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Sahin Aktar Munshi

Ph.D. Scholar, Division of
Agricultural Economics, ICAR-
Indian Agricultural Research
Institute, Pusa, New Delhi, India

Pushpendra Yadav

Ph.D. Scholar, Division of
Agricultural Extension, ICAR-Indian
Agricultural Research Institute,
Pusa, New Delhi, India

Abhijit Das

Assistant Professor, Department of
Agricultural Economics and
Extension School of Agriculture,
Lovely Professional University,
Phagwara, Punjab, India

Bikram Barman

Ph.D. Scholar, Division of
Agricultural Extension, ICAR-Indian
Agricultural Research Institute,
Pusa, New Delhi, India

Indrajit Mondal

Ph.D. Scholar, Division of
Agricultural Economics, ICAR-
Indian Agricultural Research
Institute, Pusa, New Delhi, India

Snigdha Patowary

Ph.D. Scholar, Division of
Agricultural Economics, ICAR-
Indian Agricultural Research
Institute, Pusa, New Delhi, India

Sushovan Paul

Ph.D. Scholar, Department of Soil
Science and Agricultural Chemistry,
Uttar Banga Krishi
Viswavidyalaya, Coochbehar, West
Bengal, India

Ainul Bari Malitha

Ph.D. Scholar, Department of
Agricultural Extension, Uttar Banga
Krishi Viswavidyalaya,
Coochbehar, West Bengal, India

Subhankar Saha

Ph.D. Scholar, Department of
Agronomy, Uttar Banga Krishi
Viswavidyalaya, Coochbehar, West
Bengal, India

Corresponding Author:

Sahin Aktar Munshi

Ph.D. Scholar, Division of
Agricultural Economics, ICAR-
Indian Agricultural Research
Institute, Pusa, New Delhi, India

Impact of COVID-19 pandemic on demand and supply shock on food commodities and livelihood in India

Sahin Aktar Munshi, Pushpendra Yadav, Abhijit Das, Bikram Barman, Indrajit Mondal, Snigdha Patowary, Sushovan Paul, Ainul Bari Malitha and Subhankar Saha

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Abstract

The COVID-19 induced nationwide lockdown and its associated measures disrupted food supply chains, causing panic buying and price fluctuations. The agricultural sector initially witnessed positive growth, but the shortage of labour due to reverse migration adversely affected crop harvesting, leading to food losses. The agri-food supply chain, from production to consumption, experienced disruptions in transportation, labour availability, and storage facilities. The dairy sector faced challenges with reduced milk productivity and increased expenses, leading to losses for farmers and cooperatives. The pandemic also triggered an employment crisis, especially in the informal sector, and widened income inequality. Migrant workers faced hardships and loss of livelihood. The paper emphasizes the need for comprehensive policy interventions, including labour reforms and social protection measures, to rebuild the economy and safeguard vulnerable sections of population. Ensuring resilient food supply chains and nutritional security is crucial for future crises. Government schemes and direct benefits transfers played a vital role in supporting farmers and susceptible households during the pandemic, underscoring the importance of enhancing such measures.

Keywords: COVID-19, employment, food commodity, livelihood, supply chain

Introduction

The novel Corona virus (COVID-19), Which first spread from Wuhan city of Republic of China on 17th November, 2019 became a pandemic world-wide. To curb the contamination of the disease, the Government of India declared nationwide lockdown on 24th March, 2020 which further extended till 31st May, 2020. This lockdown not only restricted people's movement, it also created panic among the people of India. Several policies were adopted to bring normality like quarantines, curfews, mass gathering restrictions, containment zones and social distancing etc. Each segment of the Indian economy, including the agriculture sector, has been impacted by these policies. Although, the magnitude of the hardship and suffering varies across different sectors. Against this backdrop, this is a systematic review of the impact of COVID-19 pandemic on demand and supply shock on food commodities in Indian context.

A bumper crop harvest and a relaxation of agriculture-related activities during the lockdown resulted positive growth in agriculture in the first quarter of FY 2020-21. However, the farm income did not significantly increase, while inflation rose by 2.3% (ET, 2020) [11]. The shortage of labour caused by the reverse labour migration had a negative impact on the intensively farmed north-western Indian plains' harvesting of winter (November-March) crops including wheat and pulse crops (Dev, 2020) [3]. According to a government report, tonnes of food grains have been lost at the Food Corporation of India (FCI) storage facilities since May 2020. Food loss at the levels of production, marketing, distribution, and family consumption were all exacerbated by the lockdown brought on by COVID-19 (Cariappa *et al.*, 2021) [5]. Supply of perishable commodities like fruits and vegetables was affected more, which further challenged the nutrition and health security of the vulnerable parts of the Indian society. Besides, the farmer-producer experienced the demand and supply shock of their produced commodities (Harris *et al.*, 2020) [14]. Emediegwu *et al.* (2023) [10] used a time varying approach and found that prices of cereal crops, milk and sugars fluctuated most during the COVID-19 induced pandemic in India.

Impact of COVID-19 pandemic on the Indian agricultural system

The crisis's uncertainty, interstate travel restrictions, and lack of transportation disrupted the

food supply chains, drove up food costs, and had an impact on agricultural operations. Agricultural commodities production, marketing, and consumption all suffered significant setbacks. The wholesale and retail prices of pulses, wheat flour, and milk were 1–5% higher a month after the lockdown, according to an analysis by Cariappa *et al.* (2021) ^[5] using official time series price data of 284 days spanning from 01.11.2019 to 10.08.2020. Prices of edible oils and staple cereals (rice and wheat) were 4 to 9% lower as a result of the removal of import restrictions and government interventions like the free distribution of food grains. Tomato prices climbed by 114 to 117% in a month following the lockdown, rising 77 to 78% in a week. Due to market reforms that protected farmers against falling prices and distress sales, markets reported a rise in visitors in May. Price increases were greater in rural and smaller cities than in urban locations (Narayanan and Saha, 2020) ^[20]. The lockdown coupled with

sudden negative income shock posed serious concerns about food and nutrition security in India.

Potential impact of the COVID-19 pandemic on the agri-food supply chain in India

Koner and Laha (2023) ^[17] made an effort to compile evidence of the COVID-19 pandemic's effects on the Indian agri-food supply chain. They have documented proof of the pandemic's disruption and the ensuing lockdown along all supply chain phases, including production, post-harvest handling and storage, processing and packing, distribution, and consumption, for this reason (figure 1). Since non-academic sources make up the majority of the paper's information, essential precautions were taken to ensure its reliability. For example, news articles written by respectable news organisations have typically been acknowledged as information sources.

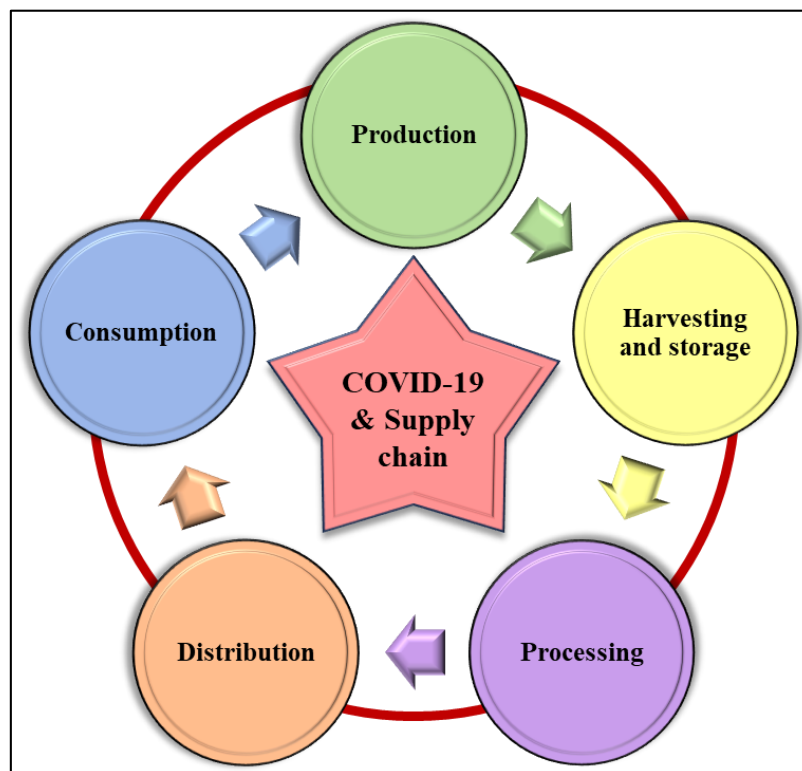


Fig 1: COVID-19 Pandemic and agricultural supply chain

Production: The implication of the COVID-19 outbreak on the production of agricultural commodities is assessed in terms of availability and access to agricultural inputs. Due to restrictions on automotive and pedestrian traffic brought on by COVID-19, there was a momentary hiccup in the timely transportation of agricultural inputs, which decreased their availability. Because of the shortage, the prices of essential inputs including fertilisers, insecticides, improved seeds, and feeds have soared in addition to their scarcity (FAO, 2020) ^[12]. Moreover, as countries across the world started closing their national boundary, the import of agricultural inputs was negatively affected. According to a study conducted by the Indian Agricultural Ministry, the COVID-19 outbreak might have a significant effect on the country's pesticide industry, which primarily imports raw materials from China (Barghava, 2020) ^[2]. The production of agriculture in India may be significantly impacted by the lack of access to and availability of agricultural inputs. Reports in the media highlighted instances where Indian farmers' crop yields were impeded by

a lack of agricultural inputs like fertilisers and insecticides. The epidemic might also have a significant effect on India's labour-intensive food output. Numerous migrant labourers reportedly fled for their homes, leaving many farms around the nation with a severe labour crisis (Jebaraj, 2020) ^[15]. Moreover, as the COVID-19 pandemic overlaps with the Rabi harvesting season in India, the migration of workers from several parts of India to their homes triggered a sense of fear and panic among the farmers. Besides, there was also a paucity of necessary agricultural machinery like combine harvesters and their operators around the country. Farmers in various Indian states were unable to harvest their ready crops due to a lack of agricultural labour and equipment. Experts feared that it could potentially not only increase the risk of food shortage but also enhance the prices of foods at rate beyond affordable for the common masses.

Post-harvest handling and storage: Activities related to post-harvest handling and storage were significantly disrupted

by the movement restriction brought on by COVID-19 outbreak. The lack of labour has caused post-harvest handling processes to be disrupted across the nation. In addition to a labour deficit, there were issues with a lack of storage and transportation facilities. The absence of proper cold storage facilities in the nation has come to light as a result of the COVID-19 pandemic. The media highlighted numerous cases of farmers having trouble as a result of a lack of suitable cold storage facilities. Additionally, there was a significant disruption in the way that government agencies and other businesses purchased agricultural products. In the first few days of shutdown, a number of Agricultural Produce Market Committees (APMC) 4 mandis (or collecting centres) remained shut across the nation. Due to a lack of sufficient labour and logistical support, farmers were unable to reach the APMC mandis and were thus compelled to make distress sales of their produce. The sharp decline in arrivals at the APMC mandis is proof of this. When compared to the average number of mandis reporting arrivals over the previous three years, only 40% of the mandis reported arrivals of wheat, 43% of chickpea, and just 33% of mustard during the 15 March to 14 April period. Additionally, just 6% of wheat, 4% of chickpeas, and 4% of mustard are arriving in 2020 compared to the amount sold during the same 21-day period in 2019 (Rawal and Verma, 2020) [22]. Timing of agricultural produce sales was also impacted by a lack of transportation. Many perishable items, including milk, fruit, and vegetables, had been significantly wasted as a result. Across the nation, there have been numerous reports of farmers dumped their agricultural products because they could not sell or store them. The situation did, however, significantly improve, particularly during the second phase of the lockdown when additional mandis were operating.

Processing and Packaging: Food processing and packaging in India were similarly impacted by the COVID-19 pandemic and consequent lockdown. According to reports, numerous food manufacturing facilities around the country remained closed despite the relaxing of lockdown guidelines (Krar, 2020) [18]. Additionally, a significant number of food processing facilities in numerous states were compelled to lower their working capacity as a result of a variety of concerns, including a lack of raw materials and labour, logistical problems, etc. Rao (2020) [21] reported that due to the shutdown of multiple mandis, many food processing firms were unable to obtain raw ingredients. Additionally, there was a severe labour shortage in the food processing industries as a result of the repatriation of many migrant workers to their country of origin (Business Standard, 2020) [4]. The industries involved in food packaging encountered comparable difficulties. The packaging businesses in many states struggled to obtain timely approval for operations from the local government in addition to the major issues of a lack of raw materials, transportation, and labour (Ambwani, 2020) [1]. Due to their interdependence, these bottlenecks severely strained the supply chain of the packaging industries, which also had an impact on the food processing industries.

Distribution: The COVID-19 pandemic imposed restrictions on automotive and pedestrian transportation, which severely disrupted India's food distribution. The supply chains of farmers-wholesalers and wholesalers-retailers have been impacted by major bottlenecks such as lack of labour and logistical services, which led to panic buying nationwide.

Retail agricultural marketplaces in numerous states have severely disrupted the flow of food from the production to the consumption centres, in addition to the shutdown of APMC mandis and other wholesale outlets. Media reports note that start-ups in e-commerce had their online meal delivery severely disrupted as a result of the closure of multiple restaurants around the nation. According to reports, the closing of state borders has also caused a serious disruption in the supply of meat and fish across the nation. Blockades at state borders also prevented new supplies from entering and caused significant delays in deliveries. This led to higher levels of food loss and waste and was particularly problematic for supply systems for fresh foods.

Consumption: The COVID-19 epidemic is anticipated to have a significant effect on India's food consumption. One of the most crucial elements affecting food consumption is price. A major disruption in the food value chain led to an increase in price. These factors included a sharp reduction in the arrivals of farm commodities in APMC markets, a sharp increase in transport costs as a result of interstate travel restrictions, and severe labour scarcity. Furthermore, the lockdown's effects on supply had reversed the downward trend in food prices that had been in place prior to the lockdown. Customers all around the country resorted to panic buying and hoarding of foods that had caused a price increase since they were unsure of the trickle-down effect of the lockout. However, things are back to normal now that people are aware that vital goods are available (The Economic Times, 2020) [18]. Additionally, an examination of the consumer food price index in India showed a tendency of growth beginning in August 2019 and continuing through March 2020 before slowing. However, the index rose following March 2020 (after the lockdown announcement in the final week of March) before quickly stabilising in May 2020. On the other hand, since February 2020 and through the month of May, the global trend in food prices showed a pretty continuous decrease tendency. But a definite increasing trend has been seen for the global and Indian food price indices starting June 2020.

Impact of COVID-19 on dairy sector:

Figure 2 presents an analytical framework for better comprehending the potential implications of COVID-19 on various dairy stakeholders. A drop in milk productivity, increased feed expenses, and reduction in milk procurement prices led to significant decrease in income from dairying (Thejesh *et al.*, 2022) [24]. During the lockdown periods, dairy farmers were often compelled to sell milk at a lower price, and under extremely difficult circumstances, they even dumped the raw milk. One of the major losses faced by the Indian dairy farmers was due to missed artificial insemination to their cattle, which has long-run implications. Due to closing of shops and hotels, demand for milk and other dairy products decreased. Dairy cooperatives had a massive inventory of unsold skim milk powder (SMP) and other dairy products because they had to use the extra milk to make the processed products. These inventory expenses added additional costs to the dairy co-operatives. Das *et al.* (2021) [7] reported that from the consumer's perspective, consumption of packaged dairy products with a higher price was more during the pandemic. COVID-19 induced man-day losses which led to reduction in income levels for majority of the population and consequently many consumers stopped taking milk or

reduced the consumption quantity.

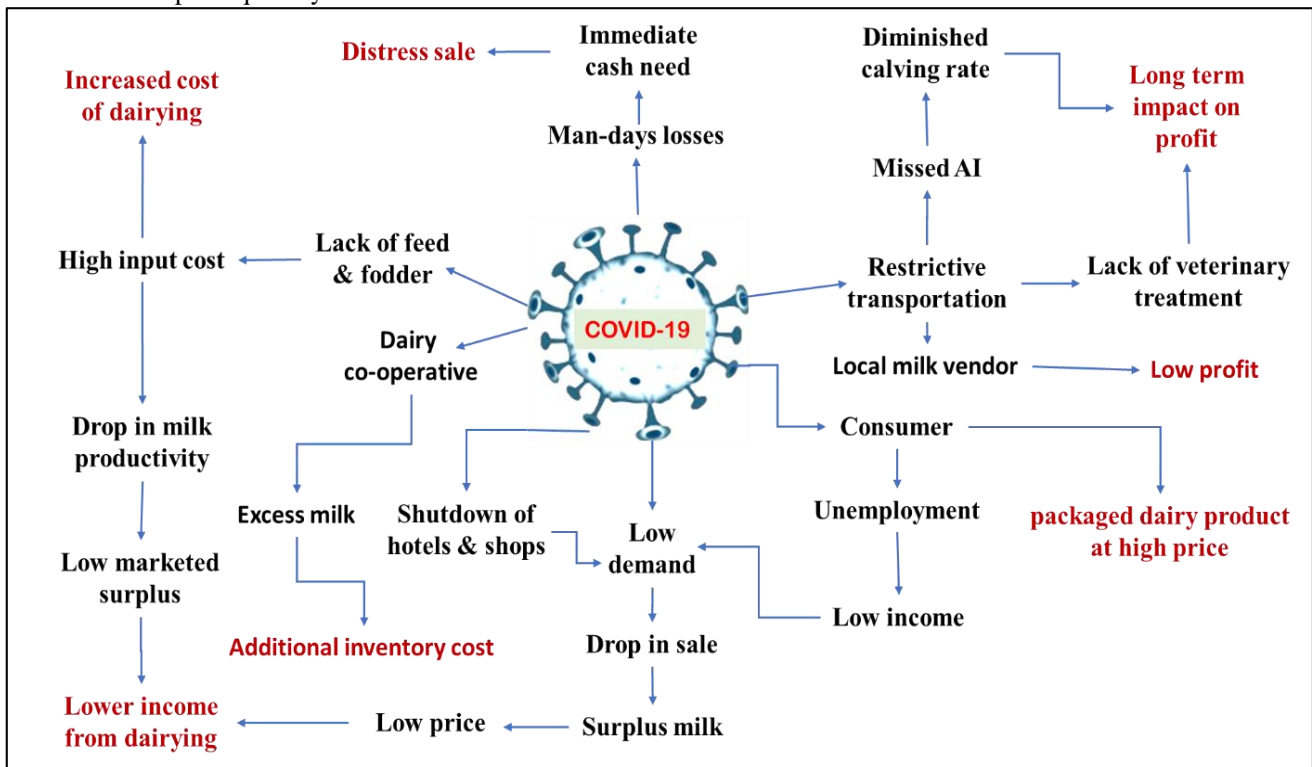


Fig 2: Potential implications of COVID-19 on various dairy stakeholders

Additionally, there was a decline in the consumption of poultry-related items, primarily as a result of supply and demand concerns. Additionally, inaccurate information about COVID-19 had a negative impact on food consumption (animal meats in particular). Due to the false claims, media reports show a significant drop in the consumption of fish, eggs, and chicken meat nationwide (Gupta, 2020) [13]. Additionally, the COVID-19 pandemic epidemic is anticipated to have a considerable negative influence on food consumption, particularly for the underprivileged and vulnerable groups in rural India. According to media sources, the extension of lockdown has caused a change in food consumption patterns, especially in urban regions. According to reports, during the second phase of the lockdown, consumers' purchasing habits significantly changed from buying needs to high-value items including snacks, processed foods, packaged food products, frozen desserts, etc.

Impact of COVID-19 pandemic on employment, labour and income:

The COVID-19 pandemic has had a profound impact on various aspects of societies worldwide, including employment, labour, and income. This paper examines the consequences of the pandemic on employment, labour, and income in India, highlighting the key challenges faced by individuals and the economy as a whole.

Employment Crisis: The pandemic-induced lockdowns and economic slowdown led to a severe employment crisis in India. According to the Centre for Monitoring Indian Economy (CMIE), the unemployment rate soared to a record high of 23.5% in April 2020 (CMIE, 2020). Many sectors, such as hospitality, tourism, and manufacturing, experienced massive job losses, leaving millions of workers unemployed. Further, the pandemic has adversely affected the livelihood status of the agricultural rural youth by hindering them to get

employment or to start a new venture (Das *et al*, 2023) [8]

Informal Sector Vulnerability: India has a significant informal sector, consisting of workers in low-wage and precarious jobs without formal contracts or social security benefits. This sector was particularly vulnerable during the pandemic. Lockdown measures resulted in widespread layoffs and reduced income for informal workers, leading to heightened economic insecurity (Srivastava and Sasikumar, 2020) [23]. The loss of livelihoods and income further exacerbated poverty and inequality in the country.

Migrant Worker Crisis: The COVID-19 pandemic exposed the vulnerabilities faced by India's vast population of internal migrant workers. With the sudden announcement of the nationwide lockdown in March 2020, millions of migrant workers found themselves stranded far from their homes, without work, and lacking access to necessities. This humanitarian crisis highlighted the need for improved social protection measures and labour reforms to safeguard the rights and welfare of migrant workers (Bhatia and Nair, 2020) [3].

Income Inequality: The pandemic has widened income disparities in India. The closure of businesses and the loss of jobs disproportionately affected the lower-income strata of society. Reports indicate that the pandemic has pushed an estimated 230 million Indians into poverty (Kijima, 2020) [16]. The income shock experienced by vulnerable populations further deepened existing inequalities, with women and marginalized communities being disproportionately affected (Mishra, 2021) [19].

The crisis led to widespread job losses, particularly in the informal sector, and intensified income inequality. The plight of migrant workers exposed systemic vulnerabilities and highlighted the need for comprehensive labour reforms. Policy interventions, though crucial, faced implementation

challenges and gaps in coverage. Moving forward, it is imperative for the government and relevant stakeholders to prioritize inclusive and sustainable strategies to rebuild the economy, protect workers' rights, and ensure social safety nets for all.

Conclusion

COVID-19 has shattered Indian economy in maximum possible ways; although, the impact differs across the regions and sectors. The demand and supply shock of major food commodities was one of the key issues during the outbreak of COVID-19 and its subsequent stringent measures to contain it. The supply and value chain of food commodities was totally disrupted during the initial stages of lockdown period. The urban poor population confronted acute supply shock of basic commodities as compared to their rural counterpart. The government's restriction on the transport and movement of people led to a heavy loss of food products especially, perishable commodities like fruits, vegetables, and milk. The consumption patterns changed in some way over the COVID-19 period; for example, people switched from meat to plant-based foods, preferred packaged goods, and included more nutrient-dense foods in their regular diets. The losses of employment, man-days and reverse migration jointly made the poor poorer and declined their purchasing power capacity. Even after the post-pandemic period several households still cannot restore the pre-pandemic situation due to the demises of the main earning person of the family and trapped in the poverty circle. Several state governments and central government transferred direct benefits to the farmers' accounts and launched few schemes to boost their effective demand, which was the need of the hour. Furthermore, to ensure the nutritional security of the Indian government should strengthen the storing facility, supply chain network and production techniques for any impending pandemic-like crisis.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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