

Reducing food loss and waste in Bangladesh

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Friday morning at city's Karwan Bazar, where waste collectors arrive early to take away the garbage from the market. A significant amount of food is lost during transit to markets, food is also wasted due to the inadequate storage facilities of retailers.

This tenth special edition of the Situation Report series has been put together by the Dhaka Food System project, with support from Embassy of the Kingdom of the Netherlands in Bangladesh. This edition focuses on reducing Food Loss and Waste (FLW) in Bangladesh, drawing on data collected through value chain studies conducted under the project. Reducing FLW can increase the quantity and quality of food available to consumers and increase profit for stakeholders in the supply chain.

One way to increase the availability of healthy, safe and high-quality food for the urban poor in Bangladesh is through reducing Food Loss and Waste (FLW). The difference between food loss and food waste can be explained in terms of where food becomes spoiled or is discarded along the food value chain. Food loss occurs when it is spoiled *before* it reaches retailers and consumers (for example during harvesting or in transit from farmers to cities), food waste occurs when food is spoiled once it is in the hands of retailers and consumers (for example food that expires on supermarket shelves or goes uneaten in restaurants or homes). The urban poor typically consume lower quality food because such food is more affordable than better quality food. Successful interventions to reduce FLW benefit food value chain actors, by enhancing their profits, because they have more food to sell, and less that is lost or wasted. Consumers are also benefitted because it results in greater availability of quality food at the same or lower price than what they are used to. The causes and impacts of FLW don't only relate to the supply chain of food, but also a whole range of economic, social, and environmental processes involved in producing, transporting, marketing, consuming and disposing of food. This overall complex system of factors is referred to as the 'food system'.

Globally, an estimated one third of all food produced for human consumption is lost or wasted somewhere between farm and fork. Typically, FLW in developed regions predominantly occurs close to consumers at retail and household level, whereas in developing regions, such as in Bangladesh, losses predominantly occur in farms and in the early stages of postharvest chains. Products that are most likely to face

food waste and loss are fruits and vegetables because of challenges related to keeping the product in good shape until it reaches the consumer, often requiring temperature control to prevent spoiling; however, FLW occurs with other food groups as well.



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A woman collects leafy greens from a pile of garbage at Karwan Bazar, one of the busiest fresh markets of Dhaka.

Food production requires inputs such as land and water, which are becoming increasingly scarce as the world's population keeps growing. The food that is produced, and eventually lost or wasted, therefore also represents inputs and resources that are lost and wasted. Furthermore, FLW comes with associated greenhouse gas emissions, and nutrient and protein losses. Reducing FLW is therefore a focal point for sustainable development and is included in the Sustainable Development Goals (SDG). Specifically, SDG target 12.3 calls for cutting in half per capita global food waste at the retail and consumer level, and reducing food losses along production and supply chains by 2030. The indicators specified under SDG 12.3 are the Food Loss Index, and the Food Waste Index.



More than ten thousand tons of waste is produced by this city every day, of which 60-70% is food waste.

What are the causes of food loss and waste?

FLW can take place at various stages of food supply chains, but the causes of FLW do not necessarily have to be at the same stage where the FLW occurs. Food supply chains link all the market players involved in the production, processing and distribution of food to consumers. Consumers, though not directly involved in the production, processing, or distribution of food, are also part of the food chain and the food system. Food reaches consumers either directly (direct purchases from farmers), or most commonly indirectly, via a number of intermediaries. Intermediate activities such as processing of raw agricultural commodities, checking consumer safety standards and packing add value to food before it is sold. Spoilage of fresh food products is a common reason for consumers to waste food; the reasons for relatively quick spoilage could have occurred as early as during harvesting. Similarly, in the implementation of food loss-reducing interventions, the food chain and food system in general need to be taken into account, beyond the FLW hotspot where food loss and waste are primarily identified. Therefore, in order to halve FLW by 2030 as per SDG target 12.3,

coordinated action along food supply chains is required.

In Bangladesh, an estimated 65kg of food is wasted per capita, but up-to-date and detailed food waste data is scarce. A similar lack of information applies for food losses. Lack of accurate data is a major issue and important aspect of being able to effectively reduce FLW. Therefore, as part of the Dhaka Food System project, three value chain studies were conducted in order to understand the hotspots of FLW. Specifically, around 1000 stakeholders were interviewed face-to-face, all operating in mango, onion or beef supply chains (325 per supply chain). The interviews were equally distributed over the four city corporations of Dhaka and including relevant production areas outside Dhaka Metropolitan Area. Actors included in the interviews were producers, intermediaries, transporters, wholesalers, retailers, mobile vendors and institutional users. Additionally, following a food system approach, the study included analysis of the enabling environment that the food supply system is embedded in, and business services that provide services and goods to the actors in the chain. Relevant literature was analyzed and incorporated in the final reports.

Figure 1 Food Loss and Food Waste occurs at different stages and places in the food value chain.

Food loss	Food waste
On farms losses can occur due to infected or diseased crops and poor harvesting techniques	In restaurants food can be wasted when excess food is not eaten by customers, or when too much is prepared that goes uneaten
On farms additional losses can occur due to exposure to direct sunlight, rough handling, etc.	In superstores food can be wasted if it goes unsold and expires
In storage facilities losses can occur due to humidity or inadequate temperature control	In households food waste can occur when left-over food is discarded
In factories processing losses can occur due to improper sorting, grading and packaging	In fresh markets food waste can occur when food spoils due to lack of refrigeration, rough handling and inadequate storage facilities



Food wastes from fresh markets often remain unattended in front stalls due to a lack of awareness about food safety and hygiene and the current practice of waste management at markets.

How can food loss and waste be reduced?

Reducing FLW requires an integrated food systems approach. A food system approach is a conceptual framework for research and policy aimed at sustainable solutions for the sufficient supply of healthy food. A food system approach is characterised by an integrated study of the food chain and associated social, economic, and environmental domains that food supply chains interact with. Besides considering processes within food chains, a food system approach pays attention to the causes of FLW that originate outside the food chain, for example at the policy level, and to the consequences of FLW that are expressed outside the food chain, for example in the natural environment or in terms of food security.

Onion, mango, and beef value chains were selected through a systematic sampling characterised. The data collection was carried out in most of 2020, carefully taking COVID-19 measures into account. The aim of the studies was to get an understanding of hotspots of FLW and their causes in the selected product chains. Through these value chain studies we can identify the main drivers of FLW:

Food loss and waste in the onion supply chain

The main hotspots of FLW in the onion supply chain were found at the producer, retailers and mobile vendor levels. At the level of producers, the main reasons for FLW were that the onions were harvested prematurely or using techniques that damaged the onions. Additionally, no proper post-harvest practices were applied such as curing (drying) of onions to extend shelf life and rough handling of the onions occurred. Producers expressed having a lack of storage facilities for the onions and difficulties finding a market in time for their produce. At the level of retailers and mobile vendors, the main reasons for FLW were that the actors indicated to buying onions from the wholesalers and other retailers that were already damaged due to rough road conditions and packaging practices, and that they have no/limited access to cold storage facilities to store the onions, resulting in a short shelf life, especially if the onions were already not cured at producer level. Respondents also indicated to having difficulties finding a market for their produce and

competing with imported onions. At the level of producers, the majority of onions intended for the market ended up being used for personal consumption. Although not counted as food waste, this can be seen as an economic loss. At the other stages of the supply chain, lost and wasted onions primarily ended up in landfills.



Onion waste in front of a stall in Dhaka South's Shantinagar fresh market. Most of the time waste from food stalls is not collected because fresh markets do not have effective waste management systems in place.

Recommendations to reduce FLW in the onion supply chain

- ✓ **Improve the quality of onions.** Improve onion quality at production-level through effective extension systems that facilitate and educate producers on production, harvest and post-harvest handling practices, particularly curing
- ✓ **Increase domestic storage capacity.** Onions can be stored for a few months, if well-handled and stored properly
- ✓ **Reduce price fluctuations.** Price fluctuations can be reduced by improving the management of imports and through improving the capacity of producers to organise themselves to effectively negotiate prices

Food loss and waste in the mango supply chain

For the mango supply chain, hotspots of FLW were at the level of retailers and institutional users. Mangoes that were lost or wasted mostly ended up in landfills, used as animal feed, or they were given away for free. All intermediary actors indicated to have purchased poor quality fruits which resulted in losses. The main causes of FLW in mango therefore largely occur early on in the chain. During harvesting, many mangoes are damaged, spoiled, infected or diseased. Rough handling, improper timing of harvest and exposure to sun further contributes to food loss. Additionally, mangoes are considered an expensive product by the majority of Bangladeshi consumers and domestic demand for mango is quite low. There are however export and branding opportunities for good quality mangoes.



A significant number of mangoes get damaged in the fresh markets while unloading the products.

Recommendations to reduce FLW in the mango supply chain

- ✓ **Improve the quality of mangoes.** Improving the quality of mangoes at production-level, through effective extension systems that facilitate and educate producers on production, harvest and post-harvest handling practices
- ✓ **Developing the potential of the brand.** Investigate whether branding with respect to food safety is an option to increase demand and price in medium and high-end markets in urban areas
- ✓ **Develop export potential.** Explore ways to support export of mangoes
- ✓ **Improved marketing and promotion.** Stimulate domestic consumption of fruits, including mangoes

Food loss and waste in the beef supply chain

The beef value chain is slightly different from the onion and mango value chains because live animals are involved. A major reason for FLW is animal mortality, which was an estimated 7 percent at the level of producers and 4.4 percent at the level of intermediaries. Other reasons

for losses were suboptimal working accuracy of butchers, specifically meat that is not properly and completely cut from the bones. Due to lack of a well-developed cold chain for meat, poor quality meat is often wasted due to lack of customers, also raising food safety concerns. There is however a growing demand for beef, particularly among urban consumers.



Proper handling, improved transportation systems, and improved storage is necessary to reduce food loss in the beef supply chain.

Recommendations to reduce FLW in the beef supply chain

- ✓ **Increase availability and affordability of feed costs.** Increase the production and preservation of cattle feeds and fodder
- ✓ **Invest in cold storage facilities.** Invest in construction of cold storage facilities to maintain quality and preserve the beef for longer periods
- ✓ **Raise awareness.** Create consumer awareness about buying safe and good quality meat
- ✓ **Better oversight of food safety practices.** Provide supervision by veterinary doctors and Huzur in slaughterhouses
- ✓ **Increase the number of slaughterhouses.** More slaughterhouses are needed in urban areas, closer to main food purchasing areas



Many retailers in the city buy onions from the wholesale section of Karwan Bazar fresh market.

Recommendations

These value chain studies resulted in the following general recommendations that not only directly apply to the onion, mango and beef value chains, but can also support other vegetable, fruit and animal product value chains. Because of the applied food systems approach, these general recommendations are not only specifically for value chain actors, but researchers, private and public sector actors all have a share in contributing to these general recommendations as well.

- ✓ **Improve the quality of products at production-level:** Facilitating skill development and educating producers on post-harvest handling practices, supporting private sector actors to train their suppliers, supporting farmer-to-farmer trainings/visits, and better monitoring and management of domestic production and imports, all help to improve production, harvest and post-harvest handling practices that reduce food loss.
- ✓ **Support and develop collaboration within food value chains:** Investing in social structures for collaboration, such as farmer cooperatives, can improve access to farm machinery, labor and storage facilities, that improves the capacity of farmers to reduce food loss.
- ✓ **Improve access and availability of storage facilities:** Investing in infrastructure and improving the availability, accessibility and quality of storage facilities can prolong the life of food products and reduce food loss.
- ✓ **Enforce regulations by increasing institutional monitoring capacity:** Increasing the capacity of relevant monitoring and regulatory authorities can ensure that regulations are enforced that ensures food does not spoil.
- ✓ **Develop the enabling environment:** Investing in creating enabling environments and business services, can help ensure that inputs (e.g. financial) are available for efficiency-enhancing and food loss-reducing interventions by supply chain actors. For example, increasing access to micro-finance options, supporting private sector actors to provide access to capital to suppliers and evaluating the availability and effectiveness of current financial structures.



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An informal waste collector gathers garbage from the vegetable section of Karwan Bazar fresh market.