



Managing Food Supply Chains Post COVID-19: A Perspective

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Abstract

The coronavirus (COVID-19) has already left its footprints over vast geography worldwide and the rest of the globe is also under a big threat to this ongoing pandemic. Its effect can be felt amongst every sector of the economic ecosystem, and one of the most severely affected components is the food sector. The impact of COVID-19 on food supply chains (FSCs), especially agriculture, has created grave concerns for food security globally. This paper presents a perspective on future FSCs and the predicted outcomes which are likely to occur post COVID-19 based on the plans, reviews of critical reports, and information made available to date. The food industry needs unprecedented safety, technology & policy-measures to shine again and to manage the supply chain operations. In this highly-connected world, technological innovations and improvisations will create more resilient and sustainable food supply chains. Further, key production and distribution challenges are also highlighted.

Keywords: food supply chain, COVID-19, pandemics, lockdown, agriculture

1. Introduction

Today, COVID-19 has changed means of managing the economy, technology, safety, and information in an organization, and the pandemic situation is now compelling the human community to think far beyond their own-set working & thinking limits. Food being an inevitable thing, cannot be eliminated due to any crisis until the extinction of life on earth, and the COVID-19 pandemic has severely affected the food sector. If we see with future lenses, COVID-19 will affect food supplies in every industry from better to worst as it is undeniable that consumers have a significant concern over food safety and hygiene after this pandemic situation. FSC is a complex network of entities linked with *farm to fork*. It is a crucial challenge for MSMEs, start-ups as well as for well-established food businesses, and a question about their brand value to meet the dynamics of demand and safety at every step of supply chain management (Mor et al., 2018, 2015). Seeing the spread of COVID-19, numerous consequences in the food sector itself will be severely affected if lockdowns and restrictions continue. A significantly reduced demand for food and beverage products also lead to supply chain disruption challenges. As the situation will normalize (but when?), the consumption of beverages and food will pick up again, but it would take a lot of effort to cover up the lost sales (Poathan et al., 2020). The implications are quite complex in the fisheries & aquaculture sector, and data capture fishery's inability of fishing vessels to operate can create a domino effect in FSCs. The most affected food sector is going to be the aquaculture, poultry, and fishery products because of logistics issues and the pandemic's impact on the livestock sector due to limited access to livestock fodder and slaughterhouses, and hence, a diminished sale of these types of products (Orner and Brown, 2020; Singh et al., 2020). There is a lack of fresh food supplies because of the blockage of transport routes and increased levels of food wastage. The restrictions regarding transportation and quarantine measures are likely to hamper farmer's access to marketplaces reducing their throughput and impeding them from selling their produce at a justified price. Food security has been a challenge worldwide. Although the reduction in the labour force will disturb the incomes of laborers as well as labor-intensive forms of food production, at the global level, many developing nations would be the hub of food sectors shortly (Balram, 2020).

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Authorities are working effectively and providing essentials to needy and major victims of the epidemic in their homes and taking drastic measures to reduce the impact of the predicted economic recession as a result of COVID19 (Cappelli and Cini, 2020; Larue, 2020; Ivanov and Dolgui, 2020).

This paper focuses on assessing the impacts of COVID-19 on the agri-food sector, promoting collaborations towards technological innovations, building sustainable strategies accompanied by all stakeholders, and ensuring their implementation. The paper covers the human perspective detailing the effect of COVID-19 on our lives, business perspective relating to COVID-19 and food businesses, postharvest issues associated with the sector, and challenges in production & distribution. Thus, a new kind of design thinking is needed that enables organizations to reconfigure their supply chains and be resilient to rapidly changing global trade policies, supply dynamics, and disruptions. A connected view of information would be crucial for businesses to understand and design their agri-food supply chain strategies.

2. Human Perspective

Since the time of the *Lockdown 1.0*, we have all found ourselves sitting in our homes, which has had different sorts of impacts on different types of people, but one thing worth mentioning here is this, that the average number of times we have our meals has increased. People find themselves eating a lot more than usual days, and a standard increment in food intake and consumption is observed (Deloitte, 2020). However, this might be misleading to some of the fast-moving consumer goods (FMCG) companies, and they might commit an error while estimating their production rates because this increment in food demand is of homemade and home-produced food and not of food & consumer products (NSSO Report, 2012). A sharp dip is observed in demand for packaged food items, and a large share of the reason behind this phenomenon is the consumer's apprehension regarding the handling of such consumer products before it reaches them. To mitigate such dilemmas, FMCG businesses now need to ensure new, reformed, and sanitized with minimal human interaction based supply chains (Hobbs, 2020).

The worst about lockdown is that it has concurred with the peak harvesting season, particularly to the Asian nations. However, the government has exempted farming and related operation from the purview of the lockdown. Indian non-agriculture sector includes nearly 71% of workers in rural areas, and 67% of workers in urban areas were engaged in the informal sector (NSSO Report, 2012). To mitigate the dearth of workers, the government needs to focus on the use of farm machinery and provide incentives on devices and machinery which help in automating the process of harvesting and farming (Carberry, and Padhee, 2020; FAO, 2020). Farmers should be loans on reduced interest rates to purchase such machinery. Implementing such a strategy will have two-fold benefits first; it will help in improving the production rates next; it will also promote the production of indigenous machinery, hence support that industry as well. In western India, in Pune, the harvesting of grapes suffered, and students had to come to help the farmers for harvesting. Due to the heavy load on storage facilities, the farmers had to sell the produce at low prices and suffered losses. The right information needs to flow in the right direction, and agri-food organizations should come together to support the economy (Pandhav et al., 2020; Reardon et al., 2020).

3. Business Perspective

In this unexpected time, what food and beverage businesses should do is to opt for backward supply chains to support their primary food producers, i.e., farmers, by offering loans and credits schemes, providing essential seeds required, etc. to reduce the supply chain disruptions. The last leg of FSC, the retail shops, the supermarkets will be the least hit, especially those who buy directly from farmers also because supermarkets will be capable of maintaining the rules of social distancing. Media reports show that the closure of hotels, restaurants, convenience stores, and teashops during the closure is already reducing the sale of milk. In the meantime, poultry producers have been beaten so severely because of a misunderstanding that chicken is the carriers of COVID-19 (Mayurnikova et al., 2020). Due to the upcoming global recession and reducing incomes, the food prices may go down. The shutting down cafeterias and street food vendors is an issue for raw-food producers and processors that can also lead to disruptions as in the fish, poultry, and meat sectors (CIRAD, 2020). The effect will be most potent in the informal sector due to inadequate cleaning facilities, and in SMEs, because they do not have the machinery to operate. Still, they use the workforce, hence more sense the workforce more severe effect. And the most significant impact of COVID- 19 in agriculture is due to labor migration. FSCs in many developing nations are not as automated and, thus, very reliant on labor for most of the supply chain operations, including planting, harvesting, food movement, etc. (FAO, 2020; Kumar et al. 2020).

Another most important aspect of mitigating the effect of the lockdown is maintaining the supply chain of the food intact because a large number of deaths during the Bengal famine were not due to the shortage of food but due to improper delivery and maintenance of the supply chain. Hence, there is a vast potential for the e-commerce companies to come together along with delivery companies and devise ways in which the stability of the supply chain can be maintained (Zurayk, 2020).

4. Postharvest Perspective

The effect of COVID-19 is more on the postharvest activities at farmer's end, and some of the severe consequences are as follows (Larue, 2020; Farias, 2020).

- The massive production of wheat is disturbed, majorly due to two reasons, i.e., labor migration and transportation restrictions.
- Onion produced in the largest onion growing place in Maharashtra was not able to transfer to other areas and states.
- Due to such a massive dip in demand for meat and poultry products, their prices suffered hugely, and the international markets suffered huge losses.
- People were apprehensive about the vegetables reaching them; hence the cucumbers produced in some states suffered huge losses due to no buyers.
- The FMCG sector faces enormous losses due to labor shortage and inadequate transportation.
- Hoarding of goods creates problems in some food commodities, consumers are fear struck, and they are buying stuff to ensure they have their groceries stocked up.

5. Production and Distribution Challenges

Key challenges in food production and distribution include:

- The food supply chain has been limited, and stocks have run out.
- Migrants are forced to leave their working grounds, which has led to a sharp decline in production capabilities at the farm level.
- Shortage of raw material for FMCG companies to manufacture, a major challenge for medium small & micro enterprises and food & beverage start-ups.
- Diminished sales in terms of logistic involvement, reduced excess of animal feed and slaughterhouse, thus creating a domino effect.
- Compliance of certifications to continue the production & distribution operations has affected the food sector severely.
- People were very apprehensive about the food reaching them; the vehicles had to maintain standard operating procedures, which led to a delay in supply chains.

6. Conclusions

Following the scenarios of the food industry, COVID-19 has led to affecting the cross border agricultural market chains in most of the nations, and trade restrictions have had a significant loss on the communities, which depend on agriculture as a livelihood. These constraints have contributed to the reduction of farmer's income and inflation of crop prices from local and seasonal patterns, thus creating a climate of mistrust and uncertainty for producers and consumers present in these networks. Production is affected by the labor shortage with products such as rice that depend on farmer's groups for planting and harvesting. The disease has raised the price difference between production and consumption centers. The informal sector is in grave danger, mainly because of the lack of regular income, and farmers and other immigrant workers were severely affected during the closure.

In conclusion, food supply chains are going to be affected at every step to maintain quality, which is a major concern. It is expected that the traditional food culture is going to increase and will lead the industry. However, the food industry needs unprecedented safety, technology & policy-measures to shine again and to manage the supply chain operations. Although this is a very novel research area and technological innovations & improvisations will create more resilient and sustainable food webs worldwide through research.

References

Balram, S. (2020). COVID-19 Impact: Food and fashion retail will take a year to revive, predict top industry associations. Retrieved from: <https://retail.economictimes.indiatimes.com/news/industry/covid-19-impact-food-and-fashion-retail-will-take-a-year-to-revive-predict-top-industry-associations/75124557>.

- Cappelli, A., and Cini, E. (2020). Will the COVID-19 pandemic make us reconsider the relevance of short food supply chains and local productions? *Trends in Food Science & Technology*, Vol. 99, pp. 566-567.
- Carberry, A., and Padhee, A. K. (2020). Containing COVID-19 impacts on Indian agriculture, Retrieved from <https://www.icrisat.org/containing-covid19-impacts-on-indian-agriculture/>.
- CIRAD – Agricultural Research for Development (2020). Covid-19 and food security | India and its jobs crisis. Retrieved from: <https://www.cirad.fr/en/news/all-news-items/articles/2020/science/covid-19-and-food-security-india-and-its-jobs-crisis>.
- Deloitte. (2020). COVID-19: Impact on food & beverage consumer products companies. Retrieved from: <https://www2.deloitte.com/global/en/pages/about-deloitte/articles/covid-19/covid-19--impact-on-food--beverage-consumer-products-companies.html>.
- Farias, D. P., and Gomes, M. G. S. (2020). COVID-19 outbreak: What should be done to avoid food shortages?. *Trends in Food Science & Technology*, Vol. 102, pp. 291-292.
- Food and Agriculture Organization (FAO). (2020). Q&A: COVID-19 pandemic – impact on food and agriculture. Retrieved from: <http://www.fao.org/2019-ncov/q-and-a/impact-on-food-and-agriculture/en/>.
- Hobbs, J. E. (2020). Food supply chains during the COVID-19 pandemic. *Canadian Journal of Agricultural Economics*, pp. 1-6.
- Ivanov, D., and Dolgui, A. (2020). Viability of intertwined supply networks: extending the supply chain resilience angles towards survivability. A position paper motivated by COVID-19 outbreak. *International Journal of Production Research*, Vol. 58(10), pp. 2904-2915.
- Larue, B. (2020). Labour issues and COVID-19. *Canadian Journal of Agricultural Economics*, Forthcoming, Vol. 68, pp. 231-237.
- Kumar, A., Luthra, S., Mangla, S. K., and Kazançoğlu, Y. (2020). COVID-19 impact on sustainable production and operations management. *Sustainable Operations and Computers*, Vol. 1, pp. 1-7.
- Mayurnikova, L. A., Koksharov, A. A., and Krapiva, T. V. (2020). Food safety practices in catering during the coronavirus COVID-19 pandemic. *Foods and Raw Materials*, Vol. 8(2), pp. 197–203.
- Mor, R. S., Bhardwaj, A. and Singh, S. (2018). Benchmarking the interactions among barriers in Dairy supply chain: An ISM approach. *International Journal for Quality Research*, Vol. 12(2), pp. 385-404.
- Mor, R. S., Singh, S., Bhardwaj, A., and Singh, L. P. (2015). Technological implications of supply chain practices in agri-food sector: a review. *International Journal of Supply and Operations Management*, Vol. 2(2), pp. 720-747.
- Orner, B. and Brown, J. (2020). Meat supply chain begins to feel effects of COVID-19 pandemic. Retrieved from: <https://www.nwherald.com/2020/04/22/meat-supply-chain-begins-to-feel-effects-of-covid-19-pandemic/aiw3lnx/>.
- NSSO Report. (2012). Informal Sector and Conditions of Employment in India, NSS 66th Round (July 2009 – June 2010), Govt. of India. Retrieved from: http://mospi.nic.in/sites/default/files/publication_reports/nss_rep_539.pdf.
- Pandhav, C. S., Ranjan, S. and Sharma, S. (2020). COVID-19: Agriculture innovation to achieve food security & tackle malnutrition in India. Retrieved from: <https://www.theweek.in/news/india/2020/04/20/COVID-19-Agriculture-innovation-to-achieve-food-security-tackle-malnutrition-in-India.html>.
- Pothan, P. E., Taguchi, M., and Santini, G. (2020). Local food systems and COVID-19; A glimpse on India's responses. Retrieved from: <http://www.fao.org/in-action/food-for-cities-programme/news/detail/en/c/1272232/>.
- Reardon, T., Mishra, A., Nuthalapati, C. S. R., Bellemare, M. F., and Zilberman, D. (2020). COVID-19's Disruption of India's Transformed Food Supply Chains. *Economic & Political Weekly*, Vol. 55(18), pp. 1–4.
- Singh, S., Kumar, R., Panchal, R. and Tiwari, M.K. (2020): Impact of COVID-19 on logistics systems and disruptions in food supply chain, *International Journal of Production Research*, pp. 1-16.
- Zurayk, R. (2020). Pandemic and Food Security. *Journal of Agriculture, Food Systems, and Community Development*, Vol. 9(3), pp. 1-5.