MANIFESTO

REGENERATING GROWTH

Tackling biodiversity & climate emergency through nature-based solutions

zebra IMPACT

CONTENTS

01

INTRODUCTION

Soil is the cornerstone for addressing climate emergency, nature loss, and social inequalities all at the same time.

The importance of soils to society has gained increasing recognition over the past years, with the potential to contribute to most of the United Nations Global 2030 Agenda. With unprecedented and growing demands for food, water and energy, there is an urgent need for a global effort to address the challenges of climate change and land degradation, whilst protecting soil as a natural resource.

A healthy soil is the foundation of all civilizations. It is crucial for agricultural production, clean and abundant water supplies, and a stable climate. As Franklin Roosevelt once said, “The nation that destroys its soil, destroys itself.” Unfortunately, the world’s soils and, thereby, our planetary ecosystem are in danger. Deforestation and industrial agricultural practices have degraded the soil that people and nature need to thrive. This scenario is particularly troublesome given that agricultural production - which is dependent on healthy, fertile soils - will need to transition dramatically by 2050 if we’re to continue to feed, fuel, and clothe the world’s population.

Over the past decade, there has been increasing momentum within the agricultural industry to help producers move towards a regenerative agricultural system, including improved soil health, while ensuring profitable and resilient working lands. Science tells us that large-scale adoption of proven conservation practices can rebuild our agricultural soils, improve water quality, enhance biodiversity, and reduce carbon emissions. These practices include maintaining living roots in soils (cover crops), minimizing tillage or disturbance (conservation tillage or no-till), increasing crop diversity (new crops or rotations), and applying nutrients more efficiently (4Rs) (The Nature Conservancy) .

Despite cutting-edge science and proactive partnerships, the current pace and scale of the adoption of regenerative practices is not enough. To make significant progress, we need to challenge the status-quo by identifying nature-positive solutions that will circumvent or disrupt roadblocks to large-scale change.

Sweeping innovations, including trends in vertical farming, aquaculture, biotech, big data, AI, blockchain, and robotics are transforming the way we produce food into a more sustainable system, and will continue to do so. The influence of technology on food systems is greater than ever.

02 URGENT NEED FOR TRANSFORMATION

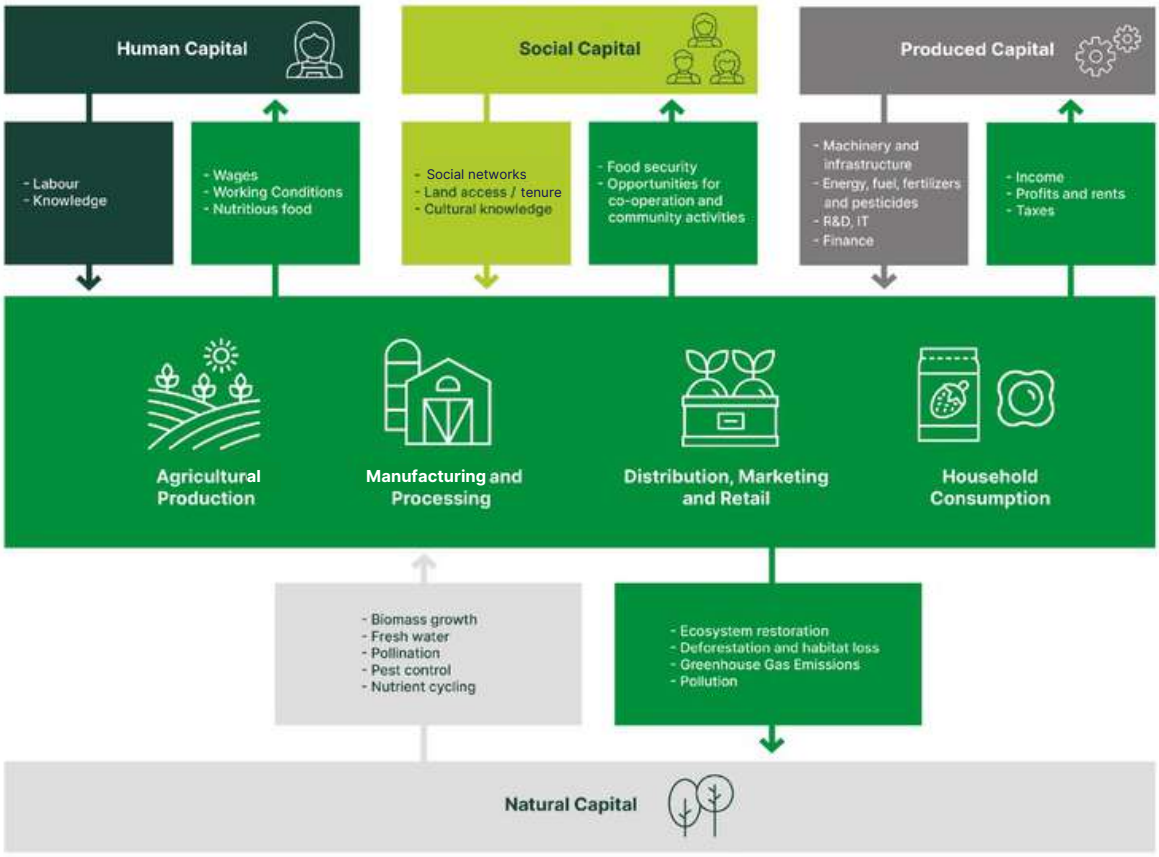
1.1 What is it all about?

Soil is the **most important ecosystem on earth**. The interaction between human activities, soil and biodiversity is fundamental. If you break or destabilize that symbiosis, the system breaks down.

Nature provides **fundamental services to human life and activities**:

→ It provides energy and materials as inputs,
→ It regulates the system by sequestering carbon or pollination,
→ It provides habitats for species, maintains genetic diversity,
→ It is a source of spiritual enrichment and mental and physical health.

Figure 1: Agriculture and food, a global ecosystem where nature place is central.



Source: FoodSIVI

However though, natural ecosystems and food production are both threatened. Humans and demographic growth, being at the top of the food value chain, are disconnected from what is actually going on at the very beginning of this value chain.

Global food systems are responsible for several negative impacts on our ecosystem:

24%
of GHG emissions

50%
of land use

70%
of freshwater withdrawal

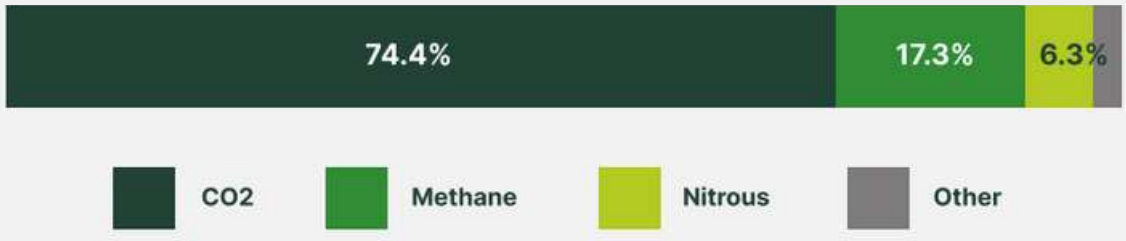
33%
of food loss or waste

60%
of biodiversity loss

DID YOU KNOW?

Figure 2: What makes up GHG emissions gas?

Source: Our World in Data



→ Global food systems emit between 10.8 and 19.1 billion tons of CO2 – equivalent emissions per year and it remains centuries or thousands of years in the air. You can imagine that one ton of CO2 is the same as driving your car during half a year. You will need on average 50 trees to offset what you will have traveled.
→ Methane could be up to 28 times more harmful than CO2 but remains in the air only 12 years. (Tackling methane emissions is a good way to reduce GHG emissions more rapidly!)
→ Nitrous could warm 265 times more the planet than CO2 but has a lifetime of 121 years.
(Our World in Data, Climate Neutral)

Shifting from a linear to a circular economy is key to ensure a **fair, regenerative & distributive economy** to stay within social and planet boundaries of the doughnut theory. To value our ecosystems, humans need to provide their own share of services for the benefit of the environment and their own well-being.

To achieve that, we need **innovation** and **technology**, and bring the 4th Industrial Revolution to the benefit of the global food systems and its stakeholders.
We need to change what and how we produce, for healthy and sustainable diets while managing loss and waste (Stockholm Resilience Center).

Transforming the global food system is a necessity is we want to achieve the 2030 Agenda:

"A healthy economy should be designed to thrive, not grow." Kate Raworth, Economist and Author of the Doughnut Theory

1.2 What if we don't change?

"Agricultural production more than tripled between 1960 and 2015, owing in part to productivity-enhancing Green Revolution technologies and a significant expansion in the use of land, water and other natural resources for agricultural purposes" FAO

1.3 What has gone wrong?

Inefficient and harmful practices

The Green Revolution has been possible by increasing both land use (expansion) and yields (intensification). Practices such as monocropping have already been implemented in the 19th century. An example of this would be the Great Hunger in Ireland, when potatoes (the only crop grown in the area) were infected by a microbe that destroyed all the production.

Monocultures were largely adopted in the 50s' for three reasons: they can be applied on a large surface of hectares, it consists of a single product, and it can easily respond to a distant market. Specialization is much more efficient in terms of resources needed, it makes the production easier and of larger quantities. Less specific equipment and knowledge are needed, and it benefits productivity and profit, for the achievement of economies of scale. But these poor soil practices have contributed to climate change by emitting large carbon emissions into the atmosphere and by decreasing the diversity of microorganisms essential for soil fertility.

Monoculture and other practices such as **tillage** have accelerated soil degradation, affecting both nutrients and biodiversity present in the topsoil. But microorganisms in the soil are essential for photosynthesis in order to absorb carbon.

Fertilizers are used to increase crop resilience to the external environment, improve soil fertility and increase yields, as a response to soil degradation and climate change. From 1965 to 2019, nitrogen fertilizers have increased from 46.3 million metric tons to 190 million tons (Statista). While fertilizers applied in excess can't be absorbed in their totality by the plants, the residues end up polluting water, and the soil.

Pesticides on the other hand have increasingly been used to protect and control diseases and pests that could affect crops. However, pesticides usage implies negative impact on biodiversity, including insects, animals and microorganisms.

Livestock farming also requires large amounts of land and water to produce crops for animal feed and raise livestock. 26% of the Earth's arable land is used to graze animals (Pitchbook). This has led to higher methane emissions and manure, contributing to climate change and pollution.

To face climate change and disease spread among animals, **antibiotics** have been used in big quantities, although its utilization seems to start decreasing (EFSA). This has raised health concerns as antibiotics received by animals increase body resistance against human antibiotics.

DID YOU KNOW?

Soil is the root of life

The last meter of soil is rich enough in nutrients to sustain 87% of life on Earth, from microorganisms to human beings. It takes decades to be formed and stabilized, which is essential to ensure life for future generations. We might only have soil left for agriculture for the next 45-60 years (Isha).

There is no food without a healthy soil

95% of our food is grown in the topsoil, making the topsoil as one of the most important components for the global food systems (The Gardian). That is why, the microbiome around the roots of plants is essential. It keeps nutrients that plants need, improves stress resistance, degrades toxins and eradicates pathogens.

The problem is in our plate

With the adoption of monocropping and specialization practices, large production was possible that even sufficed to feed animals.
More **meat** started to be produced. However, it is one of the most pollutant foods in terms of GHG emissions and other environmental impacts. Animal welfare on the other hand, is another concern of our 21st century. Intensive practices inevitably use unethical practices against animals.

Non-communicable diseases (diabetes, cardiovascular disease, cancers,...) appeared with diets low in fruits, vegetables, nuts, seeds, grains, and omega-3 fatty acids and diets that are rather high in sodium and sugar. 1/5 of deaths are linked to **unhealthy diets** (Reuters).

This could represent a loss of global economic output of $7 trillion for the period 2011 – 2030 (WEF). People that cannot afford healthy and sustainable food, will be constrained to buy cheap food. This will unprecedentedly affect the health of the poorest.

Poor diversity of food in our plate is also one of the problems making our systems less resilient, both in terms of production and nutrients. Plant-based products are higher both in calories and protein supply than what meat provides (see the graph below). Moreover, humanity relies essentially on four basic grains: Wheat, rice, soybeans and maize, representing about 60% of the calories that we consume (Stockholm Resilience Center).

"More change in the human diets in the last 150 years than in the last 1 million years."

Dan Saladino, Journalist and Author of the book "Eating to Extinction"

Figure 3: Greenhouse gas emissions per kilogram of food

Emissions are measured in carbon dioxide equivalents (CO2eq). This means non-CO2 gases are weighted by the amount of warming they cause over a 100-year timescale.
Check this out to compare the different environmental impacts of your food consumption!

Source: Our World in Data

Figure 4: Global land use for food production

Source: Our World in Data

Too much food is produced, and yet not all countries benefit from this surplus because of **excess food loss and waste**.
The loss of food produced is estimated to be around 14%, between harvest and retail, and the waste to be 17% between retail and consumption (FAO).

What are the reasons?

- →Some parts are left because it does not create value to the existing products.
- →The shape of a product differs from the norms, and it is removed from the supply chain.
- →The products expire or are closed to the best-before date (discarded by retailers or rejected by consumers).
- →Surplus of food that is not consumed because it exceeds requirement (at the consumer level and in catering establishments).

"US consumers spend approximately 9% of their discretionary income on food, down from 17% 60 years ago. Those prices omit hidden costs like food waste, pollution, and greenhouse gas emissions."

Bain & Company

03 OUR CURRENT SYSTEMS ARE UNSUSTAINABLE

We have already **exceeded 6 of the 9 planet's boundaries** and soil fertility is essential for food: agriculture depends on water, soil components, and weather.

Extreme weather events such as floods, wildfires, drought, livestock and crop infections and diseases are **threats for agriculture**, in terms of production, agricultural livelihoods, food security, and food prices.

The agri-food system of today plays its part in climate change and soil depletion, but at the same time, the system pays for it.

Beyond the fact that nature provides inputs and resources for human activities, **the soil is also related to the human microbiome**. Studies have found that people living in cities have much less bacterial diversity than people in rural areas. Moreover, a diet rich in fiber is more likely to preserve the gut microbiome, such as rural areas in Africa, while processed food is most common in urban areas, such as in the Western World. The human microbiome is essential for health. It impacts the immune system, mental health, and the risks of cancer and other diseases.

Global food systems must shift from food quantity to food quality starting by adopting regenerative agricultural practices.

DID YOU KNOW?

The secluded population of hunter gatherers in the Amazon jungle is the human group that has the highest diversity of bacteria and genetic functions ever reported (MDPI).

HOW TO DRIVE THE CHANGE?

04

4.1 The regen-ag tech positioning

It's time to transform our systems if we want to live in a world in which more than 9 billion people are able to live well, within planetary boundaries, by 2050.

We believe that wrong soil use is at the cornerstone of several problems, but enhanced good soil practices are a source of several opportunities.
We should focus on structural change by **acting upstream** and making impact where it's needed the most.

To achieve this vision, we need transformation at scale, and businesses need to focus their actions on the areas through which they can best lead the system's transformations.

Adapting technology to the needs of the ecosystem and involving all actors around is key to making impact scalable. This is why our approach focuses on complementarity between technologies within our portfolio.
There is no one size fits all. We believe we will make change happen by seeking positive nature-tech solutions to move to regeneration.

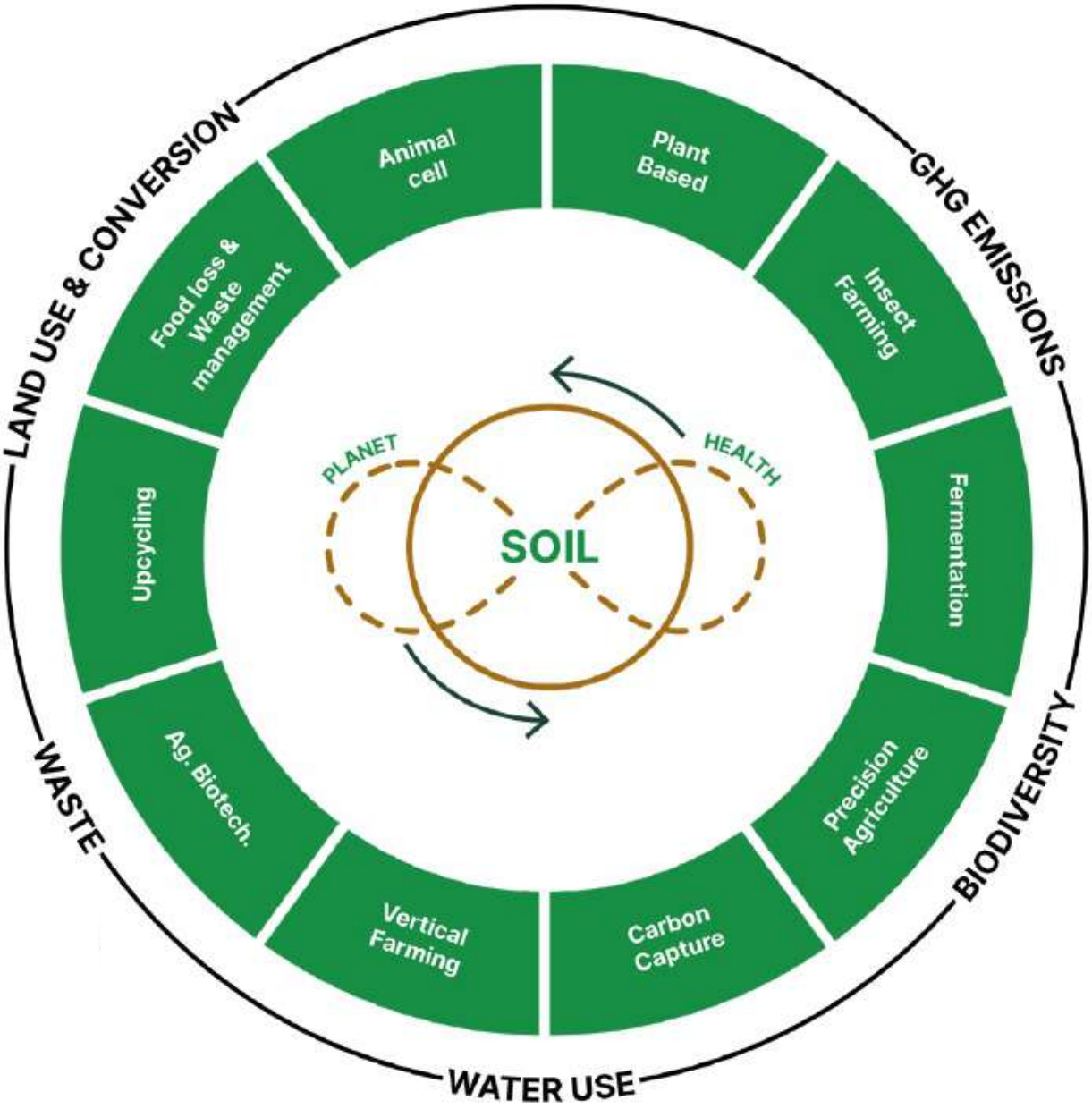
We aim to **track 5 impact KPIs**, essential to ensure a regenerative future:

1. GHG emissions
2. Waste
3. Land use & conversion
4. Water use
5. Biodiversity

Structural change in the agri-food system goes even far beyond the regeneration of soil and nature: it is at the frontier with biotechnology, where the soil interacts with the human microbiome.

Our Z Regenerative Growth Circle is based on the belief that planet and health are directly related to the soil.

Z Regenerative Growth Circle



Our approach is inspired from different models, including the Planet boundaries from the Stockholm Resilience Center, the Doughnut Theory and the EAT-lancet, to link environmental health to social well-being.
The sectors and subsectors that we have identified might evolve over time.

4.2 Impact process

Impact is embedded in **our mission, across our processes and behaviour**.
It's part of **our DNA**. We apply an impact framework to all our investments. We build our approach based on the standards developed by the Impact Management Project (IMP) with additional criteria focusing on the concept of additionality of the technology and the commitment of the foudners.

Additionality	We identify and **select technologies** that have the potential to accelerate the transformation of global systems, at the right speed, scale and to what it's needed the most.
Intentionality	We select companies that have the **right mindset** and are ready to commit to net-zero carbon emissions, efficient use of resources and protection of biodiversity.
Action plan	Ultimately, we define and implement an **impact action plan** with each venture based on decarbonization, biodiversity protection, efficient use of resources, etc.
Active ownership	Proactive contribution to monetize impact and grow venture's business

The result of our investment process must be the **impact** & the **financial performance**.

4.3 What does the future look like?

Global food systems will dramatically change in shape and content. Humans will need to return to nature and soil, produce and consume locally, dramatically diminish their animal-feeding. Production will be driven by smart technologies. **Satellite monitoring, drones, robots** and **machine learning technology** will be applied in the fields, helping farmers to better understand their soil and increase positive impact.

Farming techniques will be regenerative, or redesigned into another farming system such as **insect** or **algae aquaculture**.

IoT and the **blockchain** will serve the supply chain to better manage food loss and increase transparency.

What we will get on our plate will change drastically. **Plant-Based proteins**, **food by fermentation** or **seaweeds** are already getting a lot of attention, while **lab-grown meat** and edible **insects** are still at an early stage. And more is yet to come.

More generally, our diets need to be more diversified in nutrition benefits. It therefore suggests a reduction in meat consumption, and an increase in cereals.

This will bring a cultural adaptation, led and supported by the new generation.

4.4 Where to drive the change : three high-potential sectors of transformation

Precision farming

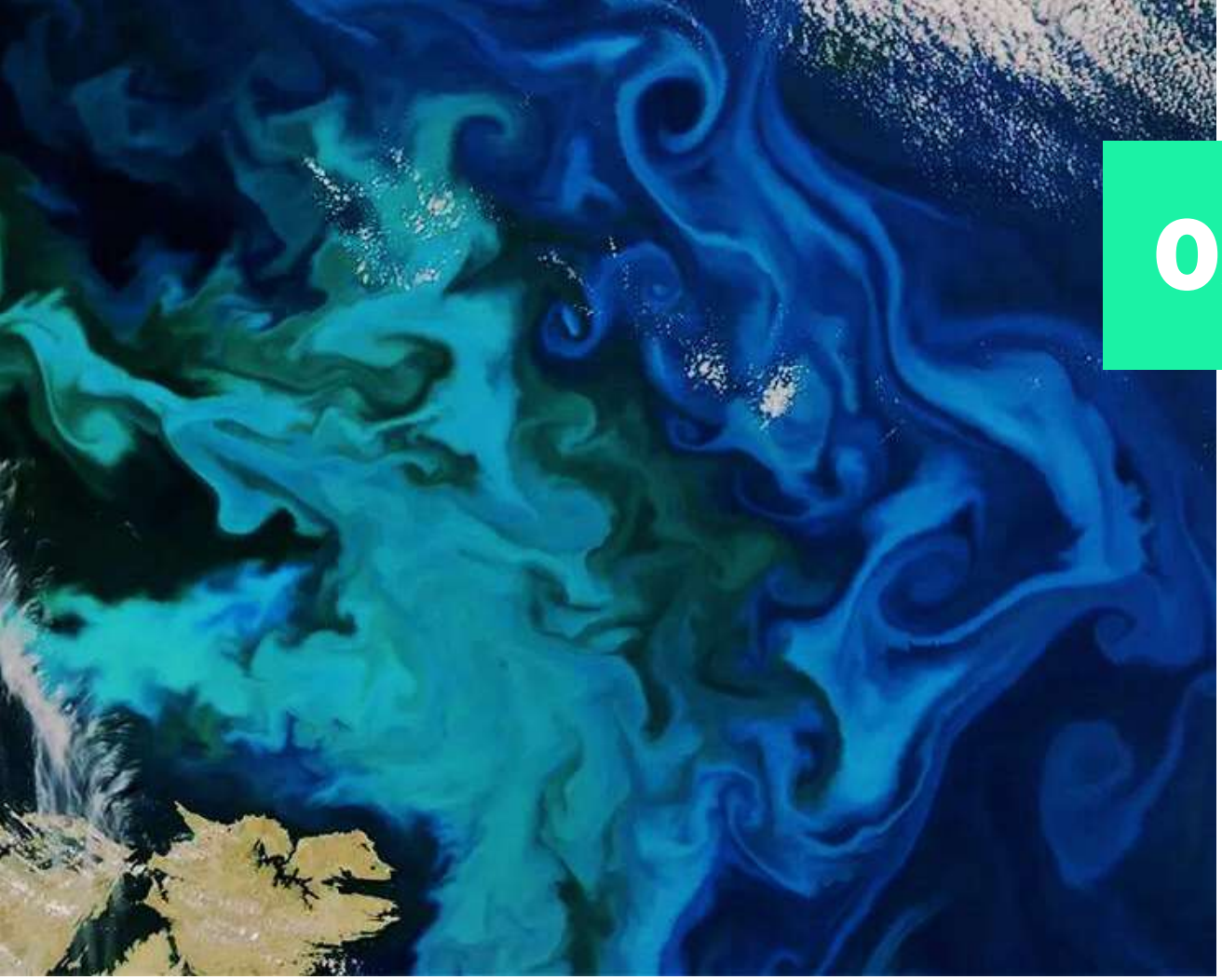
Precision farming means the iteration of agriculture and aquaculture towards 4.0., i.e., using technologies from IoT to drones to AI for improving agriculture in terms of resource efficiency, pesticide use, carbon sequestration and productivity. Precision farming techniques play a role in both indoor and regenerative farming.

Alternative Nutrition

Alternative nutrition aims to offer products that are more attractive than today's products but without traditionally grown animal ingredients. It aims at linking the human and soil microbiomes. It consists of plant/insect or algae-based meat or dairy substitutes and precision fermentation.

Upcycling & circularity

Upcycling and circularity ensure that food does not go to waste throughout the whole lifecycle. Food waste reduction can target more operational efficiency from sourcing, warehousing to distributing more resistant food products. Finally, there is an opportunity in upcycling food that is going aside and making that "waste" beneficial.



05

ZEBRA-CORN ILLUSTRATIONS

Let's rethink growth.
We are a Swiss-based venture capital firm, impact by nature and tech-driven. We invest only in nature-tech companies and founders leading the change.

BettaF!sh are kind of the new seaweed farmers of the decades. They propose a new agricultural model in response to overfishing. The German venture has developed a technology that transforms regenerative and nutritious cultivated seaweed into plant-based seafood, such as vegan tuna. Worth noting, they are building a database of species to develop new application opportunities around the world and impact the global food systems in the protection of biodiversity.

www.bettafish.co

Koa Impact are rethinking the production of cocoa by upcycling the part of the fruit that is traditionally thrown away. The Swiss-based start-up uses solar power to extract the cocoa pulp on-site in Ghana and makes of this natural resource an additional value for the farmers themselves and for the food & beverage industry. With the cocoa pulp, KOA makes new tasty gastronomic and industrial ingredients. More than that, they process the husks and turn it into biochar for the farmers.

www.koa-impact.com

Ecorobotix propose a direct solutions to respond to key challenges in the farming sector, highly under pressure of the EU regulation. They have conceived a machine that is towed to a tractor and that is equipped with cameras, AI and machine learning to precisely spray fertilisers & pesticides on weeds and crops. Therefore, this technology has the capacity to save GHG emissions by increasing yields and reducing chemical inputs up to 95%.

www.ecorobotix.com

xFarm Technologies are a SaaS company. They have a direct impact on the soil health by providing the farmer an integrated platform to make the right decision at the production and harvesting stage. Features like weather forecasting, crop monitoring with satellites, or plant protection via sensors are essential to enable the agricultural transition, both environmentally and economically by generating additional value for farmers.

www.xfarm.ag

WHO WE ARE

A Swiss-based venture capital firm, impact by nature & tech-driven.

We only work with nature-positive companies that have the right mindset and the potential to lead the transformation the world needs.

We share new power values focusing on collaboration, participation and transparency. We also believe in a just value of capital, where the enterprise value constitutes more than just outstanding equity.

We move within our network through collective action and partnerships, to generate impact at the necessary speed and scale.

We stay agile and humble vis-a-vis the challenges we face.

Geneva, Switzerland

info@zebraventures.ch

www.zebraventures.ch

REFERENCES

1. AgFunderNews: *What Are Novel Farming Systems?*
2. AgFunderNews: *What is Agriculture Biotechnology?*
3. AgFunderNews: *What is Precision Agriculture and How is Technology Enabling it?*
4. AgFunderNews: *Why precision agriculture is essential in combating climate change?*
5. Bain and Company: *Food System Transformation: The Time Is Now*
6. Bayer: *How We Can Counter Climate Change by Reducing Food Loss and Waste*
7. Breakthrough energy: *Agriculture*
8. Business Insider: *Rising emissions could drain foods like rice and wheat of their nutrients, causing a slow-moving global food crisis*
9. Business Wales: *Can Precision Farming Help Mitigate Climate Change?*
10. Capgemini: *Why food waste is everybody's problem?*
11. Climate Neutral Group: *What exactly is 1 tonne of CO2?*
12. Columbia Climate School: *Climate Change May Have Huge Impacts on Staple Crops Within 10 Years, Says NASA*
13. Deloitte Switzerland: *Food waste has gone viral*
14. About Doughnut Economics: *About Doughnut Economics*
15. EAT-Lancet: *Healthy diets from sustainable food systems*
16. EFSA: *Third joint inter-agency report on integrated analysis of consumption of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from humans and food-producing animals in the EU/EEA*
17. EIT Food: *Can regenerative agriculture replace conventional farming?*
18. EIT Food: *Is vertical farming really sustainable?*
19. EIT Food: *Sustainable Agriculture: more than just a transition?*
20. European Commission: *Farm to Fork strategy*
21. European Commission: *The rise and fall of monoculture farming*
22. FAO: COP26: *Agricultural expansion drives almost 90% of global deforestation*
23. FAO: *Damages and losses*
24. FAO: *Future of food and agriculture 2018: alternative pathways to 2050*
25. FAO: *International Day of Awareness of Food Loss and Waste*
26. FAO: *Sustainable food systems: Concept and framework*
27. FAO: *The future of food and agriculture 2017: trends and challenges*
28. FAO: *The impact of disasters and crises on agriculture and food security*
29. FAO: *The state of food and agriculture 2019: Moving forward on food loss and waste reduction*
30. FAO: *The state of food and agriculture 2021*
31. FAO: *The State of Food Security and Nutrition in the World 2021*
32. *Financial Times: Would carbon food labels change the way you shop?*
33. Food Processing Technology: *Bühler Group Insect Protein Production Plant*
34. FoodHack: *Food Waste Innovators: From marketplaces to shelf-life technology - discover 70+ food waste startups & companies helping cut down on waste*
35. FOODSivi: *Valuing the impact of food: Towards practical and comparable monetary valuation of food system impacts*
36. FutureBridge: *Start-ups using Artificial Intelligence to produce Alternative Protein*
37. Geneva Environment Network: *Food Systems and the Environment*
38. Global Seafood Alliance: *What is Aquaculture, and Why Do We Need It?*
39. Good Food Institute: *Cultivated meat and seafood*
40. Good Food Institute: *Deep dive: Plant-based meat ingredient optimization*
41. Good Food Institute: *Environmental benefits of plant-based meat products*
42. Good Food Institute: *Plant-based meat for a growing world*
43. Good Food Institute: *The science of cultivated meat*
44. Good Food Institute: *Fermentation: Meat, seafood, eggs, and dairy*
45. Gottlieb Duttweiler Institute: *European Food Trends Report 2021*
46. IFAD: *Why water is crucial for sustainable system*
47. IFT: *Active and Intelligent Packaging = Longer Shelf Life*
48. IFT: *Moving Toward a More Circular Food System Via Upcycling*
49. IFT: *The Sustainable, Nutritious, Functional Power of Algae*
50. Institute For Global Change: *Technology to feed the world*
51. IPCC: *Chapter 5 : Food Security - Special Report on Climate Change and Land*
52. Isha: *The Importance of Soil Revitalization and 5 Methods to Save the Soil*
53. John Innes Centre: *Soil: the foundation of life on Earth*
54. JPMorgan: *Establishing a Framework for Food and Agriculture Sustainability Transition ("FAST")*
55. LSE Business Review: *Sadhguru: We must move fast to save our soil from dying*
56. Making.com: *Find Insect Protein Production Technology*
57. MDPI: *Does Soil Contribute to the Human Gut Microbiome?*
58. MDPI: *Precision Agriculture Technologies Positively Contributing to GHG Emissions Mitigation, Farm Productivity and Economics*
59. Medium: *The Soil-Gut Connection: Roots of Health for our Internal Garden*
60. MIC: *This company is combining AI and algae to fight climate change*
61. NOAA: *What is aquaculture?*
62. OP2B: *Scaling up Regenerative Agriculture - OP2B's contribution*

REFERENCES

63. Our World in Data: *Data Explorer: Environmental Impacts of Food*
64. Our World in Data: *Greenhouse Gas Emissions*
65. Our World in Data: *How much of global greenhouse gas emissions come from food?*
66. Our World in Data: *Land Use*
67. Our World in Data: *You want to reduce the carbon footprint of your food? Focus on what you eat, not whether your food is local*
68. Pitchbook: *Emerging space: Carbon capture*
69. Pitchbook: *Emerging space: Insect-based foods*
70. Pitchbook: *Exploring a new crop of startups: A closer look at indoor farming*
71. Quartz: *Algae might be a secret weapon to combatting climate change*
72. ReFED: *Food waste is a solvable problem – here's how to do it*
73. Reuters: *One in five deaths worldwide linked to unhealthy diet*
74. Statista: *World fertilizer consumption by nutrient 1965 to 2019*
75. Stockholm Resilience Center: *Amid new crises, a sustainable diet is still possible*
76. Stockholm Resilience Center: *Resilience insights related to the global food crisis*
77. Swiss-food.ch: *Food trends: Innovative technologies are indispensable*
78. TED Talk: *Kate Raworth: A healthy economy should be designed to thrive, not grow*
79. TED Talk: *Ndidi Okonkwo Nwuneli: The future of the food ecosystem - and the power of your plate*
80. The Economics of Ecosystems & Biodiversity (TEEB): *TEEB for Agriculture & Food: Scientific & economic foundations report*
81. The Institute for Functional Medicine: *Food crops: Nutrient fluctuations and malnutrition*
82. The Guardian: *The world needs topsoil to grow 95% of its food*
83. The Nature Conservancy: *Nature Climate Solutions Handbook*
84. UBS: *The food revolution*
85. UNEP: *Definition of food loss and waste*
86. UNEP: *UNEP Food Waste Index Report 2021*
87. Vontobel: *Precision farming on the rise: How robots are changing agriculture*
88. WBCSD: *Vision 2050 Food Pathway: We can provide healthy diets for all*
89. WCRF: *The link between food, nutrition, diet and non-communicable diseases*
90. WEF: *How technology can help address challenges in agriculture?*
91. WEF: *Alternative proteins will transform food, mitigate climate change and drive profits. Here's how.*
92. WEF: *Bio-Innovation in the Food System*
93. WEF: *COP26: feed the world without destroying the climate*
94. WEF: *Dubai has the 'world's largest' vertical farm - is this the future of agriculture?*
95. WEF: *Fermentation can help build a more efficient and sustainable food system – here's how*
96. WEF: *Fourth Industrial Revolution*
97. WEF: *How can we produce enough protein to feed 10 billion people?*
98. WEF: *How can we protect food systems against global shocks? Here's what business leaders say*
99. WEF: *How to build more sustainable, healthier, more equitable food systems*
100. WEF: *Meat: The future series*
101. WEF: *Strategic Intelligence*
102. WEF: *The Earth's freshwater cycle has exceeded the safe limit, says research*
103. WEF: *The role of technology innovation in accelerating food systems transformation*
104. WEF: *The world's food waste problem is bigger than expected - here's what we can do about it*
105. WEF: *Transforming food systems with farmers: a pathway for the EU*
106. WEF: *What is 'nature positive' and why is it the key to our future?*
107. What Design Can do: *How bad design is driving the 'take-make-waste' economy*
108. World Bank: *Climate-Smart Agriculture*
109. WWF: *One way to tackle food waste? Eat more of what we grow*
110. WWF: *Driven to Waste: The global impact of food loss and waste on farms*