

Digital Technological Solutions for reducing Food Loss and Waste (FLW)

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Primary production (including harvesting or Slaughter)



Food processing and manufacturing



Wholesale and retail



Out-of-home catering (restaurants, caterers, etc.)



Private households





- Losses during transport and storage
- Overproduction, i.e. no purchase on the market
- failed product and quality standards for market acceptance





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- Technical faults (temperature control, packaging/labelling, recipes)
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- Products no longer saleable due to suboptimal storage (temperature, light, etc.)
- Legal aspects: deviation from trade classes/product requirements; labelling errors





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- short-term changes in the number of meal guests; lack of monitoring of surpluses
- Consumer behavior: bad taste, portions too large, leftovers cannot be taken away





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- Shelf life of (fresh) food not considered when shopping
- Poorly planned purchases (too much bought, wrong purchases)
- wrong storage, wrong or inadequate preparation (too large quantities cooked)



Digital technologies can help avoid FLW at all stages of the value chain



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Examples for digital technologies and AI-supported approaches to avoid FLW

Pre-harvest-losses: Digital learning approaches

For example, CABI Academy offers online courses ("Crop Pest Diagnosis", Crop Pest Management", "Introduction to Bioprotection Products") to help farmers and extension workers develop and enhance their skills in identifying and managing plant diseases and to avoid potential harvest losses.

Food manufacturing: AI-supported forecasting and ordering systems

To completely automate quantity calculation for the baking process in large bakeries with many shop branches, a German company developed cloud-based software that digitises the ordering process. The software recommends the optimal delivery quantity based on objective key figures such as sales and returns quantities in the individual shops. Changes are immediately visible. In this way, overproduction, often typical for large bakeries, is reduced.

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Examples for digital technologies and AI-supported approaches to avoid FLW

Retail: Online-based marketing of non-standard vegetables and fruit

Companies like *oddbox* for example, market non-standard vegetables and fruit to consumers via a digital ordering and distribution system of delivery boxes.

Processing: Online B2B marketplaces for searching and offering raw materials

The start-up *Leroma*, for example, has created an online B2B exchange for food producers to search for raw materials and to offer own surpluses. The target group is almost the entire food processing industry, e.g. bakeries, fish industry, beverage producers, meat processing, milk and cheese industry, fruit and vegetable processing, confectionery producers, etc.





Examples for digital technologies and Al-supported approaches to avoid FLW

Trade-private household interface: Apps to inform customers about discounted food

Platforms like *FoodLoop* or *Too good to go* enable retailers to automatically discount products close to their best-before date. Through the apps, consumers are notified of these reduced offers in real time. For the retailer, this reduces disposal costs, saves labour and increases turnover. Customers save on the purchase of food that is still in perfect condition.

Out-of-home catering:

Al-assisted measurement of waste to optimise supply

Companies like *Winnow* or *Leanpath* offer automatic measuring systems for food waste in restaurants, canteens, hospitals, etc. Camera systems with adaptive databases quantify and qualify food residues on plates and in waste containers. This helps to optimise the quantities purchased and the dishes offered.











🚓 🏤 🏤 food banks in Argentina



















Food producers Supermarkets Trucking companies



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3. Based on this data, food banks can use empty runs of the trucking companies for surplus transport.



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Meanwhile, food banks are storing food surpluses less and less themselves, but are acting as a logistical network between the donors and the recipients.



This example, but also the others described briefly, illustrate the following:

- The basic precondition for the drastic reduction of FLW is that creative, smart ideas for action emerge from the existing knowledge of reduction possibilities in science and business.
- Digital technologies that can help us do this already exist on a large scale.
- Without creative ideas and the will to act, i.e. without social innovation, these technologies are of little use at first.
- But with the help of these technologies, we can mitigate and avoid FLW to a degree that would not be remotely possible without them.



A key insight and take home message:

We rightly discuss the need for joint research efforts in

- soil and water management,
- plant breeding,
- improved fertilization,
- control of transboundary plant and animal diseases,
- food behaviour, etc.

to make our food systems more sustainable, to feed a growing world population safely and to protect the climate.



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But we should be aware that we have by far the greatest leverage to achieve these goals by using the food we already produce today as loss-free as possible.







Thank you very much! धन्यवाद् !

