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Market Vulnerabilities and Potential of Horticulture Crop in India

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Indian agriculture sector today stands in the midst of a horticultural revolution. Horticulture contributes 30.4 per cent of the agriculture Gross Domestic Product (GDP) using only 13.1 per cent of gross cropped area. Over the years, total horticulture production in the country has surpassed the total foodgrains production, achieving a higher production record every year. Despite all these achievements, horticulture sector is currently facing the problem of post-harvest losses, lack of storage infrastructure, price seasonality and market volatility. Urgent steps are needed to integrate and revamp horticulture production and value chain system, which will promote production of healthier and more nutritious foods and improve the income of farmers'. In the coming years, agri start-ups and Farmer Producer Organizations (FPOs) are bound to play major role in creating backward and forward linkages necessary for revamping the horticultural value chain.

In 2020-21, the production of horticultural crops has been pegged at a record 329.86 million tonnes (MT) as per the Second Advance Estimates, 2.9 per cent higher than the final estimates of 2019-20 (320.47 MT). The production of vegetables, especially tomato, onion and potato (TOP) has increased significantly over the years, making India the second largest producer of all the three vegetables in the world (Figure 1).



Note: Share of Vegetables includes Melons, Fruits excluding Melons, Cabbages include other Brassicas, Cauliflower includes Broccoli and Lemon includes Lime Status of Horticulture in India

Horticulture production in India has more than doubled from 146 MT in 2001-02 to 329.86 MT in 2020-21 whereas the production of foodgrains increased from 213 MT to 308.65 MT during the same period (Figure 2).



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Productivity in Horticulture

The National Horticulture Mission (NHM), a centrally sponsored scheme, was launched in 2005-06 with one of its major objectives to increase horticulture production and doubling farmers' income. Just before the launch of the NHM, the production of horticulture crop was about 167 MT, using only 9.7 per cent of the cropped area (18.5 million hectare); the total foodgrains production was 198 MT, covering 63 per cent (120 million hectare) of gross cropped area of the country. Horticulture has registered a sharp rebound in production and acreage, far outpacing the foodgrains production since 2012-13. The most notable factor behind this is that the productivity of horticulture has increased from 8.8 tonnes per hectare (TPH) in 2001-02 to 12.1 TPH in 2020-21. The productivity of total foodgrains increased from 1.7 TPH to 2.5 TPH during the same period. State-wise productivity is indicated in Figure 3, which shows that Gangetic plain region has better productivity than other regions.



Figures 4a and 4b highlights state-wise productivity of vegetables and fruits for the year of 2014-15 and 2020-21. It is showing that productivity of fruits and





vegetables have improved in the low productive states while high productive states are more or less stagnant. Hence, yield gap is decreasing among the states.

Issues with Horticulture Marketing

Despite, the rapid increase in horticulture production, it has not bought much optimism to the farmers. Reeling under over production, they are resorting to distress sales, burning their crop or discarding them on roads. The current market situation begs the question as to why, despite record levels of production, we have not been able to do justice to our farmers. The answer is; fragmentation, high price volatility, substantial quality and quantity losses and low levels of processing characterize horticultural crops market in India. Unlike cereals and dairy, where procurement and marketing are quite developed, a decent value chain in fruits and vegetables is missing. The reason for that lies in the perishable nature of the crops, regional and seasonal concentration, associated losses and lack of storage facilities.

Marketing of horticultural crops is quite complex and risky due to the perishable nature of the produce, seasonal production and bulkiness. The spectrum of prices from producer to consumer, which is an outcome of demand and supply transactions between various intermediaries at different levels in the marketing system, is also unique for fruits and vegetables. Moreover, the marketing arrangements at different stages also play an important role in price levels at various stages viz. from farm gate to the final consumer. These features make the marketing system of fruits and vegetables different from other agricultural commodities.

Major Issues

a) Large Post-Harvest Losses

The food loss is segmented into 3 broad categories: Production loss, post-harvest loss, and retail and consumer loss. The post-harvest period exists from the time the food is harvested till the time it reaches retails markets for consumption. Post-harvest loss of food is defined as the measured loss of quantity and quality in the harvested food commodity before it reaches the retail market.

A comparative study by the Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana ((2015), reported that about 16 per cent of fruits and vegetables are lost in the post-harvest (Figure 5). While it is important to focus on reducing food loss across different commodities, this huge gap emphasises the need to focus on reducing wastage in the fruits and vegetables sector.

Within the total vegetable crops, the post-harvest losses is significantly high among the TOP crops, which has 51 per cent share in total vegetable production. Amongst the TOP crops, the post-harvest losses are the highest in tomato (12.44%) followed by onion (8.20%) and potato (7.32%).



b) Infrastructure Availability

In India, because of imperfect coordination between supply and demand, seasonality and perishable nature of horticulture crops, storage infrastructure plays an important role in the marketing. Cold storage infrastructure is one of the most important factors in the post-harvest process because it is where the commodity is at in most of its lifetime. In India, there are around 7600 cold storages with storage capacity of 34.9 million metric tonnes (MMT) but their distribution among the states are not equitable (Figure 6). Around 59 per cent of the storage capacity (i.e. 21 MMT) is present only in the 4 states of Uttar Pradesh, West Bengal, Gujarat and Punjab. Moreover, about 75 per cent of the cold storages are dedicated only for potatoes, which signify the dearth of availability to other products while also stressing the importance of potatoes for Indian



consumers. Most of these cold storages are located very near to the production centres and thus depend heavily on transportation to reach the consumers. From a technical standpoint, a multi-commodity cold storage requires different conditions such as temperature and humidity for each commodity and there are not enough efficient systems to handle that in a cost-effective manner. This results in many of the cold storages being single commodity facilities that helps in bringing down the operational costs because of scale. Further, there is marked paucity in the availability of advanced systems that helps in increasing the shelf life of the stored commodities.

c) Prices Seasonality and Market Volatility

The Figure 7 depicts the retail price of the TOP crops in major centres across India. The prices of TOP crops depict a seasonal variation, which arises due to variations in market arrivals across seasons. Due to lack of storage and warehousing facilities, TOP crops have a short shelf life and thus we see price rises in the same months every year. This is paramount highlighted in the case of onion, where there is a constant demand for the product, but due to paucity of supply, there is a sharp rise in prices in October every year. While the seasonality and market volatility is more acute for TOP crops, it is largely true for all vegetable and fruit crops. This issue can again be largely resolved if we address the issues of post-harvest losses, create requisite storage and warehousing infrastructure and create a fully integrated supply chain.



Realising the Potential: Way Forward

It is essential, that the fruits and vegetables value chain be made market demand- driven, where the farmers do not face the problem of plenty. In order to do this, it is imperative that various kinds of losses, wastages and inefficiencies along the value chain be reduced. First step in this regard would be to minimise harvest and post-harvest losses, by bridging the storage infrastructure deficit and correcting the spatial mismatch through schemes like Kisan Rail and Krishi Udaan, etc. Second, we need to eliminate the inefficiencies in the marketing chain by considering alternate marketing models/ channels. In a typical fruits and vegetables value chain, high margins appropriated by intermediaries lead to low share of the farmer in consumers' rupee. Innovative models like Farmer Producer Organisations linking organised retail directly with farmers, farmer- consumer markets, contract farming and so on, have come up as a solution. Today, there is also an urgent need to bolster agricultural extension and accelerate the technological transmission from lab to land. It is here, that agri start-ups are bound to play a crucial role in the future. Agritech start-ups are providing relevant and innovative solutions to a number of challenges being faced across the agricultural value chain. These start-ups have become the link between the farmers, input dealers, wholesalers, retailers and consumers connecting them to each other and providing strong marketing linkages and quality produce on time thereby enhancing share of producer in consumer's rupee. Also, cultivation of horticulture crops needs to stay abreast with the emerging technology. In this context, adoption of blockchain technology, artificial intelligence, IOT, drone technology, etc. would be inevitable. Accordingly, skill development has to keep pace with these emerging technologies to ensure the necessary tech transfer from lab to land. The agri startups are envisaged to lay a crucial role in this regard.

It is also imperative that horticulture becomes a priority investment sector with greater emphasis on naturesmart horticulture. This, will go in long way in reshaping horticulture as a prime mover of economic growth providing employment, food and nutritional security and environmental services and above all availability of produce as per the needs both for domestic and export markets.

Since agriculture is a state-subject, the states play a key role in ushering in these reforms. Finally, developing markets for the farmers is also crucial in ensuring stable and profitable remuneration. To this end, efforts have to be made in earnest to develop our processing capacity and export market for both fresh and processed fruits and vegetables.

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