



The New Paradigm IV

Food Packaging

How can smart packaging reduce food loss and waste while respecting the environment?

we're working for **the future of food**

Kök Projekt is an agri-food startup accelerator and an innovation partner for **the food, agriculture and water sector companies.**

We work together with companies, NGO's and governmental organizations to establish interfaces for entrepreneurs to reach beyond their potential.



we work through the food value chain



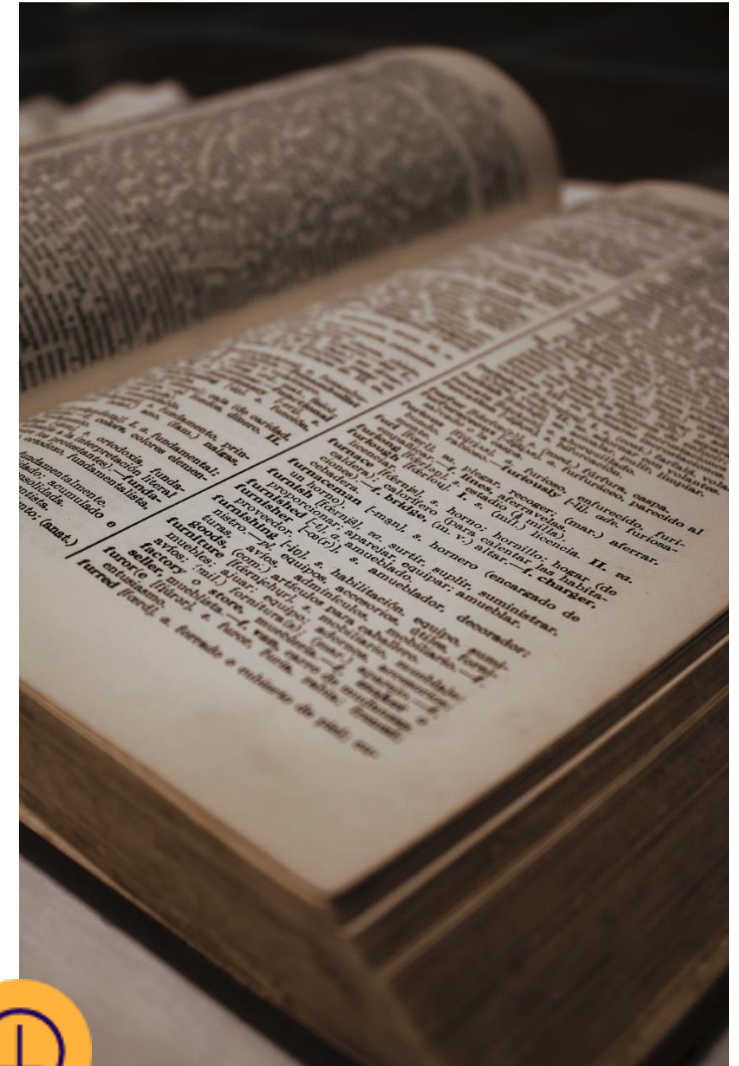
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Understanding The Global Issue

Overview of Food Waste and Loss

- The world population is going to be nearly 10 billion people by 2050. The big question is how to feed this growing population sustainably while creating economic development and tackling the challenges of climate change?
- In the climate change era, tackling the food waste and loss can create a triple win. Farmers, households, and companies can save money by reducing wasted food. More people can be fed if we prevent food loss and waste. It also helps to alleviate pressure on climate as well as on water and land.

(WRI)



Food Loss and Waste

FAO's Definitional Framework

- Food loss refers to a decrease in mass (dry matter) or nutritional value (quality) of food that was originally intended for human consumption. These losses are mainly caused by inefficiencies in the food supply chains, such as poor infrastructure and logistics, lack of technology, insufficient skills, knowledge and management capacity of supply chain actors, and lack of access to markets. In addition, natural disasters play a role.
- Food waste refers to food appropriate for human consumption being discarded, whether or not after it is kept beyond its expiry date or left to spoil. Often this is because food has spoiled but it can be for other reasons such as oversupply due to markets, or individual consumer shopping/eating habits.
- Food wastage refers to any food lost by deterioration or waste. Thus, the term "wastage" encompasses both food loss and food waste." (FAO, 2013) (EU FUSION)



Statistics and Trends

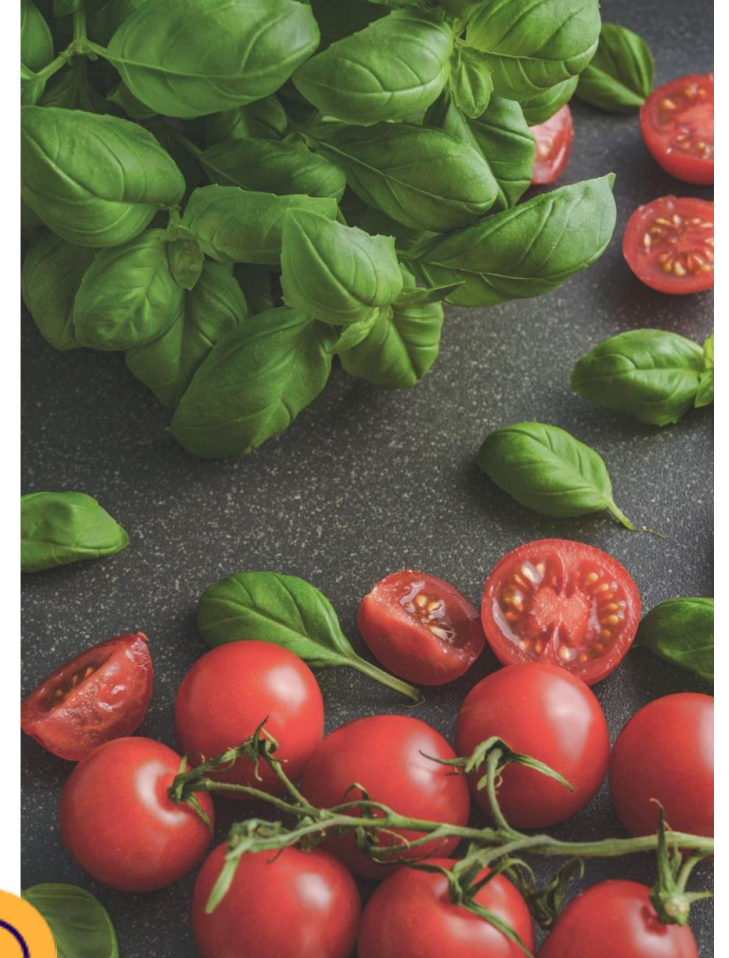
Challenges of Our Food System

- Every year around the globe, 1,3 billion tonnes of food are lost or wasted. That is 1/3 of all food produced for human consumption. Food loss and waste mean loss and waste of resources, including water, land, energy, labor, and capital. It also means needlessly produce greenhouse gas emissions, contributing to climate change and global warming.

(FAO, 2019)

- Social Perspective; On the other hand, in 2019, nearly 750 million people were exposed to severe levels of food insecurity. Approximately 2 billion people did not have regular access to safe, nutritious, and sufficient food in 2019.

(UN, Goal 2: Zero Hunger)



Food Loss & Waste Along The Supply Chain



FAO, Retrieved from: <https://www.facebook.com/UNFAO/photos/a.448783138585/10156090554783586/?type=3&theater>



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> **6% of Global Gas Emissions come from food losses and waste!**

“ Food Production is responsible for 26% of global greenhouse gas emissions. ”

Source: Our World In Data

Food Loss, Waste and GHG Emissions

6% of global greenhouse gas emissions come from food losses and waste

Our World
in Data

Emissions from food that is never eaten accounts for 6% of total emissions



Source : Our World In Data, <https://ourworldindata.org/food-waste-emissions>,

Food Packaging

As a means to minimize food loss and waste I

- Sustainable food systems depend on sustainable packaging.
- Packaging helps customers make smart food choices by maintaining food quality and safety and offering clear, concise information about product origin, use, storage needs, date marking, cooking guidance, and other topics. This reduces wasteful behavior.

(FAO, Packaging as a means to reduce food loss and waste)



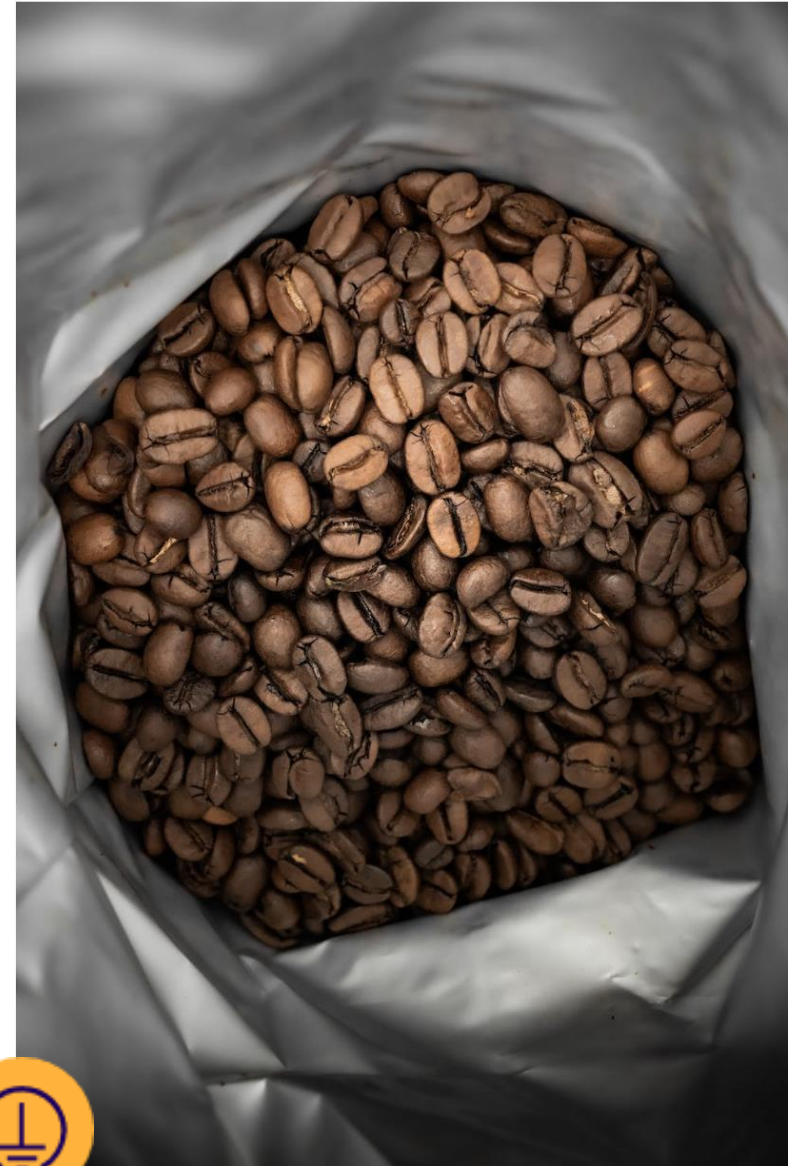
Food Packaging

As a means to minimize food loss and waste II

Packaging plays a crucial role in reducing food loss and waste throughout the supply chain from production to final consumption.

- **Packaging;**
 - Extends Shelf Life
 - Protects During Transportation
 - Prevents Contamination
 - and Informs Consumer

Packaging significantly contributes to the reduction of overall food waste, which is a critical environmental issue as well as a socioeconomic burden. Food waste is mostly caused by inefficiencies in the distribution and consumption of food. It is imperative to strike a balance between the advantages and the environmental implications of the packaging materials.





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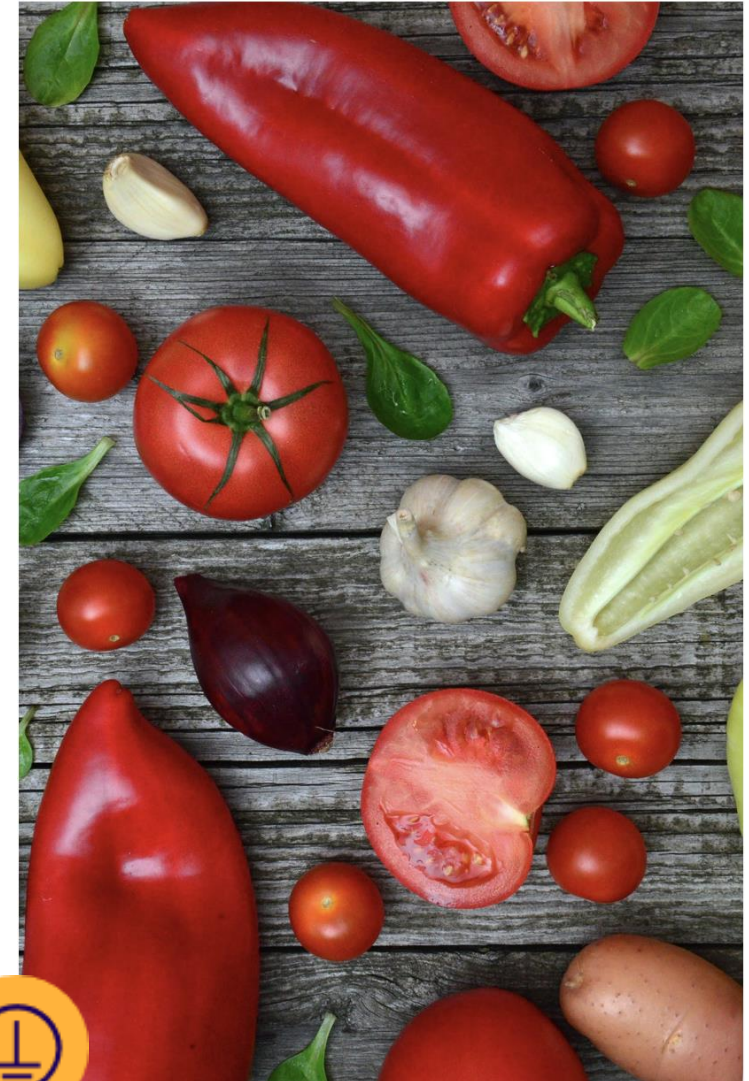
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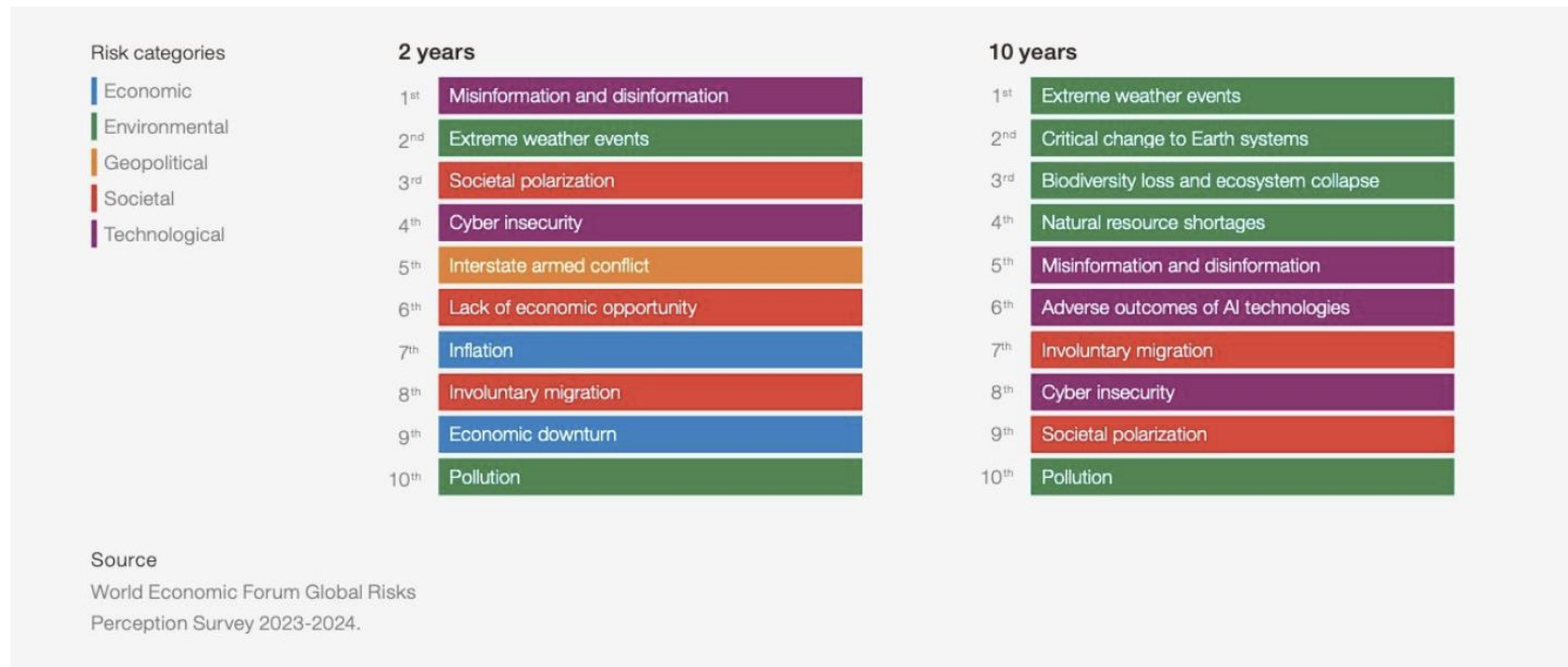
> Smart Packaging

Changing Consumer Demands and Risk Perception

- World Economic Forum just released its global risk report with extreme weather events, critical change to Earth Systems and biodiversity loss and ecosystem collapse ranking at the top of the list over the next 10 years. (WEF)
- Demand for sustainable, efficient, and fair supply chains is on the rise.
- International society is also willing to create a more sustainable, efficient, and fair food system. One good example is Green Deal where the EU is making promises to create an agriculture and food system respecting planetary boundaries.
- A recent study shows that *"67% of European consumers would value food information showing the sustainability from farm to fork."*(EIT)



Global Risks Perception Survey



Source : World Economic Forum Global Risks Perception Survey 2023-2024.



Impact of Technology

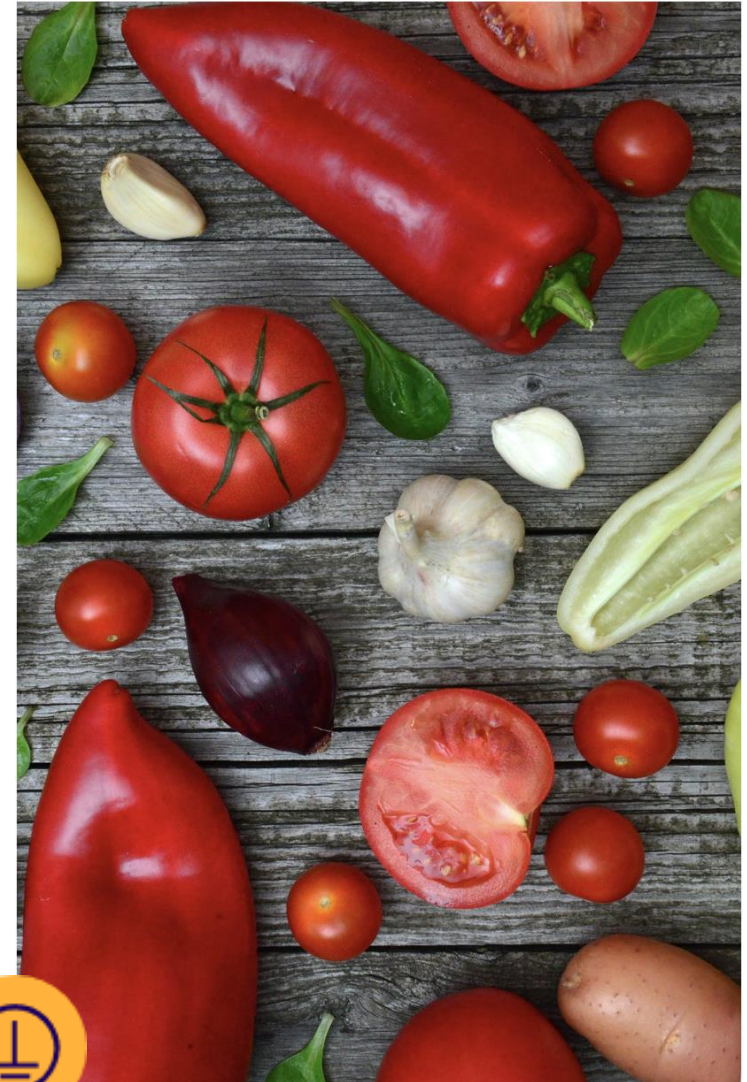
Technology in the service of paradigm shift

- Although technology can not be a silver bullet for the current food system problems, it may help to create more sustainable, efficient, fair, and healthy food supply chains.
- In our the new paradigm report series, we search for tech solutions to tackle the climate change while respecting the environment..
- For smart packaging technologies , we chose three startups that work to make a paradigm shift in the food system.



Smart Packaging

- Smart packaging is a crucial area of innovation, especially in the context of reducing environmental impact, food waste and loss, and increasing food safety.
- Smart packaging not only aims to replace plastic materials with more sustainable options but also incorporate intelligent features that can enhance food sustainability and safety.
- We can divide smart packaging into two main categories one is alternative to plastics the other one is reusables. The idea of reusable packaging is far from being a new one. Alternatives to plastics section is newer.



Smart Packaging

Alternatives To Plastics

- Edible Packaging
- Bioplastics From Food and Agricultural Waste
- Bio-Coatings
- Smart Paper Packaging/Sensors
- And many more..

Reusables

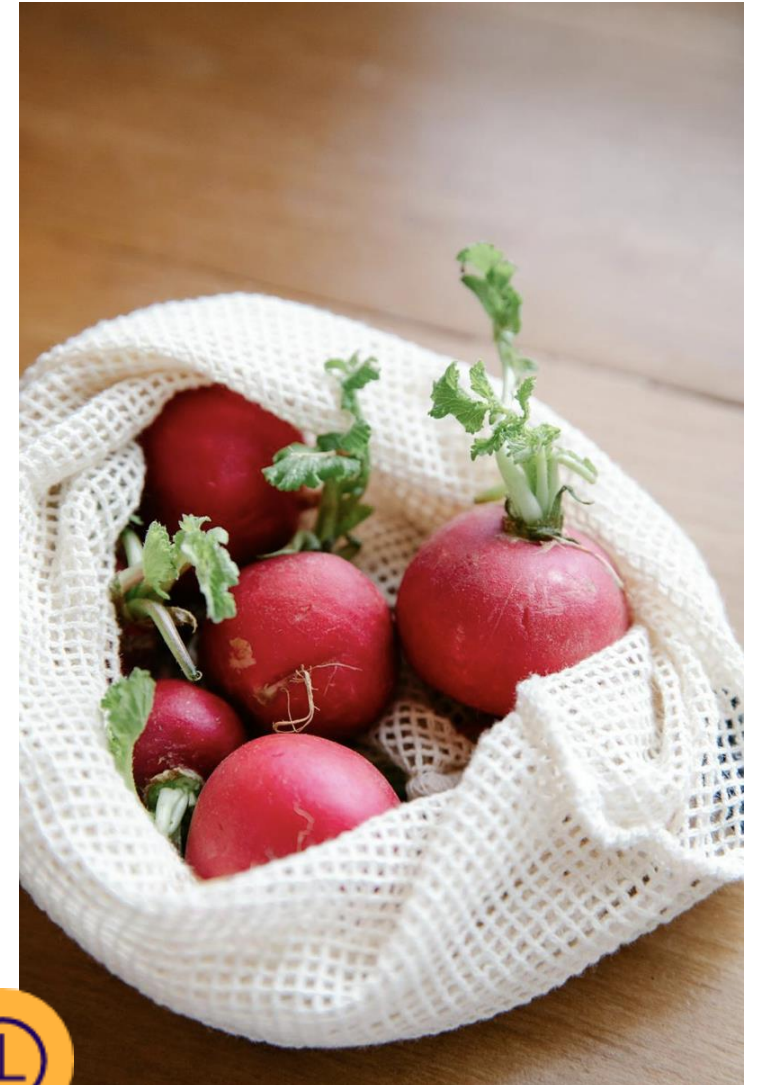
- Durable Materials
- Easy to Clean
- Deposit Systems



Smart Packaging

Alternatives To Plastics

- **Edible Packaging;** This packaging is edible and made of natural materials, so it may be consumed with the product. However, there are some concerns about the taste and practicality of it.
- **Bioplastics From Food and Agricultural waste;** Derived from agricultural waste, food waste, coffee grounds and so on these materials are sustainable and compostable.
- **Bio-Coatings;** a solution which slow down the ripening process of fruits and vegetables. Bio-coatings offer a thin layer of edible and environmentally friendly materials that could be consumed and a barrier for the food products.
- **Smart Paper Packaging;** Smart paper packaging that has been upgraded with sensors or indicators can change color to show changes in temperature or spoiling, giving customers access to real-time product information.



Smart Packaging

Reusables

- The idea of reusable packaging is far from being a new one.
- Reusable packaging strives to decrease waste and lessen the environmental effect of packaging materials. It is an eco-friendly and sustainable method of product packaging. The key idea is to design packaging that can be used multiple times, either for the same product or for a different purpose.
- Reusable packaging often uses durable materials such as glass, metal or high-quality materials. It offers modular design and easy cleaning.
- A deposit and return system is incorporated into certain forms of reusable packaging. When buying a product, consumers must pay a deposit. This deposit is refunded when the empty packaging is returned to approved collection locations.





Swapbox

Eliminating packaging waste in food services, workplaces, and events.

- Founded in 2019 in the Netherlands, SwapBox is a zero-waste packaging firm that develops and manufactures reusable packaging for the food and beverage industries.
- The reusable packaging service aims to help food services, workplaces, and events to eliminate packaging waste.
- Swapbox offers a modular service of reusable packaging, logistics, tracking technology, and cleaning that fits any type of operations or event.
- SwapBox's Eco-System offers an innovative and comprehensive approach to reusable packaging by combining their Washing as a Service, Packaging Rental, and Tracking Technology solutions. SwapBox's integrated services promote sustainability, efficiency, and cost-effectiveness for businesses looking to minimize their environmental impact while streamlining operations.





Innoscentia

Dynamic shelf life labelling to reduce food waste

- Innoscentia is a foodtech company that aims to disrupt one of the most ad-hoc systems of our society the expiry date system.
- Swedish startup has developed a unique sensor technology that indicates food status in real time, both visually for consumers and digitally for blockchain systems. This unlocks lost shelf-life and enables the packaging and food industry to optimize their value chain.
- The sensors can indicate the growth of bacteria in a meat that inform consumers.





Apeel

Food Saving Companion

- Developing science-backed, technology-supported solutions that help improve the produce experience on shelf.
- Apeel offers plant-based protection that helps the fruits and vegetables stay fresh for longer.
- Apeel is an extra peel of protection made by applying another layer of what already exist naturally on fruits and vegetables. This extra peel keeps moisture in and oxygen out. Fresh produces are living, breathing things, Apeel simply slows down the respiration process and associated oxidation and water loss for longer freshness.



- WRI, Reducing Food Loss and Waste, Setting A Global Action Agenda, Retrieved from; https://wriorg.s3.amazonaws.com/s3fs-public/reducing-food-loss-waste-global-action-agenda_0.pdf (Accessed: 16/01/2024).
- EU Fusion, Retrieved from; <https://www.eu-fusions.org/index.php/about-food-waste/280-food-waste-definition>, (Accessed: 18/01/2024)
- FAO, 2019, The State of Food and Agriculture, 2019, Retrieved from; <https://www.fao.org/interactive/state-of-food-agriculture/en/> (Accessed: 17/01/2024).
- UN, SDG, Goal 2 Zero Hunger, Retrieved from; <https://www.un.org/sustainabledevelopment/hunger/>, (Accessed: 20/01/2024)
- Our World In Data, Retrieved from; <https://ourworldindata.org/food-waste-emissions>, (Accessed: 17/01/2024).
- FAO, Packaging as a Means to Reduce Food Loss and Waste, Retrieved from; <https://www.fao.org/europe/events/detail/packaging-as-a-means-to-reduce-food-loss-and-waste/en> (Accessed: 15/01/2024)
- EIT, New research shows majority of people would embrace an international eco-label on food products, Retrieved from; <https://www.eitfood.eu/news/new-research-shows-majority-of-people-would-embrace-an-international-eco-label-on-food-products> (Accessed; 05/02/2024)
- The Economist, What is The European Green Deal, June 1, 2021, (Accessed; 05/02/2024)
- WEF, Global Risks Report 2023, Retrieved from; <https://www.weforum.org/publications/global-risks-report-2023/> (Accessed; 05/02/2024)

Startups

- SwapBox Startup Example, <https://www.swap-box.com/>, (Accessed:18/01/2024).
- Innoscentia, Startup Example, <https://www.innoscentia.com/>, (Accessed: 17/01/2023).
- Apeel, Startup Example, <https://www.apeel.com/> (Accessed:18/01/2023).

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