

# CIRCULARITY IN FOOD SYSTEMS

A SUSTAINABLE AND DYNAMIC VALUE-BASED FOOD SYSTEM

FOOD 2030: CIRCULARITY



The shift from linear processing and consumption of products, to a sustainable economy which is regenerative by design, requires disruptive innovation. It will allow reduced fossil fuel use and food waste, enhanced resource use efficiency, and increased recycling with the aim to retain as much value as possible across the food supply chain.

## SPECIFIC R&I BREAKTHROUGH TOPICS

**Reduced waste:** By using innovative technology and AI to measure the scale and incidence of their food waste, aware and organised consumers and food service providers can take action by adjusting levels of purchase, as well as establishing networks of food donations and exchange. Innovative solutions are also crucial to reduce post-harvest food loss and extend the life of fresh products. This may be through the use of sun-powered climatized stocking sites that protect perishable crops, or producing resistant, bio-degradable packages enhancing vegetables' resistance.

**New uses of waste:** Wilting produce can be used in soups, as well as ripe fruit in fresh smoothies. New techniques allow the conversion of food scraps into organic fertiliser, compostable bioplastics, biofuels, and renewable energy. As landfills run out of space, an increasing number of towns are diverting food waste to compost facilities, using the end product to restore depleted soil.

**New recycling business models:** An increasing number of start-ups are successfully making a business by converting food waste into renewable energy and other products, through a biological process called anaerobic digestion. Innovative companies are integrating worms and larvae into their economic cycles, so as to produce animal feed and organic fertilisers from waste. Entrepreneurs, in areas like coffee and beer brewing, are adding new services to their core businesses, such as the production of organic mushrooms from coffee grains and energy bars from spent cereals.

**New structure in food systems:** Innovative solutions designed at the consumer and producer/processor/retailer levels require an enabling regulatory environment to produce large-scale positive effects. Policies can make use of incentives, regulation, and co-ordination to address the effects of action against food waste on winners and losers. Food waste reduction priorities are also increasingly integrated into cross-sectorial policies, for example through legislation adding food waste to the list of mandatory recyclables.

## EXPECTED IMPACT

Circularity holds the potential to change food production, processing, and consumption patterns. In the social domain, circular economies can stimulate growth in high-skilled employment and create jobs in areas where unemployment is high. In the economic domain, it can provide new business investment opportunities and produce a positive impact on GDP. Circularity in food systems can also reduce extraction and use of natural resources, decrease GHG emissions and primary material consumption, reduce land-use, and save fresh water use.

## MARKET OPPORTUNITIES / CHALLENGES

- Financial institutions can provide innovative loan packages to smallholder farmers, while the latter can benefit from low interest rates thanks to public incentives.
- Waste management enterprises can expand their activities to incorporate reuse of material into their core business models.
- Lack of infrastructure, expertise and/or collaboration throughout the food chain can hinder absorption of innovative practices at the system level.
- The market share held by circular business models is limited. For example, food start-ups are often confronted with a lack of real market demand in the absence of anti-food waste regulation.
- Status quo biases that are still inherent in investments and consumer behaviour can slow the implementation of circular business models.

## EXAMPLE REFERENCES

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 Geislar S (2020), Quantifying Food Waste. Routledge Handbook of Food Waste, 255-268.  
 Schanes K (2018), Food Waste Matters - A Systematic Review of Household Food Waste Practices and Their Policy Implications. Journal of Cleaner Production, (1)978-991.  
 XU F et al (2018), Anaerobic Digestion of Food Waste – Challenges and Opportunities. Bioresource Technology, (247)1047-1058

## ASSOCIATED TRENDS IN FIT4FOOD2030 (URL)

- |                                 |   |
|---------------------------------|---|
| ○ Climate change                | ○ Responsible consumers                         |
| ○ Urbanisation                  | ○ Biobased packaging                            |
| ○ Demographic change            | ○ Packaging 4.0                                 |
| ○ Scarcity of natural resources | ○ Reduction of plastic packaging                |
| ○ Economic globalisation        | ○ Food waste recovery up-cycling/waste cooking. |
| ○ Health and food consciousness |   |

## ASSOCIATED CASES IN FIT4FOOD2030 (URL)

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|----------------------|-----------------------|
| ○ Feeding the 5000   | ○ Ostara              |
| ○ Foodwin project    | ○ KromKrommer         |
| ○ GrowUp urban farms | ○ Ecofeed             |
| ○ Rethink Resource   | ○ Toast Ale           |
| ○ Ultima Restaurant  | ○ Smart floating farm |
| ○ Winnow             | ○ TIPA                |
| ○ The Plant          | ○ Eat me (AT)         |
| ○ Fareshare          |                       |