



# FOOD LOSS AND WASTE: VALORIZING WASTE WHILE MAINTAINING FOOD SAFETY

Reducing food waste can have a positive impact on food security, the climate and the overall sustainability of agrifood systems. Since food waste and by-products may contain contaminants, it is essential to incorporate food safety management measures when redistributing or upcycling these materials for other uses, to ensure consumer health.

## FOOD WASTE: THE PROBLEM AND CIRCULAR SOLUTIONS

Around 14 percent of the world's food is lost after it is harvested and before reaching the market, while a further 17 percent is wasted in retail and by consumers. Food loss and waste accounts for 8–10 percent of global greenhouse gas emissions, driving climate change and in turn, negatively impacting on food security.

Under the Sustainable Development Goals (SDGs), target SDG 12.3 aims to halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses, by 2030. In support of this target, the FAO Voluntary Code of Conduct for Food Loss and Waste Reduction presents guiding principles and actions for countries to address the causes of food loss and waste.

Food safety and food loss and waste are linked; when crops and animal products don't meet food safety and quality standards, they should not be used as food and are often discarded. Food is also thrown out at the retail and household levels due to contamination issues. This contributes to food loss and waste. On the other hand, many practices that prevent food loss and waste, for example adequate storage and refrigeration, also improve food safety. Transitioning from the current linear "take-make-use-dispose" model to a circular model can address food loss and waste.

### KEY MESSAGES

- > **Reducing food waste** is a priority for food security, climate action and sustainability.
- > Various methods are being explored to **transform food waste** into valuable resources that are fed back into agrifood systems.
- > When repurposing or upcycling food waste and by-products, **food safety** should be a key consideration to protect consumer health.

This involves preventing food loss and waste across the entire food supply chain, redistributing surplus food that is safe and suitable for consumption, and recycling, upcycling or repurposing food by-products (like peels, seeds and pulp). It is critical to consider the potential food safety implications of these measures, to ensure a safe transition to circular systems.

## FOOD WASTE AND BY-PRODUCTS: FOOD SAFETY CONSIDERATIONS

There are a number of food safety issues to consider when using food waste and by-products to close the loop in a circular economy:

### > RISK OF MICROBIOLOGICAL AND CHEMICAL CONTAMINANTS IN FOOD WASTE

Food waste may contain pathogens (bacteria, viruses, fungi) and parasites or other chemical contaminants like fungal toxins and heavy metals. The level of risk depends on the type of food and the degree of spoilage and contamination before and after disposal.

Since pathogens or contaminants could potentially transfer to the food or feed grown in the compost, this can pose a risk to human and animal health when using food waste to make compost. However, with correct management, food waste compost systems can eliminate pathogens and many countries have statutory or voluntary standards for compost sanitization.

### > PHYSICAL HAZARDS AND MICROPLASTICS IN FOOD WASTE

Food waste can be contaminated with fibrous waste or plastic packaging if not properly separated or screened. For example, if the twines used to support plants are not removed from waste crop material, they will transfer into the composting process. In addition to the physical hazards to handlers, these wastes often introduce other contaminants, such as microplastics and plastic additives. While the food safety risks from microplastics are still not fully understood, the increase of plastic additives in the compost can potentially present a pathway for uptake of these substances into food crops.



©FAO/Eduardo Soteras

### USING INSECTS TO REDUCE FOOD WASTE

Raising insect species on food waste and by-products is increasingly being explored as an option for transforming waste into valuable resources for the agrifood sector. Insects can then be used as animal feed or as food for humans. In many countries, it is customary to eat insects and there is increasing interest globally in farming insects as a food source with a good nutritional profile and low environmental footprint. Aside from the direct consumption of insects for food or feed, protein and oils extracted from insects are alternative sources to supplement and replace oilseeds and fishmeal production, reducing land and stock demands.

What are the food safety considerations of using insects in this way? General food safety aspects related to consuming insects have previously been explored by FAO, concluding that the food safety hazards depend on the rearing conditions and insect species. There is a potential for rearing insects on crops that would not be acceptable for food or feed. While some studies have shown that insects do not accumulate certain toxins from contaminated feed, the science is incomplete, and further research is needed to safely utilize insects in food and feed applications.

Source: FAO. 2021. *Looking at edible insects from a food safety perspective. Challenges and opportunities for the sector.* Rome.

Agrifood Systems and Food Safety Division – Economic and Social Development

**Food and Agriculture Organization of the United Nations**

Rome, Italy

Required citation: FAO. 2024. *Food loss and waste: valorizing waste while maintaining food safety.* Rome.

The findings of this brief have been adapted from FAO. 2024. *Food safety in a circular economy.* Food Safety and Quality Series, No. 29. Rome. <https://doi.org/10.4060/cd1789en>



Some rights reserved.  
This work is available under  
a CC BY-NC-SA 3.0 IGO licence

