GROWING FOOD SECURITY

Innovation and International Best Practice in Food Security

Presented by Anne-Maree McInerney
General Manager, Gould League
@ EASL 2025

GOULD LEAGUE

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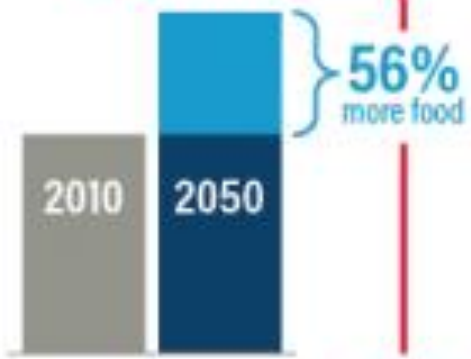
Enough for all forever!

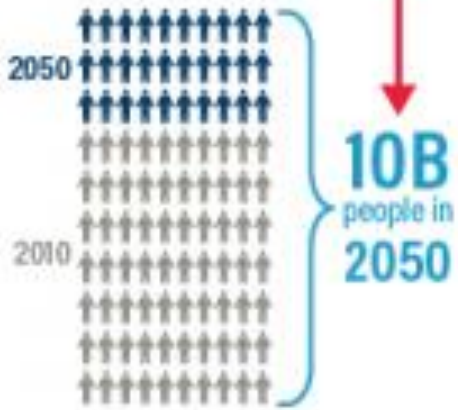
CREATING A **SUSTAINABLE FOOD FUTURE BY 2050**

How do we feed 10 billion people...

WE WILL NEED



TO FEED NEARLY



10B people in **2050**

...without using more land...

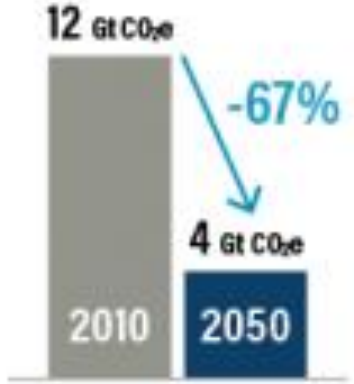
WE NEED TO PREVENT AGRICULTURE FROM EXPANDING

we currently use **~50%** of the world's vegetated land for agriculture

TO SAVE AN AREA OF FORESTS NEARLY **2X** the size of India

...while lowering emissions?

WE CAN LOWER EMISSIONS



WITH INNOVATIVE TECHNOLOGY LIKE

Improved feeds

Plant-based burgers

Resilient crop breeds

Source: wri.org/sustfoodfuture

WORLD RESOURCES INSTITUTE

2 ZERO HUNGER

Goal 2 is about creating a world free of hunger by 2030.The global issue of hunger and food insecurity has shown an alarming increase since 2015, a trend exacerbated by a combination of factors including the pandemic, conflict, climate change, and deepening inequalities.

By 2022, approximately 735 million people – or 9.2% of the world's population – found themselves in a state of chronic hunger – a staggering rise compared to 2019. This data underscores the severity of the situation, revealing a growing crisis.

In addition, an estimated 2.4 billion people faced moderate to severe food insecurity in 2022. This classification signifies their lack of access to sufficient nourishment. This number escalated by an alarming 391 million people compared to 2019.

The persistent surge in hunger and food insecurity, fueled by a complex interplay of factors, demands immediate attention and coordinated global efforts to alleviate this critical humanitarian challenge.

Extreme hunger and malnutrition remains a barrier to sustainable development and creates a trap from which people cannot easily escape. Hunger and malnutrition mean less productive individuals, who are more prone to disease and thus often unable to earn more and improve their livelihoods.

2 billion people in the world do not have reg- ular access to safe, nutritious and sufficient food. In 2022, 148 million children had stunted growth and 45 million children under the age of 5 were affected by wasting.

2 ZERO HUNGER

END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION AND PROMOTE SUSTAINABLE AGRICULTURE

ZERO HUNGER GOAL

AT RISK

MORE THAN **600 MILLION** PEOPLE WORLDWIDE ARE PROJECTED TO **FACE HUNGER IN 2030**

LITTLE TO NO PROGRESS

HAS BEEN MADE IN REDUCING ANAEMIA WORLDWIDE SINCE 2000

PREVALENCE OF ANAEMIA IN **WOMEN AGED 15–49**

HAS REMAINED STAGNANT **AT AROUND 30%**

DESPITE DROPPING IN 2021,

HIGH FOOD PRICES CONTINUE TO PLAGUE MANY NATIONS

SHARE OF COUNTRIES EXPERIENCING MODERATELY TO ABNORMALLY HIGH FOOD PRICES:

1 IN 3 PEOPLE

WORLDWIDE STRUGGLE WITH MODERATE TO SEVERE **FOOD INSECURITY**

MALNUTRITION PERSISTS WORLDWIDE, JEOPARDIZING CHILDREN'S WELL-BEING AND FUTURE DEVELOPMENT

CHILDREN UNDER AGE-5 AFFECTED BY:

(2022)

Australia's food security problem

At least **one million** Australians **can't afford** to buy enough food

Climate change and **pandemic** are disrupting the food system

There will be more frequent **shocks** to our food supply

Less land, water and other **natural resources** are available to grow food

Food prices will continue to **rise**

More Australians will be **unable** to buy enough food in future

More people are becoming **dependent** on emergency food relief

Emergency food relief **is not** a long term solution

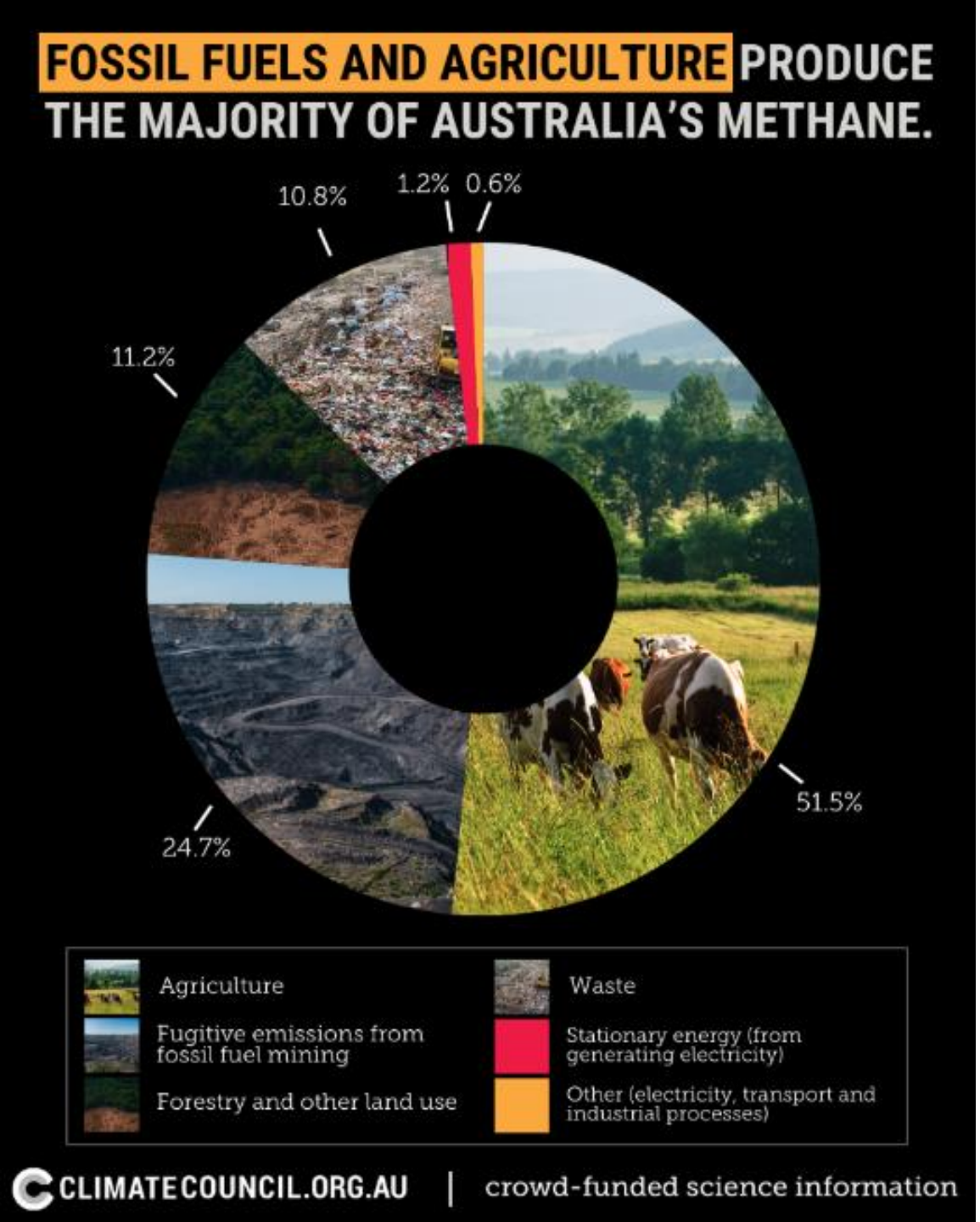
Australians need **dignified** access to nutritious food

We need a **food resilience plan** to ensure **everyone has enough food** in a world of shocks and stresses

fvas.unimelb.edu.au/research/projects/foodprint-melbourne

LORD MAYOR'S CHARITABLE FOUNDATION

THE UNIVERSITY OF MELBOURNE



51.5% of methane comes from Agriculture. We need to scale up available and emerging methane solutions and incentivise farmers to adopt them. For example, feed supplements for cattle, such as **red seaweed** Asparagopsis, which, **if fed daily, has been shown to reduce methane from livestock by 90%.**

Other agricultural solutions include: vaccine treatments for cattle gut microbes, methane-reducing pasture species, and selective breeding of lower methane cows.

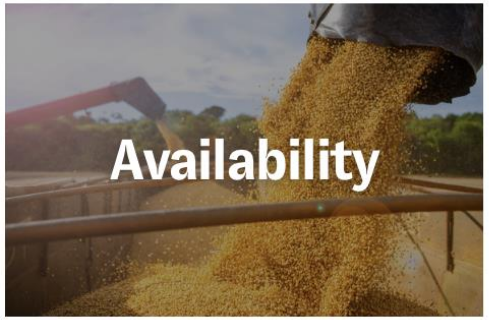
Adjusting our diets can also help mitigate methane emissions as well. Reducing meat and dairy consumption and increasing the proportion of our diets from plants has climate, as well as health benefits.

Although not best practice in agriculture, more information for consumers about the climate impacts of food will help everyone make more informed choices eg Kangaroo.

The 11th Global Food Security Index shows a deterioration in the global food environment for the third year, threatening food security

The GFSI considers the issues of:

Measures the ability of consumers to purchase food, their vulnerability to price shocks and the presence of programmes and policies to support consumers when shocks occur.



Measures agricultural production and on-farm capabilities, the risk of supply disruption, national capacity to disseminate food and research efforts to expand agricultural output.

Measures the variety and nutritional quality of average diets, as well as the safety of food.

Assesses a country's exposure to the impacts of climate change; its susceptibility to natural resource risks; and how the country is adapting to these risks.

ECONOMIST IMPACT

The Global Food Security Index 2022 shows continued deterioration in the global food environment for a third year

Increased risk of armed conflict and soaring food prices continue to stress the global food system

The GFSI 2022 shows that we need to manage natural resources like land and water more effectively in the face of extreme weather and rising temperatures

More investment is needed in agricultural R&D to ensure long term resilience and sustainability of the global food system

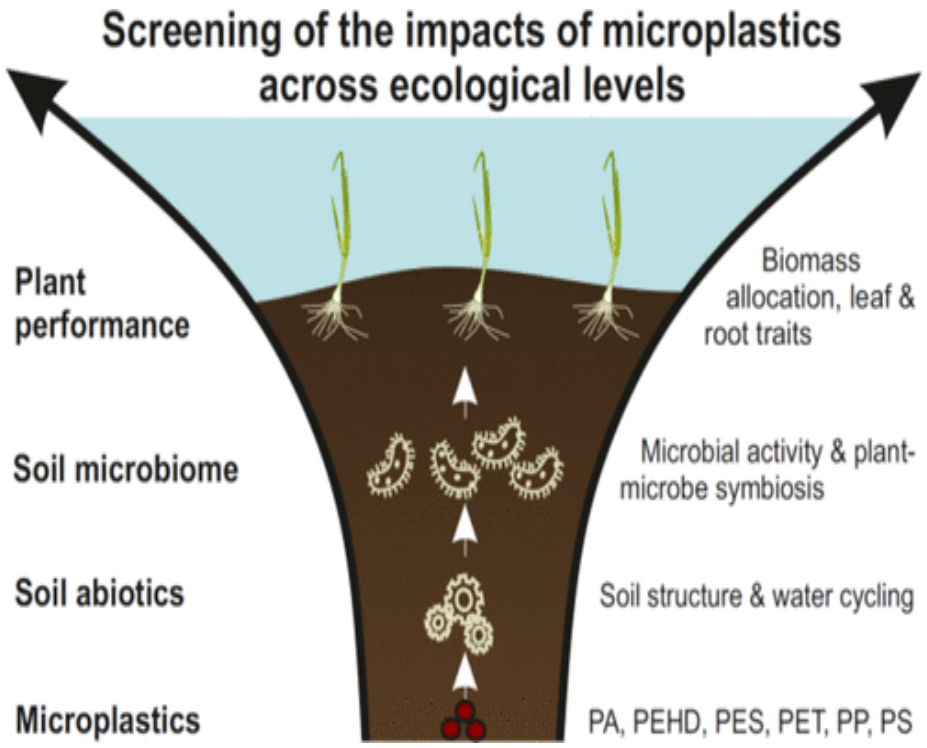
For more information on the drivers of global food security, visit the Global Food Security Index 2022: economistimpact.com/food-security-index

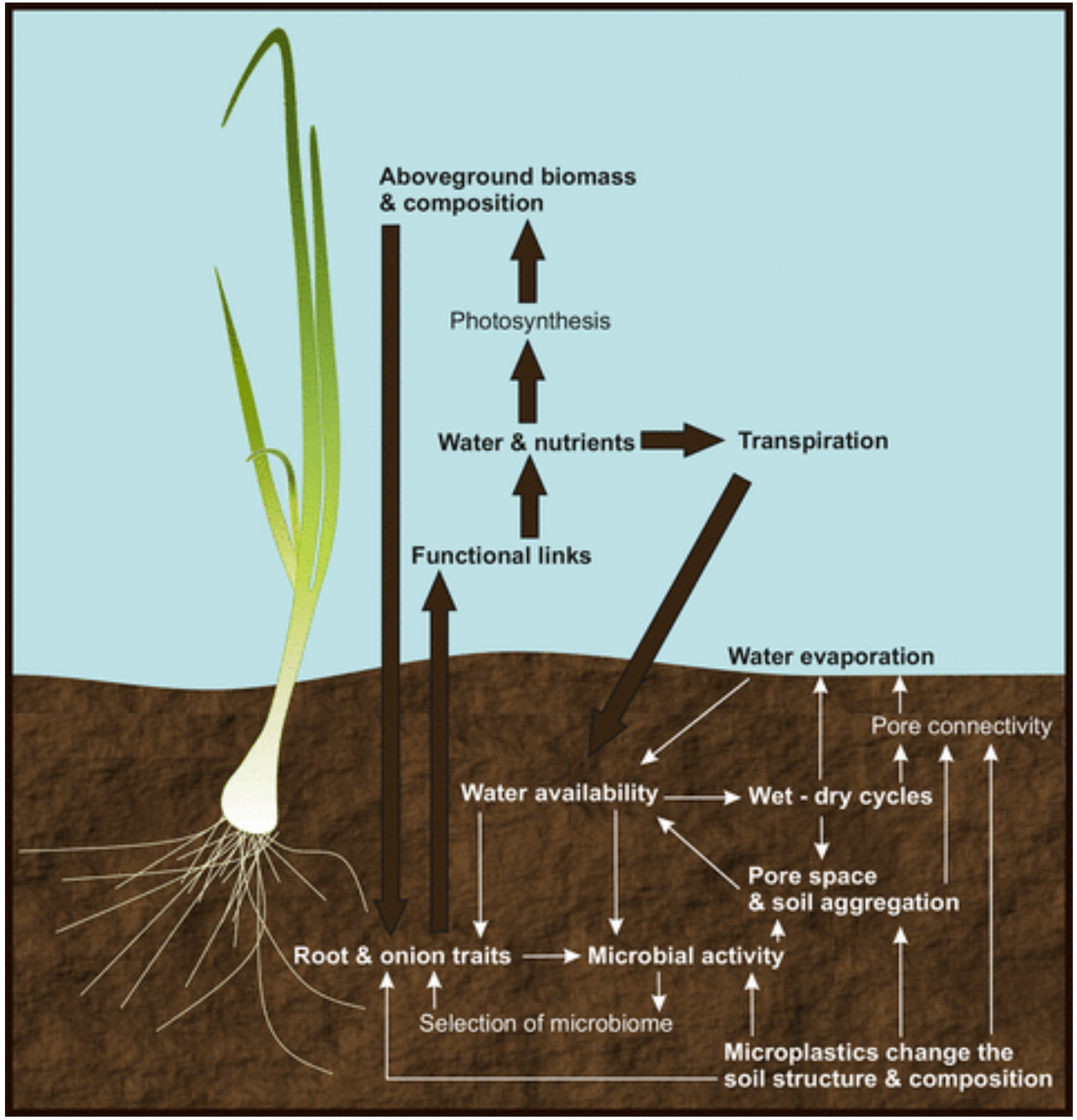
Supported by:

CORTEVA agriscience

Need to reduce microplastics in our soil.

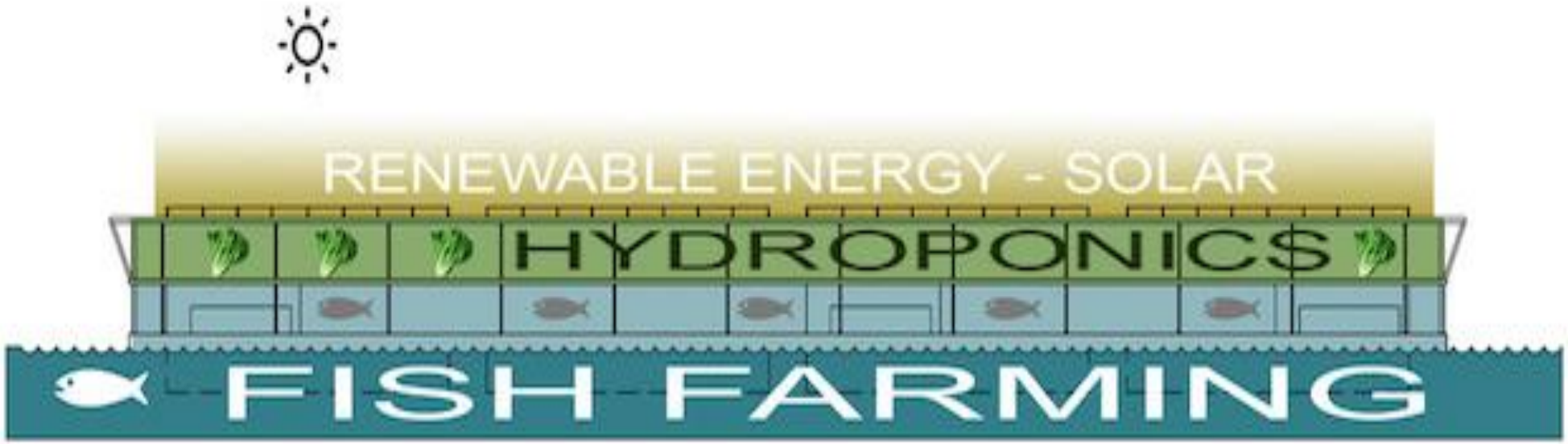
Microplastics increase soil pH and decrease microbial activities as a function of microplastic shape, polymer type, and exposure time.





Smart Floating Farms

SYSTEM LAYERS: WHAT ARE WE PROPOSING?



EQUATION

THE SMART FLOATING FARMS INTEGRATE PHOTOVOLTAICS ,SOLAR FARMING AREAS, HYDROPONICS-GREEN GROWING EXISTING RACKS, CONTROLLED FISH FARMING AND IT TECHNOLOGIES IN ORDER TO REDUCE FOOD PRESSURE.ALL SYSTEMS ARE 100% COMPATIBLE AND ABLE TO BE INTEGRATED IN 1 SFF MODULE

https://aquaticurbanism.com/smart-floating-farms/

Vegetables & Fish potential types

Leafy Greens


Lettuce


Chinese


Xiao Bai Cai


Bayam


Kang Kong (Water spinach)


Cai Xin


Gai Lan


Nai Bai


Cabbage

Vegetables


Artichokes


Asparagus


Beans


Beats


Broccoli


Brussels sprouts


Cucumbers


Eggplant


Leeks


Onions


Peas


Radishes


Rhubarb


Tomatoes


Bell peppers

Fruits


Rasperberries


Watermelon


Strawberries


Blueberries


Blackberries

Herbs


Balis


Arugula


Chervil


Chives


Coriander


Dill


Lemon grass


Mache


Majoram


Peppermint


Sage


Tarragon


Thyme


Rosemary

Fish

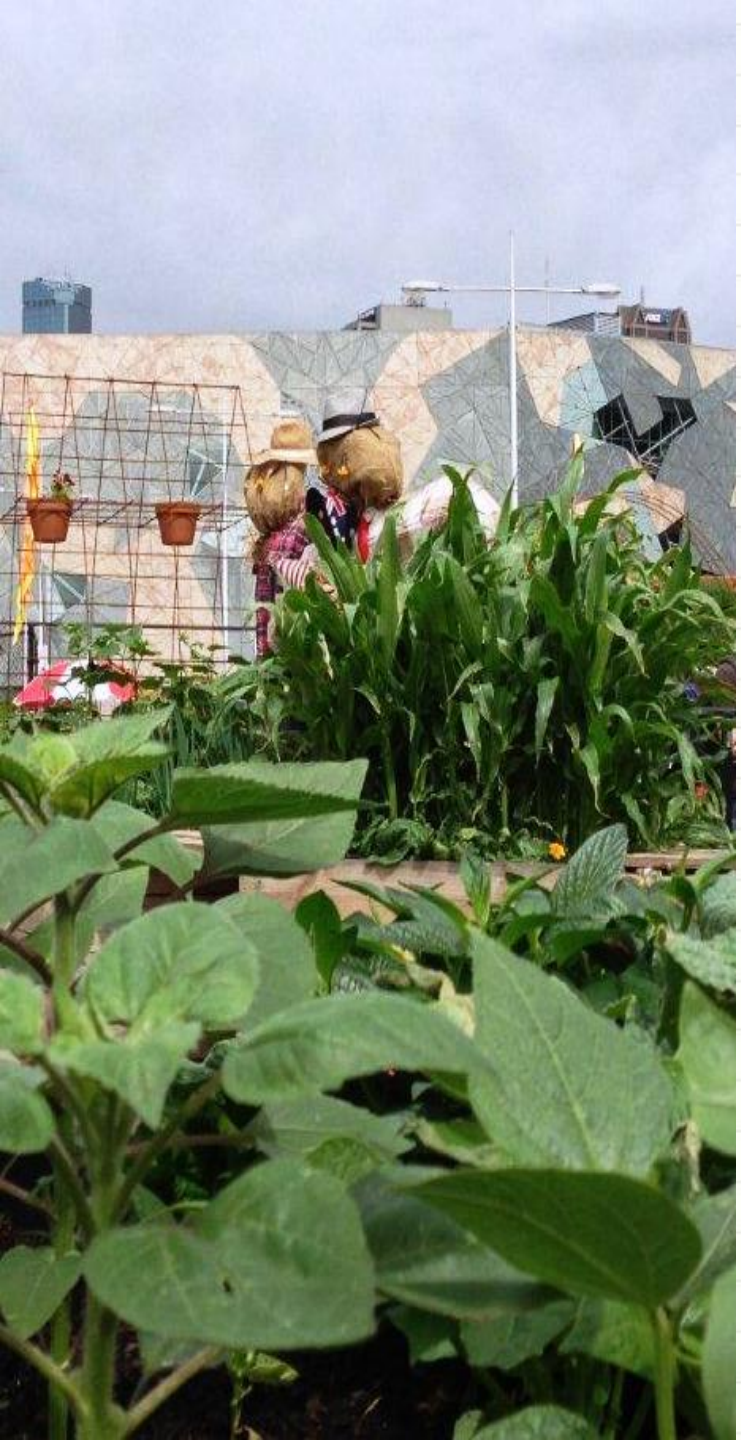

STORAGE

Farming without soil: new Japanese tech makes growing fruit and vegetables possible in any environment…

Polymer film is the key to a cutting-edge farming method that makes it possible to grow fruits and vegetables on practically any flat exterior.

Made of hydrogel – a super absorbent material typically used in household products such as disposable diapers – the film works by soaking up water and nutrients through a multitude of nano-sized pores measuring one millionth of a millimetre in diameter.

Plants grow on top of the film, but instead of digging into the ground, the roots spread across the surface of the membrane in wispy, fan-like formations.



Globally, the U.N. has predicted that 68% of the world's population will live in urban areas by 2050, compared with 55% in 2018. **Urban farming will become increasingly important as society reorganizes.**

Urban agriculture using commons resources (rain) is one way to aid food security.

We need to use what is freely available to us – to grow food. Abandoned buildings, footpaths, rooftops in all forms!

Year round fresh fruit & vegetables

Iceland

Greenhouse Structures

Greenhouse technology

Water systems

Meeting the growing demand for fresh fruit and vegetables for the local and export markets in a country with **harsh climate and mostly uncultivatable land,** to ensure food security and jobs for over 10,500 people requires:

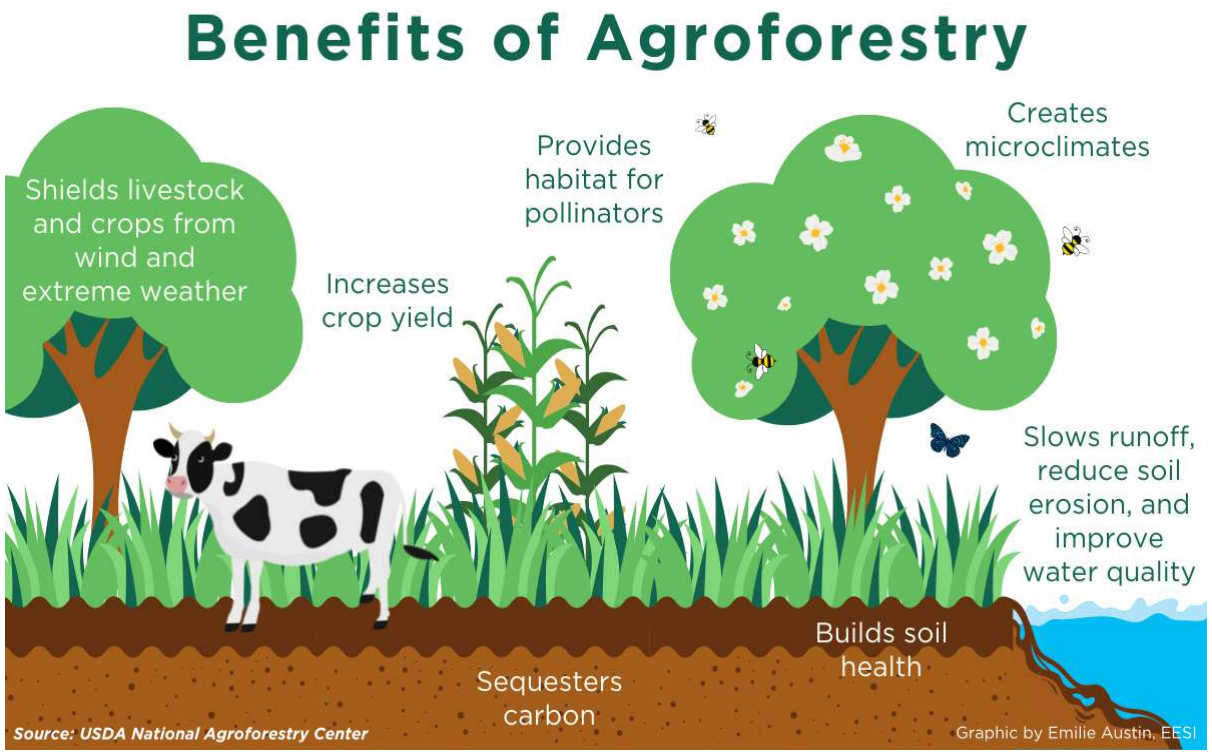
1. **Greenhouses with data analytics** (Artificial Intelligence) to provide predictive analytics so one can respond faster to changes in market conditions and become more competitive.

2. Use the high-tech greenhouse model to maximize the amount of food produced within smaller spaces and **create more efficiency than conventional agriculture**.

3. Take full advantage of the natural agricultural resources available in Iceland. The **abundance of fresh water for irrigation and the preponderance of geothermal energy to heat and cool the facilities.**

4. **Organic farming** - By growing crops indoors, the need for pesticides and other chemical inputs are reduced, thus healthy food is grown in an environmentally friendly and climate resilient space.

Dairy Farming
Morocco



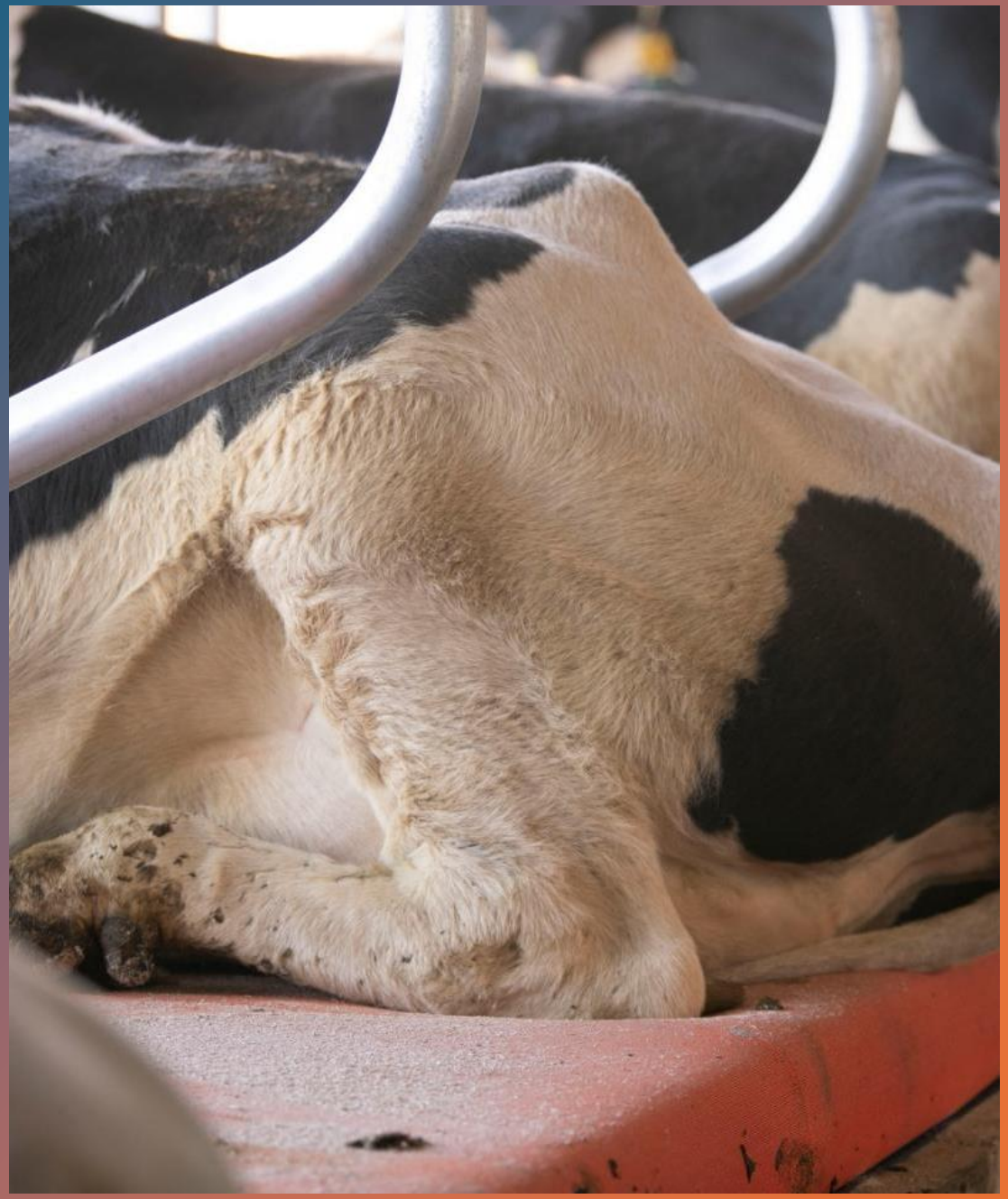
The total land for the project will be around 4 500 Ha.

Agroforestry will cover around 4000 Ha.

3000 Ha will be used for seed production with the remaining 1500 Ha used to grow different crops some of which will be used as supplementary fodder. Some of the crops will also be used to produce herbal and or medicinal products.

There will also be milking sheds, production facilities and an R&D facility.

- ✓ A full comfort modern, air-conditioned 7000 to 8000 dairy cows' capacity barn
- ✓ Imported 7000 premium pedigree Dairy Cows pure breed high quality
- ✓ Automatic Milking Robots



Dairy cows are sensitive to different stress, especially heat. Thermal stress, starting at 25° C and even less, leads to a decline in production. Deaths start to be recorded from 42° C.

Barns can capture methane for all energy needs and designed to offer optimal conditions of comfort, temperature, hygiene, air quality … for extended stays and even quasi-permanent ones.

- automatic brushes on demand.
- comfortable mattresses to lie down on.
- ventilation for fresh and clean air at all times, along with fresh and clean water at will.
- scraping effluents several times a day, and frequent cleaning of their living space.

The chosen trees and shrubs will be fast growing, agroforestry compatible, fire resistant, regenerative, high biomass producing, thus high carbon yield storage capable.

They will also be drought resistant, while native species seem to be more forest fire vulnerable and no longer adapted due to climate warming. Unmanaged forests are vulnerable to brush fires.

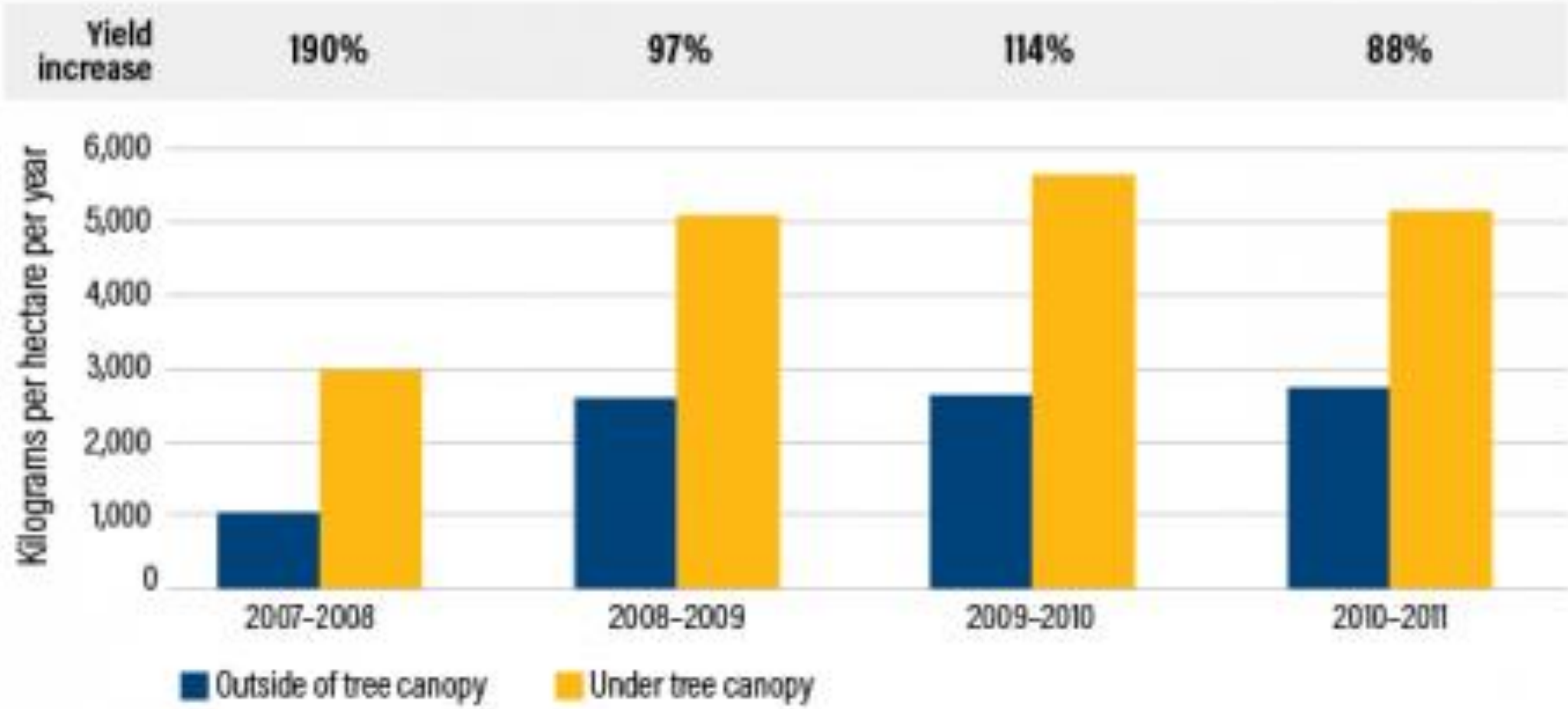
Silvopastoralism with livestock grazing between trees or planting and harvesting feed for livestock will be a good solution to improve the system fire forest resilience.

Vertical agriculture in a controlled environment provides concrete responses to address climate change impacts.

The ideal temperature for grass growth is permanently adjusted day and night. The right dose of water is provided at all times. **Pests, insects, and pesticides are excluded including biological insecticides; thus no pesticides nor chemical residues will be found in milk.**

Daily evolution of barley on right shows the young shoots (day 7) are at the optimum stage for dairy cow nutrition. 9th day shows the grass and roots that are also consumed. Unlike grass in pastures, these roots are edible because they do not have soil residues.

Agroforestry increases maize yields in Zambia



Note: Average maize grain yields from trial sites under and outside canopies of mature Faidherbia albida trees across regions in Zambia.
Source: Shitumbanuma (2012).

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Food and Agriculture Organization of the United Nations

https://www.fao.org/millets-2023/about/en

INTERNATIONAL YEAR OF

MILLETS

2023

1. The sustainable cultivation of millets can support climate-resilient agriculture

SDG 13 (Climate Action) and SDG 15 (Life on Land)

- Millets are often referred to as climate-resilient crops because they can grow on arid lands with minimal inputs and maintenance, are tolerant or resistant to diseases and pests and are more resilient to climate shocks than other cereals.
- Including and/or expanding the production of millets in national agricultural systems can support the transformation to more efficient, inclusive, resilient and sustainable agrifood systems for better production, better nutrition, a better environment and a better life.

2. The sustainable production of millets can fight hunger and contribute to food security and nutrition

SDG 2 (End Hunger)

- In arid areas, millets are very often the only crops that can be harvested in the dry season and are a crucial part of the household food basket. Millets can help to overcome food scarcity in difficult periods, therefore contributing to the food security and nutrition of vulnerable populations.
- Millets can grow in very poor and fertile soils in dryland conditions and do not heavily deplete soil nutrients. By providing land cover in arid areas, they reduce further soil degradation and help support biodiversity and sustainable land restoration.

https://openknowledge.fao.org/server/api/core/bitstreams/c8e62919-c89a-4b74-a342-9501100c7327/content

3. Millets can be an important part of a healthy diet

SDG 3 (Good Health and Well-Being)

- Millets are good sources of minerals, dietary fibre, antioxidants and protein. With a low glycaemic index, they are a good option for people with high-blood sugar. Millets are also gluten-free and an excellent and cost-effective source of iron for iron-deficient diets.
- As whole grains, each variety of millets provide different amounts and types of fibre. Dietary fibre has a role in regulating bowel function, blood sugar and lipids, and satiation.

4. Greater consumption of millets can offer opportunities to smallholder farmers to improve their livelihoods

SDG 8 (Decent Work and Economic Growth)

- The production of millets and the demand for them has declined as other cereals such as wheat, maize or rice became a dietary preference. By promoting millets and regaining market opportunities, additional sources of revenue can be created for smallholders and in the food sector, boosting economic growth.
- Millets were among the first plants to be domesticated and for centuries, they have been an important food for hundreds of millions of people in sub-Saharan Africa and Asia. They are deeply rooted in Indigenous Peoples' culture and traditions and therefore a strategic crop to guarantee food security in areas where they are culturally relevant.

5. Proper handling of millets is key to maintaining their high quality and nutritional benefits

SDG 2 (End Hunger) and SDG 3 (Good Health and Well-Being)

- Timely harvesting ensures good grain quality followed by threshing to remove grains from the stalks. Controlled mechanised processes for the dehusking of millets, at any scale, are more efficient than manual dehusking, as they reduce losses from spillage and provide clean intact grains that are ready for market. Smallholders and supply chain holders benefit accordingly from better incomes and reduced drudgery.
- Innovative agro-processing, especially in the production of nutritious foods, could target both traditional and non-traditional markets such as youth, urban consumers, tourists etc. This value addition could lead to market expansion, and increased food and nutrition security and incomes for smallholder farmers.

6. Greater trade in millets can improve the diversity of the global food system

SDG 8 (Decent Work and Economic Growth) and SDG 12 (Sustainable Consumption and Production)

- Millets, including sorghum, account for less than 3% of the global grains trade. With the need to improve the resilience of global trade and its ability to respond to sudden changes in the foodgrain market, millets are a valuable option to increase output diversity and mitigate risks related to production shocks.

- Market structure and transparency, in relation to volumes and prices of millets, are key elements to ensure stability and sustainability. It is important to ensure that millet traders benefit from the same tools as other grain traders, such as digitalization, which could boost the added value of millet along the grains value chain and consequently provide more revenue opportunities for producers.

Farming in the desert
Mexico’s desert region

Baja California

Turning deserts into farms in 3 months using...

Natural pest control and mixed cropping with soils supported by compost, biochar, ash and aeration. **They feed the soil not the crops** to get lifelong productive farms within 3 months.

Soil is a living material: if you hold a handful of healthy soil, there will be more micro-organisms in there than the number of people who have ever lived on the planet.

These microbes recycle organic material, which underpins the cycle of life on earth, and engineer the soil to make it more resilient and better at holding onto water.

Key is to FEED THE SOIL not the crops.

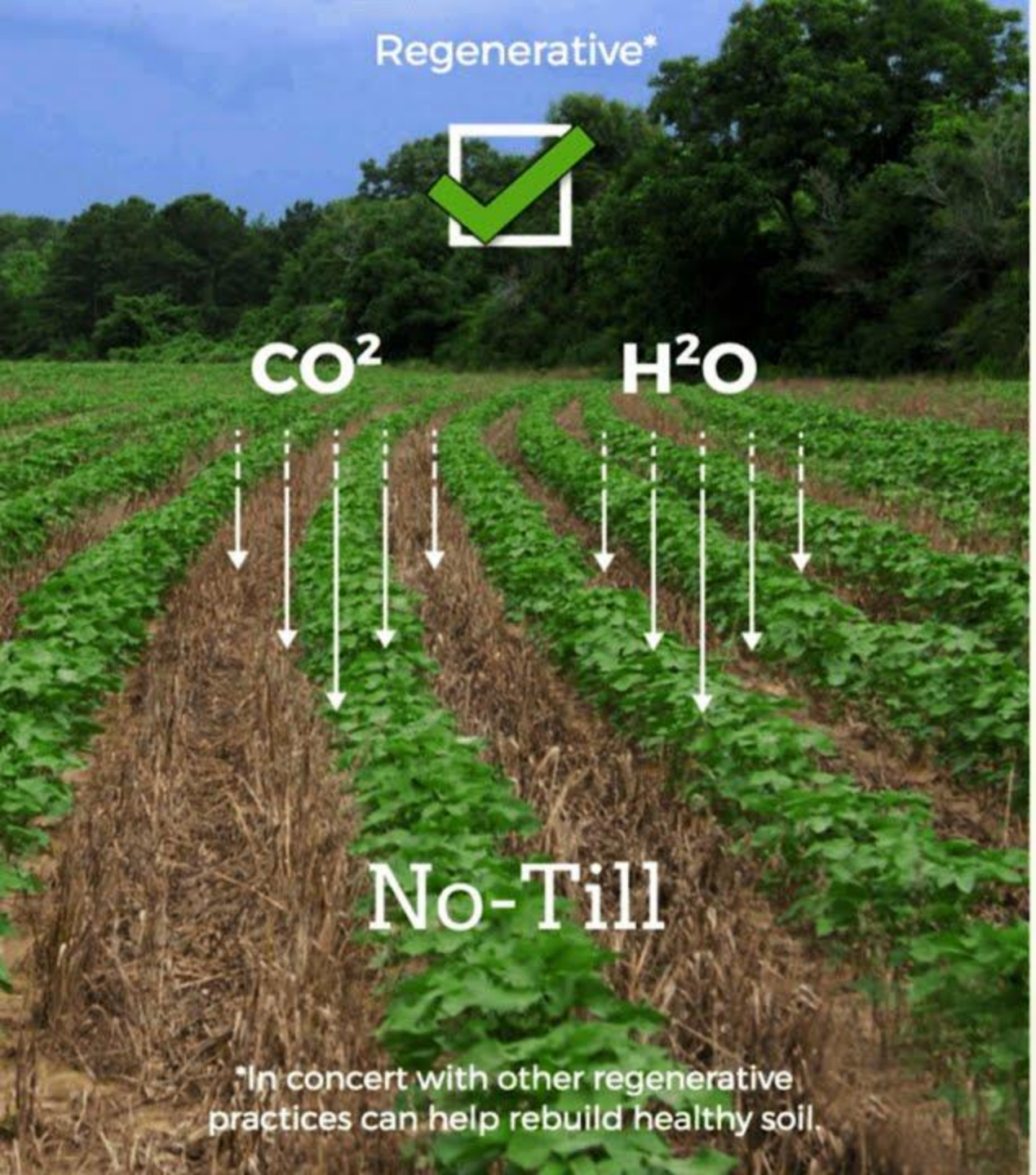
"Nature, imaginative by necessity, has already solved many of the problems we are grappling with. Animals, plants, and microbes are the consummate engineers. They have found what works, what is appropriate and most important, what lasts here on Earth."

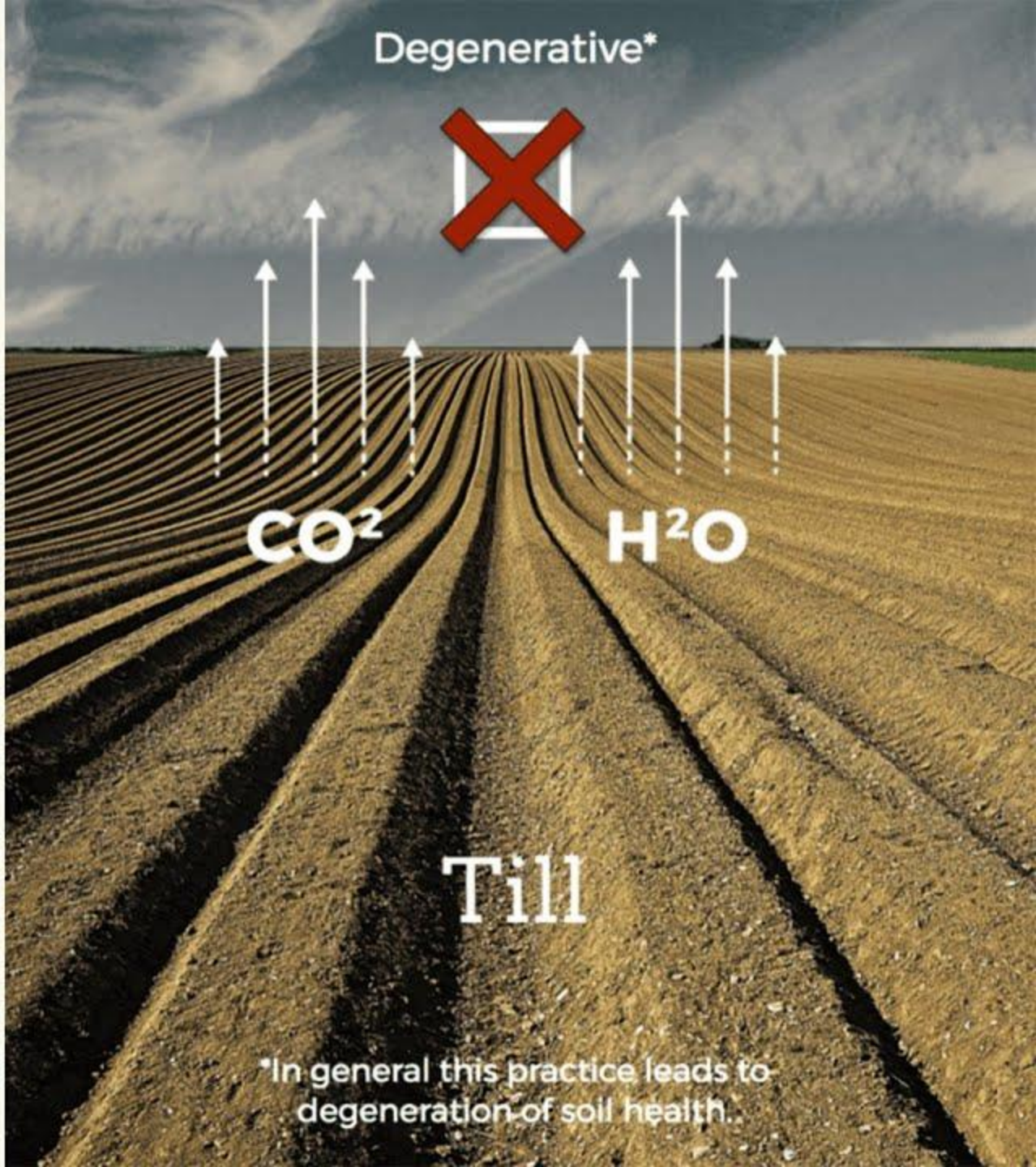
– Janine Benyus

Guide to Regenerative Agriculture

Kiss the Ground's Guide to Regenerative Agriculture highlights the issues with our current agricultural model, covers the core principles and practices of regenerative agriculture, addresses common myths and concerns, and provides resources to get involved.


REGENERATIVE AGRICULTURE
SHIFTS THE PARADIGM
Compete with Nature
Partner with Nature
Disturb Soil
Protect Soil
Monoculture
Diversity
Reductionist
Holistic


Regenerative*
CO²
H²O
No-Till
*In concert with other regenerative practices can help rebuild healthy soil.


Degenerative*
CO²
H²O
Till
*In general this practice leads to degeneration of soil health.

Regenerative agriculture explained...

Regenerative farmers use growing practices that improve the health of their land. Methods include:

Cover crops

That are grown in the soil after the commercial harvest and can be grazed or harvested themselves

Integrating livestock

To combine animals and plants in a circular ecosystem

No-till systems

That improve soil health and prevent erosion thanks to minimal soil disturbance

Minimising chemical inputs

That destroy biodiversity and pollute waterways due to runoff

Rotating crops

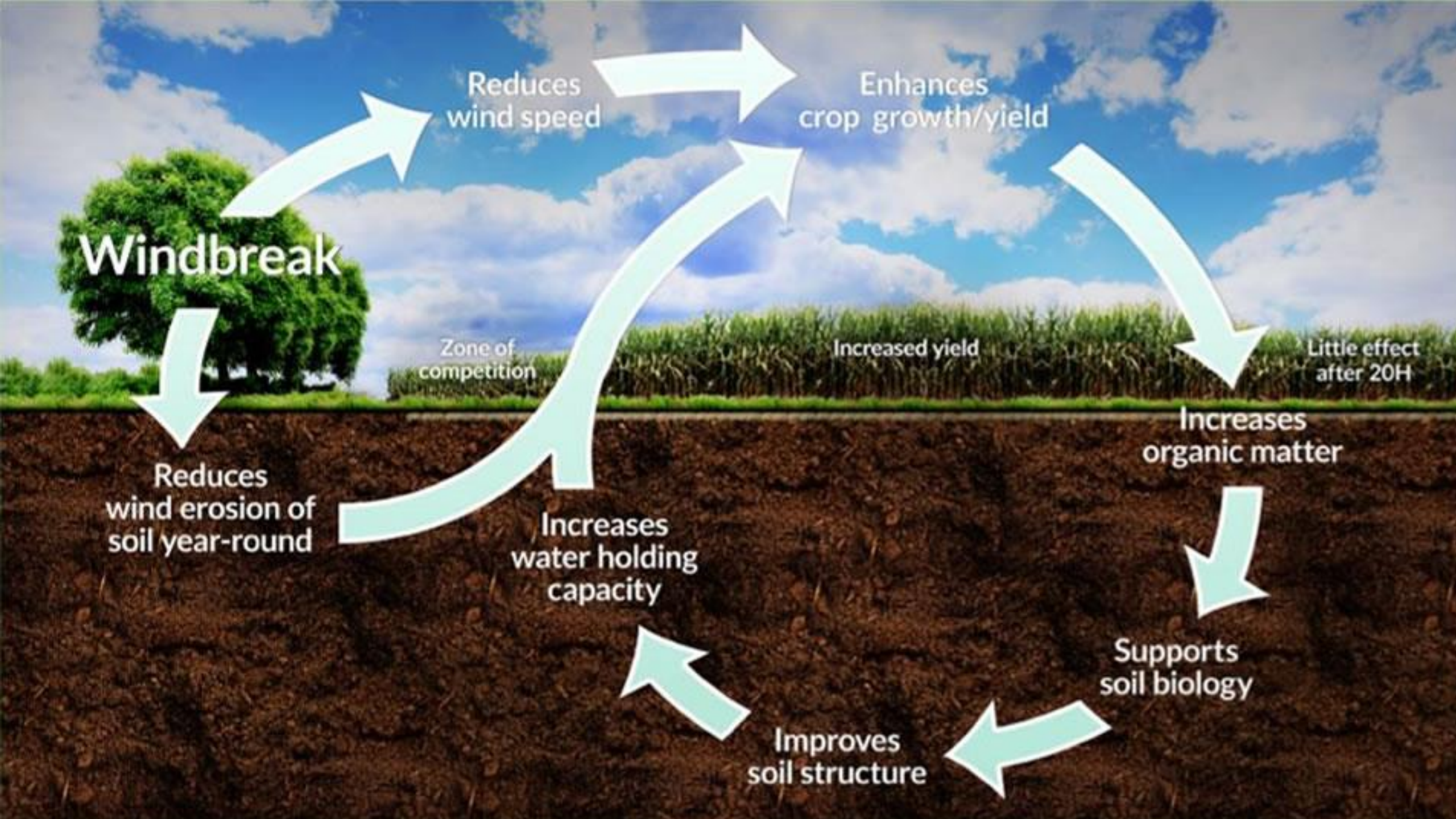
To naturally balance what is being taken out and put into the soil

Increasing biodiversity

To boost nutrients, natural decomposition and attract insect predators of pests.

www.eitfood.eu/regenerativeagriculture

EIT Food is supported by the EIT, a body of the European Union


Windbreak
Reduces wind speed
Enhances crop growth/yield
Zone of competition
Increased yield
Little effect after 20H
Increases organic matter
Supports soil biology
Improves soil structure
Increases water holding capacity
Reduces wind erosion of soil year-round

In Australia – regenerative farming is being supported by the Emissions Reduction Fund.

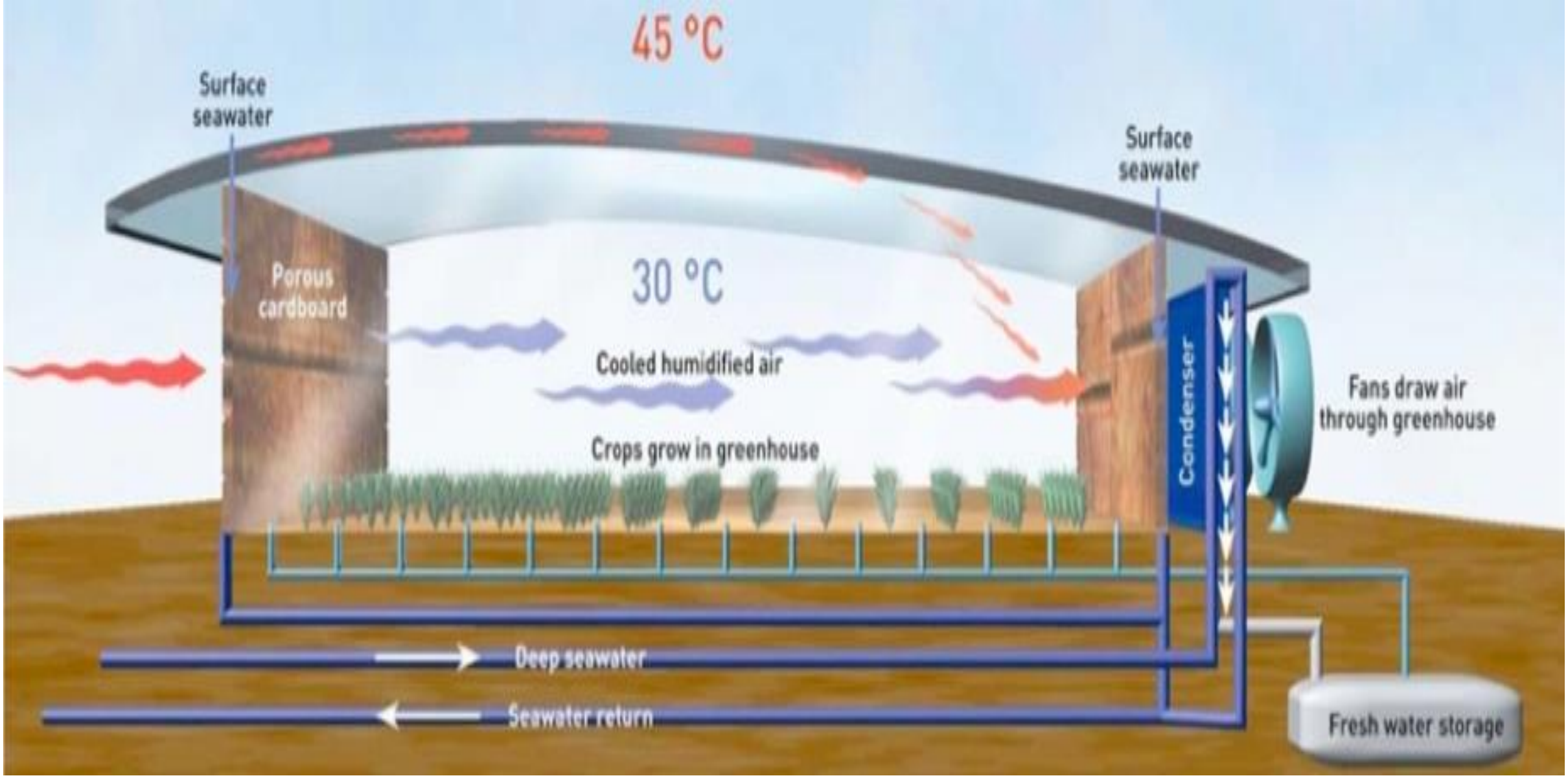
Commencing 2025 biodiversity credits part of the Nature Repair act will support farmers to **increase biodiversity on farms** by to restoring and protecting the environment. It encourages nature positive land management practices that deliver improved biodiversity outcomes such as:

- Re-establishing vegetation along waterways.
- Keeping pests and feral species from destroying native species and ecosystems.
- Planting a mix of local native species; protecting rare grasslands that provide habitat for an endangered species;

The Nature Repair Market will provide opportunities for improved outcomes for nature in both the carbon and biodiversity markets.

SUNDROP FARMS

Growing crops in deserts and on dry arid land



Sundrop Farms use the sun to desalinate seawater for irrigation and to heat and cool greenhouses as required, and thence cheaply grow high-quality, pesticide-free vegetables year-round in commercial quantities.

Groundwater

Fossil Fuels

Nutrients

Sunlight

Typical Greenhouses

Food

Seawater

CO2

Sunlight

Nutrients

SUNDROP FARMS

Freshwater

Food

Salt & Minerals

Sundrop and **our planet**

A Sundrop greenhouse turns seawater and sunlight into energy and water. We then use sustainably sourced carbon dioxide and nutrients to maximise the growth of our crops.

Because we don’t need soil, we’re able to grow our produce on degraded land in arid areas previously considered too barren for agriculture.

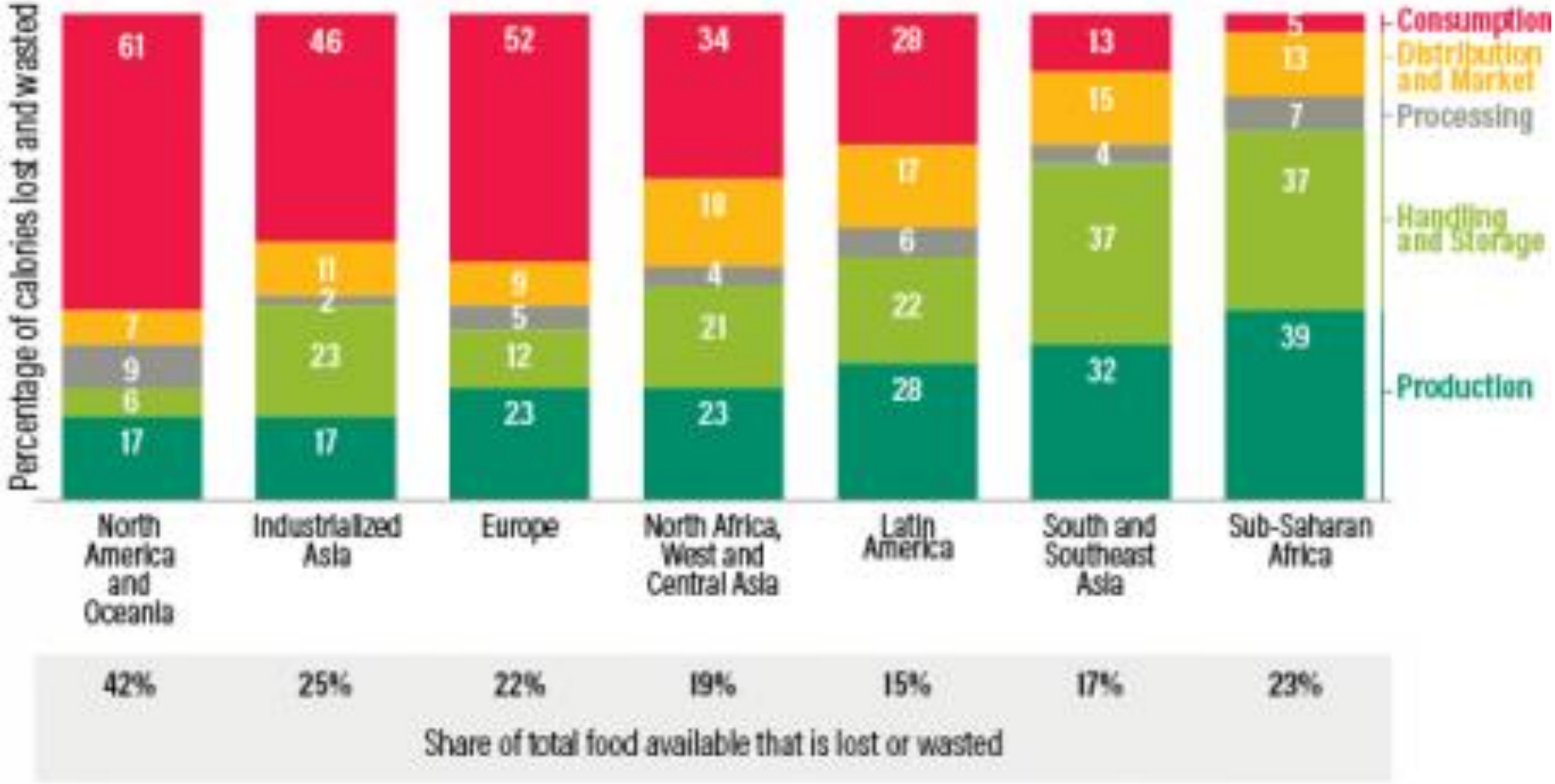
Sundrop have **transformed agriculture**

We are showing the world that you can grow delicious, mouthwatering produce without needing fossil fuels, vast amounts of fresh water and thousands of acres of cultivated farmland.

In other words, we are breaking farming's dependence on finite resources.


If food waste was a country, it would be the third biggest emitting country behind China and USA.

Where food loss and waste occurs along the food supply chain



Source: WRI analysis based on FAO (2011b).

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Black Soldier Fly

Nature's ultimate food recycler

The black soldier fly life cycle

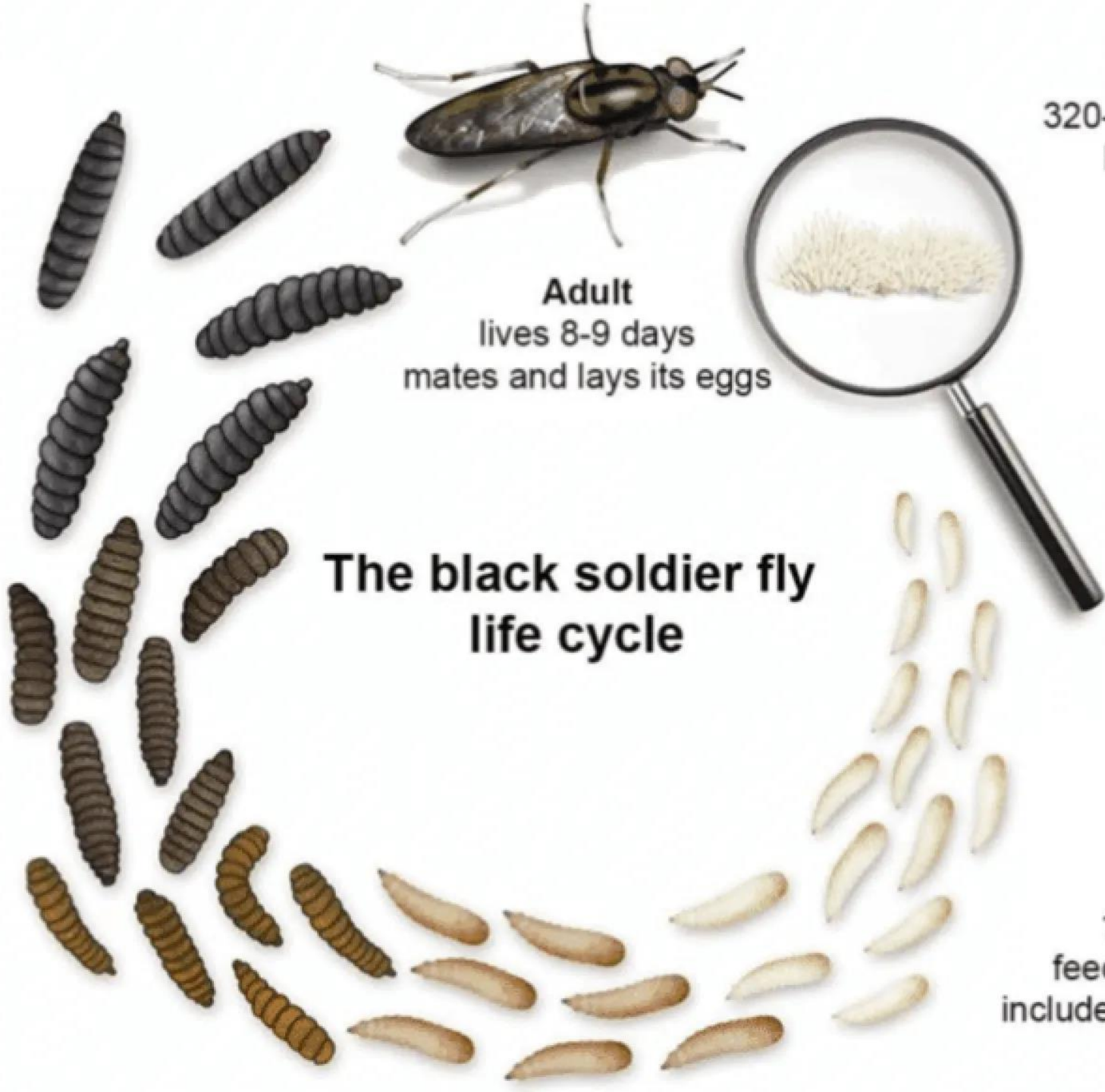
Pupal stage
minimum of
8 days,
not feeding
nor moving

Adult
lives 8-9 days
mates and lays its eggs

320-620 **eggs**
hatches in
4 days

Prepupal stage
7-10 days
not feeding,
migrates to
a dry site,
6th instar

Larval stage
10-52 days
feeding stage,
includes 5 instars



After the maggots feed on the waste, they are washed, dried and grounded to produce a product that is high in protein and used for feeding, chickens, pigs, quail, fish…

- Insect larvae are the natural food of chickens and ducks in the wild and fish in streams and river systems. Their nutritional composition is as good as that of fishmeal and better than soya.
- The BSF larvae will eat kilograms of scrap food a night in composting units, eliminating food waste **before it can even begin to rot.**
- High in protein and fat they could become a main ingredient in future animal feeds.
- They also produce excellent wound healing treatments.


Flsh like them tender
Too Tough!
Perfect!
eco films
Quick TIP
Harvest your Black Soldier Fly Larvae when they are immature and white coloured before they develop a harder shell like layer. The fish like them tender.


Black Soldier Fly
Bio-composter
blacksoldierflyblog.com

The world urgently needs new sustainable sources of protein.
A growing population, scarce water and land resources as well as declining natural fish stocks, make this more critical than ever.


Goterra CEO
Olympia Yarger
Maggot Farmer since
2014

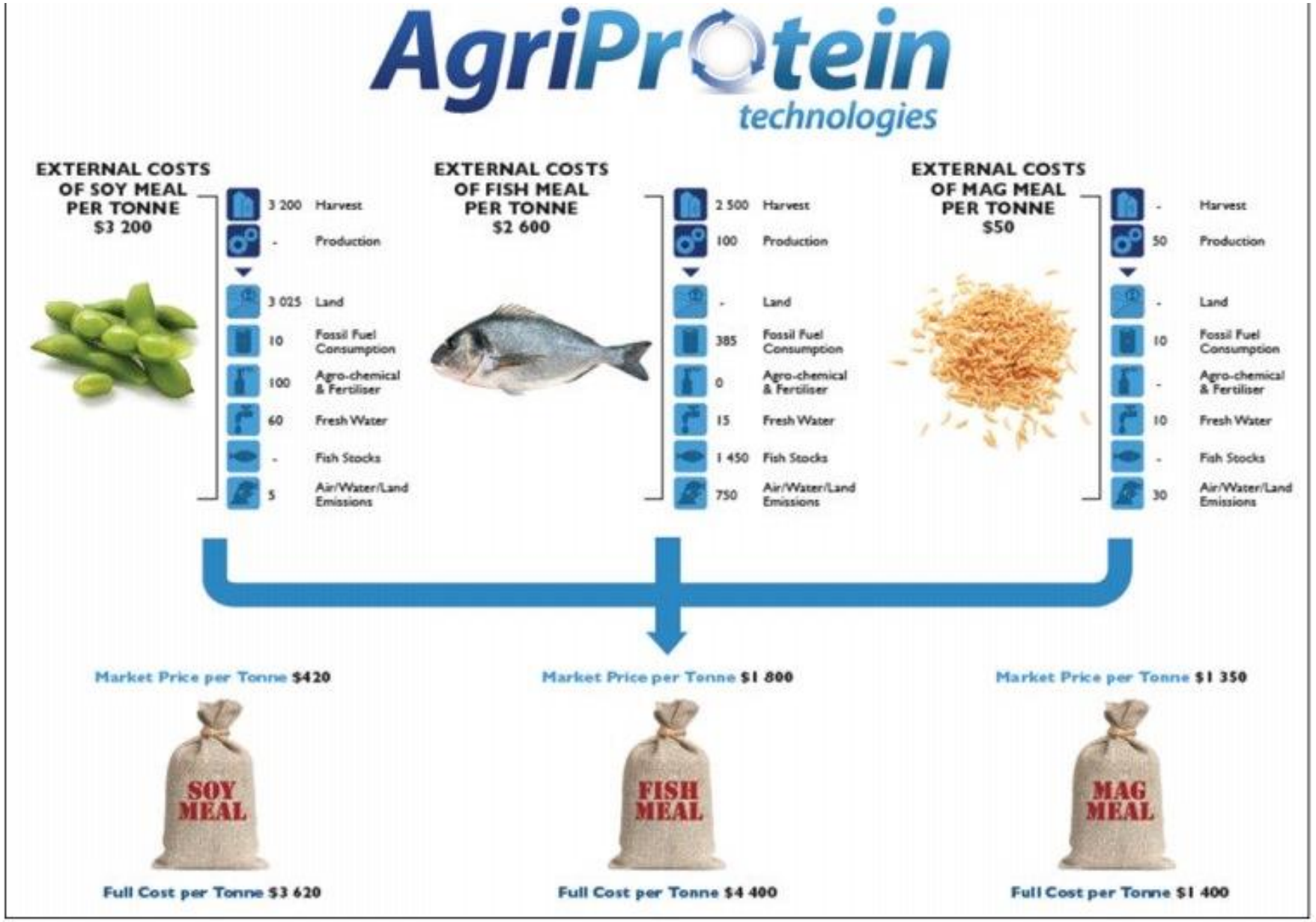
Solving the transport problem

One of the biggest financial and environmental costs of producing protein is transport. For waste management, it's the same.

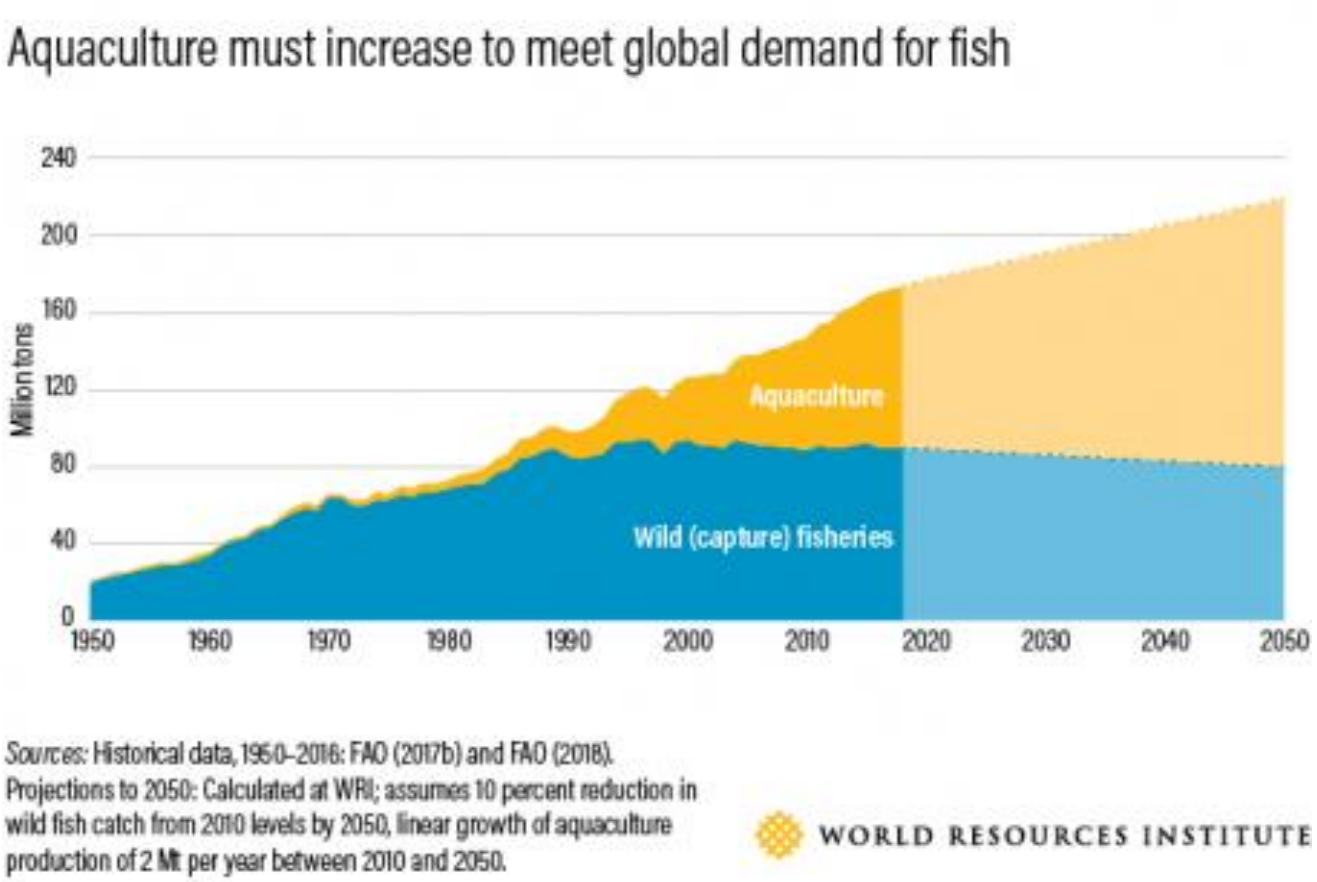
How do we resolve this? Replicating large scale, single location farming doesn't change the system. Decentralising it does.

Goterra's fully automated Modular Infrastructure for Biological Services (MIB) was born. Building insect farms powered by robots meant we can produce at scale. Putting them in stackable shipping containers that can be deployed and serviced anywhere was the disruptive innovation.

Lendlease uses Goterra to manage high volume commercial and retail food waste at Barangaroo



The international trade in animal feed has an estimated turnover of just under AUS $600 billion every year.



UN FAO estimates that **commercial feed production** will need to **increase by 70% by 2050** to **meet the growing demand for protein**. Black Soldier Flies are high in protein, making them highly attractive for various livestock production systems, and a possible alternative to the meat, fish, and soy bean meal that currently comprise 60 -70% of production costs.

Developing sustainable aquaculture systems, in particular, is becoming increasingly critical as we look for healthy and affordable sources of protein. The World Bank estimates that by 2030 nearly two-thirds of seafood will be farm-raised. This is a huge opportunity to replace fish and soy meal currently used to feed fish.

PROJECT DRAWDOWN

DONATE

Project Drawdown is the world's leading resource for climate solutions.

Our work focuses on:

ADVANCING SCIENCE-BASED SOLUTIONS & STRATEGIES

- Drawdown Science
- Drawdown Solutions Library
- Drawdown Roadmap
- Drawdown Food
- Climate Solutions 101

FOSTERING BOLD CLIMATE LEADERSHIP

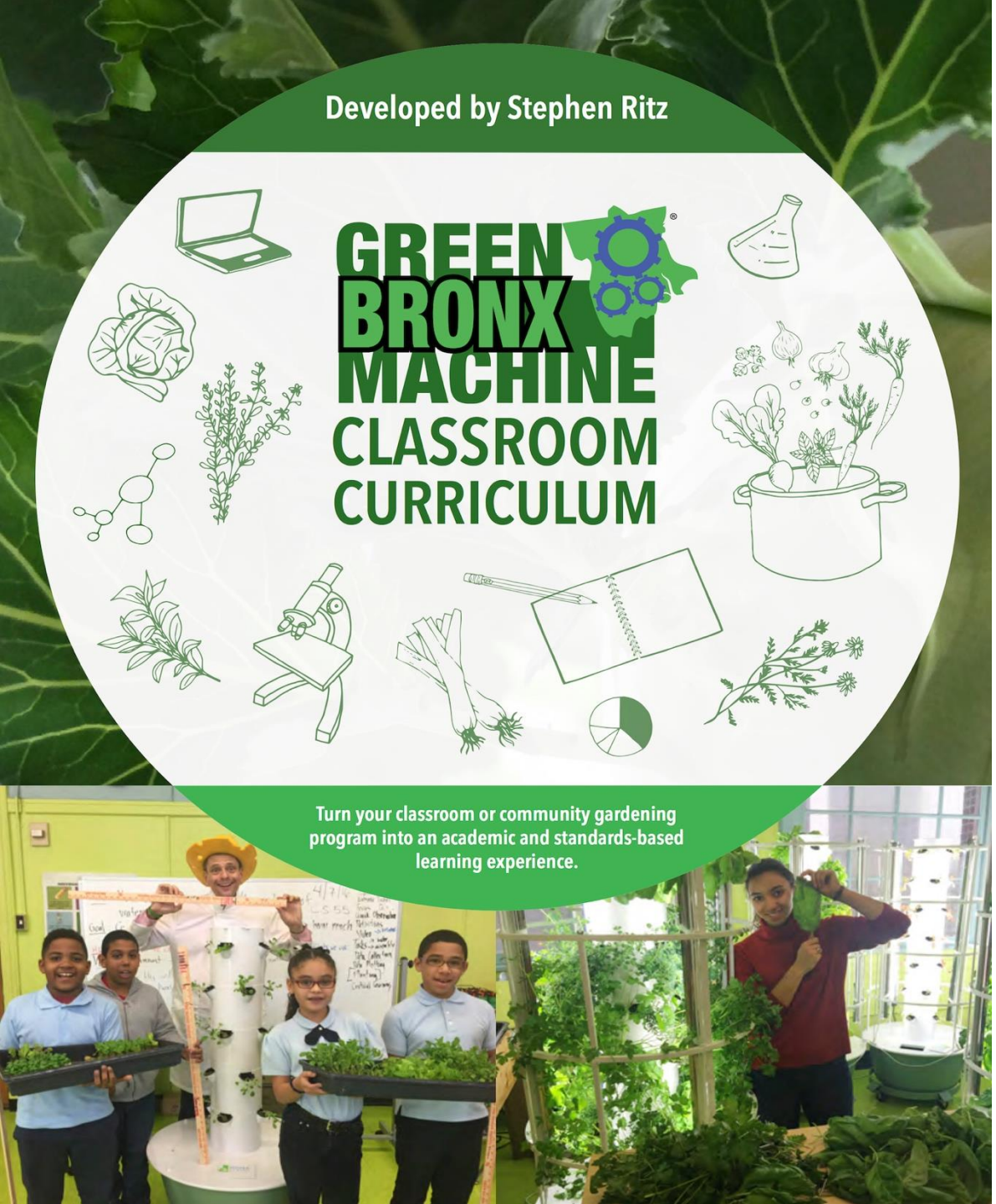
- Drawdown Labs
- Drawdown Business Coalition
- Drawdown Capital Coalition

PROMOTING NEW NARRATIVE & VOICES

- Drawdown Stories
- Drawdown's Neighborhood
- Global Solutions Diary

DRAWDOWN FOOD

Advancing science-based solutions and sharing insights at the intersection of food, agriculture, land use, and climate change



The importance of teaching kids how to grow food!

Teacher Steve Rix has been transforming lives by teaching his students and now students from right across the globe how to grow food and importance of nutrition.

He started with an afterschool program and vacant land near his school. His students soon earnt more than their parents!

They continue to break new ground from designing and building the first year round, wheelchair accessible urban farm and culinary training kitchen in the nation to establishing a Cancer Treatment Centre commercial farm fully staffed and run by foster-care youth.

https://greenbronxmachine.org

Aust has its own version of the Green Bronx Machine

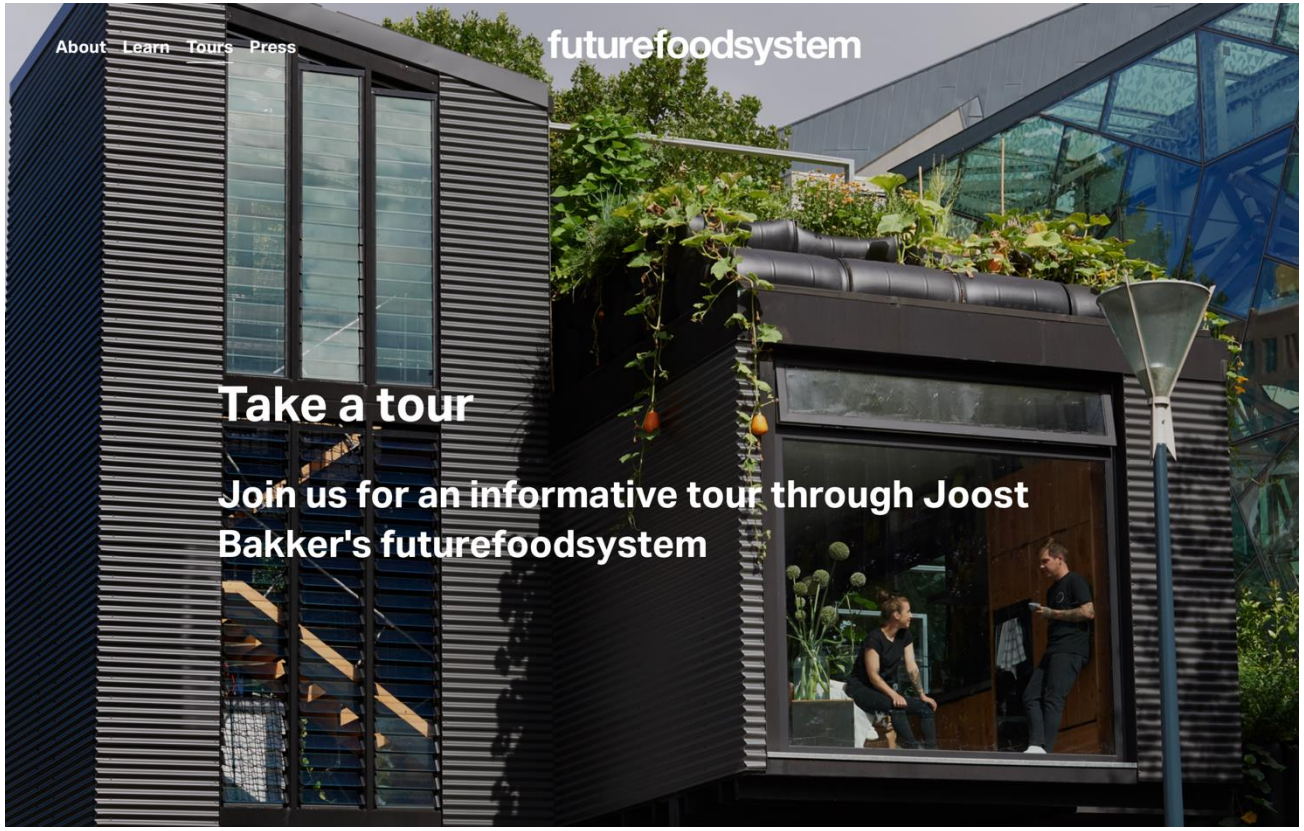
Farm my School

Turning a disused soccer pitch in to a productive garden and the community paid to be part of it!

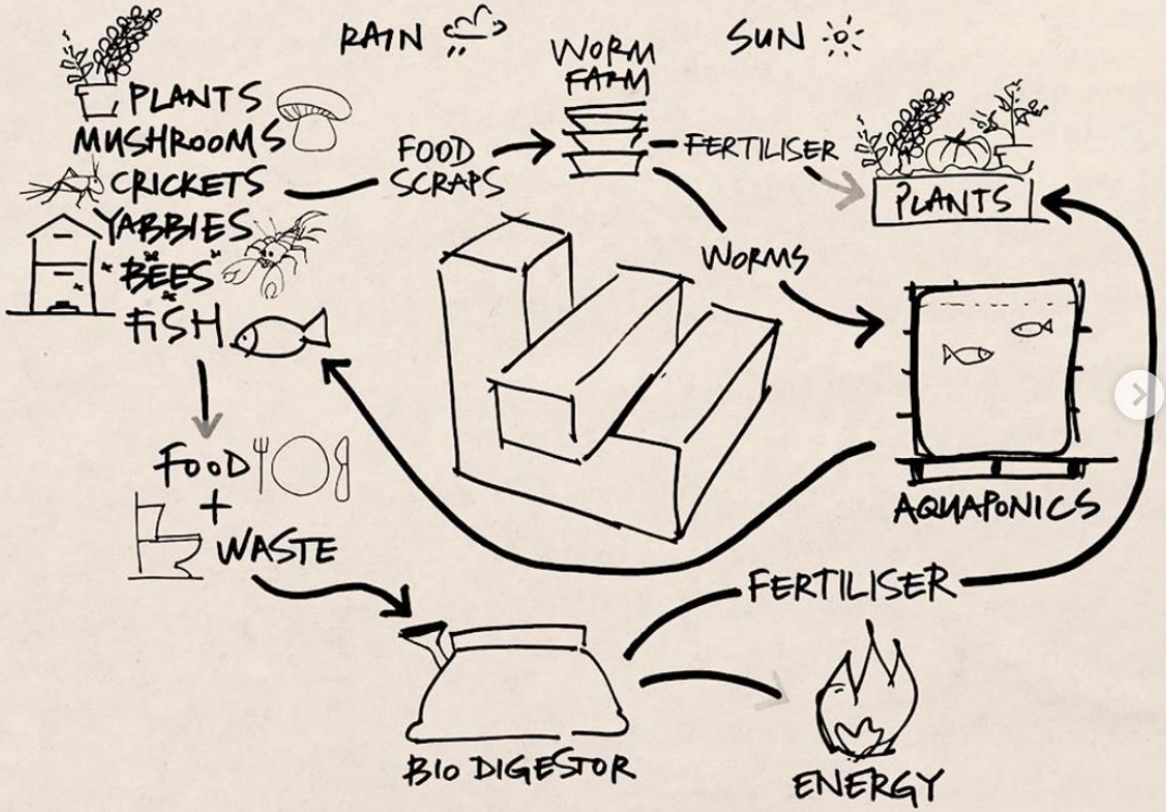
https://www.abc.net.au/gardening/how-to/growing-school/104991432?utm_content=link&utm_medium=content_shared

GREEN HOUSE FUTUREFOODSYSTEM – FED SQUARE

https://youtu.be/_dBTypWLTow



Live at Fed Square or visit:
https://www.futurefoodsystem.com/tours

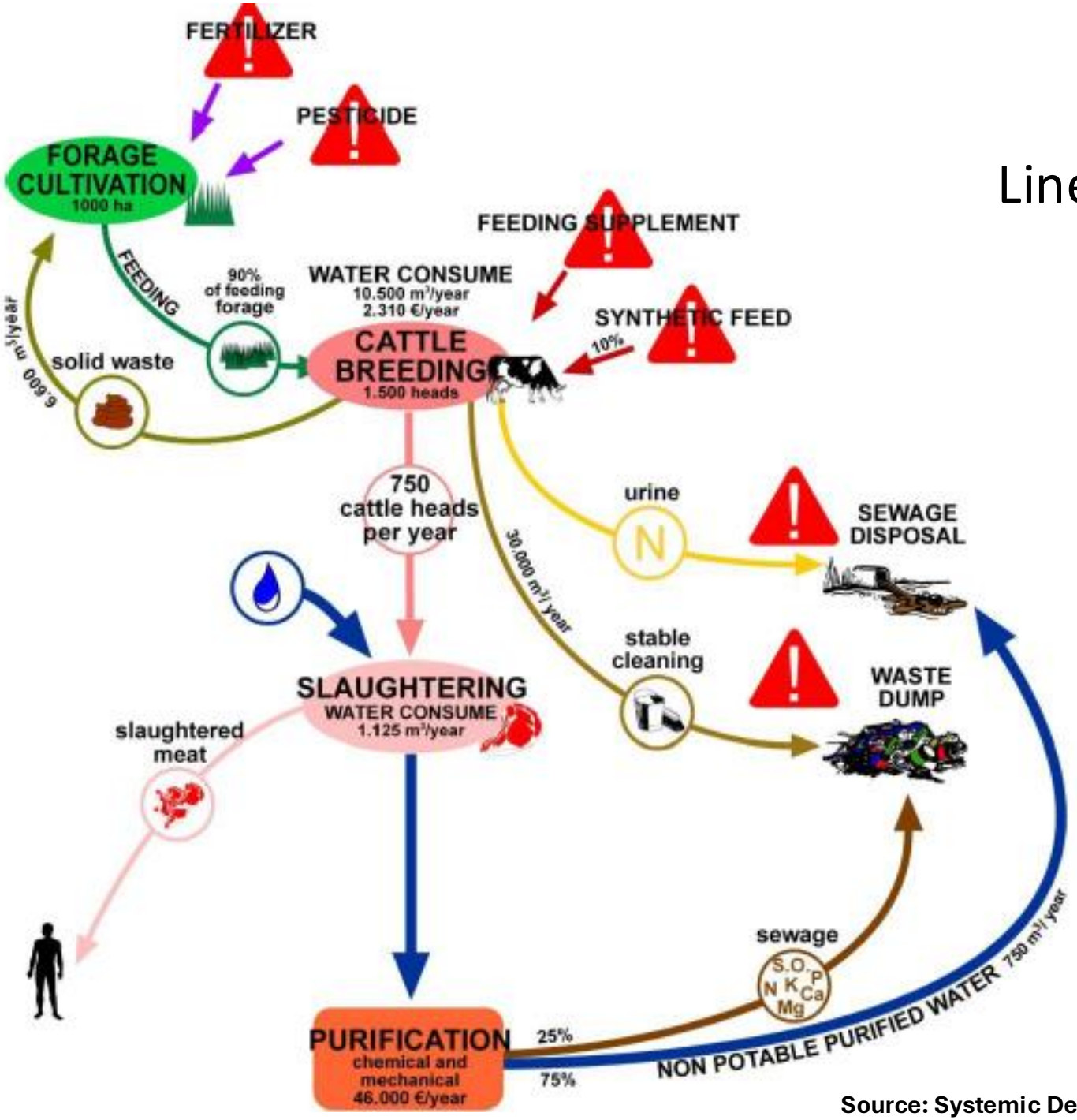


Greenhouse by Joost on WaterBear

We must introduce systems thinking and closed loop systems to achieve zero waste in food production. Case Study – Waste Waters of an Abattoir in an Italian city of 100,000 inhabitants

Source: Systemic Design

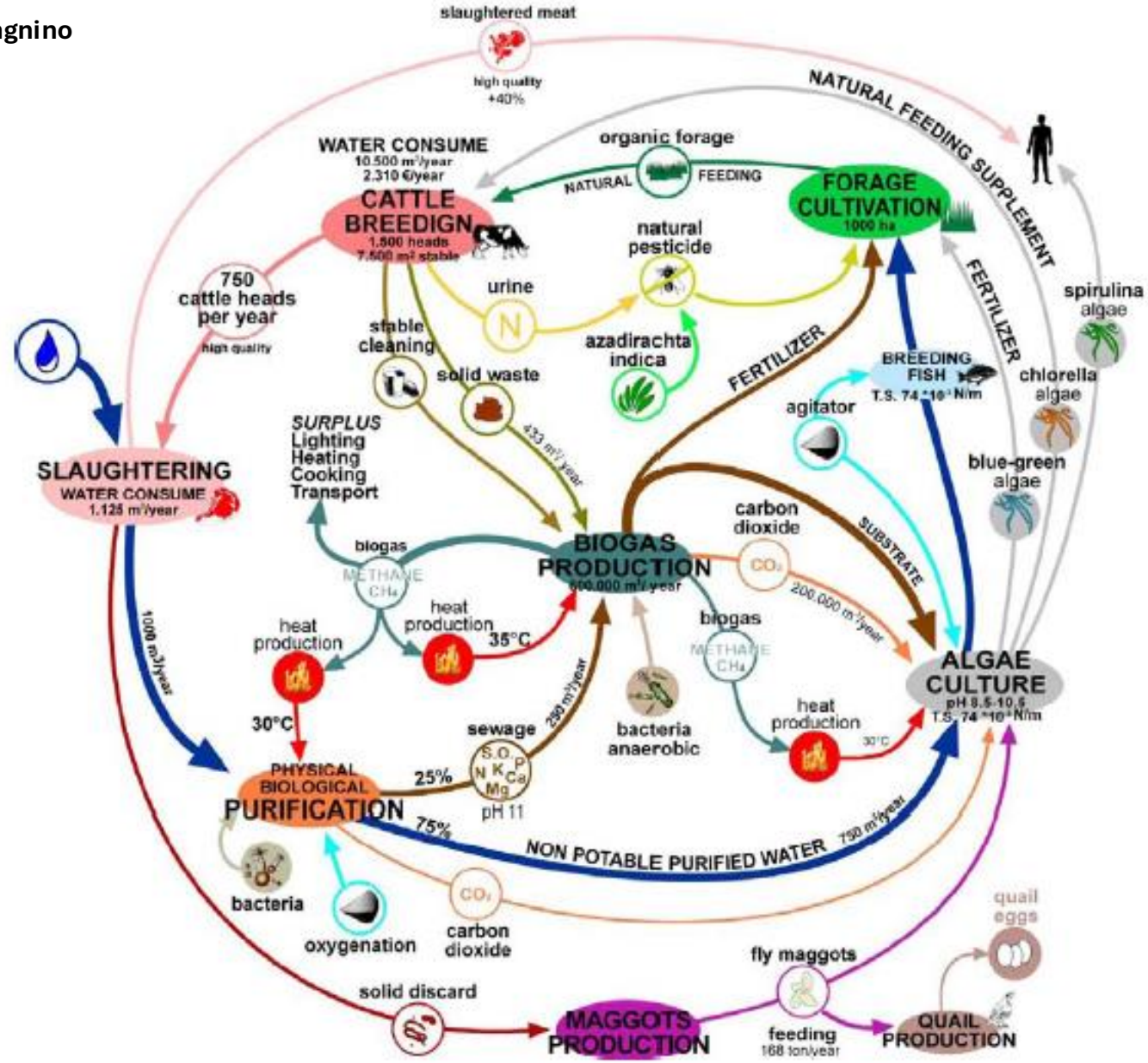
Linear Approach



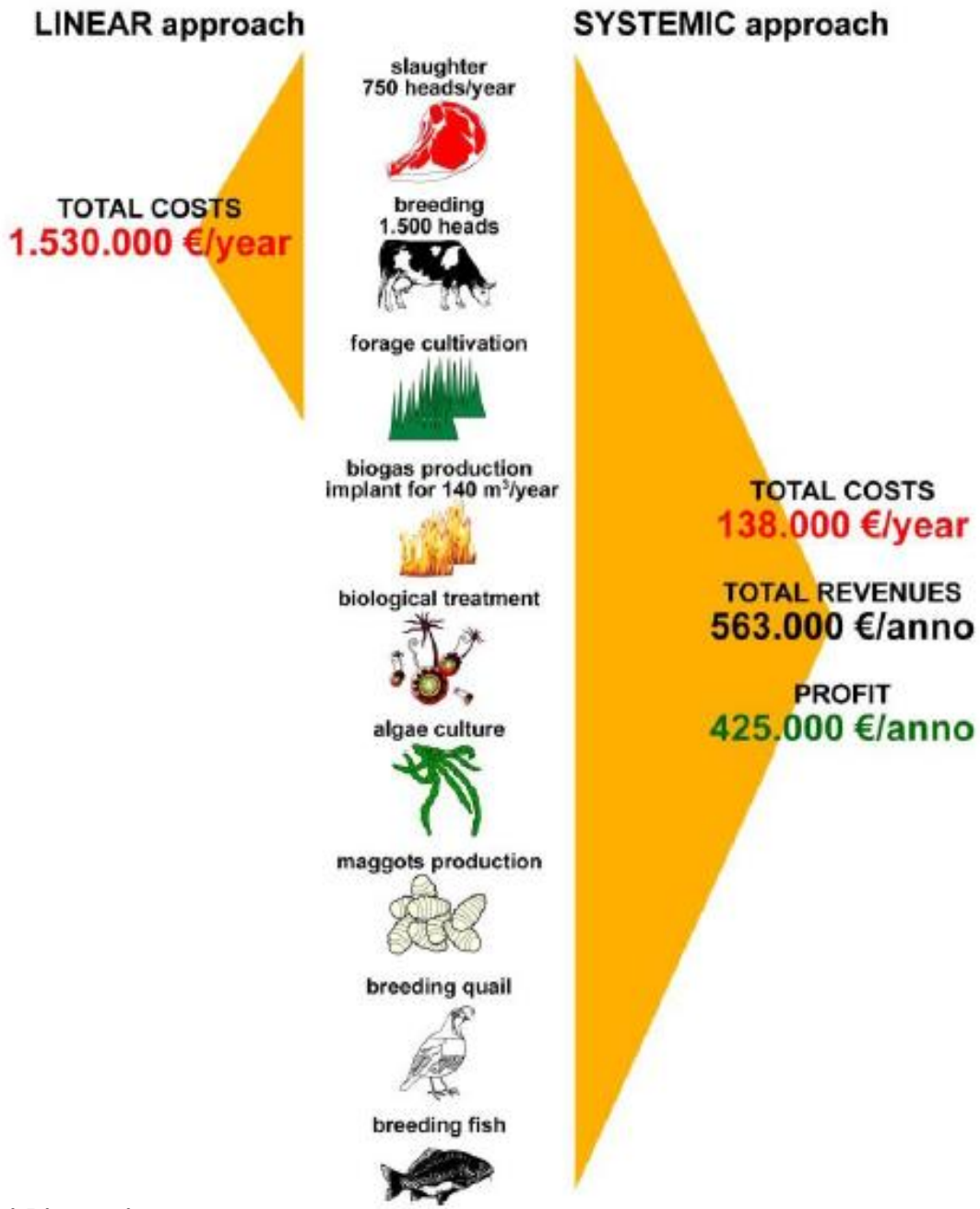
Source: Systemic Design, Luigi Bistagnino

Source: Systemic Design, Luigi Bistagnino

Systemic Approach



A systemic productive model, applied to waste waters and slaughtering processes, triggers an on-going metabolization flow, jointly with remarkable economic outcomes (project: Design, Politecnico di Torino).



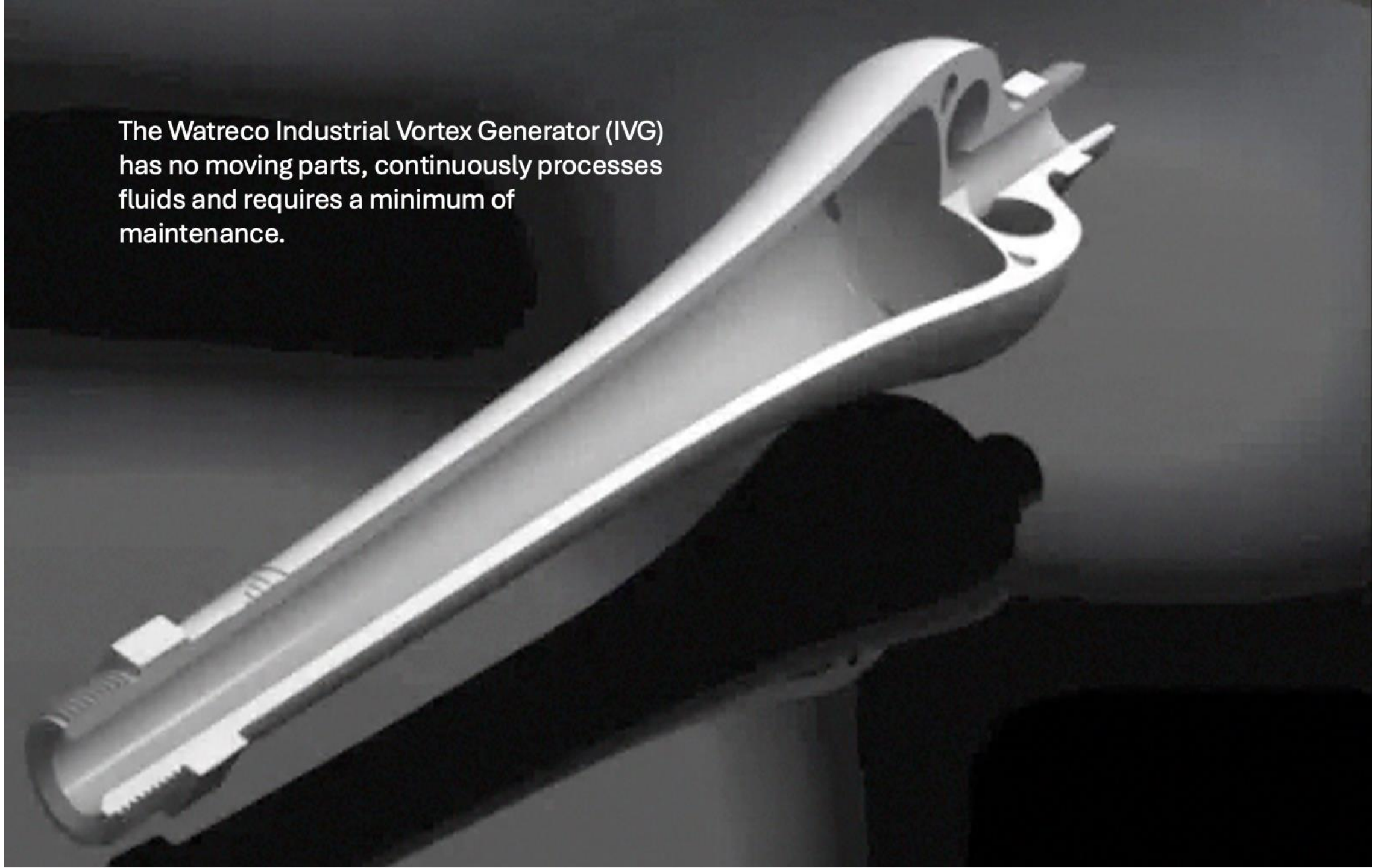
Source: Systemic Design, Luigi Bistagnino

Introducing
Vortex Processing Technology by Watreco, Sweden

The idea behind VPT - Vortex Process Technology is to allow a fluid to self organize into an ordered vortex movement.

The unique **biomimetic design** of Watreco's vortex generators allows the harnessing of the extreme power of a tornado in industrial applications.

Flowmixer from Watreco is aerating river systems and increasing aquaculture yields by a factor of 5


The Watreco Industrial Vortex Generator (IVG) has no moving parts, continuously processes fluids and requires a minimum of maintenance.

Something extraordinary happens when you water plants or crops using vortex technology…

Case Study – Tomato early plant growth

SLU
Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences
Fakulteten för landskapsplanering, trädgårds- och jordbruksvetenskap

Effect of Vortex-processed Water on Tomato (*Solanum lycopersicum*) Plants

Effekt av vortex-behandlat vatten på tomat (*Solanum lycopersicum*) småplantor

Malin Vagnell

- Pilot study examined whether treatment with Vortex Process Technology of the irrigation water used on tomato plants had any affect on plant growth.
- **Plant height, stem, width and internodal length were significantly different in tomato plants grown in Vortex-process water compared with the untreated control.**
- This study focused ONLY on early plant growth phase and no other influencing factors were studied.
- In other studies where full crops were grown, results were similar to that found in cucumbers.

Netherlands – Cucumbers grown using vortex technology

- ✓ Total yield ↑ 6.35 %
- ✓ Rejects ↓ 19.75%
- ✓ Quicker growth
- ✓ Overall improved quality in taste and shelf life

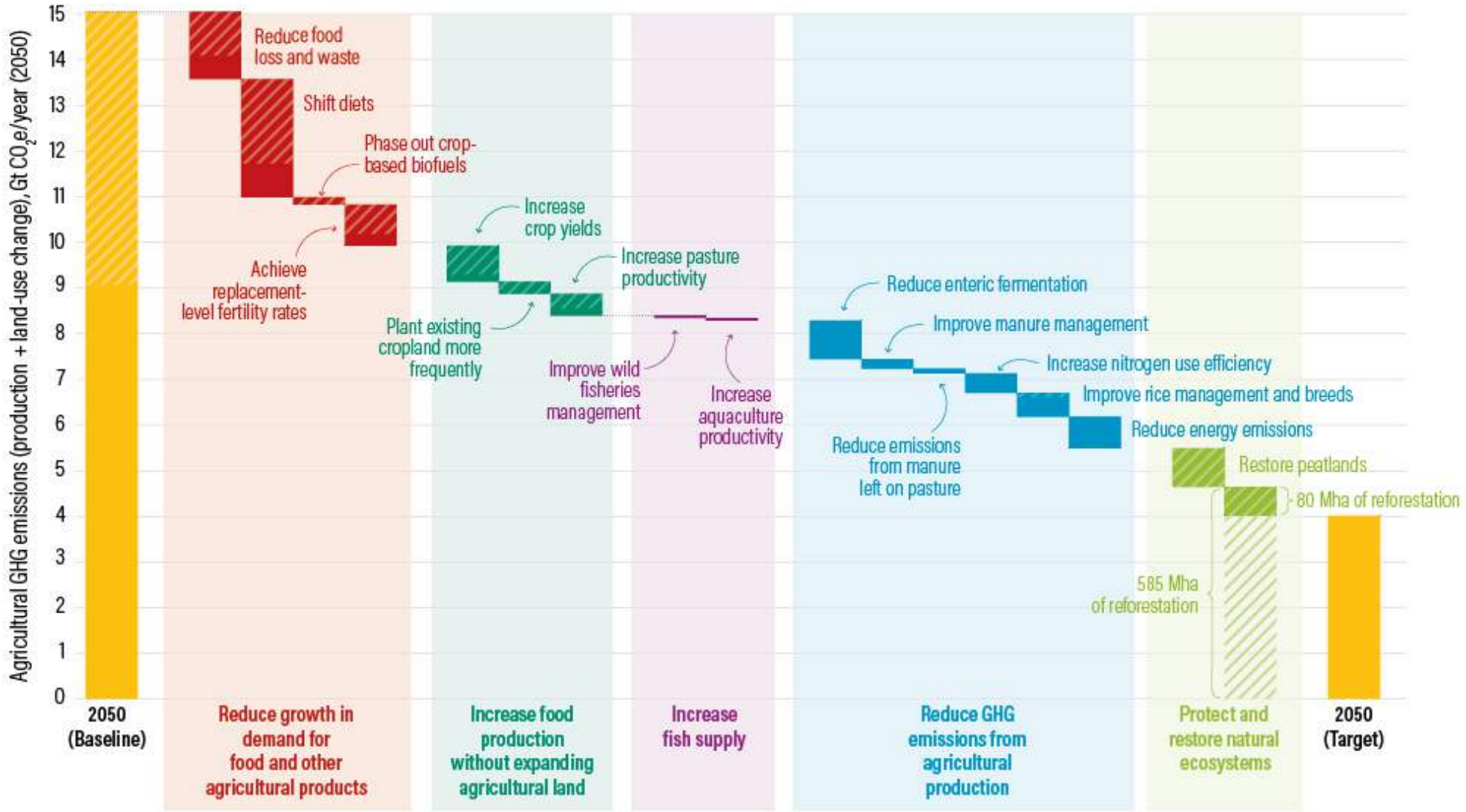
Paprika grown using Vortex Treated water at the Improvement Centre in the Netherlands showed similar results to Cucumbers

- ✓ Total yield ↑ 6.35 %
- ✓ Rejects ↓ 19.75%
- ✓ Quicker growth
- ✓ Overall improved quality in taste and shelf life

In the desert and in space,
the Vortex Process Technology
is being used to spray water and
fertilizer to grow crops known as
Aero Ponics.

Yields are similar to that of the
cucumbers grown using vortex
treated water.

A 5-Course Menu of Solutions Can Reduce Agricultural Emissions by More than 70%



Note: Solid areas represent agricultural production emissions. Hatched areas represent emissions from land-use change.
Source: GlobAgri-WRR model.

WORLD RESOURCES INSTITUTE

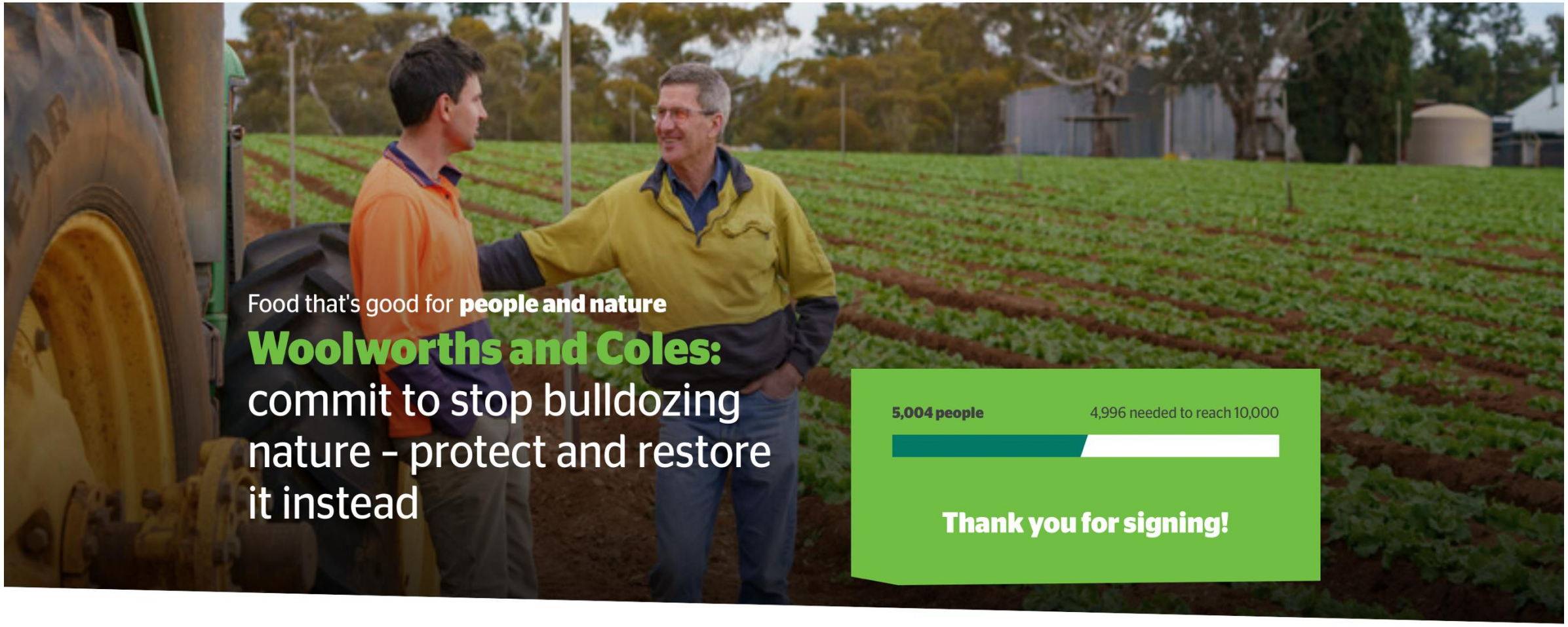
Food is integral to life. It's not just something we need, it's something we love. It's part of who we are —our favourite meals, our family identity, our culture. It sustains us, but what sustains it?

Healthy nature is vital for food production in Australia. From clean air and water to a liveable climate, our food system and nature are intrinsically linked. But Australia's food system is failing nature.

Agriculture for food is one of the largest drivers of nature destruction in Australia, contributing to the collapse of 19 ecosystems and our position as a global deforestation hotspot. It accounts for approximately three quarters of freshwater withdrawals and contributes up to 17% of Australia's greenhouse gas emissions annually.

Put simply, the modern food system is a key contributor to the climate and nature crises. But it's also a critical part of the solution. With a rapidly changing climate and growing global population to feed, it has never been more important to address the health of nature and the food system's impact and reliance on it.

AUSTRALIAN CONSERVATION FOUNDATION | Nature needs us, now



A food system that is good for people and nature is possible and the big supermarkets must help to create it.

If you share our vision for a thriving, sustainable Australian agriculture industry which nurtures landscapes, supports, communities, and rewards farmers, please add your name to this simple ask of Woolworths and Coles:

ADVOCACY is a key part of ensuring Food Security. Will you and or your students sign up?


Q
&
A

thank you!

For further information and or support contact

Anne-Maree McInerney
General Manager
Gould League

Email: gould.org.au
Ph: 03 95857860 / 0429 193 134

GOULD LEAGUE