



Leibniz Institute of Agricultural Development
in Transition Economies

Overview on Food Loss and Waste: a Sustainable Approach

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- Significance of FLW
- Reconsideration on the measurement of FLW
- Objectives for reducing FLW
- Policy implications to achieve a sustainable goal

Significance of FLW

As an increasingly and globally recognized problem, food loss and waste (FLW) is of high interest to the public, politicians, and researchers from various fields.

France battles food waste by law
France has become the world's first country to ban supermarket waste and compel large retailers to donate unsold food. While many charities hail the legislation, some worry about their capacity to handle the extra food.

正在阅读: 惊人! 中国餐饮业人均浪费食物11.7%
浪费率11.7%
大型聚会浪费达38%
学生盒饭有1/3被扔掉

Fine dining from food waste
Europe throws away 88 million tons of food annually. Now, a Berlin restaurant is turning food waste into gourmet meals from produce headed for the trash.

央视网消息: 2018年, 中国科学院地理科学与资源研究所和世界自然基金会联合发布的《中国城市餐饮食物浪费报告》披露, 中国餐饮业人均食物浪费量为每人每餐93克, 浪费率为11.7%, 大型聚会浪费达38%, 学生盒饭有1/3被扔掉。初步测算, 2015年中国城市餐饮业仅餐桌食物浪费量就在1700万至1800万吨之间, 相当于3000万至5000万人一年的食物量。杜绝餐饮浪费, 不仅关系到改变消费陋习, 更指向粮食安全这个事关国运的重大命题。

警醒! 时刻保持对粮食安全的危机意识

事实上, 连续多年稳定的粮食生产并未减少公众对于粮食安全的关注, 新冠疫情、洪涝灾害, 特殊的2020年, 国人更需要认真对待粮食的巨大浪费现象。

昨天(8月13日)上午, 国新办发布会透露, 今年洪涝灾害已经导致6032.6千公顷农作物受灾, 其中绝收1140.8千公顷。

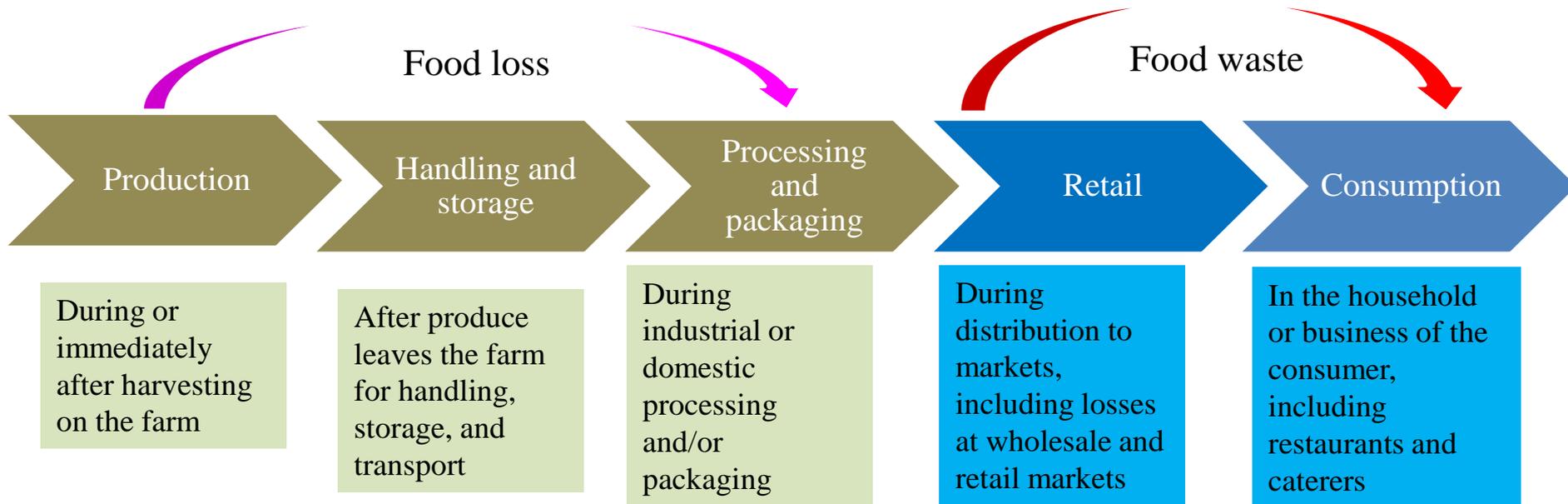
FUSIONS Newsletter
Check out the food storage directory and learn how to avoid #FoodWaste with these essential storage tips...

missioner Health & Food Safety
speak a keynote speech at the final European Food Safety Summit in Brussels...

FUSIONS Retweeted
Interested in #EUFoodWaste? Check here for news from our national partners and network organisations about #FoodWaste

Significance of food loss and waste

Definition of food loss and waste from FAO



Source: WRI analysis based on FAO. 2011. Global food losses and food waste – extent, causes and prevention. Rome: UN FAO.

Significance of FLW

Some facts:

- Globally, **one third** of the world's food production (1.3 billion tons) lost or wasted (FAO, 2013).
- Almost **half** of all the fruits and vegetables produced are wasted.

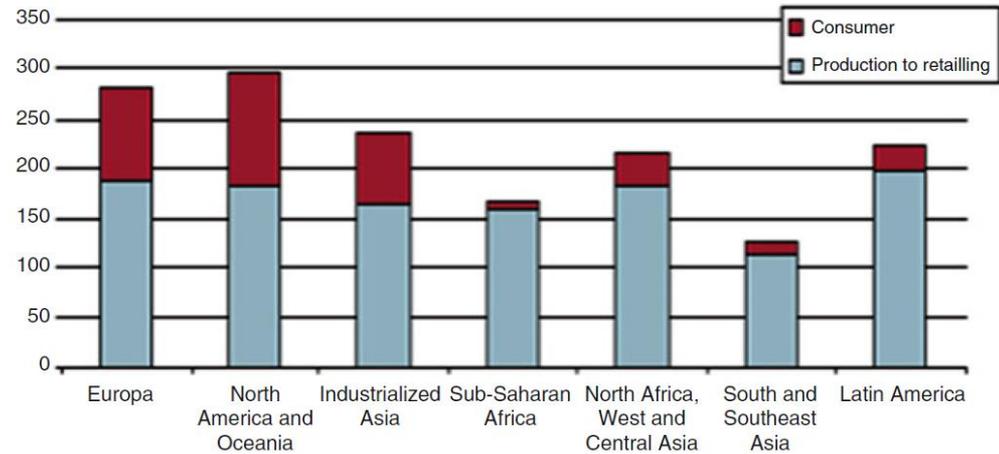


Significance of FLW

Some facts:

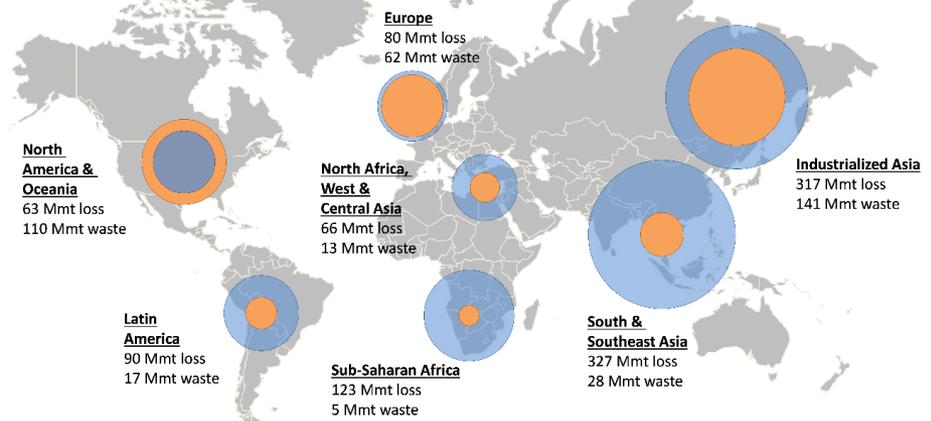
- ❑ Middle- and high-income regions, food waste at the **retail and consumer** level tends to be higher.
- ❑ FLW in developing countries mainly occurs at the **production stage** due to inefficient or inadequate facilities, logistics, and agricultural management.

Per capita food losses and waste (kg/year)



Food waste and food loss around the world, millions of metric tons¹

Unlike consumer driven waste in the developed world, over 90% of all wastage in developing Asia and Africa occurs during production, postharvest, processing, and distribution



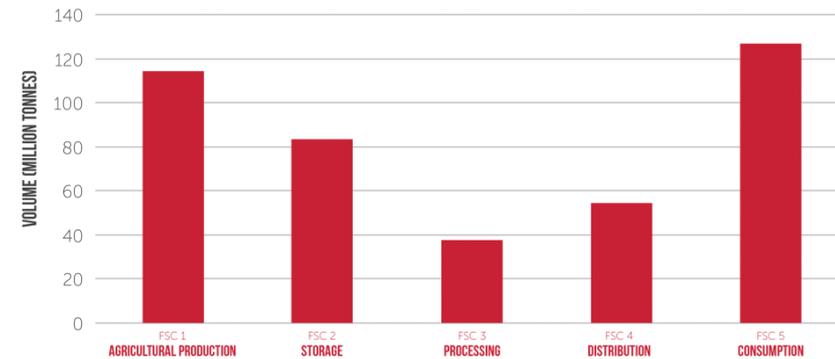
Mmt = million metric tonnes
Source: (1) FAO "Global Food Losses and Food Waste," 2011; Dalberg analysis

Significance of FLW

China:

- ❑ **35 billion kg** of grain loss at pre-consumption stages including storage, transportation and processing annually.
- ❑ Approximately **18 billion kg** of food is wasted every year in China's urban catering industry
- ❑ China had **151 million** undernourished people, down 48% from 289 million in 1990/1992 (FAO, 2014).
- ❑ Wasted food in China could feed **30-50 million** people.

CHINA FOOD WASTAGE VOLUMES, BY FOOD SUPPLY CHAIN PHASE



Source: FAO, 2013

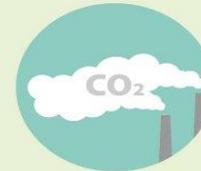


Significance of FLW

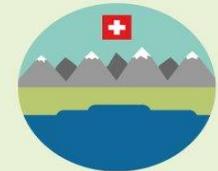
Impact:

- ❑ **Economic impact:** the direct economic consequences of food wastage (excluding fish and seafood) run to the tune of \$750 billion annually.
- ❑ **Social welfare impact:** the lost consumer surplus resulting from our food waste pushes up the price of food, especially for poorer individuals.
- ❑ **Resource impact:** substantial amount of resource is wasted to produce food that is never used, approximately \$1 trillion from resource costs (land, water, fertilizer, etc.).
- ❑ **Environmental impact:** the externality of environmental impact, as 95% of food waste goes to landfills, which produce methane, the leading culprit in climate change.

Environmental impact of food loss and waste



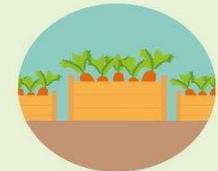
Food loss and waste is responsible for about **8%** of global **greenhouse gas (GHG) emissions**



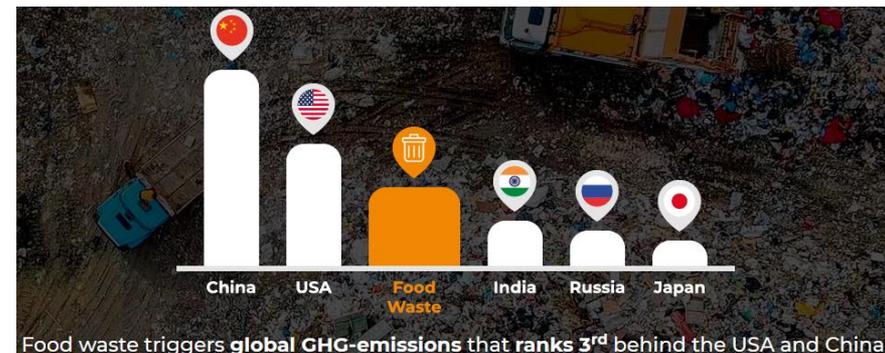
Volume of **water** used to produce lost or wasted food is equivalent to three times the volume of **Lake Geneva**



Nearly **30%** of the world's **agricultural land** is currently occupied to produce food that is ultimately never consumed



If food use and **distribution** is better managed, **14%** of all **GHG emissions from agriculture** could be avoided by 2050



Reconsideration on measurement the FLW

- ❑ No consistent definition on the measurement of FLW

Items/ definition	FAO	ERS	FUSION	EPA
Landfill	Y	Y	Y	Y
Recovered for non-food use	Y	Y	Y	N
Exclude inedible	Y	Y	N	N
Exclude not harvested	N	Y	N	Y
Exclude pre-consumer	N	N	N	Y

Various definitions result in largely different estimations for FLW!

Reconsideration on measurement the FLW

❑ Problems in measurement of FLW:

- As food products are a combination of factors (food and non-food products), **aggregation over quantities** along the food value chain often makes no sense at least for economic purposes.
- Neglecting of by-products and complementary services, added other products and processing costs, the value of FLW is **overestimated**.
- Some of the raw product is taken off and directed to **other uses**, e.g. non-food uses.
- Compared to calculation of FLW quantities, the **value of all resources used** in the production process up to the stage of the value chain where the loss or waste occurs are more reliable.

Reconsideration on measurement the FLW



Skin 3%

Safety gloves, cosmetic surgery, energy bars, chewing gums, cheesecake, low-fat butter and other low-fat products, clarity agent in wine beer, fruit juice, capsule pills



Bones 14%

Batteries, cork from cheaper wine, bullets, inkjet paper, organic fertilizer, cellular concrete, fine bone china



Meat 53%

Pork, chops, sausages, bacon, fibrin



Internal organs 14%

Pet food, Heparin, pig heart valves, Tambourines



By-products can be important!

Miscellaneous 6%

Pig hair for paintbrushes, pig brains and hooves are delicacies in some countries



Fat 5%

Soap, shampoo, conditioners, fabric softeners, biodiesel fuel, candles, on dry pet food



Blood 5%

Hemoglobin in some cigarette filters, added to ham as a coloring agent, fish food



Objectives for reducing FLW

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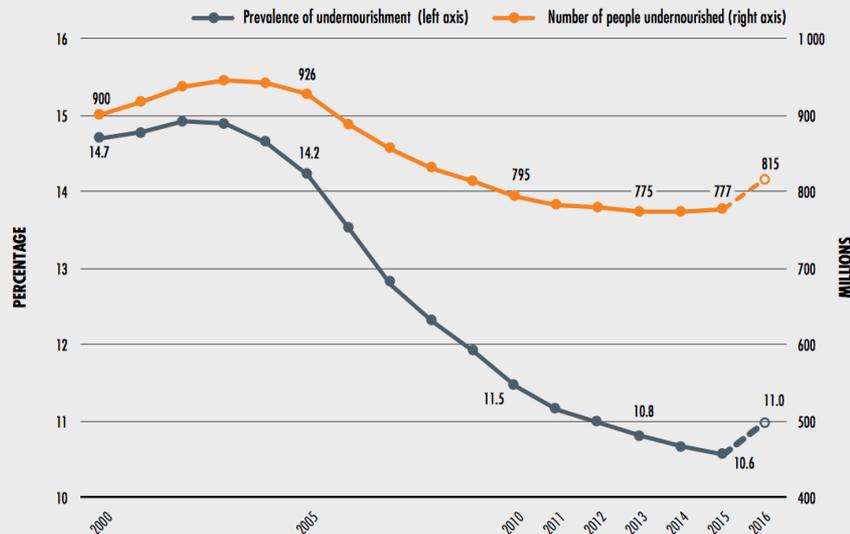
- Improving food security
- Improving efficiency of resource use (sustainable environment)
- Cultural and ethical motivations



Objectives for reducing FLW

□ Improving food security

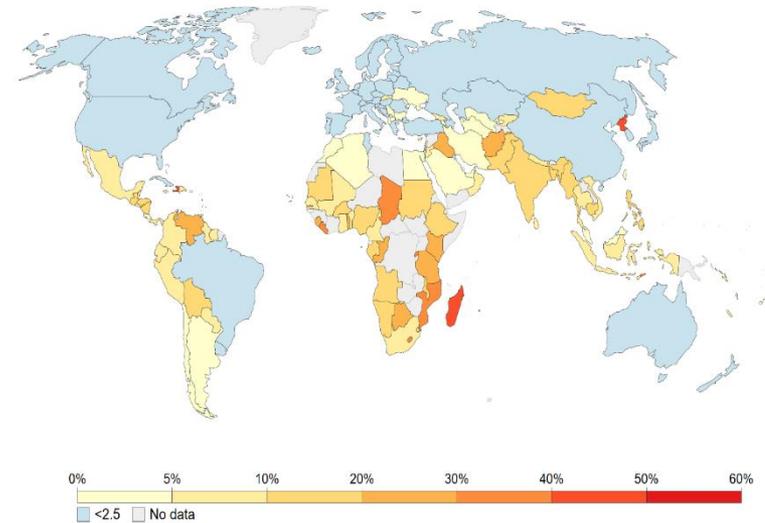
THE NUMBER OF UNDERNOURISHED PEOPLE HAS BEEN ON THE RISE SINCE 2014, REACHING AN ESTIMATED 815 MILLION IN 2016



Share of the population that are undernourished, 2017

Share of individuals who have a habitual energy intake lower than their requirements.

Our World
in Data



Source: UN Food and Agriculture Organization (FAO)

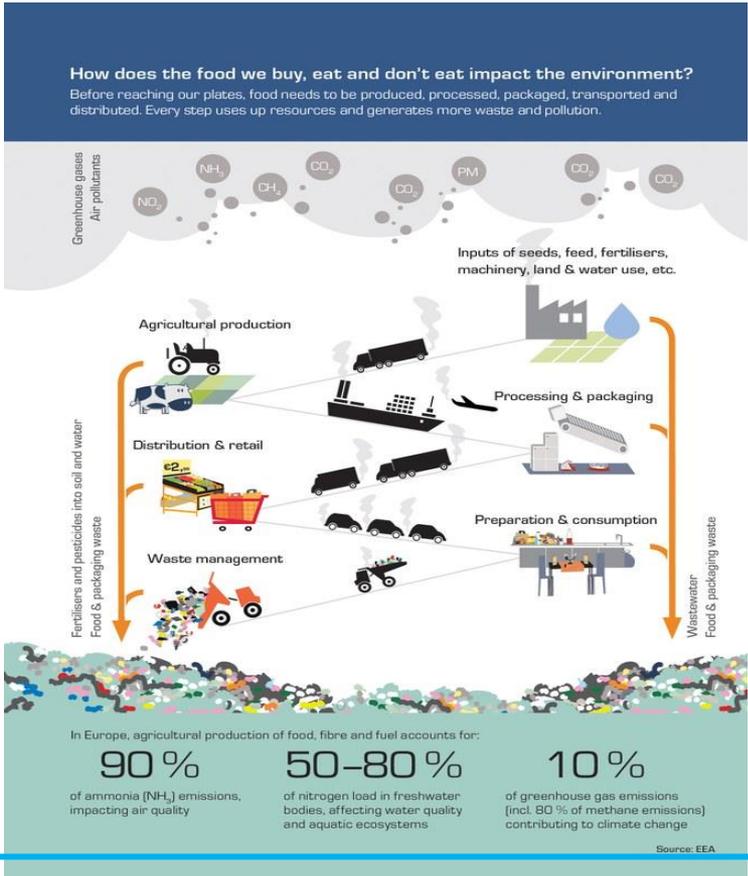
OurWorldInData.org/hunger-and-undernourishment • CC BY

Note: Undernourishment is defined as having food energy intake which is lower than an individual's requirements, taking into account their age, gender, height, weight and activity levels.

Considering storage and transportation cost, can reducing FLW really improve food security?

Objectives for reducing FLW

□ Improving efficiency of resource use (sustainable environment)



What are the sources of food waste in Europe?
Around one third of the food produced globally is lost or wasted. Food waste represents a substantial loss of other resources such as land, water, energy and labour.

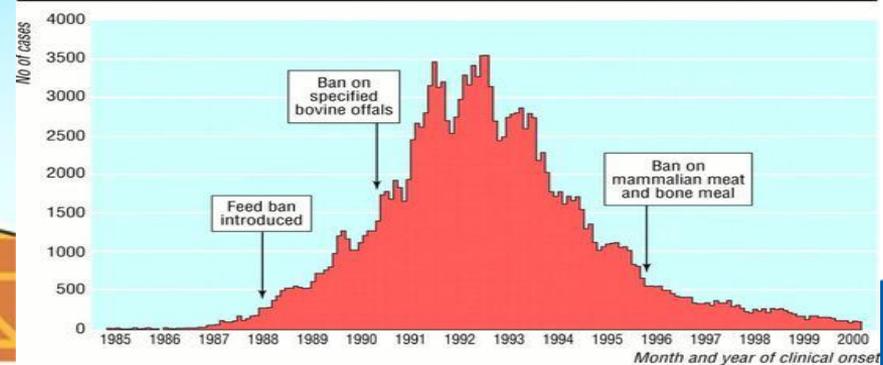


When reducing and diverting FLW for food or non-food use require more resource investment, can reducing FLW really improve efficiency of resource use ?

Objectives for reducing FLW

□ Cultural and ethical motivations

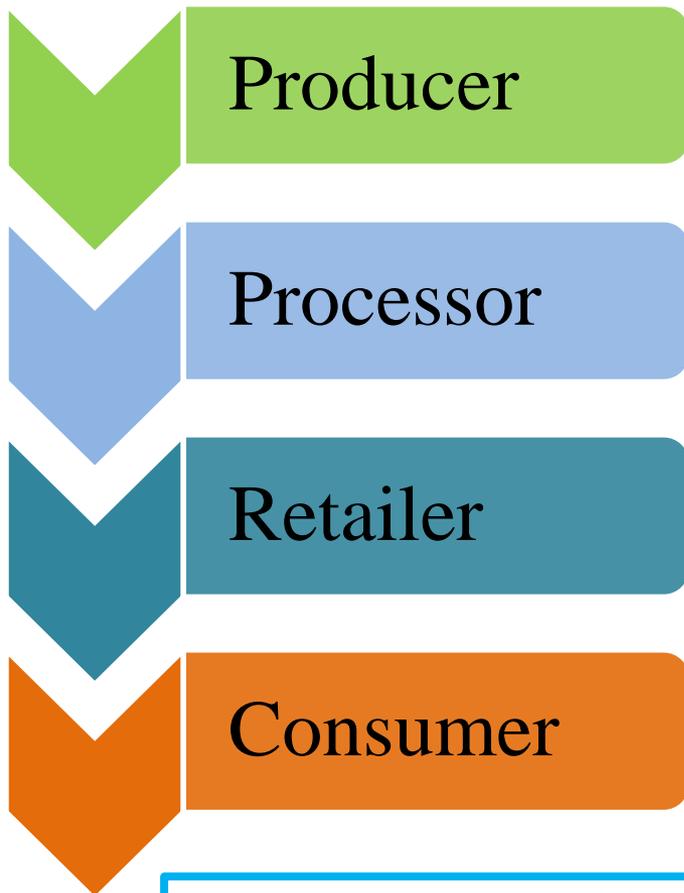
- ‘Wasting food’ – the phrase alone carries the implication that it is **ethically** wrong
- But **wasting energy** might **not** be ethically wrong, even its negative effect is larger.
- **Risk** involves in reducing and diverting FLW for food or feed use, such as risk for human and animal health.



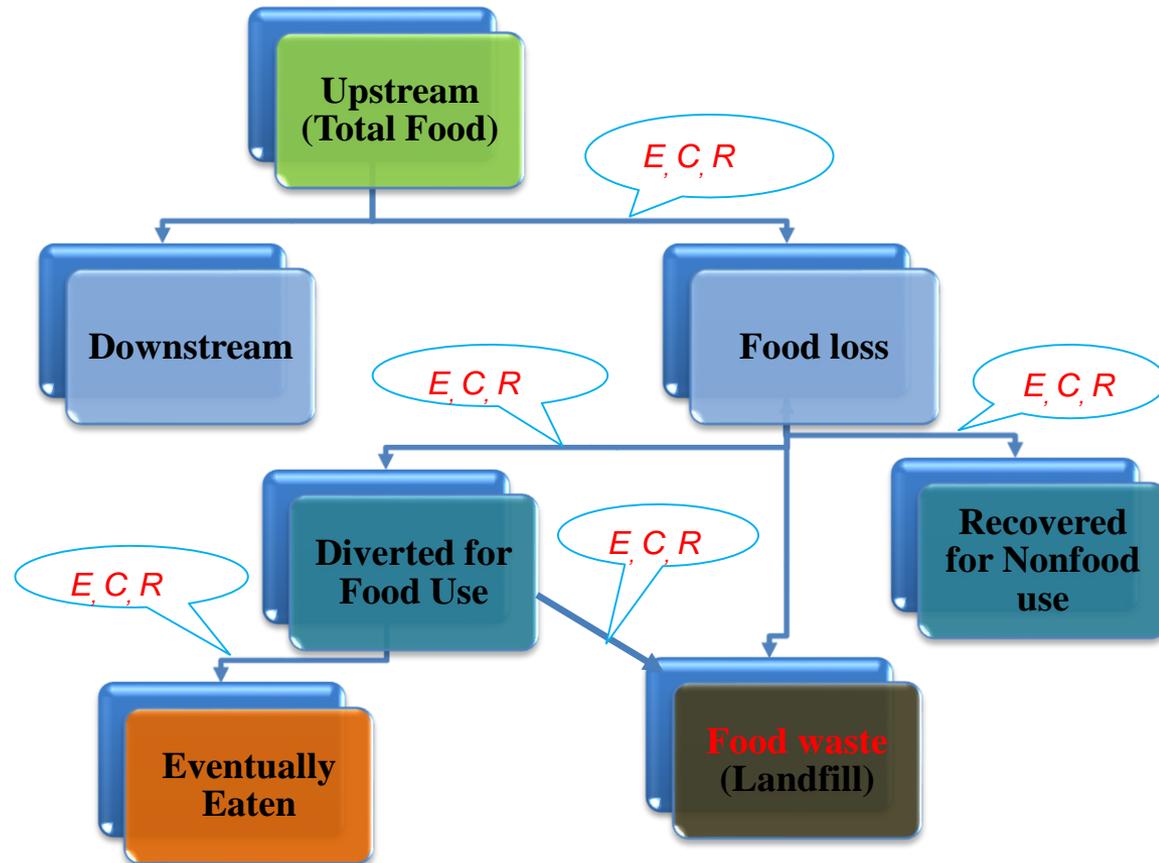
Objectives for reducing FLW

Costs and risks along the food supply chain

Food supply chain



Food flow within any given stage of food supply chain



Environmental effects (E), costs to reduce FLW (C), risk involved with the reduction in FLW (R)

Objectives for reducing FLW

Reconsideration:

- ❑ Reducing FLW may demand investments in **better facilities**.
- ❑ Diverting or recovering FLW require more **resource input**.
- ❑ Diverting or recovering FLW for food or feed use may increase **health risks** for the consumer and animals.
- ❑ Neglecting the costs and risks caused by saving or redirecting FLW might lead to **inefficiency of resource use**.

Reducing FLW VS Improving resources use?



1 kg 面包 = 1 kg 石油

Policy implications to achieve a sustainable goal

What we have done:

- ❑ **International Day of Awareness of Food Loss and Waste**, the first IDAFLW on 29 September 2020.
- ❑ **United States:** promoted a Sustainable Development Goal **Target 12.3** to halve per capita food waste at the retail and consumer level by 2030.
- ❑ **EU:** implemented **Farm to Fork Strategy** for a healthy and environmentally friendly food system, and established the **EU Platform on Food Losses and Food Waste**
- ❑ **China:** adopted **the Anti-Food Waste Law of the People's Republic of China** on 29 April 2021, to prevent food waste by offering legal backing to the country's efforts to safeguard food security and promote traditional virtue of thrift.



What need to be reconsidered:

- ❑ Discussions on FLW need to consider the **costs and the risks** of reducing FLW, the value of FLW is only one side of the coin.
- ❑ Food products always include non-food resources, thus, a **resource-based approach** to FLW is more appropriate.
- ❑ Policies which focus on the reduction of the **volume of FLW** are likely **ineffective**.
- ❑ Policies should rather focus on resource based FLW in areas where the value of **resource based FLW exceeds the costs and risks** of reducing FLW.
- ❑ Food prices should reflect **external or environmental effects** to induce long-term efficient behavior.

Policy implications to achieve a sustainable goal

What need to be reconsidered:

- ❑ State regulations often **overvalue** risks and **undervalue** costs, which reveals great potential to use resources more efficiently.
- ❑ We may support research in various fields to **develop new ideas and technologies** for more resource efficient production, consumption, and storage of (food) products.
- ❑ **Consumer preferences** are not static and can be easily influenced, thus, public information campaigning may inform and influence our preferences toward more resource-efficient consumer behavior.
- ❑ How to effectively deal with the **inevitable FLW** is an important aspect of sustainable development, such as biofuels.



We are still on the way...

Thanks for your attention!