Impact

creation report

2021 -2022

ASTANOR

Where tech meets nature

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01 Foreword

Astanor was born five years ago with the mission to find, support and scale the most disruptive, impactful solutions to accelerate the transition towards a regenerative agrifood system. We embarked on this journey aware of the urgency to deeply transform the agrifood industry across the entire value chain and to build a food system that is sustainable, regenerative, resilient and viable in the long term.

Today, many of the pillars upon which the current agrifood system is upheld are being challenged, exacerbating its internal fragility and susceptibility to disruption. Prices of inputs such as energy and fertilizers are rapidly increasing, weather patterns upon which farmers have relied are becoming more extreme and unpredictable and fertile soil and freshwater resources are being depleted at rapidly increasing rates across the world.

In addition, these pillars are systematically weakened by practices and policies that place short-term productivity over long-term protection of agricultural lands and nutrition security. A notable example is the EU Farm to Fork strategy, which was put in place in 2020 with highly ambitious plans to transition the European agrifood industry towards regenerative practices. This policy has been drawn into question since the outbreak of the war in Ukraine as many countries push to backpedal towards productivity-focused policies.

The agrifood system must transition. This is not a choice but a fact. Science has shown that retracting or going back to “business as usual” methods of production is not a viable option and returning to pre-industrial small-scale agriculture will not feed 10 billion people by 2050. This transition will be made possible by technological advances that enable regenerative agriculture at scale and will require financing by large-scale investment from public and private actors.

Agrifood tech entrepreneurs are rising to the challenge, driving major advancements to make the transformation technologically possible and economically viable. There is no silver bullet to redirect the system. A successful transition will only succeed with collaboration from farmers, entrepreneurs, investors, scientists, chefs, consumers and policy makers. This report covers the steps we take at Astanor to continue to earn and maintain the trust of our stakeholders to help steer the agrifood industry to provide healthy, delicious, nutritious meals for all, while providing a fair system for all players along the value chain and regenerating the land, ocean and atmosphere that make it possible.

The Astanor Team

02 Introduction

The agrifood system is responsible for one third of global anthropogenic greenhouse gas (GHG) emissions, uses half of the globe's habitable land surface and accounts for 70% of freshwater use.[1,2] The current climate emergency is deeply affecting the agrifood system and those who rely on it, driving disruption in water cycles, heat waves, biodiversity loss and deterioration of livelihoods.

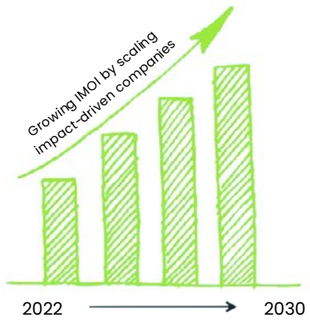
Astanor is an active catalyzer of a necessary evolution in the agrifood system, fueling the transition from its current extractive state to one that is regenerative, protective and provides affordable nutrients for a growing population with shifting dietary demands.

With this second edition of Astanor's Impact Creation Report, we again aim to share our journey as an impact investor, our progress in our holistic approach to impact and our latest developments in the space of impact creation measurement. The report explains our approach to investing which covers the whole value chain "from soil and sea to gut", the assessment of the impact created by our portfolio companies based on six impact KPIs (GHG Emissions, Water Use, Biodiversity, Social, Health and Climate Intelligence), our Environmental, Social and Governance (ESG) assessment of the portfolio and the philosophy that drives our activity as an impact investor. The metrics we employ and the methodology we developed allow us to track progress towards our goal of a resilient and regenerative agrifood system.

This all-encompassing perspective, supported and enhanced through our constant collaboration with scientists, policy makers, activists and tech entrepreneurs, allows us to **invest in mission-driven companies that are re-inventing the food system in a systemic way** at the speed demanded by both climate policy and climate science. We hope that sharing our practices will help lead the industry in which we operate towards greater transparency and encourage others along the journey of impactful and profitable investments. At Astanor, we believe in the future of an agrifood system that provides affordable nutrients for 10 billion people, preserves and regenerates natural resources, actively contributes to decarbonization and reverses land and ocean biodiversity loss.[3]

> ***As an impact VC investor, we invest in early-stage companies with high impact potential. Thus, the material impact created by these companies can be low in these early stages of development. A key element of our mission is to assess each company's impact creation pathway, measure their long-term impact creation potential and help them achieve the greatest impact possible as they scale.***

Expected evolution of Impact Multiple on Investment (IMOI)



Astanor translates social and environmental impact creation to monetary value through IMOI.
See more on page 19

2021-2022 Highlights

Cumulative progress across Astanor's 6 impact KPIs

32 K metric tons of CO_2e avoided

8 K hectares of land use saved

187 K m^3 of water use avoided

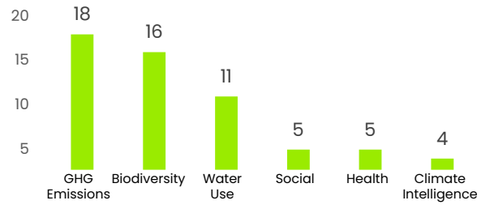
26 M healthy products sold

11 K farmers financed

€ 293 M of financing for agricultural projects

230 M queryable assets

Number of companies per impact KPI



Between January 2021 and June 2022

ESG at Astanor Portfolio Companies

Environment	Social	Governance
27% have an environmental policy in place	**82%** have a health and safety policy in place	**50%** are B Corp certified or are pending certification
55% assessed their exposure to raw material scarcity	**68%** of employees have been given access to capital (on average)	**36%** have a supplier code of conduct

As of December 2021

About Astanor

30 Employees from 12 different nationalities

370 Million euros invested

40 Portfolio companies from 11 different countries

36% Women in management

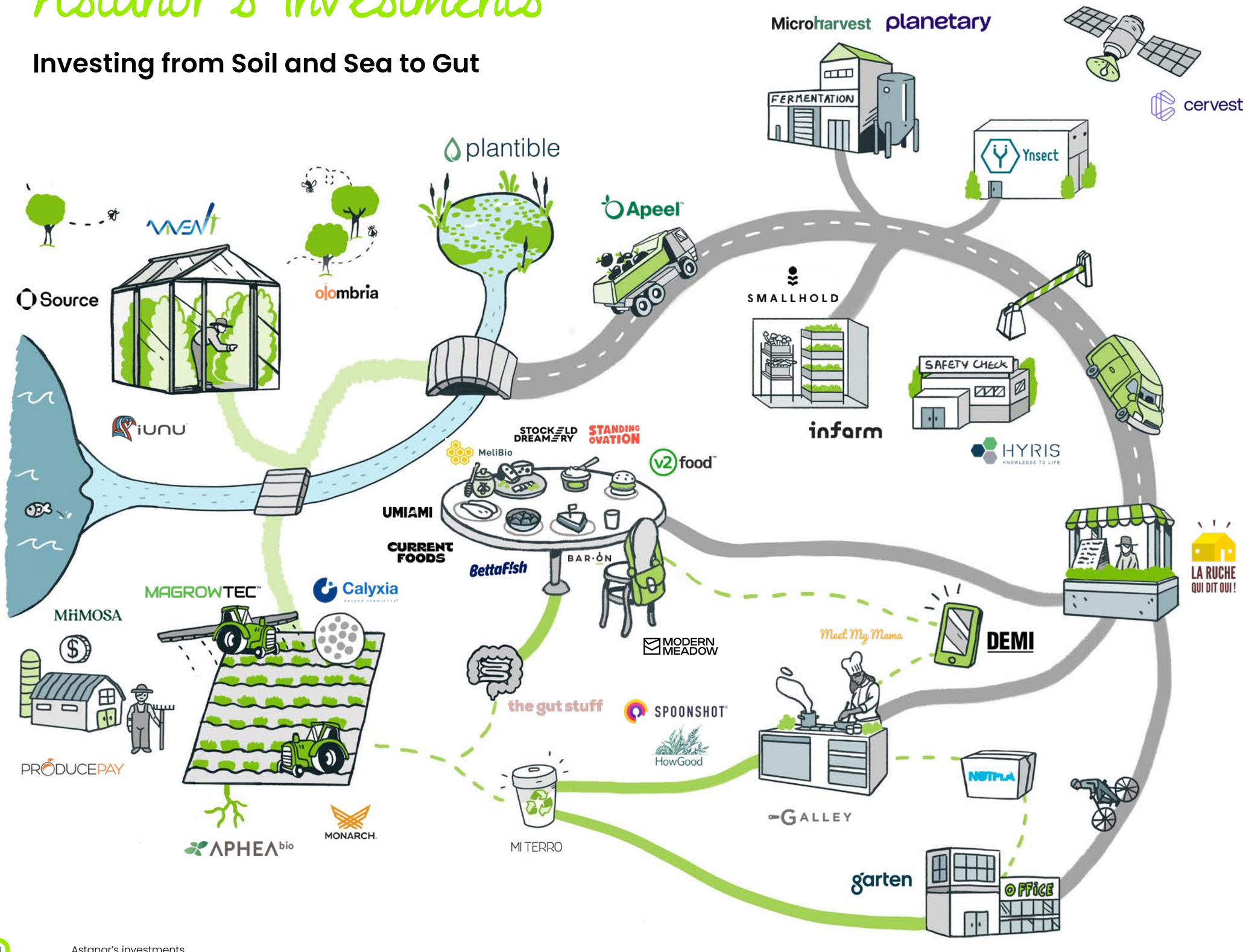
30% Of carried interest linked to impact creation

2 Partnerships with NGOs

As of September 2022

Astanor's Investments

Investing from Soil and Sea to Gut



Guiding principles for investment

1. Regeneration
Health for people and the planet starts and is sustained by fertile soil and healthy oceans.

2. Agrifood Integrity
Traceability, transparency, fair labor and supply chain practices will restore trust, decrease risk and strengthen communities.

3. Nourishment and Deliciousness
Sustainably grown and minimally processed foods protect and promote health.

4. Protection
Greater care and efficient use of natural capital, alongside new methods to repurpose waste, are needed to repair the planet.

03 Astanor's Approach

Investing for Impact

Impact investing supports mission-driven companies that have identified a social or environmental problem and a solution to help resolve it.

Astanor invests across the agrifood value chain: from the regeneration and efficient use of primary resources and sustainable and circular methods of production and distribution, to the support of fair worker compensation and production of nourishing, healthy and sustainable food for the end consumer.

Our focus is on finding mission-driven entrepreneurs who have developed a product or service that will have a positive impact on the planet and its people. We approach investing through the lens of both ESG and Impact as both are necessary to achieve a sustainable and resilient agrifood system.

ESG (internal) + **Impact (external)**

Advancing sustainability with systemic vision

Growing successful companies with lasting impact is Astanor's *raison d'être* - it is core to our investment philosophy and the driving factor behind each of our investment decisions. A company's impact is defined by the external impact its product or service will have on the planet and its people. At Astanor we continuously assess the impact of our investees, evaluating companies through our guiding principles from initial screening to exit. Along the way, we provide guidance on how to increase their impact, tools to measure impact creation and support in setting relevant KPIs to keep them on track.

ESG is about the internal health of a company, promoting good management practices and minimizing any potential harm caused by the company's operations. Companies are more likely to succeed if they have a strong and well-articulated ESG strategy. Such a strategy is essential in attracting and retaining talent – a company with a highly impactful product or service will not achieve its mission if it lacks a solid ESG framework of strong values, policies and processes.[4] Guiding our portfolio companies during their first steps in ESG is thus an essential contribution from Astanor.

A trusted, sustainable partner

Astanor's investment process has been designed to provide an in-depth understanding of the sustainability and impact of each company at the time of investment. From the time of our initial screening, we work with our companies to build an individualized engagement roadmap to improve their ESG profile and scale their full impact potential over the course of our investment.

Investing in companies to transform the agrifood system requires the right data and tools to ensure that change is both scalable and long-lasting. We consistently update our processes with the latest methodologies of ESG and impact measurement to influence sustainable impact creation among our portfolio companies.

At Astanor, we maintain a very close relationship with our investees: challenging, advising and supporting them through their sustainability and impact journey. Our tools and metrics help us track and monitor our constant improvements, while our partnerships and experts allow us to connect companies with the necessary support where and when they need it.

Astanor has set up an **Impact Community** for our portfolio companies to foster collaboration, share best practices and support each other in their growth. We regularly organize meetings and webinars to coach portfolio companies on impact and ESG topics. Through this community, our investees share best practices on sustainability topics such as benchmark performances and targets, policy templates, and innovative solutions for carbon accounting and reporting.

Investment Process

1 Initial screening

Universe
- Positively screen for solutions
- Rate ESG risks
- Assess fit with guiding principles

2 Due diligence

Full assessment
- Integrity check on management & co-investors
- Guiding principles and KPIs review
- Assess capacity to multiply impact with scale

3 Investment documentation

Legal commitment
- ESG questionnaire
- LCA, company carbon footprint and impact committee clauses
- B Corp legal alignment

4 Impact deep dive

Impact KPIs
- Conduct full assessment on guiding principles, UN SDGs and EU regulation
- Define impact KPIs
- Build ESG & impact roadmap

5 Investment monitoring

Ongoing
- ESG & impact review twice a year
- Produce annual sustainability and impact report
- Navigate growth with impact

6 Exit

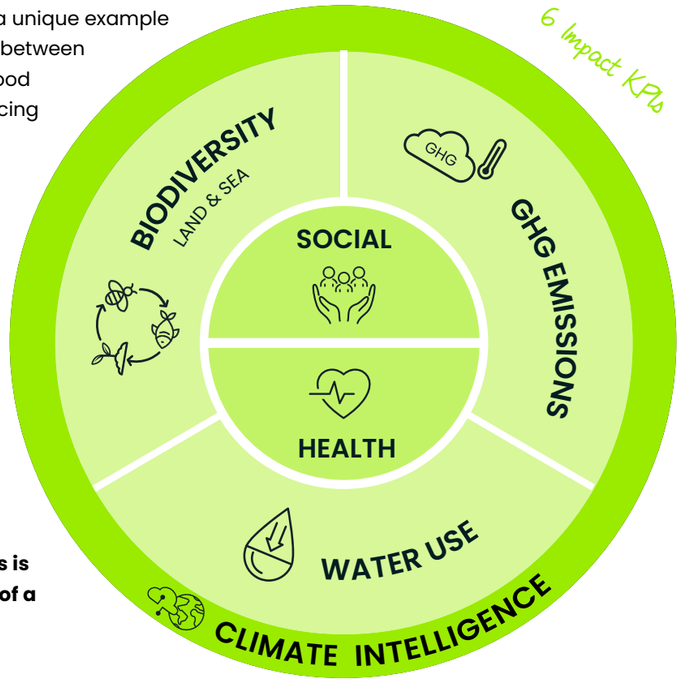
Impact creation
- Quantify impact creation pre- and post-exit
- Quantify ESG improvements through the investment lifecycle

Impact KPIs

Defining the right metrics is an essential first step to measuring impact. To address the diverse and far-reaching environmental and social consequences of today's agrifood system, we have established six impact KPIs that provide a holistic understanding of the impact of our portfolio companies on the planet and its people: GHG Emissions, Water Use, Biodiversity (land and sea), Social, Health and Climate Intelligence.

The global agrifood system provides a unique example of the need for a balanced approach between sustainability concerns. Today's agrifood system has been optimized for producing large quantities of cheap calories while becoming a leading source of greenhouse gas emissions, a catalyst for water scarcity and biodiversity loss and a leading driver of social inequalities and health crises at a global scale.

As an impact investor, we embrace our responsibility to balance these elements, to search for entrepreneurs with disruptive ideas that promise to deliver impact at scale to build a truly sustainable system. **Each of these six impact KPIs is an essential pillar in the foundation of a sustainable food system.**



3 Planet KPIs

The agrifood industry is one of the largest contributors to climate change and ecosystem degradation. We have established three "planet" KPIs to efficiently assess a solution's potential to address these challenges: GHG Emissions, Water Use and Biodiversity. While the market is often focused on carbon emissions, these three factors are deeply interconnected and instrumental to fully assessing the agrifood industry's environmental impact and tackling climate change at the root.

GHG Emissions
The agrifood system is responsible for around 18Gt of CO_2e per year, one third of total global GHG emissions.[5,6] It is at the same time extremely vulnerable to climate change - rising temperatures pose a significant threat to crop yields while encouraging weed and pest proliferation.

Water Use
Agricultural production is both entirely dependent on freshwater resources and the largest user of this limited resource. Agriculture accounts for 70% of water use worldwide and yet 60% of it is wasted due to inefficient use.[7] Freshwater has historically been regarded as an easily accessible and affordable resource but it can no longer be treated as such.

Biodiversity
While food production is heavily dependent on biodiversity, the global food system is the primary driver of biodiversity loss. Agriculture alone has been identified as a threat to 86% of species at risk of extinction (24,000 species out of a total 28,000 listed). This is largely caused by land use change, overexploitation of wild species and overuse of agricultural inputs.[8]

2 People KPIs

Social
Structural inequalities in the food system have resulted in widespread social inequalities for producers and consumers. Farmers earn low and unreliable incomes and lack access to partnerships and market transparency. In addition, their livelihoods are increasingly vulnerable to climate uncertainty.[9] Consumers, on the other hand, are impacted by a lack of education, product misinformation and limited access to healthy food options.

Health
The agrifood industry has created a double burden of malnutrition: 26% of the world's population experiences hunger or lacks access to sufficient and nutritious food, while 39% is overweight or obese.[10,11] While the volume of food produced globally is sufficient to feed everyone on the planet, nutrition and distribution challenges continuously exacerbate global health crises.[12]

1 Enabler KPI

Climate Intelligence
The Climate Intelligence KPI is designed for technologies that enable the acceleration of the agrifood transition. They support other businesses, including agrifood companies, by providing intelligence to facilitate informed decisions and support impact creation for both people and the planet. These enablers play a critical role in building resilience in the agrifood sector as it faces the growing challenges of climate change.

Measuring and Scaling Impact

We are continuously improving our methodology to measure and scale impact. In the VC industry, Astanor has pioneered the use of quantitative impact measurement methods, such as **environmental Life Cycle Assessment (LCA**), to evaluate the complete environmental impacts of a solution.

An environmental LCA is a comprehensive assessment that includes an analysis of: extraction and processing of energy and raw materials, manufacturing, distribution, use, and recycling and disposal of the end product. This quantified data is invaluable for a company to understand the impact created by its products or services and to map out which areas might pose risks or provide opportunities for market developments or process improvement as the company scales.

At Astanor, we require all portfolio companies (beyond series seed) with an identified environmental impact to conduct an LCA. We provide support for companies through in-house guidance as well as through our network of partners and external experts. LCAs provide high-quality data that structures our impact measurement process and provides valuable insights for our investees. The obtained data helps our companies remain agile, understand the full impact of their operations, design their products in a sustainable way, identify key sustainable outcomes and objectively communicate their positive impacts and negative externalities.

Impact Valuation

To support the long-term development of impact investing, there is a growing need for a unified approach that enables investors to compare strategies and understand how well capital has been deployed and what impact has been created. In addition, impact investors need tools to evaluate and compare the potential impact of companies during the due diligence process.

We have been working on a new approach to address these two issues. While our holistic approach to impact measurement is tailored to fully capture the impact of individual agrifood solutions, comparing the impact of potential investments across six impact KPIs has proven challenging. For example, assessing deals only by referring to the metric tons of CO_2e avoided will only provide one part of the picture and will be insufficient to compare deals and funds. To address this challenge, we developed a model that allows us to demonstrate impact creation across investments as a single aggregated metric.

We launched our Impact Valuation project in January 2022 to better understand the challenges and potential of applying impact valuation to early-stage companies. Inspired by the True Cost Accounting (TCA) and Social Return on Investment (SROI) approaches, our model assesses the impact of our companies on people and the planet. **The expected and realized benefits of the products or services of our investments are translated and demonstrated in monetary terms.**

The Impact Valuation model is based upon an impact framework that considers human, social and natural capital and uses science-based impact pathways representative of the activities and markets of a company. The method considers both positive aspects, such as cost savings from healthcare or the prevention of overfishing, and negative aspects, such as water pollution. Impact Valuation aims to provide an integrated perspective across these dimensions by converting heterogeneous indicators usually available in multiple physical units (*e.g.*, tons of CO_2 equivalent, liters of water used or number of jobs created) into a single indicator expressed in a monetary value. The Impact Valuation model strengthens our ability to place impact at the core of our definition of success.

In addition to being useful to assess deals and allow comparison across funds, the model is also a dynamic tool for our portfolio companies' management teams.

A clear understanding of the impact generated by their product or service and a granular view of that impact across different regions allows the management teams to make more informed decisions, maximize impact at scale and communicate on quantified impact to all stakeholders (including suppliers and customers looking for sustainable partners).

Impact Multiple on Investment

At exit, the model will be the basis to compute each portfolio company's expected impact multiple on investment (IMOI) considering the computation of the realized impact pre-exit and the discounted future impact post-exit based on our ownership. We will first calculate the realized impact (impact achieved over the investment period). However capturing only the realized impact does not fully illustrate the full value-add of a VC investor. Early-stage investors play a critical role in setting young companies on the right track, yet it is highly likely that the company will not achieve its full impact potential before exit. In some instances, none of the impact will be realized during the lifetime of the investment and it will only start to materialize post-exit. For this reason, we also calculate the discounted cumulative expected future impact over a 10-year horizon at time of exit. The weight allocated to the realized versus future impact will be determined based on the level of the company's maturity at the time of exit.

At the fund level, the IMOI of each fund's investments is weighted by the amount invested to assess the total fund's impact creation. At time of exit, the fund multiple is to be reviewed by the fund's advisory committee and externally reviewed by an auditor.

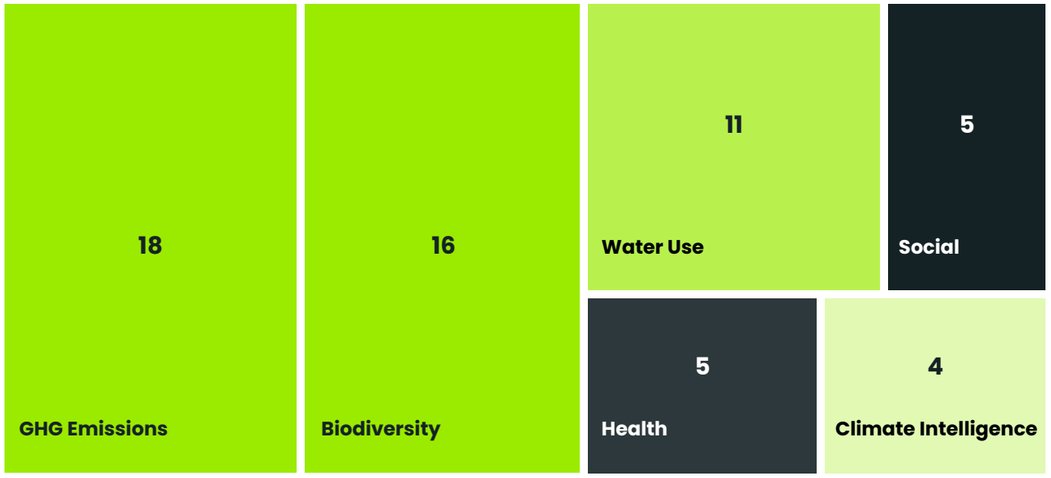
$$\textbf{Portfolio Company Impact Multiple on Investment (IMOI)} = \frac{\left(\text{€ Realized Impact at time of exit}\right) x\,\% + \left(\text{€ Discounted Cumulative Impact 10 years post exit}\right)(1-x)\,\%}{\text{€ Invested amount}} \times \text{Astanor ownership}$$

x = company impact maturity at time of exit

04 Impact KPIs Deep Dive

The following section is a deep dive into our six impact KPIs: GHG Emissions, Water Use, Biodiversity, Social, Health and Climate Intelligence. Each deep dive includes a description of our methodology and focus, as well as a case study of an Astanor portfolio company. Although each case study is focused on one specific KPI, most of our companies address more than one impact KPI.

Number of portfolio companies contributing to each impact KPI



Companies and Impact KPIs

	GHG Emissions	Biodiversity	Water Use	Social	Health	Climate Intelligence
Apeel	✓					
Aphea.Bio	✓	✓				
Calyxia	✓	✓	✓			
Cervest						✓
Current Foods		✓				
Demi				✓		
Galley Solutions	✓	✓	✓			
Garten					✓	
HowGood						✓
Hyris					✓	
Infarm	✓	✓	✓			
La Ruche Qui Dit Oui	✓			✓	✓	
MagrowTec	✓	✓	✓			
MicroHarvest	✓	✓				
MiiMOSA				✓		
Modern Meadow	✓	✓	✓			
Monarch Tractor	✓					✓
Notpla	✓	✓				
Plantible Foods	✓	✓	✓			
ProducePay				✓		
Smallhold	✓				✓	
Standing Ovation	✓	✓	✓			
Stockeld Dreamery	✓	✓	✓			
The Gut Stuff				✓	✓	
Umiami	✓	✓	✓			
v2food	✓	✓	✓			
Vivent						✓
Ynsect	✓	✓	✓			

✓ indicate portfolio company case studies can be found in impact KPIs Deep Dives.

Seed investments are not included in the table.

GHG Emissions

The agrifood system emits 18Gt of CO_2e on average per year.[13]

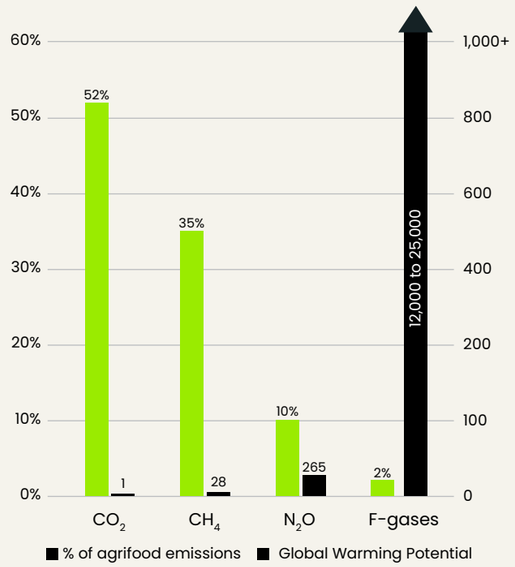
The agrifood system is responsible for one third of global anthropogenic GHG emissions.[14] While energy, transportation and construction may have garnered the most media attention in the global climate crisis, the agrifood industry has recently come under the public spotlight as one of the largest emitters of greenhouse gases.

Agrifood is also one of the sectors most directly vulnerable to climate change as food production is directly dependent on climate and water cycles. Transforming the agrifood system presents a twofold opportunity: reducing carbon emissions and increasing carbon sinks. Regenerative agriculture practices balance the carbon cycle and draw down the carbon in the atmosphere, increasing carbon storage in plants and soils – an integral part of the global roadmap to get to net-zero.[15]

GHG emissions occur across the entire agrifood value chain, from initial land use change to waste production. In order for agrifood to contribute to the Paris Agreement goal of limiting global warming to 1.5°C, significant changes need to be made to how we farm, how we eat and how we manage our soil, waste and forests to transform soils into natural carbon sinks.

While CO_2 is the primary contributor to climate change and the most widely recognized greenhouse gas, the agrifood sector emits other, more potent, greenhouse gases including methane, nitrous oxide and fluorinated gases, all of which are much stronger than CO_2.

Breakdown of agrifood GHG emissions



Global Warming Potential (GWP) measures the ability of a gas to trap heat in Earth's atmosphere. GWP allows the direct comparison of the global warming impacts of different gases and is essential to determining the most effective methods to combat climate change. The most commonly used metric considers the potential for the gas to warm the Earth over a 100-year period, as compared to CO_2 (employed as the reference with a GWP of 1).[16]

Breakdown of GHG emissions for the agrifood sector

	Food production	Land use and land use change	Supply chain	Waste
Contribution	40%	32%	21%	9%
Activity	Livestock and ruminants, rice cultivation and the application of fertilizers	Carbon losses from deforestation and degradation of organic soil	Processing, packaging, transportation and refrigeration	Water treatment and decomposition of organic matter in landfills
Primary GHGs emitted	CH_4 and N_2O	CO_2	CO_2 and F-Gases	CH_4

Source: Crippa et al. (2021) As per source data, numbers do not sum to 100 due to rounding.

Carbon dioxide – CO_2

CO_2 emissions from the agrifood sector stem primarily from deforestation and soil degradation, followed by agricultural production, food processing, packaging, transportation, consumption and waste.[17] In addition, deforestation driven by the agrifood industry alters the carbon cycle of forests, one of the planet's key carbon sinks.[18]

Methane – CH_4

The agrifood industry is responsible for 53% of global methane emissions, primarily through livestock, rice production and food waste. Methane has a strong GWP (28) and a short lifespan in the atmosphere (staying only 9 years on average), so reducing these emissions today is essential to limiting temperature increases in the short term.[19,20]

Nitrous oxide – N_2O

80% of global nitrous oxide emissions come from the application of fertilizers and livestock manure. While fertilizers have been key to enabling large-scale agrifood production capacity, overuse has led to severe environmental and social consequences.[21] Nitrous oxide harms the quality of the soil and the organisms that live in it and depletes the ozone layer that protects the planet from harmful ultraviolet rays.[22]

Fluorinated gases – F-gases

Refrigeration, which is essential to food safety and distribution of fresh produce, is responsible for the emission of fluorinated gases – ozone-depleting substances with the highest level of GWP.[23] The EU introduced targeted regulation to address F-gases in 2015, as emissions of F-gases in the EU doubled from 1990 to 2014 – in contrast to emissions of all other greenhouse gases, which were reduced.[24]

Our focus

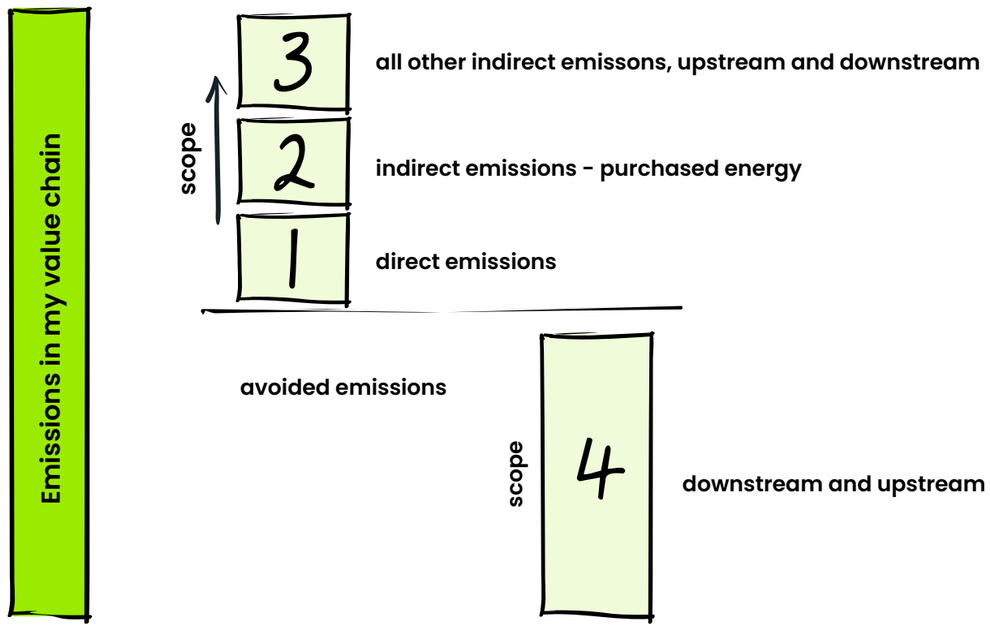
Today's climate-related accounting and ranking frameworks focus on the GHG emissions generated by a company in its activities and supply chain, *e.g.* the scopes 1, 2 and 3 from the GHG Protocol. These methods regard companies solely as sources of emissions, not sources of solutions. **At Astanor we actively invest in companies providing solutions that decarbonize the agrifood industry**. Strictly adhering to these reduction frameworks and considering only the companies' own emissions can mask the benefit of scaling low carbon solutions. Our focus lies instead on measuring the positive impact of our portfolio companies through avoided emissions ("scope 4").

Avoided emissions are achieved if a product or service performs the same function as the market standard with significantly lower GHG emissions. In general terms, the method of measuring avoided emissions is to compare the enabling solution with a baseline of the product it replaces.[25,26]

Although avoided emissions are our focus, we accompany our portfolio companies in both the measurement and reporting of their scopes 1, 2 and 3 according to the GHG Protocol. Our investees' company carbon footprints tend to be small today but will grow as their business scales (more employees, larger offices, increased production, etc.). This is why we guide them through this growth to ensure that their GHG intensity (emissions per FTE or sales) remains low or decreases.

> ***Through investing in solutions that actively reduce the carbon intensity of the agrifood system, Astanor aims to transform the sector from being one of the largest causes of climate change to one of the greatest remediations.***

Understanding carbon footprint



MONARCH

Case Study

Mission

Labor shortages, climate change and food safety concerns present a multitude of challenges for farmers. Monarch Tractor is committed to elevating farming practices to enable sustainable, efficient and economically viable solutions for today's farmers and the generations of farmers to come.

Solution

Monarch Tractor is developing novel tractors that are electric, autonomous and combine machine learning and data analysis to set a new standard in tractor technology capabilities and accelerate the future of sustainable and smart farming.

Impact

While innovations in fuel efficiency and electrification have taken over the automobile market, tractors have remained mostly unchanged and highly carbon intensive. On average, a diesel tractor produces roughly 14 times the GHG emissions of a passenger car each year. More than 537 $MtCO_2e$ could be reduced between today and 2050 with the adoption of zero-emissions on-farm machinery and equipment.[27] Monarch Tractor, with its first-to-market smart electric tractors, contributes to decarbonizing this key pillar of the agrifood industry.

Integrated sensors and cameras allow the Monarch tractor to continuously learn as it captures and interprets data in the fields, enhancing the farmer's decision-making capacity and input efficiency. These insights enable a much greater level of precision in farming, reducing the use of harmful herbicides and pesticides.

The smaller and lighter driver-optional tractors also have the potential to accelerate the transition towards regenerative farming. Both mechanical and biological alternatives to conventional chemicals require more hours of tractor operations per acre, which is a known obstacle to the adoption of regenerative practices. Monarch Tractor's solution enables a single operator to command multiple tractors, work continuously and apply inputs with greater accuracy, helping alleviate this barrier to entry.

> ***"Astanor encourages us to think beyond carbon emissions and take a full ecosystem approach to articulating the impact our technology can have. This helps us prioritize product features that will optimize farm outcomes across multiple dimensions, including input reduction and worker health and safety."***
>
> Praveen Penmetsa, CEO and Co-Founder at Monarch

Additional Impact KPIs:

Biodiversity

The health of the planet, and all of its systems on which humans depend, is inextricably linked to the balance of biodiversity in the natural world. Healthy ecosystems clean our water, purify our air, pollinate our crops, maintain our soil, regulate the climate and carbon cycles, recycle nutrients and provide us with food. **Biodiversity is indispensable to food security** and makes production systems and livelihoods more resilient to shocks and stresses.

Agriculture is the primary driver of biodiversity loss. It has contributed to the disruption of entire ecosystems through the exploitative use of sea and land resources including the depletion of soils with harmful practices and pollution. Activities linked to agrifood have accelerated the global rate of species extinction today, bringing it to a significantly higher rate than what was observed over the past 10 million years.[28,29]

The Planetary Boundaries represent the nine environmental limits within which humanity can safely operate. Surpassing a Planetary Boundary indicates that humanity has overused an essential resource, reaching a tipping point and consequently increasing the strain on the other boundaries.[30]

> ***Life on Earth depends on healthy ecosystems: plants in the ocean provide between 50% and 80% of the planet's oxygen and 78% of crop production relies on pollinators.***[31,32]

The Planetary Boundaries depict well the complexity of biodiversity as five of the nine boundaries are directly or indirectly related to biodiversity:

Biosphere integrity
The ever-increasing demand for water and natural resources leads to severe biodiversity loss and causes the damage and depreciation of entire ecosystems.

Land-system change
Land conversion for human use, mainly for agriculture, grazing and urban expansion, is one of the main drivers of biodiversity loss in forests, grasslands and wetlands.

Biogeochemical flows
The biogeochemical cycles of nitrogen (N) and phosphorus (K) have been radically changed by many industrial and agricultural processes. These elements are essential for plant growth, but their overapplication has led to nutrient saturation creating zones where life is no longer possible.

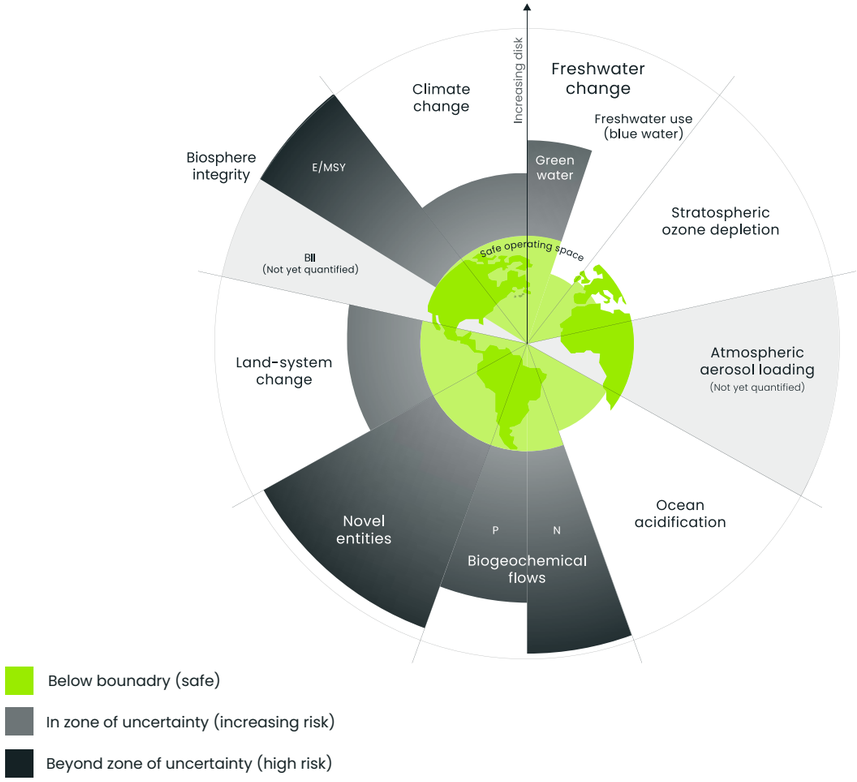
Ocean acidification
Oceans play a key role in the carbon cycle, acting as a carbon sink to capture excess CO_2 emissions. However, higher levels of CO_2 in the atmosphere increase the level of carbon being captured by the ocean, increasing the acidity of the ocean, compromising marine life and reducing the ocean's ability to mitigate climate change.

Novel entities
Novel entities are manufactured chemical entities created by human activities with mostly unknown effects on the Earth's ecosystems. These include plastics, pesticides, antibiotics and industrial chemicals. They have been introduced in the environment in such high levels that they have reduced and endangered marine, bird and mammal populations.

As depicted in the graph, the safe operating space for six of the nine Planetary Boundaries have already been exceeded and two of them were transgressed during H1 2022 (novel entities and water). There are more than 350,000 novel entities in existence today and based on their use, mass and Earth system effects, it was concluded in January 2022 that the Planetary Boundary for novel entities has been crossed.[33] Agrifood tech solutions that enable the reduction of novel entities such as pesticides, fertilizers and plastics are essential to bring the Earth back within this Planetary Boundary. The Water Boundary, surpassed in April 2022, is further detailed in the next section.

> ***Novel Entities: The total mass of plastics on the planet is now over twice the mass of all living mammals and roughly 80% of all plastics ever produced remain in the environment.***

While several of the Planetary Boundaries affecting biodiversity have been surpassed, the transformation of the agrifood industry can be part of the solution to reverse this trend. Solutions such as alternatives to soil-based agriculture through vertical farming, reduced chemical fertilizer and pesticide use enabled by regenerative agriculture or the replacement of plastics with sustainable alternatives are key to this transformation.



Source: Stockholm Resilience Centre, J. Lokrantz/Azote based on Steffen et al. 2015.

Our focus

It is at the core of Astanor's mission to support companies that have a positive impact on the planet's soils and oceans. The Biodiversity KPI cannot be captured by one single metric as is the case for GHG Emissions. Instead, the impact of our companies on Biodiversity is approached through a range of KPIs which, together, quantify the positive impact of a business's products and services on global biodiversity. We measure the Biodiversity KPI through metrics such as reduced land use, quantity of wild species spared, reduced use of pesticides and fertilizers, quantity of plastics avoided and reduced eutrophication and acidification.

Calyxia
beyond chemistry®

Case Study

Mission

Calyxia is on a mission to replace outdated, water and soil-polluting microencapsulation technologies to tackle key environmental challenges such as the accumulation of microplastics in soils, oceans, rivers and lakes, which jeopardize soil and aquatic ecosystems and the conservation of biodiversity.

Solution

Calyxia has developed a unique technology and sustainable manufacturing process to produce the world's first readily biodegradable, customizable and advanced performance microcapsule products that directly combat global microplastic pollution in the agriculture, consumer care and materials sectors.

Impact

Microplastics (plastics of less than 5 mm) are a global environmental pollutant that pose a threat to biodiversity, ecosystem functions, human health and food security, because of their difficulty to be removed from the environment.[35] Today, experts estimate there are 24 trillion tons of microplastics in our oceans and rivers.[36] More specifically, they are present in over 210 commercial species of fish and in over 90% of all tap and bottled water worldwide.[37] Recent findings, however, estimate that these numbers might be several orders of magnitude higher.[38] Furthermore, through the use of sewage sludge as a fertilizer and the use of outdated microcapsules for crop protection, microplastics have drastically polluted our agricultural soils, destroying ecosystems, biodiversity and soil fertility, posing a threat to global food production. While solutions are emerging, ocean plastic pollution is expected to quadruple by 2050.[39]

Thanks to a breakthrough microencapsulation technology, Calyxia's solution aims to revert the projected trends of microplastic increase in the upcoming decades.[40]

Their innovation enables the delivery of active ingredients, in use cases such as the production of biocontrol technologies for crop protection or detergents with fragrances, that otherwise would not be achievable without the use of microplastics.

In addition, Calyxia's microcapsules are creating a paradigm shift in the sunlight and wear resistant performance of plastic materials used in renewable energy generation, electronics, sporting goods and automotive and transportation technologies. Calyxia's technology can prolong the lifespan of these products by over 10 times, dramatically reducing the generation of microplastics produced by light and wear degradation of plastic materials.

The result of the widespread use of Calyxia products in agriculture, consumer care and materials will eliminate more than 1 million tons of additional microplastic pollution to our oceans and soils in the next 7 years. This is expected to have a significant impact on reducing the destruction of the aquatic and soil ecosystems and the preservation of soil fertility.

> ***Astanor is a world-renowned firm, with an unparalleled network and expertise in high-impact green innovations. As an investor and board member, Astanor is accelerating our international expansion, global product deployment and supporting on many impact-driven initiatives. Together, we are playing a pivotal role on the war against microplastic pollution.***
>
> Jamie Walters, CEO at Calyxia

Additional Impact KPIs:

Water Use

Agriculture is the largest consumer of freshwater globally, accounting for 70% of freshwater use. The system is drastically inefficient, with 60% of this water being wasted due to leaky irrigation systems, inefficient application methods and the production of water-thirsty crops in dry environments.[41]

If current patterns of irrigation, urbanization, pollution, groundwater depletion and deforestation continue, it is estimated that **half of the world population could be living in water-stressed areas by 2025**.[43] In addition, climate change will lead to more severe and frequent extreme weather events like droughts, storms and floods, which will have devastating impacts on food production globally.

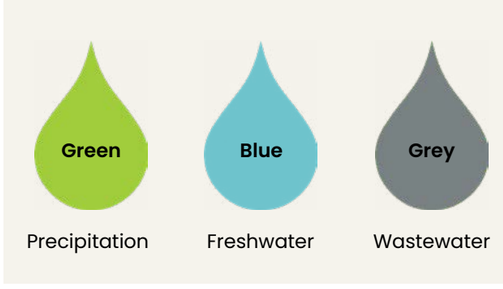
Water is vital for all life, and freshwater as a resource has been undervalued and overexploited for generations. However, water stress indicators clearly demonstrate that this status quo is under threat. Water stress is defined by a situation in which water demand exceeds water supply. It is measured through the water stress ratio: the ratio of total withdrawn freshwater to annual renewable freshwater supply. This indicator is deteriorating globally due to changing rain patterns (altered natural supply) and overdraft from depleted aquifers (excessive demand). High water stress leads to many undesirable consequences, such as hampering economic and social development, all of which tends to disproportionately affect the most vulnerable populations.[44] In some regions, water stress is already critical.

A water stress level below 20% is considered low to moderate stress while above 80% is considered extremely high stress. By 2040, water stress levels are expected to reach between 40% and 80% for California and over 80% for Spain.[45,46] Worrying projections for such paramount agricultural regions depict how water supply will compromise food supplies with reverberating impacts across entire supply chains: Spain is the largest producer of fruit and vegetables in the European Union, contributing to 25% of the total production in 2022, and California grows over a third of US vegetables and two-thirds of the country's fruits and nuts.[47,48]

Understanding water footprint

Blue water refers to freshwater in lakes, rivers, reservoirs and groundwater stores. Green water is the precipitation that adds to soil moisture and does not run off, eventually evaporating or transpiring. Grey water refers to the wastewater from, for example, sinks, showers and dishwashers.[49]

In April 2022, the Planetary Boundary for water was reassessed to include green water in addition to blue water. This led water to become the sixth Planetary Boundary to be transgressed, meaning that the terrestrial precipitation, evaporation and soil moisture that sustain the agrifood system are now compromised both in the short and long term.[50]



While humans require only 1 or 2 liters of drinking water per day, it takes about 3,000 liters to produce the daily food needs of an average person.[42]

Our focus

Increasing the efficiency of water use in the agrifood industry, especially in water-stressed areas, is necessary to ensure the long-term availability of freshwater. At Astanor, we look for solutions that either increase water use efficiency or reduce water pollution and water stress, thereby ensuring that there is enough reliable, clean water for the health and livelihoods of people and natural environments.

To understand the impact of our portfolio companies, we measure how their solutions contribute to a reduction in water use. This translates into the reduction of freshwater use (*e.g.* innovative methods of production such as vertical farming, replacement of animal proteins with plant-based ones) or the reduction in water runoff (*e.g.* precision irrigation).

v2food™

Case Study

Mission

Animal agriculture is a major cause of greenhouse gas emissions, water use, land degradation and biodiversity loss worldwide. v2food is committed to the creation of a "version 2" of meat that is delicious, sustainable and nutritious at the scale to feed the projected 10 billion population by 2050 without compromising the planet.

Solution

v2food has created a range of meat alternatives (burgers, mince, sausages, schnitzels, tenders and ready meals) that are delicious, affordable, nutritious and highly sustainable. Depending on the country of distribution, v2food's products save around 90% of carbon emissions, land and water use compared to beef alternatives.

Impact

Livestock production has significant impacts both on water use and water pollution. It is estimated that about 41% of total agricultural water use, or 4,387 km^3 of blue and green water (6% and 94% respectively), is dedicated to producing feed for livestock.[51] The disposal of cattle production waste (manure) without proper treatment leads to the pollution of both surface water and groundwater.[52] The resource intensity required for beef production is far from proportional to its contribution to the global calorie supply (18%) and protein supply (37%).[53]

v2food is steering alternative meat towards sustainability, prioritizing taste and increasing positive impacts for human health through products that are high in fiber and low in unsaturated fats and additives. With their plant-based meat products, they are on track to meet global protein demand without compromising water resources. Their products use only 16L of water to produce 1kg of plant-based meat.

Although v2food's solution already has a very sustainable environmental profile when compared to conventional meat, the team is continuously improving and optimizing the company's entire value chain driven by inputs provided by an LCA. They have partnered with Loam Bio, an Australian carbon farming company to drive carbon sequestration trials on local soy and canola crops. Such practices will lead to healthier soil and will increase its ability to retain water, an improvement that will reduce both soil erosion and nutrient runoff into coral reefs.[54] Today, their solution produces 2.2kg of CO_2 per kg, and v2food is committed to reducing these emissions even further.

> ***Astanor has opened up their network in Europe to us with some of these leads having a direct benefit to our business and our technology development. Their commitment to positively impacting the environment is clear and refreshing, and their contribution at board meetings has been vital to creating an important balance between mission driven and business driven voices."***
>
> Nick Hazell, CEO at v2food

Additional Impact KPIs:

Social

Today's agrifood system has created a double social burden felt on both ends of the food system, from farmers to consumers. While farmers bear the social, economic and financial pressures of an industry that has grown exponentially without regard for their livelihood, consumers' socioeconomic status systemically defines their access to and education about healthy food choices.

Farmers

While farmers are at the root of the entire agrifood system, it does little to secure their livelihoods. Farming today requires a broad range of skills with farmers required to excel in topics such as finance, marketing, communication or human resources in addition to caring for crops and livestock. **Farmers are facing structural issues** including unreliable payments and access to credit, inputs, storage, labor and transport. Life as a farmer is inherently an independent professional life, increasing risks of social isolation, mental health issues and suicide due to debt exposure, downward pricing spirals, as well as changing climatic conditions.[55]

In spite of their essential role to societies worldwide, 78% of the world's poorest people are farmers. Even in the European Union, the average family farm's annual income is nearly 60% lower than that of non-farming families. These low incomes are also often exacerbated by structural difficulties in accessing financing

New agricultural technologies have the potential to enhance farmer livelihoods. It is key for farmers to understand the latest advancements that can ease their tasks and long hours and improve decision making across their operations, including agricultural inputs, production, crop management and sales. New technologies can provide adapted financing mechanisms better tailored to support their business. These technologies must also be accompanied by solutions that shorten the supply chain (by connecting farmers with consumers and buyers), ensure fair compensation for farmers and help consumers and chefs gain access to and education about healthier, fresher and sustainably grown products.

Investment in farmer livelihoods is important to ensure the generational transition and support the root of the agrifood value chain. Recent studies also show that adopting climate-smart agricultural practices can improve farmer livelihoods in the EU region by up to €9.3 billion annually by 2030.[57] Farmers are at the forefront of climate change and will be the first to suffer the consequences of heatwaves, droughts, storms and fires. There is an urgent need to support the workers that are feeding the world.

Consumers

Socioeconomic status has been statistically proven to determine healthy food choices and access to healthy food. Many studies point to the direct link between parental socioeconomic status and soft drinks and sweet consumption.[58,59] **Education is key in order to achieve the universal adoption of healthy diets** that will also mitigate the degradation of the environment.[60] Without targeted nutritional education, consumers are disarmed in front of aggressive industrial marketing campaigns leading to increased consumption of and addiction to junk foods.[61]

In addition to the paramount need for education, a third of the world's population does not have access to safe, nutritious and sufficient food year-round. Therefore, improving access to healthy food and combatting food deserts are key to enhancing the livelihoods of not only farmers but of every individual.[62]

Consumers also have the ability to play a role in ensuring fair compensation of farmers by choosing suppliers that shorten the value chain, build more direct relationships with farmers and grow the demand for products with positive environmental and health effects.[64]

> ***Healthy diets are out of reach for 3 billion people worldwide.***[63]

> ***Food and agriculture directly account for more than one-fifth of jobs globally. Climate change continues to alter growing conditions, increasingly threatening the livelihoods of farmers and compromising food security worldwide.***[56]

Our focus

Astanor's focus on the Social KPI is placed both on farmers and consumers. We invest in solutions that connect farmers directly to buyers and consumers, provide innovative financing mechanisms to empower farmers, provide education on sustainable and healthy diets to all consumers and increase access to healthy food.

To quantify the impact of these solutions, we measure how they contribute to the financial stability of producers through an increase in farmer remuneration and the number of farmers receiving access to transaction security and financing. For those solutions whose focus is to increase awareness of healthier and affordable diets, their impact is quantified by the number of consumers educated and number of consumers reached.

PRODUCEPAY

Case Study

Mission

ProducePay aims to build a sustainable, thriving and inclusive fresh produce supply chain by empowering growers from seed to sale, rewarding growers' social and environmental performance and supporting farmer livelihoods through strengthening and securing the relationships and trust between growers, shippers, retailers and consumers of fresh produce.

Solution

ProducePay operates a financing and market access platform for farmers and buyers to increase transparency and reduce risk. Their platform addresses the barriers of access to capital for growers while its matchmaking service connects growers and buyers to build long-term transparent relationships. All parties transacting via ProducePay benefit from insights on pricing, sustainability, import status and sales analysis.

Impact

ProducePay is addressing the social and economic issues within the fresh produce supply chain, a challenging area within the agrifood industry. These seasonal, perishable and fragile products are dependent on complex supply chains and purchase agreements. Inefficiencies within this system cause financial insecurity for farmers, in addition to recurrent issues of food waste and quality loss. ProducePay's transparent and farmer-first network improves farmers' financial resiliency in a context where 87% of their produce gets exported worldwide and is susceptible to shocks in logistics and delays due to customs formalities.[65]

The agrifood system today requires growers to maintain very thin margins and expose themselves to high levels of risk without a guaranteed flow of capital. ProducePay's innovative financing products ensure that farmers have the pre-season liquidity to finance all needed inputs without using their land as collateral and allowing growers to collect up to 96% of their shipment's value on the day of sale.

The global fresh produce market is notoriously opaque, with growers having very little market information or direct relationships with end buyers. ProducePay's matchmaking platform aims to improve trust and provide full pricing transparency by providing buyers with access to a verified network of growers while providing growers with a fully secured transaction and simplified access to buyers.

The company is now also starting to leverage its vast network of growers to enable the development of sustainable practices at the core of the value chain. ProducePay works directly with growers to foster and reward social and environmental performance and to bring education and access to carbon credit markets.

> ***Since ProducePay's founding, we knew that sustainability had to be part of our DNA, which is why we started a company with the objective of reducing the food and economic waste along the entire produce supply chain. For us, sustainability goes beyond compliance. We are working to create an inclusive supply chain, promote sustainable agriculture, and drive leadership and shared responsibility across the industry."***
>
> Pablo Borquez Schwarzbeck, CEO & Founder at ProducePay

Health

The current agrifood system suffers from a double burden of malnutrition. As of 2019, 26% of the world's population experienced hunger or did not have access to sufficient and nutritious food, while 39% was overweight or obese.[66,67] Addressing this paradox is not about producing more food – the world's farmers already produce enough calories to feed 1.5 times the global population.[68] Instead, the key lies in ensuring that food is affordable, accessible, evenly distributed, healthy and nutritious.

The agrifood industry needs to transition towards nutrition security instead of just food (and thus calorie) security. The food system has prioritized quantity over quality over the past 70 years, optimizing the entire supply chain for the production of cheap calories. As a result, **diets on a global scale are severely unbalanced**, underdelivering amino acids, nutrients and fiber and leading to a steep increase of food-related health conditions such as high cholesterol, diabetes, high blood pressure and heart disease.[69]

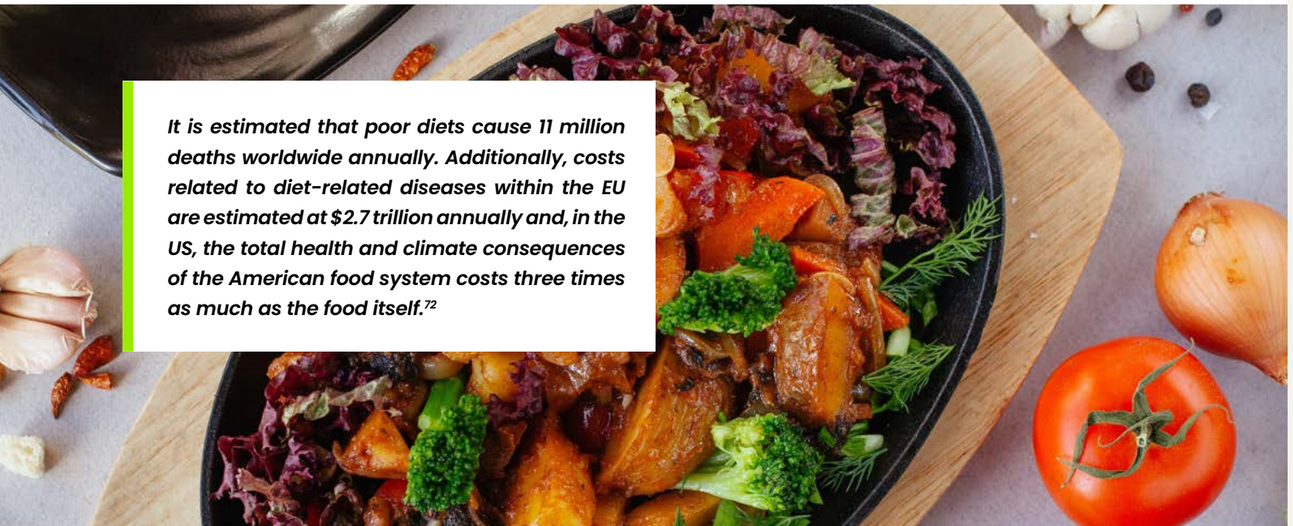
While ensuring a reliable supply of healthy food is a first and essential step, making this food attractive for consumers is key to ensuring a transition that stands the test of time. Chefs, restaurants and large-scale foodservice operators are essential actors in setting new sustainable meal trends.

Mounting evidence shows that many fruits, vegetables and grains grown today are less nutritious than those grown five decades ago. Studies show that key nutrient levels including protein, calcium, phosphorus, iron, riboflavin and vitamin C have significantly declined. As a result, even seemingly healthy dietary choices do not deliver the expected nutritional value.[70]

Shifting from conventional farming methods to regenerative practices can restore soil health and reverse these nutrient declines, resulting in the production of nutritious food with the components essential to combat chronic disease and meet dietary requirements.[71]

Our focus

Health improvement is a difficult KPI to measure. Surveys are often used to assess the impact of a product or treatment on consumers. However, surveys that cover the innovative solutions in our scope of investment rarely reach the critical mass required for accurate data collection. To measure the Health KPI, we assess the impact created based on the number of people reached by a specific solution with indicators such as the number of healthy products sold or the number of consumers that benefit from a healthier diet.



It is estimated that poor diets cause 11 million deaths worldwide annually. Additionally, costs related to diet-related diseases within the EU are estimated at $2.7 trillion annually and, in the US, the total health and climate consequences of the American food system costs three times as much as the food itself.[72]

the gut stuff

Case Study

Mission

The Gut Stuff is on a mission to empower gut health in everyone. The Gut Stuff provides a full healthy microbiome platform and leverages its access to leading scientists in the sector to incorporate the newest learnings about gut care.

Solution

The Gut Stuff is an all-encompassing platform that provides access to education, products and services related to their gut care and health, a key piece of human wellbeing that is poorly understood.

Impact

Humans consume an average of 60 tons of food in their lifetime along with an abundance of microorganisms from the environment that can either improve or degrade gut integrity.[73] Each year, 15 million people between the ages of 30 and 69 die from noncommunicable diseases (NCDs), accounting for 26% of all deaths globally.[74] Chronic conditions are one of the largest causes of death and disability, yet they are largely preventable through the modification of lifestyle factors such as diet and exercise.

To challenge the lack of education about the importance of gut health, The Gut Stuff aims to make microbiome-positive foods and diet available and understandable to a broad set of consumers. Through their products, B2B services, books and communication operations, they are removing taboos around essential health processes such as digestion. The brand was initially built as a trusted source of support and information for consumers - amassing 118k Instagram followers, 18k newsletter subscribers and 20k monthly organic website users. They have built significant brand fame with an impressive media reach (100+ articles this year). They are also launching a new TV show with Universal NBC this year.

They have created an ecosystem to encourage daily gut habits with their first product launches of diaries, fermenting kits, tools and resources for everyone to implement the simple lifestyle changes for a healthy gut. They also promote a healthier diet by giving fiber the importance it lacks in meals, along with a fiber bar to bring gut health into the category and convenience arena.

The company is democratizing and raising awareness for gut health and the importance of diet and wellbeing, aiming to improve physical and mental health among the population. The Gut Stuff aims to build a world where everyone knows their gut and understands its importance in overall health.

Certified B Corporation

Awarded B Corp "Best for the World" for governance in 2022

"Astanor is incredibly supportive at making sure we fulfill our mission and create social impact - they've been with us for our whole B Corp journey and continue to push us to think of new ways to unlock, measure and scale our impact potential."

Lisa Macfarlane, Co-Founder at The Gut Stuff

Additional Impact KPIs:

Climate Intelligence

Data is essential to making sustainability goals, priorities and frameworks operational at a global, local and individual company level. As illustrated through the first five Impact KPIs, high-quality data and intelligence are critical for accurate impact measurement.

The Climate Intelligence KPI is designed for technologies that enable the acceleration of the agrifood transition. **Climate Intelligence supports other agrifood companies by providing intelligence that empowers them to make more informed decisions** and enable greater impact on both the people and the planet. These enablers play a critical role in strengthening climate and agrifood resilience.

Access to high-quality data is essential for companies to understand their impact and reach the sustainability goals that have been set for the upcoming decades. Yet, today, the majority of sustainability issues lack reliable and comparable data to make informed decisions to resolve them. For example, it is estimated that 86% of Earth's species are still unknown, posing an enormous challenge when trying to understand the consequences of biodiversity loss.[75] Data is therefore essential to understand current baselines, define metrics and measure progress.

Data is also essential to understanding how climate forecasts might affect a specific company, sector, region, type of soil or crop. With data, adaptation and mitigation solutions can be developed, having real positive impacts and empowering local actors.

Our focus

Data collection enables the achievement of impact at scale by providing the tools to assess a baseline, make better-informed decisions and quantify the benefits of impact investments. Through investing in solutions that transform data into climate intelligence, Astanor's investees empower every actor in the agrifood system, from farmers to policy makers to mission-driven agrifood tech companies and beyond, to become better equipped for climate mitigation and adaptation. This KPI gets measured through the number of data points collected and the number of users who benefit from science-based data-driven solutions.

Case Study

Mission

Vivent's mission is to optimize crop production through increasing the efficacy of agricultural inputs, plant growth management and crop problem diagnosis prior to the appearance of visual symptoms of plant disease and stress.

Solution

Vivent's solution translates the electrophysiological signals of plants into information about crop stressors to derive real-time and actionable insights that improve crop growth management for growers.

Impact

Losses in food crop production, both through lower yield and pre-harvest waste, are caused by lack of water, poor nutrient status or plant disease. Data-driven decision making for crop management is essential to improve food production yields and quality to feed an expected population of 10 billion people by 2050.[76] This food must also be grown using fewer and better targeted applications of environmentally preferable crop protection agents and fertilizers. This will also have a positive impact on biological diversity.

Vivent's hardware, software and algorithms allow for an earlier detection and a more tailored response to crop health needs, thus reducing resources required to produce food and protecting against crop disease and loss. Counting on real-time information about crops and the diseases that threaten them is key to more efficient management and a more resilient agrifood system. Vivent's pioneering technology system provides early warnings of stress before visual symptoms appear on the plant for more than 40% of the global top 20 food crops, including maize, wheat, potatoes and soybeans.

This data enables growers to increase yields and reduce costs through replacing harsh chemical solutions with biological treatments applied only in the threatened area or adjusting irrigation. As their system allows for the optimization of plant health, the monitored crops develop a higher nutritional and flavor profile.

Greenhouse growers using Vivent's sensors have reported up to 10% increases in yields of tomatoes using the same amount of inputs. With the data they receive from Vivent, they are better able to control environmental conditions and decrease the number of hours during which their plants are under stress and unproductive. In addition, some of these growers are using the data to optimize the temperature in the greenhouse, reducing their energy use and carbon footprint.

> ***We really appreciate Astanor's focus on impact, as a startup it is daunting to know where to start with the myriad of metrics, labels, certification schemes and consultants available. Astanor has helped us to navigate this effectively.***
>
> *Marina Martin Curran, Sustainability Manager at Vivent*

Certified B Corporation

Awarded B Corp "Best for the World" for governance in 2022

05 ESG Journey

Sustainability Partner

While impact is Astanor's driving force, ESG is an essential element to help our investees scale and ensure their future success. As we invest in early-stage companies, it is both common and expected for them not to have an ESG framework at the time of investment. Hence, we actively support our companies in building their ESG capabilities over the course of our collaboration.

Over the years, we have developed a full shelf of solutions to support our investees on both impact and ESG. **At the time of investment, we assess each company's ESG baseline and co-define a constructive ESG roadmap**. We then share a broad range of ESG tools such as templates for ESG policies, company carbon footprint measurement tools, LCA and support in obtaining B Corp certification to help achieve essential milestones for ESG development.

Astanor coaches each portfolio company and connects them with service providers and advisors to develop best practices and in-house expertise. Our experience working with companies across our portfolio helps us guide each investee to focus their efforts depending on their stage of development and to provide examples of best practices with all stakeholders such as suppliers, customers, co-investors and employees.

Astanor ESG framework

Astanor collects ESG data from portfolio companies at the time of investment and on an annual basis. This data enables us to set the baseline, track ESG improvement and define next steps in each individual roadmap. Our ESG questionnaire, which has been tested, externally reviewed by ESG experts and refined for three years, is tailor-made to fit the business needs of growing start-ups. The high level of engagement from our portfolio companies demonstrates the value and suitability of this exercise.

Through data collection and collaboration with our portfolio companies, we have identified key ESG trends and minimum requirements for our portfolio companies. We have set reliable benchmarks for ESG performance per funding series and defined ESG milestones to reach before each new round of funding.

	Series A	Series B	Series C and beyond
E	• Life Cycle Assessment • Exposure to raw material issues	• Corporate carbon footprint • Environmental policy	• Task Force on Climate-Related Financial Disclosures (TCFD)
S	• Employee incentive plan • Health & Safety policy	• Diversity and inclusion policy	• Parental policy • Philanthropic intiatives
G	• Sustainability manager • B Corp certification	• Sustainable supply chain policy • Grow diversity at the board and management levels	• Sustainability manager on the board • Alignment to global standards

Regulation Landscape

The **European Green Deal** was launched in 2020 to outline the EU's plan to be climate-neutral by 2050. In addition, the EU has established a set of frameworks and regulations to finance its sustainable growth strategy, prevent greenwashing and help investors make greener choices.

The **EU Taxonomy** is a green classification system that translates the EU's climate and environmental objectives into criteria for specific economic activities for investment purposes. It is the fundamental cornerstone of a suite of regulations launched by the EU to improve and standardize sustainability reporting, in particular the **Sustainable Finance Disclosure Regulation** (SFDR) and the upcoming Corporate Sustainability Reporting Directive (CSRD).

The SFDR aims to provide transparency in sustainable investments and sustainability risks disclosures to investors with a comprehensive reporting framework for financial products and financial entities. As an impact fund manager, we were already ahead in integrating sustainability considerations in our investment decision-making and data collection process before SFDR reporting came into effect. All of Astanor's current and future funds are classified as ***"dark green"* Article 9 funds**, which means that they have sustainable investment as their core objective.

While these new regulations are pushing the industry in the right direction, some clarifications are still expected to allow for a harmonized understanding for all market participants, allowing a fair and transparent comparison of financial products among fund managers. Despite the further need for clarification, we have already implemented the relevant data point collection in 2022 to align with the upcoming deadlines. This has allowed us to gain several valuable insights both for us and our portfolio companies.

There is an urgent need for standardization

Over the last few years, due to regulation and industry-specific needs from different parties, there is growing demand from investors and all stakeholders to collect ESG data from portfolio companies. As there is currently no standard framework on non-financial data, portfolio companies are under great pressure to answer multiple questionnaires and requests. The lack of uniformity and standardization across stakeholder requests, presents a challenge for companies as they have limited bandwidth and yet find themselves required to repeatedly answer the same questions for each stakeholder under a different format.

Having tested our questionnaire from Series Seed to Series E companies and refined it over the last three years, it has now become a very complete and suitable questionnaire for VC targets. We are encouraging our companies to share the Astanor questionnaire with all of their stakeholders.

06 About Us

Our Values

At Astanor, we believe in the future of an agrifood system that provides affordable nutrients for 10 billion people, preserves and regenerates natural resources, actively contributes to decarbonization and protects land and ocean biodiversity. Our holistic approach to investment is reflected in our internal and external ecosystem connected by the same mission: to transform the agrifood industry from one of the greatest causes of environmental and social harm to one of the greatest remediations.

Our advisors are industry leaders – chefs, scientists, policy makers, educators, coaches and farmers – who are committed to helping our portfolio companies grow to transform the agrifood system through technology, entrepreneurship and unwavering commitment to impact.

Impact is at the core of who we are at Astanor. The "Astanor Impact Team" is the whole team. Each team member has the responsibility and the commitment to drive us towards our mission of transforming the agrifood industry. **Astanor's long-term incentive program is dependent upon the impact performance of our funds**. If we fail to deliver on our impact creation mission, up to 30% of the team's carried interest will be distributed to NGOs and charities selected by Astanor, a process overseen by the fund's Advisory Committee. If we meet our impact creation goals, 1% of the carried interest will be distributed.

Our values guide us as investors and as individuals, and they reflect how we lead by example among our stakeholders. They allow us to attract diverse mission-driven entrepreneurs who will themselves build long-lasting businesses that foster diversity, equity and inclusivity.

	Integrity	Diversity, Equity & Inclusion	Sustainability
	We walk the talk and lead by example.	**We foster an environment with a strong sense of belonging.**	**We embrace sustainability from investments to individual actions.**
What this means	We understand that trust is built upon clarity, reliability, honesty and a high standard of both personal and professional behavior.	We are committed to providing a work environment free of any kind of direct or indirect discrimination.	We encourage the sustainable use of resources and responsible consumption for staff and portfolio companies.
What we do	Our sustainability values are integrated into our bylaws so that our sustainability focus continues to be our main driver as we grow.	Astanor has an internal Diversity, Equity and Inclusion (DEI) and Parental Leave policies. Externally, we engage with and help entrepreneurs and the VC community to support DEI.	Internally, we have sustainable purchasing and mobility policies. Externally, we engage our portfolio companies and extended community into a change-making behavior.

Our Philanthropic Action

Astanor supports selected NGOs that are working to transform the agrifood industry by creating a more just, nutritious and equitable food system for all. We are committed to donating 1% of our carried interest to these associations. As an impact donor, we bring support and guidance, in addition to capital, to the NGOs and charities we work with. Through this collaboration, we will support these organizations in their impact measurement process and guide them to further scale their impact.

In 2022, we launched our donation program with two organizations, **Swayam Shikdan Prayog** (India) and **Vivons en Forme** (France). By starting with these two organizations, we will work to define our role as an impact donor while learning and refining our approach to build a robust program able to donate larger amounts and target more associations when the carried interest starts to be distributed.

In this first phase of our donation program, we have chosen to support two organizations that are tackling challenges in the agrifood industry that technology alone cannot solve. The work done by these organizations addresses UN SDG 1 No Poverty, SDG 4 Quality Education and SDG 5 Gender Equality. We have partnered with these organizations to build an ongoing collaboration as Astanor continues to grow.

SSP SWAYAM SHIKSHAN PRAYOG
Margin to Mainstream

Swayam Shikshan Prayog is an Indian non-profit organization focused on empowering women in agriculture.

Through their Climate Resilience Farming model, they reposition women as farmers and bearers of the knowledge, enabling them to take informed decisions about what to grow, what to consume and how much to sell and where. Doing so enhances food nutrition, income and water security.

In the last 3 years, SSP has had an impact on the lives of 41,000 women farmers and on 30,000 acres under land bio farming management, with an increased yield of 25% on average.

VIF Vivons en forme

Vivons en Forme is a French non-profit organization founded in 1991 that focuses on promoting a healthy lifestyle from an early age.

Their methodology combines social marketing with collective impact to change habits and make health a priority that is appealing and friendly, involving individuals, families, schools, and villages across France.

Today, VIF works with over 250 cities in France and reaches over 560,000 people. One of its programs improved weight status in half of the overweight and obese children in primary education.[77]

Our Commitments and Partnerships

> ***Since we launched Astanor five years ago, we have continuously ensured that the right processes and practices are in place. We believe in the relevance of the B Lab standards, both for our portfolio companies and within our organization. To this end, we strongly encourage our portfolio companies to become B Corp early on and submitted our own application in April 2022.***

Astanor plays an active role in responsible investing organizations and working groups to help strengthen and facilitate the adoption of impact investing.

PRI Principles for Responsible Investment

Astanor is a signatory of the UN PRI, the world's leading proponent of responsible investment. Founded in 2005, the international organization works to promote the incorporation of ESG into investment decision-making.

Operating Principles for Impact Management

Astanor is a signatory of the Impact Principles, a framework for investors to assess the implementation of impact management systems, ensuring that impact considerations are integrated throughout the investment lifecycle.

INVEST EUROPE

Astanor is a member of Invest Europe, the world's largest association of private capital providers, where we sit at the Responsible Investment Roundtable, host webinars and collaborate on ESG Projects.

Finance for Biodiversity Pledge

Astanor is signatory of the Finance for Biodiversity Pledge and member of the Foundation, a group of 98 financial institutions calling for and committing to ambitious action on biodiversity and reverse nature loss in this decade.

ESG _VC

Astanor is a founding member of ESG_VC, an initiative by the venture capital industry to address urgent social, environmental, and economic challenges that are increasingly impacting early-stage businesses.

GATA GLOBAL AGRIFOOD TECH ALLIANCE

Astanor is a founding member of the Global Agrifood Tech Alliance (GATAlliance), an alliance to build partnerships between impact-driven agrifood companies and investors, with the aim of transforming food systems through innovation and technological solutions.

Our Carbon Footprint

In anticipation of the upcoming EU SFDR directive which will require financial institutions to report on various sustainability data, we completed our first carbon footprint exercise in 2021 and supported our portfolio companies to conduct the same assessment. For most companies, this was the first time they completed this exercise.

Scope 1	Scope 2	Scope 3
Emissions that originate from direct operations and from stationary combustion of fossil fuels.	Emissions resulting from the purchase of electricity, steam, heat and cooling.	All other indirect emissions across the value chain, both upstream and downstream.
This scope was null for Astanor as we do not own company vehicles, offices or other sources of in-house combustion.	This scope was null as Astanor offices are powered entirely by renewable energy. Life cycle emissions related to the production of renewable energy will be accounted for in scope 3.	This first year we did a partial assessment and focused on the emissions due to our purchases, business travels and the scope 1, 2 and partial scope 3 of our investments (% ownership based).

We gained several key learnings from this complex exercise that provided insights both to us as an investor and to our portfolio companies. In this first footprint calculation process, we encountered some significant challenges in data quality management which hindered our ability to set a relevant baseline that we can share today. For this reason, we are implementing improvements based on the key learnings below:

- In both cases, the majority of emissions are within scope 3 which therefore makes it the key scope to focus on to understand our footprint. However, the inherent complexity of understanding the upstream and downstream emissions of the entire value chain makes it the most difficult to calculate.
- Data identification, collection and quality assessment is a key challenge in this exercise. Maintaining high quality data requires a high level of commitment from a range of stakeholders with varying data inputs. The right processes must be established to identify which data points to collect as well as their sources and to collect the data while limiting quality loss. This is particularly challenging for fast-growing companies.
- Although it is key to onboard our companies early into the carbon footprint journey, the timing of engagement, quality of the data required – sector, monetary or physical data - and gains from the exercise are dependent on the stage of development of each portfolio company.

Astanor's scope 3 is mainly composed of our financed emissions – scope 3 category 15 of the GHG protocol. Financed emissions are the indirect GHG emissions attributable to financial institutions due to their involvement in providing capital or financing to the original emitter. We calculate this using the equity approach, in which an organization accounts for GHG emissions from investments according to its ownership percentage in the portfolio company. The **Partnership for Carbon Accounting Financials** (PCAF) standard, which aims to bring more consistency in the financed emissions calculations as well as more transparency of the data quality, provided valuable guidance.

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ASTANOR

Where tech meets nature

The agrifood industry is one of the leading causes of social and environmental harm.

We are transforming it into the greatest regenerative solution.