Food loss and food waste (FLW)

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Programme

14^{00}-15^{00} Part I: Setting the scene

- FLW amounts, causes, costs
- *Group assignment* | *Sharing insights*

15^{00}- 15^{20} Break

15^{20}-16^{20} Part II: Mechanisms and solutions to reduce FLW

- EU policies, behavior & incentives, reduction solutions
- *Group assignment* | *Sharing insights*
- Take-away messages

PART I
Setting the scene

- How much food is wasted or lost?
- What is food waste and what are food losses?
- Where in the food chain FLW take place?
- What are the SDG goals related to FLW?
- What are the causes of FLW?
- What are the (hidden) costs of FLW?

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Roughly 1/3 of food produced for human consumption is lost or wasted globally

Total food losses and waste amount to about 1.3 billion ton per year (FAO, 2018).

- 30% cereals
- 20% dairy products
- 35% fish and seafood
- **45% fruits and vegetables**
- 20% meat
- 20% oilseed and pulses
- **45% roots and tubers**

- About 2/3 of all food waste occurs in perishables products (fruit & veg, bread, dairy, fish, meat)
- In the Netherlands total food loss values € 4.4 billion, Household food waste in Netherlands: 120 euro pp/year = € 2.2 billion (source: Voedingscentrum 2019)

Food loss

Food Loss is the decrease in the quantity or quality of food resulting from decisions and actions by **food suppliers in the chain**, excluding retailers, food service providers and consumers

FAO, 2020

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Food waste

Food Waste refers to the decrease in the quantity or quality of food resulting from decisions and actions by **retailers, food service providers and consumers**

FAO, 2020

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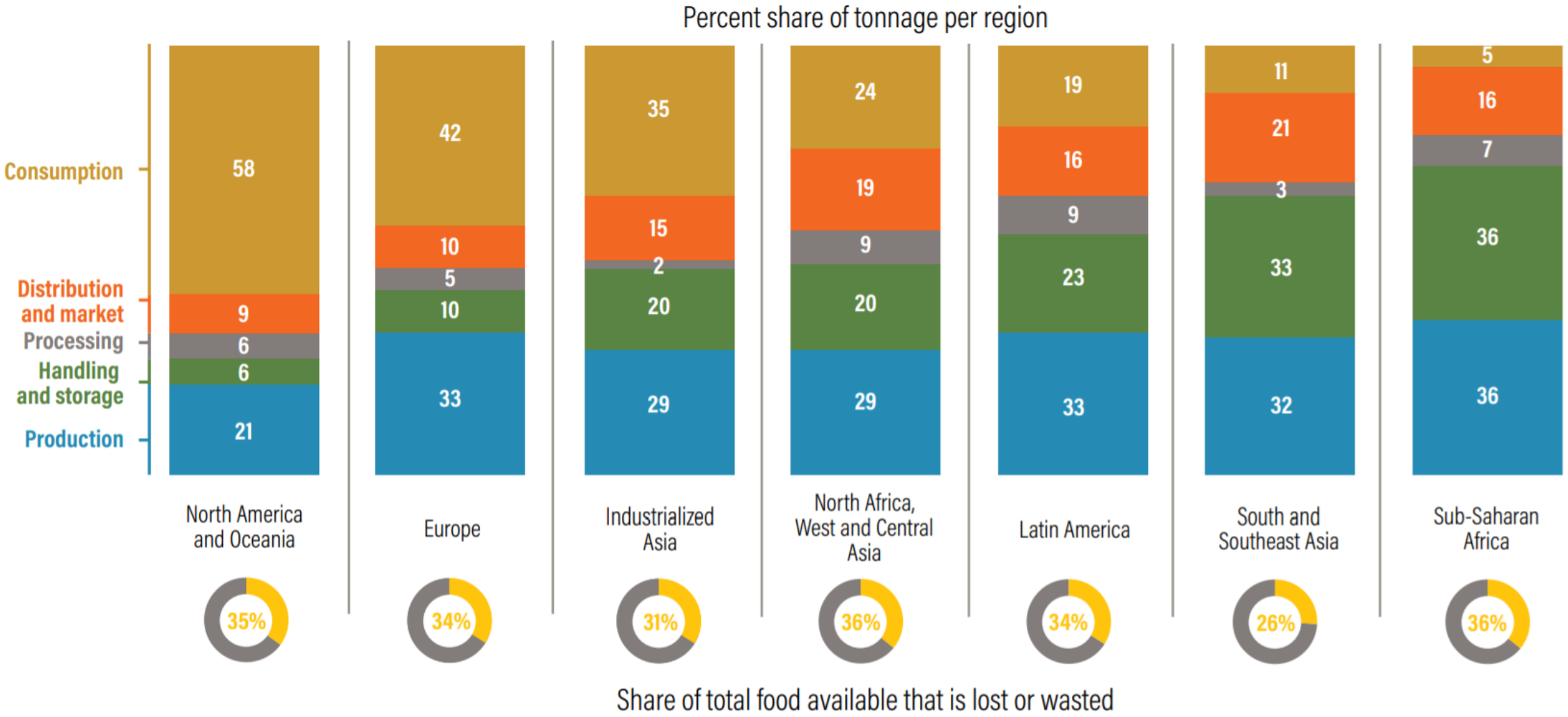
Food loss and waste per region & value chain segment



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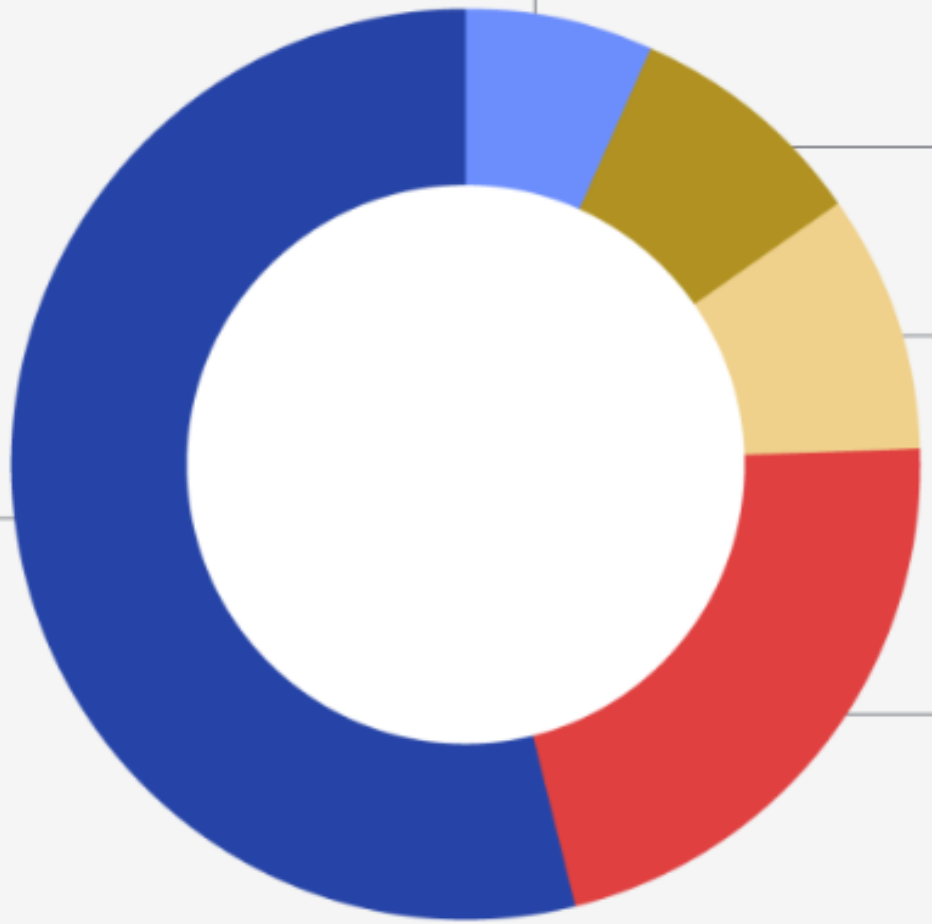
Food waste in the EU by main economic sectors, 2021

(kg per inhabitant)

TOTAL: 131 KG PER INHABITANT



9KG
RETAIL AND OTHER DISTRIBUTION OF FOOD

11KG
PRIMARY PRODUCTION

12KG
RESTAURANTS AND FOOD SERVICES

70KG
HOUSEHOLDS

28KG
MANUFACTURE OF FOOD PRODUCTS AND BEVERAGES

Data not available: Czechia, Germany, Greece, Spain, Cyprus, Malta, Romania.
Due to roundings, the sum of the values for the categories does not match the total.

eurostat

Have we started wasting more or less food? Facts from NL

- In NL approximately 2 mln tons of food is wasted every year

=

- Despite the decrease in FW among Dutch consumers in 2013 -2019, there seem to be a stagnation. Decrease in bread and dairy FW.
- Differences in reporting numbers for Dutch FW between EU and NL
  - Differences in definitions EU vs NL (2.8 mln t vs 2 mln t)
  - NL is food producing and exporting country
  - Differences in data quality among MS

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SDG 12.3 - Global Food Loss and Waste

SDG 12: Responsible consumption and production

Ensure sustainable consumption and production patterns

Sub-goal SDG 12.3

By 2030, 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

Truly a global target... although solutions may differ between developed and developing nations, every country, company, and individual has a role to play.

Progress on SDG 12.3

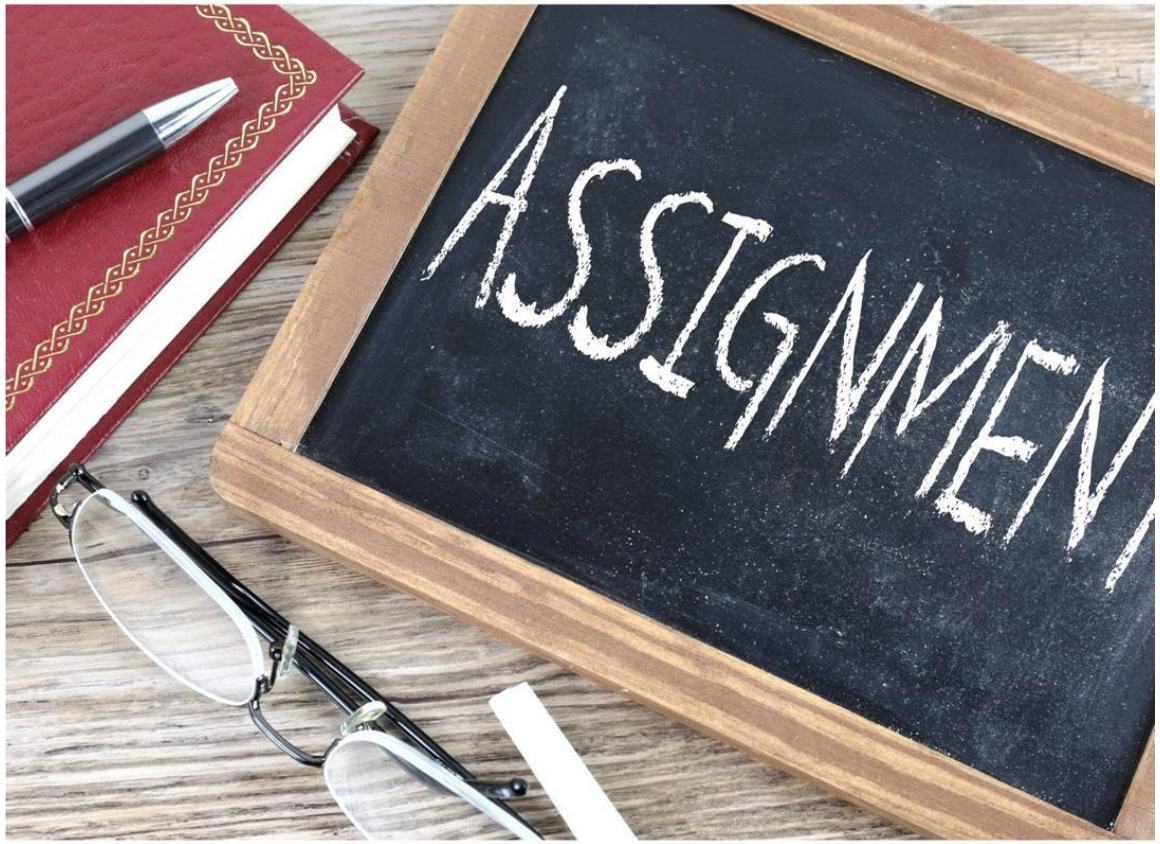
- COVID-19 and Russia's invasion of Ukraine have exacerbated FLW by causing massive disruptions to human supply. Although progress toward achieving SDG 12.3 continues to be limited, there are signs of movements as many initiatives in FLW reduction are being implemented at all stages of the food supply chain.
- The **UK** is the first country to get more than halfway toward meeting this target, having reduced its national food loss and waste levels by 27% from 2007-2018. *Several companies* have achieved food loss and waste reductions of more than 30%.
- As of 2022, the **Netherlands** has achieved a reduction in household food waste from 48.0 kilograms (kg) per capita to 33.4 kg per capita since 2010, a 30 % reduction *at the consumption stage* of the food value chain.
- From 2022, all **European MS** are obliged to report their food waste annually
- But: With just 7 years to go, *the world is far behind* where it needs to be to achieve SDG Target 12.3 by 2030.

September 29- International Day of Awareness of Food Loss and Waste

Assignment: FLW causes, impact and costs

In group of 2-4 people (15 min discussion + 10 min share insights)

1. What are the causes of FLW?
    a. Differences among industrialized and developing countries
2. What is the impact of FLW on climate change?
3. What are the (hidden) costs of FLW?



Drivers of food losses and waste

Technological

- Related to characteristics of food
- Related to modern technologies
- Related to the suboptimal use of & mistakes of modern technology

Business & economy

- Related to management solutions operated within & between food supply chain
- Related to broader economic & structural variables

Institutional

- Related to agricultural policy, food quality & marketing standards
- Related to food safety, consumer health & information
- Related to the waste, taxation policies & other policies

Social

- Related to wide social dynamics that are difficult to change
- Related to consumers' behaviors

Examples of FLW drivers

Technological

Related to food characteristics:

Perishability of the products due to storage & microbiological issues;

Contaminations, seasonal variation, etc.

Related to modern technologies

Processing methods: mechanical peeling, handling, automated harvesting

Related to suboptimal use & mistakes

Cold chain inefficiencies; damages during transportation

Business Management & Economy

Related to business management solutions

Production errors- wrong labels, failure of heal seal in packages;

Errors in grading and sorting of food products;

Incorrect forecast leading to overproduction; Production of sub-standard food;

Prolongation of food shops' opening hours

Related to economy

Low prices of farm products stimulating unharvesting and product;

Limited access to finance in developing counters;

Cheap price of food in households in developed countries

Institutional

Related to agricultural policy, quality & standards

Marketing standards for fruit & vegetables;

Related to food safety, consumer health & information

Compliance with safety standards;

Complexity of European legislation on labelling information;

Issues with food donations- liability, VAT, etc.

Related to the waste, taxation policies & other policies

Waste disposal taxation and/or fees lower than environmental & operational costs

Lack of tax breaks and fiscal incentives on food donations

Social

Related to wide social dynamics that are difficult to change

Urbanisation & related changing dietary habits;

Modern "busy" lifestyles; Relatively high-income level

Related to consumers' behaviors

Consumers' preference for the wide choices about food products;

Poor food skills and information;

Practice of making bulk shopping;

Practices of unplanned and "spontaneous" food purchases

Further reading on causes of food waste:

Drivers of post harvest food losses

https://www.mdpi.com/2071-1050/11/3/579

Drivers of food waste

https://www.mdpi.com/2071-1050/9/1/37

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Costs of FLW (from FAO, 2019)

- **RESOURCE COST: $1 trillion from resource costs**
  - Wasted labor, material resources, time and energy that go into food production.
  - It's nearly impossible to estimate the potential economic benefits from redirecting these resources, but the situation carries considerable gravity (TheEconReview, 2019)
- **ENVIRONMENTAL COSTS: $700 billion per year**
  - From resource overuse- like water scarcity and soil erosion- and from pollution
  - 95% of food waste goes to landfills, which produce methane, the one of the causes in climate change
- **SOCIAL COSTS: $900 billion per year**
  - Impact on poorer individuals- nutritional deficiencies for lower-income people
  - Higher healthcare costs and lost productivity from individuals weakened by nutritional deficiency and food insecurity


THE UGLY TRUTH ABOUT
FOOD WASTE

Reducing food losses and waste can be a triple win

1. **It can help feed more people** (increasing food and nutrition security: volume, calories, micronutrients)

2. **It can save money** for farmers, companies, and households (reducing costs, increasing profits)

3. **It can reduce the food system's environmental impacts** (reducing resource use: land, labour, water, chemicals, fuel)


Have a
Break

PART II

Mechanisms to reduce FLW

- EU policies affecting FLW
- Behavior and incentives
  - Michie model
  - Positive and negative incentives
  - Case: Moving from Niche to Norm
- Reduction solutions
- Food waste – food security claims

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Marketing Standards....

Edible and safe food products that do not meet aesthetic criteria (e.g., size and shape) can be taken out of the food supply chain

..... and labels: how do you read these?

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The difference is...

Confusion about the different meanings of “best before,” and “use by” dates is still a cause of food waste.

More examples of EU Policies affecting FLW

- Hygiene rules (Food Hygiene Package): caution that a rule excessively binding and disproportionate to practical hygiene needs might cause food waste.
- Producer liability (EU General Food Law): Recently some EU MS adopted legal provisions at national levels that has exempted some food business operators from liability. One of these cases is connected to food donation (Good Samaritan Law), where food donors are relieved of liability regarding the final beneficiaries.
- VAT rules: In some countries, if the product cannot be sold, its price, and therefore the VAT of the product, is calculated as "zero." Conversely, in other EU Member States, the price of a product to be donated is calculated to be the same as its purchase price. Thus, VAT is assessed at the same level. This could discourage donations, with obvious negative consequences.

The question is how to adapt the policies to achieve a change?

FLW and Behavior

- *Improving the design and implementation of evidence-based practice depends on successful behavior change interventions (Michie, et al., 2011*).
- What are the drivers of behavior?
- How to incentivize behavior change?
- What for instruments can be used?

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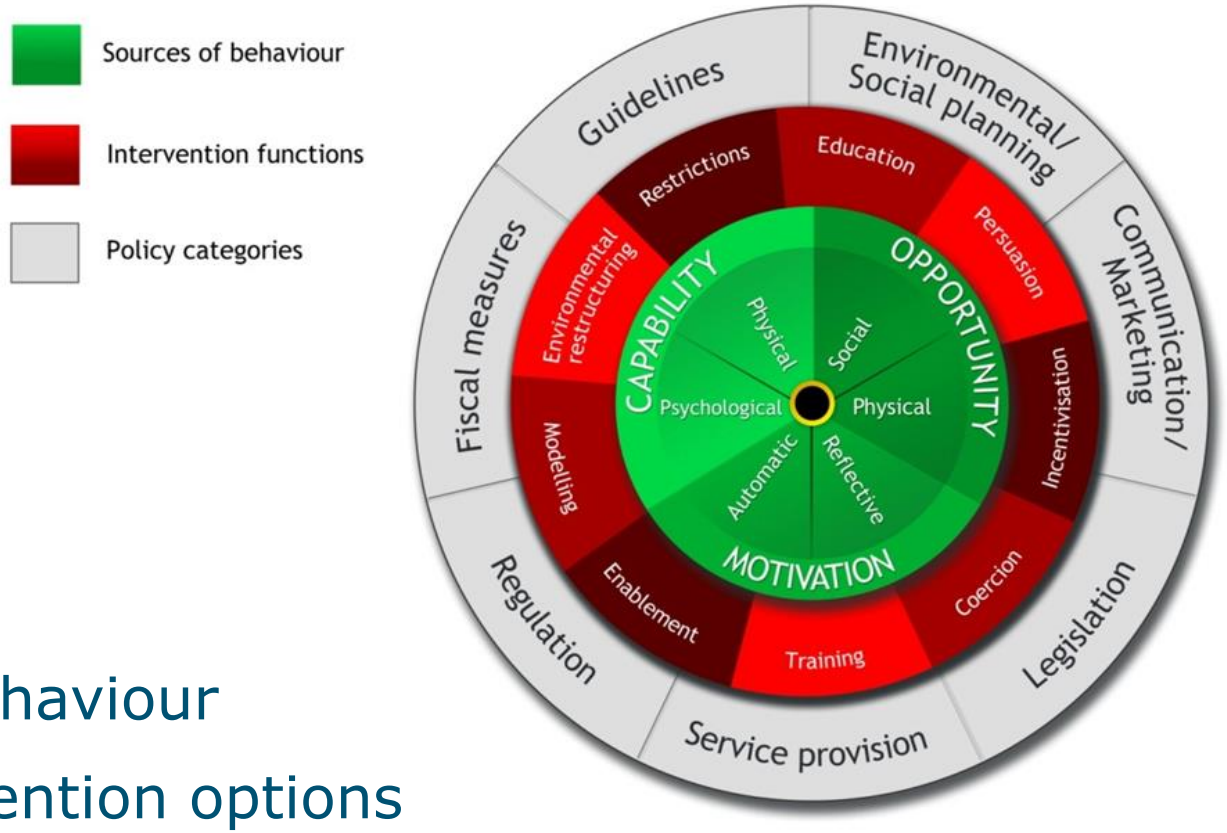
Behavioural change wheel (Michie et al., 2011)

COM-B model: Behavioral outcomes are driven by people's capability, motivation and opportunity to change behavior (*Michie et al., 2011*).

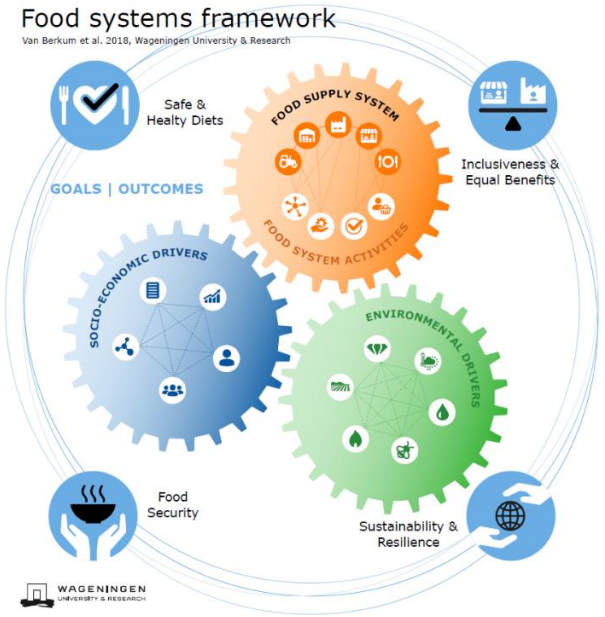
Bottlenecks related to each of these aspects require a **specific mix of instruments and tools**.

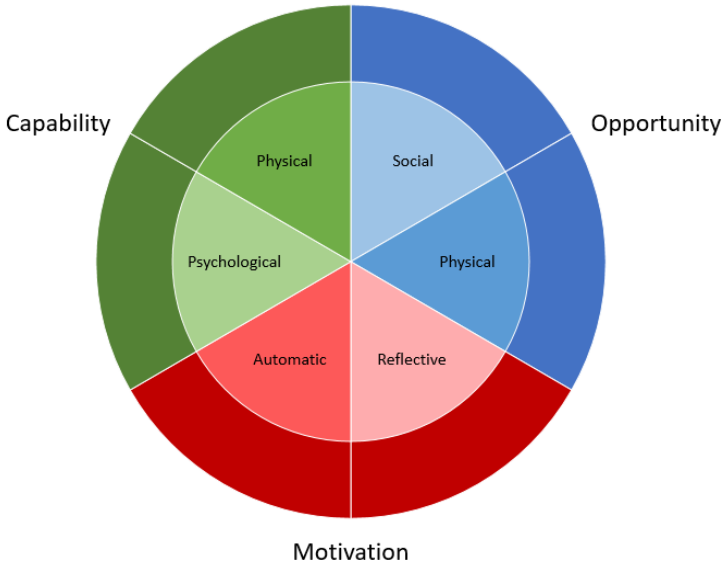


1. Understand behaviour
2. Identify intervention options
3. Identify content and implementation options

Michie, S., Van Stralen, M.M., West, R., 2011. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implementation Science 6, 1–11. https://doi.org/10.1186/1748-5908-6-42

Case:Moving from Niche to Norm- Lessons from Food Waste Initiatives





- Food system activities within the food supply system are closely interrelated with **socio-economic drivers** (economic conditions, personal factors, culture and social norms, rules and regulations) and **environmental drivers**.
- Individual behaviour is resulting from a combination of personal / intrinsic factors, and from the enabling environment.

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Together against food waste

Together against food waste

- Intervention in itself (facilitating collaboration)
- Hosting various interventions

5 interventions that are part of Together against Food Waste were analysed:

- Food waste challenge in hotel-sector
- Side stream valorization in bread & dough value chain
- Food waste challenge in higher education (developing business cases)
- Voucher enabling knowledge exchange between industry and research for side stream valorisation.
- Baseline measurement of food waste in retail sector

Common success traits and barriers

Presence of a motivated initiator (M-of COM)
Dependence on a single motivated person

Having the right external partners and internal collaboration (O-of COM)
Opposing interests of stakeholders

Awareness of a societal problem for spurring motivation (Contextual factor)
Lack of common understanding of problem definition

Availability of financial and/or operational resources (O-of COM)
Small investment margin

Capability (Management skills, Knowledge and Experience) (C-of COM)

Fragility of frontrunner position

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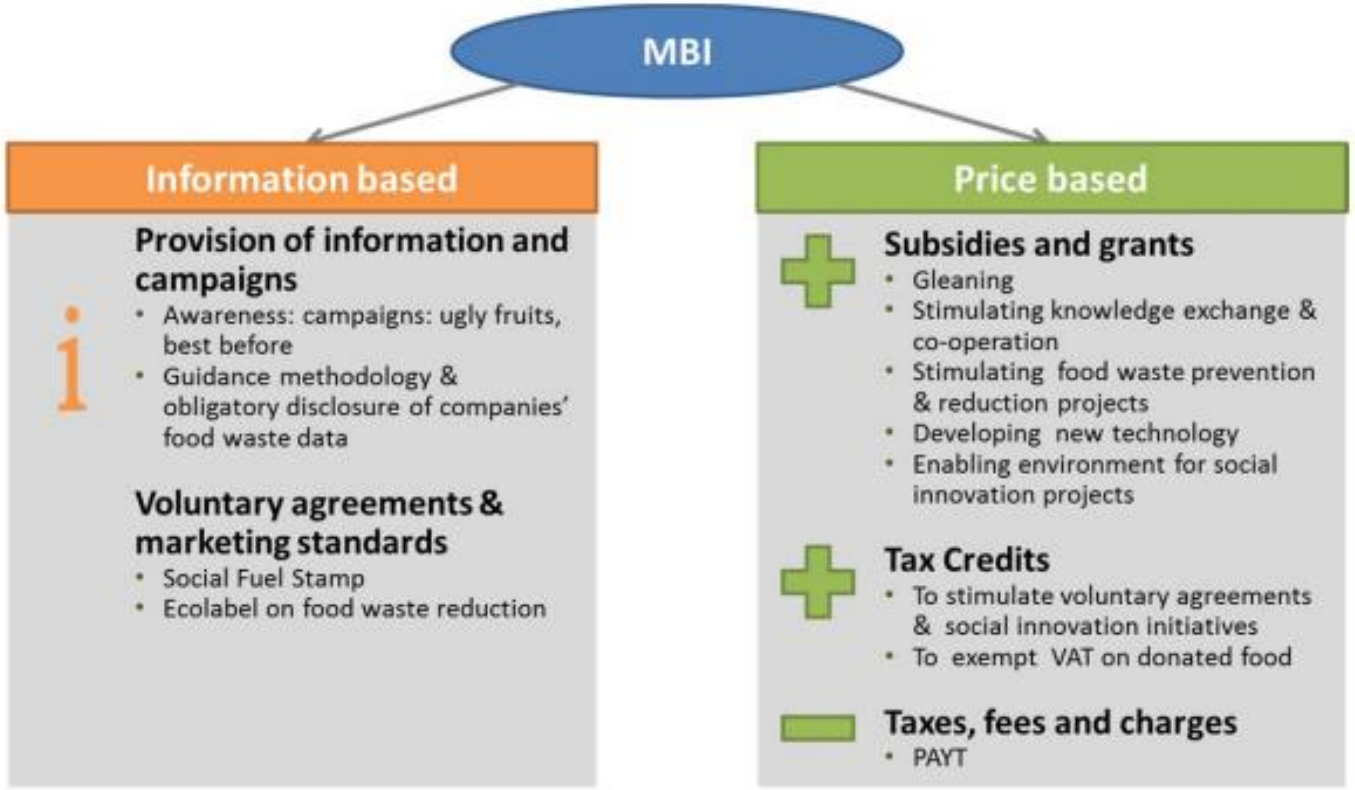
For behavior change to become a new shared norm, a combination of instruments is needed that provides the right incentives for a change

- Development and stimulation of new business models
- Integrated sector approach
- Continuous attention for long term vision and impact
- Agenda-setting and public awareness
- Stimulation of collaboration & partnerships

Market-based instruments (MBIs)

Policy tools that encourage behavioral change through market signals rather than through explicit directives

- Price-based, quantity-based & informational-based instruments
- Positive vs negative incentives
- Mixed incentives



Source: EU Fusions, 2016 Analysing food waste policies across the EU-28 (eu-fusions.org)

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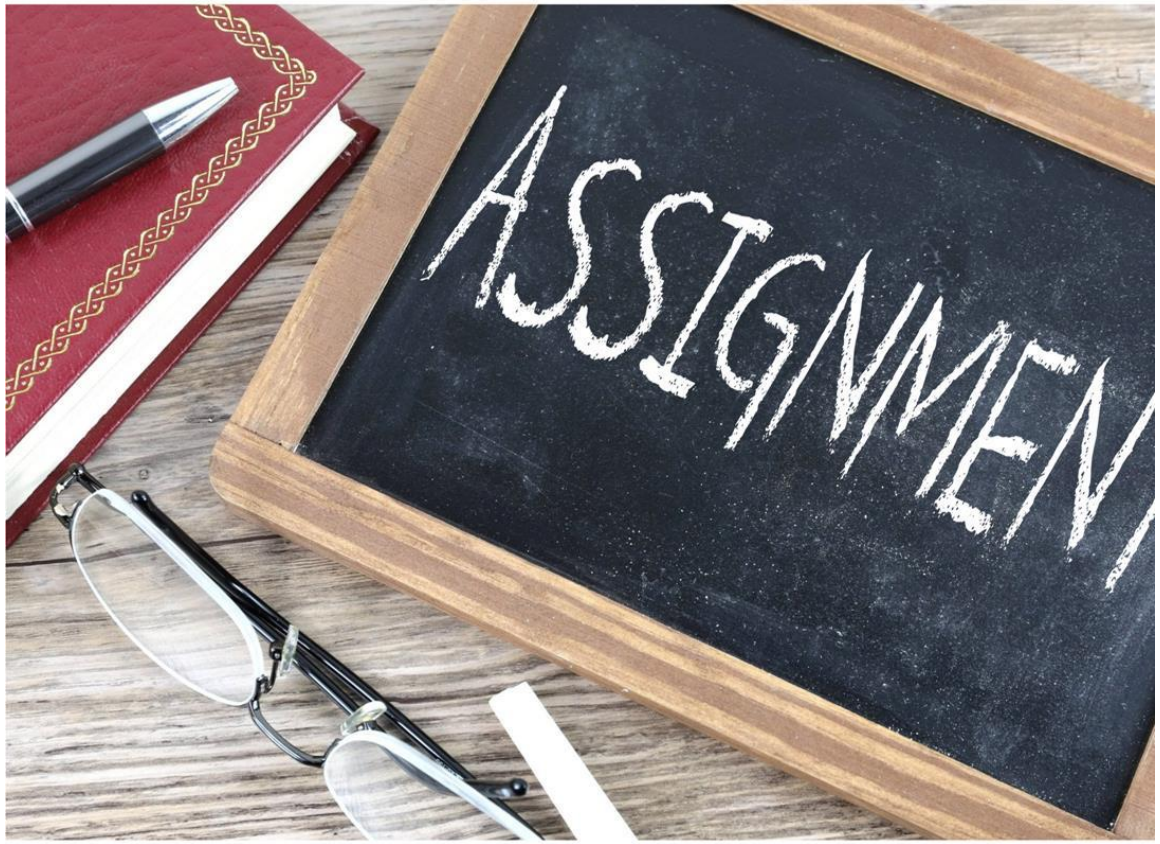
Assignment: FLW causes, impact and costs

In group of 2-4 people (10 min discussion + 10 min share insights)

Think about a food waste or food loss case in your own country

1. Which instruments would have most potential for reducing food loss / food waste?
2. What could be the trade-offs from implementing this instrument?



Solutions to reducing losses

- Improve quality and timing of **inputs** in agricultural production
- Reduced mechanical damage during harvest
- Extension of **product shelf-life** through technological and scientific manipulations on production/processing conditions
- Improve **planning**
- Use **contracts** + incentives in contracts to reduce waste
- **Avoid errors** in production (labels, product contents)
- Finding alternative uses of **secondary streams**
- Adapt/implement **technologies** (packaging, storage cold chain, etc.)
- ….

Solutions to reducing waste

- Raise **awareness**, educate professionals, children and students
- Adapt marketing **standards**
- Reduce margins of **best-before dates** when possible
- Customized meal/portion **servings**
- Innovations in **promotion**
- **Consumers** to avoid buying too much (shopping lists) and to cook in correct quantities (measures)
- **Government regulation** e.g.: French Food Waste Law (4000 euro fine if supermarkets are caught throwing away edible foods, since 2016)
- **Private entrepreneurship:** business cases

INSTOCK

Too Good To Go

Business realities & value chain dynamics

- Preventing/reducing loss may be (very) cost-effective...
- But, investing in reducing losses:
  - May involve too much risk
  - May not lead to a net-benefit (waste = business)
  - May involve a long payback time
  - May not be possible due to constraints in resources (e.g. access to credit)
- There may not be a ready market for the extra produce
  - In the longer term: development new markets
  - In the long term: change of production patterns

Action needed

- Focus on business cases for FLW reduction (moving away from business cases driven by excess production)
- Better collaboration between governments, financial institutions and private sector: create an enabling environment for reducing FLW
- Evaluate / redesign policies that might (unintendedly) incentivize food loss and waste (i.e., subsidies, standards, not taking into account true price of food)
- Increase effort to measure and innovate
- Influence consumer choice: behavior change is key
- Act in parallel, both in developed and developing countries, since loss and waste of food happen everywhere

Food waste – food security claims

True or False? | Reducing FLW directly leads to improved food security.

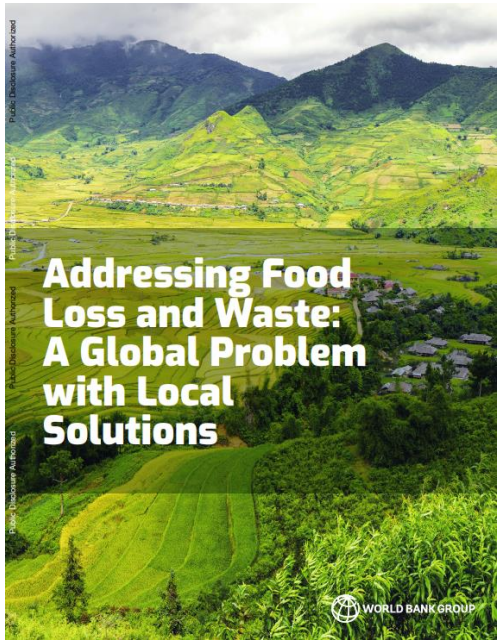
Source: http://www.rescuingleftovercuisine.org/food-insecurity

Does reducing losses lead to less hunger?

- Yes, for some; but not for others...
- They are not direct impacts as they do not take into account interactions between:
    - Demand and supply
    - The role of prices
    - Interactions between actors and sectors in the food system and in the wider economy
- Impacts commonly presented in terms of:
    - Value of resources embodied in the waste (water, land)
    - Value of output of:
        - What could have been done with lost / wasted food
            - Feeding people
            - Saving money and using it for something else
            - What could have been avoided (input use, emissions)

Take-aways

- **Low food prices** are a key driver of FLW at all levels of the food supply chain (FLW is cheap, and therefore difficult to combat).
- Reducing FLW would help **reduce the environmental footprint** of food systems while at the same time **improving food security**.
- However, a decline in FLW do **not translate one-to-one** to more food security.
- **Impacts** of a reduction in FLW at a specific stage are usually **ambiguous**, requiring empirical analysis of each situation.
- Various **interventions** can be considered, depending on FLW reduction policy objectives, commodities, and stage of the supply chain to target.
- **Research** will have a key role to play, and it is essential that food research agendas consider the entire food supply chain and explore new and existing ways to reduce FLW.



World Bank, 2020

Studies on FLW for further reading (by WEcR)

Behavioral economics in food waste prevention, reduction	Identifying the most important behavioral economic interrelationships influencing the adoption of innovations by businesses https://eu-refresh.org/socio-economic-implications-food-waste-business-behavioural-typologies-and-interrelationships
	Moving from niche to Norm: Lessons from food waste initiatives https://edepot.wur.nl/551548
	Behavioural economics : assessing food waste innovations diffusion through ABM models - insights from Italy and the Netherlands https://doi.org/10.18174/478168
Policy analysis	Analyzing food waste policies across the EU-28 https://www.eu-fusions.org/index.php/publications/267-analysing-food-waste-policies-across-the-eu-28
	Market-based instruments and other socio-economic incentives enhancing food waste prevention and reduction https://www.eu-fusions.org/index.php/publications/267-analysing-food-waste-policies-across-the-eu-28
	Food redistribution policies and practices in the EU https://op.europa.eu/en/publication-detail/-/publication/189fa4cd-b755-11ea-bb7a-01aa75ed71a1/language-en
	Removing cosmetic aspects from the EU marketing standards: implications for the market and impact on food waste https://doi.org/10.18174/503631
FLW drivers, causes, solutions	A Systems Approach to Food Loss and Solutions: Understanding Practices, Causes, and Indicators https://www.mdpi.com/2071-1050/11/3/579
	Food waste drivers in Europe, from identification to possible interventions https://www.mdpi.com/2071-1050/9/1/37
	Food waste reduction in supply chains through innovations: a review https://edepot.wur.nl/551548
FLW & food security	Potential impacts on sub-Saharan Africa of reducing food loss and waste in the EU: A focus on food prices and price transmission http://www.fao.org/save-food/news-and-multimedia/news/news-details/en/c/370008/
	The relationship between household food waste and food security in Tehran city: The role of urban women in household management 10.1016/j.indmarman.2021.06.016
	Using food loss reduction to reach food security and environmental objectives – A search for promising leverage points https://www.sciencedirect.com/science/article/pii/S0306919220301196

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Further reading (open access literature) & videos

Reading

- Sheahan, M., & Barrett, C. B. (2017). Food loss and waste in Sub-Saharan Africa: A critical review. *Food Policy*, *70*, 1–12. http://doi.org/10.1016/j.foodpol.2017.03.012
- Bellemare, M. F., Çakir, M., Peterson, H. H., Novak, L., & Rudi, J. (2017). On the Measurement of Food Waste. *American Journal of Agricultural Economics*, *99*(5), 1148–1158. http://doi.org/10.1093/ajae/aax034
- Affognon, H., Mutungi, C., Sanginga, P., & Borgemeister, C. (2015). Unpacking postharvest losses in sub-Saharan Africa: A Meta-Analysis. *World Development*, *66*, 49–68. http://doi.org/10.1016/j.worlddev.2014.08.002
- FAO. 2019. The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction. Rome. Licence: CC BY-NC-SA 3.0 IGO https://www.fao.org/3/ca6030en/ca6030en.pdf
- World Bank (2020). Addressing Food Loss and Waste: A Global Problem with Local Solutions https://www.fao.org/3/ca6030en/ca6030en.pdf

Videos

- https://www.youtube.com/watch?v=WvazXvoAXkk
- https://www.youtube.com/watch?v=LZj04mXXRmI&t=8s
- https://www.youtube.com/watch?v=pxoz88-GXyk
- https://www.youtube.com/watch?v=4xow3iBjr3Y&t=18s

Time for questions!

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