.5 times in Kullu. Chamba, Mandi, Sirmaur, Solan, Kinnaur and Shimla have positive and significant contribution from the area under the crop. The area effect is highest in Chamba district. The interaction effect is highest in Lahul-Spiti district followed by Kangra, Sirmour, Shimla and Kinnaur. Interestingly, in Kinnaur, Lahul-Spiti and Shimla, all the components of growth are positive and significant which shows the bright future of apple production in these districts.

4. Conclusion and Suggestions

H.P. has emerged as an important apple producing state and is next only to Jammu and Kashmir in the production of this crop, the area under this crop and production both recorded tremendous increase over the period of time. The importance of apple in the state economy can be judged from the fact that around 50 percent of area under the fruits and around 90 percent of fruits produced in the state consists of apple. It came out from the analysis that apple production is shifting to high altitude and districts, like Kinnaur and Lahul-Spiti are emerging as prominent apple producers.

Based on research done following suggestions may be given:

i. The Government should build up the basic infrastructure in these districts so that the produce can be transported to the markets in adjoining states.

ii. Basic training and extension services should be provided to the apple growers in these districts.

iii. In low height districts, new varieties of apple, conducive to the changing weather conditions should be promoted and farmers should be motivated to grow the other off-season vegetables and fruits.

iv. Climate change would be major factor determining the production and hence, productivity of apple in the hill state, so it requires immediate steps to mitigate the effects of climate change.

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Effects of COVID-19 Lockdown on Agriculture Sector & Extenuating Measures: An Overview of Bihar and Jharkhand

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Abstract

India has been under unprecedented lockdown since 24th March, 2020, and there is no forecast as to how long will it last. Due to this still continuing lockdown, along with various other economic activities, agriculture and allied sector has been severely affected across the value chains of various crops, particularly garma/ summer crops (crops which are being sown in March and harvested in June-July). Some policy related analysis on the effects and implications of COVID-19 for agricultural and rural sector is desired to frame short, medium and long-term policies. In view of this, this research study is undertaken based on 'Online Survey' of 50 farm households of Patna district alongwith telephonic discussions with some progressive farmers of Begusarai, Muzaffarpur and Bhagalpur districts of Bihar and Godda and Giridih districts of Jharkhand. This paper seeks to examine effects of lockdown on crop-raising and allied activities in Bihar and Jharkhand states during and post-lockdown period. It is suggested that our policymakers, elected public representatives, researchers and scientists should concentrate on determining and chalking out short, medium and long-term contour and contingent plans for sustaining, developing and strengthening agriculture and all its allied activities instead of treating lockdown as a 'Pause Button' only. Provision of inputs, transportation, storage, procurement, etc. should be made for agricultural farmers alongwith ensuring the fulfillment of basic need of foodgrains through National Food Security Act (NFSA). Emphasis should also be given on confiding and working sincerely on the already devised and determined seven-points' strategy of doubling farmers income (DFI) by the year 2022 which will enable India's economy to regain its 'pre-Corona prosperity'.

Keywords: *COVID-19, input subsidies, agriculture, foodgrains, lockdown.*

1. Introduction

No doubt, reverberations from the economic dislocation caused by the COVID-19 are being felt across the world. The second phase of the pandemic response, started from 15th April, 2020 is slowly easing the burden on the economy by permitting a measured return of business and economic activities, so that livelihoods and supply chains can be restored to some minimum desired extent. India has been under lockdown since 24th March, 2020 and there is no forecast as to how long will it last. It means most of the economic activities related to goods and services have and will remain suspended atleast for sometime in future. Consequent of such a long suspension/halting of various economic activities, income levels of quite high number of people would have definitely been reduced significantly, or even become zero. So, after the COVID-19 threat is over and lockdown is withdrawn, it is expected that the demand for foodgrains and other agricultural commodities will continue to rise as it is the basic necessity while, the demand for all other goods & services will start gaining momentum only after some time, when other production and economic activities would start. Amid growing concerns among poor farmers and under privileged people, the Government of India has taken steps for direct cash transfers to farmers under 'PMKisan Samman Nidhi' scheme. Besides this, free foodgrains are being given to mitigate distress and hunger of the poor, resourceless and the deprived sections of the country. As the economy is shrinking (not only at the national level, but at the world level too due to this pandemic), there is, no doubt, need to find ways and prioritize actions to get a "V-shaped economic recovery" by strengthening agriculture and its allied sectors/ activities in the post-lockdown period.

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Grounding of agriculture sector: The problem

At present, it is highly desirable that harvesting of rabi crops, particularly wheat, is facilitated, so that there is no avoidable loss. In view of non-availability of desired number of masks, work with homemade masks, communication on social-distancing and tracking, labourers need to be allowed to harvest, thresh and put the grains in bags. Procurement and transportation of marketable/surplus quantities of foodgrains to storage centres and sale points are also points of dismay. Limited movements of trucks and tractors have to be made fully unrestricted (having complied with the guidelines of safe distancing). The risks in undertaking these agriculture & its allied activities are minimal. Besides, these have potentiality of cushioning the agricultural economy, on which large proportion of India's population is dependent. Unless the Government steps in to generate demand of various goods & services rapidly by exploring possibilities/areas of employment generation, under the informal sectors, preferably in the rural areas at higher wage-rates in the post-lockdown period, the recovery is likely to be feeble. There is precedent of 2008, when a stimulus package of around 4 percent of the then GDP resulted in a 'V-shaped recovery'.

Counteracting post COVID-19 effects: DFI's strategies

With the view to extenuate the after effects of post-COVID-19 period on agriculture and allied activities and various enterprises, seven-point strategy determined for achieving the goal of doubling farmers' income (DFI) by 2022 set by the Prime Minister, Shri Narendra Modi. This can prove to be of great help to improve the economic condition of farmers by 2022. For the first time, a Prime Minister had put such a target before the nation for the direct welfare of farmers. For getting the pronounced goal of the Government of India achieved, no doubt, a large number of officials and farmers too, have been making continuous efforts**.** The seven-point strategy which has been encircled for this purpose includes: (i) increase in production, (ii) effective use of input cost, (iii) reduction in post-harvest losses, (iv) value-addition, (v) reforms in agriculture marketing, (vi) risk security and assistance and (vii) allied activities. Further, allied activities have been desirably impregnated with more emphasis on the following seven components/ sectors, namely (i) horticulture, (ii) integrated farming, (iii) white revolution, (iv) blue revolution, (v) sub-mission on agro-forestry, (vi) bee-keeping and (vii) rural backyard poultry development. In this context, it can be said that the adverse impact of long lockdown, for preventing the spread of COVID-19, on agrarian and overall rural economy of India may be effectively reduced by seriously working on the already determined seven-point strategy of DFI by the year 2022.

1.1. Objectives of the study

This write-up seeks to examine following objectives:

(i) Prepare contour of estimated loss in the form of areas shrinkage under different summer crops due to lockdown.

(ii) Examine prioritization of activities/things in post-lockdown situation.

(iii) Briefly expound weather and other constraints faced by farmers & extirpating measures by Government of Bihar.

(iv) Briefly discuss lockdown impediments & steps taken by the Government of Jharkhand to take out poor from gloomy period of no economic activity.

(v) Suggest action points for future planning.

2. Methodology

Expatiated description and inputs being provided through this research study containing lockdown agrarian scenario of Bihar and Jharkhand states have been divided into four parts.

Analytical overview of Part-I is based on telephonic discussion with some farmers belonging to Keshavai, Korai, Ratanman Babhangama, Rajopur and Karichak Villages in Begusarai district of Bihar.

For Part-II, an online survey of 50 farmers was conducted (using questionnaire with objectives-based limited questions) in Patna district of Bihar. These 50 farmers were taken randomly from across 14 blocks of the district out of its total 23 blocks. Actually, sample size comprised the farmers, who could respond to mailed questionnaire. Online surveyed farm-households comprised 5 marginal, 13 small, 27 medium and 5 large/big households. Land size-wise classification was determined based on the

following definition: marginal (owned cultivable land from 0.01 to 2.5 acres), small (more than 2.5 to 5 acres), medium (more than 5 to 10 acres) and large/ big farmers (more than 10 acres). Simple tabulation and percentage methods have been used to derive some quick results/ understanding. Names of blocks, from where the farmers joined to respond our online survey, are: Danapur, Punpun, Patna Sadar, Dhanaura, Barh, Masaurhi, Bihta, Dulhin Bazar, Belchi, Fatuha, Khushrupur, Sampatchak, Daniyawan and Paliganj.

It is to be noted that reference period for data collected through online survey is 7th to 12th April, 2020. While, the reference period for secondary data-based analysis is March 24th to May 5th, 2020.

Part-III gives an overview of ongoing constraints before farming community and steps taken by the concerned State Governments, i.e., Bihar and Jharkhand. All the inputs have been contemplated through state level daily newspapers and other reliable secondary sources.

3. Discussion

3.1. Part-I: hardships & scope

This section deals with scenario of cultivation/ harvesting related activities during the first phase of COVID-19 lockdown in Begusarai district of Bihar.

As during the 1st phase, there was hardly any purchase of fruits and vegetables was made by wholesaler and big traders of markets across the districts, so vegetable and fruits' growers had to suffer economic losses. No purchasing of rabi crops, particularly gram, maize and wheat, by private agencies due to lockdown has also done away with willingness of farmers towards cultivation activities. Till second week of April, 2020, there was no procurement of wheat by the Government, and private traders, wholesalers and marketing agents also couldn't turn-up to purchase the marketable surplus of farmers, so for want of capital and/ money, quite a good number of farmers drew back from taking decision in regard to sowing garma/ summer crops (crops which are being sown in March and harvested in June-July) in some areas. Non-availability of desired storage facilities at the farm household levels, on hiring basis and at government level have also put some farmers in dreary environment. It is so, because a good number of farmers of the district did not prefer to sell surplus quantities of wheat produced immediately after harvesting. Neither any problem or damage would have caused in case of wheat production even due to lockdowns, only because of the weather condition remained normal and favourable. But, 2-3 rainfall with storms during 2nd week, 15th and 19th April, 2020 in different parts of Bihar has definitely led to damage of rabi crops upto some extent.

(A) Effects on dairy sector

During the beginning of 1st lockdown phase, when all the activities and vehicular traffic were totally stopped, procurement, processing, chilling and packaging of milk at "Dr. Rajendra Prasad Milk Producers' Union'', popularly known as Barauni Dairy had to be suspended for 3 shifts due to overflow of milk. But after that, demand for milk resumed and production process started same as before. Thus, dairy co-operative sector and marketing have remained unaffected.

(B) Effects on horticultural crops

Mango and Litchi are the two main fruits grown prominently in large areas. The two horticultural crops will be ready for marketing by 15th-20th May, 2020. No adverse effects are likely to fall on production and marketing of these valuable and tasty fruits with distinguished aroma.

(C) Subsidy & inputs-related constraints

Rainfall with hailstorms that occurred during 14th -19th April, 2020 has caused damage to rabi crops ready for harvesting, particularly maize. But, State Agriculture Department has directed not to give subsidy to farmers, whose less than 33 percent of total cropped area has been damaged.

During our fight against COVID-19 (collectively at national level), more than one month has passed after having submitted application for Input Subsidies (IS), but the amounts had not been credited to farmers' accounts till 12th April, 2020. Farmers, whose crops were damaged due to untimely rainfall and hailstorms in February, 2020 have not yet been compensated. By 12th April, 2020approximately 13,23,893 farmers were waiting for their compensation. In beginning, the processes of assessing extent of crop damages were not done by the Agricultural Co-ordinators, and then as a result

of technical fault in website, the amounts couldn't be transferred to suffering farmers' accounts. If official sources were to be believed, farmers might have to wait till 19th or 20th April, 2020. It is to be noted that to solve this problem, entire amount meant for February month's IS has already been released at the Chief Minister's level well before. Now, those 6,17,372 farmers, who had submitted applications for IS by the last date, i.e., 18th April, 2020 are likely to get their amounts only by the end of May, 2020.

(D) Fisheries sector

For taking out fish from ponds of big/medium size, 15-20 labourers are required to erect fishing net. Villagers also gather around tanks/ponds, when fishing exercises undertaken. Thus, maintaining social-distancing and strict adherence of other guidelines becomes difficult. Transportation of labourers for fishing is also a constraint.

(E) Poultry sector

During the 1st phase of lockdown, rumours and some false or true apprehensions about Bird' Flu prevailed among non-vegetarian people of the Bihar state due to which poultry birds were thrown away or put under debris. In quite a few places, poultry rearers had stopped further activity. As a result, even though with the beginning of 2nd phase of lockdown poultry birds have been confirmed to be safe for consumption, its supply has significantly declined. Consequent to this, retail sellers of poultry birds are getting it at higher prices (@ Rs. 130/- per kg on an average). It is leading to lower profit margins of the sellers and poultry rearers both.

3.1.1. Part-II: Expatiated scenario of Bihar during 6th to 13th April, 2020

Total area owned by 50 surveyed farmers belonging to marginal, small, medium and large size households-was 363.43 acres. This part encompasses data-based inferred facts in three sub-sections, *viz., (A) effects* in the form of less areas sown than the normally decided ones, (B) farm class and crop-wise estimated monetary losses due to COVID-19-lockdown, and (C) constraints/challenges faced by farmers.

(A) Gauging effects in the form of less areas sown than the normally decided ones for Summer crops

Consequent to suspended activities in all sectors, shrink in areas under various crops, namely moong, vegetables, maize, onion and barseem were reported (measured in terms of less than the areas that would have been used under normal circumstances). In percentage terms, marginal farmers who found to have not undertaken sowing for moong, maize and vegetables are 100 percent, 50 percent and 100 percent, respectively. In case of small farmers, drop in areas sown was 40 percent, 40 percent and 20 percent for moong, vegetables and onion, respectively. Medium farm households used 40.54 percent, 37.5 percent, 35.29 percent and 20 percent less areas for growing maize, vegetables, onion and moong, respectively. Large farm households also could sow maize and moong in 75.68 percent and 49.02 percent less areas, respectively than they would have under normal condition. This is elaborated in table-1 given below.

TABLE 1: COVID-19 LOCKDOWN EFFECTS ON GARMA/ SUMMER CROPS IN BIHAR IN TERMS OF PERCENTAGE DROP IN AREA SOWN PER-ACRE

Farm-size Classes	Number of Sample Farmers	Size-Class Wise Total Areas (Owned)	Average size of Land	Moong	Vegetables	Maize	Onion	Barseem
Marginal (0.01-2.5 Acres)	05	11.25	2.25	100.00	100.00	50.00	0.0	-
Small (>2.5-5 Acres)	13	56.25	4.33	40.00	40.00	0.00	20.00	0.00
Medium (>5-10 Acres)	27	190.00	7.04	20.00	37.50	40.54	35.29	80.00
Large/Big (>10 Acres)	05	105.92	21.18	49.02	-	75.68	—	—
Total	50	363.42	7.27					

Source: Obtained from surveyed households through online mode.

(B) Farm class and crop-wise expected/estimated monetary losses due to COVID-19-lockdown

In this sub-section, estimated farm class-wise and crop-wise losses in terms of Rs./Acre have been illustrated based on data collected from households. Table 2 shows that surveyed marginal farm households reported their estimated losses to be Rs. 4000 per acre, Rs. 9555.56 per acre, Rs. 9333.33 per acre and Rs. 4444.44 per acre for moong, maize, onion and vegetables, respectively. Small farm households reported estimated losses of nearly Rs. 3600 per acre, Rs. 3022.22 per acre and Rs. 2222.22 per acre in respect of moong, onion and barseem crops, respectively. Medium farmers expected to face per acre losses of about Rs. 2315.79, Rs. 3236.84 and Rs. 1342.11 in case of moong, maize and onion, respectively. Expressed fear of highest expected per acre losses were reported by large farm households, *viz.*, Rs. 6515.58, Rs. 4178.47 and Rs. 2691.22 in case of moong, maize and onion, respectively.

TABLE 2: FARM CLASS-WISE AND CROP-WISE ESTIMATED AVERAGE LOSSES PER FARM HOUSEHOLD (IN RS./ACRE)

S.No.	Farm-Size Classes	Moong	Maize	Onion	Vegetables	Barseem
1.	Marginal	4,000.00	9,555.56	9,333.33	4,444.44	-
2.	Small	3,600.00	1,066.67	3,022.22	1,422.22	2,222.22
3.	Medium	2,315.79	3,236.84	1,342.11	868.42	131.58
4.	Large	6,515.58	4,178.47	2,691.22	-	-

Source: Primary survey through online submitted responses.

Overall (including all farm-size groups) highest per acre losses due to area shrinkage were estimated for maize followed by moong, onion, vegetables and barseem as Rs. 3398.63, Rs. 3238.08, Rs. 2712.97, Rs. 1425.74 and Rs. 811.04, respectively, as shown in table 3 below.

TABLE 3: FARM CLASS-WISE AND CROP-WISE TOTAL LOSSES & AVERAGE LOSS (IN RS.) AS EDUCED/ ESTIMATED TO INCUR BY RESPONDENTS DUE TO LOCKDOWN

S.No.	Farm Size Classes	Number of Farm households	Moong	Maize	Onion	Vegetables	Barseem
1.	Marginal	05	20,000.00	47,777.80	46,666.65	22,222.20	-
2.	Small	13	46,800.00	13,866.71	39,288.86	18,488.86	28,888.86
3.	Medium	27	62,526.33	87,394.68	36,236.97	23,447.34	3,552.66
4.	Large	05	32,577.90	20,892.35	34,456.10	-	-
5.	Total	50	1,61,904.23	1,69,931.54	1,35,648.58	64,158.40	32,441.52
6.	Average		3,238.08	3,398.63	2,712.97	1,425.74	811.04)

Source: Field survey through online mode.

(C) Constraints faced by Farmers

During the 1st phase of lockdown, 100 percent of the surveyed farm households reported to have faced constraints, like: shortage of labour, closure of output and inputs markets and suspension of all agricultural, industrial activities and movement. Problems related with distribution of inputs, non-availability of inputs, crop insurance, harvesting & threshing were experienced by 85 percent, 75 percent,

50 percent and 45 percent of the surveyed farm households, respectively. Table 4 gives an overview of constraints faced by households during lockdown period.

TABLE 4: CONSTRAINTS FACED BY FARM HOUSEHOLDS DURING LOCKDOWN (ALL FARM-SIZE CLASSES TAKEN TOGETHER)

S.No.	Types of Constraints	Response (%)
1.	Lack of Labour	100.00
2.	Lack of Inputs	75.00
3.	Closure of Output & Inputs Markets	100.00
4.	Suspension of all Economic, Industrial &Production Activities	100.00
5.	No Insurance Coverage related Facilities	50.00
6.	Problems in Harvesting & Threshing	45.00
7.	No Free Distribution of Inputs	85.00
8.	Awaiting Desired Increase in Crop Prices	15.00
9.	Droopy amidst New Likely Decisions about Crops' Price Increases	05.00

Source: Primary data obtained through online mode.

3.1.2. PART-III: Steps taken by the government of Bihar

The State Government of Bihar is serious about different problems of the farmers (including harvesting of wheat) about 75-80 percent of which had already been done by the end of third week of April, 2020. Helpline centres have been installed in various districts. Earlier this arrangement was available at the state level only which had been receiving 3,000 calls/day. Due to large number of incoming calls and the difficulty in solving the problems of farmers, subsequently, at the end of the 1st phase of lockdown, helpline centres have been set-up at the district level. Separate numbers have also been released / promulgated for it. Farmers can have easy access to agriculture scientists and concerned officers of the department/ agencies, and can get their issues/queries addressed.

(i) Support through MSP procurement

Procurement of wheat at MSP had started in Bihar from 21st April, 2020. It will be continued till July 15th, 2020. This year, 2 lakh metric tonnes of wheat will be purchased. The Union Government of India has already fixed purchase price of wheat at Rs. 1,925 per quintal. Co-operative department of the state government has initiated the process of registration of wheat growers. Online registration can be done through website of the department. State Government has also announced to provide the facility of procuring wheat and paddy simultaneously, till 30th April, 2020. The farmers who have got themselves registered for paddy, were required to get registered for wheat separately.

(ii) Procurement by the state government

The State Government is equally sincere for purchase of wheat. The target of procurement has been enhanced to 7 lakh metric tonnes as compared to the earlier target of 2 lakh metric tonnes for current year. Primary Agricultural Credit Society (PACSs) has now been directed to whole-heartedly focus on it. The State Government has suspended PACSs' license to work as public distribution system (PDS) for 3 months. Beneficiaries attached to these PACSs have been ordered to be linked with nearby PDS shops. It is to be noted here that 4,000 PACSs in Bihar have PDS licence. This decision has been taken after having consent from the Department of Food & Consumers Affairs with a view to ensure speedy purchase of Wheat. Besides this, the District Magistrates have been directed to maintain reserved stocks of wheat purchased at MSP in all districts.

(iii) Discreet initiative of Bihar Agricultural University (BAU), Sabour (Bhagalpur)

With the objective to take out agriculture sector of the state from disruptive effects of the lockdown,

BAU has prepared extensive work plan. Under this plan, farmers are being made available inputs, like seed, plants, chemicals, Plant Preservative Mixture (PPMs), etc., through its Krishi Vigyan Kendra (KVKs) situated in 21 districts of Bihar. In addition to this, BAU is also making farmers aware. Farmers are also being advised to maintain social-distancing, while working on field, or at work. By using FM Radio installed at the headquarters and KVKs, Barh, BAU is providing knowledge and information which includes: protection from COVID-19 infection, standard guidelines for safety, precautionary measures regarding agricultural operations, compliance of government's directions, etc. Relay duration of radio programmes has been extended to 12 hours from the existing 3 hours.

(iv) Employment for inward migrated labourers in agriculture sector

With the objective to extenuate deleterious effects of long lockdown due to spread of COVID-19, Department of Agriculture, Government of Bihar has initiated to provide employment opportunities to the labourers, who migrated back from other states. Such employment will be provided at local levels, i.e., in the surrounding areas of their homes. Presently, works are likely to be started on the on-going plans/schemes. It has been decided to train large number of youth after the lockdown is withdrawn. In addition to these, under the "Bio-tech Farmers' Hub Plan", various exercises are being speeded-up for makhana, mushroom and banana production. In the six aspirational districts of Bihar, namely Araria, Aurangabad, Banka, Khagadia, Purnia and Katihar back-migrated unemployed youth are being exhorted for undertaking agricultural plans/activities. Works on skill development will be started after lockdown. Online teachings are also being provided for several courses. Works have also been decided to be undertaken for increasing milk production, improvement in the breeds of cows and to increase the number of indigenous cows.

(v) Compensation & input subsidies (IS)

In Bihar, alongwith the process of compensating farmers for damage of rabi crops, process of providing IS is also going on. About Rs. 87 crores had already been credited for the month of March, 2020 in the accounts of 2,49,40,300 farmers. For those farmers who could not have applied earlier, the process of submitting application had been restarted from May 4, 2020, and they could have done so upto 11th March, 2020. Farmers of 196 blocks belonging to 23 out of total 38 districts of the state have been provided with this opportunity.

3.2. COVID-19 pandemic lockdown: impediments for Jharkhand

(i) A 'telephonic interview-based picture' of Jharkhand has been presented here briefly. In the beginning of the first lockdown period upto 20th April, 2020, the ready crops, particularly vegetables couldn't be taken to district and sub-division level markets. Due to high perishability of the vegetable crops and dearth of storage facilities in villages or even at block levels, these had to be sold at lower prices in villages itself. This resulted in huge loss to vegetable growers.

(ii) In Jharkhand, nearly 75 percent of the net sown area is upland and is also the rice fallow land. In respect of cereal crops, it may be termed as a mono-cropped state. Even then, if wheat had been sown in quite few areas in some of the districts, problems were faced in harvesting of the crop due to lack of labourers and absence of means for transportation and other inputs.

(iii) Due to abject of rural people under complete suspension of all economic and production activities and sudden unemployment, by the time the situation will be normal after some time or so of lockdown, majority of the marginal & small farmers and rural artisans will have no money with them to undertake any agricultural activities during the kharif season.

(iv) Prospect of kharif crops in Jharkhand, mainly paddy, maize and in some upland areas arhar seem to be adversely affected. However, large number of migrant workers (about 6.43 lakh), who were stranded in various parts of the country, had started coming back after 3rd May, 2020 as per the new guidelines of the Ministry of Home Affairs (MHA), Government of India. So, more than desired agricultural labourers will be available for kharif season cultivation activities. But, challenge of ensuing lower wage rates for the surplus labour force may prevail.

(v) No significant changes in the form of less areas cultivated than the normal ones in case

of garma/ summer crops was reported in respect of medium and large farmers. It may be so because the decision of sowing vegetables had already been taken and applied before the lockdown. But, losses to potato growers of the state due to untimely rains before harvesting of the crop must be a matter of concern.

3.2.1. Exhilarating steps taken by the Government of Jharkhand

With a view to provide foodgrains to the people belonging to poor and deprived sections of the society in Jharkhand during this period of COVID-19 pandemic, the government of Jharkhand has taken steps to make available foodgrains free of cost/or at lower prices. Government of Jharkhand has provided 10 kgs of foodgrains per member @ Rs. 1/-kg and 70 kgs of foodgrains per card at the same price, during April, 2020 under Priority (PHH) & Antyodaya (AAY) categories of National Food Security Act (NFSA) ration card, respectively. For the month of May, 2020, 10 kgs of foodgrains per member for the card holders of PHH and AAY categories had been decided to be provided free of cost in the districts covered under NFSA. For the month of June, 2020, the Government of Jharkhand has announced to make available 5 kgs of foodgrains/member @ Rs.1/ per kg to PHH Card holders and 35 kgs/Card @ Rs.1/-per kg to card holders of AAY. Both types of card holders will be provided 5 kgs of grains free of cost. It reveals genuine concerns of the state government for the poor people of Jharkhand.

4. Conclusion and Suggestion

Hope beyond despair

Mahatma Gandhi had once rightly told "The earth provided enough for everyone's need, but not for anyone's greed". So, in place of our focus on meeting the greed of a few, if our policy–makers, elected public representatives, researchers and scientists concentrate on determining and chalking out short, medium and long-term contour and contingent plans for sustaining, developing and strengthening agriculture and all its allied activities, then India will definitely and efficaciously succeed in overcoming the almost lymph and gloomy socio-economic environment due to COVID-19 lockdown**.** Lockdown cannot be taken to be a 'Pause Button' only till the 3rd week of May, 2020 as it has proved to be an 'option less life-saving measure'.

4.1. PART-IV: Observation-based action points

(i) With the view to rehandle the already suspended economic activities, agricultural production activities need to be promoted by timely availability of funds meant for IS (*i.e.*, input subsidies).

(ii) Under the Market Intervention Scheme (MIS) of the Government of India, purchase of perishable agricultural commodities and horticultural crops (from the vegetables and fruits' growers of Bihar and Jharkhand states) should be done by the respective state governments. Losses incurred due to non-selling of vegetables & fruits, or selling at lower prices than costs of production during lockdown may also be compensated upto 70 percent, *i.e.*, 20 percent more than the provision under the Scheme.

(iii) As a part of long-term revival measures, installation/construction of adequate storage infrastructure at block and district levels should be envisaged.

(iv) Big agricultural machines, like combined harvester be made available to Bihar with trained drivers /operators from other states, like Punjab. Alternatively, Farm Mechanization Banks (FMBs) need to be strengthened and expanded.

(v) If necessity of any further lockdown arises in the future, some exclusive relaxation may be given for fishing operations.

(vi) In view of estimated high average per acre losses incurred due to areas that couldn't be sown during lockdown, some incentives/ special assistances may be given to farmers for maize, moong, onion and vegetable growers.

(vii) As a medium and long-term exercise and measure, Government may like to provide mandatory 'Crop Insurance Coverage' to one and all farmers, preferably real cultivators.

(viii) To remove doom of rural economy in Jharkhand, all farm households (particularly, marginal, small, semi-medium and share-croppers) should be provided adequate/atleast desired inputs related assistance in cash / kind or both so that paddy, maize, arhar and other kharif

crops may be sown in maximum possible areas.

(ix) To keep the system in ready-mode against and to face any likely threat of the current frightfulness of COVID-19 in the future, the Government may think to ensure broader marketing horizon for disposable quantities of crops grown by farmers of all size-classes.

(x) In place of limited procurement only at mandies, purchase centres may be opened at: rice and dal mills, or for that matter, even at village schools, gram panchayat offices, PACS/ LAMPS/FSSs, district board offices and at any other unused public places (if any such lockdown is promulgated again in future). We will have to remain in readiness to tackle such conspicuous adverse circumstances.

(xi) Rural people and farmers engaged in poultry rearing, need to be provided with some elating assistance, so that they may stay in the business.

(xii) Some emollient assistance (in the form of cash/ inputs) may be provided to those dispirited farmers of Jharkhand, who have faced losses on two fronts (one due to part/ full damage of potato, and the other, as result of lower prices of vegetables) during lockdown.

(xiii) After the lockdown is completely withdrawn, the outcome of COVID-19 like distracting disease would have badly distressed all the countrymen (particularly, rural people, marginal, small, semi-medium farmers, agricultural labourers and the poor). Atleast, one year will be required to restart several types of economic and industrial activities (at the pace before COVID-19). People may be taken out of the formidable phase of dreadful disease and 'almost halted economic scenario' by strengthening and expanding agricultural sector of India and nothing new/special needs to be done for this sector. Only by confiding and working sincerely on already devised and determined seven-points' strategy of DFI by the year 2022-will enable India's economy to regain its 'pre-Corona prosperity'.

(xiv) By the time threat of Corona virus is evanesce, large number of rural people particularly engaged in informal sectors, would have gone out of employment. As the daily-wage workers of Bihar and Jharkhand states, who have back migrated from different big cities of India after lockdown, have started thinking not to go outside the state again for earning bread. Such situation/mindset may prevail for atleast one year, or so. There may be heavy burden of workforce in Bihar and Jharkhand seeking employment in rural areas. In view of this likely challenge, there is need to identify areas/ locations, where cereal crops', horticultural crops, dairy, fisheries, wood/ timber, paper and leather-based OAMEs, NDMEs and DMEs can be installed. In Bihar, a large number of such processing units/ industries should be installed in areas of surplus productions of mango, litchi, banana, maize, watermelon, sugarcane, jute, makhana, paddy, tomato, potato, milk and fish. In Jharkhand, installation of such processing industries/units based on timber, bamboo, minor forest produces (MFPs), jack fruit, mahuwa, etc., may be devised and taken-up.

These short, medium and long-term measures will definitely remove miasma prevailing due to COVID-19, and extenuate the magnitude of penury, apart from boosting the Indian economy on speedy track.

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Agro-Economic Research

Strategies to Bridge Yield Gap of Major Crops in Bundelkhand Region of Uttar Pradesh*

PROF. G.C. TRIPATHI

1. Introduction

Among three principal components of a crop, *viz.* Area, Production and Yield, the yield (productivity) *i.e.* production per unit area of land, is the key component and of vital importance. This is so, since the 'land' as an input factor in producing a crop, is the most scarce resource in agriculture and, therefore, to increase overall agricultural production, in general, and specific crop production, in particular, the main emphasis has to be laid on the yield factor. It can also be said that improving crop yield is most essential and an urgent need of the hour to account for ever-increasing demographic pressure on land which is the scarcest resource in Indian agriculture. It is essential for feeding millions and millions of people and boosting farm income thereby improving the agricultural along with overall economy of the country.

The study of yield variability in terms of existing 'yield gaps' from farm to farm, at a micro level and correspondingly bridging these gaps at all possible macro level, has become imperative, not particularly for a single crop but in general for all the major field crops, for upgrading the agricultural sector of Indian economy. In this regard, the words of Van Iltersun (1st March, 2013) may be well quoted, "Yield Gap Analysis is an increasingly popular concept, as powerful method to reveal and understand the bio-physical opportunities to meet the projected increase in demand for agricultural products towards 2050, and to support decision making on research, policies, development and investment that is needed."

The yield gap study of a crop is thus serving a multi-faceted solution(s) on the adoption of improved agricultural technology with proper management practices. It identifies various factors causing the existing yield gap and also highlights various constraints such as respondents' lack of knowledge, method of seed treatment, proper doses of fertilizers, unavailability of desired verities of seed, required input mixes, labour force, timely irrigation, high costs of input(s). This underlines the need to take due care for maintaining soil nutrients and their basic characteristics. This would result ultimately in minimizing the yield gap(s) coupled with the maintenance of ecological balance.

The present study has been conducted mainly to analyse the 'yield gap' of rice (paddy) and wheat, the two foremost crops in the respective seasons, *viz.*, Kharif and Rabi. Also among total foodgrains produced in the entire Bundelkhand region of Uttar Pradesh, rice and wheat cover above 10 percent of acreage under the crop in relation to net area sown. The study aims to analyse yield gaps of these two crops grown by the cultivators of different sizes of farms to identify the factors affecting the yield gaps of these two crops, along with various socio-economic, technological and environmental constraints.

1.1 Objectives

The following objectives were set forth:

(i) To specify various socio-economic characteristics of farmers of different categories (*i.e.*, size of farms, etc.).

(ii) To analyze the yield gap of major crops grown by the cultivators of different sizes of farms.

(iii) To identify factors affecting the productivity of major crops.

(iv) To identify various socio-economic, techno-logical constraints of major crops.

(v) To suggest policy implication(s) to narrow down the yield gap of major crops to the minimum.

2. Methodology

A field survey has been conducted, using a multi (four) stage stratified random sampling; with districts

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forming the first stage, blocks within the district the second stage, villages within the block as the third stage and farmers (wheat/rice growers) as the fourth stage or the ultimate units of sampling. The selection procedure has been (a) at the first stage, two districts were selected, *viz.* Lalitpur and Banda based on High Yield Gap and Low Yield Gap for crop rice and accordingly two districts, *viz.* Mahoba and Jalaun based on High Yield Gap and Low Yield Gap, for crop wheat, to make a total selection of four districts, (b) at the second level, one block was selected in each of the four selected districts based on the maximum area under the respective crop, (c) at third stage, a cluster of three villages was selected from each selected block and finally, (d) at fourth stage, a list of all small (less than 2 hectares), medium (2 to less than 5 hectares) and large (5 hectares and more) farmers (paddy/wheat growers) was prepared and then selecting 10 farmers randomly from each list, to make a total sample of 60 farmers for paddy and 60 farmers for wheat resulting into an overall sample of 120 farmers for the entire study. The corresponding primary data pertaining to the year 2018-19 was collected from the respondents through personal interviews by the AERC research team.

3. Findings and Conclusions

The findings and conclusions obtained from the present study on strategies to bridge yield gaps of rice and wheat crops in Bundelkhand region of Uttar Pradesh, are presented as under:

i. Out of total 120 respondents, 55 percent were Soil Tested Farmers, while only 34 percent of them had received Soil Health Cards (SHCs).

ii. Under System of Rice Intensification (SRI) method, the potential yield of paddy in this region has been recorded as 24 quintals per acre. Against this, the highest and the average recorded yields for the whole sample, have been respectively as 20 quintals per acre and 16 quintals per acre.

iii. Under conventional method of paddy cultivation, against the potential yield of 16 quintals per acre, the highest and average yields are recorded as 11.36 quintals per acre and 8.27 quintals per acre on an overall basis.

iv. The yield gap analysis for wheat crop shows that the potential yield, highest yield and also the average yield of wheat match with respective paddy yields under SRI method, but they are relatively higher than those of paddy yields under conventional method on an overall and category-wise basis.

v. Percentage-wise all yield gaps levels, *i.e.*, yield gaps -I, II and III for crop wheat have been lower than the corresponding ones in case of crop paddy whether under SRI or conventional method on overall and category-wise basis.

vi. Among SRI and conventional methods cultivators, the main sources of information regarding paddy cultivations are in order; agriculture departments, progressive farmers and relatives/neighbours, while TV/Radio and newspaper as sources of information are not used by any category of paddy grower , except a single farmer of large category adopting the conventional method.

vii. Similar to paddy cultivators, the main sources of information to wheat cultivators have been in order as agriculture department, progressive farmers and relatives/neighbours.

viii. The two major constraints according to paddy growers under SRI method, in adopting recommended packages are lack of suitable machinery and high cost of inputs. Other constraints, as reported by paddy cultivators under SRI method, have been in order, unavailability of desired variety of seeds, unavailability of capital, and lack of knowledge about the method of seed treatment and proper doses of fertilizers.

ix. Similar to SRI method, under the conventional method of paddy cultivation also, on overall basis, the two main constraints have been lack of suitable machinery and high cost of inputs.

x. As in case of crop paddy (both SRI and conventional methods), high cost of inputs has been a major constraint for wheat crop. Among other constraints, the unavailability of the desired variety of seed has also been the main constraint for paddy and wheat cultivators.

xi. Among 12 independent variables selected for paddy and 11 for wheat, 9 variables have a statistically significant effect on yield of paddy

and 6 in case of wheat at 10%, 5% and 1% level of significance. Among these, the two variables affecting the yield significantly for both paddy and wheat crops are urea and DAP applications, with positive coefficients.

xii. The variables which are statistically significant with positive coefficients have been source of seed, soil test, (seed treatment), varietal improvement, urea application, (DAP application), size of holding and method of sowing for crop paddy and those of source of seed, Urea and DAP applications and irrigated land for crop wheat; and their positive contribution(s) in increasing respective crop yields have also been revealed.

xiii. Irrigated land, the sole variable in case of paddy, while age and seed rate the two variables in case of wheat are having negative and statistically significant coefficients at 5% level of significance to show their adverse contribution towards enhancing the yield of these two crops.

xiv. On overall basis, all the selected variables, 12 in paddy and 11 in wheat, when taken jointly are, respectively, explaining 94.20% of total variations in 'yield' for crop paddy and 86.20% for crop wheat. This may be taken as quite a satisfactory performance of selected variables in the case of both the crops towards increasing crop productivity.

xv. It may also be mentioned that very high coefficients in case of some variables, may be possibly due to their over (excessive) or under (meagre) application(s).

4. Suggestions

Based on research, following suggestions can be given:

i. The awareness level of the farmers of the region needs to be enhanced regarding testing of soils and the farmers should be encouraged to get Soil Health Cards. For this the directions to concerned agencies entrusted with the responsibility of carrying out soil testing and distribution of SHCs should be issued to take care of this aspect as earnestly as possible.

ii. The dominance and importance of agriculture departments, progressive farmers and relatives/ neighbours in providing required and needful information to paddy growers of the region for enhancing aggregate production need special mention. For this, the sources like TV/radio, Kisan Call Centre, newspapers should take special care.

iii. Further, while agriculture departments, progressive farmers and relatives/neighbours have been successfully providing desired information to the wheat growers, the sources like TV/radio, Kisan Call Centre and newspaper should strive hard to become an effective source of information to farmers.

iv. Special care has to be taken in respect of (i) making available required inputs and the needed machineries to the concerned farmers to aid and support their respective pocket sizes, through subsidies on recommended input mixes (packages) and their timely availability, and (ii) providing financial assistance, supply of desired variety of seeds and Soil Health Cards as remedial measures to them.

v. The findings in respect of various constraints reveal that (a) high cost of input and un-availability of desired variety of seed have been the main constraints for both paddy and wheat crops, (b) un-availability of labour at peak operational period has also been a serious concern for both the crops. And, in general (c) lack of suitable machinery and un-availability of capital are the constraints for both the crops, but to a greater extent in case of paddy. As such all these too need special care.

vi. All such variables which have positive but insignificant coefficients need caution and due attention in their respective application(s) to underline their individual impact(s) as well, in increasing the crop yield and accordingly narrowing down the existing yield gaps of wheat and paddy crops to the minimum.

vii. Apart from different schemes already launched/being launched by the government, the various government/nodal agencies, extension workers, researchers, soil scientists/ soil health workers should devise training programmes keeping in view the respondents

educational status and knowledge level of appropriate cultivation practices. The training may be imparted through demonstrations and field trials for proper seed treatment, source of seed, varietal improvement, Soil Health Card (SHC) based recommendations in adopting cropping schemes and the need-based fertilizer (Urea/DAP) application(s). This should have the prime motto of increasing crop yields and thereby the aggregate crop production of rice and wheat in this region of Uttar Pradesh.

viii. As an effective policy implication in respect of sensitivity and wide applicability of this prime issue of bridging yield gaps of major field crops at a micro (regional) and macro (national) level, it is recommended to have three-year based strong database instead of a single year. Therefore, this study should be continued for another two successive years for both the parts, i.e., Uttar Pradesh and Madhya Pradesh region of Bundelkhand agro-climatic zone of India, one of the least developed regions of the country. The respondents for the successive studies may remain the same or new respondents may be selected.

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Commodity Reviews

Foodgrains

Procurement of Rice

The total procurement of rice during kharif marketing season 2019-20 up to 31.03.2020 is 39.37 million tonnes as against 37.26 million tonnes during the corresponding period of last year. The details are given in Table 1. A comparative analysis of procurement of rice for the period of marketing season 2019-20 (up to 31.03.2020) 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

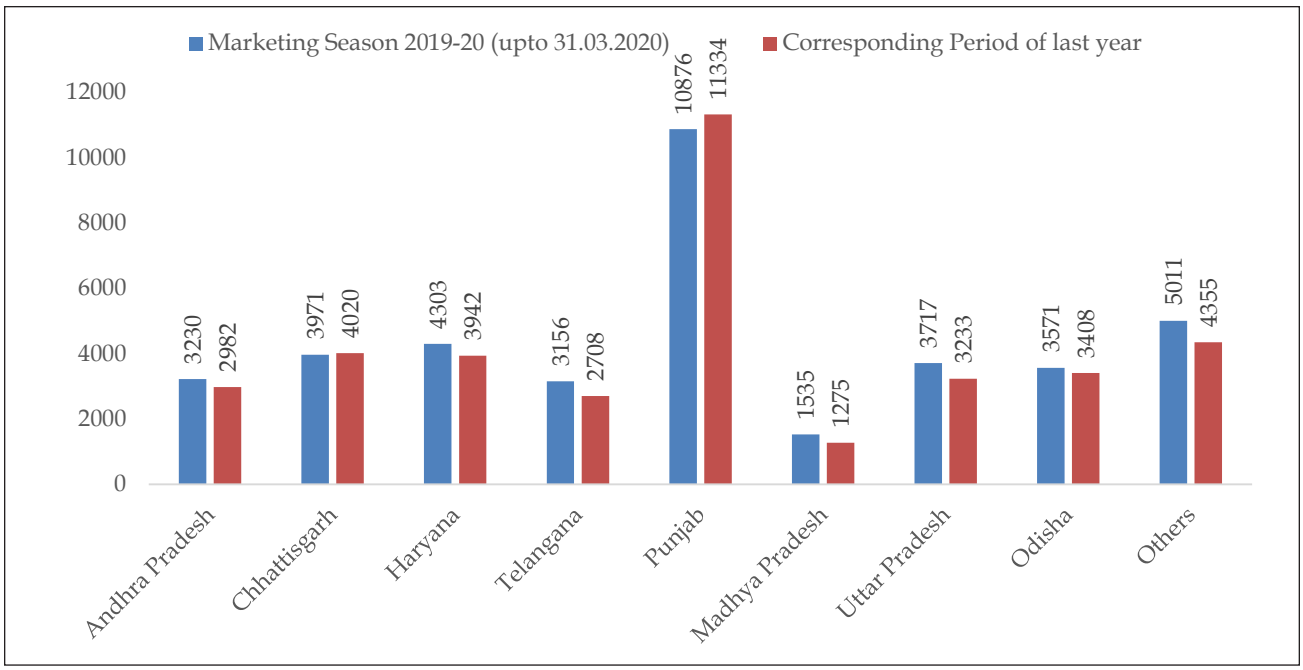
(In thousand tonnes)

State	Marketing Season 2019-20 (upto 31.03.2020)		Corresponding Period of last Year 2018-19	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Andhra Pradesh	3230	8.2	2982	8.0
Chhattisgarh	3971	10.1	4020	10.8
Haryana	4303	10.9	3942	10.6
Telangana	3156	8.0	2708	7.3
Punjab	10876	27.6	11334	30.4
Madhya Pradesh	1535	3.9	1275	3.4
Uttar Pradesh	3717	9.4	3233	8.7
Odisha	3571	9.1	3408	9.1
Others	5011	12.7	4355	11.7
Total	39369	100.0	37257	100.0

Source: Department of Food & Public Distribution.

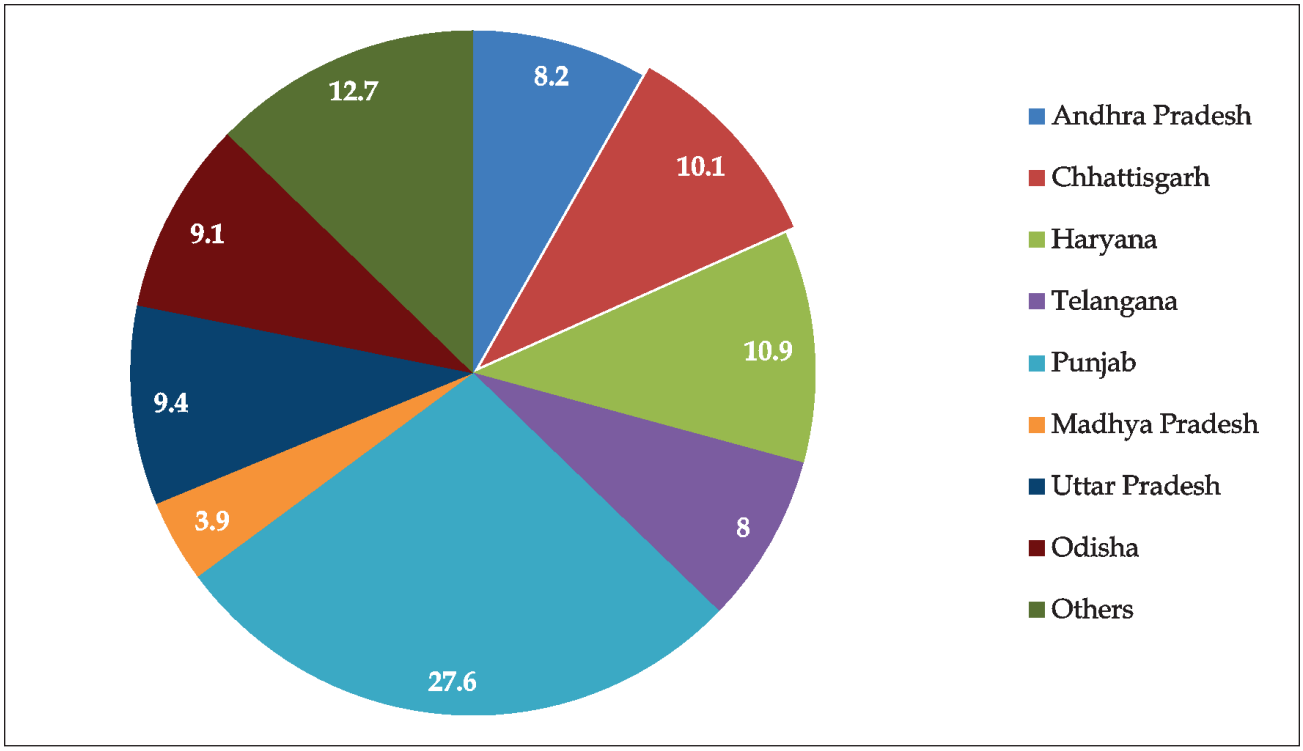
Figure 1: State-wise Procurement of Rice

(In thousand tonnes)



Source: Department of Food & Public Distribution.

Figure 2: Percentage Share of Different States in Procurement of Rice during Marketing Season 2018-19 (up to 31.03.2020).



Source: Department of Food & Public Distribution.

Procurement of Wheat

The total procurement of wheat during rabi marketing season 2019-20 up to 04.07.2019 is 34.13 million tonnes as against 35.37 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 2019-20 (up to 04.07.2019) with the corresponding period of last year. The percentage share of different states in procurement of wheat has been given in figure 4.

Procurement of Wheat

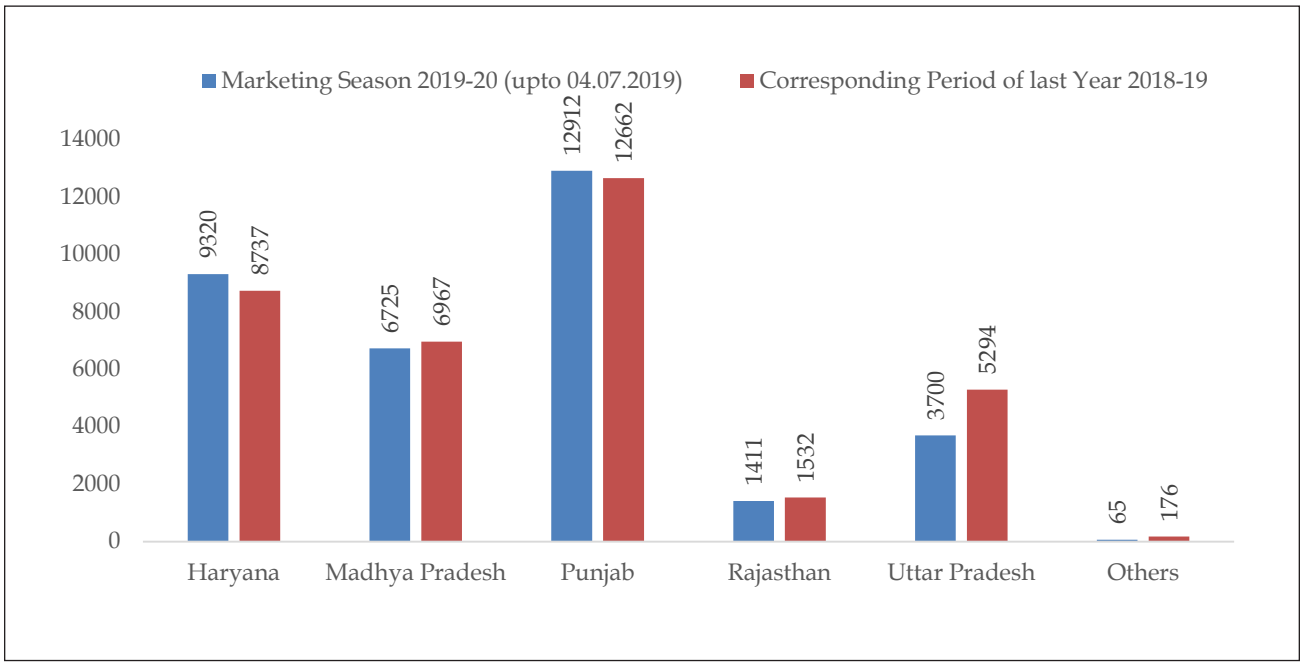
(In thousand tonnes)

State	Marketing Season 2019-20 (upto 04.07.2019)		Corresponding Period of last Year 2018-19	
	Procurement	Percentage to Total	Procurement	Percentage to Total
1	2	3	4	5
Haryana	9320	27.3	8737	24.7
Madhya Pradesh	6725	19.7	6967	19.7
Punjab	12912	37.8	12662	35.8
Rajasthan	1411	4.1	1532	4.3
Uttar Pradesh	3700	10.8	5294	15.0
Others	65	0.2	176	0.5
Total	34133	100.0	35368	100.0

Source: Department of Food & Public Distribution.

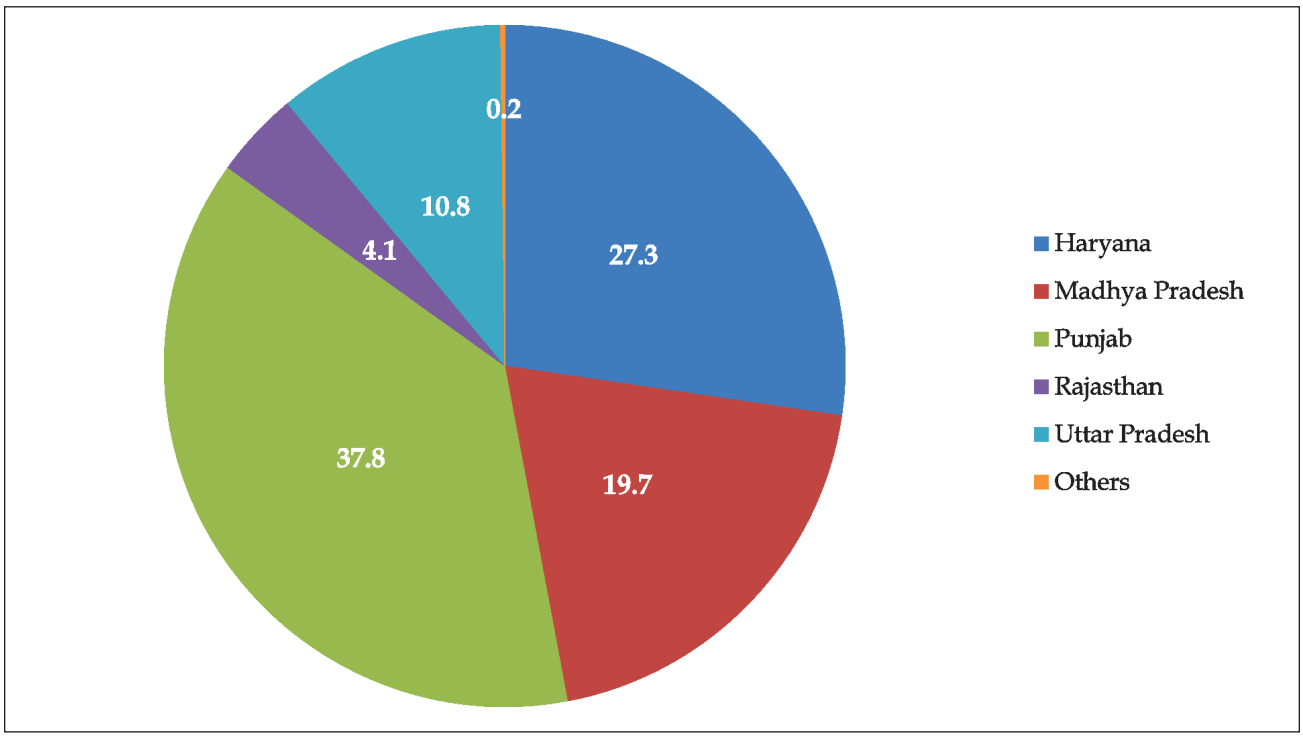
Figure 3: State-wise Procurement of Wheat

(In thousand tonnes)



Source: Department of Food & Public Distribution.

Figure 4: Percentage Share of Different States in Procurement of Wheat during Marketing Season 2019-20 (up to 04.07.2019).



Source: Department of Food & Public Distribution

Commercial Crops

Oilseeds

The Wholesale Price Index (WPI) of nine major oilseeds as a group stood at 149.9 in March, 2020 showing a decrease of 2.5% and increase of 3% over the previous month and year, respectively. The WPI of cotton seed increased by 6.3%, groundnut seed by 5.5% and gingelly seed by 0.6% over the previous month. The WPI of safflower (kardi seed) decreased by 11.9%, soyabean by 8.4%, sunflower by 7.1%, rape & mustard seed by 1.5%, niger seed by 1.4% and copra (coconut) by 1.2% over the previous month.

Manufacture of Vegetable and Animal Oils and Fats

The WPI of manufacture of vegetable and animal oils and fats as a group stood at 128.4 in March, 2020 showing a decrease of 0.5% and increase of 12.9% over the previous month and year, respectively. The WPI of groundnut oil increased by 2.3% and mustard oil by 0.8% over the previous month. The WPI of rapeseed oil decreased by 1.3%, sunflower oil by 0.7%, cotton seed oil by 0.6% over the previous month. The WPI of copra oil and soyabean oil showed no change over the previous month.

Fruits & Vegetable

The WPI of fruits & vegetable as a group stood at 150.7 in March, 2020 showing a decrease of 4.7% and increase of 6.3% over the previous month and year, respectively.

Potato

The WPI of potato stood at 216.5 in March, 2020 showing an increase of 2.5% and 61.8% over the previous month and year, respectively.

Onion

The WPI of onion stood at 229.3 in March, 2020 showing a decrease of 17% and increase of 112.3% over the previous month and year, respectively.

Condiments & Spices

The WPI of condiments & spices (group) stood at 149.4 showing a decrease of 0.4% and increase of 18.9% over the previous month and year, respectively. The WPI of Turmeric increased by 7.2% and Black Pepper by 1.6% over the previous month. The WPI of Chillies (Dry) decreased by 1.5% over the previous month.

Raw Cotton

The WPI of raw cotton stood at 107 in March, 2020 showing a decrease of 0.5% and 8.6% over the previous month and year, respectively.

Raw Jute

The WPI of raw jute stood at 210.2 in March, 2020 showing a decrease of 1.0% and increase of 3.8% over the previous month and year, respectively.

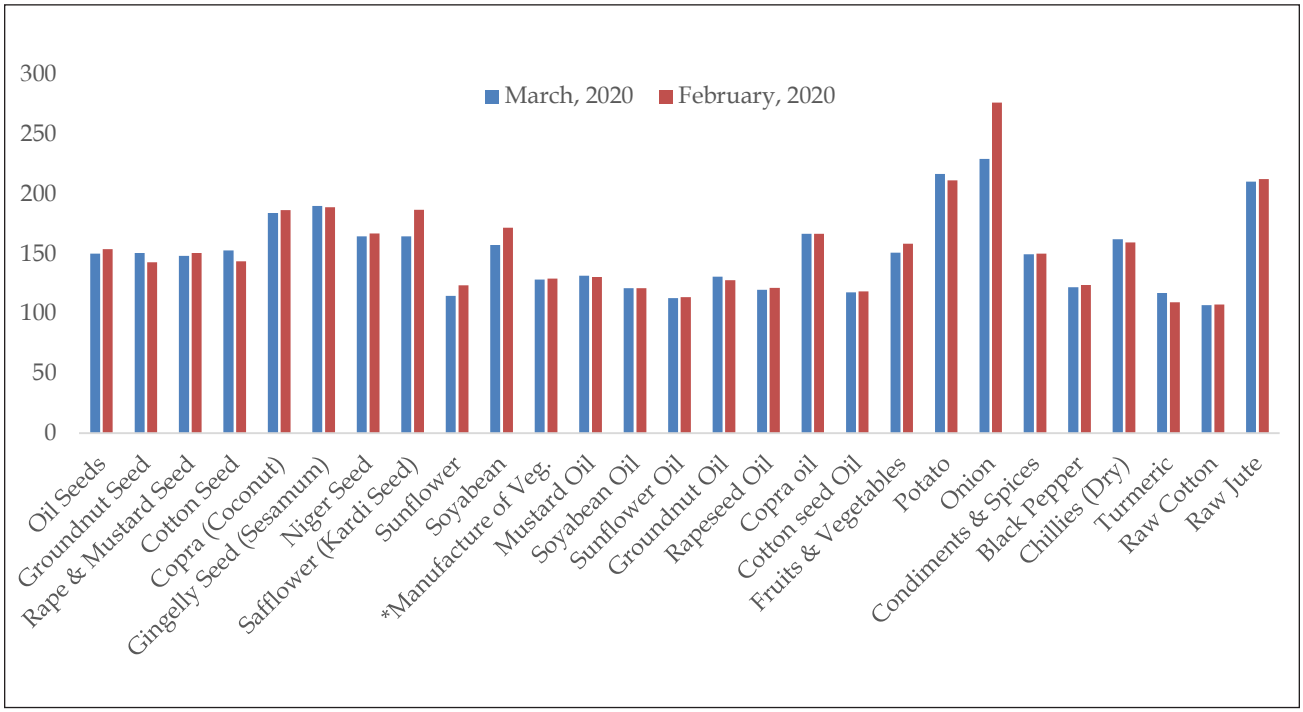
Wholesale Price Index of commercial crops is given in Table 3. A graphical comparison of WPI for the period of March, 2020 and February, 2020 is given in figure 5 and the comparison of WPI during the March, 2020 with the corresponding month of last year has been given in figure 6.

TABLE 3: WHOLESALE PRICE INDEX OF COMMERCIAL CROPS

(Base year: 2011-12=100)

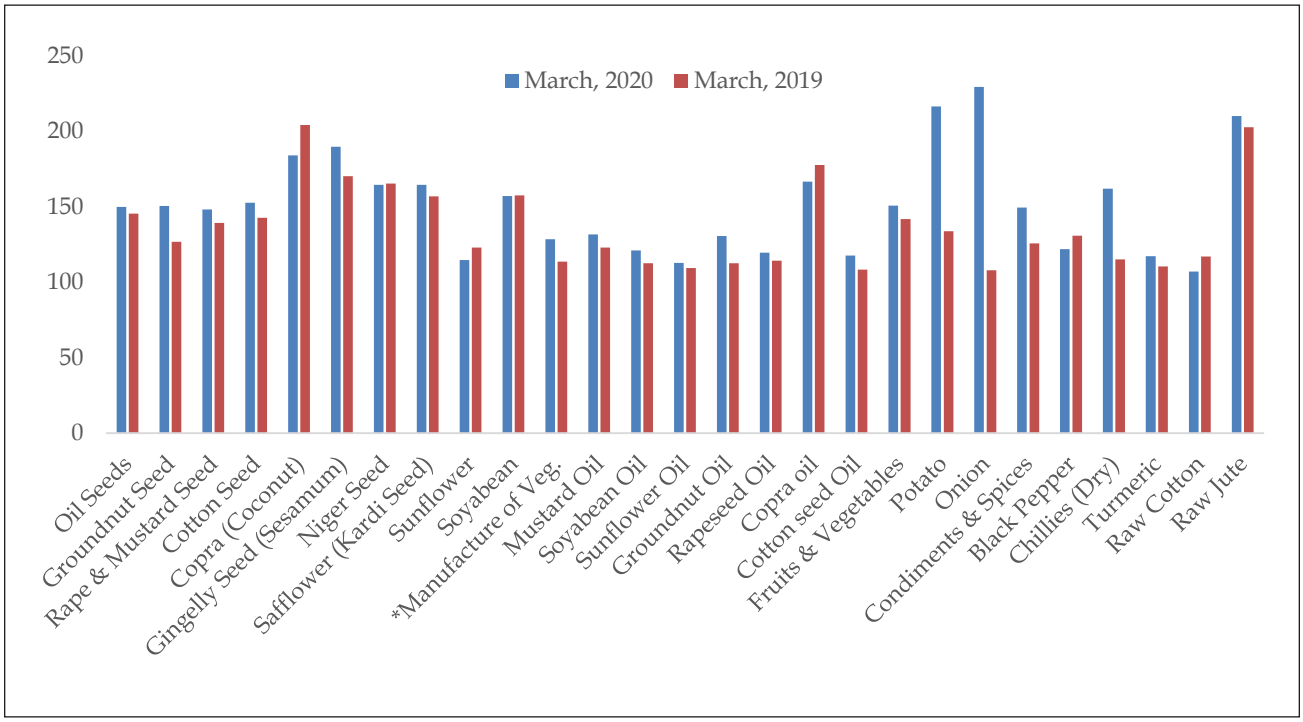
Commodity	Latest March, 2020	Month February, 2020	Year March, 2019	%age variation over the	
				month	year
Oil Seeds	149.9	153.7	145.5	-2.5	3.0
Groundnut Seed	150.5	142.7	126.8	5.5	18.7
Rape & Mustard Seed	148.2	150.5	139.4	-1.5	6.3
Cotton Seed	152.6	143.5	142.8	6.3	6.9
Copra (Coconut)	184.1	186.3	204.2	-1.2	-9.8
Gingelly Seed (Sesamum)	189.8	188.7	170.3	0.6	11.5
Niger Seed	164.5	166.9	165.3	-1.4	-0.5
Safflower (Kardi Seed)	164.5	186.7	156.8	-11.9	4.9
Sunflower	114.8	123.6	122.9	-7.1	-6.6
Soyabean	157.2	171.6	157.5	-8.4	-0.2
Manufacture of Vegetable and Animal Oils and Fats	128.4	129.1	113.7	-0.5	12.9
Mustard Oil	131.6	130.5	122.9	0.8	7.1
Soyabean Oil	121.1	121.1	112.5	0.0	7.6
Sunflower Oil	112.8	113.6	109.4	-0.7	3.1
Groundnut Oil	130.7	127.7	112.7	2.3	16.0
Rapeseed Oil	119.7	121.3	114.4	-1.3	4.6
Copra oil	166.6	166.6	177.6	0.0	-6.2
Cotton seed Oil	117.7	118.4	108.3	-0.6	8.7
Fruits & Vegetables	150.7	158.2	141.8	-4.7	6.3
Potato	216.5	211.2	133.8	2.5	61.8
Onion	229.3	276.2	108	-17.0	112.3
Condiments & Spices	149.4	150	125.7	-0.4	18.9
Black Pepper	121.9	123.8	130.8	-1.5	-6.8
Chillies (Dry)	162	159.4	115.1	1.6	40.7
Turmeric	117.2	109.3	110.5	7.2	6.1
Raw Cotton	107	107.5	117.1	-0.5	-8.6
Raw Jute	210.2	212.4	202.6	-1.0	3.8

Figure 5: WPI of Commercial Crops during March, 2020 and February, 2020



* Manufacture of Vegetable, Animal Oils and Fats

Figure 6: WPI of Commercial Crops during March, 2020 and March, 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	Dec, 19	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chandrapur	Ballarpur	Dec, 19	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

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

(In Rs.)

State	District	Centre	Month & Year	Type of Labour	Normal Daily Working Hours	Ploughing	Sowing	Weeding	Harvesting	Other Agri Labour	Herdsman	Skilled Labours		
												Carpenter	Black Smith	Cobbler
Chhattisgarh	Dhamtari	Sihava	Nov,19	M	8	250	200	NA	180	180	200	300	200	200
				W	8	NA	175	NA	150	150	170	NA	150	NA
Gujarat*	Rajkot	Rajkot	Jan,20	M	8	263	263	266	260	238	200	481	481	469
				W	8	350	325	263	253	238	196	NA	NA	NA
	Dahod	Dahod	Jan,20	M	8	294	294	163	163	163	NA	400	350	300
				W	8	NA	250	163	163	163	NA	NA	NA	NA
Haryana	Panipat	Ugarakheri	May, 19	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	Dec, 19	M	8	250	NA	200	200	250	150	400	400	NA
				W	8	NA	NA	200	200	200	NA	NA	NA	NA
	Satna	Kotar	Dec, 19	M	8	300	300	300	300	300	300	500	500	500
				W	8	NA	300	300	300	300	300	NA	NA	NA
	Shyopurkala	Vijaypur	Dec, 19	M	8	NA	300	NA	NA	NA	300	400	400	NA
				W	8	NA	300	NA	NA	NA	300	NA	NA	NA
Odisha	Bhadrak	Chandbali	June, 19	M	8	350	350	350	350	383	300	500	400	400
				W	8	NA	300	300	300	308	250	NA	NA	NA
	Ganjam	Aska	June, 19	M	8	300	250	250	300	325	250	500	500	500
				W	8	NA	220	220	250	267	220	NA	NA	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
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	Dec, 19	M	8	500	500	400	NA	NA	500	700	500	NA
				W	8	NA	NA	NA	NA	NA	300	NA	300	NA
	Jalore	Sarnau	Dec, 19	M	8	400	NA	300	300	NA	NA	600	400	NA
				W	8	NA	NA	250	300	NA	NA	NA	350	NA
Tamil Nadu*	Thanjavur	Pulvarnatham	Oct, 19	M	8	NA	346	NA	350	397	NA	540	450	NA
				W	8	NA	NA	158	150	126	NA	NA	NA	NA
	Tirunelveli	Malayakulam	Oct, 19	M	8	NA	NA	NA	500	610	NA	400	400	NA
				W	8	NA	200	200	187	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	Jan, 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	Jan, 20	M	8	NA	300	NA	NA	300	NA	500	NA	.NA
				W	8	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chandauli	Chandauli	Jan, 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

Prices

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

Commodity	Variety	Unit	State	Centre	Mar-20	Feb-20	Mar-19
Wheat	PBW 343	Quintal	Punjab	Amritsar		2200	2000
Wheat	Dara	Quintal	Uttar Pradesh	Chandausi	2050	2040	1980
Wheat	Lokvan	Quintal	Madhya Pradesh	Bhopal	1825	2010	1800
Jowar	-	Quintal	Maharashtra	Mumbai	3500	4100	3100
Gram	No III	Quintal	Madhya Pradesh	Sehore	NT	3750	3780
Maize	Yellow	Quintal	Uttar Pradesh	Kanpur	1875	1975	1865
Gram Split	-	Quintal	Bihar	Patna	6250	6200	5800
Gram Split	-	Quintal	Maharashtra	Mumbai	5900	5500	5700
Arhar Split	-	Quintal	Bihar	Patna	8450	8360	7025
Arhar Split	-	Quintal	Maharashtra	Mumbai	8600	8000	6400
Arhar Split	-	Quintal	NCT of Delhi	Delhi	7800	7900	6100
Arhar Split	Sort II	Quintal	Tamil Nadu	Chennai	7600	7300	6800
Gur	-	Quintal	Maharashtra	Mumbai	4700	4900	4400
Gur	Sort II	Quintal	Tamil Nadu	Coimbatore	4500	4500	4200
Gur	Balti	Quintal	Uttar Pradesh	Hapur	2400	2400	2400
Mustard Seed	Black (S)	Quintal	Uttar Pradesh	Kanpur	4200	4125	3500
Mustard Seed	Black	Quintal	West Bengal	Raniganj	4200	4400	4300
Mustard Seed	-	Quintal	West Bengal	Kolkata	4275	4350	4020
Linseed	Bada Dana	Quintal	Uttar Pradesh	Kanpur	5400	5250	4200
Linseed	Small	Quintal	Uttar Pradesh	Varanasi	4850	4650	4210
Cotton Seed	Mixed	Quintal	Tamil Nadu	Virudhunagar	1800	1700	1950
Cotton Seed	MCU 5	Quintal	Tamil Nadu	Coimbatore	3000	3000	2700
Castor Seed	-	Quintal	Telangana	Hyderabad	3900	3900	5100
Sesamum Seed	White	Quintal	Uttar Pradesh	Varanasi	9950	9875	10885
Copra	FAQ	Quintal	Kerala	Alleppey	NT	10800	10150
Groundnut	Pods	Quintal	Tamil Nadu	Coimbatore	6000	6000	5200
Groundnut	-	Quintal	Maharashtra	Mumbai	8500	8000	6700
Mustard Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1390	1370	1350
Mustard Oil	Ordinary	15 Kg.	West Bengal	Kolkata	1380	1395	1275
Groundnut Oil	-	15 Kg.	Maharashtra	Mumbai	1900	1800	1500
Groundnut Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	1950	2000	1710
Linseed Oil	-	15 Kg.	Uttar Pradesh	Kanpur	1460	1440	1445
Castor Oil	-	15 Kg.	Telangana	Hyderabad	1260	1245	1680
Sesamum Oil	-	15 Kg.	NCT of Delhi	Delhi	1830	1830	1760
Sesamum Oil	Ordinary	15 Kg.	Tamil Nadu	Chennai	2900	2935	3100
Coconut Oil	-	15 Kg.	Kerala	Cochin	2325	2280	2205
Mustard Cake	-	Quintal	Uttar Pradesh	Kanpur	2150	2125	1800
Groundnut Cake	-	Quintal	Telangana	Hyderabad	3642	3642	3214
Cotton/Kapas	NH 44	Quintal	Andhra Pradesh	Nandyal	5000	5000	5500
Cotton/Kapas	LRA	Quintal	Tamil Nadu	Virudhunagar	4600	4700	5200

2. WHOLESALE PRICES (IN RS.) OF CERTAIN AGRICULTURAL COMMODITIES AND ANIMAL HUSBANDRY PRODUCTS AT SELECTED CENTRES IN INDIA-*CONTD.*

Commodity	Variety	Unit	State	Centre	Mar-20	Feb-20	Mar-19
Jute Raw	TD 5	Quintal	West Bengal	Kolkata	4850	4900	4675
Jute Raw	W 5	Quintal	West Bengal	Kolkata	4900	4950	4725
Oranges	-	100 No	NCT of Delhi	Delhi	667	667	583
Oranges	Big	100 No	Tamil Nadu	Chennai	450	400	550
Banana	-	100 No.	NCT of Delhi	Delhi	458	458	417
Banana	Medium	100 No.	Tamil Nadu	Kodaikkanal	300	700	600
Cashewnuts	Raw	Quintal	Maharashtra	Mumbai	70000	85000	76000
Almonds	-	Quintal	Maharashtra	Mumbai	58000	73000	58000
Walnuts	-	Quintal	Maharashtra	Mumbai	60000	60000	63000
Kishmish	-	Quintal	Maharashtra	Mumbai	17000	20000	23000
Peas Green	-	Quintal	Maharashtra	Mumbai	6000	5000	5300
Tomato	Ripe	Quintal	Uttar Pradesh	Kanpur	1500	1050	1175
Ladyfinger	-	Quintal	Tamil Nadu	Chennai	2500	1500	1800
Cauliflower	-	100 No.	Tamil Nadu	Chennai	2200	2000	2200
Potato	Red	Quintal	Bihar	Patna	1720	1640	950
Potato	Desi	Quintal	West Bengal	Kolkata	1300	1100	750
Potato	Sort I	Quintal	Tamil Nadu	Mettuppalayam	2230	2630	1863
Onion	Pole	Quintal	Maharashtra	Nashik	1400	1800	500
Turmeric	Nadan	Quintal	Kerala	Cochin	11000	11500	11500
Turmeric	Salam	Quintal	Tamil Nadu	Chennai	10500	11000	10000
Chillies	-	Quintal	Bihar	Patna	12650	12650	9950
Black Pepper	Nadan	Quintal	Kerala	Kozhikode	NT	29000	30000
Ginger	Dry	Quintal	Kerala	Cochin	27000	27000	24000
Cardamom	Major	Quintal	NCT of Delhi	Delhi	144000	143500	120000
Cardamom	Small	Quintal	West Bengal	Kolkata	305000	365000	170000
Milk	Buffalo	100 Liters	West Bengal	Kolkata	5200	5200	5200
Ghee Deshi	Deshi No 1	Quintal	NCT of Delhi	Delhi	70000	69035	73333
Ghee Deshi	-	Quintal	Maharashtra	Mumbai	44000	42000	43000
Ghee Deshi	Desi	Quintal	Uttar Pradesh	Kanpur	41000	39200	39000
Fish	Rohu	Quintal	NCT of Delhi	Delhi	15000	16000	16000
Fish	Pomphrets	Quintal	Tamil Nadu	Chennai	30000	50000	40000
Eggs	Madras	1000 No.	West Bengal	Kolkata	3690	4286	3770
Tea	-	Quintal	Bihar	Patna	21950	21950	21350
Tea	Atti Kunna	Quintal	Tamil Nadu	Coimbatore	NT	NT	39000
Coffee	Plant-A	Quintal	Tamil Nadu	Coimbatore	40000	40000	28890
Coffee	Rubusta	Quintal	Tamil Nadu	Coimbatore	29500	29500	22000
Tobacco	Kampila	Quintal	Uttar Pradesh	Farukhabad	7800	7750	8100
Tobacco	Raisa	Quintal	Uttar Pradesh	Farukhabad	4800	4800	4400
Tobacco	Bidi Tobacco	Quintal	West Bengal	Kolkata	13200	13200	13300
Rubber	-	Quintal	Kerala	Kottayam	NT	11700	11500
Arecanut	Pheton	Quintal	Tamil Nadu	Chennai	63000	61500	58500

Crop Production

Sowing and Harvesting Operations Normally in Progress During June, 2020

State/UTs	Sowing	Harvesting
(1)	(2)	(3)
Andhra Pradesh	Winter Rice, Jowar (K), Bajra Maize (K), Ragi (K), Small Millets (K), Tur (K), Urad (K), Mung (K), other Kharif Pulses, Ginger, Groundnut, Sesamun, Cotton, Turmeric.	Autumn rice
Assam	Winter Rice, Castorseed.	Autumn Rice, Summer Potato (Hills)
Bihar	Autumn Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Sesamum, Cotton, Jute, Mesta, Sannhemp.	Summer Rice
Gujarat	Winter Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Ginger, Chillies (Dry), Groundnut, Sesamum, Cotton, Turmeric, Sannhemp.	–
Himachal Pradesh	Summer Rice, Maize, Ragi, Small Millets (K), Urad (K), Mung (K), Other Kharif Pulses, Ginger, Chillies (Dry), Tobacco, Groundnut, Sesamum Turmeric.	Wheat, Winter Potato (Hills) Onion
Jammu & Kashmir	Autumn Rice, Jowar (K) Bajra, Maize, Ragi, Small Millets (K), Urad (K), Mung (K), Other Kharif Pulses, Potato Chillies (Dry), Tobacco, Groundnut, Sesamum (Late) Jute, Sannhemp.	Wheat, Barley, Small Millets (R) Tobacco, Rapeseed and Mustard, Onion
Karnataka	Autumn Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Chillies (Dry), Groundnut, Castorseed, Sesamum, Cotton, Mesta, Sweet Potato, Turmeric, Sannhemp, Nigerseed, Onion, Tapioca.	–
Kerala	Autumn Rice, Ragi, Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Sweet Potato.	Tapioca
Madhya Pradesh	Autumn Rice, Jowar (K), Bajra, Maize, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Summer Potato, Ginger, Chillies (Dry), Tobacco, Groundnut, Potato, Turmeric, Sannhemp.	Onion
Maharashtra	Winter Rice, Jowar (K), Bajra, Maize, Ragi Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Chillies (Dry) Groundnut, Castorseed, Sesamum, Cotton Mesta, Turmeric, Sannhemp, Nigerseed.	–
Manipur	Autumn Rice, Winter Rice, Tur (K) Groundnut, Castorseed, Sesamum Cotton.	–
Orissa	Autumn Rice, Winter Rice, Jowar (K), Bajra, Maize, Ragi, Small Millets (K), Chillies (Dry), Tobacco, Groundnut, Castorseed Cotton, Jute, Mesta.	Summer Rice, Chillies (Dry)

SOWING AND HARVESTING OPERATIONS NORMALLY IN PROGRESS DURING JUNE, 2020-*CONTD.*

State/UTs	Sowing	Harvesting
(1)	(2)	(3)
Punjab and Haryana	Autumn Rice, Summer Rice, Jowar (K) Bajra, Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Chillies Dry, Groundnut, Castorseed, Cotton, Sweet Potato Turmeric, Sannhemp.	Wheat, Potato (Hills), Summer Potato, Tobacco, Onion.
Rajsthan	Jowar (K), Bajra, Maize, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses, Chillies (Dry), Tobacco, Groundnut, Castorseed, Cotton Sannhemp.	Small Millets (R)
Tamil Nadu	Autumn Rice, Jowar (K), Bajra, Ragi, Small Millets (K), Summer Potato (Hills), Sugarcane, Chillies (Dry), Castorseed, Seasamum, Cotton, Turmeric, Sann hemp Onion, Tapioca.	Summer Rice, Jowar (R), Sugar Chillies (Dry), Cotton, Sannhemp, Onion.
Tripura	Winter Rice, Urad (K), Mung (K), Sesamum Mesta.	—
Uttar Pradesh	Autumn Rice, Winter Rice, Jowar (K), Bajra Maize, Ragi, Small Millets (K), Tur (K), Urad (K), Mung (K), Other Kharif Pulses (Moth) Ginger, Chillies (Dry), Groundnut, Castorseed, Cotton Jute Mesta, Sweet Potato, Sannhemp, Nigerseed.	Sugarcane, Onion.
West Bengal	Autumn Rice, Maize, Tur (K), Ginger, Chillies (Dry), Mesta.	Chillies (Dry), Sesamum.
Delhi	Jowar (K), Bajra, Cotton.	
Andaman & Nicobar	Autumn Rice, Winter Rice.	

(K)—Kharif (R)— Rabi

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M.C. — Market Closed.
N.R.—Not Reported.
Neg. — Negligible.
Kg. — Kilogram.
Q. — Quintal.
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