

4. Causes and prevention of food losses and waste

Food is wasted throughout the FSC, from initial agricultural production down to final household consumption. In medium- and high-income countries food is to a high extent wasted, meaning that it is thrown away, even if it is still suitable for human consumption. Significant food loss and waste do, however, also occur earlier in the food supply chain. In low-income countries food is mostly lost during the production-to-processing stages of the food supply chain.

In industrialized countries food gets lost when production exceeds demand. In order to ensure delivery of agreed quantities while anticipating unpredictable bad weather or pest attacks, farmers sometimes make production plans on the safe side, and end-up producing larger quantities than needed, even if conditions are “average”. In the case of having produced more than required, some surplus crops are sold to processors or as animal feed. However, this is often not financially profitable considering lower prices in these sectors compared to those from retailers.

Prevention: *Communication and cooperation between farmers.* Cooperation among farmers could reduce risk of overproduction by allowing surplus crops from one farm to solve a shortage of crops on another (Stuart, 2009).

In developing countries and, sometimes, developed countries, food may be lost due to premature harvesting. Poor farmers sometimes harvest crops too early due to food deficiency or the desperate need for cash during the second half of the agricultural season. In this way, the food incurs a loss in nutritional and economic value, and may get wasted if it is not suitable for consumption.

Prevention: *Organizing small farmers and diversifying and upscaling their production and marketing.* Small resource-poor farmers can be organized in groups to produce a variety of significant quantities of cash crops or animals. In this way they can receive credit from agricultural financial institutions or advance payments from buyers of the produce.

Box 2. Snapshot case: appearance quality standards

Carrot quality standards, by the supermarket chain Asda

As research for the book ‘Waste – understanding the global food scandal’ (2009), Tristram Stuart visited several British farms in order to understand how quality standards affect the level of food waste. Among others, Stuart visited M.H. Poskitt Carrots in Yorkshire, a major supplier to the supermarket chain Asda. At the farm, the author was shown large quantities of out-graded carrots, which, having a slight bend, were sent off as animal feed. In the packing house, all carrots passed through photographic sensor machines, searching for aesthetic defects. Carrots that were not bright orange, had a bend or blemish or were broken were swept off into a livestock feed container. As staff at the farm put it: “Asda insist that all carrots should be straight, so customers can peel the full length in one easy stroke” (Stuart, 2009). In total, 25-30% of all carrots handled by M.H. Poskitt Carrots were out-graded. About half of these were rejected due to physical or aesthetic defects, such as being the wrong shape or size; being broken or having a cleft or a blemish.

High ‘appearance quality standards’ from supermarkets for fresh products lead to food waste. Some produce is rejected by supermarkets at the farm gate due to rigorous quality standards concerning weight, size, shape and appearance of crops. Therefore, large portions of crops never leave the farms. Even though some rejected crops are used as animal feed, the quality standards might divert food originally aimed for human consumption to other uses (Stuart, 2009).

Prevention: *Consumer surveys by supermarkets.* Supermarkets seem convinced that consumers will not buy food which has the ‘wrong’ weight, size or appearance. Surveys do however show that consumers are willing to buy heterogeneous produce as long as the taste is not affected (Stuart, 2009). Consumers have the power to influence the quality standards. This could be done by questioning them and offering them a broader quality range of products in the retail stores.

Prevention: *Sales closer to consumers.* Selling farm crops closer to consumers without having to pass the strict quality standards set up by supermarkets on weight, size and appearance would possibly reduce the amount of rejected crops. This could be achieved through, e.g., farmers markets and farm shops (Stuart, 2009).

Poor storage facilities and lack of infrastructure cause post-harvest food losses in developing countries. Fresh products like fruits, vegetables, meat and fish straight from the farm or after the catch can be spoilt in hot climates due to lack of infrastructure for transportation, storage, cooling and markets (Rolle, 2006; Stuart, 2009).

Prevention: *investment in infrastructure and transportation.* Governments should improve the infrastructure for roads, energy and markets. Subsequently, private sector investments can improve storage and cold chain facilities as well as transportation (Choudhury, 2006).

Unsafe food is not fit for human consumption and therefore is wasted. Failure to comply with minimum food safety standards can lead to food losses and, in extreme cases, impact on the food security status of a country. A range of factors can lead to food being unsafe, such as naturally occurring toxins in food itself, contaminated water, unsafe use of pesticides, and veterinary drug residues. Poor and unhygienic handling and storage conditions, and lack of adequate temperature control, can also cause unsafe food.

Prevention: *develop knowledge and capacity of food chain operators to apply safe food handling practices.* Food chain operators should be skilled and knowledgeable in how to produce safe food. Foods need to

Box 3. Snapshot case: poor post-harvest facilities



Lack of facilities for rice threshing, drying and winnowing, Tajikistan

A farmer winnowing rice in Tursunzade, Tajikistan in 2010. Sun drying exposes rice to rodents and parasites, which may eat or damage the harvested crops. Proper storage facilities are also important in order to reduce the amounts of food lost during post-harvest handling and storage.

Box 4. Snapshot case: food safety at risk

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Rickshaws transporting milk in Bangladesh

Rickshaws transporting milk from the countryside to processing plants in Baghabarighat, Bangladesh. Transporting milk in the warm and humid climate of Bangladesh without a proper cold chain may cause milk losses. The rickshaw transportation on narrow and winding roads prolongs the time milk is handled in warm temperatures.

be produced, handled and stored in accordance with food safety standards. This requires the application of good agricultural and good hygienic practices by all food chain operators to ensure that the final food protects the consumer.

'Disposing is cheaper than using or re-using' attitude in industrialized countries leads to food waste. Industrialized food processing lines often carry out trimming to ensure the end product is in the right shape and size. Trimmings, in some cases, could be used for human consumption but are usually disposed of. Food is also lost during processing because of spoilage down the production line. Errors during processing lead to final products with the wrong weight, shape or appearance, or damaged packaging, without affecting the safety, taste or nutritional value of the food. In a standardized production line these products often end up being discarded (Stuart, 2009; SEPA, 2008).

Prevention: *develop markets for 'sub-standard' products.* Both commercial and charity organizations could arrange for the collection and sale or use of discarded 'sub-standard' products that are still safe and of good taste and nutritional value (SEPA 2008).

Box 5. Snapshot case: disposing is cheaper than using or re-using

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French fries production in The Netherlands

During his thesis, D. Somsen interviewed a Dutch french fries producer to better understand the causes of food waste in the french fries production line (Somsen, 2004). The company reported several steps in the production line where raw material was lost and wasted, e.g. during the size reduction in which potatoes are cut into strips. French fries are fragile and easily break when transported during processing as well as when packaged. The unwanted products are sorted out and occasionally end up wasted. In addition to this, some potatoes are sorted out prior to entering the factory, due to damage during loading, transport from producer to factory and/or during storage.

Box 6. Snapshot case: poor market facilities

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Central wholesale market in Pakistan

Central wholesale market in Lahore, Pakistan. These bananas are traded among unsanitary conditions, causing major health hazards since food is handled and piled on the ground close to the gutter. This kind of market environment also causes food waste, since the unsanitary conditions and rough handling cause deterioration of fragile fresh products.

Lack of processing facilities causes high food losses in developing countries. In many situations the food processing industry doesn't have the capacity to process and preserve fresh farm produce to be able to meet the demand. Part of the problem stems from the seasonality of production and the cost of investing in processing facilities that will not be used year-round.

Prevention: *develop contract farming linkages between processors and farmer.* Governments should create a better 'enabling environment' and investment climate, to stimulate the private sector to invest in the food industry and to work more closely with farmers to address supply issues.

Large quantities on display and a wide range of products/ brands in supply lead to food waste in industrialized countries. Retail stores need to order a variety of food types and brands from the same manufacturer to get beneficial prices. Consumers also expect a wide range of products to be available in stores. A wide range of products does, however, increase the likelihood of some of them reaching their "sell-by" date before being sold, and thereby wasted. When shopping, consumers expect store shelves to be well filled. Although certainly beneficial for sales statistics, continually replenished supplies mean that food products close to expiry are often ignored by consumers. This is particularly difficult for small retail stores (SEPA, 2008).

Inadequate market systems cause high food losses in developing countries. To minimize losses, the commodities produced by farmers need to reach the consumers in an efficient way. There are too few wholesale, supermarket and retail facilities providing suitable storage and sales conditions for food products. Wholesale and retail markets in developing countries are often small, overcrowded, unsanitary and lacking cooling equipment (Kader, 2005).

Prevention: *Marketing cooperatives and improved market facilities.* Marketing cooperatives are organizations providing a central point for assembling produce from small farmers and preparing commodities for transportation to markets and other distribution channels. The marketing cooperatives should be able to reduce food losses by increasing the efficiency of these activities. Although the development of wholesale and retail markets should preferably be done by the private sector, local governments and marketing cooperatives can be instrumental in establishing and improving market facilities (Kader, 2005).

Food wasted at consumer level is minimal in developing countries. Poverty and limited household income make it unacceptable to waste food. A contributing factor is that consumers in developing countries generally buy smaller amounts of food products at the time, often just enough for meals on the day of purchase.

Box 7. Snapshot case: public awareness raising**Voluntary initiatives**

'Stop Wasting Food' in Denmark give guidance to consumers on how to avoid wasting food by shopping according to daily needs of households, and promotes better household planning and shopping patterns in order to encourage a movement away from impulsive to rational food shopping and consumption patterns

In the UK, the Waste Reduction Action Plan (WRAP) encourages leading retailers, brand owners and their supply chains to identify collaborative approaches towards reducing the amount of food and packaging waste that ends up in the household bin and ultimately in landfill. WRAP aims at reducing packaging waste and consumer food waste by carrying out R&D work, by guidance on best practices and by promotion. WRAP partners with packaging manufacturers, retailers, brands, suppliers, research institutes, universities, design agencies and environmental and design consultants.

Abundance and consumer attitudes lead to high food waste in industrialized countries. Perhaps one of the most important reasons for food waste at the consumption level in rich countries is that people simply can afford to waste food. The amount of available food per person in retail stores and restaurants has increased during the last decades in both the USA and the EU. A lot of restaurants serve buffets at fixed prices, which encourages people to fill their plates with more food than they can actually eat. Retail stores offer large packages and "getting one for free" bargains. Likewise, food manufactures produce oversized ready to eat meals (Stuart, 2009).

Prevention: Public awareness. Education on these matters in schools and political initiatives are possible starting points to change people's attitudes towards the current massive food waste.