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The Battle of the Bin: Confronting Food Waste through Innovation, Education, and Bioeconomy

Summer Camp | July 7 – 11, 2025 | Marseille, France



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Agri-food Waste Management for Sustainable bio-economy through Higher Education curricula and upskilling

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Goals

AGRIMA aims to foster universities' **capacity building** for the **green transition** through **innovative practices** and **higher education curricula updating** in **agri-food waste management** for the **circular bioeconomy**.

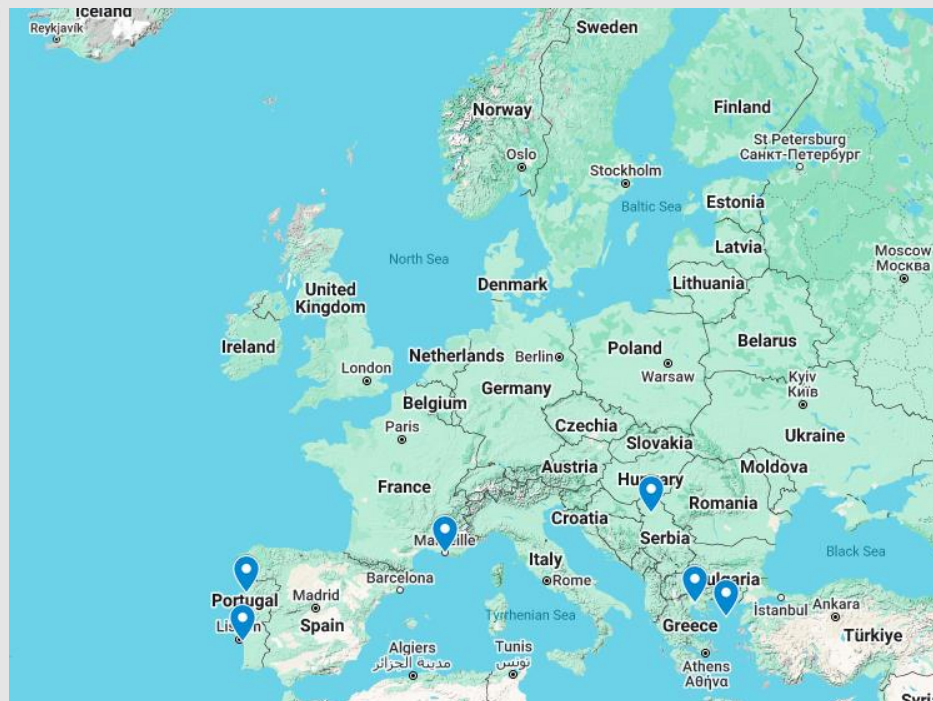
AGRIMA addresses:

- 1. Advancing pedagogical methods** for industrial agri-food waste valorisation **based on business-academia synergies**.
- 2. Integrating citizen science** in bio-economy-enhanced waste valorisation as a means of **civic engagement and environmental advocacy**.





Partners



Food waste: Meet the Villain



- ❖ Consumes 1/3 of the food we produce.
- ❖ Releases out methane.
- ❖ Steals water, energy, and time.
- ❖ Hides in every kitchen and supermarket.

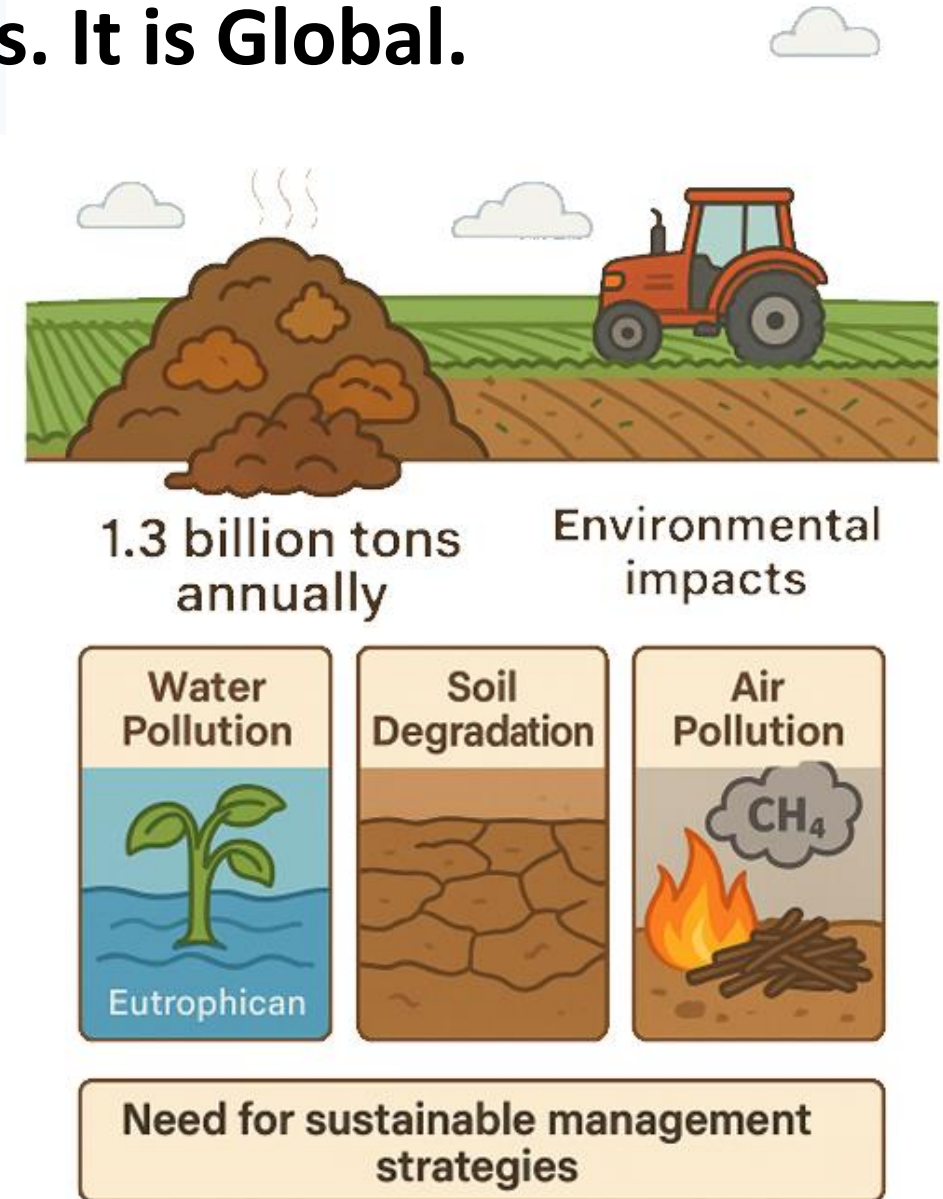
Real-World Damage: It is Not Just Gross. It is Global.

Agricultural Waste: A Growing Challenge

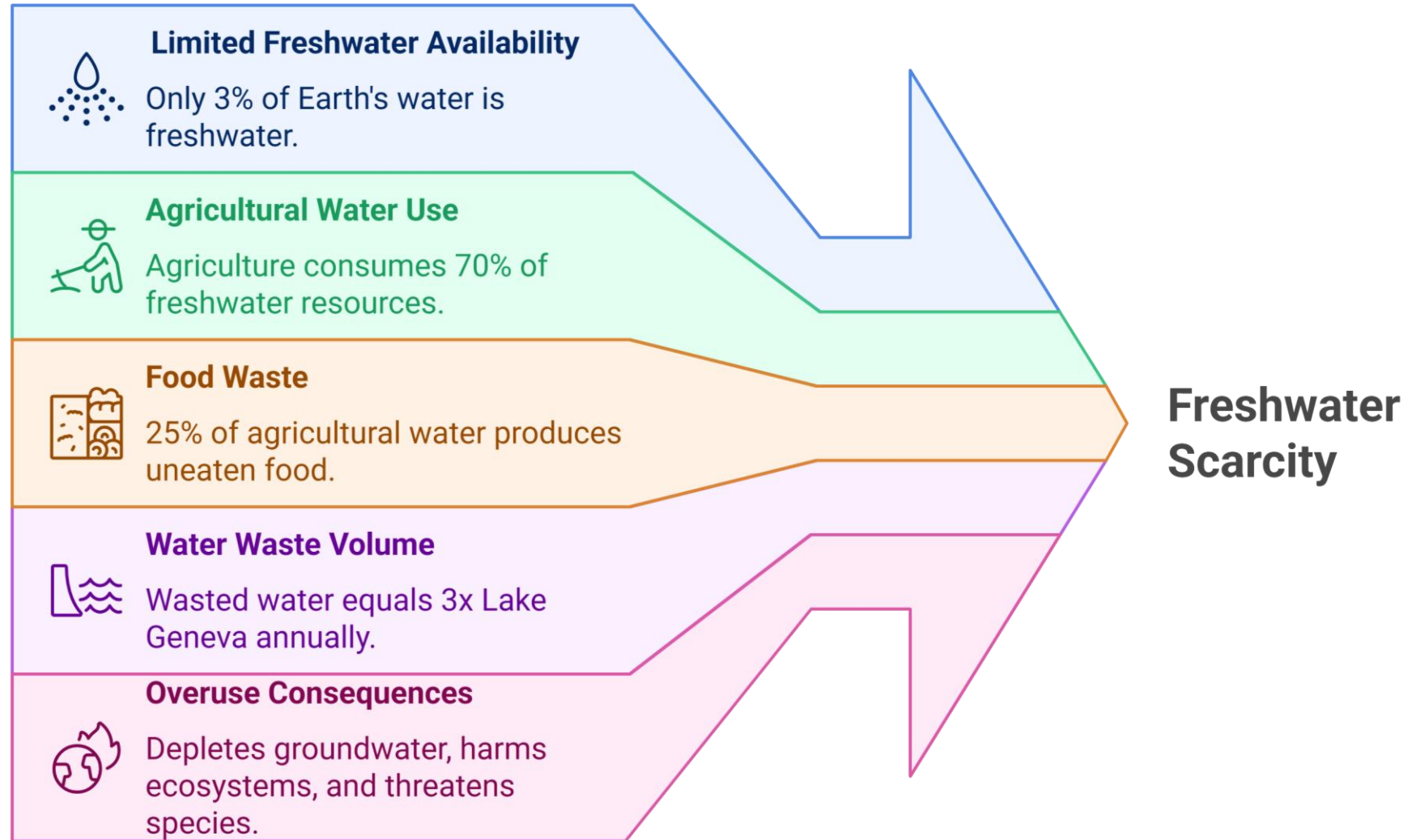
- ❖ Crop residues, manure, and agro-industrial byproducts
- ❖ Driven by increasing demand for food and agricultural products

Environmental Impacts

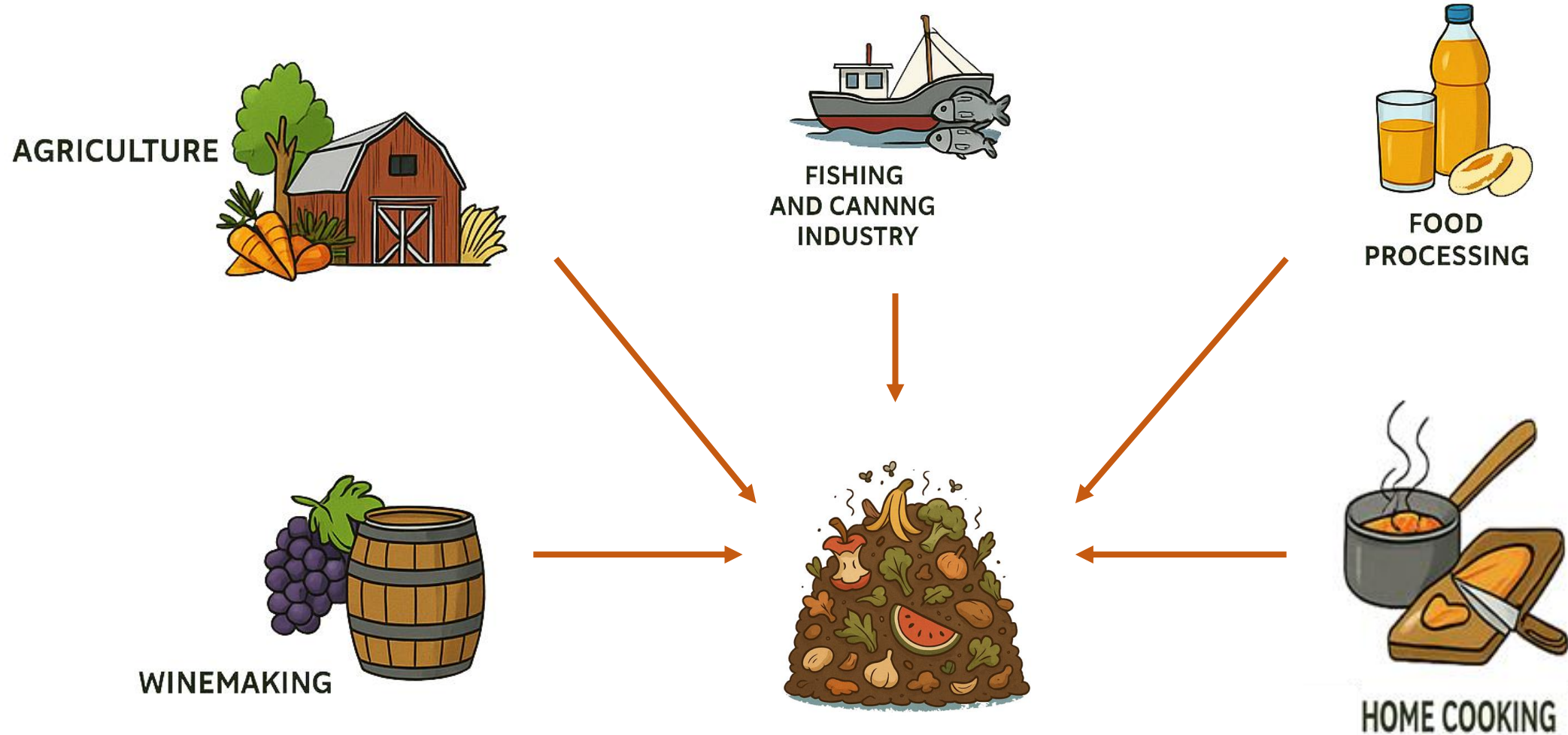
- ❖ Water pollution and eutrophication (excess N & P)
- ❖ Soil degradation and biodiversity loss
- ❖ Air pollution from open burning of residues
- ❖ Methane emissions from decomposition → contributes to climate change



Impact on Freshwater Depletion



Food waste: the greatest contributors

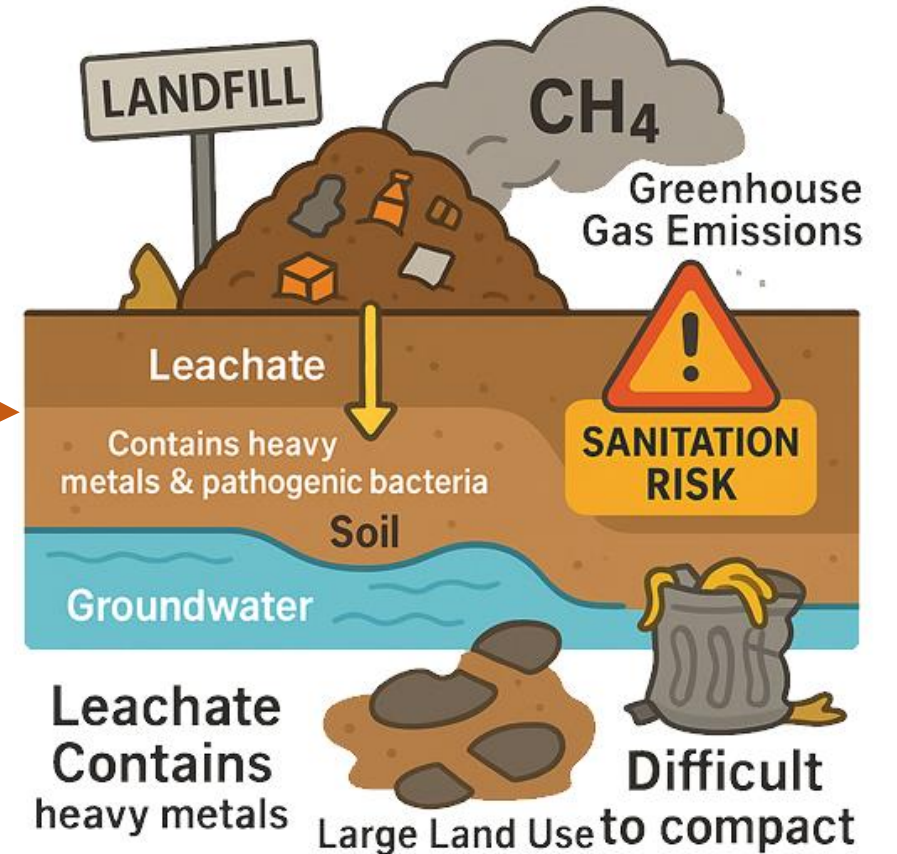
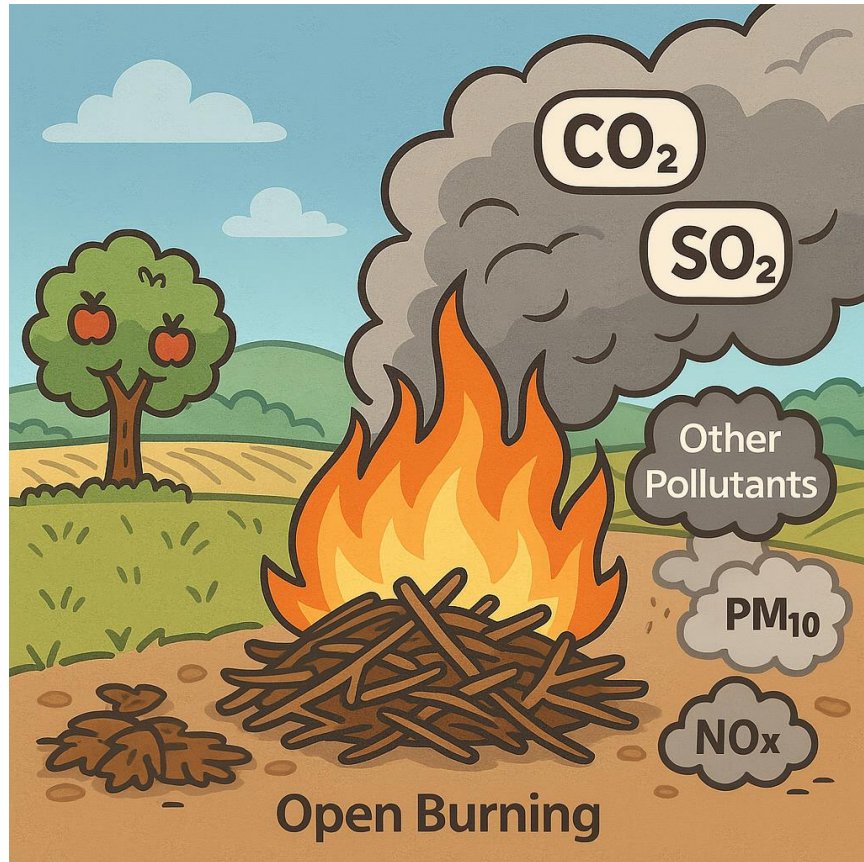


Food waste: the greatest contributors

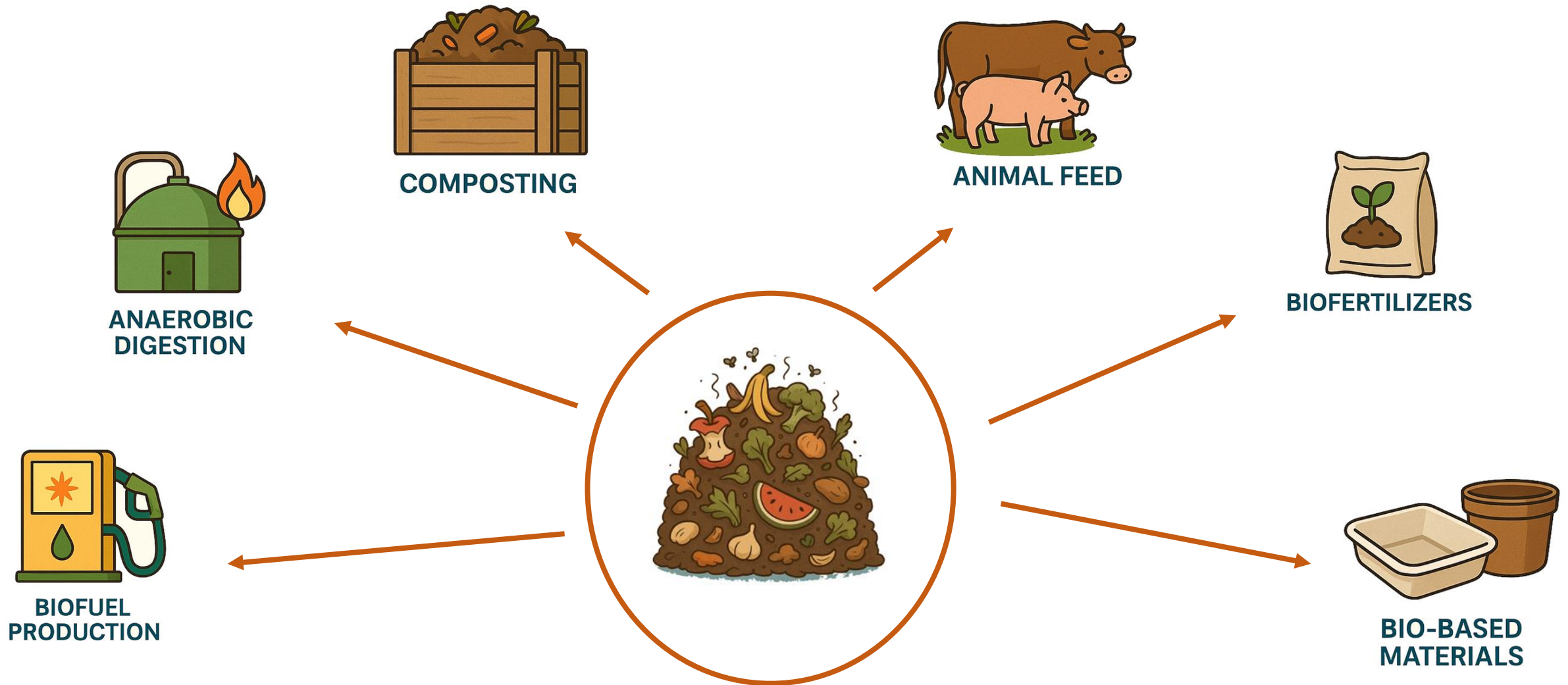
- 1.3 billion tonnes of food suitable for consumption are lost or wasted per year—1/3 of all food produced.
- According to the Portuguese Environment Agency, more than 50% of the waste generated in Portugal, especially food waste, was landfilled.
- Households generate 50% of all food waste.



Food waste: most common solutions



Food waste: other solutions and uses



Food waste: other solutions and uses

However, circular economy potential remains underused due to:



Tech gaps



Logistics challenges



**Economic
barriers**

Food waste: Who Will Save Us?



- Science
- Innovation
- Education & Upskilling

Food waste: Superpower 1: Science!

Product / Company	Waste Source	Scientific Principle
PHA bioplastics (Full Cycle Bioplastics)	Organic waste	Microbial fermentation of waste carbon into biopolymer
Mycelium packaging (Ecovative)	Ag residues (e.g., corn stalks)	Fungal mycelium grown into molded forms
Biochar (Carbo Culture, Cool Planet, Ibero Massa)	Nut shells, pruning waste	Pyrolysis of biomass to stabilize carbon
Lactic acid / Ethanol	Molasses, starch-rich residues	Industrial microbial fermentation
Orange Fiber (Italy)	Citrus peels	Cellulose extraction & regeneration into viscose-like fibers
Wine Leather (Vegea)	Grape pomace	Biopolymer conversion of vinification waste
Upcycled antioxidants (Caudalie, Upcycled Beauty Co.)	Grape & olive pomace	Extraction of polyphenols for skincare

Food waste: Superpower 2: Innovation!

Product / Company	Waste Source	Innovative Feature
ReGrained Bars & Flour	Spent brewer's grain	Tasty food + functional fiber/flour from beer waste
Cascara teas (UpToGood, Huskee)	Coffee cherry husks	Turns waste into a new beverage market
Piñatex (Ananas Anam)	Pineapple leaves	Leather alternative, upcycling field residue
Sir Kensington's Vegan Mayo	Aquafaba (legume cooking water)	Aquafaba replaces egg yolk in condiments
Imperfect Foods / Misfit Juicery	Ugly/surplus fruits	Repackaging imperfect produce as premium juice/snacks
Banana Flour / Kadalys	Overripe bananas	Upcycling into food and cosmetics
Avani Eco	Cassava waste	Compostable cutlery and packaging

Food waste: Superpower 3: Education & Upskilling!

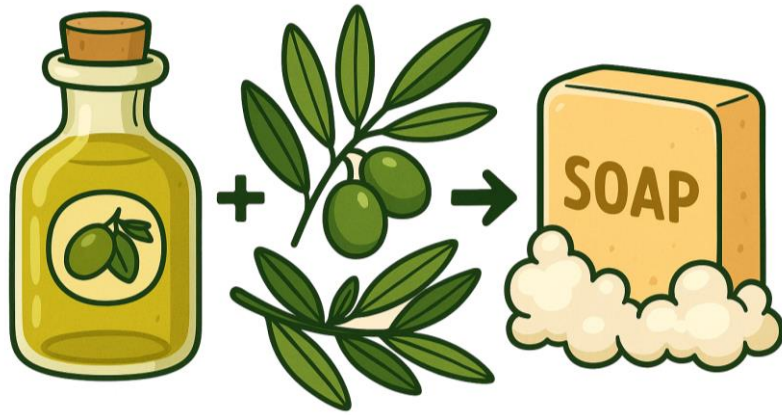
Initiative / Product	Waste Source	Learning/Impact
ReFood Portugal	Surplus restaurant food	Local networks recovering meals while teaching food value
Lipor (Portugal)	Urban food waste	Community composting & bio-waste literacy
Zero Desperdício	Surplus food from restaurants and catering	Awareness campaigns, sustainable practice implementation, community involvement in redistribution
AgroGrIN Tech	Fruit & veg residues	B2B solutions that connect science to business training
Miniwaste project	Urban bio-waste	EU pilot for household composting education
Huskee Cups	Coffee husks	Teaches sustainable design + barista industry awareness
Botanical Colors	Onion skins, beets, grape marc	Natural dye education for designers/artisans

Food waste: Unexpected Heroes!!

Product / Company	Waste Source	Why It is Unexpected
Frank Body	Used coffee grounds	Coffee as a skincare hero ingredient
Green Banana Paper	Banana stems	Wallets & paper goods from island agri-waste
Fruta Feia	Aesthetically rejected fruits & vegetables	Small fruits with big impact — turning cosmetic rejects into a social movement and viable food distribution busines
Avocado Pit Oil (Upcycled Beauty Co.)	Avocado byproducts	High-end cosmetic ingredient from waste pits
Zume (pizza boxes)	Sugarcane & ag fibers	Replaces plastic in pizza delivery packaging
PROVE (Portugal)	Local fresh products, small-scale surplus	Training for farmers, community engagement, participatory guarantee system (SPG), local marketing education
Frulact (Portugal)	Second-grade fruits	Quietly integrates waste valorization into global food industry

Food waste: Scientific Projects@ISEP.IPP!

Naturbel: Integration of olive oil and olive leaves in soaps



NATURBEL

EDIÇÕES ESPECIAIS » EDIÇÕES ESPECIAIS DE SABONETES



A Castelbel reinterpreta um dos elementos mais característicos da cultura mediterrânica e apresenta o seu primeiro sabonete produzido a partir de uma base de azeite. Enriquecido com partículas de folha de oliveira e perfumado com notas aromáticas de ervas verdes, o sabonete Naturbel tem um efeito refrescante e suavemente esfoliante na pele.

Com um estilo rústico e campestre, os sabonetes Naturbel são cunhados individualmente, embrulhados à mão e envoltos numa banda de juta.

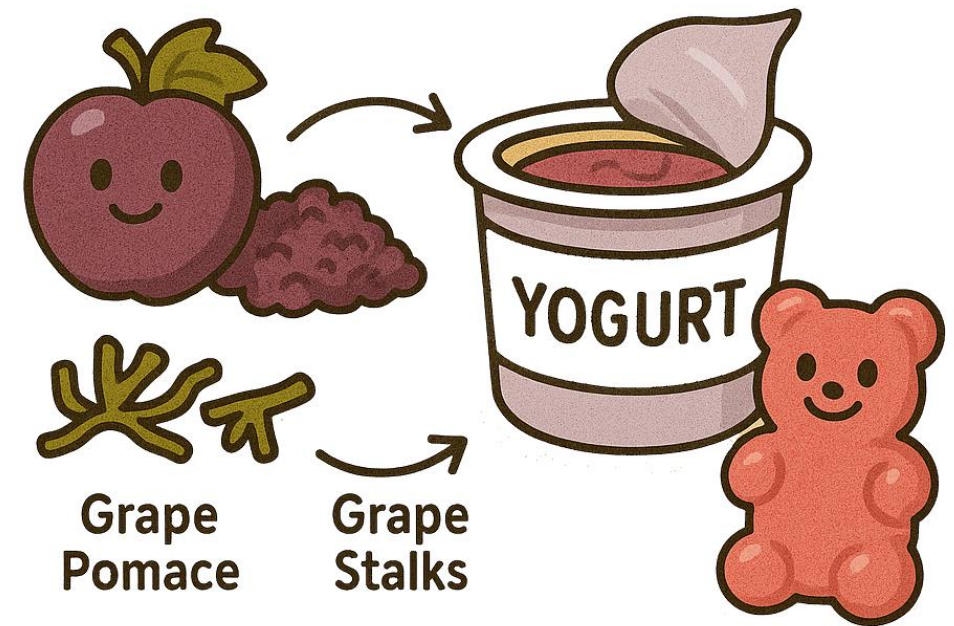
Food waste: Scientific Projects@ISEP.IPP!

Kiwi4Health – Eco-Innovative Reuse of Baby Kiwi By-Products for Oral Mucositis: An Exploratory Approach



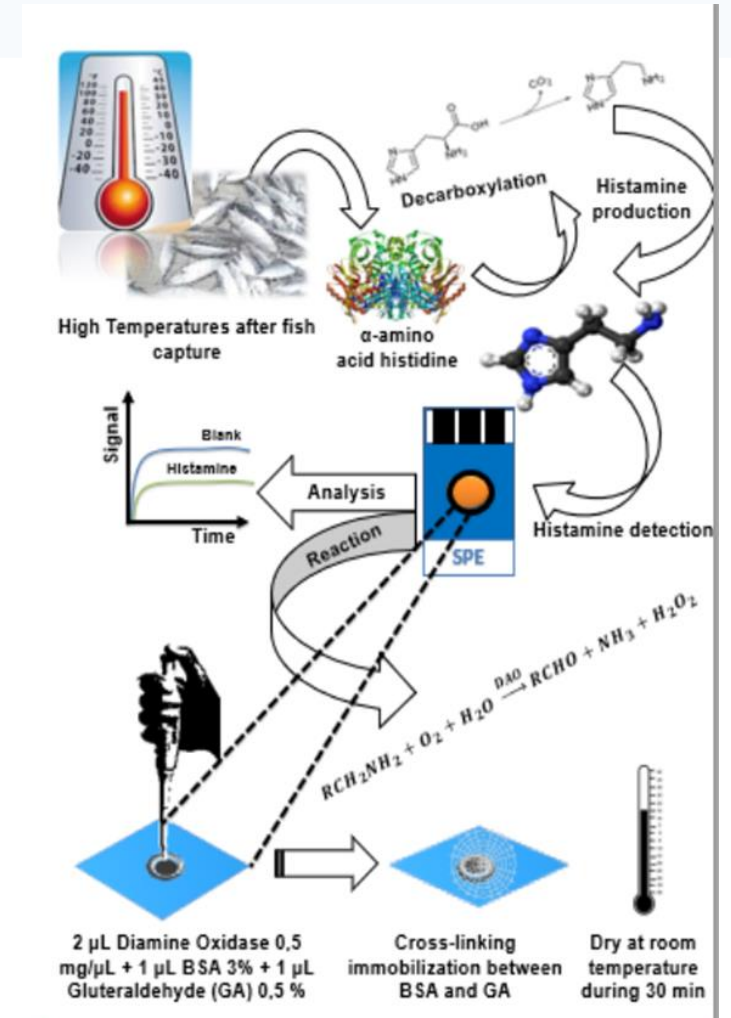
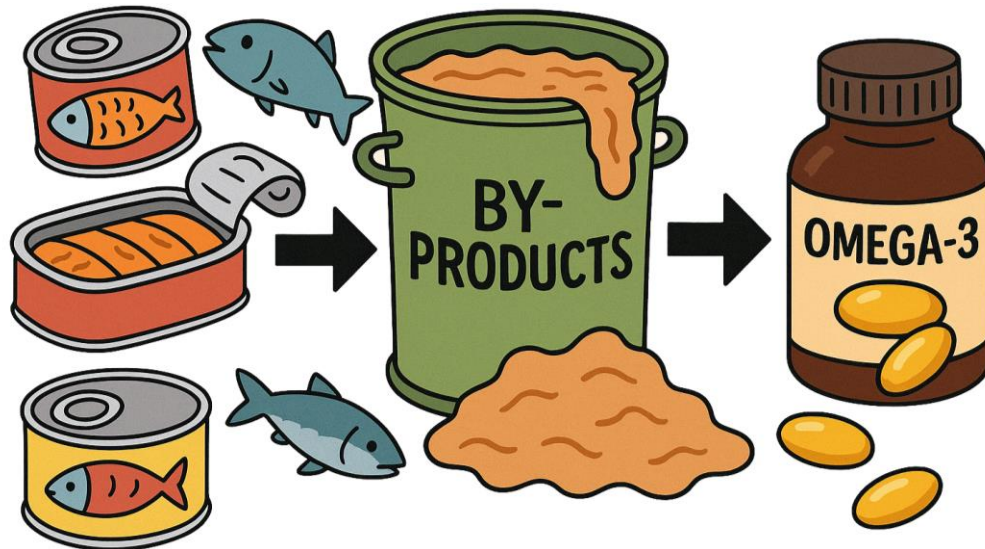
Food waste: Scientific Projects@ISEP.IPP!

Valorization of agro-food wastes as a source of bioactive compounds for cosmetic and food applications



Food waste: Scientific Projects@ISEP.IPP!

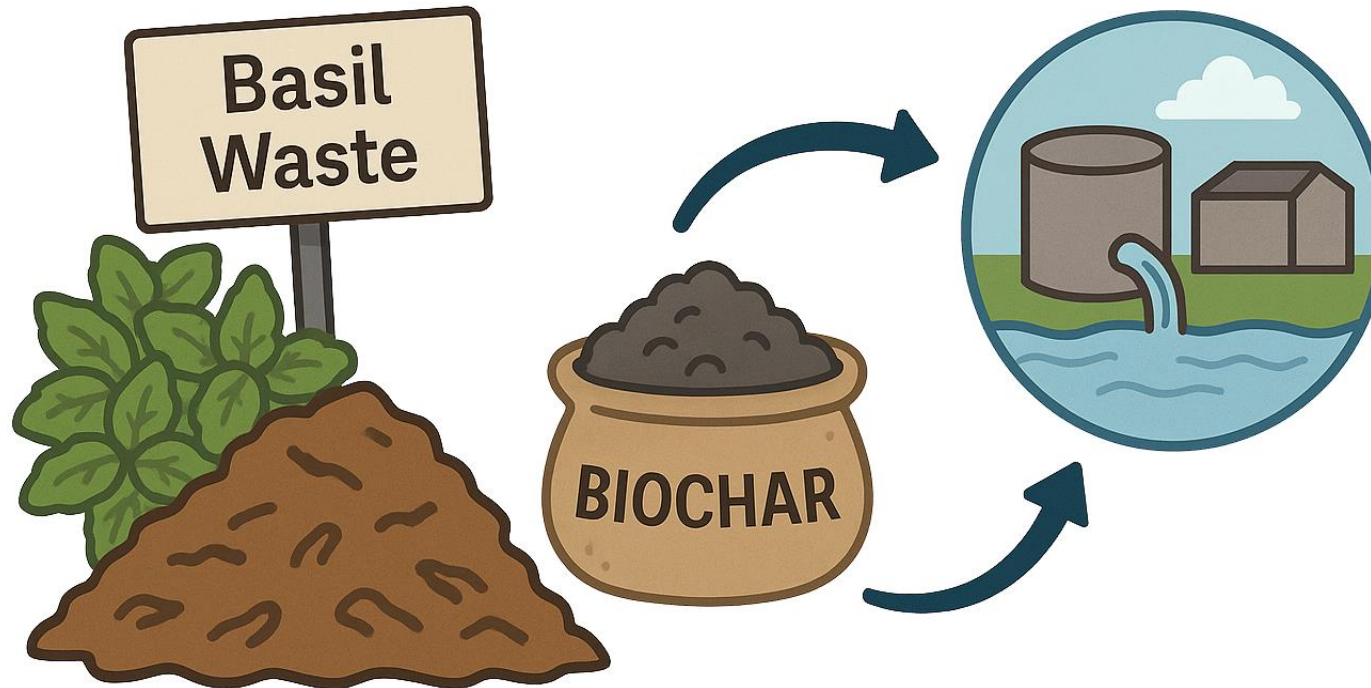
Reuse the liquid by-products of the **canning industry** for the production of omega-3 fatty acids



Electrochemical biosensor for histamine detection in **fishery products**

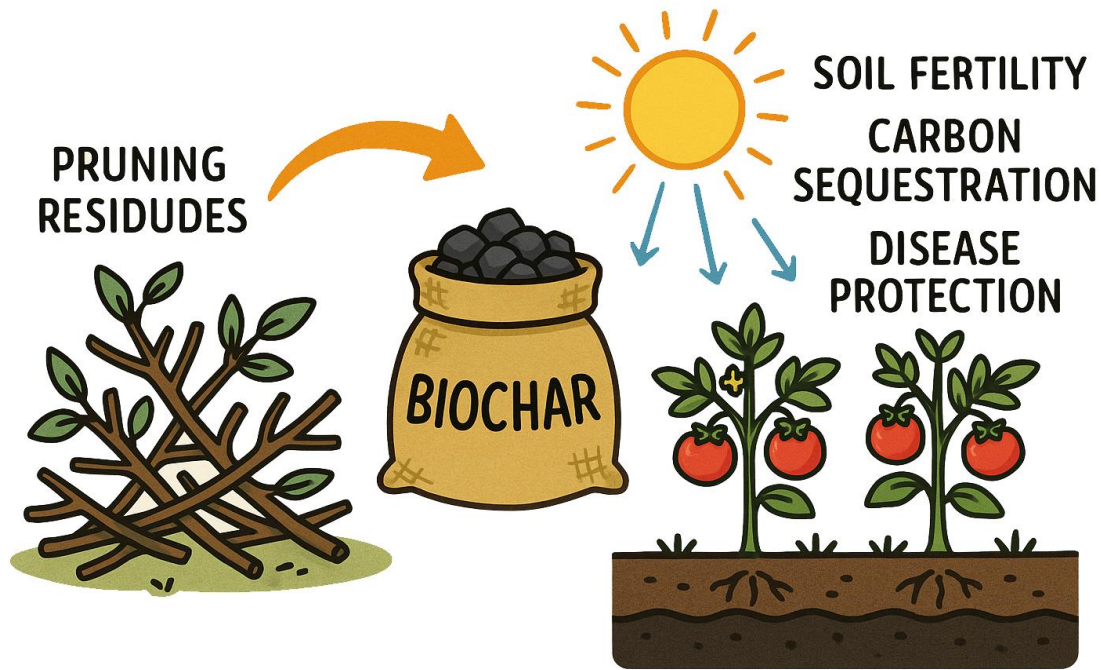
Food waste: Scientific Projects@ISEP.IPP!

BioECOchar: a multifunctional application for reusing agricultural waste and treating wastewater.

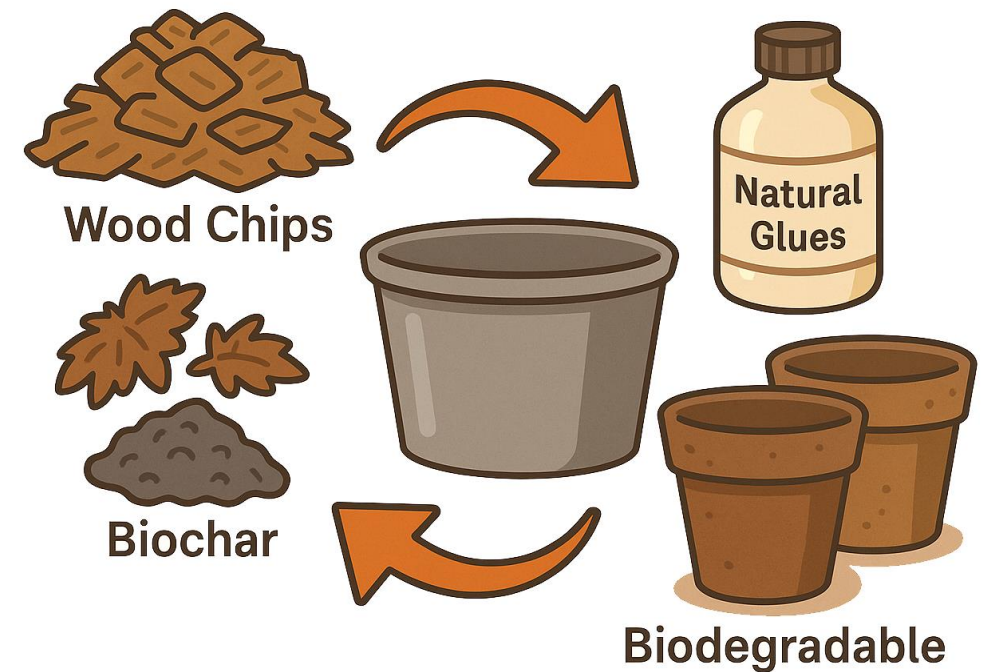


Food waste: Scientific Projects@ISEP.IPP!

Biochar production from agricultural waste and potential uses



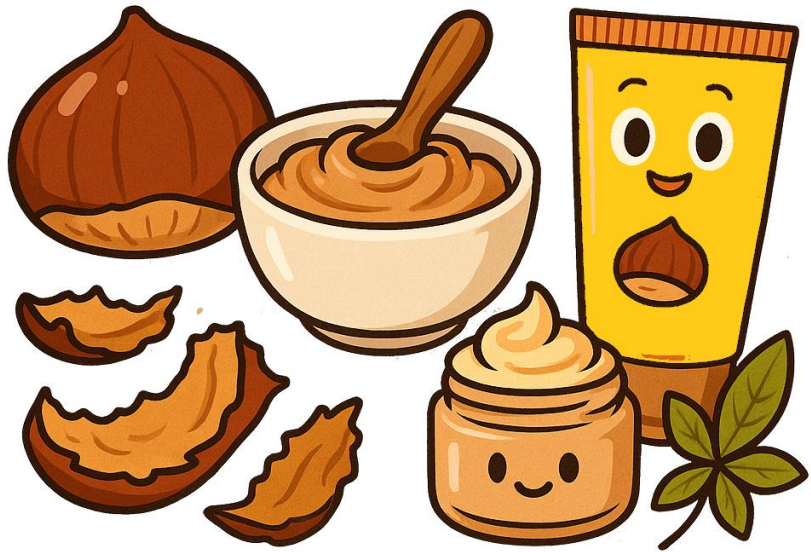
Fertilizer and soil conditioner



Biodegradable pots production

Food waste: Scientific Projects@ISEP.IPP!

FFCastanea - Peel of sweet chestnut as a source of active ingredients for Functional Foods and Cosmetics: A sustainable approach



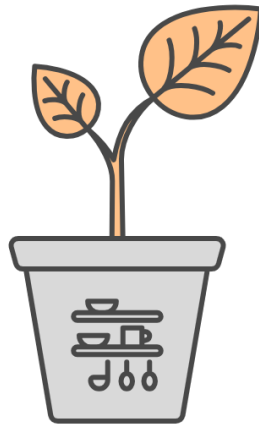
Chestfilm - Valuation of solid residues from nut processing: biopolymer extraction and preparation of biodegradable films

Food waste: How YOU Can Join the Fight!

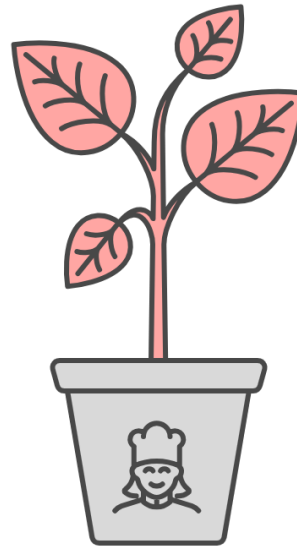
At home



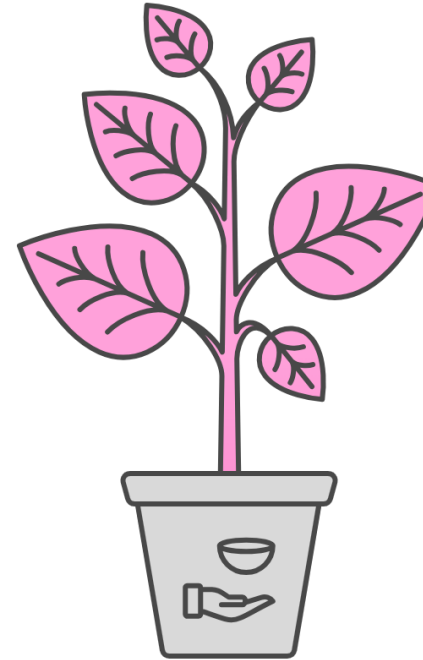
Plan Meals



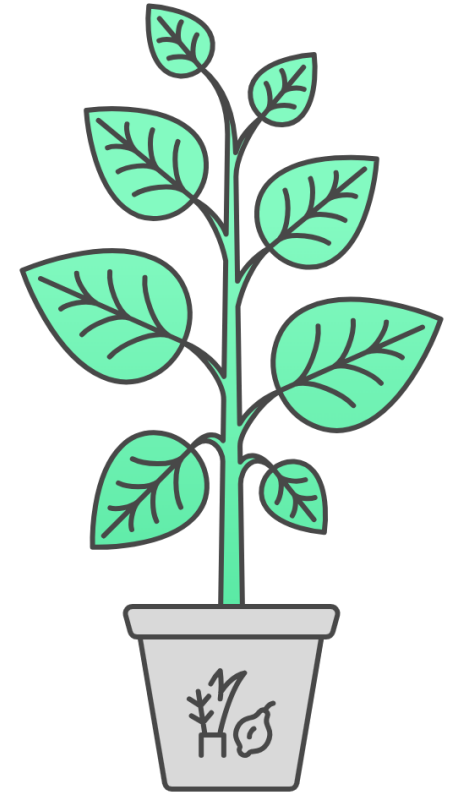
Store Food Properly



Reuse Leftovers



Donate Excess Food



Start a Garden

Food waste: How YOU Can Join the Fight!

In Businesses and Restaurants

Implement Waste Systems

Separating and treating food waste

Use Expiring Food

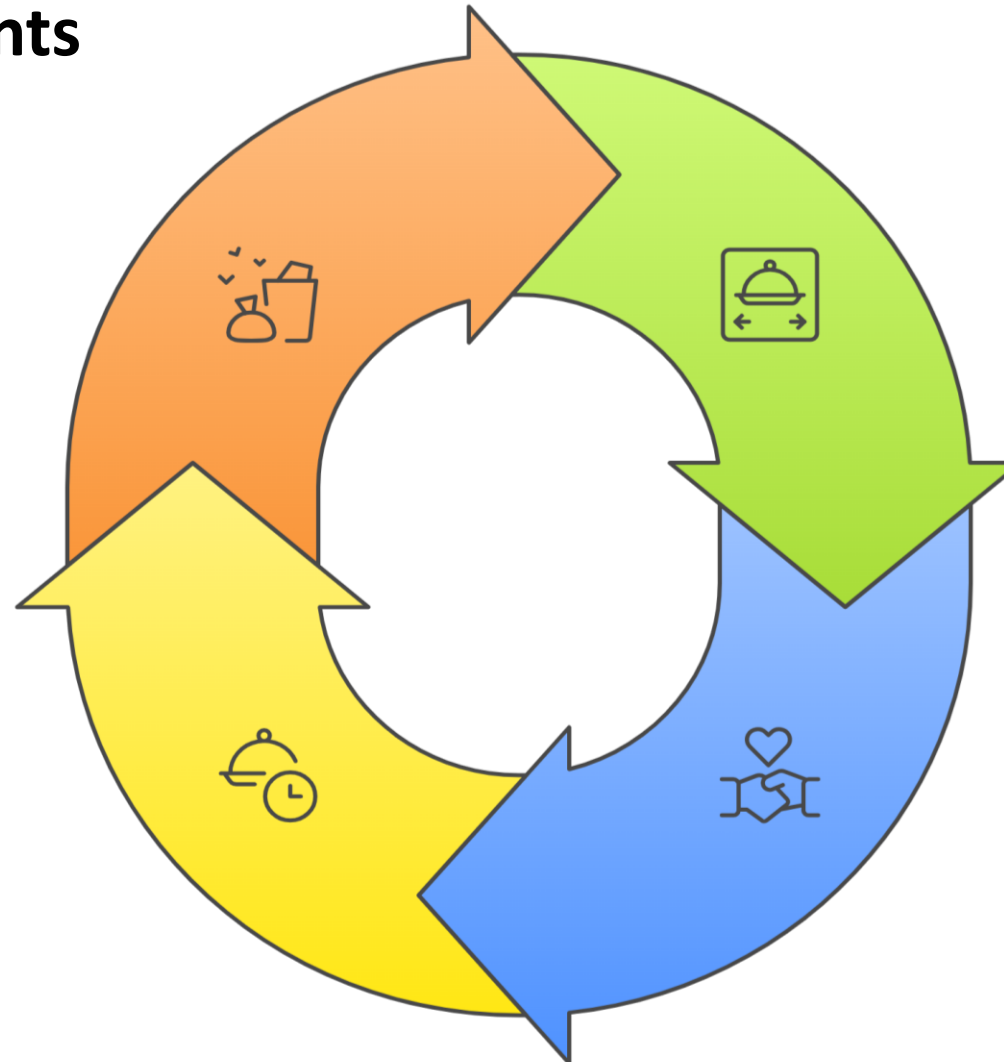
Offering discounts on expiring food

Reduce Portion Sizes

Offering smaller portions to customers

Partner with Charities

Donating unsold food to those in need

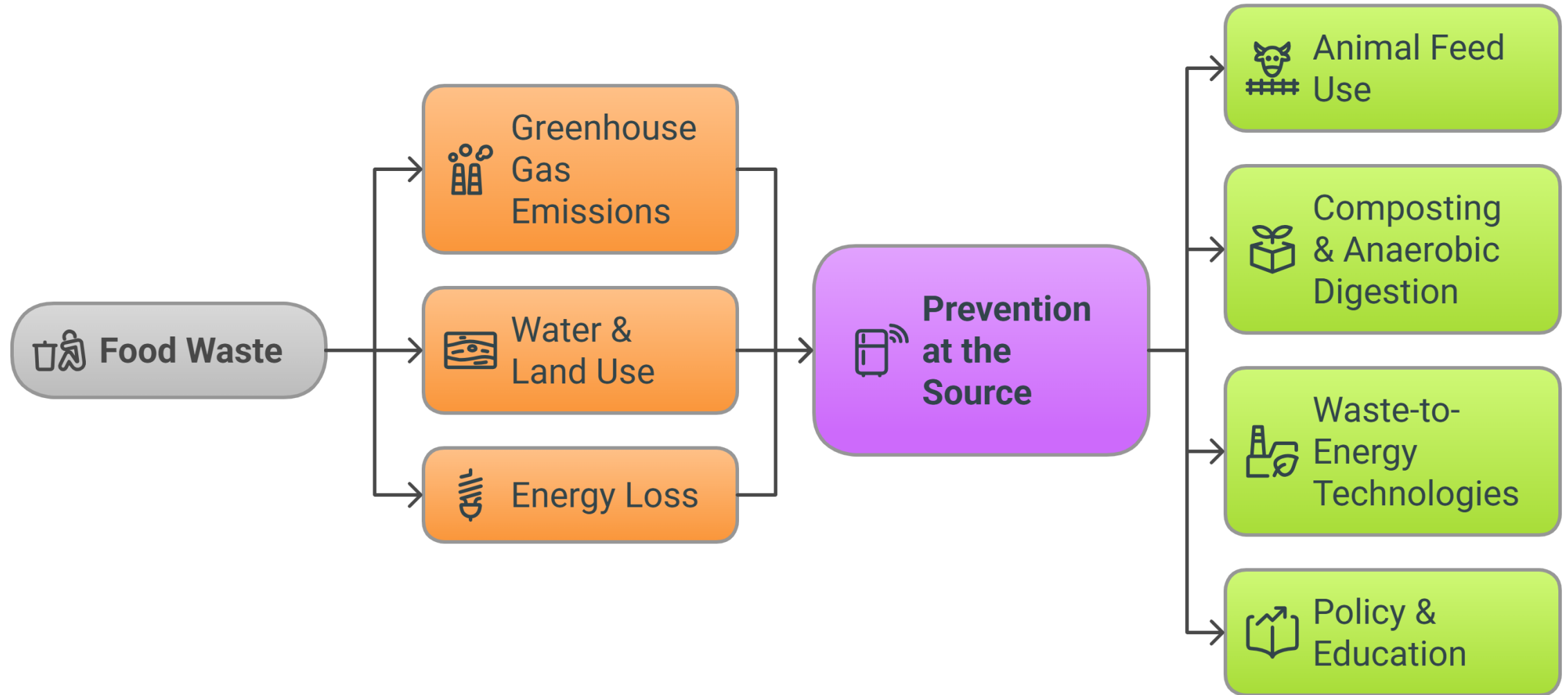


Food waste: How YOU Can Join the Fight!

Additional Tips

- ✓ Join Projects and Initiatives like: Re-food; Zero Desperdício ("Zero Waste") or Fruta Feia ("Ugly Fruit").
- ✓ Know the origin of your food: **Buying local** products can reduce transport distance and environmental impact.
- ✓ Raise awareness about conscious consumption: By adopting more **conscious consumption habits**, you can contribute to a more sustainable future

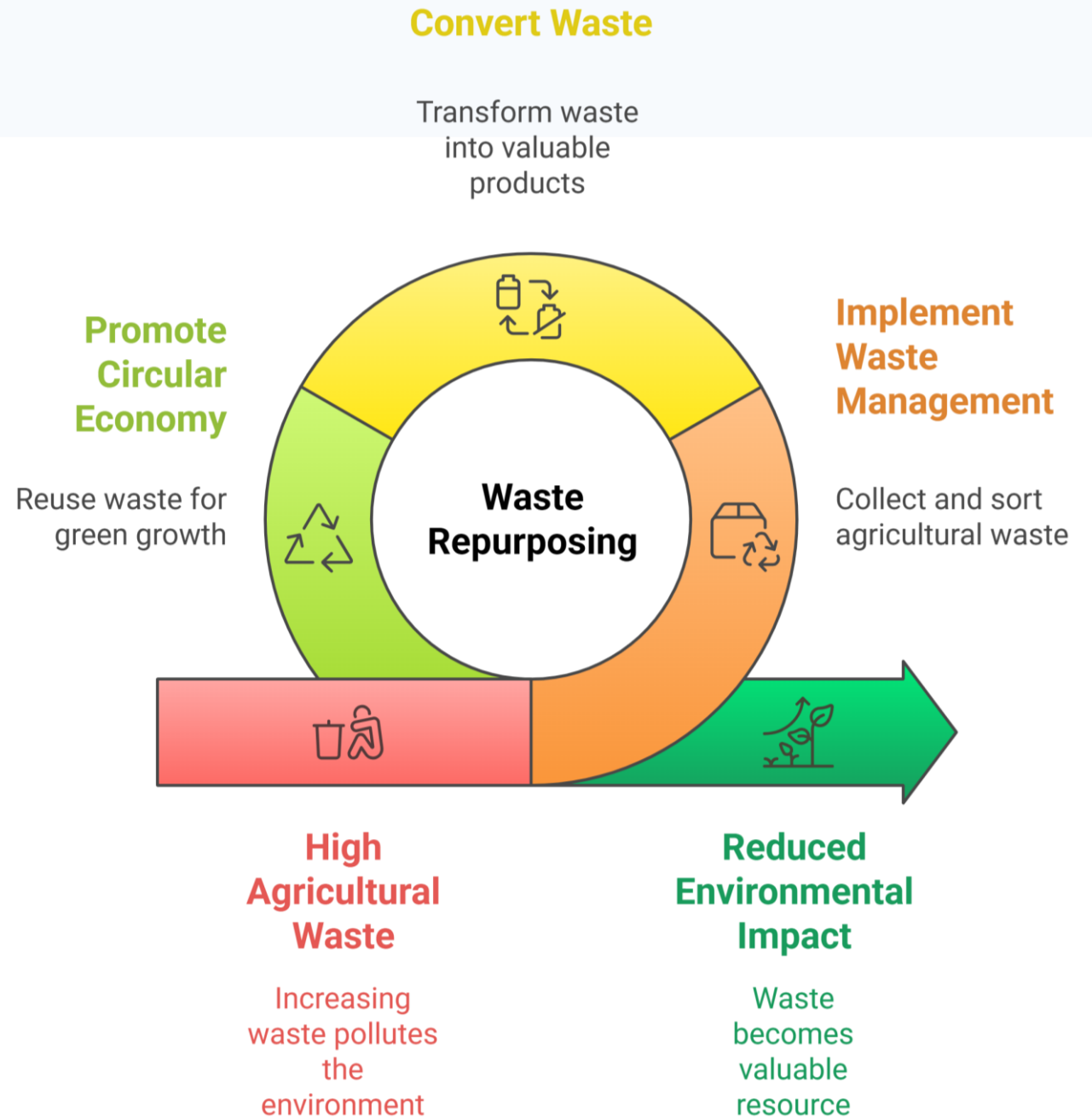
Food waste: final remarks!



Food waste: final remarks!

Innovative, sustainable solutions are critical for:

- ✓ Environmental protection
- ✓ Climate mitigation
- ✓ Efficient resource use



“The future belongs to those who rethink waste”.



Thank for your attention