

Jahan, Sheikh Morshed

**Working Paper**

## Food loss in international trade in the Asia-Pacific region: Country case study on Bangladesh

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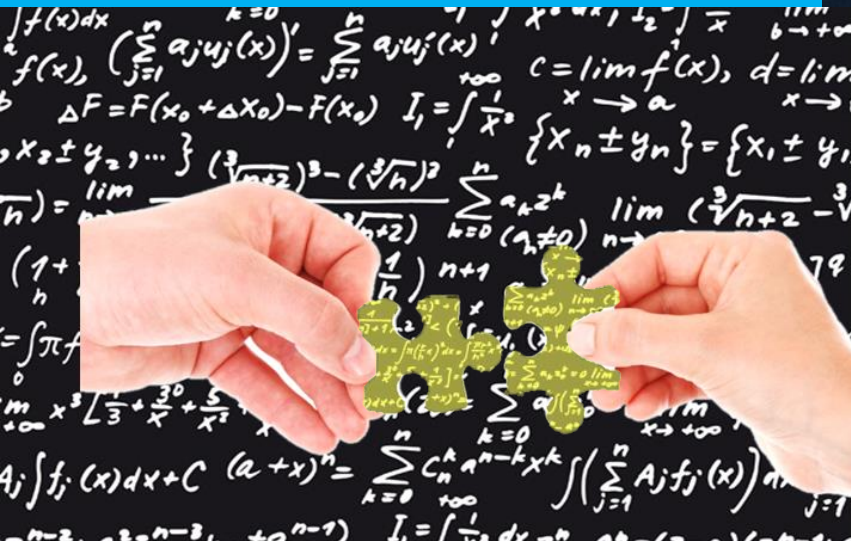
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# Food Loss in International Trade in the Asia-Pacific Region: Country Case Study on Bangladesh



Sheikh Morshed Jahan

ASIA-PACIFIC RESEARCH AND TRAINING NETWORK ON TRADE

# Working Paper

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ASIA-PACIFIC RESEARCH AND TRAINING NETWORK ON TRADE

# WORKING PAPER

## **Food Loss in International Trade in the Asia-Pacific Region: Country Case Study on Bangladesh**

Sheikh Morshed Jahan<sup>1</sup>

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## **Abstract**

The global food supply chain experiences a loss of approximately one-third of the food produced, making food loss in international trade a significant threat to food and nutrition security and economic loss. Bangladesh, a major producer of vegetables and fruits, faces constraints such as post-harvest management, inadequate transportation and storage facilities, limited access to quality seeds, and stringent quality standards imposed by importing countries. The country also faces non-tariff measures and other obstacles to trade, with the agri-food products sector being the most affected. The lack of cold storage systems and specialized transportation facilities, inadequate port facilities, and weak trade governance are the main causes of food loss in the fruit and vegetable trade. Good agricultural practices, post-harvest management practices, and value chain efficiencies are lacking, resulting in a significant amount of food loss. To mitigate food loss, compliance with good agricultural practices and SPS measures, effective post-harvest practices, and a vapor heat treatment facility, packaging, and cool chain are essential. The government of Bangladesh should also incentivize private sector investment, ease regulatory requirements, and develop a cohesive export-oriented institutional ecosystem to reduce food loss in international trade.

**Keywords:** food loss; non-tariff measures (NTMs); border rejections; Asia-Pacific

**JEL Codes:** F14, Q22

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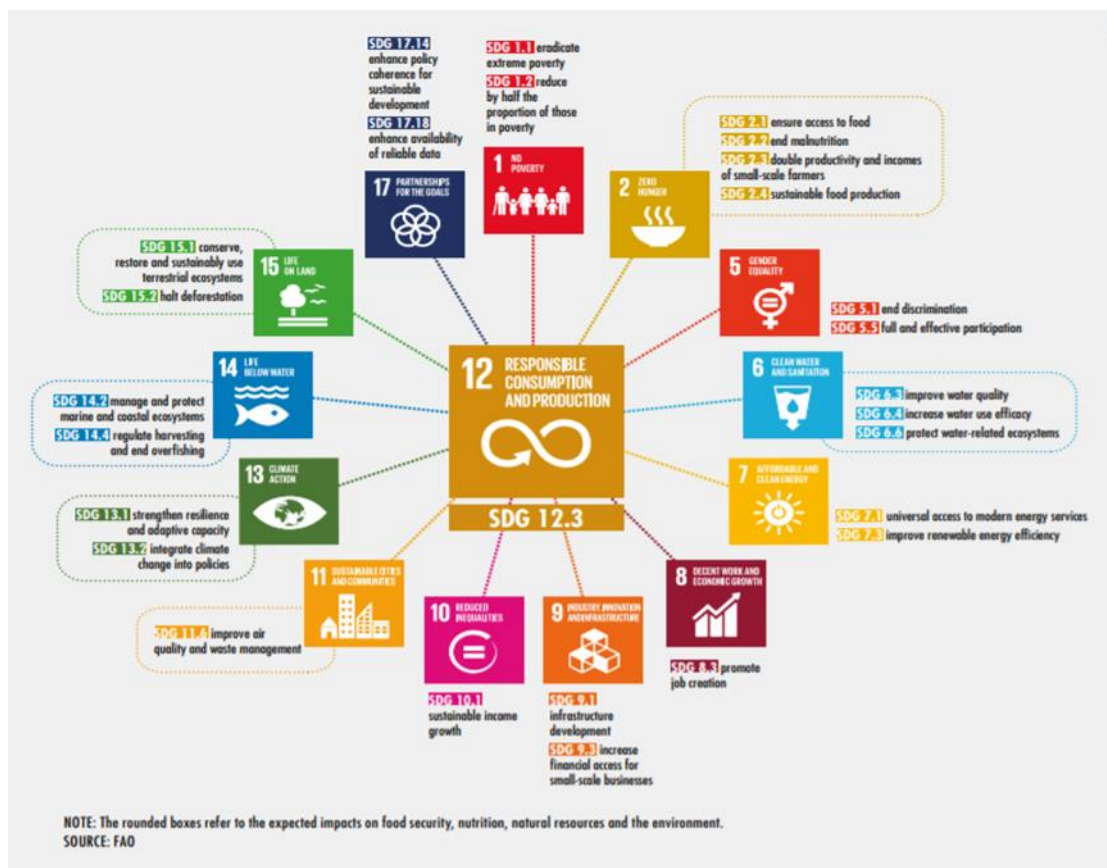
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# 1. Introduction

Approximately one third of food produced globally is lost along the food supply chain, from the production stage to the final consumption stage (Gustavsson and others, 2011). Sustainable Development Goal 12 targets reducing per capita global food waste by half by cutting losses during production and the post-harvest stage and along the supply chains. It also focuses on the environment, specifically, appropriate management of harmful chemicals and wastes to “significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment”. According to the Food and Agriculture Organization (FAO), 14 of the 17 Sustainable Development Goals are connected to food loss and waste, with responsible consumption and production, with it being the main focus of Goal 12 (figure 1).

**Figure 1: Sustainable Development Goals – Food loss**



Food loss in international trade, particularly in the post-harvest stage and marketing and distribution value segments, threatens national and global food and nutrition security and causes economic loss to farmers and market actors along agri-food value chains. Recent studies conducted by the Economic and Social Commission for Asia and the Pacific (ESCAP) indicate that border rejections (due to non-compliance with national standards),

non-tariff measures (NTMs), and domestic procedural obstacles are some of the root causes of food loss in international trade.

This implies that there are opportunities to reduce food loss, such losses related to perishable commodities by removing obstacles along the agri-food value chains spanning from the farm to the fork. Accordingly, unearthing the causes of food loss in international trade and crafting innovative solutions to reduce the losses deserve front-burner policy attention.

In Bangladesh, agriculture is the dominant sector, with farming being the main occupation: 37 per cent of the country's population of 170 million are involved in agriculture (BBS, 2019)<sup>2</sup> – for subsistence and commercial purposes. Bangladesh is one of the top 10 global producers of vegetables, such as potatoes, and tropical fruits, such as mangoes. Despite this, the country's participation in international trade in agri-food is very limited.

Although Bangladesh is the seventh largest producers of mangoes in the world (2021), the country has yet to capitalize on related international trade opportunities despite high international demand and some highly talked about programmatic interventions targeting the mango value chain. Similarly, Bangladesh produced 11 million metric tonnes of potatoes in 2021, against domestic demand of 8.5 to 9.0 million metric tonnes.

### ***About this study:***

The objective of this study is to explore the agri-food export performance of Bangladesh, discuss trade preferences that Bangladesh enjoys, investigate the reasons behind the country's food loss and suboptimal trade performance, and provide evidence-based practical recommendations to improve the country's trade in agri-food and reduce food loss in trade. To do this, the focus of the study is on horticultural crops (fresh fruits and vegetables) in general, while highlighting mangoes.

For this study, a desk review of existing literature, databases, web resources, and primary data, collected through key informant interviews (KIIs) and meetings involving major stakeholders from the country's horticulture trade ecosystem were used. Among the stakeholders who participated in the study are leading exporters and importers, service providers, top-tier representatives and professionals of import and export associations, relevant government officials, senior agricultural extension professionals and leading export facilitation experts.

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<sup>2</sup> Statistical Yearbook Bangladesh 2019 (no date). BANGLADESH BUREAU OF STATISTICS (BBS). Available at: [http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b2db8758\\_8497\\_412c\\_a9ec\\_6bb299f8b3ab/2020-09-17-15-30-d0e641b2e659019f2aa44cbaf628caa8.pdf](http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/b2db8758_8497_412c_a9ec_6bb299f8b3ab/2020-09-17-15-30-d0e641b2e659019f2aa44cbaf628caa8.pdf) (Accessed: March 31, 2023).

## 2. Literature review

The world produced 1.84 billion tons of fruits and vegetables in 2019, according to the latest report of FAO. Approximately 30 to 40 percent of these fruits and vegetables are lost in different stages after harvesting.

Global trade patterns of fruits and vegetables change more rapidly than for most other products. Huang (2004) suggests that the global trade flow of fruits and vegetables are controlled by several factors, including, among them, climate, geographical proximity, trading arrangements, and historical and political arrangements. In addition, extra regional trade has been gradually becoming more significant than intraregional trade. The countercyclical seasons of different hemispheres has boosted the change in trade patterns, prominently in the case of North-South trading. Global fruits and vegetables trade has become diverse over the years. A study by Scheelbeek and others (2020) has shown that, the diversity in the international trade of fruits and vegetables has increased over the past 27 years. The rise of trade in tropical fruits was distinct, while there was a noteworthy decrease in the trade of traditional vegetables. A CRS study has listed several factors that are responsible for the change of global fruit and vegetables trade patterns. Among them are increased competition, tariffs, trade barriers, counter-seasonal supplies and market factors such as exchange rate fluctuations.

Losses in fruits and vegetables is a common scenario in international trade due to various challenges in these sectors. According to FAO<sup>3</sup>, among all the types of foods, fruits and vegetables constitute the highest category of losses, and approximately 60 percent of them are lost throughout the whole supply chain in trade.

Several challenges related to trade of fruits and vegetables persist. A natural challenge in this trade flow is perishability (Huang, 2004). Transporting fruits and vegetables over long distances is a major cause of food loss. Some fruits and vegetables have longer shelf lives and low-cost transport arrangements are sufficient to ship them. On the contrary, for some premium fruits, expensive air cargo is required to transport them because of their highly perishable nature. The medium used to transport fruits and vegetables depends on different factors, including, among them, perishability, value and distance of the transportation (Harris, 1988)<sup>4</sup>. In case of landlocked countries, such as Afghanistan, high transportation costs affect the trade of fruits and vegetables, and frequent customs and transport delays often lead to the wastage of partial or full shipment of them. Research conducted by the United States Trade Representative suggests that the international trade of fruits and vegetables faces unique challenges due to the small window of optimum freshness and the unpredictable nature of the demand. Apart from

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<sup>3</sup> Gustavsson, J. & Food and Agriculture Organization of the United Nations. (2011). Global Food Losses and Food Waste. Food and Agriculture Organization of the United Nations.

The food loss in case of fresh fruits and vegetables in all the regions (Except Europe) is greater than 50% and close to 60%.

<sup>4</sup>[http://www.cd3wdproject.org/INPHO/VLIBRARY/X0014E/X0014E08.HTM#6.%20ON%20THE%20HOVE%20\\_%20TRANSPORTATION%20OF%20FRESH%20PRODUCE](http://www.cd3wdproject.org/INPHO/VLIBRARY/X0014E/X0014E08.HTM#6.%20ON%20THE%20HOVE%20_%20TRANSPORTATION%20OF%20FRESH%20PRODUCE)

all these challenges, high instability in exports sometimes leads to negative impacts on the exports of fruits and vegetables (Office of the United States Trade Representative, United States Department of Agriculture and United States Department of Commerce 2020). (Goyal and Gupta (2009). Elik and others (2019) has proposed two different reasons for losses<sup>5</sup> in the fruit and vegetable international trade. They suggest that the poor condition of infrastructures, such as transportation, technologies and storage systems are the main causes of fresh fruits and vegetables losses in international trade. On the other hand, the causes of the losses in developed country is mainly associated with the demand side.

The Covid-19 pandemic has also created significant implications for the international trade of fruits and vegetables. A study by the Organization for Economic Co-operation and Development (OECD)<sup>6</sup> listed several factors for the increased food loss in international trade in fresh fruits and vegetables due to the pandemic, including, among them, transportations delay due to restrictions and a devastated supply chain resulting from flight cancellations, fatigue and stress.<sup>7</sup> The study focused on the significance of internationally agreed and recognized protocols to avoid the loss of fruits and vegetables during the pandemic.

The complex nature of the import and export procedures also contributes towards the losses in the fruits and vegetables trade. According to Karim and others (2011), the main barriers for Bangladesh in carrying out fruits and vegetables trade internationally are the high costs of logistics and transportation, and marketing costs. Among the transportation costs, air freight costs tend to be the highest. Meanwhile, regulatory control over the market is not so strong which is one of the main barriers in the trade of fresh fruits and vegetables. A significant bottleneck in the vegetable supply chain in Bangladesh is the poor condition of storage facilities (Rahman and Pandey, 2015). Use of different chemicals instead of a proper storage system keeps the country from reaching it's true potential in exporting fruits and vegetables to countries with stringent quality inspection systems. Approximately 30-40 per cent of the fresh agroproducts get spoiled throughout the whole value chain due to inefficient post-harvest management and issues related to poor transportation systems, packaging and storage facilities (Jahan, Ahmet and Morshed (2019).

The large amount of losses in the fruit and vegetables also generates wastes along the whole supply chain. The amount of waste material generated at the retail level is primarily from the fruits and vegetables. (Scholz, Eriksson and Stridl and others, 2015). According to research conducted by Brancoli and others, (2017), approximately 29 per cent of the wasted foods at the retail level are generated from the fruits and vegetables. In 2008,

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<sup>5</sup> <https://ustr.gov/sites/default/files/files/reports/2020/ReportSeasonalPerishableProductsUSCommerce.pdf>

<sup>6</sup> *Evaluation of the Impact of the Coronavirus (COVID-19) on Fruit and Vegetables Trade* (no date). Trade and Agriculture Directorate Committee for Agriculture, OECD. Available at: <https://www.oecd.org/agriculture/fruit-vegetables/oecd-COVID-19-impact-on-fruit-and-vegetables-trade.pdf> (Accessed: March 31, 2023).

<sup>7</sup> Fatigue and stress are an issue. In the past, some trucks would have two drivers depending on the distance, allowing them to take turns driving. At present, social distancing requires there be only one driver at all times <https://www.oecd.org/agriculture/fruit-vegetables/oecd-COVID-19-impact-on-fruit-and-vegetables-trade.pdf>

Fruits and vegetables accounted for 26 per cent of the total value of food loss in the United States of America. (Buzby and Hyman, 2012). They also account for approximately 46 per cent of the total loss of the carbon footprint (Scholz Eriksson and Stridl, 2015)<sup>8</sup>. Arvanitoyannis and Varzakas (2002)<sup>9</sup> found in their study the effect of the wastes generated from fruits and vegetables that the lost and wasted fruits and vegetables created a significant impact on the environment through the degradation of them in the municipal landfills. According to a study conducted by Gowe (2015)<sup>10</sup>, due to the increased demand of processed and packed foods, waste from fruits and vegetables has increased over the past 25 years. In addition, adverse economic effects are associated with the high transportation and disposal costs of the wastes from fruits and vegetables. (Bello and others, 2018).

Reducing the losses is one of the most significant aspects of the international fruits and vegetables trade. As the challenges are severe to some extent, the remedies are multidimensional. The losses can be minimized by taking some precautions when controlling temperature in the storage, transport and packaging of the goods. (Ahmad and Siddiqui., 2015). A recent study conducted by FAO highlighted the significance of strengthening the supply chain of fruits and vegetables to reduce losses and wastes. It stressed the strategy of providing assistance to the farmers to link them with the buyers directly. In addition, it was suggested in the study that public and private entities increase their investment in such areas as the transportation, packaging, processing and infrastructure related to fruits and vegetables to mitigate the possibilities of the spoilage.<sup>11</sup> According to Khoury, Jarvis and Jones, (2020) investments in efficiency focused on technologies and a stable transport system would boost the fruits and vegetables supply chain by incorporating resilience into the whole international fruits and vegetables trade system.

Packaging is one of the most significant factors to combat the perishability of the fruits and vegetables in international trade. A large portion of fruit and vegetable losses that occur while they are being transported is the result of improper packaging and the low quality of the packaging materials. Kitinoja and Alhassan (2012) conducted a study on the packaging used in transportation in South Asia and in the sub-Saharan countries. They found that improper packaging materials, such as open baskets, large sacks and cloth bundles were used in packaging and a significant portion has no packaging at all.

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<sup>8</sup> The fruit & vegetable department contributed 85% of the wasted mass and 46% of the total wastage CF. Scholz, K., Eriksson, M. and Strid, I. (2015) "Carbon footprint of Supermarket Food Waste," *Resources, Conservation and Recycling*, 94, pp. 56–65. Available at: <https://doi.org/10.1016/j.resconrec.2014.11.016>

<sup>9</sup> Arvanitoyannis, I.S. and Varzakas, T.H. (2008) "Vegetable waste treatment: Comparison and critical presentation of methodologies," *Critical Reviews in Food Science and Nutrition*, 48(3), pp. 205–247. Available at: <https://doi.org/10.1080/10408390701279798>

<sup>10</sup> Kuyu, Chala. (2015). Review on Potential Use of Fruit and Vegetables By-Products as A Valuable Source of Natural Food Additives. IISTE-Food Science and Quality Management. Vol.45. 47-61.

<sup>11</sup>Global Initiative on Food Loss and Waste Reduction (no date). Available at: <https://www.fao.org/3/i4068e/i4068e.pdf> (Accessed: March 31, 2023).

Food Loss and Waste in the Food Supply Chain (no date). Available at: <https://www.fao.org/3/bt300e/bt300e.pdf> (Accessed: March 31, 2023).

As a result, the losses of fruits and vegetables are quite large in these regions in the transportation phase of a trade. In a study conducted by Verma (2000), the main focus was on the role of packaging in reducing the loss in the international trade of fruits and vegetables. The result of the study indicates that improved packaging can significantly reduce the perishability and associated loss and wastages in international trade of fruits and vegetables. A significant portion of fruits and vegetables losses occur during the loading and unloading processes in international trade. Due to the lack of skills and carelessness of the people associated with the loading and unloading operation, mechanical damages cost large amounts of losses and wastes. (Azabağaoğlu, 2018)

A good storage system can play a significant role in the loss reduction in fruit and vegetables trade. Parfitt, Barthel and Macnaughton (2010) argue that quick freezing ensures a reduction in loss and wastage by extending the shelf lives of the perishable commodities. They described how many supply chain-related issues associated with food losses and wastes can be eliminated in properly frozen foods. The global supply chain of perishable foods has evolved with the help of improved freezing procedures, and the amount of loss and wastes has decreased by a great margin due to the innovative technologies for frozen foods. Research carried out by Shove and Southerton (2000) supports freezing within the “clean labelled” label and provides greater control in home conditions. This “clean label” trend has been widely introduced in the retail sectors recently to ensure freshness and safe health conditions (Asioli and others, 2017).

Proper regulations and codes and the strict application of them is critical to control losses and wastes in the food and vegetables trade. According to ECE (n.d.)<sup>12</sup>, a code of good practice would go a long way to ensure the quality of fresh fruits and vegetables to reduce losses. A main part of the study is an outline of some necessary steps required to be incorporated into the different stages of the supply chain of fruits and vegetables. The importance of improved communication among the different stakeholders along the whole fruits and vegetables supply chain to reduce the losses and wastes is also stressed in the code. Additionally, under the code, the measurement and notification process which gives the companies proper feedback frequently is called for. The objectives of the code of good practice are aligned with Sustainable Development Goal target 12.3 to halve food losses and wastes by 2030. Research conducted by Mason-D’Croz and others (2019) was intended to quantify the gaps in the supply chain of fruits and vegetables. The results of the research indicates that systematic public policies and thoughtful investments in developing innovative technologies can play a significant role in mitigating the losses in the international trade of the fruits and vegetables.

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<sup>12</sup> Redefining the Food Loss Challenge for Sustainable Impact: Prevent | Reuse | Repurpose| Redistribute (no date). Available at: <https://unece.org/trade/wp7/food-loss-and-waste> (Accessed: March 31, 2023).

### 3. Trade in Mangoes

The mango is one of the most popular fruits in the world. The mango tree is the national tree of Bangladesh, and mango is the national fruit of India, Pakistan and the Philippines. Thakor (2018) analysed the trend and scenario of mango exports around the world and found that approximately 50 per cent of the total tropical fruits produced are that fruit. Mangoes are grown commercially in more than 80 countries worldwide. India is the primary producer, accounting for more than 40 percent of the total production. In spite of being quite common in tropical regions, trading of mangoes did not flourish until the 1960s (Mitra, 2016). Mango exports have increased significantly in recent years, by approximately 2.6 times in recent decades. According to a report by FAO (2013), mango trade has increased to 1,656,000 tonnes in 2013.

Mexico, Thailand, Pakistan and India have recorded noteworthy increases in the mango trade. India, Thailand, Brazil, Peru, Netherlands and Pakistan are the leading exporters of mangoes. Saudi Arabia, the United Arab Emirates, the United Kingdom of Great Britain and Northern Ireland and the United States of America the main importers of mango. Mexico exports the highest, (17.78 percent) with respect to its total production (Thakor, 2018).

#### 3.1 Thailand

Thailand is the leading exporter of mango. In 2020, the country was ranked eighth in terms of mango production (Tridge, 2021). But, in terms of export quantity, it was ranked number one with 15.25 per cent the export share. Thailand exports mangoes to a many economies including, among them, Australia; China; Japan; New Zealand; Republic of Korea; Singapore; United States, Hong Kong, China; and the Middle East. The major exported mango varieties are Nam Dok Mai No.4, Nam Dok Mai Si Thong and Mahachanok. (Suthikul, 2011)<sup>13</sup>

Thailand is major exporter of mangoes due to different factors, including, among them, geographical advantages in the production of the fruit; adoption of good production and post-harvest technologies, off season production using soil drench, use of vapor heat treatment, bagging techniques, special pruning techniques, and efficient cultivars. The most important catalyst driving the export of mangoes is the introduction of a cluster farming strategy to coordinate farmers in an efficient manner with assistance from the Thailand Department of Agriculture, the Thailand Department of Agriculture Extension, exporters, agro-chemical companies and other stakeholders. (Chomchalow and Songkhla, 2008). Thailand has also developed a strict standard for the export of mangoes and has ensured proper compliance with this standard to maintain the quality of the fruit. The appearance, size, pest infestation, classification, quality tolerances, size tolerances, uniformity, packaging, marking and labelling, analysis, sampling and every

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<sup>13</sup> Suthikul, K. (2011) Development initiatives on mango quality and marketing in Thailand. Available at: [https://unece.org/DAM/trade/agr/promotion/2011\\_Thailand/MangoQualityAndMarketing\\_Thailand\\_Kanjana.pdf](https://unece.org/DAM/trade/agr/promotion/2011_Thailand/MangoQualityAndMarketing_Thailand_Kanjana.pdf) (Accessed: March 31, 2023).

other aspect of mango exports has been codified into this standard and the stakeholders are strictly monitored to ensure compliance with these standards. (TAS, 2003)<sup>14</sup>

The geographical location and climatic condition of Thailand makes the country very suitable for producing and exporting mangoes. Due to the regional tropical climate and the land resources of Thailand, most tropical fruits can be harvested throughout the year. The country's tropical heat is conducive to mango production. The mango trees also grow in lower-grade soil in comparison to other fruits and only takes four to five months from the flowering to become ripe mangoes (Thaiger, 2019)<sup>15</sup>. The Government is also production friendly and has adopted policies for the application of agricultural science and technologies in the production process. The Government has also invested in infrastructures like cold room and hot water dip equipment etc. (Bunsiri, 2016)<sup>16</sup>. Thailand has a good logistic system too. Thai fruits are easily exported to China and other countries by different routes including land, air and sea. These transportation routes enable the exporters to transport the fruits in less time with lower cost while the freshness of the fruits remains intact. Thailand has good marketing strategies. The National Research Council of Thailand has conducted an integrated research program realizing the significance of branding and marketing of the export-oriented mangoes (Pongpanich and Phitya-isarakul, 2008)<sup>17</sup>.

Thailand has created an effective market through the China-ASEAN Fruit expo. It also participates in high-quality fruits expos, such as the Shanghai World Expo.<sup>18</sup> It also has established an export fruit promotion network in China to promote Thai fruits in the large Chinese market and organizes promotional campaigns, such as the "Thai fruit golden month" to promote the export of Mango and other fruits. Additionally, Thailand has become very successful in creating effective new channels, and the foreign online trading platforms have boosted the mango exports. Thailand has also developed a quality management model for exporting mangoes, which is very beneficial to track the compliance of the recommendations by different stakeholders, including producers, collectors, exporters and facilitators. As a result, the tasks and recommendations are smoothly implemented through a joint effort involving Thai Mango Growers Association, exporters, chemical and pesticide companies, the Department of Agricultural Extension and, the Department of Agriculture, among others (Sangudom and others, 2019).<sup>19</sup> Thailand is also a beneficiary of tariff cuts implemented by China'. This has boosted Thai

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<sup>14</sup> National Bureau of Agricultural Commodity and Food Standards Ministry of Agriculture and Cooperatives. (2003). THAI AGRICULTURAL STANDARD. Royal Gazette Vol.120 Section 145D.

<sup>15</sup> For the love of mangoes. (2019, April 26). Thaiger. Retrieved March 12, 2022, from <https://thethaiger.com/thai-life/well-being/for-the-love-of-mangoes>

<sup>16</sup> Bunsiri, A. (2016, November 29). EXPORT MANGO FROM THAILAND [Slides]. UNESCAP. [https://www.unescap.org/sites/default/files/5.1%20Export%20of%20Mango%20from%20Thailand%2C%20Chachen%20gsao%20Mango%20Cooperative\\_Ms.%20Bunsiri\\_Kasetsart.pdf](https://www.unescap.org/sites/default/files/5.1%20Export%20of%20Mango%20from%20Thailand%2C%20Chachen%20gsao%20Mango%20Cooperative_Ms.%20Bunsiri_Kasetsart.pdf)

<sup>17</sup> Pongpanich, C., & Phitya-Isarakul, P. (2008). Enhancing the Competitiveness of Thai Fruit Exports: An Empirical Study in China. *Contemporary Management Research*, 4(1). <https://doi.org/10.7903/cmr.708>

<sup>18</sup> Sangudom, T., Wattanawan, C., Makkumrai, W., Chatbanyong, R., & Tongtao, S. (2019). Improvement on the supply chain of Thai mango for exporting. *Acta Horticulturae*, 1244, 209–214. <https://doi.org/10.17660/actahortic.2019.1244.31>

<sup>19</sup> Sangudom, T., Wattanawan, C., Makkumrai, W., Chatbanyong, R., & Tongtao, S. (2019). Improvement on the supply chain of Thai mango for exporting. *Acta Horticulturae*, 1244, 209–214. <https://doi.org/10.17660/actahortic.2019.1244.31>



fruit exports as Chinese consumers are attracted by the low cost of Thai fruits. The country has also entered into zero-tariff free trade agreements on fruits and vegetables with China. As a result, exports of Thai fruits have risen significantly due to the reduction of the complexities related to custom procedures and import tariffs. The transport of Thai fruit has also been facilitated by the development of the domestic transportation of its neighbouring countries (Pongpanich and Phitya-isarakul, 2008).<sup>20</sup>

Thai mango exporters also face bottlenecks and challenges. The main problem is the inefficiency of the distribution channels. Thailand mainly ships their fruits to Guangzhou and Hong Kong, China, while the large city markets in places, such as Beijing and Tianjin, are still untapped. Some of the farmers are not efficient in using science and technology and prefer traditional methods. As a result, the yield and quality has not been increased to the actual potential (Jiamin, 2019).<sup>21</sup>

Recently, Thailand has been facing strong challenges from Malaysia, the Philippines and Viet Nam, in the export of fruits. Despite the bottlenecks, mango exports from Thailand are expected to increase at a higher rate on the back of policies adopted by the Government, including the signing of foreign trade agreements with different countries, the establishment of the “One Stop Service Center” and other strategic moves. Going forward, Thailand has great potential to boost mango exports.

### **3.2 Pakistan**

Pakistan is also a major mango-exporting country. According to a report by FAO (2018)<sup>22</sup>, Pakistan is ranked number seven in terms of mango exports after Mexico, India, Thailand, Peru, Brazil and the Netherlands<sup>23</sup>. Mangoes from Pakistan are exported to more than 60 countries around the world (Badar, 2015). A low export price for mangoes is offered mainly due to, for example, the fruit’s short shelf life, fruit fly infestation, poor quality, non-compliance with the standards and poor packaging. (Mazhar and others, 2010; Jabbar and others , 2011; Badar, 2015).

Pakistan is emerging as a new force in the mango export market. Ayyaz, Bonney and Akmal (2019) indicated that, Pakistan held a comparative advantage against its competitors in the export of the fruit, except with the Philippines and Thailand. They also opined that, in spite of having a comparative advantage, Pakistan needs to address a number of issues, including, among them, food safety and sanitary and phytosanitary (SPS) restrictions, to maintain its strong position. Research conducted by Mustafa and Gafoor (2004) identified the strict grading and standardization norms adopted by the

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<sup>20</sup> Pongpanich, C., & Phitya-Isarakul, P. (2008). Enhancing the Competitiveness of Thai Fruit Exports: An Empirical Study in China. *Contemporary Management Research*, 4(1). <https://doi.org/10.7903/cmr.708>

<sup>21</sup> Jiamin, L. (2019). *Research on Competitiveness of Export Trade and Strategy of Thai Mango*. Siam University.

<sup>22</sup> FAOSTAT (2018). *FAO Statistics, Food and Agriculture Organization of the United Nations, Rome, 2018*. <http://www.faostat.fao.org/>

<sup>23</sup> Ayyaz, S., L., Bonney, and N. Akmal (2019). Competitiveness in mango trade: a comparative analysis between Pakistan and other mango exporting nations. *International Journal Of Food And Agricultural Economics*, vol. 7, No. 4, pp. 341-349.

Rizwanulhassan, M., and Shafiqurrehman (2015). Analysis of competitiveness of Pakistan's mango exports in the world market. *IOSR Journal of Business and Management*, vol. 17, No. 7, pp. 69-75.

stakeholders as a reason supporting the strong position Pakistan holds in the mango export market. Proper grading and standardization has increased the value and appeal of the mangoes from Pakistan in the international market. Rizwanulhassan and Shafiqurrehman (2015) has concluded that different effective measures taken by the Government of Pakistan involving the Pakistan Horticulture Development and Export Board and Trade Development Authority of Pakistan have helped the country achieve its true potential to export mangoes in the international market.

### 3.3 India

India is also one of the leading exporters of mangoes. Total mango production of India was 18 million<sup>24</sup> metric tonnes (Thakor, 2018). Despite being the largest producer of mangoes, the country's export share of the fruit is very low, only 1.5 percent of its total production. The main states exporting mangoes are Andhra Pradesh, Tamil Nadu, Karnataka and West Bengal, Maharashtra. The United Arab Emirates is the leading importer of Indian mangoes, with 75 percent retention probability. In terms of quantity, Bangladesh is the most stable market for India with more than 82 percent retention probability (Singh, Nandi and Adarsha, 2018). Saudi Arabia, Kuwait and the United Kingdom are other major importers of Indian mangoes.

The export performance of India in terms of mango exports is not quite up to the mark in spite of the country being one of the largest producers of the fruit. Patel (2016) revealed that the fruit-fly infestation is one of the vital reasons behind the low export performance. In 2014, the European Union imposed a ban on the import of mangoes because of the presence of fruit flies. India does not have access to the Japanese and United States markets because of the same reason. Unavailability of proper storage is another critical reason that hinders India from exporting more mangoes. Inadequate cold storage facilities, lack of cargo space, freight rates and toll taxes also adversely affect the mango exports. High prices and lack of marketing efforts also lead to the low exports, while transportation and high wholesale margins push mango prices higher (Ferrier, Petersen and Landes, 2012).<sup>25</sup>

India has the potential to become the primary exporter of mangoes worldwide. Patil and Nirban (2010) identified improvement of infrastructure facilities, including reefer vans for transport, irradiation units, C.A. containers and vapour heat treatment facilities, among others factors, that could lay an important role in boosting mango exports from India. In this regard, Singh, Nandi and Adarsha (2018) cited improved quality, favourable export promotion policies, and exploration of new trade areas.

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<sup>24</sup> The mango is cultivated in the largest area of 2,500 thousand ha and the production is around 18 million tonnes, contributing 40 % of the total world production of mango (FAO STAT, 2013).

FAOSTAT. 2013. FAO Statistics, Food and Agriculture Organization of the United Nations, Rome, Italy. <http://faostat.fao.org/>

<sup>25</sup> Ferrier, P., E. Petersen, and M. Landes (2012). Specialty crop access to U.S. Markets: a case study of Indian Mangoes. United States Department of Agriculture Economic Research Report No. 142. Available at [https://www.ers.usda.gov/webdocs/publications/45026/33787\\_err142.pdf?v=6718.4](https://www.ers.usda.gov/webdocs/publications/45026/33787_err142.pdf?v=6718.4)

### 3.4 Bangladesh

Despite producing a large quantity of mangoes, Bangladesh is not among the leading mango exporters. In 2019, the total production of the fruit totaled 2.61 per cent of the global production (Tridge, 2019).<sup>26</sup> The country is ranked number 10 in terms of mango production globally. According to the Hortex Foundation, in 2021, its production of mangoes was 2.5 million metric tonnes.

Although Bangladesh has a great potential to beef up its Mango trade, it has not yet been able to tap it for a number of reasons. In a recent study, BRCP-1 (2021)<sup>27</sup> listed the following factors behind the country's inability to boost its export of mangoes. Among them were post-harvest management and inadequate transportation facilities, lack of storage facilities at different levels of the value chain of mangoes, absence of hot water treatment facilities and vapour heat treatment facilities, limited access to quality seeds, pest and disease infestations and lack of modern technologies. Lack of proper government support was also cited on the grounds that it often discourages farmers and exporters involved in the mango trade from exporting the fruit.

Mango exporters also must deal with various other constraints, such as high freight charges, insufficient cargo space, high bank interest rates, poor facilities at the ports, lack of packaging facilities, inefficient support services, complex standards and regulations and a shortage of capital are some other constraints for Bangladesh in becoming a leading mango exporting country. Research conducted by Wageningen University (2021)<sup>28</sup> found that Bangladesh has failed to produce popular commercial varieties of mangoes in the global market, such as kent, keitt, tommy atkins or haden. As a result, export opportunities are limited. In addition, the mango is a sensitive fruit and very difficult to manage, so vast numbers of them are lost throughout the value chain. Roy and others (2019) identified the percentage of losses of mangoes at the various stages. Their findings indicate that loss percentages were 4 per cent at the farm level, 8.43 per cent at the bepari (accumulator/trader) level, 9.21 per cent at the wholesale level and 8.61 per cent at the retail level.

Bangladesh can attain its full potential in the mango export market by taking the necessary actions. Kathuria and Malouche (2016) observed that decent sanitary and phytosanitary procedures are significant requirements in exporting mangoes. The stakeholders involved in the mango trade must be aware of basic storage protocols, grading, standards, transport, technological know-how and marketing techniques, among other factors. Enhanced communication, transportation and information systems are essential in order to become a top exporter of mangoes (Kok and others, 2021).<sup>29</sup>

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<sup>26</sup> Tridge. Available at: <https://www.tridge.com/intelligences/mango/production>.

<sup>27</sup> Diagnostic Study of Agro-processing Sector in Bangladesh (2021). Bangladesh Regional Connectivity Project-1, WTO Cell, Ministry of Commerce, Government of Bangladesh. Available at: <http://brcp-1.gov.bd/wp-content/uploads/2020/12/IR-Revised-DTCL-21-12-20-Saleh.pdf> (Accessed: March 31, 2023).

<sup>28</sup> Kok, M.G. et al. (2021) Analysis of the mango value chain in Bangladesh : Towards a strategic action agenda for the Dhaka city corporations. publication.

<sup>29</sup> Kok, M.G. et al. (2021) Analysis of the mango value chain in Bangladesh: Towards a strategic action agenda for the Dhaka city corporations. publication.

Introduction of proper incentives to the exporters and developing new ways to promote exports can play a vital role in achieving specified export goals. Training and trade support on European Union and other countries' requirements would also be an effective step to take to boost mango exports. In addition, quality can be improved by facilitating the extension systems (GOB, CC).<sup>30</sup>

Mango exports are significantly influenced by different policies adopted by the countries involved in the trading of them. For example, Japan, the European Union and the United States have their own standards for the shape, size, nutritional value, weight, quality and color of the fruits. They also put restrictions on the use of pesticide and pest control, and have specific requirements pertaining to packaging, documentation, certificates and use of technology (Patel, 2016).

#### 4. Preferential treatment of Bangladesh in international trade

Being a least developed country, Bangladesh receives Generalized Scheme of Preferences (GSP) facilities from 38 countries, including 28 European Union countries. Other notable countries extending these facilities are Australia, Belarus, Canada, Japan, Liechtenstein, New Zealand, Norway, the Russian Federation, Switzerland and Turkey (EPB, 2021). Australia, New Zealand, Norway and Switzerland offer 100 per cent duty-free, quota-free (DFQF) market access, while the European Union offers it for all products but arms.

Canada and Japan offer 98 per cent DFQF market access, but has restrictions on selected agro-based products. Some other notable countries having restrictions on selected agro-based products are Iceland India, Iceland and the Republic of Korea. However, non-tariff barriers (including quality standards and certification) are significant impediments to market entry of Bangladesh, particularly in the mainstream markets (beyond ethnic markets).

**Figure 2: Preferential access of Bangladesh to international markets**

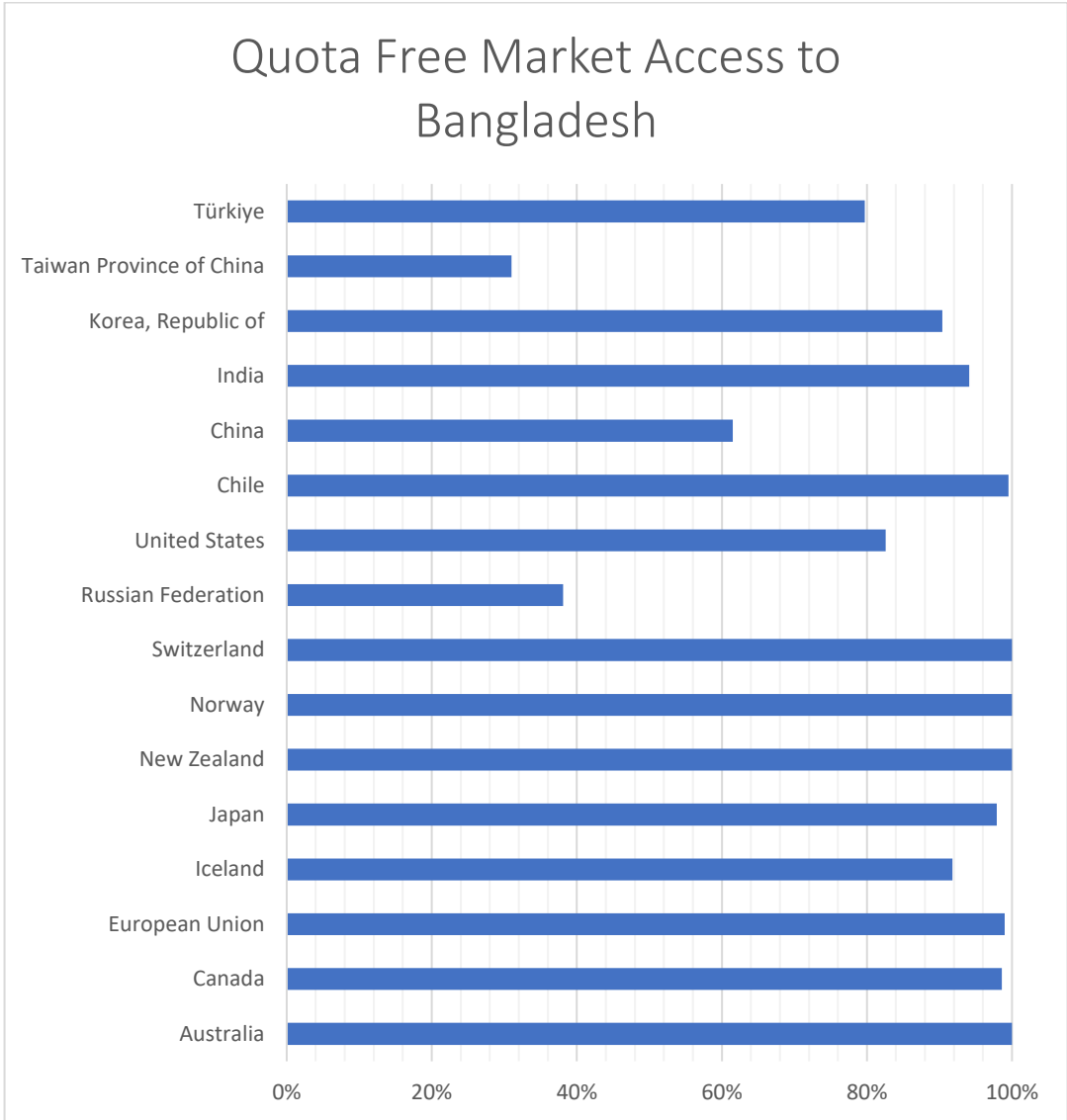
| Market         | Duty-free coverage and major exclusions |   |
|----------------|---|---|
|                | %                                       | Major exclusions  |
| Australia      | 100%                                    | none  |
| Canada         | 98.60%                                  | dairy, eggs and poultry   |
| European Union | 99.00%                                  | arms and ammunitions  |
| Iceland        | 91.80%                                  | Meat and dairy products, eggs, vegetables and plants, cereals and starch, other food preparations |

<sup>30</sup> Government of Bangladesh, City Corporation

|                                 |        |  |
|---------------------------------|--------|--|
| <b>Japan</b>                    | 97.90% | rice, sugar, fishery products, articles of leather   |
| <b>New Zealand</b>              | 100%   | none   |
| <b>Norway</b>                   | 100%   | none   |
| <b>Switzerland</b>              | 100%   | none   |
| <b>Russian Federation</b>       | 38.10% | exclusions cover a wide range of tariff lines, including petroleum products, copper, iron ores, articles of leather, articles of apparel and clothing, others  |
| <b>United States</b>            | 82.60% | dairy products, sugar, cocoa, articles of leather, cotton, articles of apparel and clothing, other textiles and textile articles, footwear, watches, others  |
| <b>Chile</b>                    | 99.50% | wheat, wheat flour and sugar   |
| <b>China</b>                    | 61.50% | chemicals, machinery, paper and wood products, cotton, textiles, steel products, others  |
| <b>India</b>                    | 94.10% | Meat and dairy products, vegetables, coffee, tobacco, iron and steel products, copper products, others.  |
| <b>Korea, Republic of</b>       | 90.40% | meat, fish, vegetables, food products, others  |
| <b>Taiwan Province of China</b> | 31.00% | Some 136 products enjoy exclusive duty-free access, including selected plastic items, raw hides and skins, textile and clothing articles, parts of vehicles, precious stones, others. The exclusions cover a wide range of products. |
| <b>Türkiye</b>                  | 79.70% | meat, fish, food, steel products, others   |

Source: Data from the Export Promotion Bureau.

**Figure 3: Duty-free quota-free market access for Bangladesh**



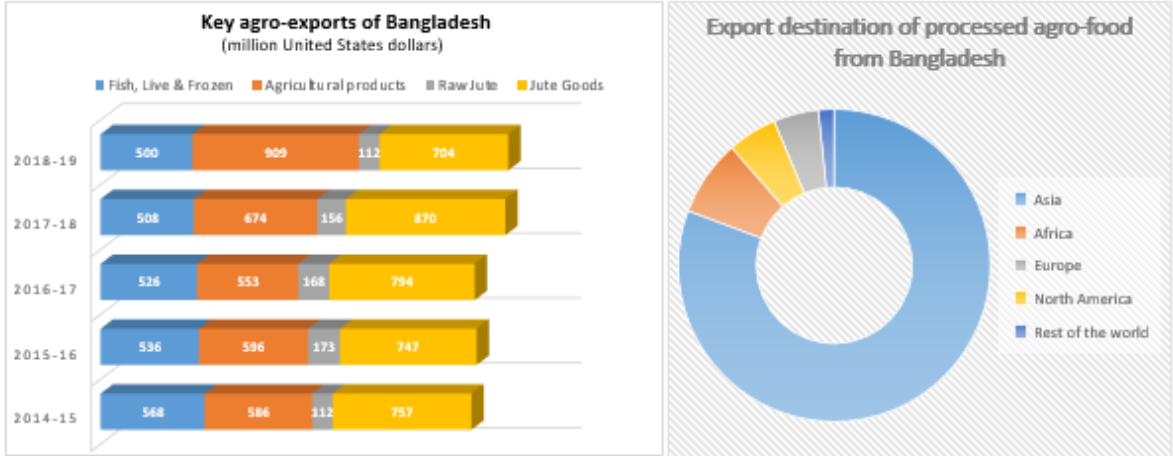
Source: Data from CDCS Analytics and Market Intelligence Unit

**5. Trade of Bangladesh in agri-food and agricultural products**

**5.1 Agricultural Exports from Bangladesh**

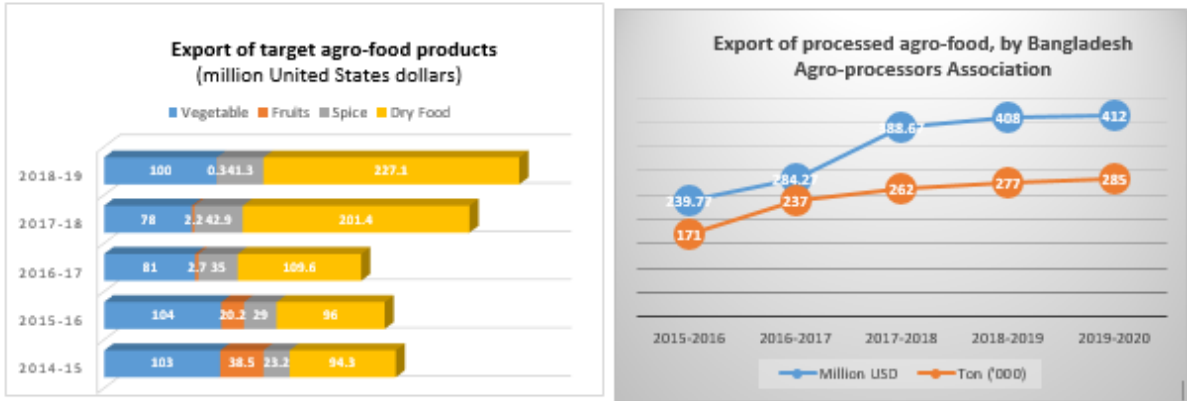
Bangladesh exports were dominated by agricultural products (to be specific, jute and tea) during the 1970s. However, their relative share has fallen sharply after the production of readymade garments expanded significantly in the 1980s. According to Export Promotion Bureau reports, exports of agricultural products in 2019-20 was \$1.318 billion, 4.12 per cent of total exports of \$32 billion. Asia was the most prominent end market for agricultural products from Bangladesh.

**Figure 4: Export of agri-food and agricultural products from Bangladesh**



Source: CDCS Analytics and Market Intelligence Unit

Source: Dhaka Tribune, 24-02-2019



Source: CDCS Analytics and Market Intelligence Unit

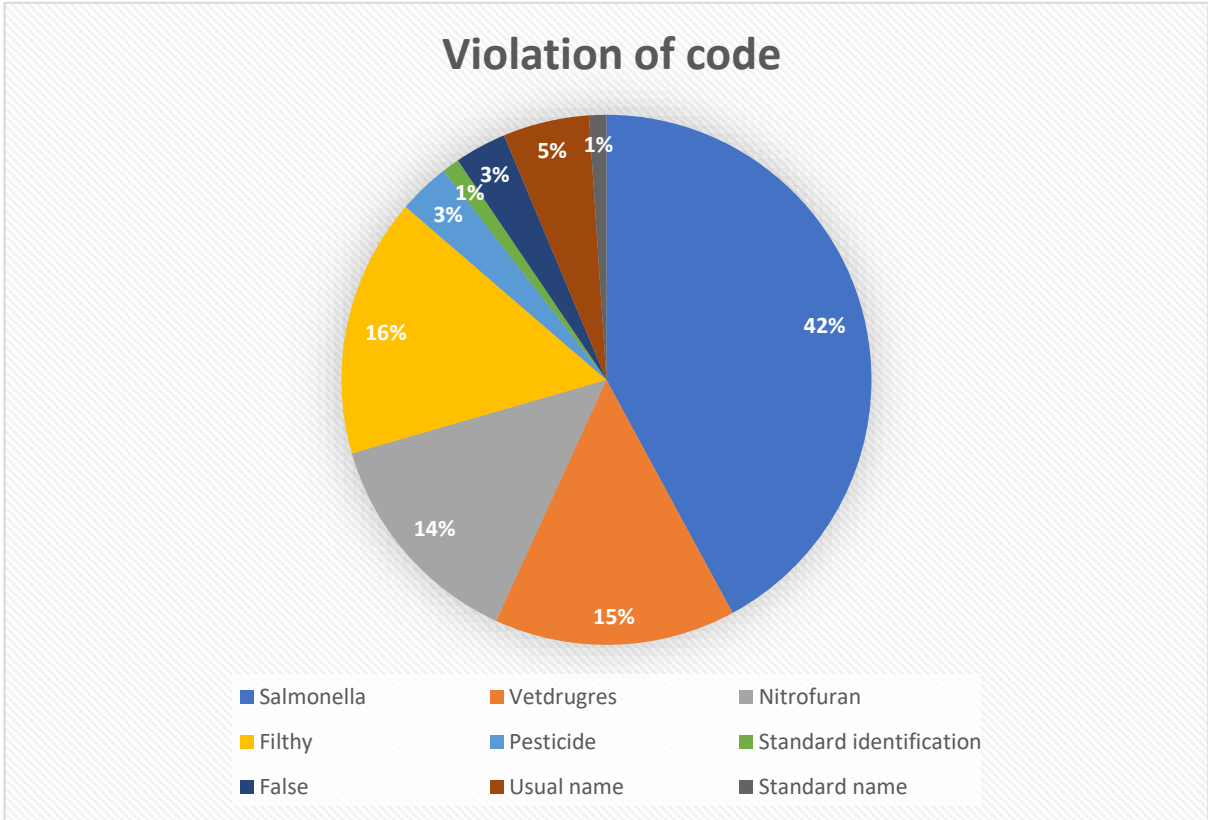
Source: BAPA

Analysis shows that the while fish, jute and jute goods subsectors have maintained the status quo, while certain agricultural products – particularly dry food and spices – are showing signs of being destined to lead the humble export performance of Bangladesh in agriculture. The role of agro-processors is of paramount importance in this connection. Data from Bangladesh Agro-Processors’ Association (BAPA) show that the contribution of its members in the export market is growing steadily.

**5.2 Rejection Due to Violation of Code – United States**

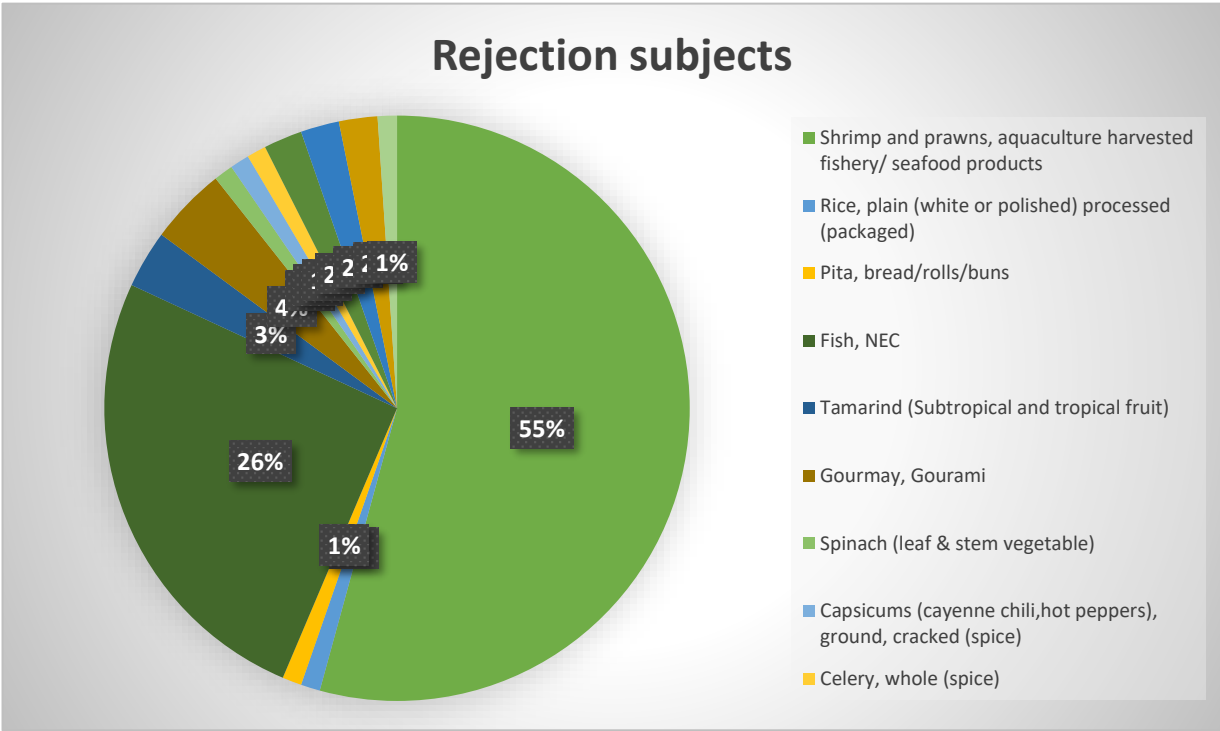
Data of the United States Federal Drug Administration indicate that between January 2019 and April 2022, there were 94 reports of code violations for exports from Bangladesh, of which 79 were related to shrimp, prawn, fish and aquaculture produce, and four were related to vegetables. The major causes of rejection were salmonella (42%), Vetdrugres (15%), Nitrofurans (14%) and being filthy (16%) (figure 5.2.1 and 5.2.2).

**Figure 5: Code violation for exports from Bangladesh**



Source: United States Food and Drug Administration (n.d.).

**Figure 5: Rejection subjects**



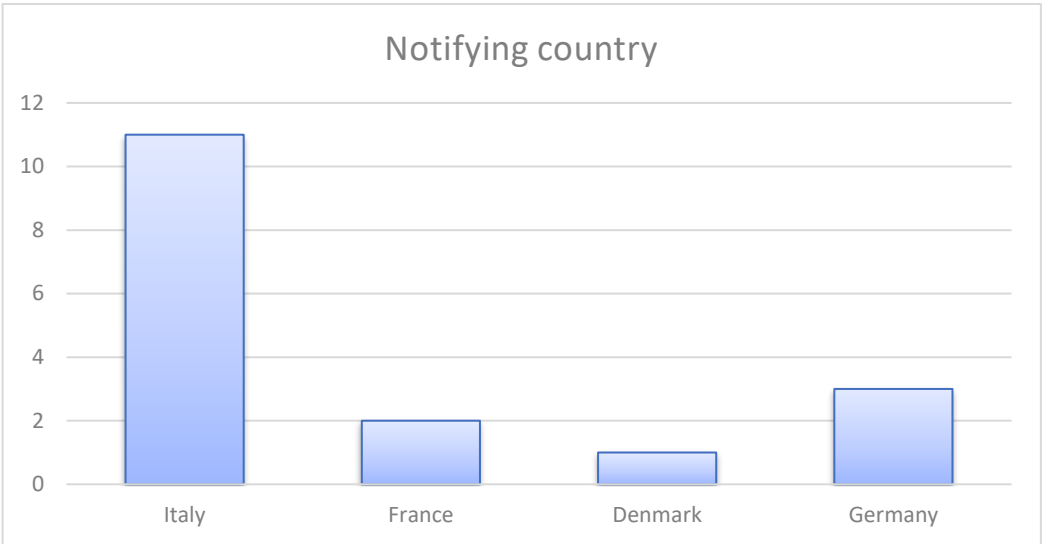
Source: United States Food and Drug Administration (n.d.).



### 5.3 Rejection Due to Violation of Code – European Union

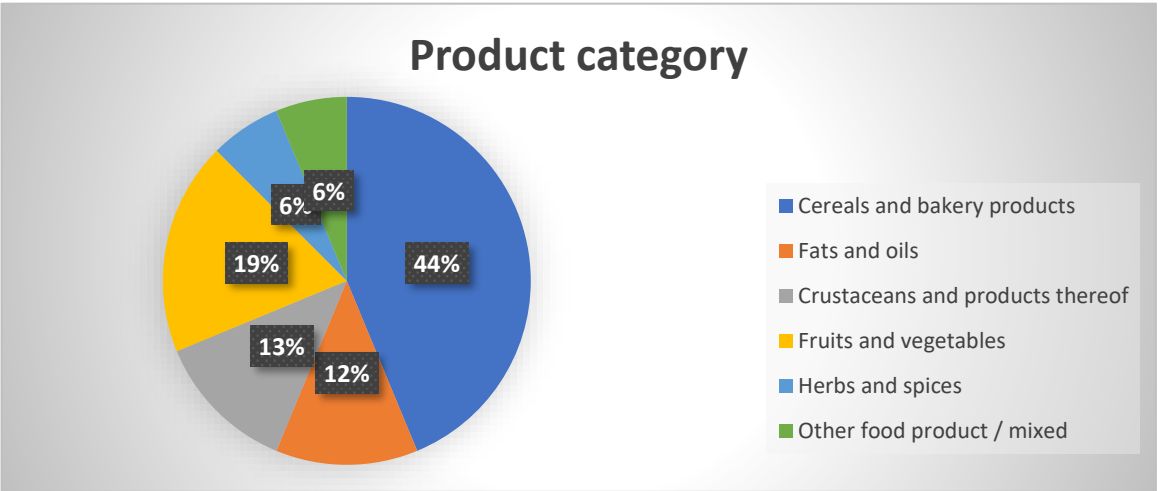
European Union trade data show that between May 2020 and May 2022, the European Union reported a total of 16 cases involving exports from Bangladesh. Of those cases, 11 came from Italy, three from Germany, two from France and one from Denmark. The most reported product category involved cereals and bakery products (7 of 16), while three cases involved fruits and vegetables. In six of the 16 cases, the goods were either destroyed or returned to the consignors. Other measures involved, for example, recall from customers, withdrawal from market and placement under custom seal. In terms of risk decision, 8 (50%) were either listed in the ‘undecided’ category or ‘not serious’ category.

**Figure 6: Countries rejecting exports from Bangladesh due to code violations (May 2020–May 2022)**



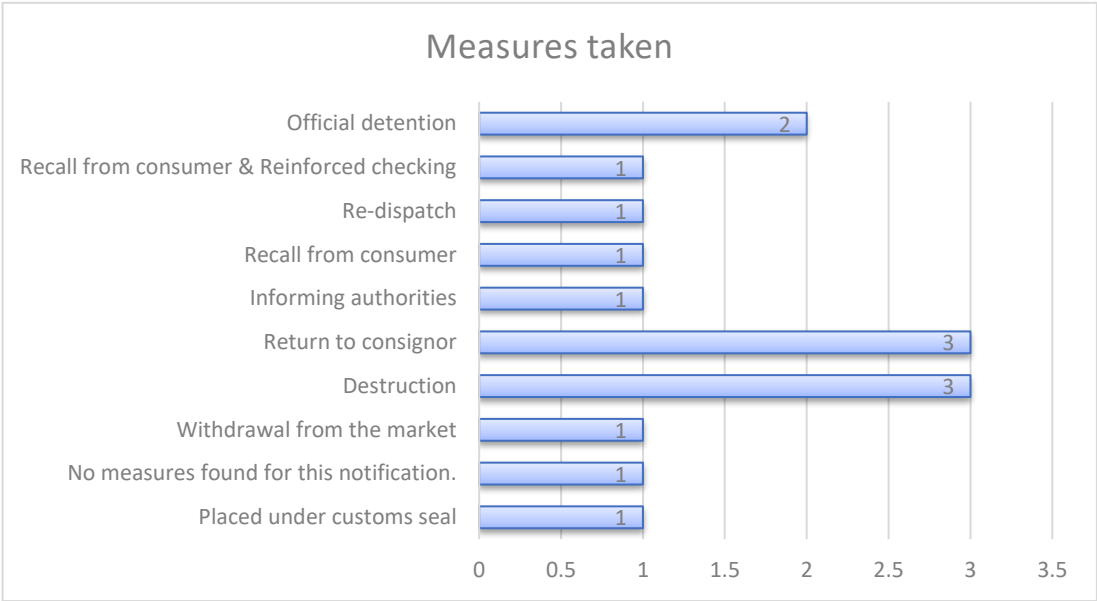
Source: European Commission (n.d.).

**Figure 7: Product categories of rejected exports from Bangladesh**



Source: European Commission (n.d.).

**Figure 8: Measures taken for rejected exports from Bangladesh**

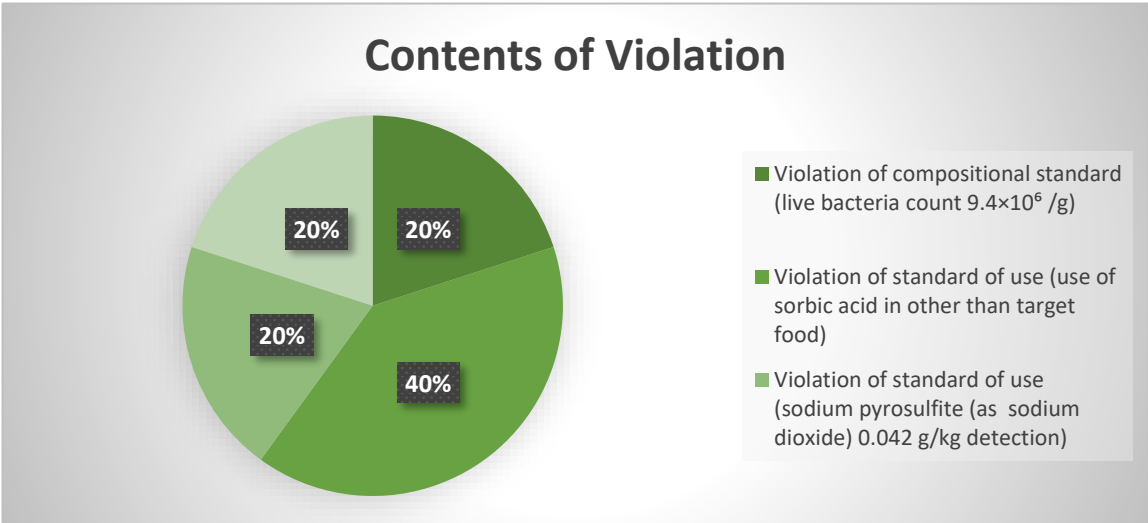


Source: European Commission (n.d.)

**5.4 Rejection Due to Violation of Code – Japan**

Trade related data of the Government of Japan reveals that For Bangladeshi food exports to Japan, five cases of violations were reported in 2016. In four of these five cases, the rejection occurred due to violation of the standard use of sulphur dioxide and sorbic acid in beverages (mango juice). Another violation case (of live bacteria) occurred in processed crab. No violations were reported for other years.

**Figure 9: Contents violation of rejected exports from Bangladesh by Japan**



Source: Japan, Ministry of Health, Labour and Welfare (n.d.).

**Table 1: Port rejection in Japan due to violation of Code, 2016**

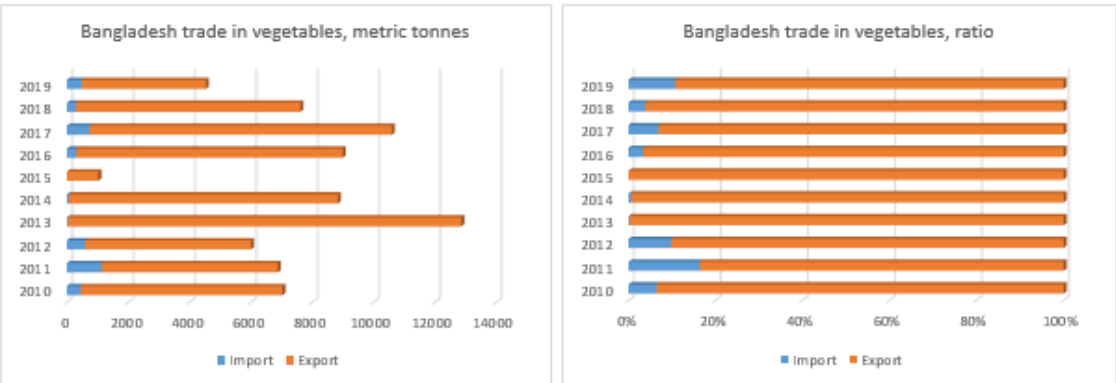
| Year | Item                                     | Contents of violation  | Quarantine     | Disposal of the cargo   | Remarks                   |
|------|--|--|----------------|---|---------------------------|
| 2016 | Processed crab                           | Violation of compositional standard (live bacteria count $9.4 \times 10^6$ /g)             | kansai airport | we directed Abandonment or return of the cargo (the whole quantity is kept) | Independent inspection    |
| 2016 | Drink beverages:mango Juice              | Violation of standard of use (use of sorbic acid in other than target food)                | Tokyo          | we directed Abandonment or return of the cargo (the whole quantity is kept) | Administration inspection |
| 2016 | Drink beverages:mango Juice              | Violation of standard of use (use of sorbic acid in other than target food)                | Tokyo          | we directed Abandonment or return of the cargo (the whole quantity is kept) | Administration inspection |
| 2016 | Drink beverages:fazlee mango fruit drink | Violation of standard of use (sodium pyrosulfite (as sodium dioxide) 0.042 g/kg detection) | Tokyo          | we directed Abandonment or return of the cargo (the whole quantity is kept) | Independent inspection    |
| 2016 | Drink beverages:fazlee mango fruit drink | Violation of standard of use (sodium pyrosulfite (as sodium dioxide) 0.057 g/kg detection) | Tokyo          | we directed Abandonment or return of the cargo (the whole quantity is kept) | Independent inspection    |

Source: Japan, Ministry of Health, Labour and Welfare (n.d.).

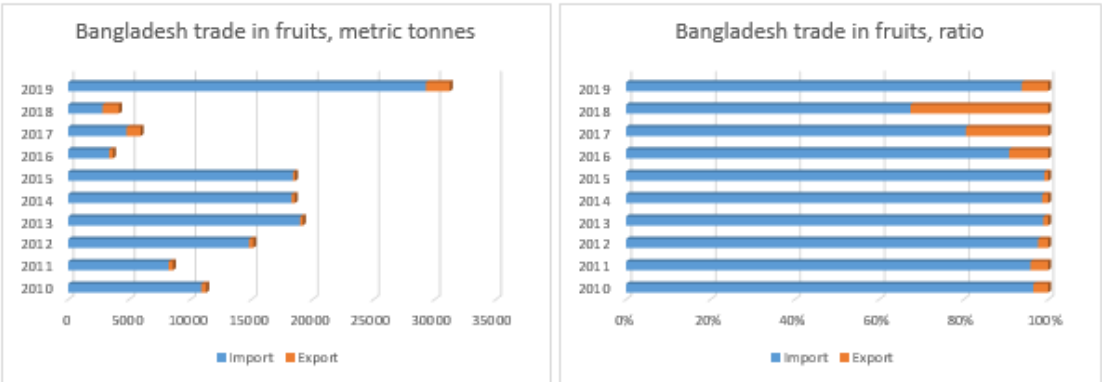
## 6. Bangladesh trade fruits and vegetables

Bangladesh is a net exporter of vegetables and net importer of fruits. Its data for the past decade indicate that although the volume of trade in vegetables and fruits is inconsistent over the period, the import-export ratio has remained largely consistent in both cases (figure 10).

**Figure 10: Export of fruits and vegetables from Bangladesh**



Source: CDCS<sup>®</sup> Analytics and Market Intelligence Unit

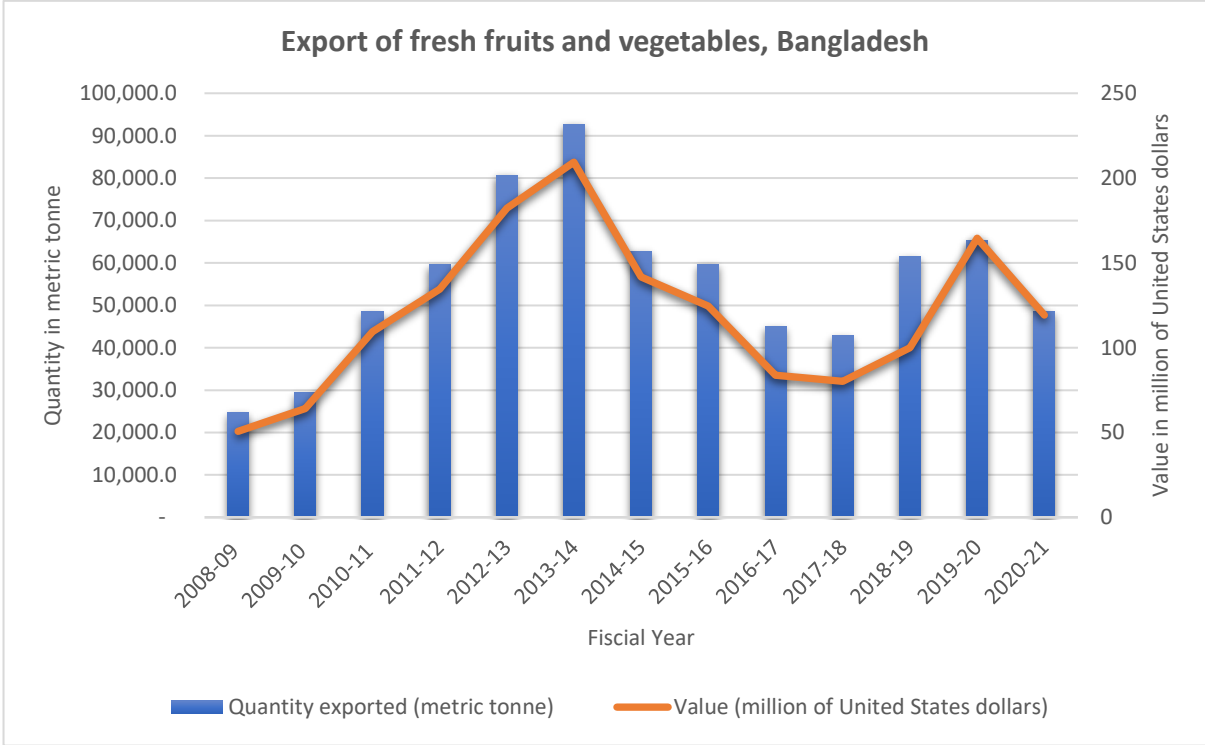


Source: CDCS<sup>®</sup> Analytics and Market Intelligence Unit

Currently, the Government of Bangladesh provides cash assistance of 20 per cent on exports for 20 types of agricultural products produced in the country. However, the volume of exports of vegetables is not consistent; it has been volatile over the years, with unpredictable ups and downs. This signals some kind of inherent systemic weakness, which requires further investigation.

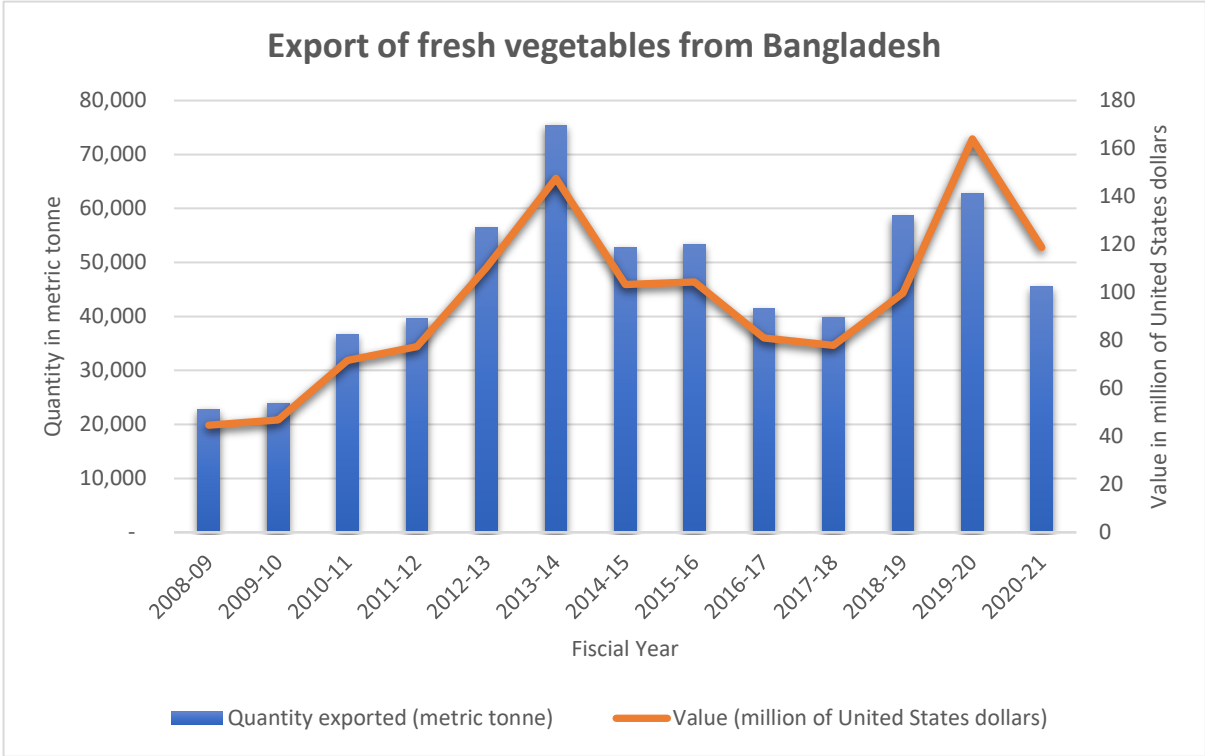
On the other hand, the horticulture export trend over the past decade shows a gradual rise up until fiscal year 2013/14 and a sharp fall thereafter. Of course, in recent years some improvement has been observed (figure 10). Independently, the trend for the export of vegetables shows a similar pattern (figure 11), while the fruit exports trend reached rock bottom and has yet to show any sign of recovery (figure 12).

**Figure 11: Export of fruits and vegetables from Bangladesh**



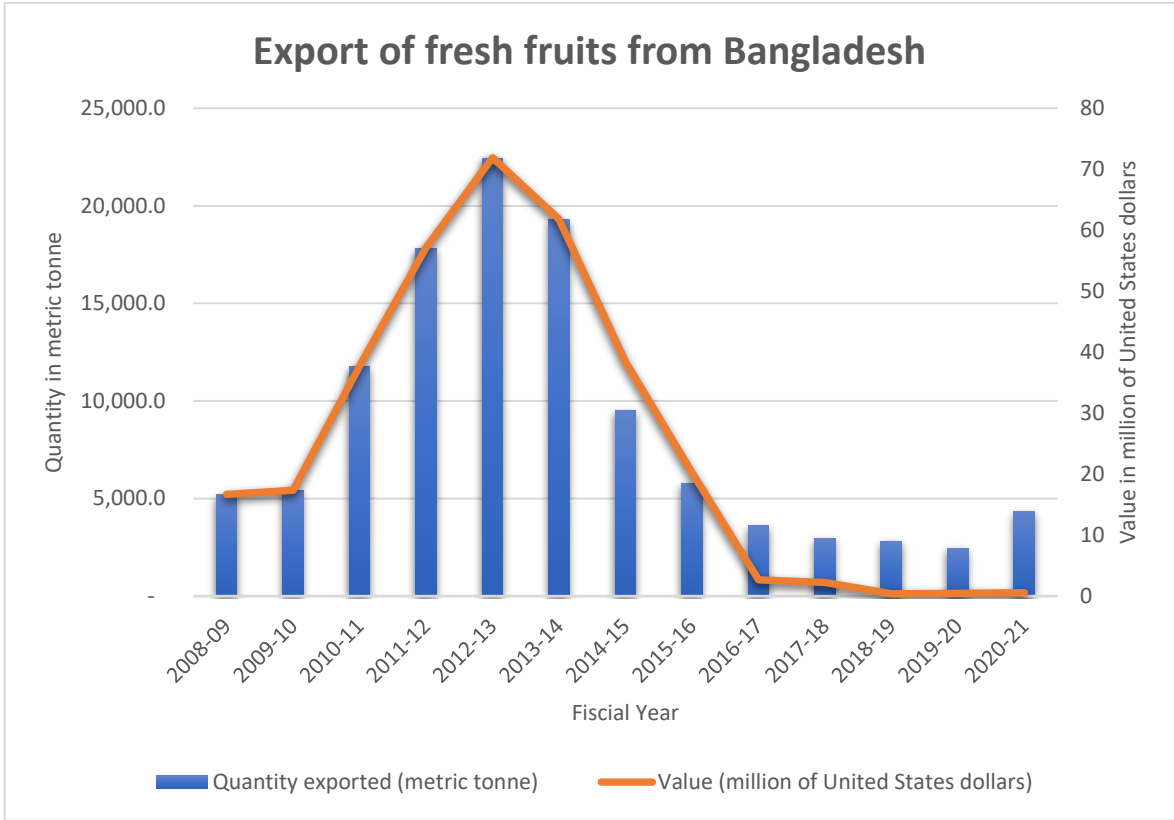
Source: Based on data of the Hortex Foundation.

**Figure 12: Export of fresh vegetables from Bangladesh**



Source: Based on data of the Hortex Foundation.

**Figure 13: Export of fresh fruits from Bangladesh**



Source: Based on data of the Hortex Foundation.

**6.1 Salmonella – the destructor, the distractor and the devil’s advocate**

The sharp fall in horticulture exports from Bangladesh since FY 2013-14 can largely be attributed to (according to an expert opinion) one single factor: the discovery of salmonella in some beetle leaf consignment sent to the United Kingdom and the subsequent ban on beetle leaf exports backed by imposition of strict border controls for all horticultural products entering the country. The measure created a large confidence gap involving overall exports from Bangladesh. It not only caused a complete collapse of shipments of beetle leaf to the United Kingdom, the gateway to the European Union, but it adversely affected the export of all other horticultural exports, including mango.

Stuck with very limited access to the European Union market, the exporters turned largely to the Asian markets, particularly the Middle East. This worked, but at a very high cost: exporters lost most of their expected revenue.

With beetle leaf being a major revenue-earning horticultural crop, exporters in Bangladesh worked hard to overcome the salmonella tragedy and regain the market. The exporters’ association, BFVAPEA, collaborated with university scientists to innovate a sustainable solution to the salmonella crisis, and at the end they became successful

rather quickly. However, it took some time to implement the protocol in the field and to negotiate and win re-entry to the European market.

The salmonella case signifies the importance of compliance in trade in agri-food, particularly by mainstreaming good agricultural practices and adhering strictly to SPS measures.

## **7. Export from Bangladesh: mangoes and beyond**

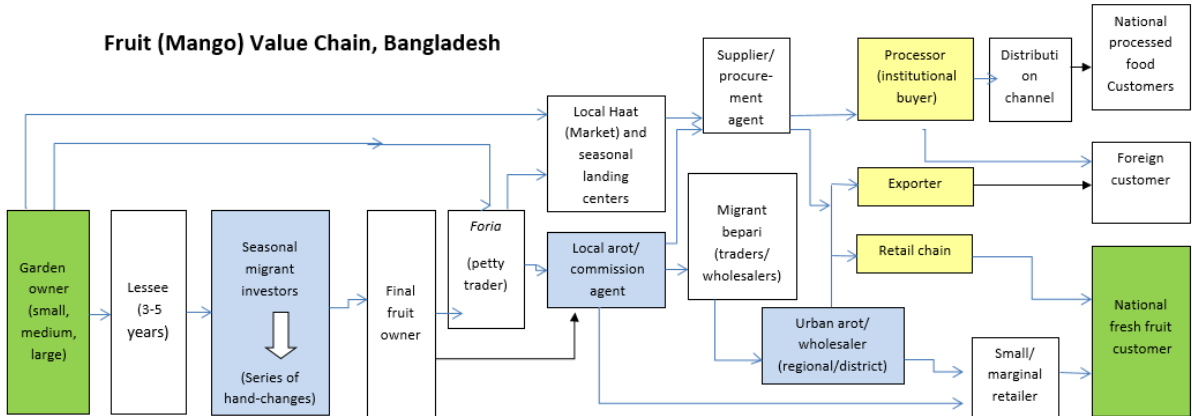
Bangladesh is the seventh largest mango producer in the world, but its share in the global mango trade of \$1.5 billion is very negligible. According to the Hortex Foundation source, last year, 2022, Bangladesh exported only 1,600 metric tonnes of mangoes against its production of approximately 2.5 million metric tonnes. Meanwhile the mango exports from Thailand, India and Pakistan were \$734 million, \$139 million, and \$101 million, respectively., Bangladesh earned less than \$100,000 from mango exports. This indicates that there is an enormous untapped opportunity for export growth. On the other hand, it would of course raise flags as to what has happened to this subsector.

A review of the literature and KIIs validates that this underperformance is because of stringent quality (such as SPS) standards imposed by importing countries and domestic logistical issues, which hamper quality. Experts believe that compliance through rigorous implementation of good agricultural practices) and effective post-harvest practices, introduction of a vapour heat treatment facility, packaging, and cool chain would be essential to meet quality standards. Added to this list of obstacles is the issue of airport facilities: the Cargo village at the Dhaka airport is not friendly to perishable products, such as mangoes and vegetables. As readymade garments gets prioritized over perishable products, exporters incur losses due to offloading of the consignment. Moreover, there is no cool chambers at the airport.

### **7.1 Fresh fruit (mango) value chain dynamics**

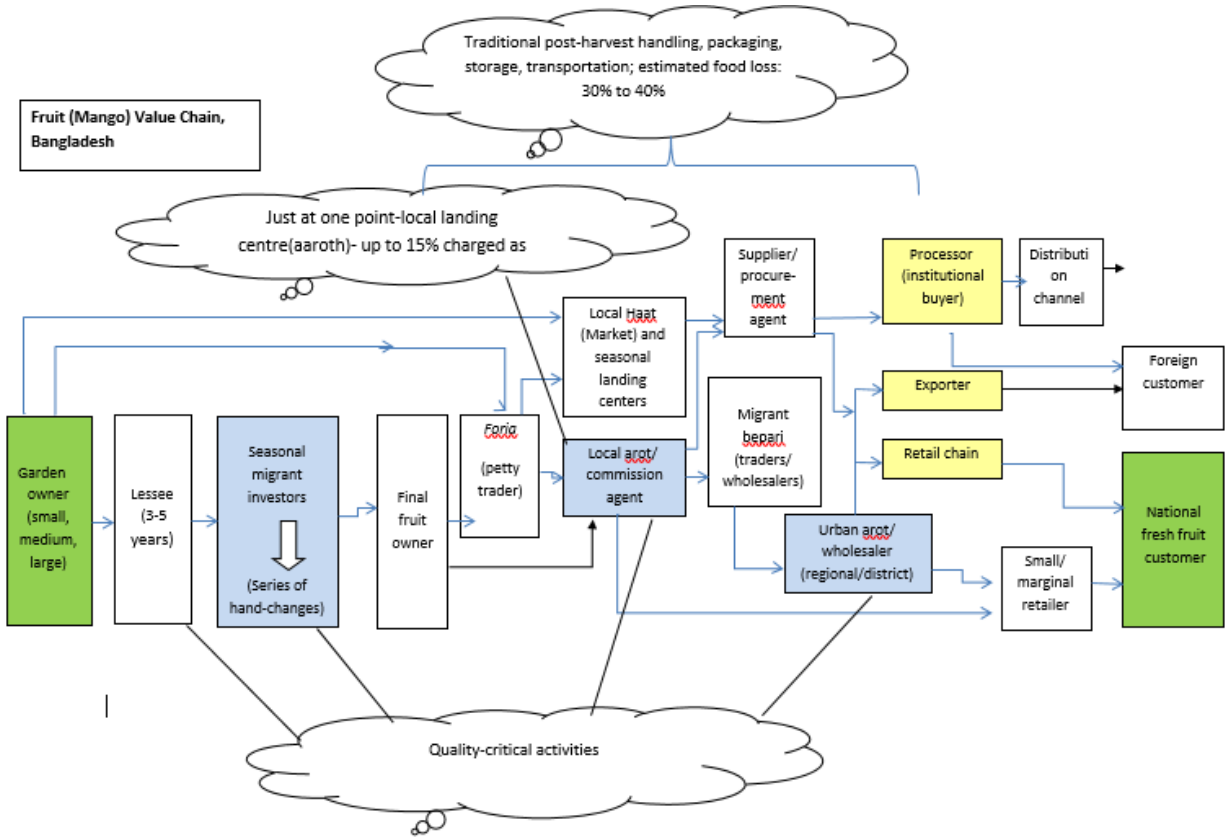
In Bangladesh, fruit and vegetable value chains, similar to other agro-produces, are lengthy and complex. These value chains involve lots of intermediaries standing in between farmers and end-consumers, making the chain inefficient and increasing loss/wastage at each point that the products change hands. Jahan, Ahmed and Morshed (2019) report as many as 20 different types of value chain actors along such chains (figure 14). Such engagements lead to post-harvest inefficiencies and wastage stemming from quality deterioration or value loss, which, in turn, results in economic and well-being loss to farmers and end-consumers.

**Figure 14: Mango value chain, Bangladesh**



For the fresh fruits (and vegetables) value chains in Bangladesh, the post-harvest loss is 30 to 40 per cent. In addition, post-harvest loss value retention is also challenged due to a lengthy value chain and excessive presence of middlemen. For example, a 15 per cent wastage (food loss) premium is charged by buyers and buying agents at a single point – the local bulk trading centre, called *arot* (figure 14).

**Figure 14: Compliance-critical value chain segments**



Source: Jahan, Ahmed and Morshed (2019).



In figure 14, three major compliance-critical value segments – farm, local aggregation centre (*arot*) and urban wholesale point – are identified. Modern farming techniques are not applied widely at the farm level, while poor post-harvest management is prevalent at both trading hubs. The section below presents details on the reasons for wastage and food loss along the value chains.

#### Pre-export procedure: central packing house

Only the best quality mangoes (as well as other fruits and vegetables) are selected for export. Exporters use their established supply chain (including contract farmers and others) and/or use their agents to do the bulk procurement, usually at the production hubs across the country. The produce reaches the central packaging house in Dhaka for final grading, sorting, cleaning, testing, certification, packaging and labelling. However, compared to the market demand, the facility is inadequate. In addition, export-quality (field) packaging, specialized transportation and storage facilities are not yet in place. This has resulted in food loss of 40-5 per cent along export value chains (from farm to the export market).

The facility is managed by the Department of Agricultural Extension, with active support from the Bangladesh Fruits, Vegetables and Allied Product Exporters Association (BFVAPEA). Once certified and documented, the produce is transported to the airport. For a detailed export flow, please refer to annex 1.

#### **7.2 Final export procedure: airport cargo ground-handling**

Exporters establish contracts with airlines. After the finalization of the consignment, the airlines allocate space for each shipment of the exporter. Cargo space booking (for perishable items) needs to be arranged 24 hours before the shipment. Following due procedures, a unique airway bill is issued for the exporter. Then, the exporter needs to fulfil the requirements in line with a checklist provided. From there, freight forwarding agents handle the procedures of the next steps, including, for example, transportation, weighting and scanning. Two types of scanning are done at the Dhaka airport: Explosive Detection System and Dual-view X-Ray. For all countries other than those in the European Union and the United Kingdom, dual-view x-ray machines are used for the scanning process for European Union destinations and the United Kingdom. The Explosive Detection System is used for scanning. BIMAN, the lone ground-handling company, has four Explosive Detection System machines, of which two are old and malfunction frequently. This causes delays, which often results in losses for the exporters.

The documentation process is also handled by the freight forwarding agents with help from customs officials. Once completed, the reweighting is done. Then, the final manifest is issued and the cargo is placed at the bay and departs. The whole cargo ground-handling process takes approximately 6 hours, starting from the acceptance of the shipment (for a detailed description of the cargo ground-handling process for export,

please refer to the flow chart in annex 2.) Sometimes, a portion of the product is offloaded due to limited cargo space. This, of course, signals some level of inefficiencies.

### 7.3 Export-related documentary requirements

Processing exports requires many documents at the pre-export and export stages. These documents need to be obtained from various sources, making the process quite cumbersome, time-consuming and costly. Table 2 presents a summary of the key documents required for exporting of agri-food from Bangladesh.

**Table 2: Export-related documentary requirements**

| Documents required   | Focal  | Processing time (expected.) |
|--|--|-----------------------------|
| <b>Pre-export stage</b>  |  |                             |
| Obtaining trade licence  | City corporation/pourasava/union parishad                | 3-5 working days            |
| Obtaining membership of association  | Any government registered association/chamber            |                             |
| Export registration certificate (ERC)  | Regional office of chief controller of import and export | 1-3 working days            |
| EPB enrollment certificate   | Export Promotion Bureau (EPB)                            | 7 working days              |
| REX certification (only for European Union countries)  | Export Promotion Bureau (EPB)                            | 7 working days              |
| Obtaining list of registered farmers and sign contract (for contract farming)                    | Upazila Agriculture Office, DAE                          |                             |
| Obtaining certificate of registration as exporter of horticultural products                      | Department of Agriculture Extension (DAE)                | 7-15 working days           |
| <b>Export stage</b>  |  |                             |
| Contract with buyer and finalization of export documentation (LC)                                | Buyer of Importing country                               |                             |
| Obtaining traceability information certificate (only for EU countries)                           | Upazila Agriculture Office, DAE                          |                             |
| Obtaining phytosanitary certificate (plus any additional declaration asked by importing country) | Plant Quarantine Wing, DAE                               | 3-4 working days            |

|   |  |               |
|---|--|---------------|
| International document 4 copies of PCs (exporters blue, customs, office, original original)   | Weblink::<br><a href="http://pqw.dae.gov.bd/dae_plant_quarantine/users/register">http://pqw.dae.gov.bd/dae_plant_quarantine/users/register</a> |               |
| Business agreement with C&F Agents and freight forwarders agent   | C&F agent, freight forwarders agent  |               |
| Obtaining EXP Form  | Commercial Bank having AD Branch   |               |
| <b>Customs clearance:</b><br>A. Submission of Bill of Export<br>B. Initial Examination<br>C. Obtaining airway bill/bill of lading and the gate pass<br>D. Physical examination of mango cartons by customs<br>E. Scanning the cartons<br>E. Return of approved shipping bill<br>F. Ship the mango cartons | Customs authority,<br>Civil Aviation Authority,<br>C&F agent,<br>Freight forwarder's agent   |               |
| Obtaining GSP Certificate/ Preferential Certificate of Origin   | Export Promotion Bureau (EPB)  | 1 working day |

Source: Adapted from CDCS®, 2022

## 8. Import of fruits and vegetables in Bangladesh

Imports of fresh fruits and vegetables has been increasing gradually over the years in Bangladesh. Fruit imports have increased at a rate of 6 per cent annually over the past five years. According to an importers' association leader, approximately 5,000 metric tonnes of fresh fruits are imported every day during the peak season, and 3,000-3,500 metric tonnes during the off-peak season. According to the fruit importers' association, South Africa is the best supplier in terms of quality, shipping, timeliness and business ethics. On the other hand, India, despite its mixed reputation involving business practice and ethics, is one of the largest fruit exporters to Bangladesh.

On average, 1.68 million kilograms of fruits are consumed in Bangladesh every day (Fresh Plaza, 2021). The average daily retail transaction in imported fruit is about 270 million Bangladeshi taka. From September to January, the local fruits supply drops and the imported fruits capture the market. During 2020-2021, approximately 616,000 tonnes of fruits were imported (Daily Prothom Alo, 2021).<sup>31</sup> More than 70 per cent of these fruits were apples and maltas. Fruit imports has increased by 6 per cent annually during the past five years. Bangladesh can only meet 40 per cent of its demand for fruit from its local supply. The rest is made up of imported fruits (Ahmed, 2020). China, India, South Africa, Bhutan, Brazil, Egypt are the primary exporting countries of fruits to Bangladesh, accounting for 94 percent of total imported fruits. Australia, New Zealand, and the United States are some of the other fruit-exporting countries. In the 2019-2020 fiscal year, approximately \$300 million worth of fresh fruits were imported from the other countries (Daily Prothom Alo, 2021). Indonesia, India, Argentina, Canada and Malaysia are top vegetable exporting countries to Bangladesh. (World Integrated Trade Solution. 2015).

***“The country severely lacks specialized cold storage facilities for fruits and vegetables (except for potato). Fruit importers are forced to use potato cold storage for storing fruits (although they are not built for that). Besides, current cold storages are mostly old and can't maintain the desired temperature which is ideal for fruits.***

***Added to this is the harassment of officials: if they find discrepancies in cold storage temperature or the contents damaged, they fine the tenants instead of the owner, who is supposed to maintain the desired temperature. This inhumane practice has brought many small fruit importers to the streets (driven out of business). The officials need to be educated on this.”***

***– Anonymous importer***

Fruits from overseas enter Bangladesh through Chattogram Port and other land ports of Bangladesh. The apple is the most imported fruit of Bangladesh; the country is the third largest apple importer in the world (Daily Bangladesh, 2020). According to a United States Department of Agriculture report, Bangladesh imported 271,000 tonnes of apples in the 2019-2020 fiscal year. Bangladesh is the sixth largest importer of maltas. Some other imported fruits are oranges, grapes, pomegranates and limes. According to the Chattogram customs, 129,690 tonnes of apples, 5,553 tonnes of pears, 66,673 tonnes of kinnows, 3,666 tonnes of grapes, 7,522 tonnes of oranges were imported in first two quarters of 2020 (Ahmad, 2020).

The import tariff on imported fresh fruits and vegetables is quite high. The National Board of Revenue (considers apples, oranges and pears as luxury goods and the importers have to pay a 89.32 per cent import tax on apples, maltas, oranges and grapes. This

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<sup>31</sup> Milad, M. (2021) Daily demand of imported fruit reaches 1.7 million kg, Daily Prothom alo. Available at: <https://en.prothomalo.com/business/local/daily-demand-of-imported-fruit-reaches-17-million-kg> (Accessed: March 31, 2023).

tariff is the summation of a 20 per cent supplementary duty, 25 per cent custom duty, 15 per cent value added tax (VAT), 5 per cent advanced trade VAT, 5 per cent advance income tax and 3 per cent regulatory duty. To keep the price low and within the reach of the customers, the Bangladesh Trade and Tariff Commission recommended the National Board of Revenue (NBR) that import tariff be reduced to 31 per cent in the 2020-2021 fiscal year (Kashem and Ali, 2022).

The increased import of fresh fruits and vegetables is mainly due to the lack of domestic production, positive change in people's food habits, health awareness and buying power, and the combined effort of the farmers, fruit importers and other stakeholders (Freshplaza, 2021). Many people prefer foreign fruits although the nutritional value of the fruits produced domestically are not less than the imported ones (Rahman 2019). Additionally, during the pandemic, the demand for citrus fruits had increased greatly, as people increased consumption of these fruits to boost their immunity (Freshplaza, 2020).<sup>32</sup>

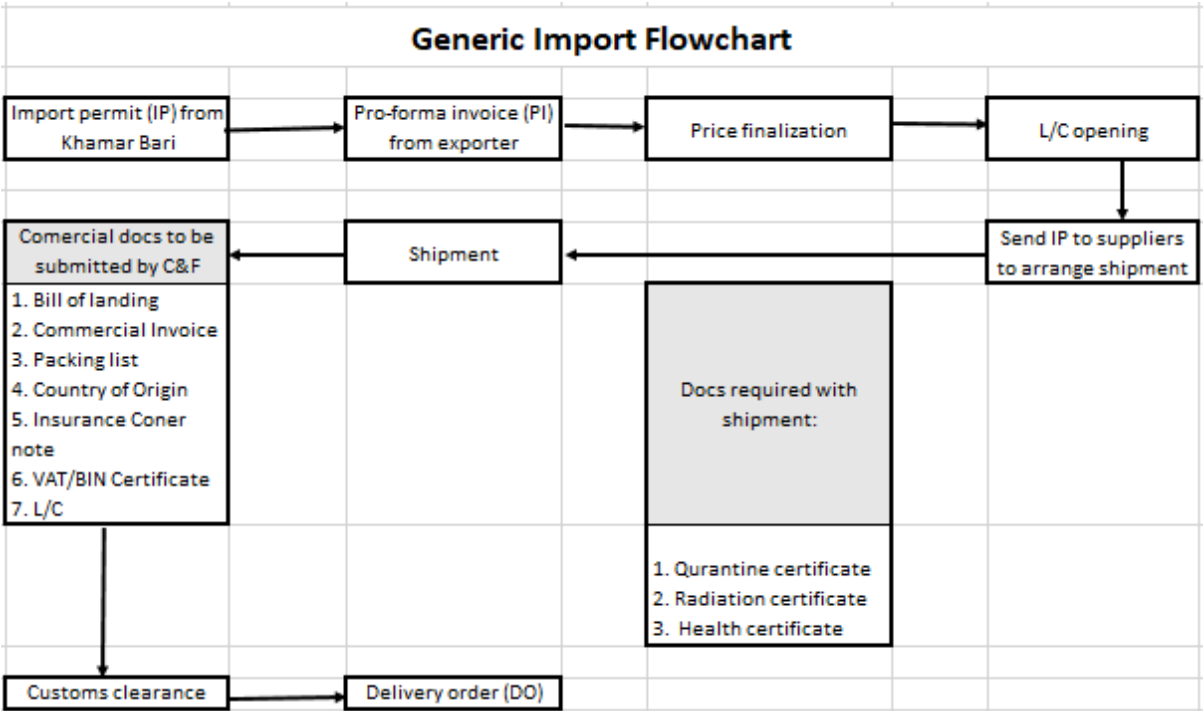
### **8.1 Import procedure**

The import of fresh fruits and vegetables starts with an import permit' (IP) from *Khamarbari*, the Department of Agriculture. After the permit is obtained, a pro-forma invoice is collected from the exporter. Then, the process to attain a letter of credit can begin. The permit is sent to the supplier for shipment processing. Important documents required before shipment include, among others, (i) an aquarantine certificate, (ii) a radiation certificate, and (iii) a health certificate. The C&F agent submits commercial documents such as a bill of landing, country of origin, packing list, invoice and insurance proof. Once custom clearance is obtained, a delivery order is issued.

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<sup>32</sup> Bangladesh imports more fruits as pandemic drives demand (2020). Available at: <https://thefinancialexpress.com.bd/trade/bangladesh-imports-more-fruits-as-pandemic-drives-demand-1595493597> (Accessed: March 31, 2023).

**Figure 15: A generic import flowchart**



**8.2 Export-related documentary requirements**

Similar to the process for export, the import process requires many documents at the pre-import and import stages. These documents need to be obtained from various sources, making the process quite cumbersome, time-consuming and costly. Table 3 presents a summary of the key documents required to import agri-food from Bangladesh.

**Table 3: Export-related documentary requirements**

| Documentary requirements   | Focal  | Processing time (expected) |
|--|--|----------------------------|
| <b>Pre-import stage</b>  |  |                            |
| Obtaining trade licence  | City corporation or municipality's relevant office or Union Parishad | 3-5 working days           |
| Obtaining Import registration certificate (IRC)  | Office of the Chief Controller of Import and Export (CCI&E)          | 1-3 working days           |
| Membership certificate from recognized chamber/trade association   | Relevant chamber/trade association                                   |                            |
| Memorandum and articles of association and certificate of incorporation (coi) [in case of limited company] | Registrar of Joint Stock Companies                                   |                            |

|   |   |                  |
|---|---|------------------|
| -registered partnership deed (for partnership organization)   |   |                  |
| <b>Import stage</b>   |   |                  |
| Preparing trade inquiry and receiving pro-forma invoice   | Importer-Exporter   |                  |
| Obtaining import permit   | Plant Quarantine Wing (PQW), DAE  |                  |
| Insurance cover note  | Approved non-life insurance company   | 7 working days   |
| Sourcing Finance and Opening an L/C   | Any local bank  | 1-3 working days |
| Obtaining necessary trade documents:<br>A. Bill of exchange (invoice of the product)<br>B. Certificate of analysis (description of product)<br>C. Country of origin certificate issued by any trade association of the exporting country<br>D. Health certificate i.e. (fit for human consumption)<br>E. Radiation certificate issued by competent laboratory of exporting country<br>F. Phyto-certificate issued by agricultural department of the exporting country<br>G. Certificate of weight and quality condition<br>H. Packing list/container list<br>I. Insurance Certificate, etc. | Exporter, trade association of exporting country, laboratory of exporting country, agricultural department of the exporting country |                  |
| Authorize a clearing and forwarding agent (C&F agent) and getting customs clearance   | C&F agent   |                  |

Source: adapted from CDCS® 2022.

According to findings from KIIs, attaining port clearance is time-consuming (to release goods from the ports). Importers need to spend up to 72 hours in approximately 50 per cent of all cases, 72 to 150 hours in 38 per cent of all cases, and 150 to 300 hours in approximately 12 per cent of all cases. Under a worst case scenario, it may take even 30 days to release the imported goods from the ports (The Financial Express, 2021).<sup>33</sup> This delay is a big problem, as fruits and vegetables are perishable in nature. However, no estimate of food loss could be made due to non-availability of authentic data.

### 8.3 Challenges in importing fresh fruits and vegetables

Stakeholder interviews with importers and representative of their associations reveal that there are some problems associated with the import of fresh fruits and vegetables, which lead to food loss. The primary problem involves storage facilities. Proper cold storage systems to store the imported fresh fruits are not available. Consequently, a significant

<sup>33</sup> MALA, D. (2021) US-funded project in action to detect bottlenecks. Available at: <https://thefinancialexpress.com.bd/trade/us-funded-project-in-action-to-detect-bottlenecks-1639189765> (Accessed: March 31, 2023).

portion to the imported produce gets wasted. Sometimes, the lack of cold storage even leads to full container spoilages. In addition, the colour and attractiveness of the produce are affected due to the lack of the proper cold storage system.

Lack of specialized transportation facilities is another significant bottleneck. There is no direct way to transport fruits to Dhaka in a short period of time. The subsequent delay results in food loss. Traffic jams also leads to food loss by creating obstacles to market access.

**Box: Topline Findings from Klls/Meetings with Fruits Importers' Association**

1. **Sever lack of specialized cold storages for fruits and vegetables.** Currently, the country has cold storage facilities primarily for potatoes, but importers are forced to use these for imported fruits. Poor quality and non-availability of the cold storages lead to significant spoilage, loss of color, attractiveness and freshness of the fruits. Purpose-built specialized high-quality digital cold storage infrastructure is required urgently. Investment in this sector should be incentivized.
2. **Lack of conducive transportation facilities.** There is no cost-effective way to transport fruits directly to Dhaka within a short period of time. For example, despite India being a major exporter of fruits to Bangladesh, there is no direct freight trains from India. Furthermore, the connecting train is scheduled for 12 to 15 hours later. This, plus double loading and unloading, discourages importers to use trains. Importing by air is smooth, but the airfare is too high. Recently, the fare has increased due to global disruptions. In order to reduce the food loss and cost of trade, transport facilities in general and railway connectivity in particular needs improvement.
3. **Impoverished Port Facility.** There is storage facilities in ports for up to 10 days. The cold storage is not good there. But, the port authority does not take any responsibility, nor does it provide any guarantee against any spoilage.
4. **Digital Supply Chain Management:** An **online (supply chain) coordination system** has already been implemented by the Government. This has made the process smooth and less complicated, and importers can track ships in real time.



Storage facilities are available in the Bangladeshi ports for up to 10 days, but the quality of the cold storage is not good. In addition, the port authority does not take any responsibility or provide any guarantee while the imported fruits and vegetables are kept in this storage. The import process by air is smooth, but the airfare is too high. The airfare also fluctuates with the demand of the fresh fruits and vegetables. Recently, the fare has been increasing significantly.

The Government of Bangladesh has taken different initiatives to improve the whole system associated with the import activities. An online coordination system, which enables importers to track real time the whereabouts of the ships carrying the goods has been implemented. The whole process is smooth and has become less complicated. The commerce ministry plans to create a separate database for the importers and exporters of fresh and processed agri-food. Information regarding the export and import regulations of different countries and information about various importers and exporters of other countries will be integrated into the database. This database will contain the details about the process of conducting lab tests and obtaining product certification in a short period of time. The Government is implementing an initiative to facilitate imports under the Bangladesh Trade Facilitation Project, which is funded primarily by the United States Department of Agriculture. Under these projects, initiatives are being taken to improve the quality of product testing and to develop the capabilities of the labs of different associated organizations to the international standards.

To make the import process of the fresh fruits and vegetables smoother and eliminate the bottlenecks, the Government needs to adopt some measures. First, good quality cold storage is required. Loan facilities for the establishment of cold storages should be introduced with easy terms and conditions. Digital storage facilities (control of temperature and other parameters with a notifications system) are required and would help to store the perishable imported fresh fruits and vegetables. Transportation facilities also need to be improved. A railway transportation system should be developed. A good railway transportation system would eliminate the hassles involved with transporting imported fresh fruits and vegetables and reduce the spoilages of them.

*On average, 5 per cent wastage is expected while importing fresh fruits. Of course, it's higher for fruits such as grapes, and lower for the such produce as apples.*

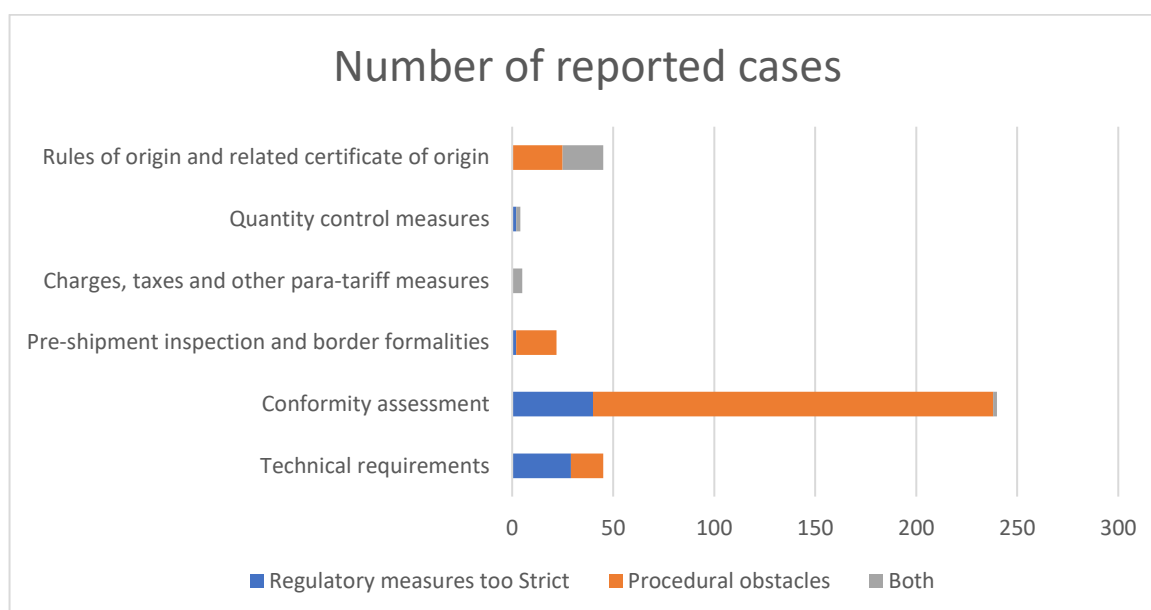
- *KII and Wholesale Market Observations*

## 9. Regulatory and Procedural Obstacles

### 9.1 Non-tariff measures by partner countries involving export of agri-food products from Bangladesh

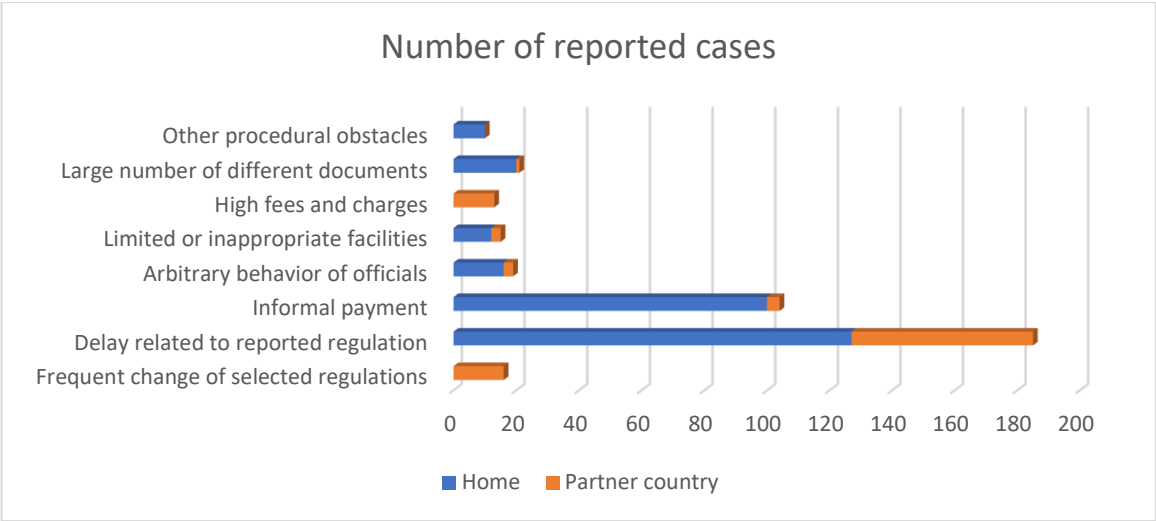
International Trade Center (2017), found in a survey that 91 per cent of exporters in Bangladesh are affected by burdensome NTMS and other obstacles to trade. Among the affected exporters, the agri-food products sector reported to be affected the most, at 96 per cent.. The most cited NTMs were (a) conformity assessment; (b) rules of origin and related certificate; and (c) technical requirements. Of the total 363 cases of NTMs cited, a staggering 240 (66%) were related to conformity assessment. For 40 of those cases, the measure were seen as being “too strict”. A total of 198 cases were related to procedural obstacles (and two on both counts). Of the partner-imposed procedural obstacles, the devastating issue cited was a delay related to a reported regulation: 127 cases reported to be faced at home and 58 cases at a partner country. The second greatest issue was informal payment: 100 cases were reported to be faced at home and 4 in partner country.

**Figure 16: Type of non-tariff measures faced by exporters**



Source: Author's analysis based on ITC NTM Business Survey Report (2017)

**Figure 16: Procedural obstacles faced by exporters**



Source: Author’s analysis based on ITC NTM Business Survey Report (2017)

**Table 4: Number and types of burdensome regulatory and procedural non-tariff measures reported by exporters**

| NTM Cases Reported ...                         |                                |                      |            | Procedural obstacles faced at ...       |      |                 |
|--|--------------------------------|----------------------|------------|---|------|-----------------|
|  | Regulatory measures too Strict | Procedural obstacles | Both A & B | Nature                                  | Home | Partner Country |
| Technical requirements                         | 29                             | 16                   |            | Frequent change of selected regulations |      | 16              |
| Conformity assessment                          | 40                             | 198                  | 2          | Delay related to reported regulation    | 125  | 33              |
|  |                                |                      |            | Informal payment                        | 100  | 4               |
|  |                                |                      |            | Arbitrary behavior of officials         | 16   | 3               |
|  |                                |                      |            | Limited or inappropriate facilities     | 10   | 3               |
|  |                                |                      |            | High fees and charges                   |      | 8               |
|  |                                |                      |            | Large number of different documents     |      | 1               |
| Pre-shipment inspection and border formalities | 2                              | 20                   |            | Delay related to reported regulation    |      | 20              |
| Charges, taxes and other para-tariff measures  |                                |                      | 5          | Delay related to reported regulation    |      | 5               |
|  |                                |                      |            | High fees and charges                   |      | 5               |

|   |    |     |    |  |     |    |
|---|----|-----|----|--|-----|----|
| Quantity control measures                         | 2  |     | 2  | Limited/inappropriate facilities for sector specific transport and storage | 2   |    |
| Rules of origin and related certificate of origin |    | 25  | 20 | Delay related to reported regulation                                       | 2   |    |
|   |    |     |    | Large number of different documents  | 20  |    |
|   |    |     |    | Other procedural obstacles   | 10  |    |
| Total NTM cases                                   | 75 | 259 | 29 | Total Procedural obstacle cases  | 308 | 98 |

## 9.2 Non-tariff measures set by Bangladesh involving export of agri-food products

The NTM measures set by Bangladesh are burdensome for agri-food exporting companies. Of these NTMs, most are related to procedural obstacles involving export inspection (37%), export permit/licensing (18%), and export taxes and charges (12%). Table 5 offers a detailed scenario.

**Table 5: Non-tariff measures applied by Bangladesh on its own exports of agri-food products**

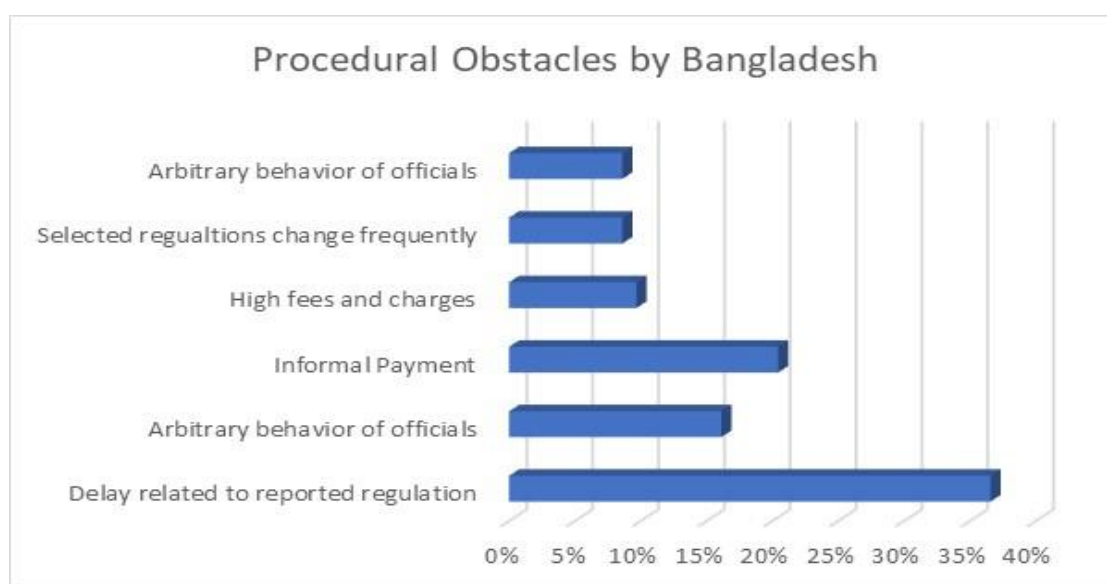
| NTM cases reported ...                          |                                |                      |            | Procedural obstacles faced at ...                       |      |
|---|--------------------------------|----------------------|------------|---|------|
| NTM (Measure)                                   | Regulatory measures too strict | Procedural obstacles | Both A & B | Nature  | Home |
| Export inspection                               |                                | 18                   |            | Delay related to reported regulation                    | 14   |
|   |                                |                      |            | Arbitrary behavior of officials                         | 5    |
|   |                                |                      |            | Informal payment  | 5    |
|   |                                |                      |            | Too short a deadline set for completion of requirements | 1    |
| Certification required by the exporting country |                                | 2                    |            | Delay related to reported regulation                    | 2    |
|   |                                |                      |            | High fees and charges                                   | 1    |
|   |                                |                      |            | Informal payment  | 1    |
|   |                                |                      |            | Limited/inappropriate facilities for testing            | 1    |
| Licensing or permit to export                   |                                | 9                    |            | Delay related to reported regulation                    | 8    |
|   |                                |                      |            | High fees and charges                                   | 8    |

|                               |   |    |   |  |    |
|-------------------------------|---|----|---|--|----|
| Export taxes and charges      |   | 6  | 4 | Selected regulations change frequently | 8  |
|                               |   |    |   | Arbitrary behavior of officials        | 5  |
|                               |   |    |   | Informal payment                       | 4  |
|                               |   |    |   | Other procedural obstacles             | 3  |
| Export price control measures | 1 |    |   |  |    |
| Export subsidies              |   |    | 1 | Informal payment                       | 1  |
| Other export related measures |   | 14 | 3 | Delay related to reported regulation   | 10 |
|                               |   |    |   | Informal payment                       | 8  |
|                               |   |    |   | Arbitrary behavior of officials        | 5  |
|                               |   |    |   | Large number of different documents    | 3  |
| Total NTM cases               | 1 | 49 | 8 |  | 93 |

Source: ITC NTM Survey Report (2017)

Regarding the nature of procedural obstacles, the most significant issues are delay related to reported regulations ((37%), informal payment (20%), arbitrary behavior of officials (16%), high fees and charges (10%), and frequent changes in selected regulations (9%).

**Figure 17: Procedural obstacles by Bangladesh**



Source: Based on ITC NTM Survey Report (2017)

## **10. Reasons for food loss in international trade involving Bangladesh**

The most striking finding of this study is that food loss in trade in Bangladesh is more due to its domestic processes (compliance, value chain inefficiencies, and logistics) than to border procedures at the destination country. Yet, in certain circumstances border issues also contribute to food loss, as the country's exporters often experience non-tariff barriers (NTBs) in different forms. For example, although the salmonella case has officially been resolved by the World Trade Organization (WTO), and the European Union has started to accept beetle leaf from Bangladesh, the United Kingdom, to date, has yet to accept the produce. Despite facing such "unfriendly" border procedures, the stakeholders of trade in agri-food prioritizes domestic issues as the main reason for food loss and underperformance in export.

### **10.1 Standards, compliance and good agriculture practices**

Compliance, certification and traceability are becoming more and more stringent, with regular updates through WTO by member countries. Meeting these standards and quality requirements in agri-food trade requires implementation of good farming practices, good agriculture practices to be precise. After years of deliberations, Bangladesh has recently introduced good agriculture practices through gazette notification, and the country is still at the nascent stage of implementing them. The *Salmonella* case is a strong reminder as to what might happen if good agriculture practices are not introduced and scaled immediately across subsectors.

### **10.2 Impoverished post-harvest management practices and value chain inefficiencies**

The volume of post-harvest loss that fresh fruits and vegetables value chains in Bangladesh experience is staggering. Mismanagement starts from the point of harvesting: poor post-harvest management practices are evident in almost all activities, including handling, sorting, grading, cleaning, packaging, storage and transportation. In addition, the chain is too long and there are an excessive number of middlemen, which raised the likelihood of more wastage and loss of value. Involvement of many actors along the value chain also makes the chain inefficient.

No widespread use of "field packaging" and "retail packaging" is evident along fruits and vegetables value chains. Only bulk packaging is seen across the chain, up to the end-market. Due to multiple changes of hands along the trade chain, repackaging is common, which has become a significant source of food loss. In addition, due to the poor quality of bulk packaging and the absence of specialized storage and transportation vehicles, the loss gets multiplied. Food loss occurs further in the absence of investment in advanced post-harvest technologies such as a vapour heat treatment plants.

### **10.3 Inadequate port facilities**

importers and exporters have raised huge concern regarding ports' trade-support facilities. This is particularly serious at airports, the primary gateway to the Bangladesh agri-food export market. As Bangladesh exports fruits and vegetables primarily through Dhaka airport, its facilities need to be upgraded to meet international standards. The Airport Cargo Village unfortunately doesn't have a cool chamber. The scanning facility is insufficient, and often non-functional. For fresh fruits and vegetable, there is no dedicated cargo plane, nor does the authority fix any significant quota (preferential treatment/priority) for perishables. Ironically, readymade garments always gets priority over agri-food exports. These factors together contribute profoundly to food loss in trade from Bangladesh. Similarly, sea ports and land ports suffer from inadequate support infrastructure, such as lacking specialized cold storage. According to the Bangladesh Trade Facilitation Activity Study report, lack of required equipment and scanning machines, shortage of ground-handling staff, and careless handling of export-bound agricultural products at the Hazrat Shahjalal International Airport are barriers to trade (USAID, 2017).

### **10.4 Private sector strategic limitations**

The private sector in Bangladesh – from farming to exporting – makes mistakes at least in three areas. First, the selection of crop variety is not always conducive to international market demand. Potatoes and mangoes are two shining examples in this connection. Second, the exporters have yet to innovate a winning and sustainable business model involving contract farming to scale up exports. Complaints of non-compliance from/against both ends – contract farmers and their principals – are common. Moreover, the private sector often wants the government to do this (contract farming) arrangements, quite unjustifiably though (as one of the KII respondents indicated).

It's also quite surprising that the private sector has not yet invested in critical infrastructure, such as a vapour heat treatment plant, specialized storage for fruits and vegetables, a cool chain (reefer van) and modern packaging

### **10.5 Weak trade governance**

Food loss in trade from Bangladesh also occurs because of weak trade governance as manifested in lack of institutional capacity and commitment, weak field monitoring, lack of interagency cohesion and coordination, bureaucracy and rent-seeking behaviour in export processing and policy-induced anti-competitive outcomes, such as association of unequals. In addition, design and management of cash incentive (on export of fresh fruits and vegetables) lead to suboptimal outcomes (due to distribution inefficiencies and corruption).

## 11. Conclusion and recommendations

The stakeholders and value chain actors of the agri-trade ecosystem in Bangladesh agree that the imposition of stringent quality standards, SPS measures and acceptance of any non-compliance outcome are all but normal in trade in agri-food. Border rejection, return or destruction of agri-food due to non-compliance is very costly for exporters and importers. However, there remains opportunities to become more compliant and benefit from that. Of course, reaching that level requires investments and interventions at different segments of the agro-food value chains and overall business ecosystem. For example, according to the exporters' association, BFVAPEA, the logistics support (particularly at the airport) been in good shape, five to ten times export growth is possible even now. This observation on procedural obstacle states the level of insufficiencies in trade-support infrastructure and inefficiencies in customs processing system. Similarly, the importers association also observed that due to poor infrastructural support, particularly lack of specialized cold-storage and reefer van, food loss is very high.

The sections below present an outline of some evidence-based practical recommendations for improving trade in agri-food and reducing food loss along trade value chains.

To reduce food loss in international trade, the Government should do the following: -

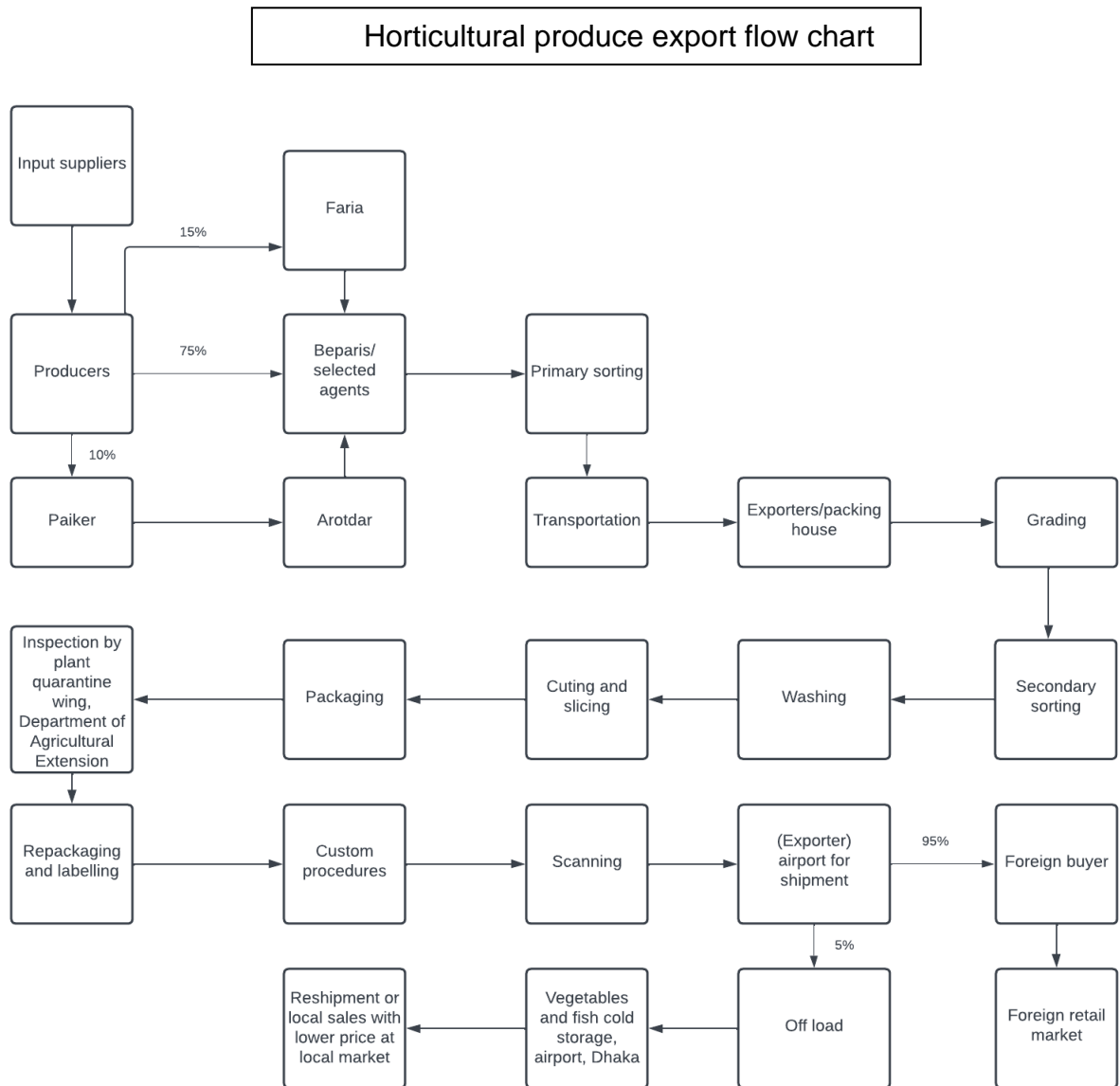
- Significantly ease regulatory requirements and reduce procedural obstacles involved in exporting and importing. For agri-food exports, procedural obstacles involving export inspection, export clearance procedures performed by government agencies, and issuance of export permit/license should be eased. In addition, export taxes and charges should be reduced. Procedural obstacles, such as delays in administrative processes, informal payment, arbitrary behaviour of officials, high fees and charges, and frequent changes in regulation, should be addressed urgently.
- Implementation of good agricultural practices at the farming value segment, with special attention to the crops to be exported should be implemented. The Department of Agriculture Extension and private sector exporters should spearhead this. In addition, exporters should craft and execute an innovative winning and sustainable business model involving 'contract farming for exports.
- Private sector investment in trade-critical subsectors, such as a vapour heat treatment plant, specialized cold storage for fruits and vegetables, specialized transport vehicles, such as reefer vans, and modern packaging (bulk and retail) should be encouraged and incentivized. Resources from the Government's cash incentives for export of agricultural produce may be redirected in these areas as indirect subsidies, such as zero-interest loans.
- The central packing house should be decentralized, at least at the regional level. Existing government facilities may be used or repurposed to suit the packaging needs of the exporters.



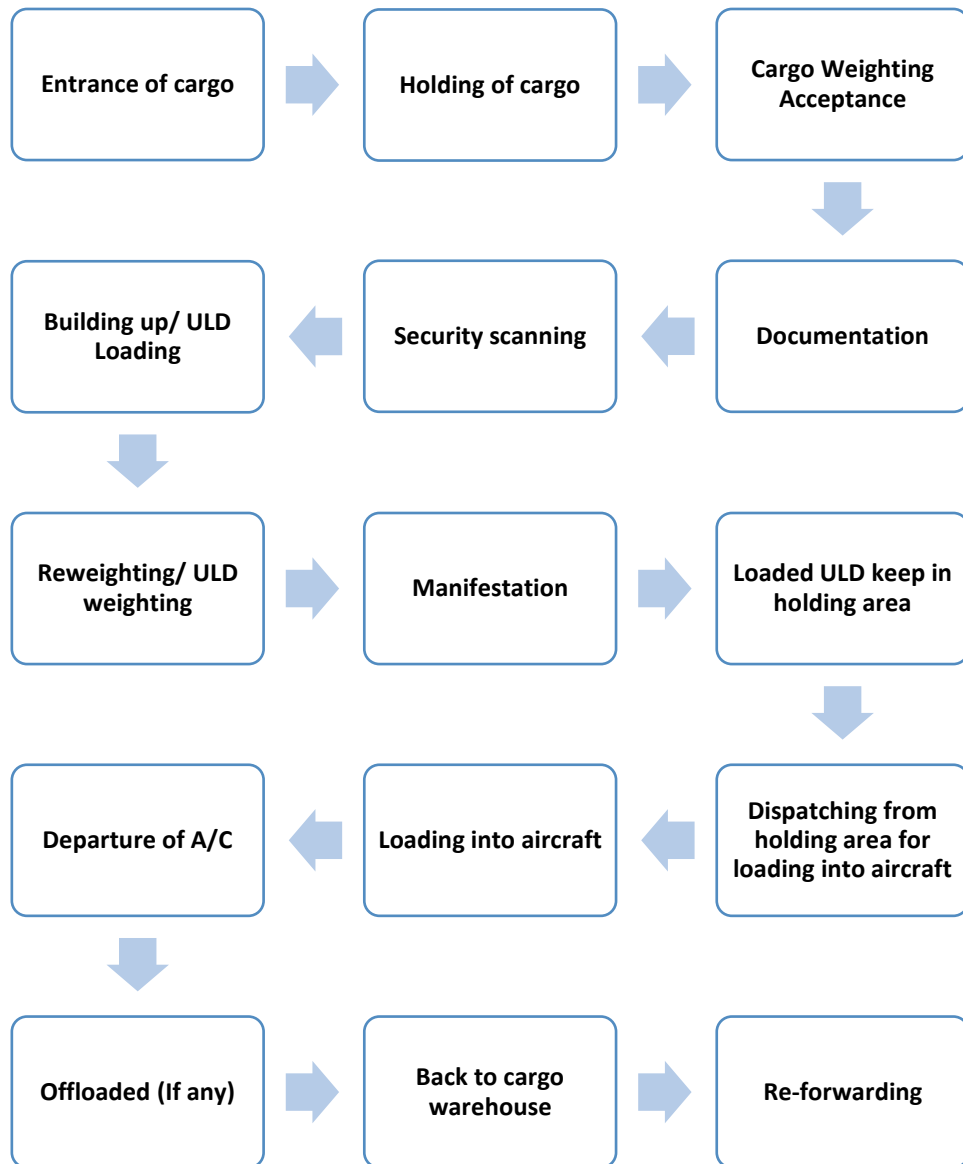
- Improvements, perhaps on a public-private partnership basis, should be made to such airport facilities, such as on cool chambers and scanners. Resources from the Government's cash incentives' may be redirected to subsidize the air freight fees.
- Specialized cold-storage, land and sea port facilities, should be made accessible and affordable in order to reduce food loss from trade in fruits and vegetables
- A cohesive export-oriented institutional ecosystem with capable, committed and accountable institutions should be developed with the objective to assist trade diplomacy, build brands and develop the market globally.

It may be noted that although these recommendations are specific to Bangladesh. Many of the recommendations may very well be applicable elsewhere, particularly in least developed countries and developing countries.

# Annex 1: Fruits and vegetables export flow chart



## Annex 2: Cargo and ground handling process flow chart for export



### Annex 3: Stakeholders who participated in key informant interviews (KIIs) and meetings

| Name                    | Designation  | Organization   |
|-------------------------|--|--|
| Hafizur Rahman          | Director General, WTO Cell<br>(Additional Secretary)                             | Ministry of Commerce,<br>Government of Bangladesh  |
| Md. Monjurul<br>Islam   | Advisor<br><br>(President's Representative)                                      | Bangladesh Fruits, Vegetables & Allied Products<br>Exporters' Association (BFVAPEA)          |
| Dinendra Nath<br>Sarker | Member   | Bangladesh Fruits, Vegetables & Allied Products<br>Exporters' Association (BFVAPEA)          |
| Mitul Kumar<br>Saha     | Joint Director (Marketing)   | Hortex Foundation, Bangladesh  |
| Kh. Hafizur<br>Rahman   | Additional Director (Former)<br><br>Plant Quarantine Wing (Airport in<br>Charge) | Department of Agricultural Extension, Ministry of<br>Agriculture, Bangladesh                 |
| Sheikh Abdul<br>Karim   | Fruit Importer (BK Food) &<br><br>General Secretary                              | Dhaka Metropolitan Fruit Importers, Exporters,<br>Storekeepers and Traders Association       |
| Mahbub Jahan<br>Khan    | Marketing Director   | Biman Bangladesh Airlines  |
| ...                     | Ground-handling /  | Dhaka Airport Cargo Village,<br><br>Bangladesh Biman   |
| Asaduzzaman             | Additional Commissioner  | Bangladesh Custom / NBR  |
| Md.<br>Akhtaruzzaman    | Deputy Director (former)   | Department of Agricultural Extension<br><br>Department of Agricultural Extension, Bangladesh |
| ...                     | Freight Forwarding / C&F Agent   | ...  |

|                      |                              |                                  |
|----------------------|------------------------------|----------------------------------|
| Abdullah Al Mahmud   | Fruits & Vegetables Exporter | M/S Abdullah Trading             |
| Shafiul Akber        | Fruits & Vegetables Exporter | Bangladesh Trading International |
| Mr. Delowar Hossain  | Fruits & Vegetables Exporter | M/S Eva Enterprise               |
| Raihan Bhuiyan Sunny | Fruits & Vegetables Exporter | Bhuiyan Enterprise               |
| Fazlul Amin          | Fruits & Vegetables Exporter | M/S Karnafully Enterprise        |
| Priyatos Mohar       | Fruits & Vegetables Exporter | M/S J.E International            |
| Uttam Debnath        | Fruits & Vegetables Exporter | M/S Standard Food Corporation    |
| . Surajit Saha       | Fruits & Vegetables Exporter | M/S Sporsha BD Trade             |
| Mahabubul Alam       | Fruits & Vegetables Exporter | M/S K.D.S General Trading        |
| Md Altaf H. Talukdar | Fruits & Vegetables Exporter | M/S Ali & Sons                   |
| Md Abdus Sattar      | Fruits & Vegetables Exporter | M/S Milky Trade International    |
| Md. Nazim Uddin      | Fruits & Vegetables Exporter | M/S N N Agro Trade               |
| Uttam Shaha          | Fruits & Vegetables Exporter | M/S Tapon Entarprise             |
| Sheikh Abdul Karim   | Fruits & Vegetables Exporter | BK Food                          |
| Jakir Chowdhury      | Fruits & Vegetables Exporter | J&J International                |

## List of References

- Ahmad, M. S., and M. W. Siddiqui, M. W. (2015). Factors affecting postharvest quality of fresh fruits. *Postharvest Quality Assurance of Fruits*, pp. 7–32.
- Asioli, D., and others (2017). Making sense of the “clean label” trends: A review of consumer food choice behavior and discussion of industry implications. *Food Research International*, vol. 99, No. 1, pp. 58–71.
- Ayyaz, S., L., Bonney, and N. Akmal (2019). Competitiveness in mango trade: a comparative analysis between Pakistan and other mango exporting nations. *International Journal Of Food And Agricultural Economics*, vol. 7, No. 4, pp. 341-349.
- Azabağaoğlu, M. Ö. (2018). Investigating *Fresh Fruit and Vegetables Losses at Contemporary Food Retailers*. *Social Sciences Research Journal*, vol. 7, No. 4, pp., 55–62.
- Badar, H. (2015). Value chain performance improvement for sustainable mango industry development in Pakistan. PhD thesis. The University of Queensland. Available at <https://espace.library.uq.edu.au/view/UQ:353669>
- Bangladesh Foreign Trade Institute. (2016). Analysing Export Readiness of the Vegetables Sector of Bangladesh. Available at [http://bfti.org.bd/pdf/final\\_analysing\\_export\\_readiness\\_of\\_the\\_vegetables\\_sector\\_of\\_bangladesh.pdf](http://bfti.org.bd/pdf/final_analysing_export_readiness_of_the_vegetables_sector_of_bangladesh.pdf)
- Bello, B., and others (2018). Evaluation of the effect of soluble polysaccharides of palm kernel cake as a potential prebiotic on the growth of probiotics. *3 Biotech*, vol. 8, No. 346.
- Brancoli, P., K. Roustia, and K. Bolton, K. (2017). Life cycle assessment of supermarket food waste. *Resources, Conservation and Recycling*, vol. 118, pp. 39–46.
- Buzby, J. C., and J. Hyman, J. (2012). Total and per capita value of food loss in the United States. *Food Policy*, vol. 37, No. 4, pp. 561–570.

- Daily Bangladesh. (2020). Bangladesh ranks 3rd largest apple importer in world. 17 December. Available at <https://www.daily-bangladesh.com/english/Bangladesh-ranks-3rd-largest-apple-importer-in-world/54560>
- Elik, A., and others (2019). Strategies to Reduce Post-Harvest Losses for Fruits and Vegetables. *International Journal of Scientific and Technological Research*, vol. 5, No. 3.
- European Commission (n.d.). RASFF Window. Available at <https://webgate.ec.europa.eu/rasff-window/screen/search>
- Ferrier, P., E. Petersen, and M. Landes (2012). Specialty crop access to U.S. Markets: a case study of Indian Mangoes. United States Department of Agriculture Economic Research Report No. 142. Available at [https://www.ers.usda.gov/webdocs/publications/45026/33787\\_err142.pdf?v=6718.4](https://www.ers.usda.gov/webdocs/publications/45026/33787_err142.pdf?v=6718.4)
- Food and Agriculture Organization of the United Nations (FAO) (2013). FAOSTAT. Available at <http://faostat.fao.org/>
- Ghafoor, A., and others (2009). Cointegration and causality: an application to major mango markets in Pakistan. *The Lahore Journal of Economics*, vol. 14, No. 1, pp. 85-113.
- Goyal, S., and R. Gupta, R. (2009). Fresh and processed fruit and vegetables: growth in production and export from India. *Foreign Trade Review*, vol. 43, No. 4, pp. 32–51.
- Gustavsson, J. and others (2011). *Global Food Losses and Food Waste*. Rome: FAO.
- Harris, S. R. (1988). Production is only half the battle – A training manual in fresh produce marketing for the Eastern Caribbean. Bridgetown: FAO.
- Huang, S. W. (2004). Global Trade Patterns in Fruits and Vegetables. Available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=753525](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=753525)
- International Trade Centre (ITC) (2017). *Bangladesh: Company Perspectives. An ITC Series on Non-Tariff Measures*. Geneva: ITC, Geneva.

- Bangladesh Trade Facilitation Activity (BTFA) Study on Non-tariff Barriers (NTBs) in Bangladesh, 2017, Dhaka, Bangladesh. USAID. Available at: [https://pdf.usaid.gov/pdf\\_docs/PA00TT3V.pdf](https://pdf.usaid.gov/pdf_docs/PA00TT3V.pdf)
- Jabbar, A. and others, (2011). Effect of combined application of fungicides and hot water quarantine treatment on postharvest diseases and quality of mango fruit. *Pakistan Journal of Botany*, vol. 42, No. 1, pp. 65-73.
- Jahan, S. M., M. Ahmed, and S. F. Morshed. (2019). Value chain inefficiencies and market failures in the agricultural sector of Bangladesh: a case study. *Journal of Business Administration*, vol. 40, No. 1.
- Japan, Ministry of Health, Labour and Welfare (n.d.). Imported foods inspection home page. Available at <https://www.mhlw.go.jp/english/topics/importedfoods/>
- Johnson, R. (2016). The U.S. trade situation for fruit and vegetable products. Congressional Research Service. Available at <https://sgp.fas.org/crs/misc/RL34468.pdf>
- Karim, M., and others (1970). Comparative advantage of vegetables production in Bangladesh. *Bangladesh Journal of Agricultural Research*, vol. 36, No., pp. 89–95.
- Kathuria, S., and Malouche (2021). *Toward New Sources of Competitiveness in Bangladesh*. Washington, D.C.: World Bank Group.
- Kashem, A. S. A., and S. Ali (2021). Import tax cuts recommended to fruits. *The Business Standard*. Retrieved, 14 March 2022. Available at <https://www.tbsnews.net/economy/import-tax-cuts-recommended-fruits-234202>
- Khoury, C. K., A. Jarvis, and A. D. Jones. (2020). Trade and its trade-offs in the food system. *Nature Food*, vol. 1, No. 11, pp. 665–666.
- Kitinoja, L., and H. Hassan, H. (2012). Identification of appropriate postharvest technologies for small scale horticultural farmers and marketers in sub-Saharan Africa and south A–Part 1. postharvest losses and quality assessments. *Acta Horticulturae*, vol. 934, pp. 31–40.



- Kok, M., and others (2021). Analysis of the mango value chain in Bangladesh: towards a strategic action agenda for the Dhaka city corporation. Wageningen Food & Biobased Research. Available at <https://edepot.wur.nl/557277>
- Mason-D'Croz, and others (2019). Gaps between fruit and vegetable production, demand, and recommended consumption at global and national levels: an integrated modelling study. *The Lancet Planetary Health*, vol. 3, No. 7. e318–e329.
- Masud, M. (2021) Bangladesh: Daily demand of imported fruit at 1.7 million kg, *English*, 7 February. Available at <https://en.prothomalo.com/business/local/daily-demand-of-imported-fruit-reaches-17-million-kg> (accessed on 14 March 2023)
- Mazhar, M., and others . (2010). Managing mango fruit quality through the supply chain: a Pakistan case study. *Acta Horticulturae*, No. 880, pp. 17-124.
- Mitra, S. (2016). Mango production in the world – present situation and future prospect. *Acta Horticulturae*, No. 1111, pp. 287-296.
- OECD Fruit and Vegetables Scheme – OECD Fruit and Vegetables Scheme*. (n.d.). Evaluation of the Impact of the Coronavirus (COVID-19) on Fruit and Vegetables Trade (no date). Available at <https://www.oecd.org/agriculture/fruit-vegetables/oecd-COVID-19-impact-on-fruit-and-vegetables-trade.pdf>
- Office of the United States Trade Representative, United States Department of Agriculture and United States Department of Commerce (2020) Report on Seasonal and Perishable Products in U.S. Commerce. Available at <https://ustr.gov/sites/default/files/files/reports/2020/ReportSeasonalPerishableProductsUSCommerce.pdf>
- Parfitt, J., M. Barthel, and S. Macnaughton (2010). Food waste within food supply chains: quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society B: Biological Sciences*, vol. 365, No. 1554, pp. 3065–3081.
- Parvez, S. (2019) Fruits imports soar. *The Daily Star*, 14 September. Available at <https://www.thedailystar.net/business/news/fruits-imports-soar-1799257>

- Patil, B., and D. Nirban (2010). Trends in the export of mango from India. *International Journal In Multidisciplinary And Academic Research*, vol. 2, No. 3.
- Rahman, S. (2019). Enabling fruits and vegetable export to improve farm income. *The Daily Star*, 20 November. Available at <https://www.thedailystar.net/round-tables/news/enabling-fruits-and-vegetable-export-improve-farm-income-1829587>
- Rahman, S., and M. S. Pandey (2015). Cold chain can save food supply chain. *The Daily Star*, 8 May. Available at <https://www.thedailystar.net/cold-chain-can-save-food-supply-chain-41858>
- Rizwanulhassan, M., and Shafiqurrehman (2015). Analysis of competitiveness of Pakistan's mango exports in the world market. *IOSR Journal of Business and Management*, vol. 17, No. 7, pp. 69-75.
- Roy, S., and others (2020). Studies on preharvest and postharvest practices of mango in Bangladesh. *International Journal of Business Management and Social Research*. Vol. 8, No. 1, pp. 459-472. 10.18801/ijbmsr.080120.48.
- Scheelbeek, P. F. D., and others (2020). United Kingdom's fruit and vegetable supply is increasingly dependent on imports from climate-vulnerable producing countries. *Nature Food*, vol. 1, No. 11, pp. 705–712.
- Scholz, K., M. Eriksson, and I. Stridl (2015). Carbon footprint of supermarket food waste. *Resources, Conservation and Recycling*, vol. 94, pp. 56–65.
- Shove, E., and D. Southerton (2000). Defrosting the freezer: from novelty to convenience. *Journal of Material Culture*, vol. 5, No. 3, pp. 301–319.
- Singh, S., A. Nandi, and L. K. Adarsha (2018). Production, export dynamics and future prospects of fresh mango of India. *Journal of Crop and Weed*, vol. 14, No. 2, pp. 105–111.
- Thakor, N. (2018). Indian mango – Production and export scenario. *Advanced Agricultural Research and Technology Journal*, vol. 3, No. 2.

The Financial Express. (2020) Bangladesh imports more fruits as pandemic drives demand. 23 July. Available at <https://thefinancialexpress.com.bd/trade/bangladesh-imports-more-fruits-as-pandemic-drives-demand-1595493597>

United Nations, Economic Commission for Europe (ECE) (n.d.) Food loss and waste: redefining the food loss challenge for sustainable impact. Available at <https://unece.org/trade/wp7/food-loss-and-waste>

United States Food and Drug Administration (n.d.). Import Refusal Report. Available at <https://www.accessdata.fda.gov/scripts/ImportRefusals/index.cfm>

United States Agency for International Development (USAID) (2017). USAID-Bangladesh trade facilitation activity: study on non-tariff barriers in bangladesh to agricultural imports and exports. Available at [https://pdf.usaid.gov/pdf\\_docs/PA00TT3V.pdf](https://pdf.usaid.gov/pdf_docs/PA00TT3V.pdf)

Verma, L. R. (2000). *Postharvest technology of fruits and vegetables: General concepts and principles*. New Delhi: Indus Publishing.

Bangladesh Regional Connectivity Project-1, Ministry of Commerce. (2021). Diagnostic Studies about Export Promotion of Agro-Processing Sector in Bangladesh. Available at <http://brcp-1.gov.bd/wp-content/uploads/2020/12/IR-Revised-DTCL-21-12-20-Saleh.pdf>

Bangladesh imports more fruits as pandemic drives demand (2020). Available at: <https://thefinancialexpress.com.bd/trade/bangladesh-imports-more-fruits-as-pandemic-drives-demand-1595493597> (Accessed: March 31, 2023).

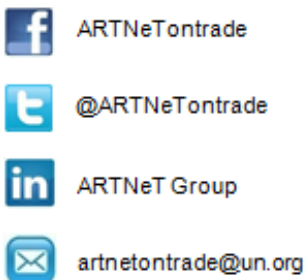
World Integrated Trade Solution (2015) Bangladesh Vegetable Imports by country WITS Data. Available at [https://wits.worldbank.org/CountryProfile/en/Country/BGD/Year/LTST/TradeFlow/Import/Partner/by-country/Product/06-15\\_Vegetable](https://wits.worldbank.org/CountryProfile/en/Country/BGD/Year/LTST/TradeFlow/Import/Partner/by-country/Product/06-15_Vegetable) (accessed on 14 March 2022).



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