Tech to Reduce Agricultural Loss Mitigates Climate Change & Boosts Farmers' Incomes

Food that spoils in farmers' fields or on the way to market wastes nutritional resources and exacerbates climate change with massive amounts of methane. A slew of start-ups in Southeast Asia are developing solutions to reduce that food loss.

Food Loss is Huge and Impactful

To understand food loss, it is essential first to know what it is. While food loss waste and food loss seem similar, they are actually different.

Food waste happens at the retail and consumer levels, Green Network explained. It includes thrown-out leftovers, expired ingredients, spoiled food and unsold produce. Food loss, on the other hand, occurs before it even reaches supermarkets or consumers. Loss happens during post-harvest processing, storage and transport. Whereas food waste more often occurs in higher-income countries or urban areas, food loss is a serious issue in rural areas, where it totals 40 percent of production. About 19 percent of cereal grain is lost in Thailand, for example, and about 33 percent of rice is lost in the Philippines.

In Southeast Asia, the WEF noted, nearly 17 percent of food is lost or wasted, with most of the loss between harvest and the consumer. Indonesia loses 20 percent of its harvested crops each year, while the Philippines loses up to 50 percent. The causes include inadequate transportation, processing and storage facilities as well as poor harvesting techniques or timing, rough handling or uneven drying. The ADB said the loss results in a large carbon footprint from methane emitted by rotting food, crop residues and agricultural by-products.

That food loss is costly. Food waste and loss globally costs more than $2.6 trillion per year, according to the UN, and Southeast Asia suffers a major portion of it. Analysis by McKinsey showed that reducing post-harvest crop losses in Southeast Asia by 40 percent would equal the food output from 1.8 million hectares of land. This potential gain can be achieved by approaches and technologies, both traditional and advanced, that address why losses occur.

Solutions Abound

Even though the Food Systems Road Map at COP28 proposed halving emissions from food waste by 2030, Fulcrum writer Elyssa Kaur Ludher opined that the document lacked explicit references to food and agriculture. Even so, a multitude of organisations have found solutions.

The WEF suggested, for instance, that four ways to reduce food waste or loss in Southeast Asia are increasing agricultural productivity, reducing post-harvest losses, improving access to markets and building resilience to climate change. Others, the ADB said, include enhancing soil as a carbon sink, deploying technologies and materials to reduce and capture livestock and crop-related emissions, and using renewable energy. ASEAN can also benefit from circular agriculture and by valorising or converting agriculture and food waste into feed and fertiliser inputs. The region's rubber, oil palm, rice, and other industries produce large amounts of agricultural biomass waste, with Indonesia, Malaysia and Thailand producing 854 million tons of biomass waste from the oil palm industry alone.

Using Vietnam as an example, the US International Trade Administration said the government's intention to reduce food loss to less than 10 percent via cold chain storage could reduce post-harvest losses that account for about 20-25 percent of losses, with a value of about US$3.9 billion each year.

Another promising potential intervention is artificial intelligence (AI), ISEAS-Yusof Ishak Institute visiting fellow Elyssa Kaur Ludher and researcher Kristina Fong Siew Leng explained in Eco-Business. AI could increase farm productivity globally by up to 67 percent by 2050, according to the International Food Policy Research Institute (IFPRI). AI algorithms can leverage images or sensors via mobile phones and drones or satellite imagery to diagnose crop

health, analyse soil moisture, project weather patterns and identify optimal harvest timings. Farmers can use the insights to make decisions on irrigation, fertilisation, and pest and disease control to maximise yield and minimise loss. AI can also analyse transport routes and storage capacities to optimise supply chains and get food to market in good condition.

Start-Ups Offer Solutions

Large domestic or international agricultural producers or food procurers as well as research organisations across South and Southeast Asia are among the many organisations developing solutions. A slew of start-ups are also developing innovative solutions to address the problems.

A significant portion of those start-ups are in India, which GIZ said has more than 1,200 "AgroTech" firms and start-ups. Their innovations include digital-tech and data-driven solutions that analyse data to advise farmers how to reduce food losses, post-harvest management solutions such as cold storage and processing, and aggregation and distribution to make the food supply chain more transparent and efficient.

Inficold provides cold storage which covers most farm gate needs for post-harvest management, for example, and S4S Technologies provides solar-powered dehydrators to help women farmers increase the shelf-life of produce. Agrowave focuses on farm-to-market mobility via an integrated network of mobile pickup stations. WayCool leverages AI to calculate demand, Mongabay added, so farmers can plan better and prevent produce from rotting.

Many start-ups in Southeast Asia are also seeking to reduce food loss.

Freshket in Thailand, for example, provides an end-to-end food supply chain platform and an online marketplace that sources and distributes fresh products directly from farmers to restaurants and hotels. By focusing on developing better technologies, processes and applications, it provides fairer pricing and transparency for the ecosystem, from farmers and food producers to restaurants and hotels.

Another firm is Octayne, which converts waste biomass from agriculture into a low-cost and scalable replacement for coal by converting a signification portion of post-harvest crop residue into a sustainable fuel source. By raising awareness about sustainable farm waste practices, Octayne also aims to address the problem of crop residue burning. It targets Indonesia and then plans to expand to Thailand and Vietnam.

Koltiva enables clients to achieve traceable and resilient supply chains as well as sustainable practices, which helps farmers reduce losses and also obtain premium prices for their crops. It supports producers by providing access to inputs, knowledge and financial services so they can increase farm productivity.

Ricult in Thailand offers digital and AI solutions such as satellite images and big data that allow it to forecast weather, crop yield and carbon footprint effectively as well as to improve data management to enhance the supply chain. The services also enable it to support sustainable agriculture, which helps carbon footprint reduction and forest preservation.

While plenty remains to be done, these start-ups and a multitude of others across the region are developing solutions that can reduce food loss substantially and help mitigate climate change.