

Impact of COVID-19 on Indian Agriculture

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Abstract

Agriculture plays a vital role in Indian economy. When on March 24, 2020 the Government of India ordered a complete lockdown of the country as a response to the COVID-19 pandemic, it had serious unwanted implications for farmers and the supply chains for agricultural produce. This was magnified by the fact that, as typically in developing countries, India's economy is strongly based on farming, industrialization of its agricultural systems being only modest. This Review paper reports on the various Impact of the COVID-19 lockdown on agricultural systems in India. Widely impact observed on Harvesting and Production, on Marketing of Agricultural Produce, on Income and employment from agricultural sectors, on Agricultural labour force and Digitalization on Agriculture. Secondly, the travel restrictions forced farmers to sell the crops at low prices in nearby markets, and also arrival and price of commodities decreased in market. The direct income reductions from price fluctuations being much larger than those stemming from other hazards, reducing income by nearly 50 per cent of the expected income in a normal year. Though, Agriculture is also saviour of economy as compared to other sectors. Covid-19 has also emerged opportunities in finding digital solutions for agriculture for better future and Indian Economy.

Key word: Agriculture, Covid-19, Lockdown

Introduction:

Agriculture plays a vital role in Indian economy. India has the second-largest arable land area in the world and has a coastline of over 7500 kilometers. About 58 per cent of country's population is depends on agriculture as source of livelihood and about 44 per cent of country's workforce is employed in agriculture sector. India is the world largest producer of milk, pulses, spices, tea and jute; and second-largest producer of fruits and vegetables, poultry, wheat and rice, cotton and fish (FICCI (June 2020)). The share of agriculture and allied sector in India's Nominal GVA (Gross Value Added) were 18.40 per cent, 20.20 per

cent and 18.80 per cent during the year 2019-20, 2020-21 and 2021-22 respectively (Source: NSO). The percent share of crops, livestock, forestry-logging and fishing-aquaculture sector in total agriculture GVA (at current prices) were about 10.70, 5.20, 1.30 and 1.20 per cent, respectively during the year 2019-20. According to Situation Assessment Surveys by NSSO the average monthly income of agricultural households (₹10218) categorised *viz.*, Income from wages (40 %), net receipt from crop cultivation (37 %), Net receipt from farming of animal (16 %), net receipt from non-farm business (6%) and Income from leasing out land (1%) during the year 2021.

The first few samples of the new corona virus were identified from the city of Wuhan located in China where few unbiased samples of the pneumatic patients where the lungs of the patient were affected and the virus was given the name of known as SARSCoV-2. It is identified as the seventh member of the corona virus family which is different from MERS-CoV and Sars- CoV that infect the human body. This novel corona virus directly affects the lungs and is known as Covid-19. (Zhu *et al.*, 2020). The first case was announced in India on January 30'2020 which started from China, was identified in Dec 2019. As per the recent updates till 17th Jan'2021 the total number of confirmed cases resulted from COVID-19 pandemic till date *i.e.* first week of Jan 2021 were 93,194,922 and deaths across the globe accounted to 2,014,729. (Source: World Health Organization).

The lockdown of India for more than two months helped in limiting the health crisis, but -as in other countries-the complete shutdown of all economic activities except essential services has created an economic crisis and misery for the poor, with massive job losses and rising food insecurity. The economic shock has been much more severe for India, for two reasons. First, pre-COVID-19, the economy was already slowing down, compounding existing problems of unemployment, low incomes, rural distress, malnutrition, and widespread inequality. Second, India's large informal sector is particularly vulnerable. Out of the total national labour force of 465 million workers, around 91 per cent (422 million) were informal workers in the year 2017–2018. Lacking regular salaries or incomes, these agricultural, migrant, and other informal workers would be hardest hit during the lockdown period. The lockdown has seriously affected all the segments of the Indian society. Agriculture is one of the sectors which adversely affected by the lockdown. Major impact of covid-19 on agriculture sector was peak harvest with no procurement, labour unavailability

due to reverse migration, fall in prices, scarcity of public goods, restrictions on sale, disruption in supply chain, and also it includes debt and cash flow constraints.

Therefore, the objectives of this review paper mainly focused on impact of the Covid-19 pandemic and the related lockdown on the agricultural sector:

- Impact of Covid-19 on Harvesting and Production
- Impact of Covid -19 on Marketing of Agricultural Produce,
- Impact of Covid-19 on Income and Employment from agricultural sector
- Impact of Covid-19 on Agricultural labour force
- Impact of Covid-19 on Digitalization of Agriculture

Material and Methods:

Literature regarding different aspect of Covid-19 like Agricultural and allied sector and impact on different sector in India was collected by using secondary data like published report, official website, different journals, data from WHO (World Health Organization). The literature reviews were found from some published and unpublished sources like research paper and thesis.

Result and Discussion:

1. Impact of Covid-19 on Harvesting and Production:

Pallab De *et al.* (2020) studied that out of the 424 respondents from 19 states of India, 57.8 per cent and 80.4 per cent have received less yield and income, respectively as compared to their last harvest. Whereas, 36.8 per cent and 16.3 per cent have expressed their views that they don't see any changes in their yield and income however, only 4.2 per cent and 3.3 per cent have acknowledged slight increase in their yield and income, respectively.

Pallab De *et al.* (2020) studied that the Covid-19 has impacted agriculture and farming sector adversely. They reported that out of the 424 respondents from 19 states of India, 48.3 per cent have identified unavailability of labour as one of the key issues faced during last harvesting followed by 27.8 per cent and 26.2 per cent have faced difficulties in getting transportation facilities and marketing of their own farm produces, respectively. Almost 23.6 per cent have shared unavailability of sufficient agricultural (farm) inputs at local level for next season and 12 per cent have confirmed untimely harvest and selling of their farm produces in low prices. However, 10.8 per cent and 9.9 per cent have acknowledged covid-19 restriction made them financially more vulnerable.

According to NABARD (2020) report, the impact on production – at all-India level agricultural production (magnitude-wise) had not been significantly-adversely impacted (-2.7%), mainly due to the fact that harvesting of rabi crops like wheat was almost completed by the end of April 2020. However, production in allied sector had declined significantly, especially in poultry sector (-19.5%), followed by fisheries sector (-13.6%) and Sheep/Goat/Pig (S/G/P) sector (-8.5%), primarily due to drastic decline in demand for these products possibly due to the widespread fear circulating in the wake of COVID 19 regarding safety of non-vegetarian food, particularly poultry meat, for health-related concerns. Similarly, production in dairy (-6.6%) and horticulture (-5.7%) sector also reduced, owing to reduced demand for these products and disruption in their supply chain.

Cariappa, *et al.* (2020) studied that the COVID-19 impact on the Indian agricultural system *viz.*, production, marketing and consumption followed by a set of potential strategies to recover and prosper post-pandemic. Survey findings indicate that the pandemic has affected production through labour and logistical constraints.

2. Impact of Covid -19 on Marketing of Agricultural Produce

Ali and Khan (2020) studied that the commodity-wise weighted average wholesale prices before and during the COVID19 lockdown periods for the Union Territory of Jammu Kashmir. The analysis of the difference in the weighted average wholesale prices for the major commodities has shown a mixed response based on the perishability of the produce. There has been a slight decline in the wholesale price of fruits during the lockdown period as compared to the corresponding period of 2019, which is not significant. However, the wholesale prices for the most hydrating perishable fruits (water content >90%) such as watermelon, musk melon, and grapes have been significantly affected during the lockdown and the wholesale price of these produces have declined. Contrary to this, the wholesale prices for not so highly perishable fruits such as apple banana, papaya, pomegranate, and mango have been slightly increased during the lockdown period. There was no significant difference in the wholesale price of vegetables as the average weighted price of vegetables during lockdowns remained similar as compared to the corresponding period of 2019. The wholesale prices of the most hydrating perishable vegetables (water content >90%) such as French bean, tomato, and cauliflowers have experienced a steep decline during the lockdown period as compared to the last year. However, the average wholesale price of onion



significantly increased from ₹ 1,260 per quintal in 2019 to ₹ 1,585 per quintal during the lockdown period ($t = -7.501, p < .001$) as onion can be stored for a longer duration. Because not so highly perishable fruit and vegetable can be stored for longer duration.

Cariappa *et al.* (2020) conducted an interrupted time series analysis (ITSA) to analyse the effect of lockdown on wholesale prices. The lockdown has caused a significant increase in the wholesale prices of rice, wheat, chickpea/gram and moong/mung bean with rice, chickpea and moong having a decreasing trend post lockdown. The wholesale prices increased due to disrupted supply immediately after lockdown but then the prices fell due to demand recession following closure of restaurants, hotels, cessation of celebrations, ceremonies, parties, social and religious gatherings, *etc.* The effect was higher in pulses than cereals and the negative sign of trend indicated that the price rise waned eventually. Wholesale prices of edible oils (soya and palm) decreased significantly and the trend was also negative owing to increase in imports of edible oil post-lockdown. They found no significant effect of lockdown on wholesale prices of milk and vegetables.

Mahajan and Tomar (2020) revealed that the quantity arrivals for vegetables and fruits fall by 20 per cent in cities. As expected, the percentage fall in quantities of arrivals at the farm-gate is larger than the increase in product stockouts at the retail level. The latter is an extreme event and occurs when zero quantity of a product is available. Thus, the product stockouts in online retail capture only the extreme disruption in food supply chains. Next, fall in quantity arrivals at the farm-gate, that is, Mandis, also varies by the distance to their production zones. Quantity arrivals in Mandis fall by 42 per cent post the lockdown for commodities that are produced farther. However, there is no fall in the arrivals for commodities that are produced near the retail centers. The results on distance are again stronger in Mandi data, as the online data captures the mean availability on the extensive margin, an extreme fall in availability. Overall, the results showed that long distance freight disruptions are behind the observed fall in commodity supplies (Wholesale level) that eventually lead to product stockouts at the retail level.

Parmar and Leua (2020) analyzed the data on total arrival, number of days worked/traded, average arrival and average price per quintal of okra for the month of April and May, 2019 and 2020 respectively. They concluded that pandemic lockdown cause breakdown in supply chain of fresh agricultural produce. As the farmers were not able to sale

their produce to the Surat market, high loss of total 860 ton arrivals in April 2020 and 809 ton in May 2020 as compared to same month of previous years was observed. These situations may arise due to lockdown and transportation was affected largely so farmers may choose to sale their product in nearby place. The COVID-19 situation created uncertain environment where the farmers avoid travelling to other market for selling their produce.

Singh *et al.* (2021) studied that Covid-19 has had a very massive impact on the lives of the people and the economy. They studied on the vegetable markets in Punjab for 14 weeks, from the first week of March to the second week of June (2020). The data were collected for four main vegetable (*Rabi*) crops, namely capsicum, bottle gourd, brinjal, and potato, from the agmarknet website. A total of 115 mandis were covered, and the data for arrivals and prices were taken for this period. The results showed that except bottle gourd, the output for all the other three crops went down. In the case of bottle guard, the arrival went up by 10.6 per cent, whereas for brinjal, it went down by 30.1 per cent, capsicum by 16.5 per cent, and potato by 44.4 per cent. The weighted average for the price was taken to calculate the loss from the sales. It was noticed that in absolute terms, the loss was to the tune of 23.8 crores than the previous year. A look at the total traded volume for this period, and the loss came out to be around 23.5 percent of the losses have just come from these four crops.

Loison *et al.* (2021) revealed that the volume of fish produced by farmers declined by 7.4 metric tons (statistically significant at 1% level). Whereas, the volume of fish traded by traders declined by 3.5 metric tons (only significant at 10% level). On the other hand, there was no significant change in the volume of fish processed between the year 2019 and 2020. This indicates that fish farmers were the most affected by the COVID-19 pandemic, followed by traders and lastly processors. Processors produced mainly dried fish, which can be stored for extended periods, unlike the fresh fish sold by farms and most traders, which was sold immediately. Moreover, processors operated smaller businesses than farmers and traders, and relied mainly on family labor to do so. These characteristics may have made processors more resilient to the shock of COVID19 than either farmers or traders.

3. Impact of Covid-19 on Income and Employment from agricultural sectors

Sekhar *et al.* (2020) studied that before COVID, the fishermen had an average monthly income of ₹ 11375 whereas during lock-down it's only ₹ 3, 075. The income levels dropped drastically to one-fourth of income of normal period. Fishers have not ventured into



the sea since 20th March 2020. The annual fishing ban period begins on 15th April to 15th June along the east coast of India. As a result, marine fishers will effectively lose nearly 90 fishing days that year. So, there is huge pressure among the fishers, fish vendors and fishing laborers as a result of the lockdown. But after lock-down, the situation is little bit encouraging and showing an increasing trend.

Ceballos (2020) found that wheat producers suffered minimal declines in income (₹486.5/acre), whereas tomato producers income fell by 50 per cent (₹ 43241/acre) relative to their expected income in a normal year (₹ 87120/acre) largely due to a steep fall in tomato prices. Because the lockdown started after the wheat growing season, right around harvest, and hence could not have had any effects on wheat production or input use. Since the lockdown was announced during the tomato growing season, crop production could be affected, and 46 per cent indeed reported having faced difficulties accessing inputs.

Parida and Suri (2020) reported that at sectoral level, employment in the agriculture sector was found to be declined and increased in industries and services sectors as the workforce in India was shifted from low productive to high productive sectors. Under the COVID scenario, economic growth rate at aggregated and sectoral levels has decreases significantly, which shows that the total employment may decline significantly. Loss of whopping jobs at sectoral level estimates revealed that 12.5, 5.0 and 0.6 million jobs were lost in the industries, services and agricultural sectors, respectively.

Das *et al.* (2021) observed that all the fishers (100%) responded that they were not allowed to fish in first phase due to strict lockdown enforced by the local authorities. In second phase, fishers of Bihar, West Bengal, and Assam responded 73, 65, and 30 per cent loss in fishing days, respectively. In the third phase, about 53 and 42 per cent loss of fishing days recorded in West Bengal and Bihar, respectively. Fishing ban was observed from 20 April to 15 June; hence, no loss was reported from third phase in Assam. The sudden lockdown falls during the medium intensity period of fishing in wetlands of Bihar, Assam, and West Bengal led to a significant economic loss to fishers because of loss of fishing days. In Bihar local administration allowed fishers to do fishing and sell for 4 hour in the morning in the second phase. In third phase of lockdown, this restriction was lifted by the district administration leading to normalcy in the fishing operation. In West Bengal, though fishing was partially allowed in second phase of lockdown, most of fishers could not do fishing dueto supply-

side constraints. The fishers of Bihar, West Bengal, and Assam lost 20, 25, and 9 per cent fishing days, respectively, due to lockdown. Overall, one fishing day provides an average income of ₹ 500 to wetland fisher.

Tripathi *et al.* (2021) reported that per capita income percentage throughout years in rural area was less affected due to lockdown as compared to urban area during COVID period.

4. Impact of Covid-19 on Agricultural labour force

NABARD (2020) reported that Agricultural labour supply had shown a decline in 70 per cent of the districts covered in the survey. The labour supply had remained the same only in 17% of the districts. Labour supply had also seen an increase in 13 per cent of the districts which may be attributed to return of migrant labour to their native places. As regards the demand for labour, at all India level, the demand for labour had increased in 43% of the districts whereas it had declined in 25 per cent of the districts. In 32 per cent of the districts, the demand for labour had remained the same. As far as wages were concerned, it was reported during the survey that wage rate had increased in 41 per cent of the districts, decreased in 13 per cent of the districts and remained the same in 46 per cent of the districts. The dynamics of supply and demand in rural areas showed a mixed trend due to outflux of labourers from agriculturally advanced states to influx of labour in relatively backwards states. The aggregate magnitude of decline in labour supply was estimated to be about 20 per cent at the all-India level whereas aggregate magnitude in increase in demand for labour was estimated to be about 6 per cent. At all-India level, the wage rate was estimated to increase by 8.36 per cent. This slight increase in wage rate could be attributed to the decline in supply of labour due to restricted mobility and increase in demand of labour at all India level.

Mamgain (2021). studied that Business as occupation in rural areas suffered with comparatively lesser intensity of job losses as compared to their counterparts in urban areas due to lesser stringent lockdown. On the other hand, the fall in the number of salaried jobs was comparatively very high in rural areas, with a very slow recovery rate, which were mainly available through daily commuting in micro- and small enterprises. The share of salaried jobs in rural employment stood at 13.3 per cent and that in urban areas at 38.6 per cent in February 2020. The pace of recovery in occupational group, small traders and wage labour, accounting for 23.1 per cent of urban employment, was phenomenal after unlock 1.0 phase These trends also indicate that non-farm economic activities in rural areas comparatively suffered more

severely with a slow pace of recovery. It is only agriculture sector which provided cushion to rural labour force by providing additional employment to 16.9 million persons between February and June 2020. This also offset the pressure of job losses in aggregate in rural labour markets.

Vatta *et al.* (2022) reported that almost 50 per cent farmers in the *Rabi* season and more than 70 per cent in the *Kharif* season faced labour shortages during the pandemic. They further concluded that only about one-third (32.5 %) of the farmers for wheat and about 22 per cent of the farmers for paddy crops faced machinery shortages. They also found that proportion of farmers who had problems in accessing the inputs increased from 1.4 to 5 per cent during the *Rabi* season and from 2.1 to 21.9 per cent during the *Kharif* season.

5. Impact of Covid-19 on Digitalization on Agriculture

Singh *et al.* (2020) studied that usage of social media and digital platforms for disseminating information by farmers community were significantly increased (97.5 %) during COVID-19 period.

Arathoon (2021) observed that India's Ama Krushi digital advisory user has drastically increased during COVID-19 period over previous period.

Conclusion

The outbreak of covid-19 has led to global pandemic, while India is witnessing major losses in the Economy. Though the country is trying to recover from this poorly surprised natural disaster, it has affected agriculture sector. The major problem lies in the restrictions imposed during pandemic. The shortage of labour led to ample spoilage of crops, fruits and vegetables and thus resulted in increase of daily wages. Secondly, the travel restrictions forced farmers to sell the crops at low prices in nearby markets, and also arrival and price of commodities decreased in market. Hence, farmers who grow perishable nature crop (*i.e.*, capsicum, tomato *etc.*) allowed the crops to rot in fields. Due to problems in supply chain, horticulture sector faced 15-20 per cent price decline, dairy sector witnessed 6 per cent in production and 15-20 per cent decrease in demand, and agri-inputs experienced 15-20 per cent decline in sales due to higher prices except tractor industry. The direct income reductions from price fluctuations being much larger than those stemming from other hazards, reducing income by nearly 50 percent of the expected income in a normal year. This is likely an underestimation of the total economic cost for those involved in farming. The global effect of

covid-19 pandemic had positive impact on export of Agri-commodities fighting travel restrictions and border closure. Agriculture is also saviour of economy as compared to other sectors. Covid-19 has also emerged opportunities in finding digital solutions for agriculture for better future and Indian Economy.

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