

Agri-food supply chain disruption: leading to positive evolution of agriculture eco-system

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Key takeaways:

- *Interventions in the agri-food supply chain post-COVID*

When the lockdown started in India in March 2020, it was a peak rabi arrival (winter crop) season across the nation for wheat, rice, pulses, spices, fruits, and vegetables. Concerns, questions, fear, restricted movement, etc. led to uncertainty looming everywhere which impacted agriculture and food supply chain as well. Farmers were waiting with harvested commodity and looking for markets (Agricultural Produce & Livestock Market Committee - APMCs) to open, so that they could sell their produce.

Although agriculture and allied activities were treated as essential services and therefore exempted from lockdown, there was no activity at APMCs. Since agriculture is a state subject, the majority of state governments tried different ways to reach out to the farmers at the village level and facilitate the trade of their produce.

Few notable initiatives taken by states and private entrepreneurs:

- Permitting trade in all Warehousing Development and Regulatory Authority (WDRA) accredited warehouses by declaring them as sub-market yards
- Farmgate collection of fruits and vegetables and selling them directly to customers through mobile farmer markets
- E-retailers directly sourcing all agricultural produce and fruit and vegetable (F&V) from farmers and Farmer Producer Organizations (FPOs)
- Developing agriculture e-marketplace for linking farmers to traders and processors.

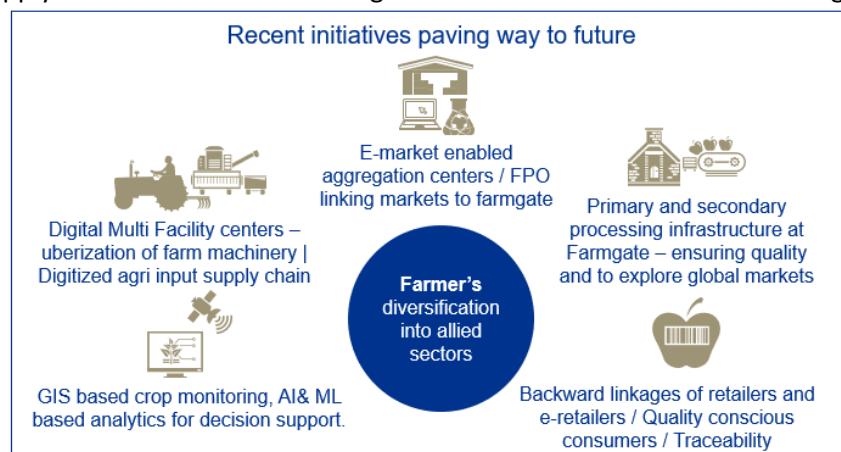
Changing consumer preferences helped branded/packed staples make their way to the majority of consumer baskets. Private labels in food retailing gained prominence with the aggressive exploration on backward integration possibilities. Varied apprehensions, however, led to a decline in production and consumption of animal-based food products, which had a negative impact on farmers' realisation.

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Agriculture production and food supply chains have witnessed a significant transformation with technology enablement at the farmgate. Multiple pilots of technology interventions in agri-food supply chains across states by various stakeholders have paved the way for technology-enabled, data-driven agriculture and food supply chains in India.

Though there are multiple initiatives at various locations, they are still limited and restricted to specific geographies.



Conceptually, technologies in agri-food are seemingly scalable; however, diverse practices of Indian agriculture could be a bottleneck for a nation-wide impact. But the areas of importance need attention from all quarters for enhanced efficiencies in agricultural business environment along with technological innovations and adoption. *Technology innovations can help transforming Indian agriculture from the current condition of subsistence farming to an enterprise level.*

Way forward for agri-food supply chains in India

The enhanced role of technology in Indian agri-food supply chains is the need of the hour today, unlike a few years ago. This needs to be channelised for holistic development of Indian agri-food supply chains. Following are some key levers that can be linked through digital and technology integration for accelerated growth.

- Providing reliable and authentic information at various stages of production:** Unavailability of agricultural information is considered one of the main reasons for abnormal price fluctuations and farmers throwing their produce in distress. Price fluctuations in tomatoes, onions and potatoes is one the major concerns even today. Making information available for farmers can help them making informed decisions on the crop to be grown, to sell or to store and possible market linkages they need to enter into. Same information will help buyers also to effectively plan their purchases from different source markets, connecting with farmers directly and engage in contract farming agreement with producers.
 - Production information of crops (both agriculture and horticulture), livestock, fisheries, animal husbandry, etc.
 - Weather related impact on the standing crops
 - Price and commodity availability of information for all agriculture and allied products
 - Global trade statistics for agricultural product import and export to make aware the impact on domestic prices.

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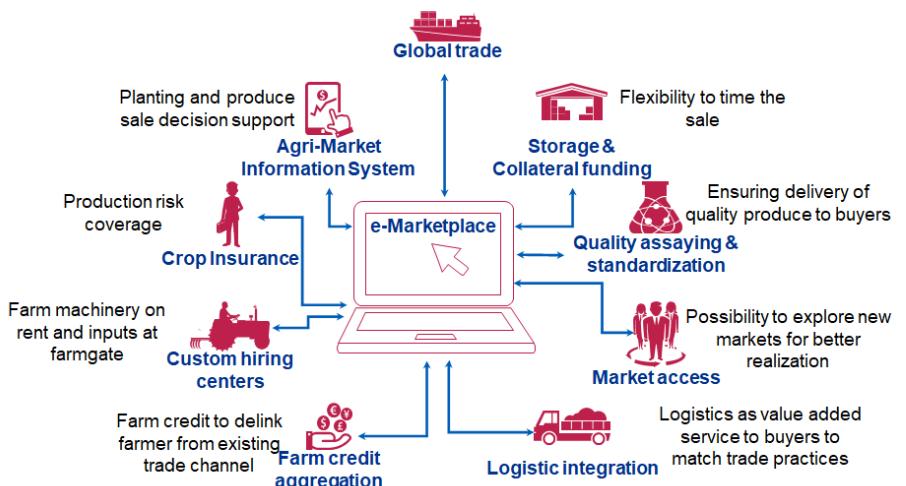
- **Making sufficient farm credit available to farmers (owner farmers and tenancy farmers):**
According to recent statistics, 61 per cent of agricultural households avail institutional credit and rest 39 per cent (30 per cent only non-institutional credit and 9 per cent both) are still dependent on informal credit due to multiple reasons.¹ Innovations in farm credit through IT integration/digital enablement is the need of the hour with linkages to their produce marketing. Blockchain could be explored for digitalising the farm credit environment and linking it to farm produce realisation.
- **Quality standardisation:**
The absence of quality standards is one of the major concerning areas in domestic and international trade of agricultural produce. Standardising the quality of the produce as well as automating the assaying process through artificial intelligence (AI) and machine learning (ML) could address some parts of the concern; the latter will also ensure quality assaying.
- **Development of alternate ways for transporting produce and logistic aggregation system:** Encouraging transport through water could optimise transportation costs. While integrated transportation by rail, road, and sea/river could result in optimal cost of transportation, the role of IT could facilitate in logistic aggregation and logistical decision support system.
- **Post-harvest management of agricultural produce:**
Post-harvest losses have been concerning in India for both agriculture and horticulture crops. The estimated economic value of post-harvest losses in India was INR 926.51 billion (USD 15.19 billion) in 2014.² Efficient post-harvest management of agricultural produce by creating a network of advanced primary processing and food handling machinery at the farmgate level, using technologies like machine vision-based cleaners and graders, could add value to the produce, reduce losses and enhance the revenue of the farming community.
- **Risk management in agriculture:**
There are multiple risks in agriculture production and trade, and there are a number of ways to manage them and integrate for better utilisation:
 - Crop insurance – managing production risk
 - Exchange -traded derivatives – price risk management and management of credit risk of crop loans
 - Contract farming – operational risk controls
 - Online trading platforms – credit risk and counterparty risk
- **Increasing the production of vegetables closer to last mile:**
Using modern farming methods like indoor vertical farming, which uses advanced technologies to grow crops, would ensure supply of fresh produce to urban consumers at better prices due to reduced intermediaries in the value chain. Being closer to consumers means less transportation, which would in turn result in low carbon emissions.

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- **Automation of farm operations:**

Automation of farm operations to tackle the scarcity of farm labour is very crucial. Established solutions are available to automate operations of large fields while more feasible and economic solutions are required to automate field operations in countries like India where the average land holding is relatively lower.

To tackle the current circumstances around the globe, all these solutions need to be implemented in an integrated way. At present all these initiatives are being implemented in silos in a geographical area or for a crop or by a start-up for a set of farmers. The real impact will be felt only by cohesive implementation of all relevant initiatives with clearly articulated scalable strategy. Agricultural e-marketplace can act as a fulcrum and integrate all the required solutions around to bring this thought to reality. Thus, helping to reduce the risks of farming and increasing farmer's income to next level.



¹ NABARD All India Rural Financial Inclusion Survey – 2016-17, Report of the Internal Working Group to Review Agricultural Credit, 13-Sep-2019

² Food loss and waste in India, The knowns and the Unknowns. (Working paper – WRI India) August 2021

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