Food Loss and Waste: Sustainable Reduction Strategies for Developing Countries

By Bezalel Adainoo

Food waste illustration (Pixabay.com)

With about 931 million tonnes of the world's food being lost and wasted, it has become increasingly important to find ways to reduce food losses and food waste. Food loss and food waste has a dire impact on global food security and the climate. The volume of food lost and wasted is enough to feed all the 820 million people who go to bed hungry each day. According to the Consultative Group on International Agricultural Research (CGIAR), global food waste and loss results in 3.49 gigatons of carbon dioxide equivalent of greenhouse gas emissions, and an estimated economic impact of USD 940 billion.

Countries in the developed world have adopted various measures to help curb food loss and waste, but many developing countries have yet to catch up on a similar scale. Some of the food loss and waste prevention approaches that have been adopted in developing countries involve the use of plastic materials to package food products to prevent them from going bad, the use of fuel/energy to cool food and the change of transportation mode to reduce the time it takes for food to reach consumers. However, analyses done by Wageningen University & Research shows that these well-intentioned food loss and waste prevention strategies may lead to an increased production of greenhouse gas emissions due to the environmental impacts of plastics and fuel use. This means it is not only important to address food loss and waste, but also find the right strategies to reduce greenhouse gas emissions.

A Wageningen University & Research project which was completed in December 2021 identified some solutions for specific food product categories that reduce both food loss and waste and greenhouse gas emissions. The project also performed case studies in developing countries. The findings provide key lessons and strategies developing countries can adopt and incorporate in their food systems to reduce food loss and waste and greenhouse gas emissions.

As part of the project, Wageningen University in partnership with Olam Rice Nigeria conducted an experiment in which they used mechanical systems to harvest and thresh rice and compared the losses in that process to the losses involved in manual harvesting and threshing of rice in Nigeria. They found that using the mechanical systems reduced food loss by 479kg per hectare, increasing farmers' incomes by about $200 per hectare and preventing the release of 1.7-tons of carbon dioxide equivalent of greenhouse gas emissions per hectare. It was also noted that while the use of the mechanical harvesters and threshers increased profit and reduced greenhouse gas emissions, the cost of acquiring both systems was estimated to be about USD 2,925, which is a challenge since individual farmers cannot afford to purchase these systems. Also, farmer cooperatives may not be able to purchase, maintain and store the equipment. Hence, there is the need for financial and service provider support for farmers to sustainably implement this strategy.

In another experiment that focused on cassava production in Mozambique, the researchers found that using mobile processing units was more effective in reducing postharvest losses and greenhouse gas emissions than using a large-scale central factory and importing starch material. The mobile processing units used in the study were designed by Dadtco PhilAfrica. Instead of transporting the cassava, which has a high moisture content (60-70%), from farms to a central factory, the mobile processing units could be moved from one farm to another or nearby to process cassava, a root tuber that is common in SubSaharan Africa, into products like cassava flour and/or cassava starch paste. In the project report, it was noted that the Dadtco Cassava Mobile Factory is a high investment technology which produces less waste than a centralized factory.

Studies conducted on smallholder potato farms in Kenya also showed that the use of better inputs like certified or cleaned seeds and selection of more appropriate fertilizer and pest control not only improved yield but also significantly reduced losses and greenhouse gas emissions per ton of marketable produce.

In addition to these case studies, the Wageningen University project developed an Agro-Chain Greenhouse gases Emission (ACGE) calculator to help the food industry and other interested parties estimate the total greenhouse gas emissions linked to various food products. The ACGE calculator is a Microsoft Excel file that analyzes the main stages in linear agro-food value chains for fresh and some processed products to estimate greenhouse gas emissions and food losses along the value chain. The calculator uses a combination of greenhouse gas emission and food loss factors in addition to user-defined parameters for the specific food product value chain to generate the greenhouse gas emissions involved in bringing the food product to the consumer.

Food loss and waste will continue to have a significant impact on global food security and the climate unless strategic steps are taken in the global food system. It is critical for governments, industries, and all stakeholders to help make this happen. In developing countries this can be achieved by:

- Providing financial support to farmers to acquire mechanical systems for their agricultural practices
- Having industrial collaborations to make available mobile processing units to produce value-added products and reduce the losses during transportation of food from farms to centralized factories
- Promoting the use of better farm inputs

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