



الجمعيّة العلميّة الملكيّة
Royal Scientific Society

Circular Food Supply chain



CIRCULAR ECONOMY
CLUB


Amman



Delivered by

Omar AlSaleh – RSS Circular Economy Expert / CEC Amman Founder



A photograph of a market stall displaying large quantities of fresh produce. The foreground is dominated by a large pile of bright orange oranges, some with green leaves still attached. To the right, there is a large pile of ripe, red tomatoes. Several small white price tags are visible, some with Arabic script. The background is slightly blurred, showing other market stalls and people, suggesting a busy outdoor market setting.

Around 14 percent of the world's food (valued at \$400 billion per year) continues to be lost after it is harvested and before it reaches the shops (FAO, 2019)

While [UNEP's Food Waste Index Report](#) shows that a further 17 percent of our food ends up being wasted in retail and by consumers, particularly in households. (UNEP)



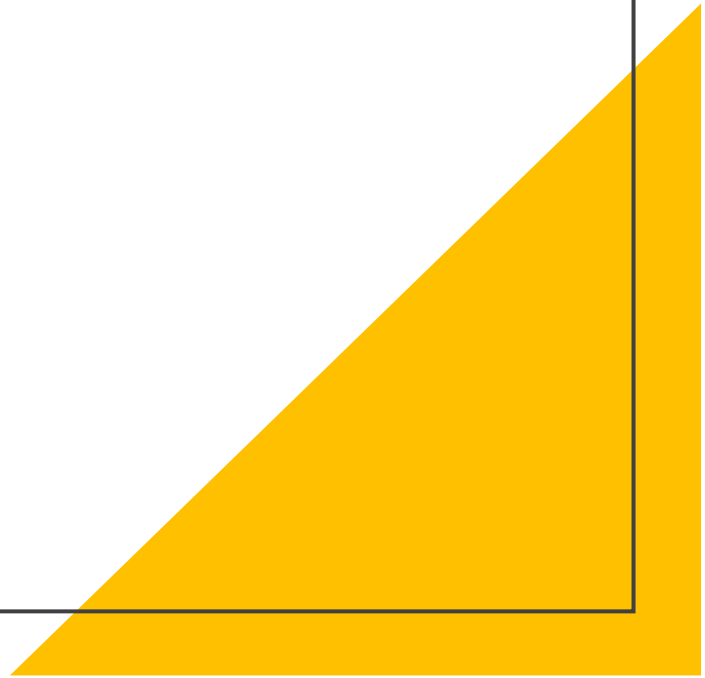
The costs associated with food waste for the EU in 2012 are estimated to be around **143 billion euros**. (FUSION Project)



The global carbon footprint of food waste has been estimated at 4.4 Gtonnes of CO₂ (FAO 2015).



If food loss and waste were a country, it would be the third largest emitter on Earth, after USA and China (FAO 2013)



A wide-angle landscape photograph capturing a tranquil scene at dusk or dawn. The sky is a gradient of soft colors, from a pale blue on the left to a warm, golden-orange on the right. In the distance, a range of mountains is silhouetted against the sky, their forms mirrored in the calm, glassy water in the foreground. A path of smooth, dark stones or pebbles is laid out across the water, starting from the lower right and curving towards the center of the frame. The overall mood is peaceful and contemplative.

Land footprints



In 2007, 1.4 billion hectares of agricultural land was used to produce food that wasn't consumed, almost a third (28%) of the world's total agricultural land area. This represents a surface larger than Canada and India together (FAO, 2015)






Water footprints





Agriculture accounts for 70% of the global freshwater withdrawal, the remaining 30% is taken for industrial production and domestic water supply. (FAO,2013)



In 2007, the global water footprint for agricultural production was about 250km^3 . In terms of volume, it represents almost 3 times the volume of Lake Geneva (HLPE, 2014)

The background of the slide is a close-up photograph of a tree trunk's cross-section, showing concentric growth rings in shades of brown and tan. The rings are slightly curved and create a sense of depth and texture.

9.7 million hectares are deforested annually to grow food, representing 74% of total annual deforestation (FAO, 2013)

SUPPLY CHAIN DIRUPTIONS



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Many reasons

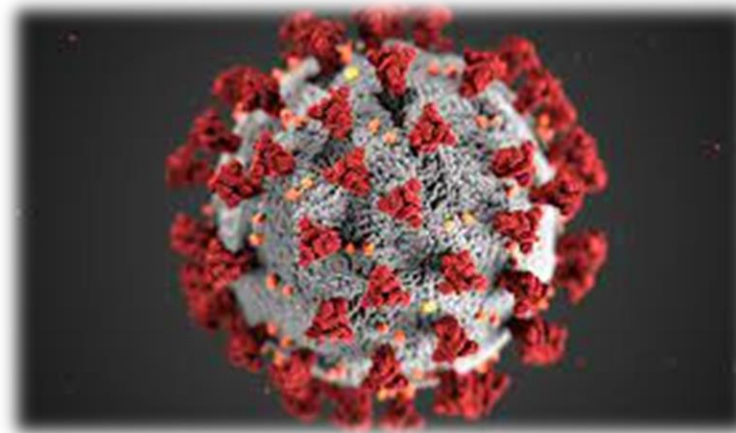


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WARS & Geopolitical
Conflicts



Pandemics




Poor logistics




Poor Sourcing &
procurement



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millions of tonnes, or a quarter of the calories intended to feed humans, becomes food loss and waste along the food supply chain (FAO, IFAD, UNICEF, WFP and WHO. 2017)



The global consensus is that, under current production and consumption trends, global food production will 'need' to increase by 60% by 2050 based on population growth.


Jordan imports more food than it exports. In 2020, the value of Jordan's agricultural imports was **four times higher than the value of its exports** (Figure 18 below), which translated into an agricultural trade deficit of **US\$ 2,863 million**. Imports were dominated by staple crops (e.g. maize, rice and wheat), mainly from Argentina, the US and Brazil.

The total amount of food wasted in Jordan could feed **1.5 million people** for a whole year. At the level of food loss, it has been estimated that **22% of all locally produced fruit and vegetables are lost** along the various nodes of the supply chain, and that **one-third** of the country's **wheat supply** is **either lost or wasted**

Jordan has a **highly centralised food-trade system**, in which all primary food items (whether produced domestically or imported) are registered and traded between suppliers and wholesalers. In Jordan, wholesale vegetable and fruit markets are the only formalized and legal marketing system for fruit and vegetables. The system has important logistical, organisational and distributional implications.

Critical Food supply (Imported)

- Wheat – Jordan imports the majority of its wheat, a staple for bread and other essential foods.
- Barley – Mainly used for animal feed, critical for Jordan's livestock sector.
- Corn – Another essential import for livestock feed, as Jordan's agricultural output does not meet domestic demand.
- Rice – A significant staple in the Jordanian diet, almost entirely imported.
- Alfalfa – Used as **animal feed** for the country's livestock, especially dairy cattle
- Sugar – Jordan imports most of its sugar for food production and consumption.
- Vegetable Oils – Including sunflower and palm oil, Jordan depends on imports for cooking and food processing.
- Soybeans – Mainly used for animal feed and oil production.
- Pulses (lentils, chickpeas, etc.) – Widely consumed, with most being imported to meet demand.

A close-up photograph of a cup of soup in a bread bowl. The bread bowl is a hollowed-out piece of bread, filled with a thick, orange-brown soup. The background is softly blurred, showing other bread rolls. The text "We need to Rethink our Food System" is overlaid in white on the left side of the image.

We need to Rethink our
Food System

The Circular Economy (CE)

Definition of Circular Economy




CE-IC

CIRCULAR
ECONOMY

*is the alternative to linear economy ; where the concept of
waste is eliminated through design for reuse &
post-consumer recovery*

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The image shows a brown paper background with a yellow sticky note in the top left corner containing the text 'CE-IC'. A wooden sign on a stick is positioned at the top center, displaying the words 'CIRCULAR ECONOMY'. Below the sign, a paragraph of text in italics defines the circular economy as an alternative to the linear economy, where waste is eliminated through design for reuse and post-consumer recovery. At the bottom center, there is a yellow circular logo with the letters 'ce' inside. To the right of the logo is a light green tag with a string and a circular icon containing three leaves. Below the logo and tag, the text 'CIRCULAR ECONOMY CLUB' is printed in a sans-serif font, with 'Amman' written in a cursive font underneath.



CE-IC

CIRCULAR
ECONOMY

*it can not happen, if material recovery & reverse logistics
are not involved ;
we need to CLOSE the loop !*

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CE Principles

KEY CONCEPT



“Waste does not exist in nature, because each organism contributes to the health of the whole. A fruit tree blossoms fall to the ground and decompose into food for other living things. Bacteria and fungi feed on the organic waste of both the tree and the animal that eat its fruit, depositing nutrients in the soil that the tree can take up and convert into growth. One organism’s waste becomes food for another.”

WILLIAM McDONOUGH

Co-Author

“Cradle-to-Cradle: Remaking the Way We Make Things”

UNITED STATES



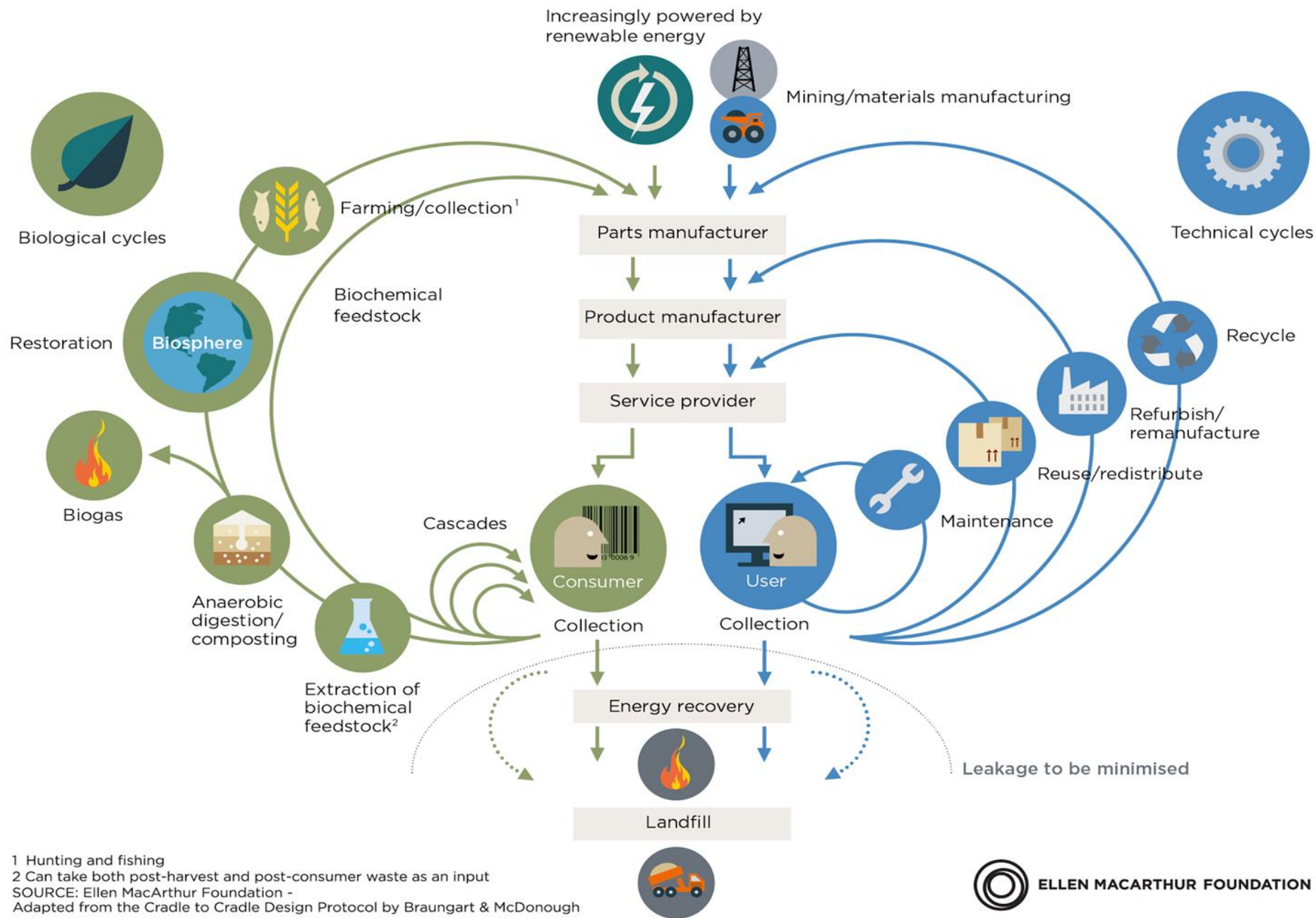
According to the **Ellen MacArthur Foundation (2013)**, the principles of the circular economy are:

Designing out
waste and
negative
externalities

Keeping
products and
materials in
use at the
highest
possible value
at all times

Regenerating
our natural
ecosystem

CIRCULAR ECONOMY - an industrial system that is restorative by design



1 Hunting and fishing

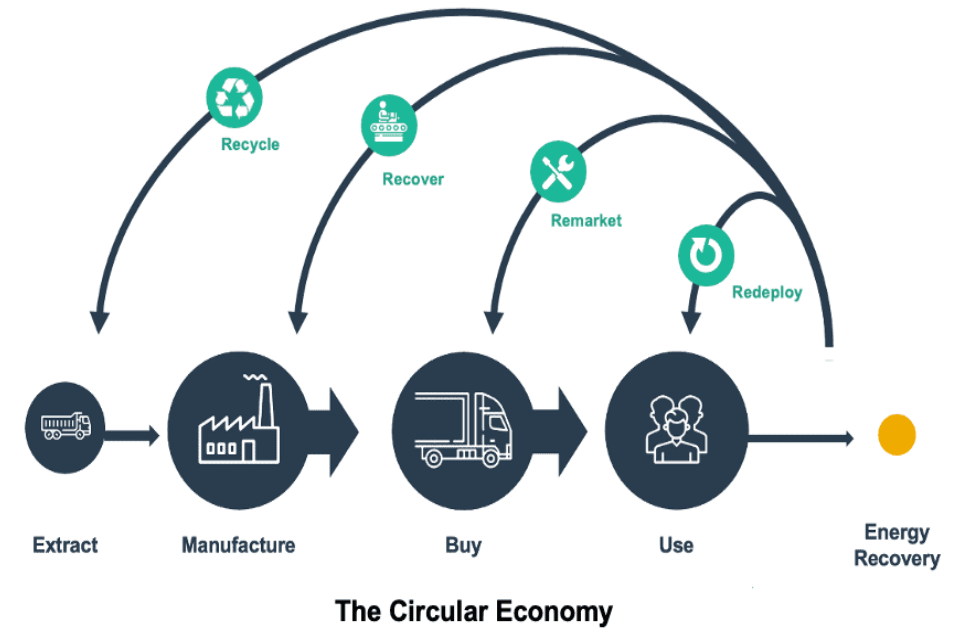
2 Can take both post-harvest and post-consumer waste as an input

SOURCE: Ellen MacArthur Foundation -

Adapted from the Cradle to Cradle Design Protocol by Braungart & McDonough

How Crucial is the Circular SCM

“A well-oiled supply chain is critical for maintaining economic stability and a functioning society”



Linear Supply Chain vs Circular Supply Chain

Linear Supply Chain:

- ✓ We describe stages as actions
- ✓ We can track back the or trace waste
- ✓ Its only an order qualifier
- ✓ Vulnerable Supply chain - monopoly
- ✓ Your sphere of influence in a supply chain ends at the manufacturer and sometimes distributor stage!

No Influence on consumer or post-consumer

Circular Supply chain:

- ✓ We break actions into processes
- ✓ Inputs & outputs are mapped
- ✓ Processes are mapped into work steps
- ✓ Three tier levels are considered (Tier 1,2, & 3)
- ✓ Waste i.e. Circular Opportunities are detected
- ✓ Saves money and generates revenue
- ✓ Resilient Supply chain via smart sourcing
- ✓ It is an order winner
- ✓ CE enhances and expands your sphere of influence across the supply chain including the consumer and post-consumer use.

END-TO-END
Sphere of influence

Nature is circular

The natural system has 2 ecological design systems:

1. Nature is full of nested & interacting cycles (carbon, nitrogen, phosphorus, water)
2. Natural processes and cycles that transform waste to resource

CE Food Systems

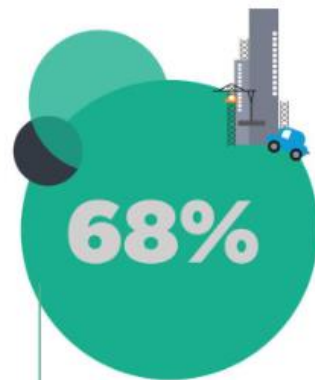
1. Connects Rural & Urban communities across the value chain (shorter supply chains)
2. Linkages consist of flows of people, goods, services, capital & natural resources (closes the loop)

Circular food systems intervene at 3 levels:

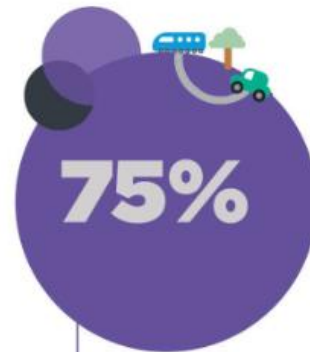
1. Food Production
2. Food Consumption
3. Food Surplus & Waste management

CE Food Ambitions

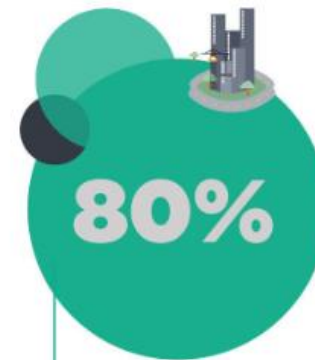
1. Sourcing food grown regeneratively, and locally where appropriate
2. Designing and marketing healthier food products
3. Making the most of food



Half of the world's population lives in cities and this number is expected to grow to 68% by 2050



Cities consume 75% of the world's natural resources



Cities consume 80% of the global energy supply.

CE interventions

1. Pre-Harvest: Regenerative agri Design + Peri Urbans
2. Post Harvest: waste to resource
3. Pre Industrial: Circular Food product (design (food+ packaging)
4. In-process: Food waste (defect & inefficiency)
5. Post Industrial: byproducts & food surplus (upcycle or redistributed or discounted)
6. Consumer culture: consume what you need, diet, repurpose, share
7. Post consumer: back to farm (regenerate nature) or energy recovery
8. End-to-End: Industrial symbiosis (Waste to resource)

Regenerative Agriculture

Regenerative practices support the development of healthy soils, which can result in foods with improved taste and micronutrient content.

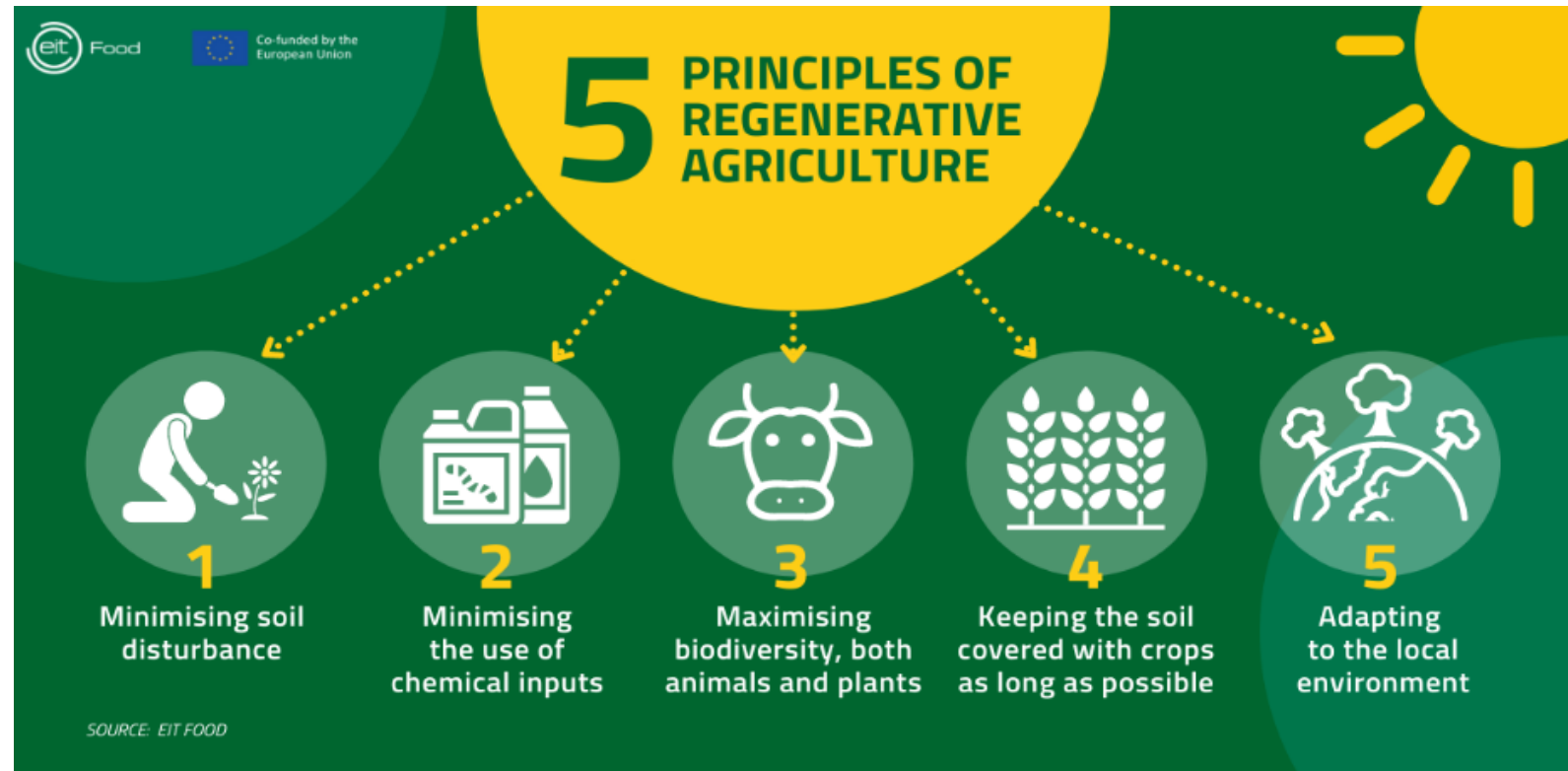
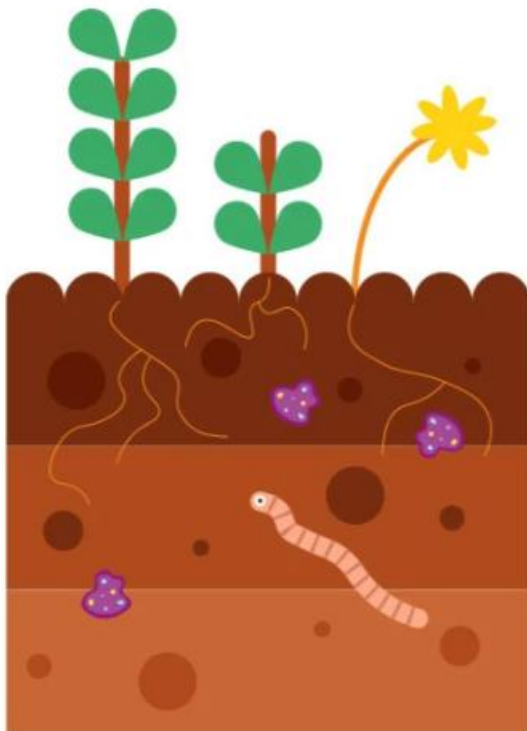


Figure 1: EIT Food's 5 Principles of Regenerative Agriculture

Degenerative vs Regenerative

CONVENTIONAL FARMING PRACTICES

Weak, easily erodible soils
High input costs
Ever-increasing quantity of synthetic fertilisers and pesticides needed
High irrigation requirement
Low crop diversity
Low biodiversity
Polluted water bodies
Health risks of chemical exposure for farm workers
Low resilience
Threat to long-term yields due to soil degradation

REGENERATIVE FARMING PRACTICES

Biologically active soils
Low input costs
High water infiltration and storage
High crop diversity
High biodiversity
Healthy local ecosystem
High water holding and filtration capacity
Low health risks to farm workers
Tasty crops with high micronutrient content
Increased resilience
Support long-term yields
Multiple revenue streams

Peri Urban Agriculture

Peri urban agriculture is a huge opportunity to localize our food sources and create a resilient food supply chain!

Only if applicable! You can pick **high value nutrients** based on import criterion & demand!

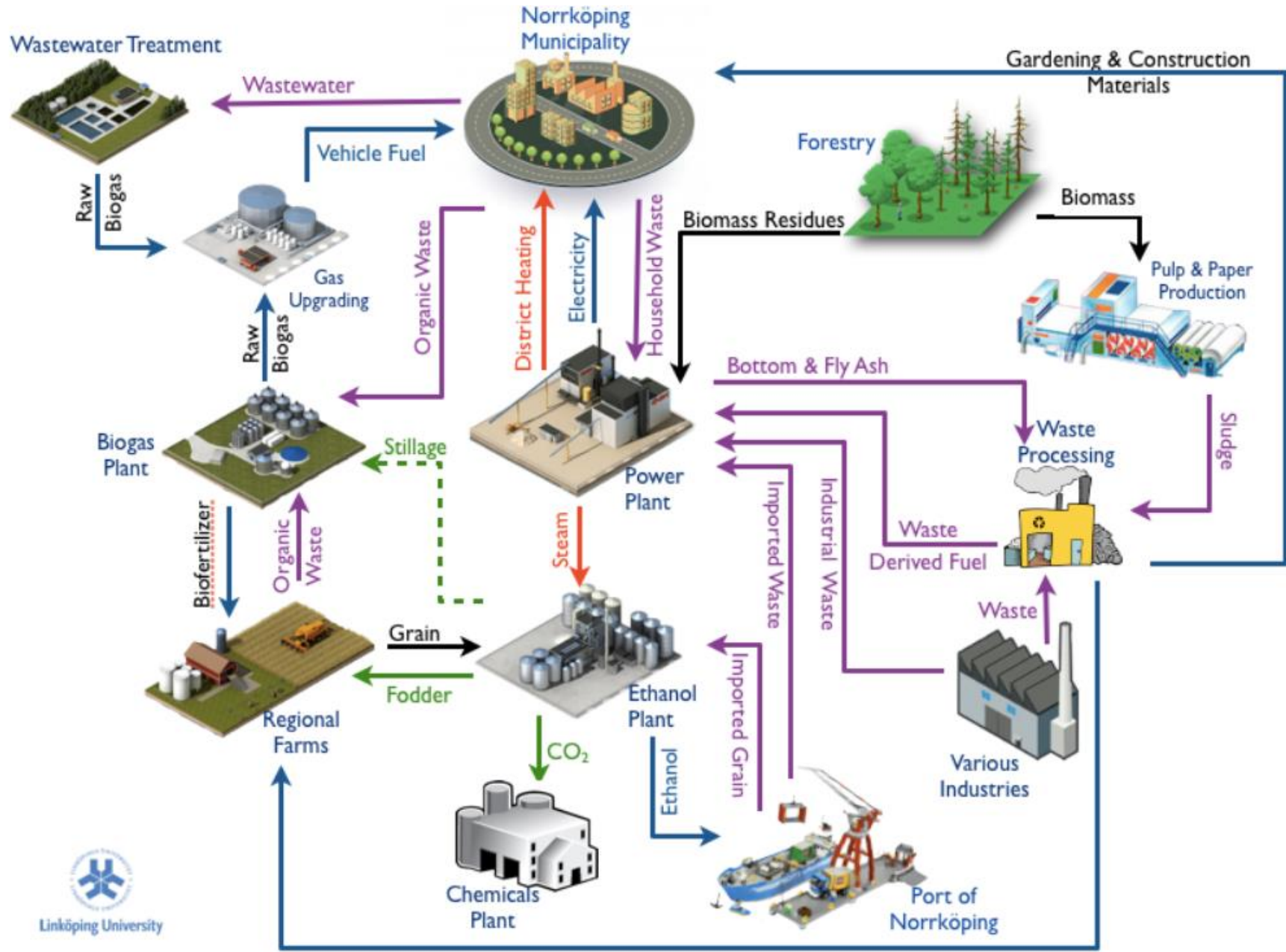
Note:

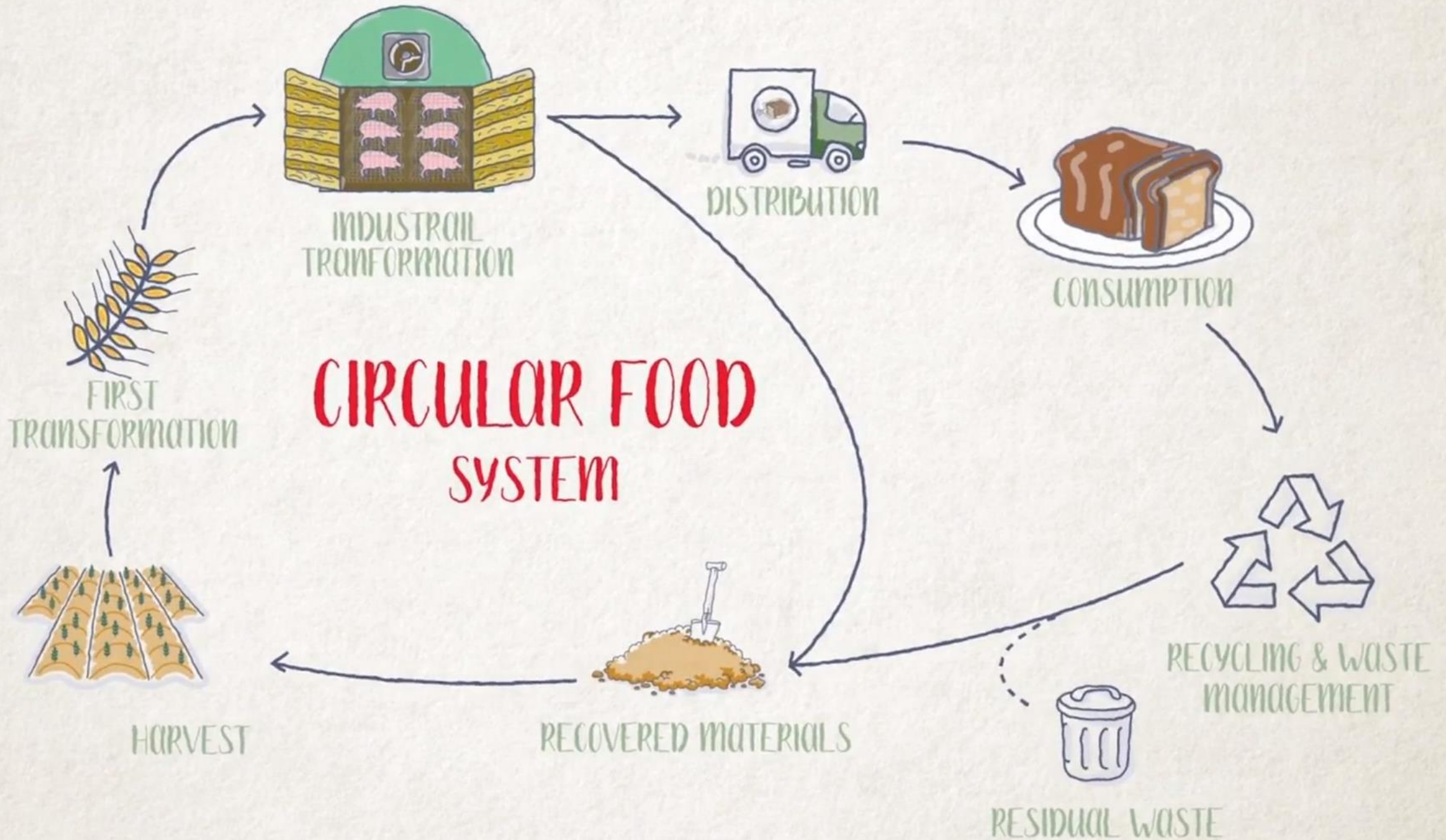
- Proximity reduces food loss or wasted across the value chain (less transits)
- Farmers to consumers direct delivery
- Allows reverse logistics and closing the loop
- FOOD SECURITY

WEFE NEXUS – Circular cities

Circular Economy is inclusive, restorative & regenerative; its an end-to-end approach:

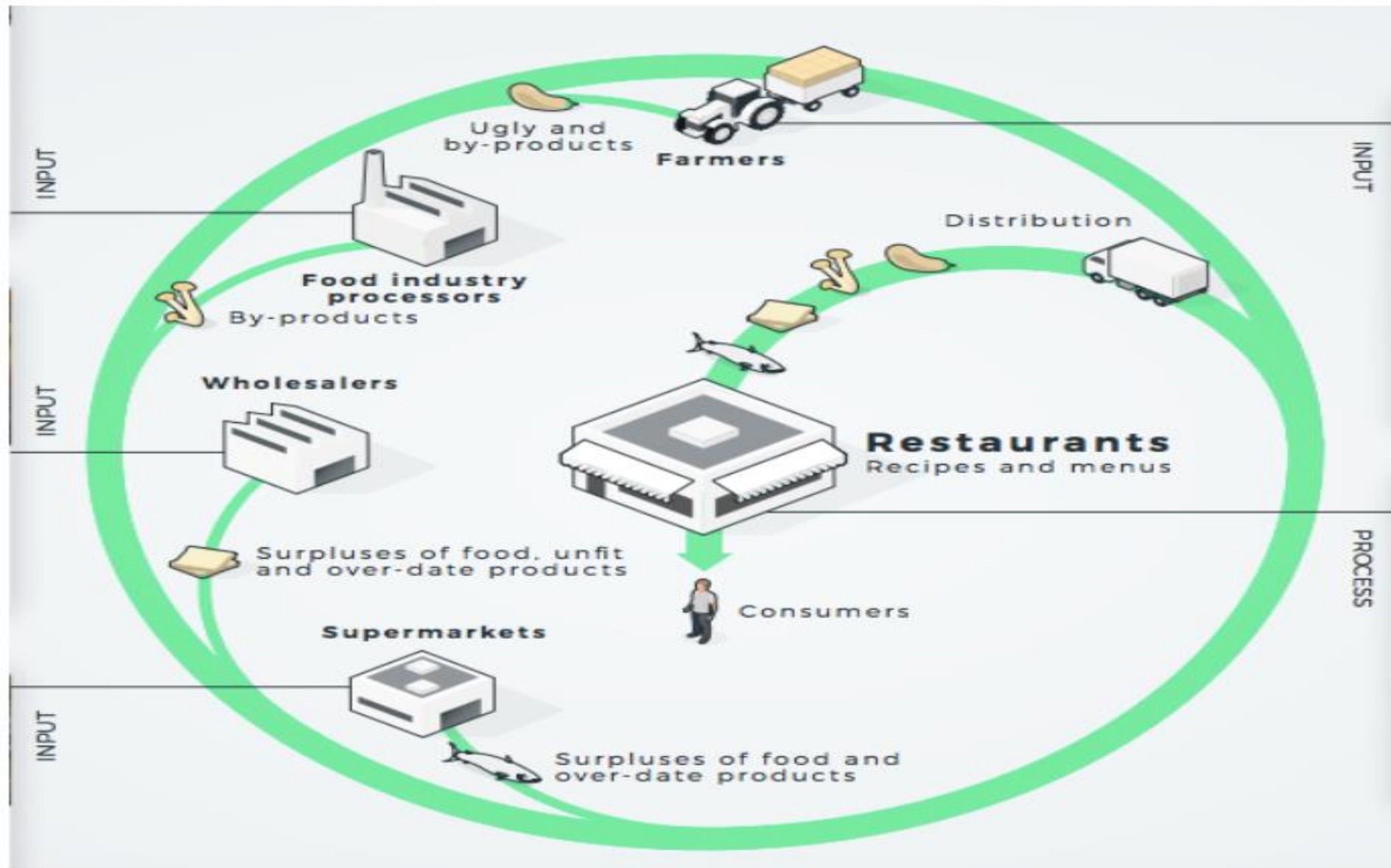
- Circular Food streams
- Circular Material streams
- Circular Water streams
- Circular Energy (renewable resources) streams





HARVEST TO NATURE

Use of waste surplus across the food industry to be used in restaurants



INDUSTRIAL SYMBIOSES



Consumers: Lets FATOUSH IT

- ✓ Buy what you need
- ✓ Eat what you need
- ✓ Eat more organic food
- ✓ Don't waste
- ✓ Share the khair
- ✓ Create more fatoush



Enabling tools

- ✓ Circular supply chain management
- ✓ LCT/A
- ✓ Process mapping
- ✓ Traceability & Labels
- ✓ AI

Circular Challenges

- ✓ Definition of waste and refining legislation
- ✓ Lack of Definition of critical nutrients (high-value nutrients)
- ✓ Slow production needs slower consumption
- ✓ Lack of sorting and & separation of waste streams
- ✓ Organic food is pretty expensive (lack of incentives & awareness)
- ✓ Consumers panic buying & diet habits (Fast food dominance)
- ✓ Transition takes time!

Circular Promises

- ✓ Maximizes value and reduces food loss & waste
- ✓ Healthier & more nutritious food = tackles obesity
- ✓ Reconnecting farmers to consumers
- ✓ Supply chain resilience & Food Security
- ✓ Creating Jobs (New food industries, reverse logistics, renewable energy, food banks, mini markets & waste management)
- ✓ Food research and innovation
- ✓ Leaks but nutritious – regenerates soil
- ✓ Carbon sequestration
- ✓ Social resilience and empowerment – sharing economy

CE- From nature to Nature!

*“Circular Economy fits economy to nature and not
nature to economy!”*

BACK TO THE FUTURE!”

Then Why Circular?

“A system that regenerates itself ..every bit of it is a high value nutrient that could be reincorporated and utilized .. a self-reliant system that self heals or heals other systems after unforeseen shocks and disruptions. Endless nature-based solutions that gives back to nature; a circular virgin of capitalism where prosperity doesn't compromise our planet; natural capital, human capital, resource capital, production capital, financial and social capital all working in harmony therefore achieving true sustainability” (CEC Amman)

Jordan Example





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Thank You



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