

Covid-19 Impact on Agriculture and Food Security

Mr. Kotha Rajesh¹, Dr. Smitha K.P.²

Department of Agricultural Extension, College of Agriculture, Vellayani, Kerala Agricultural University, Thiruvananthapuram – 695 522

Corresponding author: kotharajesh36@gmail.com

Abstract

COVID-19 having high transmissibility is more contagious, and its ability to survive on surfaces making it more challenging to destroy and this led to extraordinary socioeconomic disruption (Jafri et al., 2021). Responding to this pandemic, many countries imposed strict control measures such as lockdowns that had seriously impacted food availability, accessibility, altered dietary practices and worsened food insecurity situation. In India for a durable food security the requirements of four pillars (availability, accessibility, utilization and stability) should be fully met. Agriculture which is indispensable for food security disrupted on large scale which led to various disruptions in pre-farm gate and post-farm gate operations like unavailability of agriculture inputs, labour shortage, unavailability of machinery, extension services, agricultural marketing, storage, transportation, processing and others. This article insights how COVID-19 impacted food security and agriculture both positively and negatively and government interventions to combat the pandemic situations

Introduction

Infectious diseases are one of the major causes of death that are responsible for one fourth to one-third of mortality in world. COVID-19 which is an infectious disease first reported in Wuhan, China in early Dec 2019 (Ghosh, 2020) which suddenly escalated and became an unprecedented global health situation (Jafri *et al.*, 2021). In March 2020, the WHO declared COVID-19 as a global pandemic.

Features of COVID-19 that makes it challenging are its contagious nature, and its ability to survive on surfaces. The second feature is the delay in developing and approval of drugs. Another feature of COVID-19 is the constant evolution as new strains causing recurrent infections and threat (Shang *et al.*, 2021). Poudel *et al* (2020) in his study stated that COVID-19 crises as severe crisis since the Second World War.

As a response to this pandemic, most countries imposed strict control measures like lockdowns which included, quarantine, self-isolation, curfews etc. to mitigate disease spread. Severe preventative measures taken by governments affected people's access to healthy foods and global agri-food supply chain disrupted which contributed to food insecurity and malnutrition (Jafri *et al.*, 2021).

Impact of COVID-19 on food security

According to Gibson (2012) food security means all the people, all the times, having physical, social and economic access to sufficient, safe, and nutritious food which meets their food preferences and dietary needs for active and healthy life. Food security has four pillars they are availability, accessibility, utilization and stability.

For a durable food security in India, the requirements of all these four pillars should be fully met. Jafri *et al.* (2021) stated that COVID 19 pandemic adversely affected food availability and accessibility, altered dietary practices and worsened food insecurity situation.

Agriculture ensures food security

Agriculture improve availability of food and help in achieving food security (Wegren and Elvestad, 2018). It is Indispensable and have direct relationship with food security and it also have special importance in development of human.

Impact of COVID-19 pandemic on agriculture

In an effort to stop the spread of covid-19, Government of India announced lockdown on March 24, 2020 due to which agri-food supply chains disrupted on a large scale like

1. Impact of COVID-19 on pre-farm gate operations

- 1.1 Impact on agri-inputs availability
- 1.2 Impact on availability of labors
- 1.3 Impact on availability of machinery

1.1 Impact of COVID-19 on availability of agricultural inputs

Crop inputs had impacted during pandemic due to

- a. Disruption of raw material supply
- b. Disruption of freight/cargo and transport services
- c. Shortage of labor

This led to unavailability of seeds & planting materials, unavailability of fertilizers & manure, shortage of plant protection chemicals /botanicals / bio control agents and shortage of feed for livestock & poultry.

India and many developing countries depend on pesticide and fertilizer imports from other countries like China. Boarder closures and transportation restrictions halted exports and imports which hampered timely application and supply of agricultural inputs. COVID 19 pandemic affected the availability of Cartap, Acephate, Buprofezin (Weearasekara, 2021) and other agrochemicals in Indian markets.

According to NABARD (2020) restrictions imposed on movement and closure of shops reduced availability of agricultural inputs like seeds (-9.2%), fertilizers (-11.2%), pesticides (-9.8%), fodder (-10.8%), etc.

1.2 Impact of COVID-19 on labor availability

Countries with labor-intensive production and peak seasonal labor demand experienced shortage of labors in agricultural industries because of restrictions on people's migration across borders and lockdowns. Labors demand was increased whereas the supply reduced due to many reasons. The migrant workers head back to their homes and some laborers were denied in going to farms due to fear of coronavirus. Reverse migration combined with poor transportation caused labor shortage. Due to labor shortage labor demand increased but labor supply decreased due to this wage rates increased. (OECD, 2020).

➤ Case study - labor shortage delayed crop harvest

Severe scarcity of labor imposed a serious challenge to crop procurement and threatening to leave a long-lasting impact on agriculture as harvest of winter-sown crops delayed, particularly wheat, which in turn delayed the planting of the next crop (Krar *et al.*, 2021).

1.3 Impact of COVID- 19 on availability of machinery

Peak harvest with no labor procurement

In India many crops like wheat, gram, lentil, mustard, etc. (including paddy in irrigated tracts) were at a harvestable stage during pandemic and it was also time for farm harvests to reach mandis for assured procurement operations by designated government agencies. Because of lockdowns and travel restrictions farmers were inaccessible to machinery, drivers and labors due to lack of transportation

➤ **Case study- Kollam District of Kerala (KSM, 2020)**

In Mugathala block of Kollam district JGL with 7 acres of paddy was affected due to unavailability of harvesting machines. Even though they availed extra labor and harvested it, they incurred loss.

2. Impact on Agri-value chain

2.1 Impact on Agriculture Producers

Farmers are important producers of India's food value chain. lockdown resulted in scarcity of manpower and equipment as migratory workers in India typically migrate to rural areas during harvest, and smallholder farmers mostly rent equipment used in agriculture rather than purchase it. Another cause of uncertainty is the availability and accessibility of seeds, fertilizer, and insecticides for the upcoming crop season. However, the disruptions induced by COVID-19 lowered farm input production capacity and raised prices, making these resources inaccessible to the small and marginal farmers. Another issue that faced by farmers is unavailability of transportation for his ready crops, it is reported that truck drivers are denied their duty due to two major problems, -all restaurants and road side Dhabas were closed during lockdown so they are unable to get food. Another is strict restrictions imposed by states government is border areas were sealed off. This is likely to have an impact on agricultural product demand, labor dislocation, and supply chain disruption (Sapna, 2021).

2.2 Impact on Retailers and Consumers:

The novel pandemic has changed the enterprise practices of retailers also and made them face many confrontations in doing business. All the retailers faced the shrinkage in their business volumes, the consumption pattern of the consumers had also changed. Retailers had to manage the supply chain disruptions, restriction in the footfall of the stores due to the social distancing, hygiene improvements as per the local governance, reduction in promotional campaigns so as to avoid over crowd etc. During the lockdown, this fixed cost was balanced against the low income produced by retailers, which resulted in business closure (Sapna, 2021).

3. Impact of COVID-19 Pandemic on Post-farmgate operations

- 3.1 Impact on Agricultural marketing
- 3.2 Impact on storage & transportation
- 3.3 Impact on processing

3.1 Impact on Agricultural marketing

Functioning of mandis:

- When the lockdown was first announced, a huge number of agricultural mandis shut down.
- The sudden installation of the lockdown disrupted supply networks, as farmers were unable to transport their produce to wholesale markets
- Haats, and traders were unable to visit villages to purchase produce.
- On March 27, five days after the first-round lockdown, the government exempted agricultural mandis from the restrictions. Due to restrictions on the number of farmers allowed into the mandis and the amount each farmer could sell on any given day, there were long lines of farmers waiting outside the mandi gates for hours and days.

3.2 Impact of COVID-19 on storage and transportation

- Unavailability of cold storage resulted in rotting of perishables
- Closure of godowns and warehouses.
- Restriction on transportation resulted in supply chain disruption.
- Shut down of govt and private procurement agencies
- **Case study -fish/vegetable trade in Kerala**

For fish and vegetable trade the biggest problem is that the supply is not available. Vendors have been restricted by the government due to district and state-level limitations on border movements, as well as a shortage of transportation infrastructure. The majority of the vegetable and fish vendors were poor families that relied on daily income for their basic necessities. Vegetables and fish were not being sold in huge quantities by wholesalers. The high price of vegetables in the market was also a problem for vegetable trading businesses. lack of cold storage to store excess vegetables and fish resulted in the rotting of certain stock. (KSM ,2020)

3.3 Impact of COVID-19 pandemic on processing

In India food processing business accounted for 32 % of entire countries food market. Processing industries had faced challenges at two stages one at product production stage and another at the product marketing stage. At this product production stage due to lack of availability of raw materials and availability of labor product was not synthesized. At product

marketing stage due to travel restrictions both inside and across borders finished products did not reach markets and consumers. (OECD, 2020).

➤ **Case study -Flourmill units in Kerala**

As lockdown prevented flour mills from marketing or delivering their products, most flourmill units are suffering with deterioration of completed goods and raw materials. Since the lockdown began, there has been no business activity and many previous orders were cancelled by customers due to a shortage of transportation and finance. Entrepreneurs had a difficult time dealing with perishable foods. (KSM, 2020)

4. Positive impact of COVID-19 pandemic (Kalogiannidis *et al.*, 2020)

4.1 Rising demand for local food

Demand for organic and local food has risen dramatically due to various regulations and growing health concerns. In comparison to other products, demand for regional and local farmed products was higher. By direct selling farmers could get best price for their hard work. Many people in cities started growing crops on terrace and homesteads which led to the flourishing of Urban farming / nutrition gardens. Travel restrictions increased the demand for import substitution.

➤ **Case study from African women**

COVID-19 pandemic resulted in the acute food shortage for 7.1 million people in Nigeria and 265 million globally. During pandemic demand for yam bean has risen in Africa due to its special nutrient status, which was a forgotten crop due to global trend of crop uniformity and westernized diet. (FAO,2020)

➤ **Case study-Marigold farmer set as a Model**

N.K. Krishnan Nair cultivating marigold in 40 cents reported that during lockdown he sold flowers to traders in Kozhencherry and Chengannur, when supplies from Tamil Nadu and Karnataka dried up. Mr. Nair claims that customers prefer locally grown flowers, with a rise in COVID-19 cases in Tamil Nadu and Bengaluru. (Kuttoor ,2020).

4.2 Opportunity for small farmers

During lockdown, local farmers grouped together to gain better market prices. This strategy has proven to be beneficial to small farmers in diverse places. When

travelling restrictions were eased, wholesalers wanted large quantities of vegetables mainly due to customer stockpiling. As a result, local farmers worked together to meet the demand for vegetables at a reasonable price. (Morsy *et al.*, 2020). During the lockdown, demand for dried veggies including mushrooms and peas, as well as frozen vegetables, spiked dramatically. Farmers took advantage of this situation, avoiding the income loss from vegetables and agriculture. Milk and associated items were in high demand as well. Due to an increase in demand for milk products and immune booster meals, livestock farmers had a tremendous opportunity during COVID-19. (Farell *et al.*, 2020).

4.3 Modernizing Agriculture Sector

The authorities has given serious consideration to transform agriculture when COVID-19 devastated the country. China, for example, is investing in drones, autonomous unmanned vehicles, and other agricultural improvements in order to reduce human involvement. Mobile phones are enhancing access to business sectors, expenses, and climatic information in Africa, as well as encouraging cash transfers to aid in the modernization of rural areas. (Lal, 2020).

5. Innovative agri-solutions during COVID-19

E-book documents on “**Innovative agri-solutions during COVID-19**” contain various works done by KVK’s during pandemic period from across the country (ICAR, 2020).

5.1 Online Advisories and Consultations

Due to restrictions on people's movement during lockdown, farmers were unable to access farm advisory and solution centres such as KVKs and other such organizations. Farmers, on the other hand, have the option of contacting extension agents via telephonic chat. In this case, various ICT choices proved useful in resolving farmer issues. Photos and videos were used to explain the issues, and online solutions were supplied for all crop and livestock-related issues.

➤ Case study- KVK Alappuzha

It used conference calls, audio visual aids, social media, tele-training, and other ICT technologies to communicate with member farmers. During the months of March and April 2020, four teleconference sessions were held at weekly intervals to impart skills for proper honey gathering and storage. Online tele-trainings on colony management throughout active honey flow season, post active honey flow season, and hygienic preparations for sale were conducted with

the use of custom-made video clips. During this time, each farmer could collect up to 2 kg honey each box valued Rs.700/-, resulting in a total return of Rs.21000/-

5.2 Mechanization Solutions for Tackling Labor Shortage

The COVID-19 lockdown impacted country's most vital agricultural enterprises, wheat harvesting and selling. As a result, seasonal agri labour migration inside the country has become impossible. Farmers began to notice significant issues with their wheat harvesting and post-harvest activities. The country's agricultural extension system looked at a variety of solutions to this problem, including making farm machines available to as many farmers as possible to ensure smooth wheat harvesting and post-harvest operations.

➤ Case study -Doorstep service of farm implements during COVID-19 period

Rajasthan's Jhunjhunu district has become hotspot and red zone towards the end of March, coinciding with the primary grain harvesting season. KVK Jhunjhunu encouraged these farmers to use "JFARM SERVICES" which provides free doorstep service of various farm implements to farmers during COVID-19 shutdown through WhatsApp group, messages, and other social media.

5.3 Innovative Marketing Initiatives

Disruption of marketing channels, particularly on the consumers' side, was one of the most conspicuous problems emerged in the lockdown due to the COVID-19 in India. Subsequent to the closure of retail shops for consumers the wholesale prices of perishables such as fruits and vegetables fell drastically. Agricultural extension system in the country acted promptly to safeguard farmers' interest by suggesting them innovative methods of marketing their produce.

➤ Case study- Digital Marketing of GI-Tagged Alphonso: NICRA Village showed the pathway

In Ratnagiri, Maharashtra, GI-tagged Alphonso is the only crop that generates foreign cash. Konkan sells over 50,000 tonnes of Alphonso mangos globally. During the March-April lockdown, harvesting and marketing of 'high value-high perishable' mango was a challenge. Mango exports were halted due to the closure of international shipping ports.

Conclusion

All economic activities and supply networks impacted as a result of the lockdown imposed during COVID-19. The direct and indirect effects of pandemic are likely to persist for more than two years. It has affected both food security and agriculture drastically due to travel restrictions, social distancing, border closures and curfews. It has affected global exports & imports of agricultural goods, sowing to harvesting and supply chains like marketing of agriculture commodities from its place of production to the ultimate consumer. The current shortcomings in the agriculture industry necessitate structural reforms, technological adoption, and infrastructure investment. Investing in the food processing business will help the agriculture sector flourish. To response to the issues in the food supply chain, the infrastructure should be strengthened to make the food supply chain more flexible. So, as many pandemics may hit again, necessary strategies must be devised to combat their impacts on agriculture and food security.

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