Working Paper **

COVID-19 LOCKDOWN AND INDIAN AGRICULTURE: OPTIONS TO REDUCE THE IMPACT

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Executive Summary

1. The first priority of the Government should be to ensure that there is an uninterrupted flow of essential food products and contain panic buying by the consumers. There is no short supply of foodgrains, fruits and vegetables, and therefore panic purchase will be counterproductive in the form of artificial jacking up of the retail prices. This is true for other products also. This was visible in the form of widening gap between wholesale and retail prices during the period of lockdown.

2. Farm operations are normal and harvesting of Rabi crops has turned out to be near normal. The areas where harvesting took place in April like Punjab, migrant labour probably would not have reached and therefore such areas may have faced some problem. Partly, this would have been compensated by more use of family labour and machines.

3. There is a need to schedule marketing of crops like wheat that come just after harvest. This can be done through scheduling of market arrivals through traders, who have direct contact with farmers, procurement centres in the villages, and price incentives for farmers to bring the produce in May or later. Opening of *mandis* with social distancing has paid the dividends.

4. For vegetables, the lockdown period has nearly been a slack season and the produce available was allowed at the terminal markets. There are fixed market channels and only transport needs to be allowed and linked with the availability of the product in the producing centres like Himachal Pradesh, Uttarakhand, and eastern India. The marketing of offseason vegetables shall start after some time and their supply can be planned. This was essential to control the prices that are usually higher than seasonal vegetables, and ease of market and transport restrictions have contributed to normal functioning of the market.

5. Harvesting of sugarcane is normal with proper safety measures like social isolation. There was some problem with harvesting and marketing of grapes, particularly of the late crop. This was managed by product diversification and removing transport restrictions to use the cold storage facilities.

6. Milk is another product, which has faced marketing problems, as a significant proportion of milk (25%) was purchased and distributed by the vendors. The expansion of the reach of organized dairies for milk collection, processing and distribution was explored to reduce the pain of farmers. Secondly, farmers shifted to ghee and *khoya* making to reduce income losses.

7. Input supply (seed, fertilizers) for the Kharif 2020 was planned by the government and input agencies as there was adequate time to ensure timely availability of seed and fertilizers to farmers. This coupled with normal monsoon forecast and good Kharif harvest have contributed to help develop positive sentiments.

8. The decline in consumption would be least for staple commodities like cereals, edible oils, pulses, as compared to other food commodities. Composition of household budgets would also change, as households will reallocate expenditure from non-essential to essential items. The incidence of poverty is usually high among casual workers in rural and urban areas, which may further deteriorate if their income losses are not compensated. In rural India, this might translate to an increase of headcount poverty ratios ranging from 30% to 47% across the various risk scenarios. Poverty impact may however be a temporary phenomenon and long-term impact may occur through a consistent lower rate of growth in other sectors.

9. The Government is often criticized for the excess stock of foodgrains. They have been proved to be wrong in this COVID-19 pandemic. It is always desirable to have adequate stock of foodgrains for such emergencies, or managing short supply in the drought years. There should be adequate stock of foodgrains and resources for public distribution until normalcy is achieved. The availability of foodgrain stocks have facilitated distribution of additional ration by the end of November to poor people. Distribution of ration is a better option over cash transfer as the former helps in self-selection of the targeted beneficiaries.

10. There was an opportunity in the lockdown. There is a lot of inefficiency in the supply chains of agricultural commodities, which can be best addressed by establishing compact supply chains, at least for the perishables. Working of these supply chains has encouraged the Government to initiate agricultural market reforms and attract direct participation of private sector. These shall help link farm production with the market and reduce the losses during product handling.

11. The Government has announced a number of packages for revival of the economy and rupees one lakh crore refinancing is envisaged for post-harvest infrastructure in agriculture and food processing. The financial institutions should take proactive steps to extend this financing facility to cooperatives, FPOs, start-ups etc. Establishment of food processing and other rural enterprises shall help provide employment and income generating facilities in rural areas.

12. Revival of the economy shall be influenced by private demand which in turn will depend on income of people working in the manufacturing and services sector. The Micro, Small & Medium Enterprises (MSME) sector is hard pressed for its low margin and therefore its revival is dependent on restructuring of outstanding loan and making available working capital for operations and investment. The same holds true for some other sector and therefore restarting production and supply chains are critical for economic revival. Fiscal stimulus of the Government, agricultural growth, and rural demand for manufacturing products shall be helpful in revival of the economic activities.

IMPACT OF COVID-19 LOCKDOWN ON INDIAN AGRICULTURE

Background

Indian agriculture has done pretty well during the recent period. Annual growth has been ranging between 3.5% and 5% during the last five years and the growth has broad-based itself, in terms of both production and geographical coverage. The advanced estimates of agricultural production for the year 2019-20 are optimistic and the growth is estimated at 4%. As per the fourth advance estimates, foodgrain production is 296.65 million tonnes (4.08% higher than 2018-19). In addition, as per the third advance estimates (2019-20), total horticultural production is likely to be 320.67 million tonnes in 2019-20 as compared to 310.74 million tonnes in 2018-19, which is 3.19% higher than 2018-19. However, it is to be noted that any deviation in normal operations may give some setback to these estimates, particularly the impact of late rains and hailstorm on Rabi crops. Further, as per the Food Corporation of India (FCI) as on September 2020, the stocks of wheat and rice in the Central pool stand at 70.02 million tonnes, which is thrice more than the operational buffer-cum-strategic stock of 21.04 million tonnes. All these points towards more than adequate food supply in the country.

The lockdown in the wake of COVID-19 has disrupted economic activities and the supply chains significantly. Millions of people have been infected with COVID-19 globally and the death toll is rising fast. It is expected that the lockdown measures would flatten the infection curve soon, and essential economic activities and services shall be back in place. In India, the rate of mortality, fortunately, has not been that rapid due to timely interventions by the government, but the impact of COVID-19 has been coinciding with the economic slowdown. It is expected that the lockdown shall further reduce the economic growth by about 10% or more. This is likely to have an impact on demand for agricultural products, dislocation of labour force and disruption of supply chains. These developments shall have implications for the social safety net programs of the government. This article discusses some of the impacts of lockdown within agriculture. The impacts of economic slowdown on agriculture are also discussed in detail in the subsequent sections.

I. Farm and Post-harvest Operations

The ongoing crisis around COVID-19 pandemic has affected most economic activities across the globe. In the absence of any cure, several countries, including India, opted to go for a general lockdown to contain the faster spreading of the disease. In India, the immediate implications of this lockdown on the agricultural front were witnessed in the form of disruption of activities relating to harvesting and marketing of agricultural crops and commodities. However, contrary to the initial expectations, harvesting operations have not been seriously affected by the lockdown. Although delayed by almost two weeks, the harvesting operations were completed more or less smoothly. Reverse migration of labourers and cooperation among farmers and their families helped them to complete the harvesting in almost all the regions.

Further, there was not any significant reduction in the yields leading to a good production of Rabi crops.

The situation would not have been the same in the absence of timely and appropriate government support. The government, both at the Central and state levels, has taken several initiatives to ensure smooth agricultural operations during the lockdown. Relaxing hurdles in farming, and procurement and supply chain operations by providing exemptions from the lockdown have aided the sector. Postponement as well as extension of the procurement window for Rabi crops by the state governments, permitting direct purchase by large buyers/processors/retailers from farmers/ farmer producer organizations (FPOs) etc. have turned out to be a few of the initiatives that have helped the agricultural sector to a great extent. Despite the efforts from the government on several fronts, marketing of farm produce has remained as one of the major challenges on account of lesser number of buyers in the market and transport bottlenecks arising from prevalent market uncertainties and misinformation.

In order to overcome the challenges of marketing of farm produce, all the functions such as harvesting, storage, processing, packaging, and marketing need to be facilitated with a strong infrastructure. In addition, linkages among the ecosystem partners including the market need to be strengthened to augment the efficiencies. In this context, following are a few specific recommendations for the post-pandemic period:

a) Activate Farmer Co-operatives and Self-Help Groups (SHGs) wherever possible for value addition in basic agro-processing industries like fruit juices, pickles, *papads*, roasted snacks etc. which does not need high level of sophistication. This not only will absorb some surplus production but also generate local employment and increase storability. These products can be immediately marketed to local government agencies. Some of these products can be also used for distribution through the Mid-Day Meal scheme. The negative return, wherever applicable, due to this business model can be funded by the Central government.

b) FPOs/SHGs should act as a primary source of any government procurement. To start with a 10% mandatory procurement of whatever SHGs/FPOs produces as value added products from bamboo basket to textiles to processed food products. This will generate cash flow at local level and subsequently rural demand.

c) Creating Hubs Near Farmgates: Smallholder farmers require sufficient and efficient infrastructure at the farmgate so that these farmgates can serve as newer hubs in the agricultural supply chain. Creating the hub nearest to the production centres not only increases the efficiency in the supply chain but also increases farmers' realization for their produce.

    - Private players can be encouraged to create small-sized infrastructure at the farmgate level to facilitate the grading, storage and processing of the produce, especially perishables. In this structure, routing the marketing of produce through FPOs can help in reducing the cost of aggregation and also in attracting newer investments from private players.

- In order to run the infrastructure efficiently, the vast network of *Krishi Vigyan Kendras,* Agricultural Colleges/Universities can be utilized. All agricultural universities have food processing departments and expertise. They could be asked to take up value additions for couple of commodities and sell locally.

d) Private players should be encouraged to buy directly from the FPOs. This could be achieved through incentivizing private players in terms of nominal concession in interest rates, taxation etc.

e) In the dairy sector, milk-chilling units can be installed near farmgates. This will help a large percentage of the dairy farmers to shift from using unorganized channel of milk marketing to organized and formal channels like co-operatives. This, in turn, will help augment their realizations.

f) E-commerce provides an advantage to both consumers and sellers by reducing the middlemen and inventory. It has been successfully used for agricultural marketing as well. Over the years, several e-commerce players have started serving the consumers with online sale of groceries, fruits and vegetables. Starting from big cities, they are expanding to smaller cities also. These e-commerce portals can have a separate business-to-consumer (B2C) model for FPOs. It would have a greater appeal to the buyers due to the perception of quality and freshness associated with the products coming directly from farmers/FPOs.

g) Building a product line (branded products) that could be FPO/region specific would also increase the recognition, reach and realization. Local management schools/universities can also provide marketing support by hand holding few FPOs in their proximity/local area.

h) Though the government is focusing on improving the road infrastructure across the country, there is a need to solve the roads and logistics' challenges in producing centres, especially when the government is committed for '*Gram Swarajya*'. The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) can be utilized to improve the list mile road connectivity in producing centres.

Due to COVID-19 restricted movement of several essential services (particularly transportation) have been witnessed in the lockdown period and this has affected the operation of different agricultural activities. The nature of impact of lockdown has varied across regions and commodities. The detailed commodity-wise impact is given in Table 1 below:

Table 1: Commodity-wise impact of the lockdown			
Commodity	**Regional focus**	**Nature of the impact**	**Key interventions**
Cereals	MP, UP, Haryana, Rajasthan	• Delayed harvesting and prolonged storage may cause harvest and post-harvest losses (about 6.25% in wheat crop). • Delay in market arrivals of Rabi crops (Deficit of 42.90-99.54% arrival in Wheat crop compared to corresponding season of previous year). • There has been a marginal change in the wheat prices (-2%) as compared to last year prices in April-May.	• Incentivize farmers for local storage to avoid harvest and post-harvest losses. Private dealers must be permitted to purchase the produce directly from the farmers. Collective procurement, marketing and storage by the FPOs should be promoted. • Custom hiring centres must be established in each village/block to facilitate improved inputs besides farm machinery/implements for the next season.
Pulses	MP, Maharashtra, Karnataka, Rajasthan, Gujarat	• Delay in harvesting and threshing. • Deficit in market arrivals (Deficit of 90% arrival in gram) in all the major markets except in Karnataka between March 25 and April 20, 2020. • Rs. 3412 crores monetary losses due to harvest and post-harvest losses in gram.	• To avoid delayed harvest due to labour unavailability, mechanical harvesters and reapers should be made available to farmers at affordable prices. • Improved rural godown facilities with adequate pest control measures and aeration. Varieties suitable for mechanical harvesting should be developed and promoted on a large scale.
Oilseeds	Rajasthan, Karnataka	• Rs. 4026.75 crores monetary losses due to post-harvest losses for mustard crop. Low arrival of marketable surplus (91.7% deficit in market arrivals of mustard). • Production losses to the tune of 0.7 million tons and 10% loss in harvest and post-harvest activities in the mustard crop. This led to higher	• To avoid harvest and post-harvest losses, incentivize farmers for local storage in accredited rural godowns. • Oil processing industries must be allowed to operate at their full capacity to minimize post-harvest losses.

		prices of mustard i.e. 18% and 14% higher than April and May 2019 prices, respectively.	
Fruits	Maharashtra, MP, UP, Karnataka	• Reduction in proportion of processing and value addition. New planting was drastically reduced due to non-availability of planting material. • Delay in harvesting and market arrivals of banana and grapes were hampered. • Grape exports to the European Union region were affected due to a delay in obtaining pesticide test reports. • Inadequate labour availability affected application of plant protection measures as witnessed by farmers in the case of Apple scab. • Negative effect on the nursery business due to labour shortage issues.	• Deficient payment scheme for horticultural crops in line of Haryana government should be promoted. To avoid price distortion in value chains, price ceiling must be followed. • Encouraging and incentivizing agri-entrepreneurs for setting up processing activities and cold chains. Encouraging development of varieties of fruits and vegetables that are suitable for processing. • Strengthening farm advisory services at district/ block level. Collective pre-cooling, cooling and storage facilities should be promoted to reduce post-harvest losses.
Vegetables	Delhi, UP, WB, HP, Gujarat All India	• Due to labour unavailability, harvesting of current season crops like cauliflower, cabbage, tomato, and onion was adversely affected. • Disruption in supply chain and decline in exports of vegetables. Demand reduction (60-80%) in Delhi's Azadpur Mandi. • Reduction in wholesale prices of vegetables (-25%). Tomato arrivals and prices were low in major APMC markets of Maharashtra and Himachal Pradesh.	• Setting up *kisan bazaars* for direct marketing of vegetables. • Training and technology transfer to farmers for learning good and safe production practices. • More efforts should be made to boost agri-processing activities and upscaling value chains of vegetables. • Enhanced technical and financial support to FPOs for maintaining procurement and marketing operations. More use of ICT to link consumers and producers.

		• Increase in retail prices 30-40% in UP, Delhi and Mumbai for tomato, spinach, beans and capsicum. • Unorganized potato processing was badly affected, which is about 50-60% of potato processing in India. Shortage in market arrivals (27.74-60.30% in potato). Potato prices were however higher during March 2020 over March 2019 due to supply constraints. • Onion arrival and prices severely reduced during lockdown phase 1, but improved afterwards.	
Milk and Poultry	All India	• Decline in milk sales during lockdown (about one million litres remained unsold every day). • Milk consumption declined by 25% (during March) and sale price of milk also declined by Rs. 5-7/litre. • About 10% profit loss in dairy sector equivalent to Rs. 464.15 crores • The drop in broiler price (60% - 80%) and egg price (10% to 24%) and economic losses for poultry industry was estimated about Rs. 22,500 crores (From Feb 1 to April 15, 2020).	• Adequate vaccination and required veterinary facilities should be ensured. • Farm advisory services need to be provided regarding maintenance of proper hygiene for farm animals along with waste disposal, surveillance and monitoring of farm animals, isolation of suspected animal etc. • Milk cooperatives may be instructed to collect surplus milk from rural and urban areas and it can be converted into skimmed milk powder, ghee etc. with longer shelf life. Providing subsidy and exempting GST on livestock feed and feed ingredients to reduce the cost.
Fisheries	WB, Jharkhand, Odisha, Telangana	• In fresh aquaculture, supply chain disruptions may reduce income to the tune of Rs. 2500-3500 crores. • Destruction of shrimp seeds (5 to 6 billion) and about 50% production losses in shrimp farming	• Integrated coastal agriculture should be promoted through capacity building and R&D for local food security. • Research focus should on non-fishery dependent alternative feeds for partially replacing fish meal.

		due to non-availability of inputs. Daily fish sale drastically reduced (85%-90% in Hyderabad). • In marine fisheries, fishing efforts reduced by 6.33% that may lead to financial loss Rs 9,378 crores (for 21 days).	• Low cost storage facilities should be developed for fresh fish. • Future thrust should be on developing indigenous species and their improvement.
Flowers	All India	• Flower sale is severely affected due to closure of religious places, social functions, events etc. • Prices losses and export disruptions have financial losses in loose flowers Rs. 202.89 to Rs. 335.62 crores and Rs. 10.75 to Rs. 17.07 crores for cut flowers.	• Promotion of mechanized practices in flower plantation to reduce drudgery. • For enhancing the shelf life of flowers, solar power air cooler cart can be promoted. • Processing plants should be established in adequate numbers for upscaling extraction of essential oil, dyes and pigments, making poultry feed etc. in the form of integrated flori-marts.
Source: Based on the information compiled by ICAR			

II. Overall Economic and Agricultural Growth

The pandemic and resulting income losses during the initial phases have reduced the household expenditure on food, non-food commodities and services. Partly as a response to the reduction in demand, private investment has also gone down. Statistics indicate household expenditure has declined by 27% in real terms in Q1 of the FY 2020-21, and investments have gone down by 47%. As a measure to address the impacts, the Government has raised its expenditure by 16%, and has announced a slew of measures that would raise employment, income, and investment. One would expect investments would improve quickly in the short-run, and the pace of decline in growth would be moderated. External trade is also expected to improve. Exports of agricultural commodities like rice have increased by 35%, fruits and vegetables by 14%, and oilseeds by 10% during April-August 2020 as compared to the previous year. Positive agricultural growth witnessed during the pandemic and predicted climate normality in future bring further hope that agricultural exports would continue to improve in future as well.

Simulation results indicate that economic growth would decline by 12% during the FY 2020-21 on the presumption of moderate recovery in private investment, gradual rise in Government expenditure, and improvement in exports. Upon investments attaining to its previous levels with no decline induced during the pandemic, growth is predicted to decline only by 4.2%. Despite this slowdown, agriculture is expected to record a positive growth, ranging between 2.8% and 3.9% (Table 2). An improvement in Kharif area sown, predicted normal monsoon, quick recovery in supply disruptions, price recovery in both consumer and wholesale markets, and the Government's interventions for the future are believed to sustain the growth momentum. We expect that the crop sector would grow between 0.7% and 1.5%, livestock sector between 6.1% and 7.4%, and fisheries between 8.2% and 9.8%, presuming production trends in recent past would continue.

Table 2: Growth projections for 2020-21

Sector	**Scenario-A**	**Scenario-B**
Crops	1.5	0.7
Livestock	7.4	6.1
Forestry & logging	3.7	1.6
Fishing	9.8	8.2
Agriculture & allied	3.9	2.8

Scenario A presumes production trends since 2015 would continue, and Scenario B presumes trends since 2018.
Source: Ministry of Statistics and Programme Implementation, Government of India

III. Agricultural Markets, Farm Income and Commodity Prices

The availability, expected change in demand, and disruption in the supply chains has impacted the prices of essential commodities during the COVID-19 period. The supply of

foodgrains and other essential commodities got impacted during the first phase of the lockdown[1] due to the closure of agricultural markets and supply chain disruptions, however with the timely action by the government the supply of agricultural produce improved because of a good agricultural year. The wholesale and retail prices of foodgrains and edible oils in the four metro cities have increased moderately (less than 10%) during the fortnight ending first phase of lockdown over the pre-lockdown fortnight, except for gram dal in Mumbai and Tur dal in Chennai. Pulses' prices continued to increase even during the second phase of lockdown. This was partly because of the supply disruptions due to closure of dal mills amid non-availability of labour and lockdown restrictions, and because of change in consumer preferences from animal-based protein demand to vegetable protein sources.

The prices of vegetables have risen significantly (15-50%) during the first phase of lockdown mainly due to disruptions in the supply chains and a large part of the price change is because of the lean season for vegetables. As the harvesting of Rabi onion was in progress and there were sufficient supplies in the markets, onion prices eased in Delhi and Mumbai. The government efforts towards easing lockdown restrictions on agricultural and marketing activities resulted in easing of prices of essential food commodities during subsequent phases of lockdown, except for the off-season perishable commodities with lower supplies.

Table 3: Change (%) in wholesale and retail prices of essential food items in metro cities during different phases of the lockdown and unlock periods

Prices	Centres	Lock1	Lock2	Lock3	Lock4	Lock5	June2F	Jul.1F	Jul.2F	Aug.1F
Wheat Wholesale	Delhi	0.0	-1.6	-6.6	-2.4	0.3	-1.1	0.8	-1.1	-2.3
	Mumbai	-4.6	0.5	0.0	0.2	0.7	-2.4	-4.3	0.0	0.0
	Chennai	2.6	7.2	1.2	1.8	0.0	0.0	0.0	3.8	1.2
Wheat Retail	Delhi	0.0	0.0	-3.0	-1.2	0.0	-8.7	0.0	-2.7	-2.1
	Mumbai	-0.3	5.3	1.1	0.0	0.0	-2.3	-3.5	0.0	0.0
	Chennai	3.2	8.2	2.1	3.3	0.0	0.0	0.0	0.0	0.0
Gram dal wholesale	Delhi	0.4	2.0	0.4	-0.7	-0.7	-3.3	0.9	-1.3	-1.3
	Mumbai	14.3	2.1	0.0	-1.0	-7.0	1.3	2.2	-0.6	-2.8
	Kolkata	9.0	15.6	4.6	-16.1	-2.7	-4.0	0.2	-0.6	-0.4
	Chennai	5.2	6.8	-2.5	0.0	0.0	-3.2	0.0	1.0	-0.7
Gram dal retail	Delhi	7.5	12.2	-1.5	-9.3	-1.1	-5.3	2.0	-2.2	-1.2
	Mumbai	12.1	8.6	-0.4	-1.0	-3.6	1.0	1.4	-0.3	-2.1
	Kolkata	7.6	13.3	4.0	-14.8	-2.9	-1.9	0.2	-0.5	-0.4

[1] First phase: 25th March to 14th April, 2020; Second phase: 15th April – 3rd May, 2020; Third phase: 4th to 17th May, 2020; Fourth phase: 18th to 31st May, 2020; Fifth phase: 1st week of June, 2020; Unlock phases started from 8th June onwards.

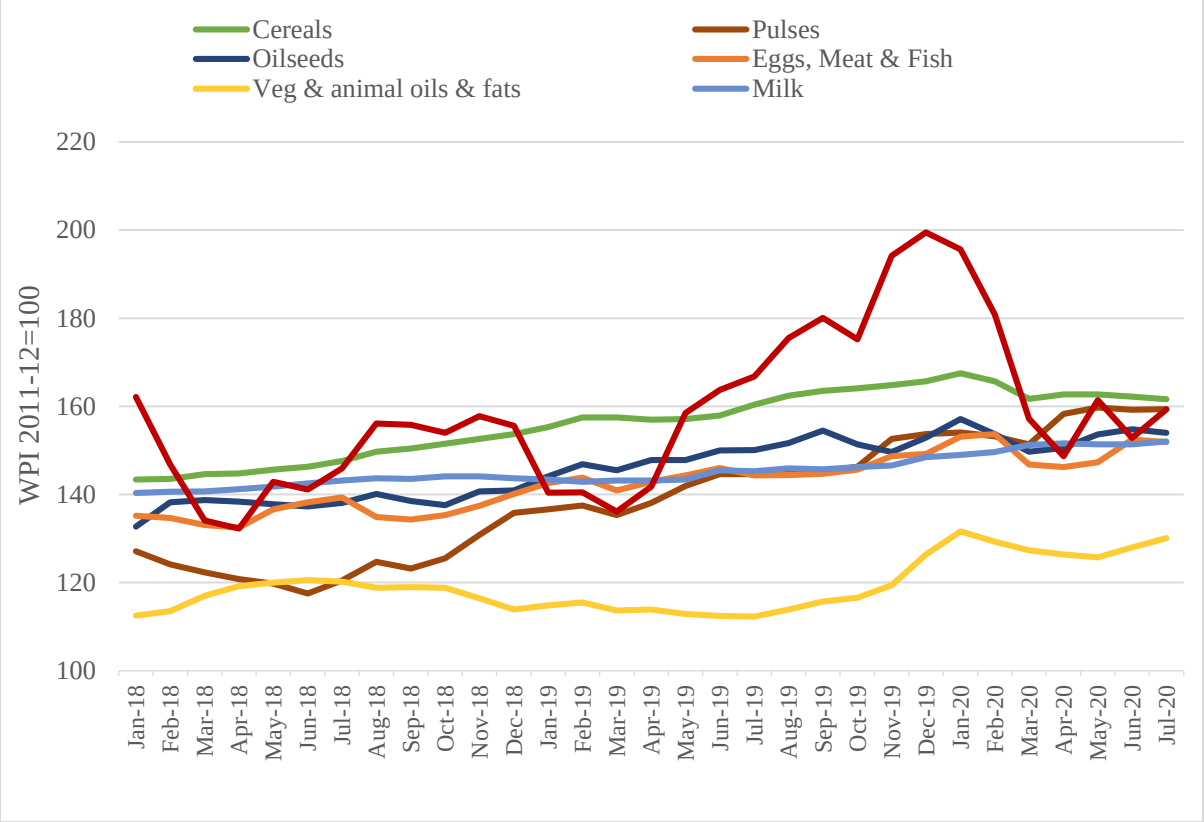
	Chennai	6.6	9.2	3.2	-0.9	-1.5	-5.5	1.5	0.0	0.0
Tur dal wholesale	Delhi	1.1	6.5	-0.2	-2.1	-1.9	-2.0	3.2	-2.0	-1.3
	Mumbai	7.6	4.9	0.0	-0.8	-5.5	-0.8	-1.4	-0.6	-2.9
	Kolkata	3.3	5.9	0.0	0.0	0.0	-0.8	0.7	0.2	-1.7
	Chennai	6.1	14.9	-4.3	-0.6	-6.7	-2.0	-0.2	0.0	-1.7
Tur dal retail	Delhi	5.7	4.4	3.3	-2.5	-2.3	-5.0	0.6	0.0	0.2
	Mumbai	7.2	11.5	1.3	-0.9	-3.4	-0.7	-1.1	-0.3	-2.4
	Kolkata	3.2	5.2	0.0	0.0	0.0	-0.7	0.6	0.2	-1.5
	Chennai	13.1	10.3	-0.6	-1.3	-3.0	-1.6	-0.1	0.0	-1.6
Groundnut oil wholesale	Delhi	-0.1	1.9	1.8	6.1	1.7	2.2	0.6	-1.7	-2.2
	Mumbai	2.8	5.2	-0.1	6.1	-0.3	-4.0	-1.0	-5.0	-2.2
	Kolkata	1.4	1.4	2.3	0.1	1.3	-1.9	7.1	6.4	-4.5
	Chennai	4.8	0.0	1.3	4.5	0.4	3.0	-0.3	0.4	-1.1
Groundnut oil retail	Delhi	4.5	2.6	2.5	0.6	0.0	0.0	0.0	0.0	0.0
	Mumbai	4.0	1.6	1.3	3.6	-0.2	-2.9	-0.5	-4.5	-1.7
	Kolkata	1.3	1.3	2.2	0.1	1.2	-1.8	6.7	6.0	-4.2
	Chennai	4.1	2.7	-0.1	6.7	0.5	-0.5	0.5	0.0	0.3
Onion wholesale	Delhi	-22.3	-23.5	-18.5	-12.8	-8.4	34.9	4.7	14.0	2.8
	Mumbai	-10.4	-35.4	4.7	-13.0	-15.8	9.7	-4.5	-3.0	4.6
	Kolkata	0.0	-2.9	-13.6	2.2	-12.6	24.9	-8.9	10.6	-2.9
	Chennai	7.4	-31.9	1.8	-16.9	-9.6	33.8	-1.2	-7.1	8.4
Onion retail	Delhi	3.1	-15.2	-10.0	-19.3	-9.0	19.0	-6.1	-7.8	-1.6
	Mumbai	6.9	-16.2	-4.6	-7.2	2.4	1.6	-1.2	-1.8	-0.8
	Kolkata	0.0	-9.6	-20.9	2.3	-8.8	18.7	-5.1	6.5	0.0
	Chennai	12.8	-24.9	32.6	-37.1	-8.9	22.1	-9.1	-3.5	0.5
Potato wholesale	Delhi	16.8	-8.6	5.9	-5.2	6.4	2.3	3.0	14.2	12.1
	Mumbai	12.2	-9.1	-2.5	0.0	0.0	4.7	6.1	3.9	2.3
	Kolkata	33.2	8.1	-5.0	5.4	9.9	2.7	10.2	10.0	-0.4
	Chennai	27.3	-1.8	-4.9	-6.2	11.4	11.7	-2.4	6.0	3.3
Potato retail	Delhi	24.9	-13.6	4.8	0.0	0.0	0.0	6.2	3.6	1.7
	Mumbai	15.8	5.7	6.2	1.8	-0.2	3.0	3.8	2.1	1.0
	Kolkata	27.9	7.1	-4.4	4.7	8.8	2.4	9.2	9.0	-0.3

Chennai	24.7	-4.3	20.0	-28.6	11.1	15.2	2.3	18.7	-6.9

Note: the change denotes percentage change in fortnightly average prices over pre-lockdown/previous lockdown phase/ unlock period ending fortnight. Lock1- lockdown 1, Lock2- lockdown 2, Lock3- lockdown 3, Lock4- lockdown 4, Lock5- lockdown 5, June.2F- June second fortnight, July.1F- July first fortnight, July.2F- July second fortnight and Aug.1F- August first fortnight.

The trend in the wholesale prices until March 2020 shows a moderating trend, which continued till April 2020, except for cereals, pulses and oilseeds that witnessed an upward movement in April 2020 (Figure 1). Milk continued to move upwards marginally and eggs, meat and fish also improved during May and June which otherwise also show some increase in their prices during this period. Fruits and vegetables followed the trend of declining prices from December onwards on higher supplies in the markets. The international prices of agricultural commodities have also witnessed a downward movement in April and May and rebounded in June and July.

Figure 1: Trends in the wholesale price index of major commodity groups



Commodity prices in major wholesale markets of wheat, grams, rapeseed and mustard, potato and onion were also projected for two periods *viz*., lockdown phase (starting third week of April 2020) and unlock phase (starting third week of August 2020) to examine the stability of prices. The daily prices of foresaid commodities were compiled from AGMARKNET from the year 2009 onwards and were converted into weekly price series. The time series forecasting models viz., Autoregressive Integrated Moving Average (ARIMA), Hybrid ARIMA-GARCH were applied and best fitted models were used for forecasts. The length of projection was six week for each period.

The observed price series during the lockdown period was compared against the projected price series, and it was observed that the prices showed a fair amount of stability during the lockdown period. In spite of the fact that market arrivals of Rabi crops delayed for a week or so, and the shutdown of many *mandis* for fifteen days from last week of March to first week of April. This stability shows that there was confidence in the market. The projected price series for unlock phase showed that prices were stable with a moderately increasing trend plausibly due to the end of arrival of Rabi crops and improved normalcy attained from phased COVID-19 unlock.

The Doubling Farm Income (DFI) strategy has stressed on market reforms as a prerequisite to enable the farmers to realize remunerative prices for their products across a unified national market. If the prices received by the farmers do not increase relative to the inflation in the economy, the farmers' income in real terms would decline. It is, therefore, important to ensure that the prices received by farmers in real terms also increase. Various factors that lead to lower price realisation by farmers include lack of connectivity from the farmgate, market imperfections, and lack of information at farmers' level on prices (information asymmetry) among others. The mere presence of markets located in close proximity is not sufficient; inter-market connectivity and connectivity between farmers and multiple markets is important for realisation of remunerative prices. It is also recommended to strengthen the supply chain for sensitive products, namely tomato, onion and potato. In this regard, the government has announced the initiation of 'Operation Greens', to develop and promote streamlined logistics for the fresh produce (greens) from farmgate to the consumer. A budgetary allocation of Rs. 500 crores has been made for 2018-19 for this purpose. The Ministry of Food Processing Industries (MoFPI) has begun the work for launching this initiative.

a. Impact on market arrivals

End of March and April months are peak harvesting period for Rabi crops, a significant proportion of farmers' crop produce comes to the market, particularly marginal and small farmers sell their produce immediately after harvest leading to a spurt in arrivals in the *mandis*. With the lockdown initiated on March 25, 2020, the trade activities in the agricultural markets halted and agricultural supply chains were disrupted. The impact of COVID-19 on agricultural markets reveals that the market arrivals declined significantly during March to August 2020. As this period is dominated by arrival of Rabi crops (especially wheat), wheat arrivals declined drastically compared to previous year's monthly arrivals. Highest decline in wheat was observed in April 2020 (Table 4). Arrivals of most of the pulses declined during the period, prominent decline was noted in arrivals of Bengal gram. Vegetable arrivals were most affected during the lockdown; the arrivals of major vegetables declined up to 60%. Arrivals of onion and potato also declined drastically. Market arrivals of foodgrains and oilseeds have increased in May and June, while they continue to be low for vegetables in the lean season.

The price comparisons were made based on wholesale price indices (WPI) compiled from the Office of the Economic Adviser, Government of India. The prices (WPI) exhibited a declining trend in most of the important commodities during March and August 2020 contrary to the increasing trends during the previous year. WPIs of wheat and maize exhibited persistent decline (Figure 2). WPI of paddy was not much affected. The prices of pulses were significantly higher in 2020 particularly for black gram and green gram (Figure 3). The price of most volatile crop, i.e. onion, exhibited a sharp decline during March to July 2020. However, the WPIs of potato and tomato witnessed an increasing trend during the lockdown period (Figure 4).

Table 4: Market arrivals for major commodities ('000 tonnes)

Period	Commodities	March	April	May	June	July
TE 2019	Wheat	1546.3	15566.5	5970.9	1407.7	982.7
	Paddy Common	912.3	885.0	1209.7	1050.4	709.9
	Mustard	688.2	631.0	377.4	211.8	123.6
	Bengal Gram	426.1	618.6	720.6	340.7	188.1
	Lentil	79.8	85.7	98.1	54.8	50.8
	Potato	1530.9	923.7	894.0	856.2	893.9
	Onion	1093.9	1115.4	1309.8	1483.0	1061.8
	Tomato	232.7	239.9	278.8	281.6	292.5
2020	Wheat	1035.1	3725.4	7349.9	2302.2	791.1
	Paddy Common	726.5	712.7	1307.6	1051.5	515.2
	Mustard	330.1	255.6	390.3	316.5	142.8
	Bengal Gram	215.2	151.0	304.4	334.4	146.3
	Lentil	88.8	71.0	97.9	61.1	25.4
	Potato	729.2	475.5	511.9	517.0	440.7
	Onion	900.6	459.8	604.9	655.9	481.0
	Tomato	199.0	169.1	219.9	283.4	263.8
% Change	Wheat	-33.06	-76.07	23.10	63.55	-19.50
	Paddy Common	-20.37	-19.46	8.09	0.10	-27.43
	Mustard	-52.03	-59.49	3.40	49.43	15.49
	Bengal Gram	-49.49	-75.59	-57.75	-1.84	-22.21
	Lentil	11.21	-17.20	-0.24	11.32	-49.98
	Potato	-52.37	-48.52	-42.75	-39.62	-50.70
	Onion	-17.67	-58.78	-53.82	-55.77	-54.70
	Tomato	-14.48	-29.51	-21.12	0.64	-9.80

Source: AGMARKNET (http://www.agmarknet.gov.in/)

Livestock products are an important component of diet and its share in food expenditure has been continuously increasing. COVID-19 has disrupted the consumption of some of the livestock products. The poultry industry has been severely hit in the country due to limited consumption caused by misconceptions of transmission of virus from animals to humans, and restrictions on inter-state movement. The lockdown disrupted these formal and informal dairy supply chains and affected the small farmers. India is the second largest bovine meat exporter worldwide, with annual exports of buffalo meat worth US$ 3,610 million. The exports were severely affected; prices were falling as exports have dried up with contracting export demand.

Figure 2: Wholesale Price Index for major cereals (January-2019 to August- 2020)

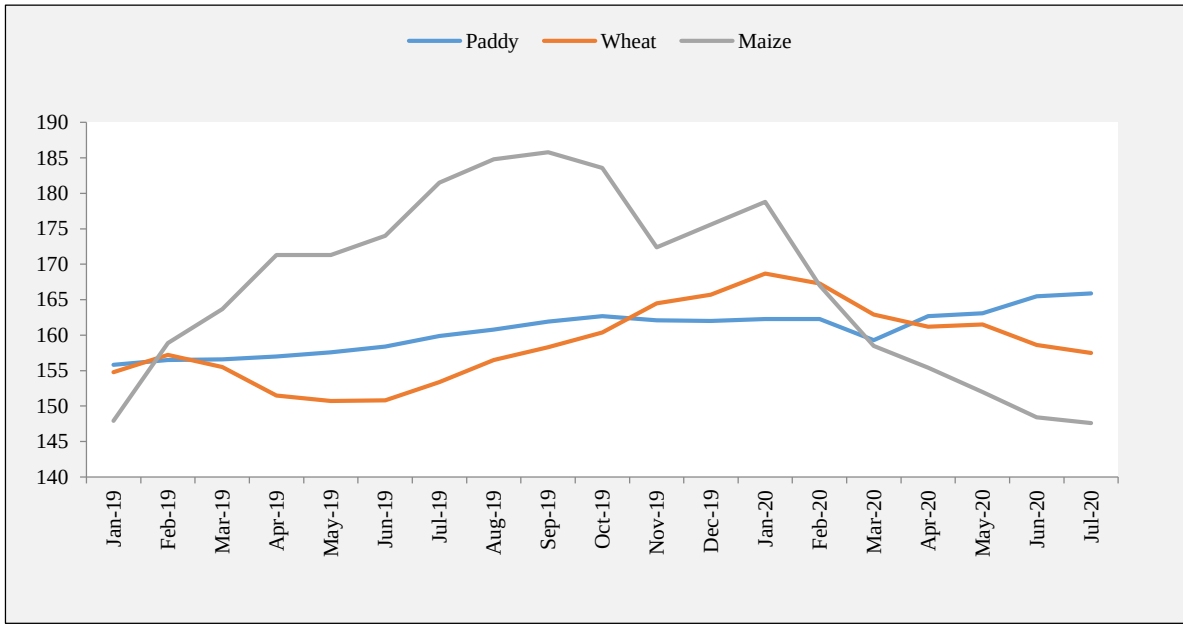


Figure 3: Wholesale Price Index for major pulses (January-2019 to August- 2020)

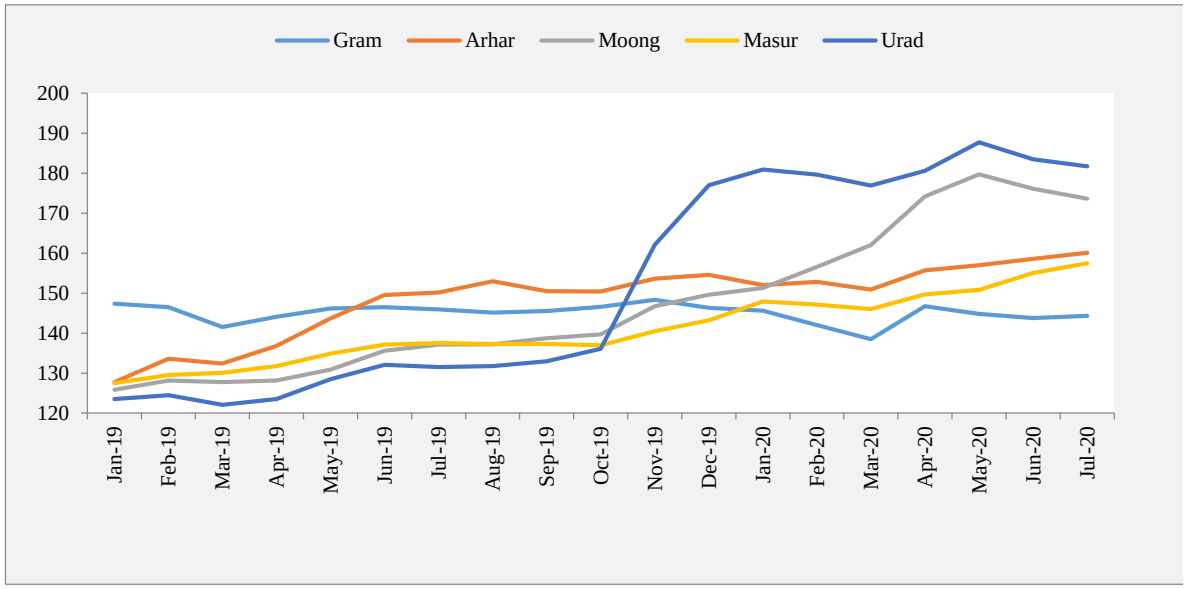


Figure 4: Wholesale Price Index for major vegetables (January-2019 to August- 2020)

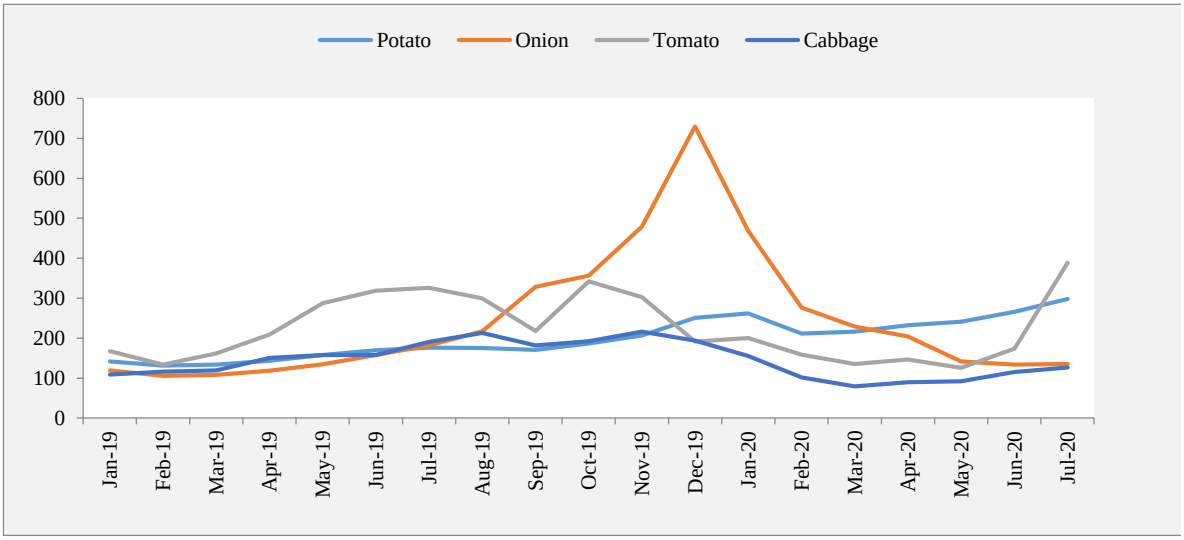
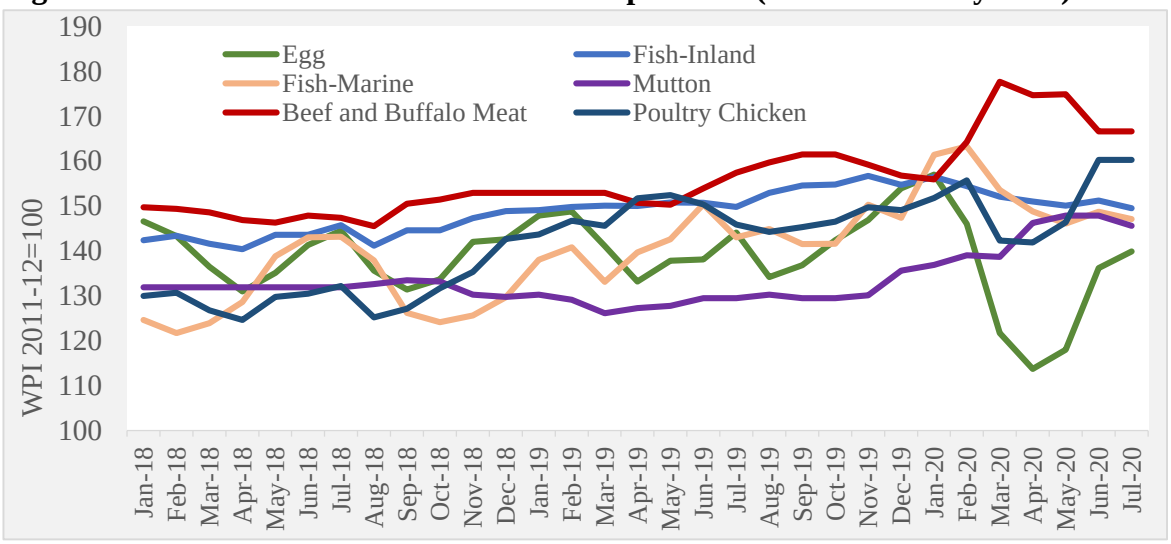


Figure 5: Wholesale Price Index for livestock products (Jan 2018 to July 2020)



Due to continuous prevalence of COVID-19, the supply chains have been disrupted, which need to be strengthened through appropriate interventions. Although, timely taken measures by the Central and state governments such as removal of restrictions on crop harvesting and marketing-related activities, resulting in the resumption of activities in the agricultural markets, helped the farmers to sell their Rabi harvest. In many essential commodities, it has been noted that both arrivals and prices declined during the lockdown period causing farmers to suffer from the reduced product monetisation. The supply chains were disrupted affecting the arrivals and prices, hence the farm incomes. Due to paucity of exact cost data, it is difficult to work out the exact change in farm income; however, one can draw indicative directions from change in arrivals and prices.

The National Agriculture Market (e-NAM) has allowed the farmers to connect with bigger agricultural markets. Until January 2020, 585 markets were connected for real-time information, transparency, price discovery, e-payment facility with ease of trading. The

Government has recently brought on-board 415 more *mandis* beyond the 585 already on-board. Inter-state trade was started in 12 states/UTs in 20 commodities. The number of registered farmers increased from 1.65 crores in January 2020 to 1.67 crores as on July 31, 2020. Significant increase has been noted in the number of registered traders on e-NAM; the number increased from 1.27 lakhs in January 2020 to 1.42 lakhs as on July 31, 2020. The recent reforms in agricultural marketing aim towards providing alternative marketing opportunities to farmers, and removing inter-state barriers to impact the arrivals and prices in the *mandis.*

IV. Agricultural Exports

Export of agricultural products (in value terms) in 2019-20 was comparable to those in 2018-19 (Figure 6) even with the existence of COVID-19 related issues in March 2020. The exports were however lower for rice (basmati and other than basmati), marine products, oilseeds and meat and its products. The available data for the first three months of 2020-21 indicated (Figure 7) that the export of agricultural products such as fresh and processed fruits and vegetables, foodgrains including rice, spices, sugar & molasses and cotton were comparable or even higher in the first quarter of 2020-21 than the corresponding period in 2019-20. Whereas, exports have decreased for animal & marine products segment, tea & coffee, oilseeds & oil meals, and other processed items.

Monthly exports data indicated that the export of agricultural products got impacted to some extent in March 2020 and greatly in the month of April (lockdown period in most of the countries), although export of non-basmati rice, foodgrains and sugar has increased in April (Figure 8). Agricultural exports rebounded in May and June months and were even higher than in the corresponding month previous year for many of the commodities. Continuous export activities have also helped improve market sentiments and thus, commodity prices were not adversely affected significantly rather they have improved recently. The disease has certainly re-shaped the consumer behaviour, maybe temporarily, in terms of declining demand for animal protein sources to vegetative sources, and the decline in the export of these products signifies this behaviour.

Figure 6: Value of agricultural exports from India

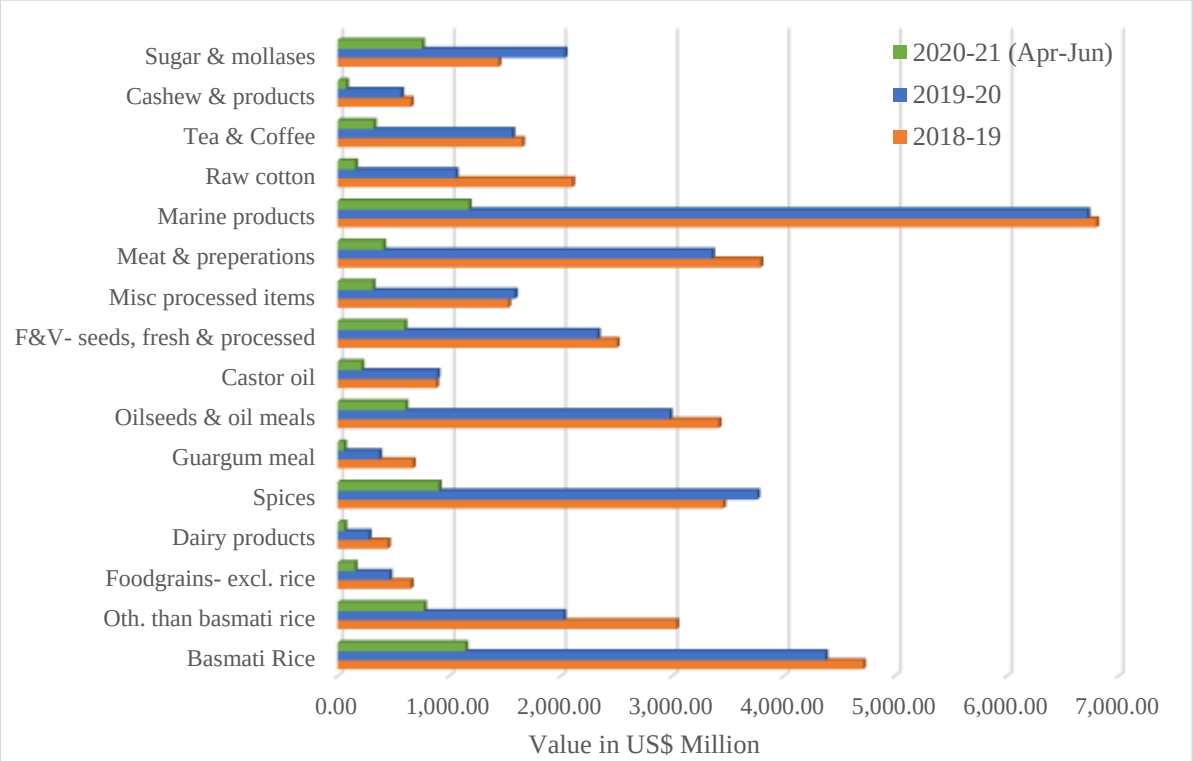


Figure 7: Value of agricultural exports from India during COVID-19 period

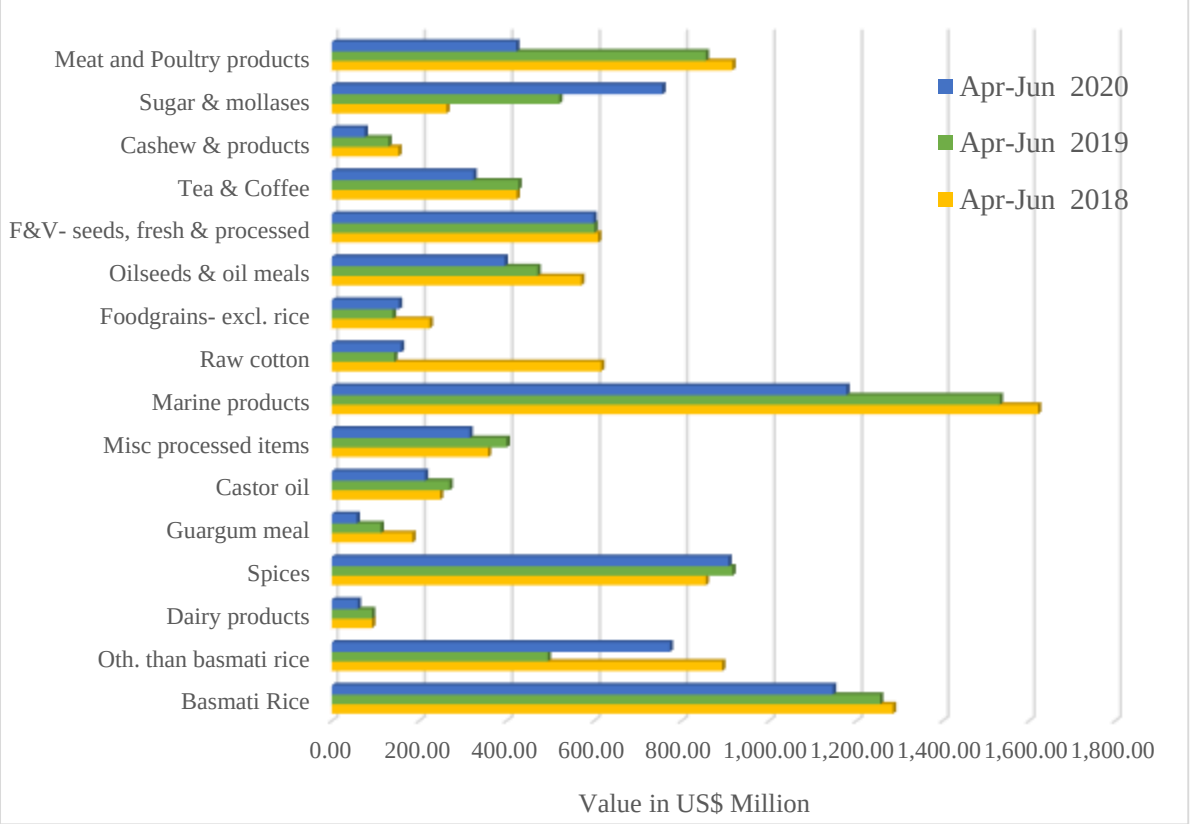
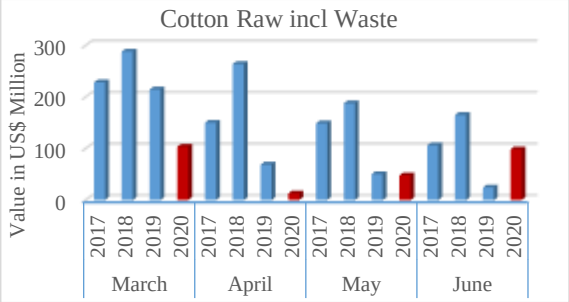


Figure 8: Monthly export of agricultural products from India during COVID-19 period



V. Food production and household consumption

The government quickly reacted to the outbreak and imposed lockdown in the country on March 25, 2020 to contain the spread of virus infection. Disruption in economic activities is expected to have an adverse effect on food and nutritional security due to demand and/or supply side shocks in the food system. The supply shocks may arise due to reduced food production or disruptions in supply chain of food commodities on account of movement restrictions imposed by the authorities or profiteering activities of errant traders. The 3.4% growth in gross value added (at 2011-12 prices) of agriculture and allied sectors during April-June, 2020 over the previous year revealed no adverse effect on food production in the country (GoI, 2020). Disruptions in supply chains are reflected through the changes in food prices. The demand-side shocks may arise due to reduced affordability of food, particularly by the poor and lower-middle income-class households, and changes in food consumption patterns from high to low perishable commodities. The impact of COVID-19 on availability and accessibility dimensions of food security are discussed at national and household level in the following sections.

a. Food production and household demand of food products

The onset of green revolution in agriculture sector during the 1960s successfully transformed India from a food-deficit economy to one, which is not only food-sufficient but also a net exporter of agricultural commodities at an aggregate level. The evidence at the national level revealed sufficient production of food to meet the actual household consumption in 2016-17 (Table 5). As per the second advanced estimates released on February 18, 2020, foodgrain production for the year 2019-20 will be 291.95 million tonnes that is 5.7% higher than the production in 2016-17. This is sufficient to cover the household demand of food in the nation. It is worth noting that household food demand does not include food consumed outside home and other indirect demand (seed, feed, wastage etc.). During the lockdown period, demand due to food consumed away from home is expected to be negligible.

Table 5: Production, household consumption and requirement of food in 2016-17

Food item	Production (mt)	Actual household consumption (mt)	NIN norms# (grams/capita/day)	Normative food demand (mt)
Cereals & millets	253	175	326	154
Pulses	23	12	71	34
Animal Food	24	10	118	56
Milk	165	68	377	179
Vegetables	178	108	432	205
Fruits	93	24	100	47
Fat	23	11	30	14
Sugar	31	12	27	13
Overall	790	421	-	702

Minimum balanced food norms of National Institute of Nutrition (ICMR) for moderate activity

Further, it is advised to consume a balanced diet to boost immunity to fight against the virus. The National Institute of Nutrition, Hyderabad has suggested Recommended Dietary Allowances (RDA) of foods for different age groups and activity status (sedentary/moderate/heavy) to supply required nutrition (NIN, 2011). Weighted average of age-wise RDA of foods using population of respective age groups (2011 Census) as weight is presented in Table 5. Using estimated average norms for moderate activity status, normative demand of food items has been projected for the base year 2016-17. The production is also found to be sufficient to meet normative demand of food commodities except for pulses, milk, vegetables, and non-vegetarian products. The analysis reveals that the country has sufficient availability of food to meet the actual household demand for all food items and normative demand of calorie-supplying food items. Changes in food intake, if any will be due to constraints in distribution of food at regional and local level, and household-specific economic and non-economic factors.

b. Income-induced impact of COVID-19 on consumption

Availability of food may be a necessary but not a sufficient condition for ensuring food security. Actual intake of food by individuals may depend on variety of household-specific factors. Among others, income is the most important factor affecting economic access to food. Reduction in income of the households due to shutdown of economic activities will have adverse impact on food intake. During April-June, 2020, gross value added (at 2011-12 prices) and private final consumption expenditure (PFCE) reduced by 22.8% and 26.68% over the previous year (2019-20), respectively. The impact of change in income and thus expenditure on consumption pattern (of both food and non-food) has been assessed under alternative expenditure scenarios using estimated expenditure elasticities.

The likely impact on consumption has been assessed under three expenditure scenarios. Scenario-1 assumes that subsequent quarters (Q2, Q3 and Q4) of 2020-21 may witness same

level of decline in PFCE as in quarter 1 (-26.68%). Scenario-2 assumes a gradual recovery wherein PFCE during Q2, Q3 and Q4 of 2020-21 will be 15%, 10% and 0% less than the previous year. Therefore, overall decline in PFCE during 2020-21 will be 12.54% over the previous year. Scenario-3 assumes 100% recovery wherein PFCE during Q2, Q3 and Q4 of 2020-21 will be equal to the level of 2019-20. In this scenario, overall decline in PFCE during 2020-21 will be 6.26%. Expenditure elasticities for food and non-food groups have been estimated using Linear Approximation-Almost Ideal Demand System (LA-AIDS) model (Table 6). Further, expenditure on food and non-food items was estimated using 68th round (2011-12) of consumption expenditure survey of the National Sample Survey Office (NSSO) and expressed at 2019-20 prices using Consumer Price Index (2011-12=100).

A perusal of Table 6 reveals that during pre-COVID period (2019-20), average monthly per capita consumption expenditure of Indian households was Rs. 2367, out of which 44.3% was spent on food items. Due to loss in income, average expected decline in monthly consumption expenditure during 2020-21 is estimated to range between 6.26% and 26.68% under different scenarios taken into consideration. As non-food items are relatively more elastic than the food items, decline in the expenditure on non-food items would be relatively steeper than on food. Non-food expenses are expected to be squeezed by 7.69% to 32.79%, whereas food expenses may be reduced by 4.98% to 21.24% during 2020-21. Among the broad food category, the decline in consumption will be least for staple commodities like cereals, edible oils, pulses, vegetables as compared to other food commodities (Table 6).

Table 6: Likely decline in consumption expenditure during 2020-21

Particulars	**Expenditure elasticity***	**Pre-COVID consumption expenditure (2019-20): Rs/capita/month**	**Change in consumption expenditure during 2020-21 (%)****		
			Scenario 1	**Scenario 2**	**Scenario 3**
Cereals	0.37	238	-9.89	-4.65	-2.32
Pulses	0.53	67	-14.05	-6.60	-3.30
Milk	0.89	202	-23.62	-11.10	-5.54
Edible oils	0.42	78	-11.32	-5.32	-2.66
Non-veg	0.96	77	-25.56	-12.02	-6.00
Vegetables	0.58	100	-15.42	-7.25	-3.62
Fruits	1.25	32	-33.43	-15.71	-7.84
Other foods	1.29	256	-34.30	-16.12	-8.05
Food_total#	0.80	1048	-21.24	-9.99	-4.98
Non-food	1.23	1318	-32.79	-15.41	-7.69

* Elasticities estimated using 68th round (2011-12) of Consumption Expenditure Survey of NSSO

**Scenario 1: With same decline in PFCE as during April-June; Scenario 2: With gradual recovery in remaining quarters; Scenario 3: With 100% recovery in remaining quarters

Elasticity of food (total) is weighted (expenditure share) average of all food items

Apart from a decline in the level of consumption expenditure, composition of household budget will also change. Households will reallocate expenditure from non-essential to essential items. The share of non-food expenditure will decline, whereas essential items like food will gain in their share in total expenditure (Table 7). Within the food basket, commodities having inelastic demand will witness an increase in its share in food budget. The reduction in the level as well as composition of consumption expenditure has definite implications on the revival of overall economy.

Table 7: Expected changes in consumption pattern due to COVID-19 led income shock (Per cent)

Items	2019-20	2020-21		
		Scenario 1	Scenario 2	Scenario 3
Cereals	10.0	12.5	11.0	10.5
Pulses	2.8	3.4	3.1	2.9
Milk	8.5	9.0	8.7	8.6
Edible oils	3.3	4.0	3.6	3.4
Non-veg	3.2	3.3	3.3	3.3
Vegetables	4.2	4.9	4.5	4.3
Fruits	1.3	1.2	1.3	1.3
Other foods	10.8	9.8	10.4	10.6
Food_Total	44.3	48.2	45.8	45
Non-food	55.7	51.8	54.2	55.0
Overall	100	100	100	100

Note: Scenario 1: With same decline in PFCE as during April-June; Scenario 2: With gradual recovery in remaining quarters; Scenario 3: With 100% recovery in remaining quarters

Apart from income, price is another factor that adversely affects purchasing power of poor households. Due to negative price elasticities, any rise in prices of food commodities will lead to a decline in its consumption. Impact of price rise will not be uniform and it will be stronger for poor households and high value agricultural commodities. These factors necessitate supplementing food demand of poor households from the Public Distribution System (PDS) supplies. Srivastava et al (2017) found that effects of in-kind PDS supplies on calorie-intake is 3.5 to 3.9 times higher than of direct cash transfer of food subsidy even at the existing level of losses and leakages in PDS supply. In the situation of lockdown and disruption in existing supply chain, importance of PDS increases manifolds.

As on September 2020, total stock of foodgrains in the Central pool was 700.27 lakh tonnes (rice – 221.95 lakh tonnes, wheat – 478.32 lakh tonnes, and coarse grains: 1.37 lakh tonnes) which are much higher than foodgrain stocking norms of 214.10 lakh tonnes (wheat: 138 lakh tonnes and rice: 76.10 lakh tonnes) for the quarter beginning January 1, 2020. Under the National Food Security Act, more than 80 crore individuals are being supplemented with minimum required foodgrains. COVID-19 has also provided an opportunity to offset the excess stock of foodgrains, which will help the procurement agencies to procure fresh supplies (of

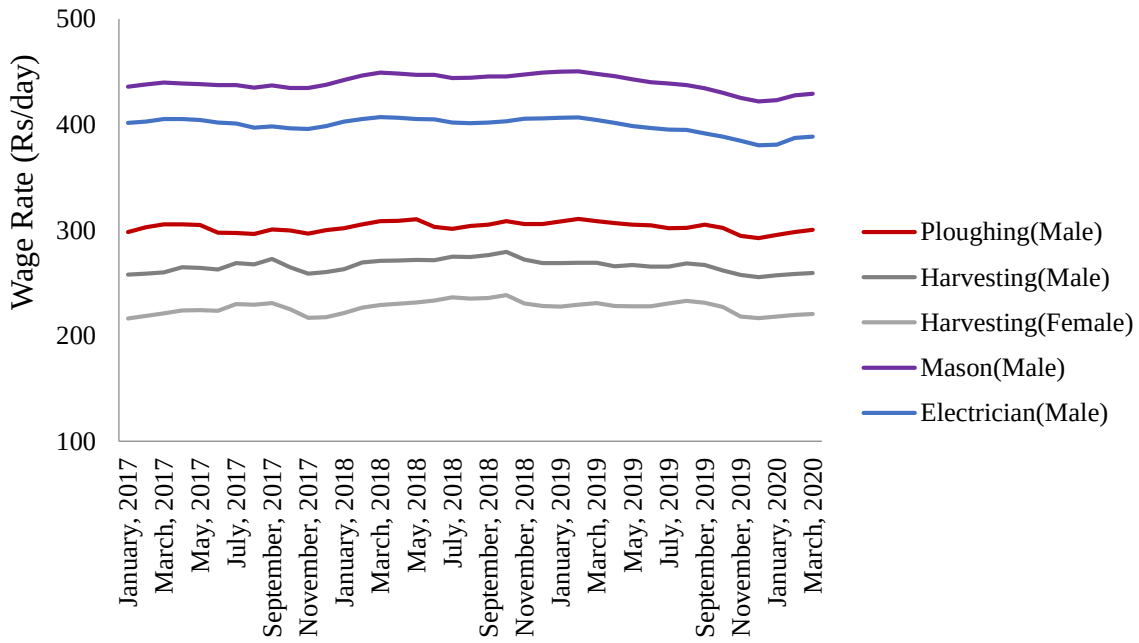
wheat in the coming season) from the farmers. This will also provide an assured market to the farmers.

VI. Poverty and employment

a. Rural wages

In India, the estimates by the International Labour Organization (ILO), Centre for Monitoring Indian Economy (CMIE) and some other researchers have pointed to a challenging unemployment situation, which further got deteriorated by the current lockdown in the country (Bloomberg Quint 2020). There are no data available to assess the current labour market scenario and its effect on their income. The data available up to early 2020 indicate slighting weakening trend in the real wages of rural workers since 2019. This trend is true for real wages of farm and non-farm workers (Figure 9). If during the lockdown period, rural non-farm workers stay back in their villages, then the wages may remain stagnant. However, in areas where rural migrant workers are important, there could be an increase in the wages of farm workers during the period of lockdown and beyond.

Figure 9: Real Wages for Selected Operations in Rural India (Jan-2017 to Mar-2020, Jan-2017=100)



b. Rural employment scenario

The lockdown to manage COVID-19 was implemented in four phases from March 25 to May 31, 2020; phase I (March 25 to April 14), phase II (April 15 to May 3), phase III (May 4 to May 17), phase IV (May 18 to May 31). After this, the unlocking process also happened over two phases: unlock 1.0 (June 1 to June 30) and Unlock 2 (July 1 to July 31). Monthly unemployment rates reported by the CMIE show that the unemployment rates increased from

8.75% in March 2020 to 23.42% in April which continued in May 2020 (23.48%) (Figure 10). These two months coincide with the lockdown period. The unemployment rates declined later in June to pre-lockdown period levels.

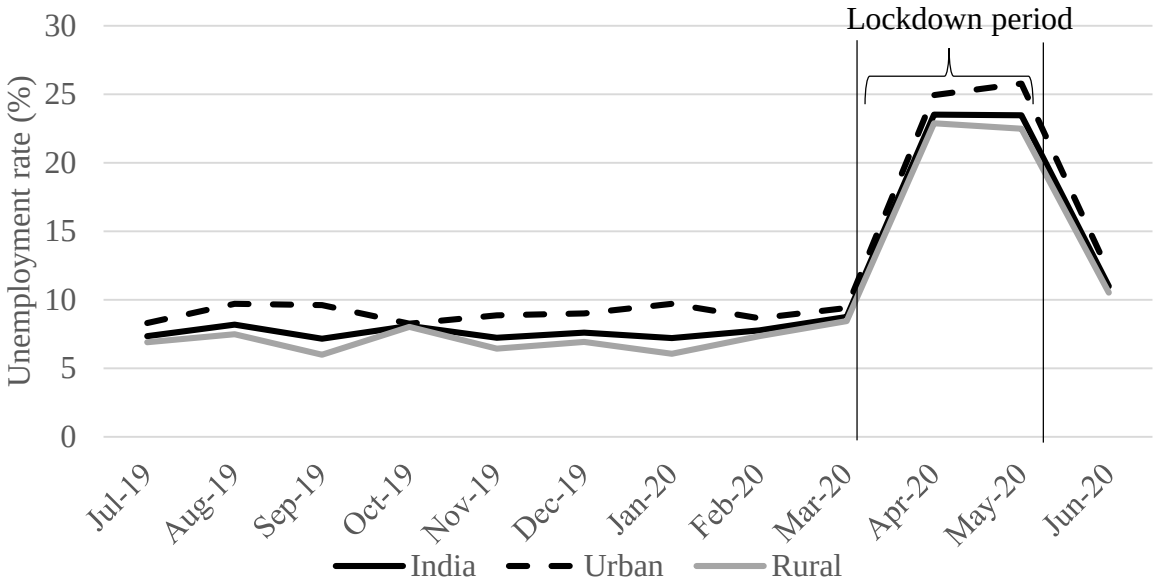


Figure 10: Monthly unemployment trend

Note: CMIE conducts a face-to-face interview of a sample of 5, 22,000 members (who are older than 15 years) from 1, 74,405 households. The full survey of 1, 74,405 households take over a period of four months. Monthly data computed using 30-day moving average of unemployment rate in India every day, using the data collected during the preceding 30 days. Unemployment Rate (UER) is the ratio of persons who are unemployed who are willing to work and are actively looking for a job to the labour force.

Source: Statistical Profiles - Unemployment in India, CMIE's Consumer Pyramids Survey, Centre for Monitoring Indian Economy (CMIE), https://unemploymentinindia.cmie.com/kommon/bin/sr.php?kall=wstatmore

As a result of the lockdown, there was reverse migration. Next, we try to track the migration based on the total migration data provided by the Census. We analyse the migration among the inter-state migrants who have been migrants for less than 1 year. This would capture the migration patterns among the seasonal migrants. As the Census data shows, out of the total rural to urban migration 23.7% migrate for work, 29.6% for marriage and 36.2% for house. Figure 11 plots the inter-state migration in major states using the Census 2011 data on migration. The major states (>70,000 migrants) by migrant origin are Uttar Pradesh, Bihar, Karnataka, Andhra Pradesh, Madhya Pradesh, Rajasthan and Gujarat. The major migrant destinations states are Maharashtra, NCT of Delhi, Gujarat, Haryana, Karnataka, Jharkhand, Gujarat, Uttarakhand, West Bengal and Punjab. This reverse migration could have an effect on labour supply in agricultural states like Haryana and Punjab. Farmers in these states have resorted to direct sowing of rice or to other crops such as cotton that require lesser labour during the sowing season. On the other hand, the migrant origin states are predominantly agriculture oriented and the reverse migration coinciding with the agricultural season has led to higher

labour availability, which is reflected as increased sowing area as reported by Ministry of Agriculture and Farmers Welfare[2].

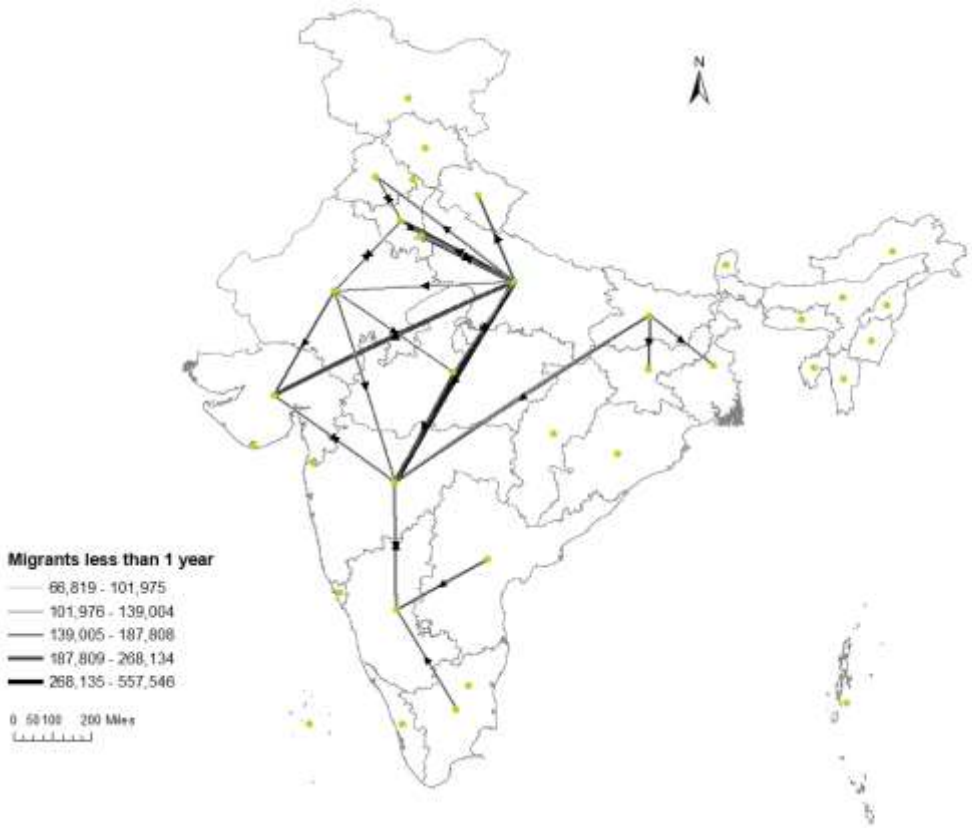


Figure 11. Inter-state migration among migrants less than 1 year (major states-migrants > 70, 000 migrants)

Note: Refer Table 1 in Annexure I.

Source: Data on migration, Census data (2011) https://censusindia.gov.in/2011census/migration.html

c. Status of poverty incidence

The ILO has undertaken a global assessment and classified the different sectors as high, medium-high, medium, low-medium and low based on the impact of the crisis on economic output (ILO 2020). Sectors such as accommodation, food, manufacturing, wholesale and retail trade, which are labour intensive, have been classified as high risk. Though agriculture, forestry and fishing are classified as low-medium risk, the scale of employment in this sector and dependence of such households on non-farm employment would lead to higher risk among these households. Based on our analysis for rural India based on unit-level data from the Periodic Labour Force Survey (PLFS) 2017-18, we observe that 15.98% of the working population is employed in sectors that are considered to be high risk, 58.66% in low-medium risk, and 6.28% in low risk (Table 8). The agricultural sector, which consists of about 59% of

[2] As on 14.08.2020, Ministry of Agriculture and Farmers Welfare reported that the total Kharif crops sown as 1015.58 lakh ha area against 935.70 lakh ha area during the corresponding period of last year. There is an increase in area coverage by 8.54% compared to last year for the Kharif season. Source: https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1645835#:~:text=As%20on%2014.08.,last%20year%20in%20the%20country.

overall rural employment, also contributes to three-fourths share in overall female employment. Within the agricultural sector, about 28% of the workers are female. Most of these women are often involved in precarious work and are thus devoid of any form of labour protection.

The share of households and the incidence of poverty in rural and urban India by different employment categories are given in Table 9. Since the latest poverty estimates are not available, the estimates for 2011-12 have been used. These data indicate that the share of rural and urban households working as casual labour in non-farm sector was 13% and 12%, respectively in 2011-12. In addition, there are 21% of households working as casual labour in agriculture in 2011-12 which reduced to 12% in 2017-18. The share of casual workers in rural non-farm and urban sector has however remained 25% in 2017-18. The immediate short-run impacts of the lockdown would be felt most among these casual workers. Here it may be noted that some of small and marginal farmers and casual agricultural labour also work in the rural non-farm sector and these may also be affected to the extent of employment lost. The incidence of poverty is high among these casual workers in rural and urban areas, which may further deteriorate if income loss is not compensated.

We further evaluate the poverty headcount ratios of impact of contractions in monthly per capita expenditure or consumption in India. We evaluate three scenarios – low risk (5 per cent contraction in consumption), medium risk (10 per cent contraction) and high risk (20 per cent contraction). All these estimates are a crude way of representing the impacts. In rural India, there are about 792 million people, of which 201 million reside below the poverty line. It is expected that there will be an addition of around 37 million to 172 million poor people ranging across low-risk and high-risk scenarios. This might translate to an increase of headcount poverty ratios ranging from 30% to 47% across the three risk scenarios. As expected, the proportion of people below the poverty line is lower among urban areas. About 43 million are classified as poor out of the total 317 million urban population. There will be an addition of around 7 million to 37 million urban poor people ranging across low-risk and high-risk scenarios. This might translate to an increase of headcount poverty ratios ranging from 16% to 25% across the three risk scenarios in urban India.

This increase in the incidence of poverty is subject to the condition of no income transfer or higher public distribution by the Government. The Government has however taken several steps to support the agricultural and allied sector by exempting the sector from the lockdown, undertaking public distribution of foodgrains and direct cash transfer (see Annexure II). Therefore, the poverty impact may be a temporary phenomenon and long-term impact may occur through a lower rate of growth in other sectors.

Table 8: Employment shares across sectors in rural India and global sectoral risk assessment, 2017-18			
Sector	Global sectoral assessment of risk	Share (%) in total employment	Share (%) of women workers
Manufacturing	High	7.82	8.31
Wholesale and retail trade	High	6.84	3.20
Accommodation and food service activities	High	1.25	1.02
Real estate activities	High	0.07	0.02
Transportation and storage	Medium-high	3.88	0.19
Arts, entertainment and recreation	Medium-high	0.17	0.04
Mining and quarrying	Medium	0.40	0.20
Construction	Medium	12.38	4.68
Financial and insurance activities	Medium	0.45	0.21
Agriculture, forestry and fishing	Low-Medium	58.66	72.41
Other services, education, heath, administration etc.	Low	8.08	9.73

Note: Employment statistics are based on principal status (the economic activity in which the person spent relatively long time (major time criterion) during the 365 days preceding the date of survey).
Source: ILO (2020) and Authors' estimation based on Periodic Labour Force Survey data, 2017-18.

Table 9: Employment categories and the incidence of poverty in India

Rural						
Household Type	**Share of households (%)**		**Poverty headcount ratio (%), 2011-12**	**5% hit - Poverty headcount ratio (%)**	**10% hit - Poverty headcount ratio (%)**	**20% hit - Poverty headcount ratio (%)**
	2011-12	**2017-18**				
Self-employed in agriculture	34.3	37.8	22	26	32	44
Self-employed in non-agriculture	15.5	14.3	19	23	28	40
Regular wage/salary earning	9.6	12.7	11	13	16	24
Casual labour in agriculture	21.0	12.1	40	46	53	65
Casual labour in non-agriculture	13.5	12.9	33	38	44	57
Others	6.1	10.1	18	22	27	34
Overall	100	100	25	30	35	47

Urban						
Self-employed	35.3	32.4	15	18	21	28
Regular wage/salary earning	41.7	41.4	7	8	10	15
Casual labour	11.8	11.8	33	36	40	54
Others	11.2	14.4	8	9	11	13
Overall	100	100	14	16	18	25

Note: State-level poverty line estimated using Tendulkar methodology for 2011-12 (GoI 2014).
Source: Authors' estimation based on Consumer Expenditure Survey data, 2011-12, PLFS data 2017-18.

VII. Economic Package and Market Reforms

To counter the adverse effects of the lockdown on economy, the Government of India on May 12, 2020 announced a package of Rs. 20 lakh crores, of which the agricultural sector accounted for Rs. 1.5 lakh crores. The COVID-19 exposed the weaknesses of the supply chain infrastructure, and hence about two-thirds of the agricultural package aims at strengthening the post-harvest infrastructure and supply chains. The rest is shared by the micro food processing enterprises (Rs. 10,000 crores), fisheries (Rs. 20,000 crores), animal husbandry (Rs. 15,000 crores), herbal or medicinal plants (Rs. 4000 crores) and beekeeping (Rs. 500 crores). Besides, the allocation to MGNREGA was raised by Rs. 40,000 crores over and above its budgeted allocation of Rs. 61,000 crores. A new rural employment scheme 'Garib Kalyan Rojgar Abhiyan (GKRA)' has also been launched with a provision of Rs. 50,000 crores to generate employment opportunities for the jobless migrants in 116 districts spread over the states of Bihar, Jharkhand, Madhya Pradesh, Odisha, Rajasthan and Uttar Pradesh. This scheme is expected to absorb about two-thirds of the 10 million migrant workers who returned to their villages during the lockdown.

The economic package aims at managing the supply as well as demand side effects of the lockdown. The MGNREGA and GKRA are expected to put more money in the hands of poor workers that will enable them to achieve their pre-lockdown income and consumption levels. On the supply side, most of the activities under both the schemes aim at building community assets and infrastructure and enhancing environmental services that contribute to improving efficiency and sustainability of the agricultural production systems. The significant fall in the market arrivals and wholesale prices of agricultural commodities in the first phase of lockdown resulted in an increase in post-harvest losses at farm level, especially in perishable commodities. This brought forth the weaknesses of agri-food supply chains. A greater allocation of funds for strengthening of the supply chain infrastructure, in terms of storage, warehousing, refrigerated transport, etc. will help farmers insulate from such socks. The package also provides incentives for diversification of agriculture towards medicinal plants and apiculture, the demand for their products is likely to grow at an accelerated rate in the near future. The promotion of micro-food enterprises is a step towards rural industrialization. This will promote (i) start-ups, (ii) processing, and (iii) packaging and branding, that will generate

income and employment opportunities for people in rural areas, and discourage migration of rural labour to cities and towns for search of livelihoods. In addition to the economic package, on June 5, 2020 the Government of India brought out ordinances to reform agricultural marketing system. These are: (i) Essential Commodities (Amendment) Act, 2020 (ii) The Farmer's Produce Trade and Commerce (Promotion and Facilitation) Act, 2020; and (iii) The Farmers (Empowerment and Protection) Agreement on Price Assurance and Farmers Services Act 2020.

More than six decades old, the Essential Commodities Act, 1955, was being criticized as a barrier to post-harvest investment due to unusually lower stocking limits on agricultural commodities and its frequent invocation in the case of abrupt price rises. The Government has significantly amended the Act by removing stocking limits on cereals, pulses, edible oils, onions and potatoes from the list of essential commodities. This is expected to attract private investment including foreign direct investment (FDI) in warehousing and cold storage and also help farmers realize remunerative prices for their produce. The Act, however, can be invoked during extra-ordinary circumstances, such as natural calamities, war and excessive price rise.

The main aim of the Farmer's Produce Trade and Commerce (Promotion and Facilitation) Act, 2020) allows hassle free intra-state and inter-state trade in agricultural commodities beyond the APMC markets that are often blamed for being non-transparent and exploitative of the farmers. This Act will push up implementation to e-NAM, leading to integration of agricultural markets in the country. The Act prohibits state governments from levying and market fees or cess on the volume traded outside the APMC regulated markets. The Farmers (Empowerment and Protection) Agreement on Price Assurance and Farmers Services Act, 2020 aims at promoting contract farming, reducing price risk and enhancing farmers' access to support services. It provides for the pre-agreed price contracts but with provision of sharing the benefits of higher than the agreed prices with farmers, and accords legal status to contract farming. The other key feature of the Act is that it provides for institutional mechanisms for dispute settlement.

The COVID-19 pandemic has brought out several behavioural and institutional changes that are likely to influence the agri-food value chain activities from genetics to end-consumption in the post-pandemic period. Agriculture and agri-business will confront new challenges or norms related to technologies, support services, marketing, trade, financing, governance, consumer preferences, etc. Government's emphasis on supply chain management and development of micro-food processing would bring primary processing facilities such as grading, processing, storage and branding closer to the farmgate, and provide a big push to rural industrialization. E-commerce that directly connects producers to consumers is likely to be a new normal in post-pandemic agriculture, and is expected to induce private investment in agri-tech start-ups connecting farmers directly to the consumers. Consumers' concerns for food safety and hygiene have never been as prominent before as during this pandemic. These will compel value chain participants from the genetics to end-consumption to comply with domestic and international food safety standards.

These long-awaited market reforms have the potential to evolve new market architecture for agricultural commodities aligning with the new normal in agriculture in the

post-pandemic period. A new vertically coordinated marketing system, driven by the institutions, such as contract farming, cooperatives and farmer producer organizations (FPOs), will reduce transaction costs of trade, making it easier for small farmers to access inputs, finance, services and technologies, and for firms to reduce uncertainty in the procurement of farm produce.

VIII. Conclusions and Policy Implications

We do not anticipate a major long-term impact of the lockdown or lower economic growth on Indian agriculture. This was seen with a four-percent growth in agriculture in 2019-20 and 3.4% in first quarter of 2020-21. The prospect of Kharif 2021 is quite encouraging. A normal agricultural growth (4%) in 2019-20 and exemption of farm operations during the lockdown period have contributed to better farm income. For marketing of agricultural produce also, special efforts have been made to ensure smooth functioning of supply chains of the perishable commodities. These direct interventions were further strengthened by a positive forecast of the India Meteorological Department (IMD) for a normal monsoon in 2021. Agriculture and MGNREGA have supported some migrant labourers who are back in the villages, and the data indicates for higher employment provided under MGNREGA. The return of migrant labour to the cities may take some time and therefore expected loss of employment and income, particularly in the rural non-farm sector and urban casual workers which form about 15-20% of the total workforce, has been worst affected. Therefore, the Government's decision to provide additional foodgrains is a welcome step. Some sectors like tourism, hospitality, transport, and real estate have faced the impact for an extended lockdown and therefore these sectors will need special attention, particularly measures for the welfare of the casual workers, and infusing liquidity to restore the production and supply chains.

The following are some of the priorities of the Government for the agricultural sector and revival of the economy:

1. Upscaling of farmer advisories for the lockdown period, particularly for farm operations and social distancing. KVK network of ICAR has contributed to this activity and such efforts now used for regular dissemination of farm advisories. Similar information for *mandi* and marketing operations has contributed to restoration of supply chains.
2. Efforts made by the government to facilitate supply chains of perishable commodities like milk, eggs, fruits and vegetables were effective. Digital contacts were used to address the bottlenecks and strengthen direct contacts of traders and farmers for repeated transactions.
3. The Central and state governments have planned for procurement of wheat and gram and the progress is quite encouraging as 38.9 million tonnes of wheat was procured. Also, all-out efforts should be made to make e-NAM operational in all the *mandis* and effectively implement the recently approved three Farm Acts. These may act to attract private participation and provide a cushion against the negative impacts of the lockdown period, or any such situation in future.

4. Some of the immediate needs of agriculture like farm mechanization like adoption of paddy transplanters following custom hiring models, promotion of clusters of pulses and oilseeds for higher production through price incentives and procurement logistics, and post-harvest management of TOP (tomato, onion and potato) should be taken up on priority. The measures to promote food-processing should help address some of these issues.
5. The Government has announced a package for Rs. 1 lakh crore for agri-infrastructure development. The financial institutions should be proactive in implementing this package and financing agri-infrastructure and logistics for better product handling and aggregations.
6. Strengthening research on biosecurity, zoonotic diseases, microbiome, and natural barriers to plant and animal diseases and natural calamities.
7. Credit delivery for agriculture and allied sectors appears to be somewhat normal during June and July 2020, but more liquidity should be injected in agriculture, particularly for commercial and processing activities. A greater allocation of funds for strengthening of the supply chain infrastructure, in terms of storage, warehousing, refrigerated transport, etc. will help farmers insulate from the shocks.
8. Fiscal stimulus and rural demand for manufacturing products are expected to accelerate the economic revival. The task is daunting as economy shrinked by 23.9% in Q1 of 2020-21 and likely to remain to nearly 10% lower than the normal during the entire year. The government should focus on restoration of production and supply chains in MSME and other manufacturing sectors whose margins are eroded. The steps taken to restructure the outstanding loans, low interest rates and additional finance should help bring back the economy on growth path.

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Annexure I

Table A1: Unemployment rate in India (%)

Period	Total	Urban	Rural
Jan-Apr, 2016	8.62	10.46	7.77
May-Aug, 2016	9.16	10.83	8.39
Sep-Dec, 2016	6.74	7.69	6.3
Jan-Apr, 2017	4.7	5.57	4.3
May-Aug, 2017	3.88	4.57	3.55
Sep-Dec, 2017	4.89	5.62	4.55
Jan-Apr, 2018	5.54	6.13	5.26
May-Aug, 2018	5.63	6.27	5.33
Sep-Dec, 2018	6.68	7.16	6.46
Jan-Apr, 2019	6.87	7.56	6.55
May-Aug, 2019	7.46	8.44	7.00
Sep-Dec, 2019	7.52	9.04	6.79
Jan-Apr, 2020	10.4	12.42	9.48

Source: Compiled by authors from Statistical Profiles - Unemployment in India, CMIE's Consumer Pyramids Survey, Centre for Monitoring Indian Economy (CMIE), https://unemploymentinindia.cmie.com/kommon/bin/sr.php?kall=wstatmore

Table A2: Intra-state migration in major states (in Lakhs)

From	To	Total migrants	Migrants <1 year
Uttar Pradesh	Maharashtra	27.55	5.58
Uttar Pradesh	NCT of Delhi	28.54	4.10
Uttar Pradesh	Gujarat	9.29	2.68
Bihar	NCT of Delhi	11.07	2.22
Karnataka	Maharashtra	14.00	2.12
Uttar Pradesh	Haryana	11.14	2.06
Andhra Pradesh	Karnataka	8.91	1.88
Bihar	Jharkhand	13.36	1.76
Maharashtra	Gujarat	9.72	1.72
Uttar Pradesh	Uttarakhand	8.91	1.69
Bihar	Maharashtra	5.69	1.58
Madhya Pradesh	Maharashtra	8.25	1.57
Rajasthan	Gujarat	7.47	1.54
Bihar	Uttar Pradesh	10.73	1.53
Uttar Pradesh	Madhya Pradesh	10.91	1.51
Tamil Nadu	Karnataka	7.37	1.39
Gujarat	Maharashtra	9.84	1.31
Bihar	West Bengal	11.04	1.30
NCT of Delhi	Uttar Pradesh	5.66	1.29

Uttar Pradesh	Punjab	6.50	1.25
Rajasthan	Maharashtra	5.70	1.13
Uttar Pradesh	Rajasthan	5.86	1.02
Maharashtra	Karnataka	5.87	0.98
Madhya Pradesh	Rajasthan	5.54	0.92
Madhya Pradesh	Uttar Pradesh	6.69	0.88
Rajasthan	Haryana	6.11	0.85
Haryana	NCT of Delhi	6.66	0.79
Haryana	Rajasthan	5.34	0.79
Haryana	Punjab	5.46	0.74
Rajasthan	Madhya Pradesh	5.00	0.73
Punjab	Haryana	5.38	0.67

Note: Major states with total migrants > 5 lakh and migrants less than 1 year > 70, 000.

Source: Data on migration, Census data (2011) https://censusindia.gov.in/2011census/migration.html

Annexure II

The Welfare Schemes of the Government for the Poor in the wake of COVID-19

As part of the Rs 1.70 lakh crore **Pradhan Mantri Garib Kalyan Package (PMGKP),** the Government announced free foodgrains and cash payment to women and poor senior citizens and farmers. The swift implementation of the package is being continuously monitored by central and state governments. More than 42 crore poor people received financial assistance of Rs 65,454 crore under the Pradhan Mantri Garib Kalyan Package.

Till September 08, 2020, the progress achieved, under various components of PMGKP is as follows:

- **Rs 17,891** crore front loaded towards payment of the first instalment of PM-KISAN to **8.94 crore** beneficiaries.
- **Rs 10,325 crore** credited to **20.65 crore** (100%) women Jan Dhan account holders as first installment. **Rs. 10,315 crore credited to 20.62 crore (100%)** women Jan Dhan account holders with second instalment. **Rs. 10,312 crore credited to 20.62 crore (100%)** women Jan Dhan account holders with third instalment.
- **Total Rs 2814.5 crore** disbursed to about 2.81 crore old age persons, widows and disabled persons in two instalments. ***Benefits transferred to all 2.81 crore beneficiaries in two instalments.***
- **1.82 crore** Building & construction workers received financial support amounting to **Rs 4,987.18 crore**.
- **Under Pradhan Mantri Garib Kalyan Ann Yojana, 37.52 LMT of** food grains has been distributed to **75.04 crore** beneficiaries in **April** 2020, **37.46 LMT** distributed to **74.92 crore** beneficiaries in **May** 2020, and **36.62 LMT** distributed to **73.24 crore** beneficiaries in **June** 2020. **Scheme was further extended for 5 months till November. Since then, 98.31 LMT foodgrains has been lifted by States /UTs so far.** In **July** 2020 **36.09 LMT** food grains has been distributed to **72.18 crore** beneficiaries in **August** 2020, **30.22 LMT** distributed to **60.44 crore** beneficiaries, and in **September** 2020 **1.92 LMT** distributed to **3.84 crore** beneficiaries as on 7th September, 2020.
- **In addition under Pradhan Mantri Garib Kalyan Ann Yojana, total of 5.43 LMT pulses has also been distributed to 18.8 crore beneficiaries between April – June 2020**. **This Scheme was also extended for 5 months till November, 2020 for distribution of Chana**. 4.6 LMT Chana has been dispatched so far. In **July 1.03 LMT** Chana has been distributed to **10.3 crore** beneficiary households, in August **23,258 MT** distributed to **2.3 crore** beneficiary households. As on 7th September, 2020, **1475 MT** of Chana distributed to **0.15 crore** beneficiary households in **September**, **86 MT** distributed to **0.008 crore** beneficiary households for **October**, and **40 MT** distributed so far to **0.004 crore** beneficiary households for **November**.

- Under **Atma Nirbhar Bharat, Government announced supply of free foodgrains & Chana to migrants for 2 months.** The estimated number of migrants provided by the States was about 2.8 crore migrants. During the distribution period up to August, total 2.67 LMT of food grains was distributed to 5.32 crore migrants. This works out to an average of about 2.66 crore beneficiaries per month, which is nearly 95% of the estimated number of migrants. Similarly, Under **Atma Nirbhar Bharat, total** quantity of Chana distributed is **16,417 MT** to **1.64 crore** migrant households, which is 82 Lakh households on an average per month.
- **Total 8.52** crore **Pradhan Mantri Ujjwala Yojana (**PMUY) cylinders have been booked and already delivered for April and May 2020 under this Scheme so far. **3.27 crore** PMUY free cylinders delivered to beneficiaries for **June** 2020, **1.05 crore** for **July** 2020, **0.89 crore** for **August** 2020, and **0.15 crore** for **September 2020.**
- **36.05 Lakh members** of EPFO has taken benefit of online withdrawal of non-refundable advance from EPFO account amounting to Rs. **9,543 crore.**
- Increased wage rate has been notified w.e.f 01-04-2020. In the current financial year, **88.73 crore** person's man-days of work generated. Further, **Rs 36,379** crore released to states to liquidate pending dues of both wage and material.
- 24% **EPF contribution** transferred to 0.43 crore employees amounting to Rs. 2476 crore. Benefits for March were given to 34.19 lakh employees amounting to Rs. 514.6 crore, for April given to 32.87 lakh employees amounting to Rs. 500.8 crore, for May given to 32.68 lakh employees amounting to Rs. 482.6 crore, for June given to 32.21 lakh employees amounting to Rs. 491.5 crore, for July given to 30.01 lakh employees amounting to Rs. 461.9 crore, and for August given to 1.77 lakh employees amounting to Rs. 24.74 crore.
- Under District Mineral Fund (**DMF)**, States have been asked to spend 30% of the funds, which amounts to 3,787 crores and that 183.65 crores has been spent so far.
- **Insurance Scheme for health workers** in Government hospitals and Health care centres operationalized w.e.f. 30 March, 2020. New India Assurance Scheme is implementing the scheme. **The Scheme has been extended up to September.**
- **MNERGA**: Increased rate of has been notified w.e.f 01-04-2020. In the current financial year, **195.21 crore** person's man-days of work generated. Further, **Rs 59,618** crore released to states to liquidate pending dues of both wage and material.

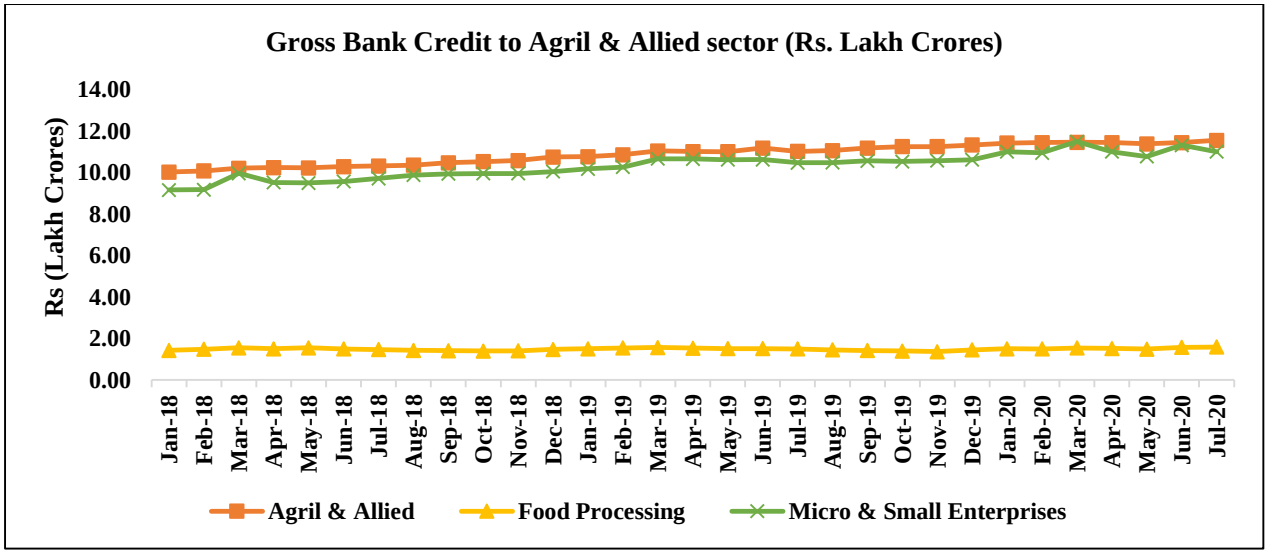
Source: PIB
https://www.pib.gov.in/PressReleseDetailm.aspx?PRID=1652231

Annexure III

Status of Agricultural Credit during the COVID-19 period

Lockdown has had a moderate impact on the deployment of bank credit from commercial banks to agriculture and allied sectors. During the month of April 2020, credit growth to priority sector lending for agriculture activities has decreased by 4% from 7.5% in April 2019 (year-on-year basis). Similarly, credit growth during the month of May 2020 also declined by 3.4% from 7.4% in preceding year of same month (i.e., April 2019). However, in the month of June 2020 and July 2020, credit growth to agriculture activities has improved and increased by 2.3% and 4.8%, respectively compared to the corresponding month of preceding year (June and July 2019). Similarly, credit growth to 'food processing' and 'micro and small enterprise sectors' also decelerated during the month of April and May 2020 whereas accelerated during the month of June and July 2020 compared to corresponding month of last year (2019).

Figure A1: Gross bank credit to agriculture, food processing and micro-small enterprises



Source: RBI