

Dysfunctional Horticulture Value Chains and the Need for Modern Marketing Infrastructure: The Case of Pakistan

Agriculture Sector Profile

The population of Pakistan stood at about 212 million in 2018 from 142 million in 2000.¹ About 63% of them live in the rural areas and depend on agriculture for their livelihood.² Gross per capita income continues to grow and reached \$1,580 in 2018 from \$480 in 2000 (footnote 2). The country is identified as part of the Next Eleven group which has the high potential of becoming one of the largest economies of the world in the 21st century. All these mean that the increase in demand for food, as well as a change in dietary preference for safe and nutritious food, are inevitable in the coming years. For example, domestic demand for fruits and vegetables in 2038 is projected to be about 50 million tons (MT) against a production of about 15 MT as of 2017. With Pakistan's large underground economy, actual demand will be even larger than the projections that are based on official statistics of income only.

Total agricultural land in the country is 36.8 million hectares. About 87% of total cultivated land is irrigated while the rest is rainfed. Pakistan is divided into 10 agro-climatic zones based on physiography, climate, land use, and water availability. The country produces a wide variety of fruits such as mango, citrus, apples, banana, guava, apricot, plums, dates, etc. The main vegetables include potato, onion, tomato, chili, garlic, turnip, cauliflower, peas, carrots, etc.

On average, cereal crops like wheat, rice, maize, jowar, bajra, and barley accounted for about 57% of total cultivated land during 2001–2015. During the same period, the average share of vegetables and fruits in total cultivated land was about 6%, and the remaining 37% was used by other crops including oil crops, fiber crops, sugarcane, etc. (Figure 1).

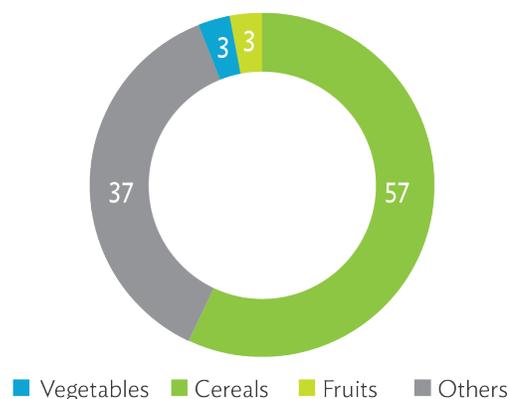
Total cereal production in the country increased to 38.34 million MT in 2016 from 25.99 million MT in 2001, registering a growth of 47.52%. More than 70% of this growth was contributed by growth in yield, while the rest was contributed by growth in cultivated land. The country produced 6.64 MT vegetables and 5.89 MT of fruits in 2001, which increased to 9.77 MT and 6.8 MT, respectively, in 2015. Yields of fruits and vegetables remain low. For example, yield of potato (in tons per hectare) in Pakistan is significantly lower compared to European countries like Belgium, the Netherlands, Spain, and Turkey; and the United States (US) (Figure 2). Overall,

growth of yield played a small role in the growth of production of fruits of vegetables during 1990–2016.³

Total production of potato, onion, and tomato was about 6.23 MT in 2015, which accounted for about 64% of quantity and about 70% of value of all vegetables produced in Pakistan. Punjab, Sindh, Khyber Pakhtunkhwa, and Balochistan provinces accounted for 83%, 1%, 9%, and 7%, respectively, of total potato production. Shares of these provinces in total tomato production were 9%, 10%, 45%, and 26%, respectively. Sindh (40%) and Balochistan (28%) led in total onion production, followed by Punjab (21%) and Khyber Pakhtunkhwa (11%).

Pakistan exports different types of fruits and vegetables. The value of the country's export of fruits and vegetables in 2016–2017 was about \$568 million. Per capita consumption of fruits and vegetables in Pakistan is low compared to Europe and America, and roughly at par with South Asian comparators like Afghanistan and Bangladesh. In 2013, per capita consumption of fruits was only about 29 kilograms (kg) in Pakistan compared to 95 kg in Europe and 105 kg in the US. Per capita consumption of vegetables was 26 kg in Pakistan compared to 115 kg in the European Union and 114 kg in the US in the same year.⁴

Figure 1: Share of Different Crops in Total Cultivated Area (%)



Sources: Authors' estimates based on data from the Agriculture Statistics of Pakistan and the Food and Agriculture Organization of the United Nations database.

¹ World Bank. Pakistan. <https://data.worldbank.org/country/pakistan?view=chart>.

² World Bank. Rural Population (% of total population). <https://data.worldbank.org/indicator/sp.rur.totl.zs>.

³ Refers to yield of tomato, apple, mango, carrot and turnip declined during this period.

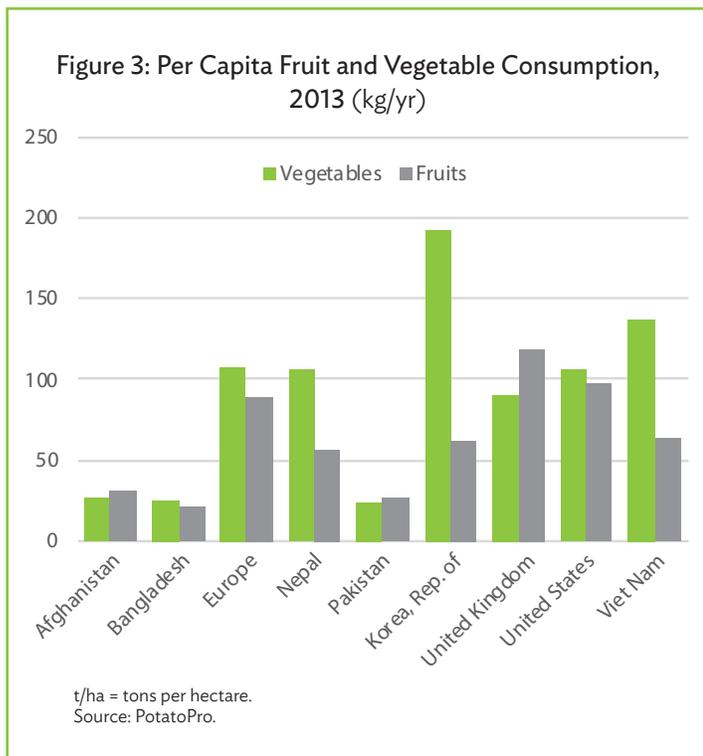
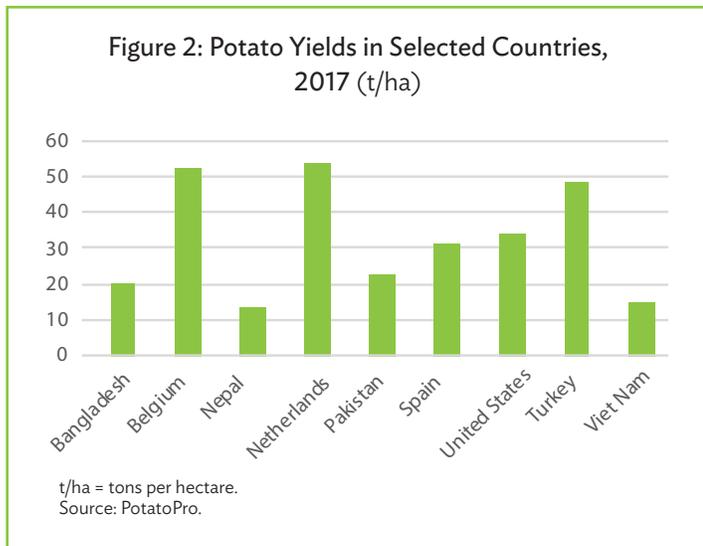
⁴ According to the Pakistan Bureau of Statistics, per capita fruit and vegetable consumption was about 33 kg and 25 kg, respectively, in 2016.

Current Horticulture Value Chain

Several players are involved in different segments of the horticulture value chain in Pakistan.

Collection and Shipment

Majority of the farmers sell their produce at wholesale markets. Most farmers contract out fruit orchards during the flowering stage to the middlemen, commission agent, and/or wholesalers who provide loans to the farmers over the course of production. Vegetables and fruits are transported by the same cart or truck from farms to the main



markets in the absence of specialized vehicles for specific products. The same vehicle is used for many other purposes including animal transportation. Recently however, reefer trucks have been introduced on a limited scale in some parts of Pakistan. In the absence of direct access of carrier vehicles to the farms, farmers gather their products in a convenient spot along the roadside for pickup. When middlemen or contractors are involved, it is their responsibility to collect and transport the produce. The unsold or unauctioned produce in one market is sent to other markets in the same locality.

Fruits and vegetables are packaged using local materials before shipment. In most cases such packaging fails to preserve the freshness and quality of the products. Another problem is absence of cooling and packaging centers, and inadequate cold storage facilities to preserve the produce at or near the wholesale markets. More than 555 cold storage units have been identified in Pakistan with about 0.9 million MT storage capacity, against more than 15 million MT of production of fruits and vegetables. There are no available cooling and packaging houses, and cold storage facilities close to the farms that can be used by the producers.

Negative Impacts of the Current Value Chain

The negative impacts of the current value chain can be assessed in terms of the low share of farmers in consumer prices. Usually producers get 15% to 20% of the retail price. Production of perishables like potato, onion and tomato suffers from a major setback every 3–4 years. Usually two or three good harvests are followed by a bad harvest. Besides, natural factors like unfavorable weather also negatively affect production. Producers do not get price dividends when production is low, shooting the retail price. Benefits of high retail prices are disproportionately expropriated by the middlemen. When there is a market glut where perishables and their prices fall, producers suffer as their share in retail prices also falls significantly. Sometimes producers throw away their perishable produce to protest their low prices. It emerged from discussions with the traders in Badami Bagh Ravi Link wholesale market that producers' share in retail prices is inversely related with the perishability of the crop.

Both seasonal and spatial price fluctuations of fruits and vegetables are high in Pakistan. For instance, in 2017, the price of 100 kg of tomato in Lahore fluctuated between 1,450 Pakistan rupees (PRs) to PRs13,150, or more than 800%. In the same year, price fluctuation for fresh potato was between PRs1,550 to PRs4,300 for 100 kg, or 177%. The annual cost of price fluctuations of fruits and vegetables is estimated to be about \$825 million.

Postharvest losses in fruits and vegetables due to mishandling of the perishable product, poor transportation, and inadequate storage facilities and market infrastructure account for about 30%–40% of total production. The annual value of postharvest losses of potato, tomato, peas, cauliflowers, carrots, turnip, radish, brinjal, squash, okra, onion, grapes, and mango in Balochistan, Khyber Pakhtunkhwa, Punjab, and Sindh, valued at the respective 2016 provincial wholesale prices, is about \$700 million to \$934 million. An alternative estimate suggests that a reduction of around 75% of the current postharvest loss, when valued at export premium prices, would be equivalent to an annual saving of approximately \$1.13 billion.

Due to low economies of scale, lack of synergies and collaboration among traders, high loading and unloading time, and high

transportation cost, overall marketing cost is very high. A reduction of marketing cost by \$0.025 per kilogram would save about \$55 million annually in the Ravi Link wholesale market in Lahore. It is difficult to comply with food safety, sanitary, and phytosanitary standards with the current value chain. The income and corporate tax revenues foregone due to the current value chain and marketing structure are also potentially high.

Current Situation of the Main Wholesale Markets in Lahore

The situation of four wholesale markets located in Lahore were analyzed, namely, (i) Badami Bagh Ravi Link, (ii) Akbari Mandi, (iii) a fish market at Urdu bazaar, and (iv) a flower market in Sughian Pul Shekhopura Road. The key findings are as follows.

Physical Limitations

The main problem is inadequate space for activities, forcing the commission agents and wholesalers to operate in open spaces with consequent spoilage. The average size of stalls is about 16 square meters only, which makes sorting, grading, and display of products difficult. Most of the corridors and offices in the premises have little active ventilation as required by international standards. There are no sewerage networks and treatment plants. Toilets are inadequate and the existing ones are unhygienic. The water supply is not sufficient, and its distribution network is inefficient for not having suction cups, drain valves, and fire hydrants. Entrances and exits are directly linked to the main road, making traffic movement cumbersome.

Managerial Limitations

The current set-up of the wholesale market is too interventionist. This impedes revenue collection. Consequently, the market is underfunded, especially for repairs and maintenance, as well as waste management. The current market rules do not specify the responsibilities of the management of the market, and the service provided by the management to the traders is of poor quality. The shared responsibilities of different actors within the management are not well-coordinated. There is no ostensible transparency and accountability in the operation. No price information is made available for buyers and sellers. As to ensuring food safety, there are no policies implemented nor actions taken, and products of different qualities are sold together.

Poor Peripheral Infrastructure

Parking areas of the markets are small, insecure, and haphazardly managed. The loading and unloading docks are poorly designed. The waste management system outside the market is missing and/or ineffective. Exterior lighting needs to be fully shielded and directed downward to prevent off-site glare. The markets are totally unfenced. No cold storage is available in the vicinity of the market forcing the wholesalers to have their own cold rooms in the market. Refrigerated transport for fresh products is yet to be introduced, especially for shipment to other districts or provinces.

Auxiliary Services

There are no fire-fighting systems nor hose cabinets in the main building. Installation of bins in all pedestrian routes is required. The telecommunication system is outdated, and a wireless data communications system should be installed throughout the market building. Maintenance of roads, buildings, lighting, and other utilities is poor and needs a new model of management.

Financial Management

A market committee manages the financial affairs of the public markets. Currently, there are 94 employees working in the Ravi Link Road fruit and vegetable wholesale market. Revenues of the public markets come mainly from licensing fees. The flower and fish markets are privately owned, and the owners collect the fees from traders.

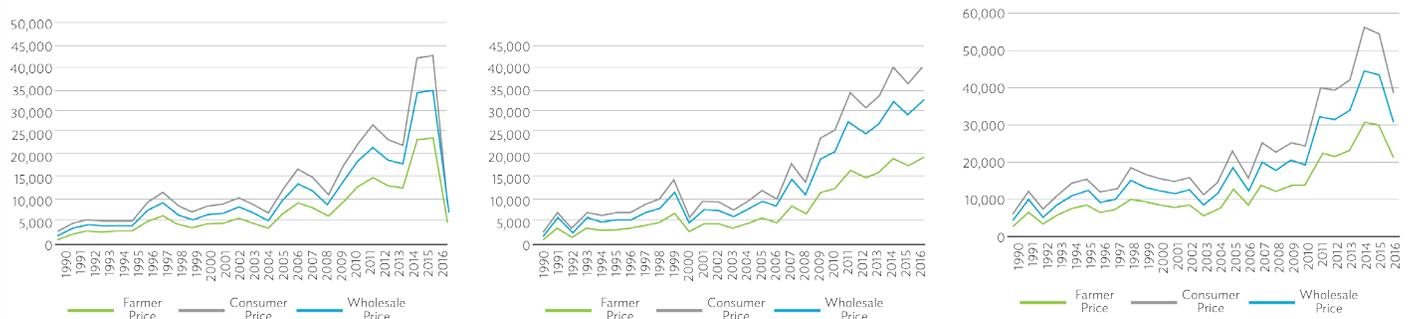
Recommendations

Based on the above analysis, a number of short- and long-term recommendations to improve existing wholesale markets and construct new ones are in order.

Short-Term Measures

Although several problems are hindering the business activities in the wholesale markets, three areas for immediate action are to be prioritized, as gleaned from the visits and in consultation with the traders operating in the markets. One, action is needed to address the poor drainage system of the markets that results in flooding and local ponding on the floor. Two, the traders and management identified introduction of a new waste management system. Missing and/or poor waste management systems need to be corrected, as these result not only in an unhygienic environment, but also affects

Figure 4: Fluctuations in Prices of Potato, Onion, and Tomato, 1990–2016 (\$/ton)



Source: Pakistan Bureau of Statistics.



Ravi Link Market, Lahore. Lack of adequate infrastructure forces traders to operate under the sky (photo by ADB).

the operation of the market. Three, given the huge traffic congestion in Lahore that makes entry and exit very difficult, better management of existing infrastructure by enacting regulation and introducing number-coded zoning in the short run are highly warranted, especially as construction of new infrastructure would take time.

Long-Term Measures

The existing wholesale markets need to be relocated, preferably in the outskirts of the city of Lahore, while maintaining the retail activities in the current locations. The new wholesale market should also trade fruits, vegetables, meat, fish, and dairy products so that all necessary products can be traded under one roof to ensure economies of scale and compliance with food safety standards. The new wholesale markets would also offer services like phytosanitary inspections, certifications, traceability, laboratory examination, e-auction, banking, catering and restaurants, accommodation, price information, and others. The rents and charges of the new wholesale markets should be competitive to provide sufficient incentives for commission agents, wholesalers, and other potential tenants to use the market facilities; and to be able to repay the capital cost incurred to build it.

Along with the construction of modern wholesale markets in the outskirts of big cities, an effective production and marketing architecture has to be set up in the country. In this regard, collection centers around the production areas in the cold chain and other agri-logistics have to be developed in the hinterlands. Depending on the need of the locality, some of these centers can work as terminal markets while others can specialize and serve the function of an assembly market. These centers will also require organized transports to carry the goods from the farms. Considering the strong seasonal nature and diverse quality of production, these centers should also provide spaces for sorting, cleaning, grading, packaging, and storage. Site selection and space requirements for different postharvest management and handling practices need to be carefully studied under a master plan.

There is a dearth of reliable and timely data on production in Pakistan making it hard for government to undertake effective actions related to export, import, public procurement of crops, or provision of advisory services to farmers to stabilize agricultural prices. Therefore, a national agriculture production information system needs to be established to provide big data on production and prices using frontier technologies as used in developed countries.



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In this brief, "PRs" refers to Pakistan rupees and "\$" refers to United States dollars.

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