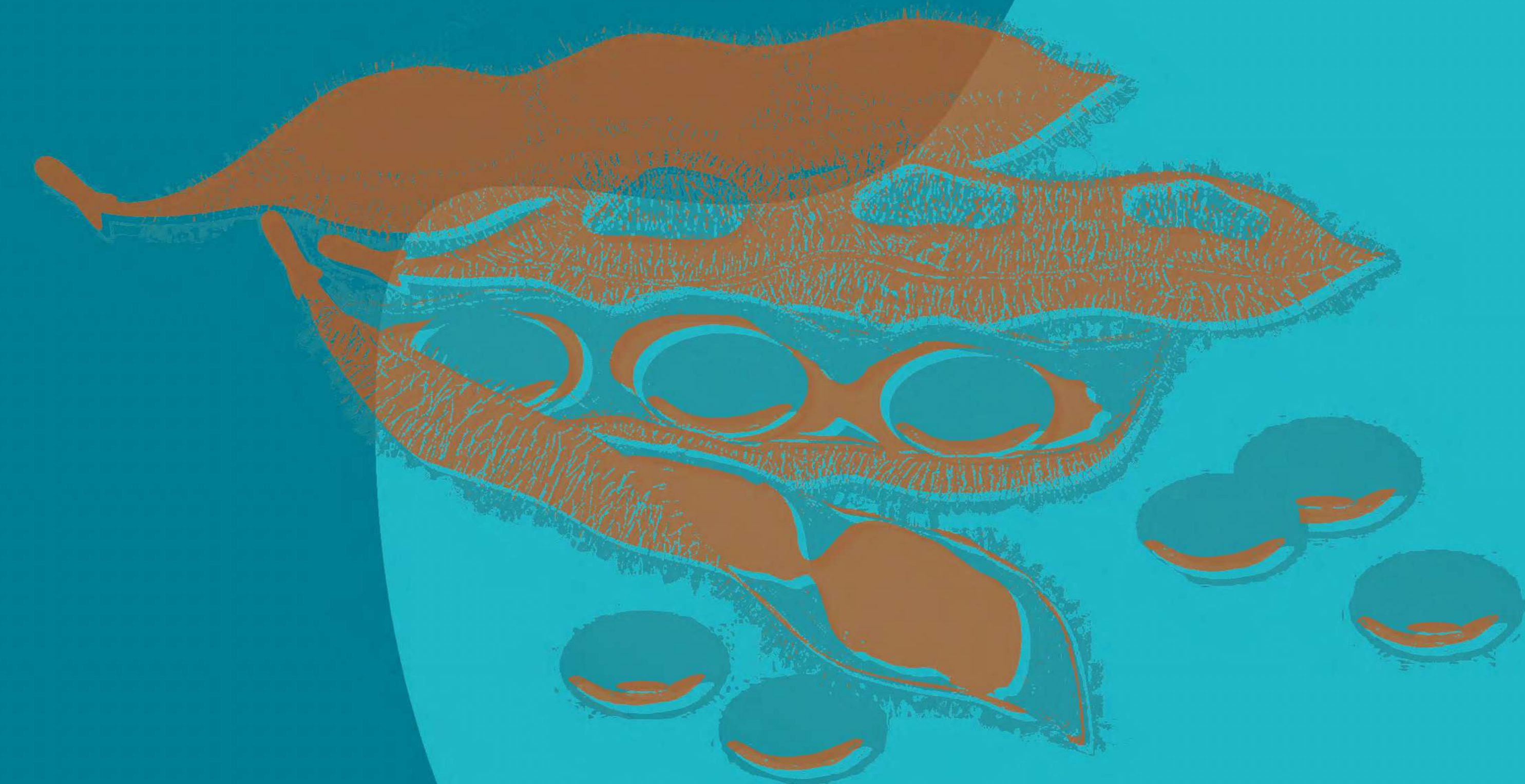


Skretting  
**Sustainability  
Report**



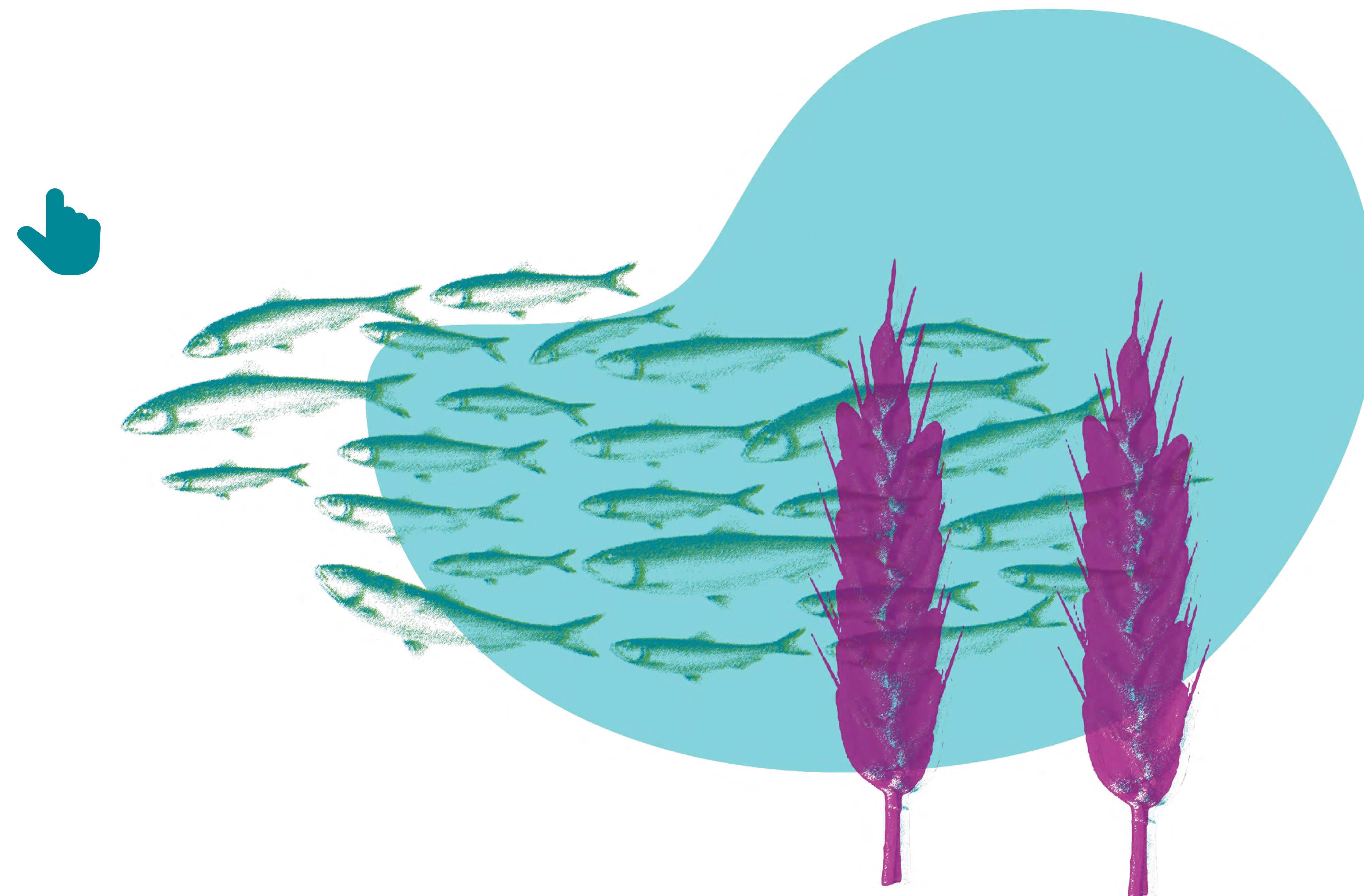
**2022**



## What is in this report?

A lot! But we're trying to make it easy to find your way around it all. Top level chapter headings can be found to the right, and of course you can search the document to find what you're looking for.

Please note, this report is designed to be digital first, and viewed on a screen. Please consider the environment before you print. 🙏



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## Abbreviations, tables and figures within this report

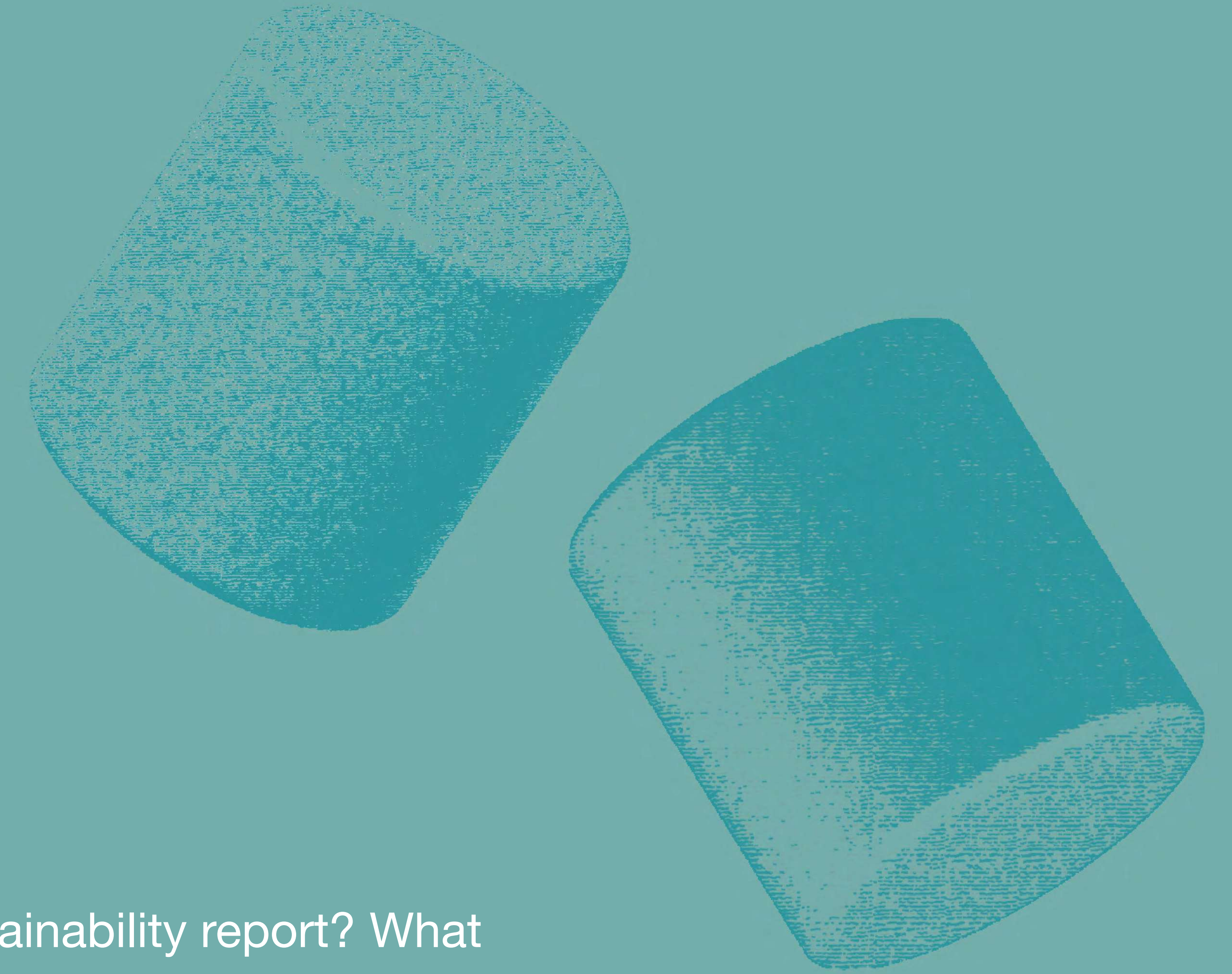
This page is a quick reference so you can find all the nitty gritty details in the report, including our sustainability targets and progress. We've also included some of the most common abbreviations used throughout the report. Jump back here if you're uncertain what one of the (many!) acronyms mean.

AMR	Antimicrobial resistance	GSI	Global Salmon Initiative
ASC	Aquaculture Stewardship Council	HSE	Health, Safety and Environment
BAP	Best Aquaculture Practices	KPI	Key Performance Indicator
BU	Business Unit	LCA	Life Cycle Assessment
CIA	Critically important antibiotic	LUC	Land Use Change
CO <sub>2</sub> e	Carbon dioxide equivalent	MSC	Marine Stewardship Council
FAO	Food and Agriculture Organization of the United Nations	NAPA	North Atlantic Pelagic Advocacy Group
FCRe	Forage Fish Dependency Ratio economic	OpCo	Operating Company
FFDR	Forage Fish Dependency Ratio	SeaBOS	Seafood Business for Ocean Stewardship
FFDRm	Forage Fish Dependency Ratio: fish meal	SOFIA	The State of World Fisheries and Aquaculture report
FFDRo	Forage Fish Dependency Ratio: fish oil	Skretting AI	Skretting Aquaculture Innovation
FIP	Fishery Improvement Project	UN SDG	United Nations Sustainable Development Goals

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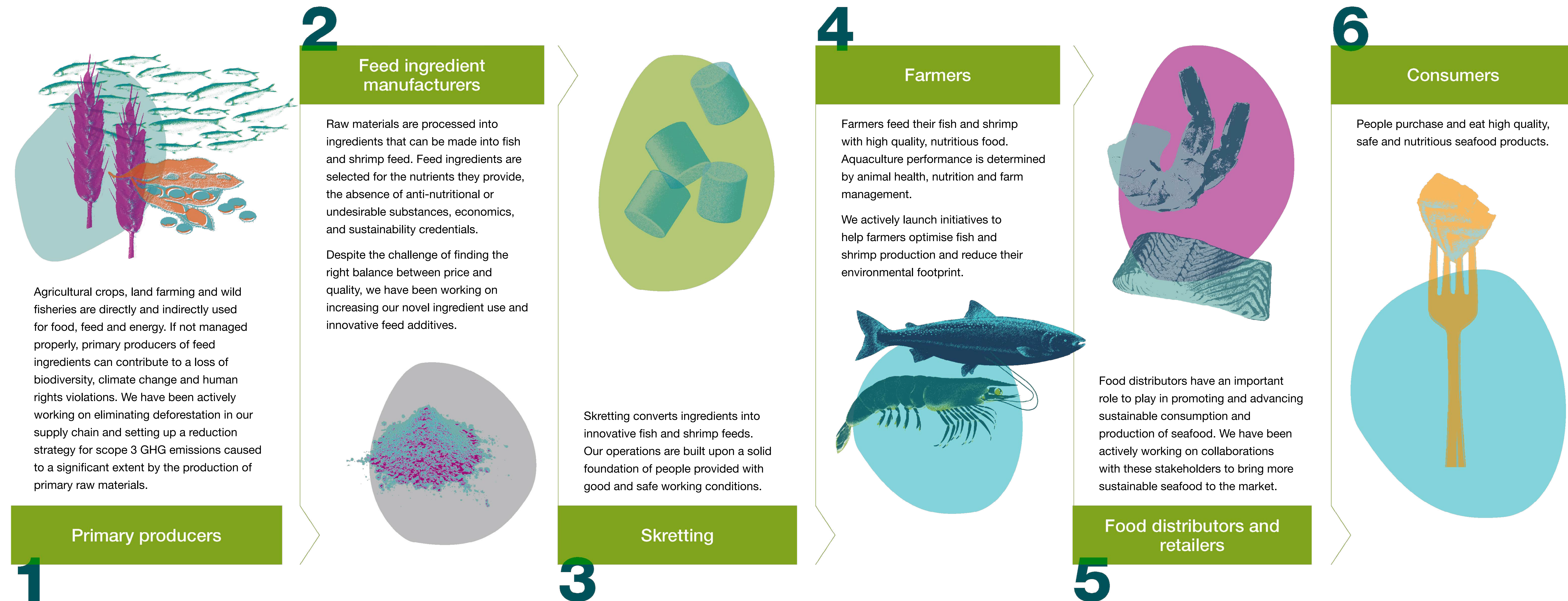
# Introductions

Why does Skretting even have a sustainability report? What are the 'can't miss' parts from this year? What are 'blue foods' anyway, and why do they matter? In this section we answer these questions and more. Read on...



## Our role in the value chain

What does Skretting do? We make feed for aquaculture, all over the world. The most important species we make feed for include Atlantic salmon, shrimp, sea bass, sea bream and tilapia. We are part of a complex value chain, which we have briefly summarised here.



## About this report

### Our approach

Skretting has a longstanding commitment to reporting progress on our sustainability journey. We have been issuing sustainability reports since 1999. Our first reports were compiled by Skretting Norway, and since 2013, we have also been reporting on our global business activities. Our sustainability initiatives are closely linked to our business operations and priorities.

### Reporting structure

This global Skretting sustainability report focuses on who we are and our main sustainability achievements in 2022. It is available to our stakeholders and the public on our website. Our focus is to make it easier for readers to find information that matters most to them. Local Skretting companies can also choose to publish their own sustainability reports to go more in depth on local challenges and achievements.

### Scope of this report

The quantitative data reported here covers the calendar year from January 1 to December 31, 2022 unless otherwise stated. The report covers all companies that are part of Skretting, which represents the aquaculture nutrition and service activities of Nutreco. Nutreco is owned by private company SHV, and all public financial information is reported through SHV. This report provides only limited financial information.

### Reporting framework

We prepared our report in accordance with the GRI Standards: core option. This report also aligns with the United Nations Sustainable Development Goals (SDGs), and throughout we have highlighted how our own goals are aligned and support SDGs.

### Assuring our disclosures

Skretting does not have external verification of the disclosures made in the report. However, Nutreco has worked with an external company to verify specific information disclosed in the Nutreco Sustainability Report. If information disclosed in the current report has been verified during this process, it will be mentioned.

### Links with Nutreco Sustainability Report

As part of Nutreco, some of the content disclosed on this report and more details can also be found on Nutreco's Sustainability Report 2022. Throughout this document we have shared links that allow the reader to deepen on how we address specific areas at a corporate level that also apply to Skretting.

### External links

Throughout this report, we have included links to a number of external websites to make it easier for the reader to learn more about our projects, partners and goals. These links are for reference only.

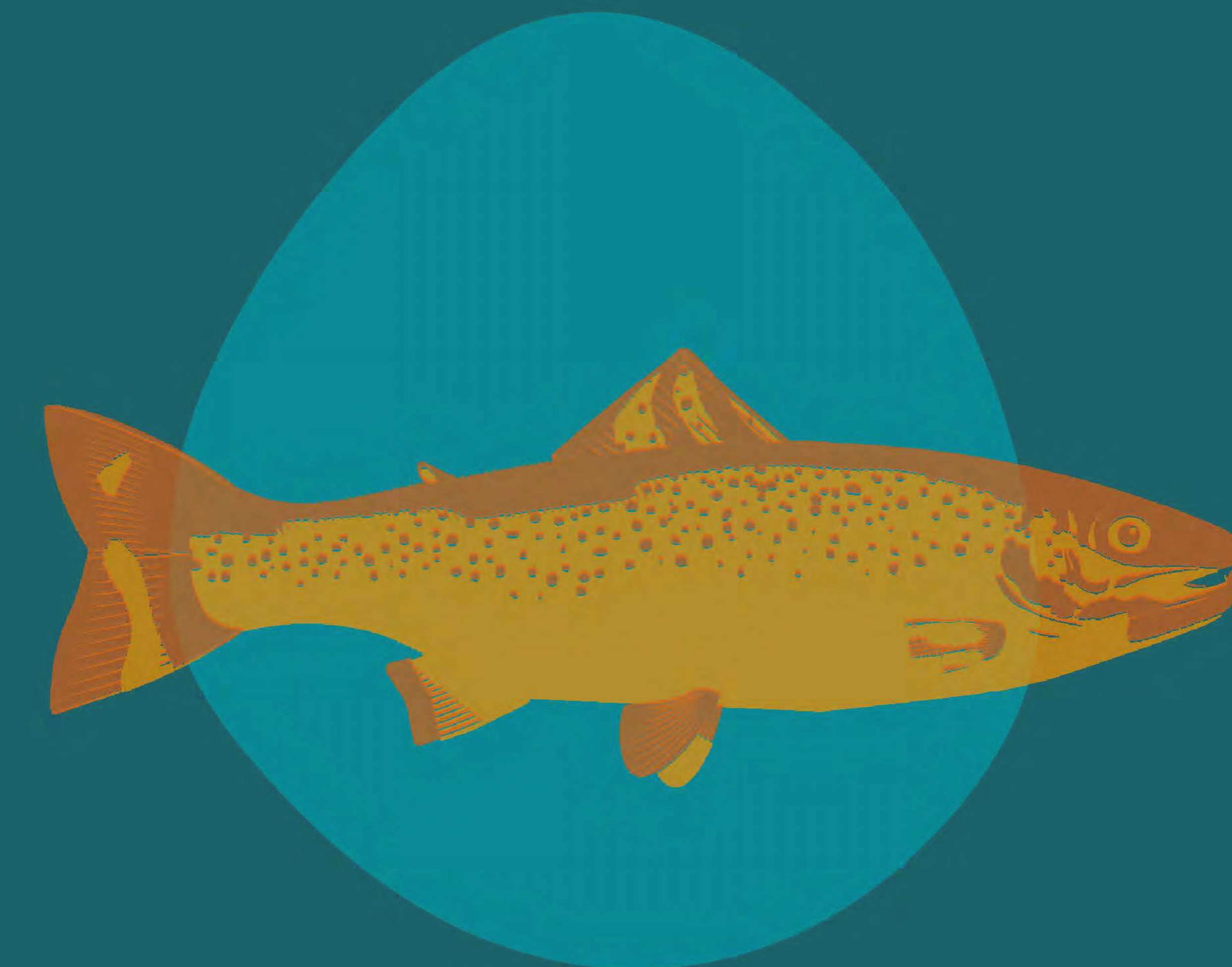
### Collaboration with stakeholders

Skretting invited different stakeholders to contribute with their own views to relevant topics addressed on this report.

### Business Units (BU)

Nutreco is organised in different business units. These are referred to throughout the report as the following BUs:

- **Salmon:** Australia, Canada, Chile, Norway
- **Latin America:** Ecuador, Honduras
- **Southern Europe:** France, Italy, Spain, Turkey
- **Asia:** China, India, Japan, Vietnam
- **Africa:** Egypt, Middle East & Africa Export, Nigeria



## From our CEO

A year of action. That's how I'd describe 2022 when it comes to our sustainability activity. Over the past few years, I've talked a lot about how we are not doing enough, and we need to do better. While it may take some time for me to stop saying that, I'm happy to report that although we are still finding ways to meet our ambitious objectives, we have made significant progress in 2022. We are reporting that progress with a level of transparency that has not been seen before.

Why do we do this? What do we gain from being open? For one, we build trust and ensure we can collaborate effectively with partners to provide real, tangible solutions, together. As difficult as it can be, I'd much rather receive criticism that we can use constructively than greenwash mediocre efforts. Transparency is a non negotiable for us. So here are our calls to action.

Firstly, for ourselves:

- Continue our commitment to Science Based Targets, reduce absolute emissions and source certified ingredients according to our RoadMap
- Increase the participation of women in senior leadership
- Strengthen work on identifying and mitigating potential social risks in our supply chain and hold ourselves accountable
- Maintain high engagement in stakeholder platforms where we can address industry challenges, together

Second, to our suppliers:

- Reduce the carbon footprint of your own operations and value chain
- Sign up for Science Based Targets and take action to stay within the Paris Agreement emission targets
- Provide better (primary) data on the ingredients you sell
- Improve and increase traceability back to the country of primary production
- Further identify and mitigate the environmental and social risks across the supply chain

To other feed companies and stakeholder initiatives that can help us to collaborate:

- Align on standard key data elements for traceability requested from suppliers
- Align on the request for primary data from suppliers
- Collaborate on digital solutions that can help us to simplify data requests and data recording

And finally, to our customers:

- Fully commit to your sustainability objectives and work with us to find solutions to the challenges that you have
- Support the use of marine ingredients that are certified or from a Fishery Improvement Project (FIP), and soy that is deforestation-free
- Promote long-term partnerships that help us to commit to longer term goals

Sustainability is not something that I believe we should compete on in our industry. It should not be a competition for who has more or better targets, or who has a lower or higher carbon footprint. Instead, this should be a collaboration to accelerate the progress that we all need to ensure that we can contribute with healthy, safe and accessible seafood for the people of the world.\*

After all, what are we competing over? The future of the planet? No thanks. I'd much rather we work together and collaborate to find solutions to challenges that are much bigger than one company can possibly tackle alone. We have everything to gain when we collaborate, and everything to lose when we don't.

The time is now - we need to act.



\* within competition rules of course!

At Skretting, we don't believe in competition when it comes to sustainability. What are we competing over? The future of the planet? No thanks. I'd rather we collaborate.



Therese Log Bergjord  
CEO, Skretting

## Our sustainability ambitions going forward

Collaboration and transparency. Two words that are easy to say but can be much more difficult to put into practice. At the same time, every year they become more meaningful, particularly when it comes to the progress across our sustainability journey.

This report is our most transparent yet. There are a number of parameters that we are reporting for the first time ever, either because we now have the ability to report on those numbers, or because we simply believe that it is the right thing to do to share our journey - even the markers that we are not so proud of.

We have again invited customers, suppliers, certification bodies and other partners to share with us their vision on what sustainability means to them, including reflections on different realities per region and species. Why do we do this? Because reaching our targets is not something that we can do alone, and we need collaboration across the entire value chain.

In this report, we not only elaborate the progress that we've made, but also on the challenges that we face, areas where we're not doing so well, and also the opportunities that we can embrace. Environmental impact and reducing the carbon footprint is a prominent focus, but decisions shouldn't be taken just based on a footprint value. Sustainability is so much more than that.

For example, what happens if an ingredient comes with a higher footprint (because it hasn't scaled up yet), but helps us to find solutions to other impacts that are not measured by the carbon footprint, such as biodiversity loss? We need to look at the different trade-offs and take decisions based on a multi impact approach rather than only a footprint number.

Reducing our environmental footprint also needs to be done with a strong focus on creating a positive social impact in our supply chain.

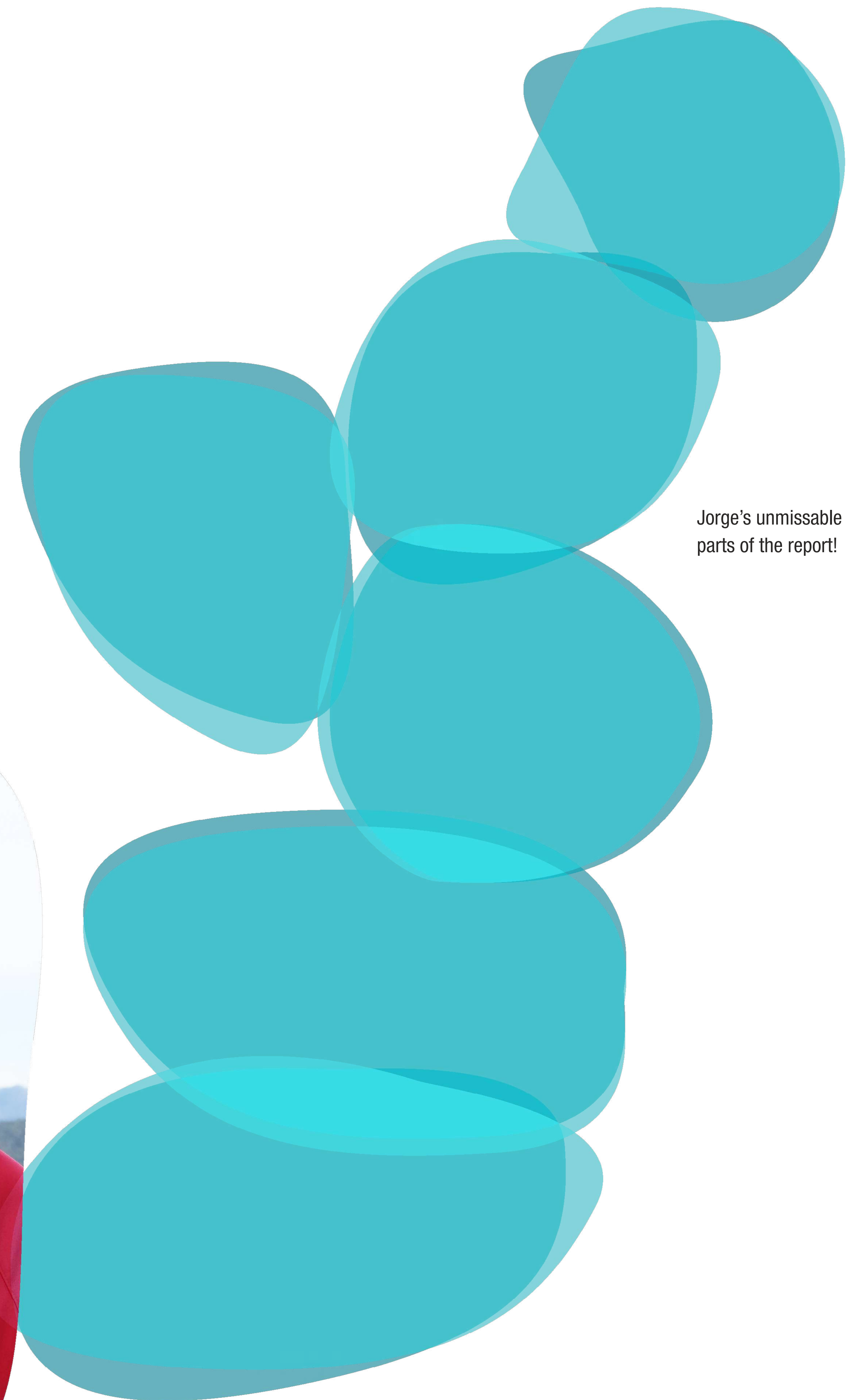
We have also included more views from just a sample of Skretting's colleagues in our report this year. Through them, we're sharing the work and commitment of our close to 4,000 colleagues spread across the world. It's through each one of us that we can make progress on our sustainability efforts.

I'm very proud of this report, and the people who have contributed, but I understand that not everyone will read the entire report. For those of you who won't, to the right are some stories that I encourage you to read over everything else!

**We still need to look at the different trade-offs and take decisions based on a multi-impact approach rather than only a number**



Jorge Diaz  
Sustainability Manager, Skretting



Jorge's unmissable parts of the report!



## The context that we operate in, and the importance of blue foods

Not only do fish, shrimp and other wild-caught and farmed aquatic foods provide more than 3 billion people with at least 20% of their animal protein - the high nutritional profile, considerable species diversity and abundance of these so-called “blue foods” mean they are also ideally-positioned to help establish resilient and sustainable global food systems.

The production and harvesting of these foods often have a much lower carbon footprint and fewer biodiversity impacts when compared to the production systems of most livestock categories. Many supply chains also stand up to close consumer scrutiny in terms of their environmental responsibility, ethical sourcing and production processes, as well as offering heightened levels of transparency and trust. As such, fish and shellfish are increasingly being recognised for their role in food security, while most health organisations have long advocated including fish or seafood in the human diet a minimum of two to three times a week.

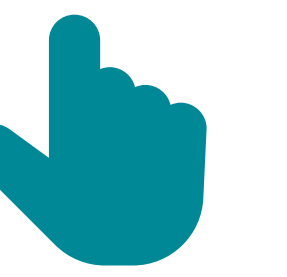
In the State of World Fisheries and Aquaculture 2022 (SOFIA), FAO states that prioritising and better integrating fisheries and aquaculture products in global, regional and national food system strategies and policies should be a vital part of the necessary transformation of agrifood systems. The UN body also reports the global per capita consumption has doubled since the 1960s – from a level of 9.9 kg to 20.2 kg in 2020, with the average annual rise consistently outpacing both the world population increase and the growth in consumption of all other animal protein foods and all terrestrially-produced meats.

Looking ahead, FAO expects that rising incomes and urbanisation, improvements in post-harvest practices and changes in dietary trends will lead to a 15% increase in aquatic food consumption – to supply on average 21.4 kg per capita in 2030.

According to SOFIA, global aquaculture production reached a record 122.6 million tonnes in 2020. This was despite the worldwide spread of the COVID-19 pandemic, with the total including 87.5 million tonnes of aquatic animals. It also confirms aquaculture accounted for 56% of the aquatic animal food production made available for human consumption.

The report estimates this supply will rise to 106 million tonnes in 2030 and should break the 100-million-tonne-threshold for the first time in 2027. To achieve this, the report projects aquaculture expansions will continue on all continents, with wide variations in the range of species and products. But at the same time, it insists that over the course of the next 10 years, aquaculture must expand sustainably to satisfy the gap in global demand for aquatic foods, especially in food-deficit regions, while also generating new or securing existing sources of income and employment.

The report also highlights that priority areas for innovative aquaculture practices should include aquafeeds and feeding, digitalisation and the promotion of efficient and pro-environment practices. It adds that implementing these solutions requires adequate capacity and skills, training, research and partnerships, and that these can benefit from developments in information and communications technology and wider access to mobile applications and platforms.



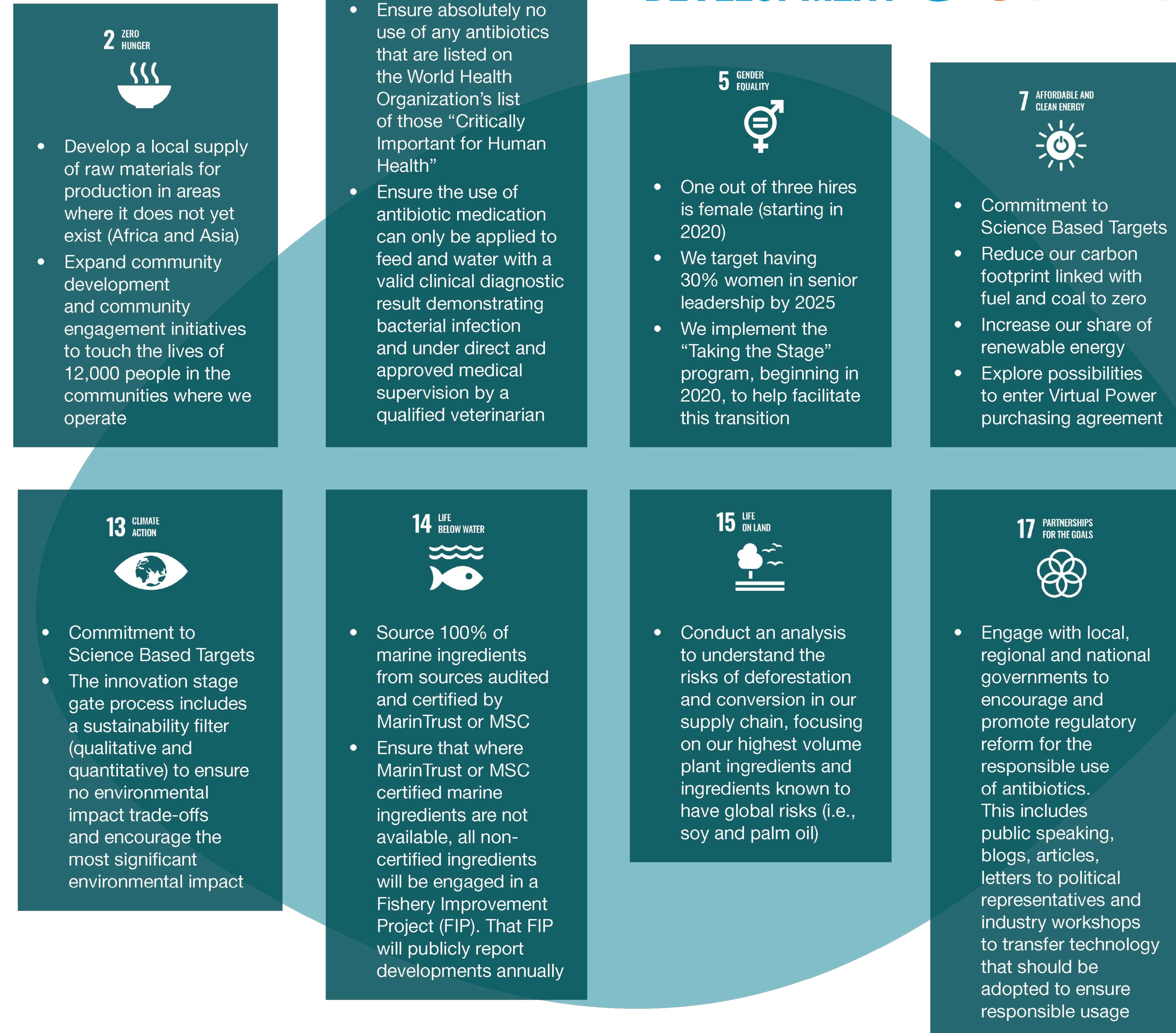
## Aligning with the SDGs

Our purpose is 'Feeding the Future', which inspires us to help solve one of humanity's biggest challenges. The Sustainable Development Goals (SDGs) launched by the United Nations in 2015 are reaching its halfway point. As stated on The Sustainable Development Goals Report 2022, and when we are at the halfway point of their implementation, the 2030 Agenda for Sustainable Development is in grave jeopardy due to multiple, cascading and intersecting crises. COVID-19, climate change and conflict predominate. Each of them, and their complex interactions, impact all of the Goals, creating spin-off crises in food and nutrition, health, education, the environment, and peace and security. To put the world on track to sustainability will require concerted action on a global scale.

To the right, you can find the UN SDGs that Skretting and Nutreco have identified as relevant for the business, and the actions that we are taking to address them directly.



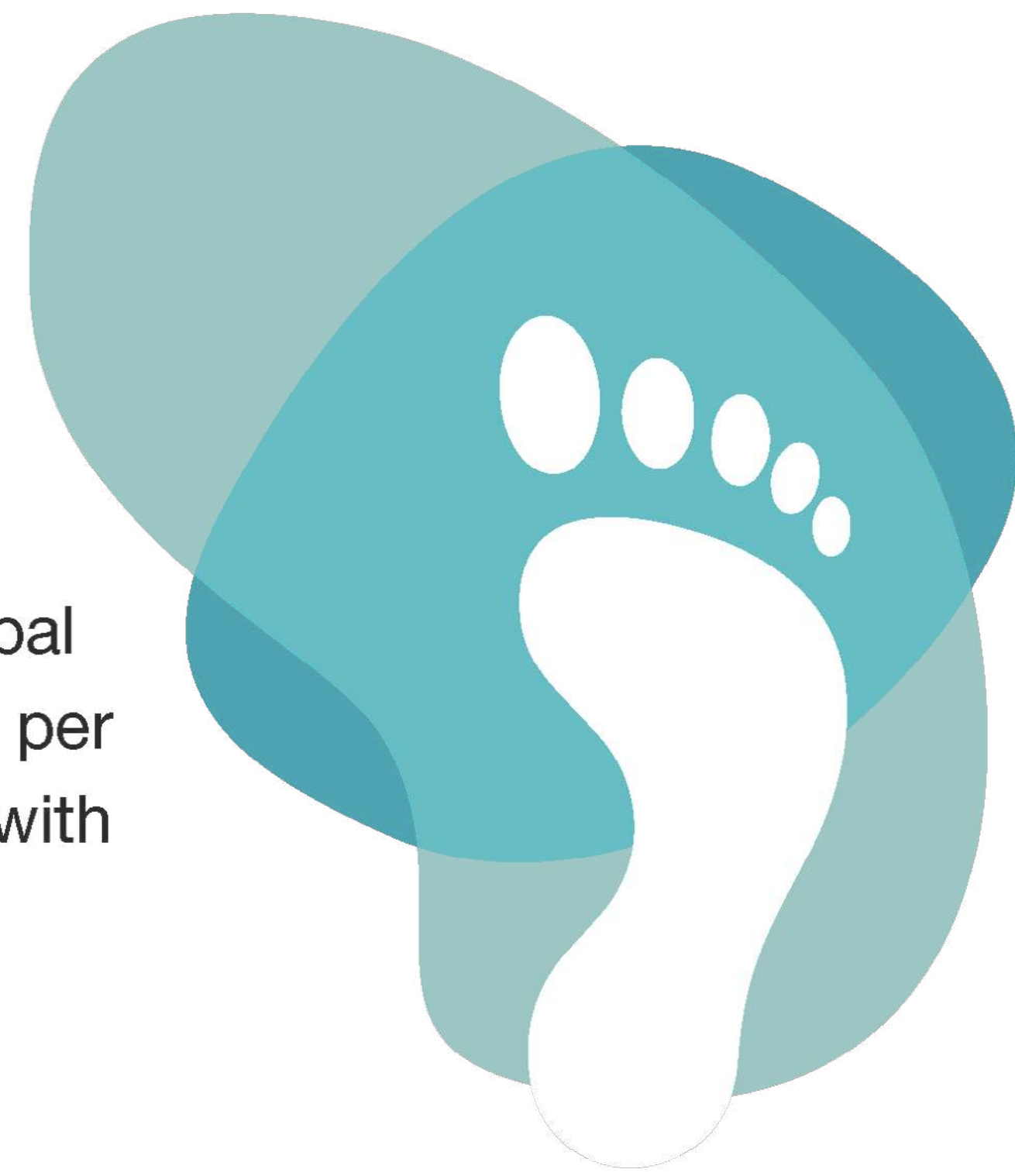
## SUSTAINABLE DEVELOPMENT GOALS



## Some highlights from 2022

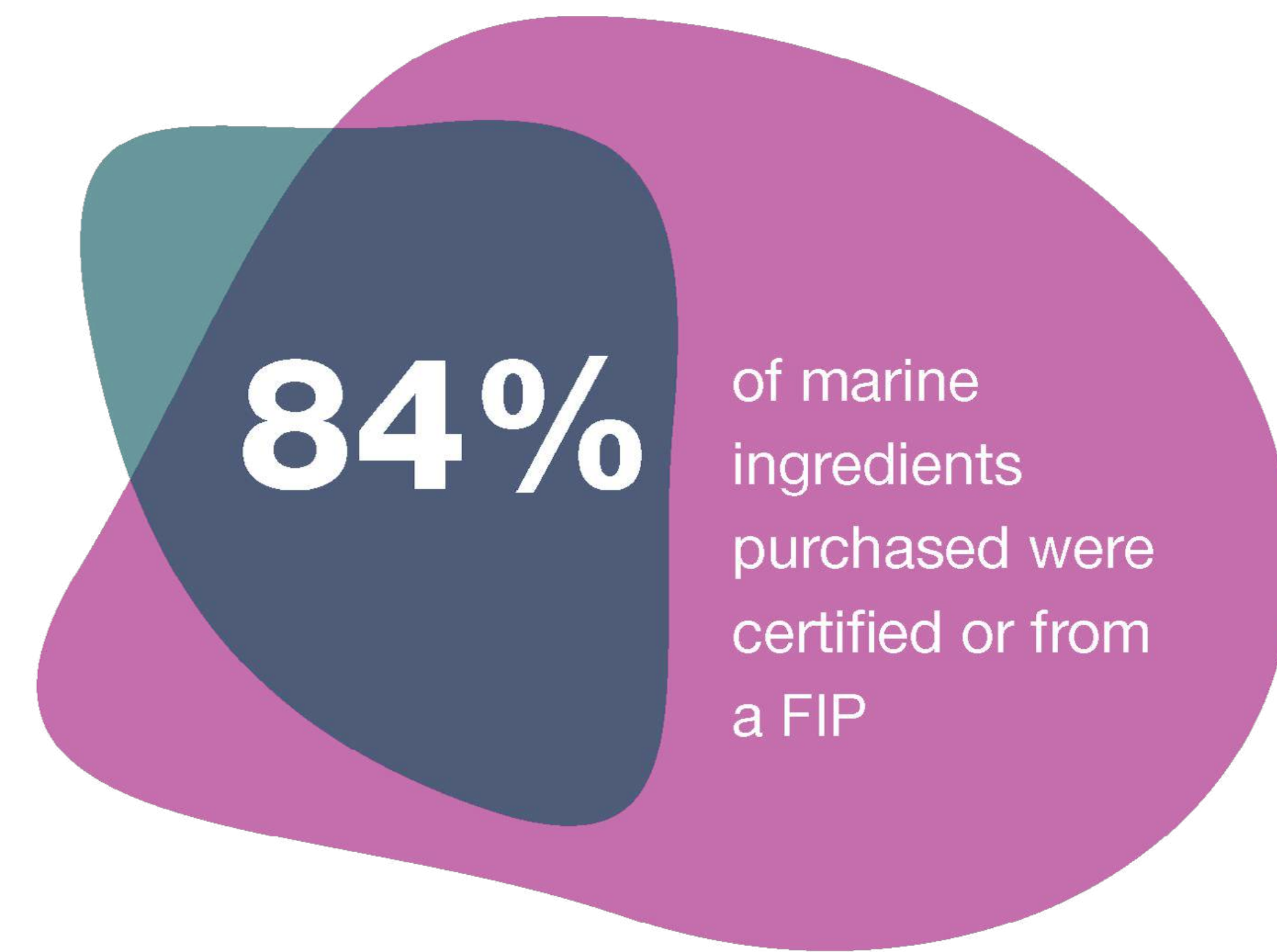
**5%**

reduction to global carbon footprint per feed compared with 2018 baseline



**84%**

of marine ingredients purchased were certified or from a FIP



**Skretting Norway**

named PwC's 2022 Climate Winner



Implemented the EcoVadis IQ and Ratings programs



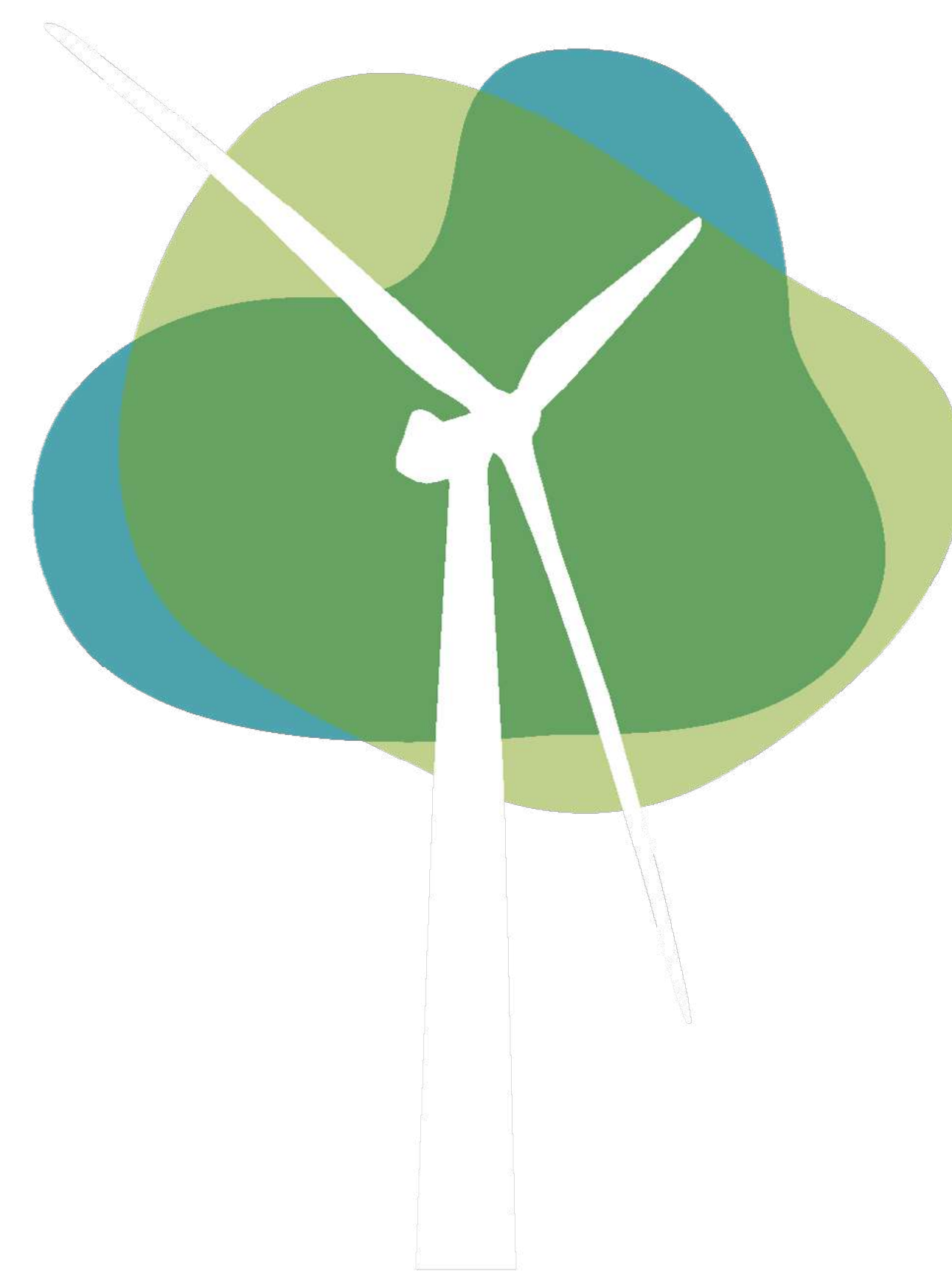
**97%**

of soy purchased in 2022 is categorised as class A or B according to our sourcing policy



**54.7%**

of electricity used in our operations is renewable



**Skretting AI**

opened its new Guayas Research Station in Guayaquil, Ecuador





# RoadMap 2025

Our sustainability RoadMap 2025 outlines our sustainability ambitions under three pillars – health and welfare, climate and circularity, and good citizenship – and includes clear, measurable targets for 2025. It was approved by Nutreco’s Management Board (formerly Nutreco’s Executive Leadership Team) in June 2020. On the following pages we present our progress towards meeting the goals outlined in the RoadMap.

Health & Welfare

Climate & Circularity

Good Citizenship

# RoadMap 2025



## RoadMap 2025 Health & Welfare

This pillar of RoadMap 2025 is primarily focused on antimicrobial resistance (AMR). We address this by innovating new products and services that directly reduce the dependence on antibiotic use.

In this section, we provide numbers on the use of antibiotics throughout our business, and discuss dilemmas and opportunities in the area of health and welfare. We also highlight some initiatives happening around the world.

Our targets 	Our progress 
No preventive* usage of antibiotics in our products and services.	No use 
No use of antibiotics for growth promotion in our products and services.	No use 
No use of antibiotics categorised by WHO** as “Critically Important for Human Health” (CIA) in our products and services.	In 2022 Skretting used less than 2,000 kg of CIA active ingredient, equal to 0.01% of total feed sales. All of the feeds sold were prescription based. 

\* Ensure no preventive usage of antibiotics in our products and services. Any order of medicated premix/feed should be accompanied with a valid prescription from an authorised professional.

\*\* as published in “Critically important antimicrobials for human medicine: 6th revision” <https://www.who.int/publications/item/9789241515528>

# RoadMap 2025 - Health & Welfare

## Antimicrobial resistance

A long-held part of Skretting's global sustainability strategy is the ambition to address the risks associated with antimicrobial resistance (AMR). This includes supporting a reduction to the use of antibiotics within the aquaculture value chain, and the elimination of specific groups of antibiotics, specifically those listed as 'critically important antibiotics' (CIAs) by WHO.

We believe that a holistic approach to animal health, whereby the prevention of challenges is promoted through farming best-practices, is far better than providing a cure. Our aim is to establish industry-wide progress with regards to tackling AMR through the development of innovative products and services that directly reduce the farmers' dependence on antibiotic use. We do this by partnering with our customers and focusing on the major issues that are driving antibiotic use.

Additionally, we focus efforts on providing robust solutions for alleviating disease challenges that have been historically difficult to control through vaccination, and are responsible for high antibiotic use in the industry, such as Salmonid rickettsial septicaemia (SRS) in Chile and Photobacteriosis and Lactococcosis in Southern Europe.

**Our aim is to focus on the major industry issues and collaborate on new products and services that will directly reduce dependence on antibiotic use**

Because feed is an important component of sustainable, preventative health management, Skretting provides optimal nutrition for all farming cycles of aquatic species, including innovative nutritional solutions that contribute to disease management.

Integrated and holistic approaches should also comprise best management and husbandry practices, continuous surveillance and early and accurate diagnosis, the implementation of biosecurity and disinfection procedures in the production sites, systematic vaccination and the responsible use of medicines when treatment is needed.

Our approach to addressing the risk of antimicrobial resistance (AMR) has not changed during the last years. The aim is to focus on the major industry issues and innovate, together with customers and other partners, with the development of new products and services that will directly reduce dependence on antibiotic usage in animal husbandry.



Anna Hesby Nessa Global Product Manager Health, and Carlos Zarza Principal Researcher at Skretting Aquaculture Innovation

# RoadMap 2025 - Health & Welfare

## Disclosure of antibiotic use per country

Animals have a right to receive treatment when they are sick, and medicated feed remains the preferred method to administer antibiotics to farmed fish and shrimp. Skretting provides medicated feed only on prescription from a veterinarian. There are relatively few antibiotics registered for aquatic animals, and we do not choose which will be used. However, we do have a network of health experts, and through our technical team we work closely with our customers to share knowledge and discuss alternative treatments or vaccines.

In some cases, a CIA is the only antibiotic that works and/or is available to treat specific diseases. This poses a further dilemma - we could stop producing feed containing antibiotics, but by doing so we risk pushing antibiotic application further down the production chain, for example farmers applying medication to the feed on-farm. These methods can pose a much greater challenge in combatting antimicrobial resistance. In contrast, when we apply antibiotics in our facilities, we do it in a safe and controlled environment where our workers are protected, and the final dose is measured, and the production is done with high quality standards.

In 2022 we recorded a decrease to the amount of medicated feed with antibiotics and medicated feed containing CIA as percentage of our total feed sales compared to 2021. Across our global business, less than 2 000 kilograms of CIA were prescribed and added to feed, representing a 28% reduction. For other antibiotics, the inclusion of active ingredients was reduced by 35%.

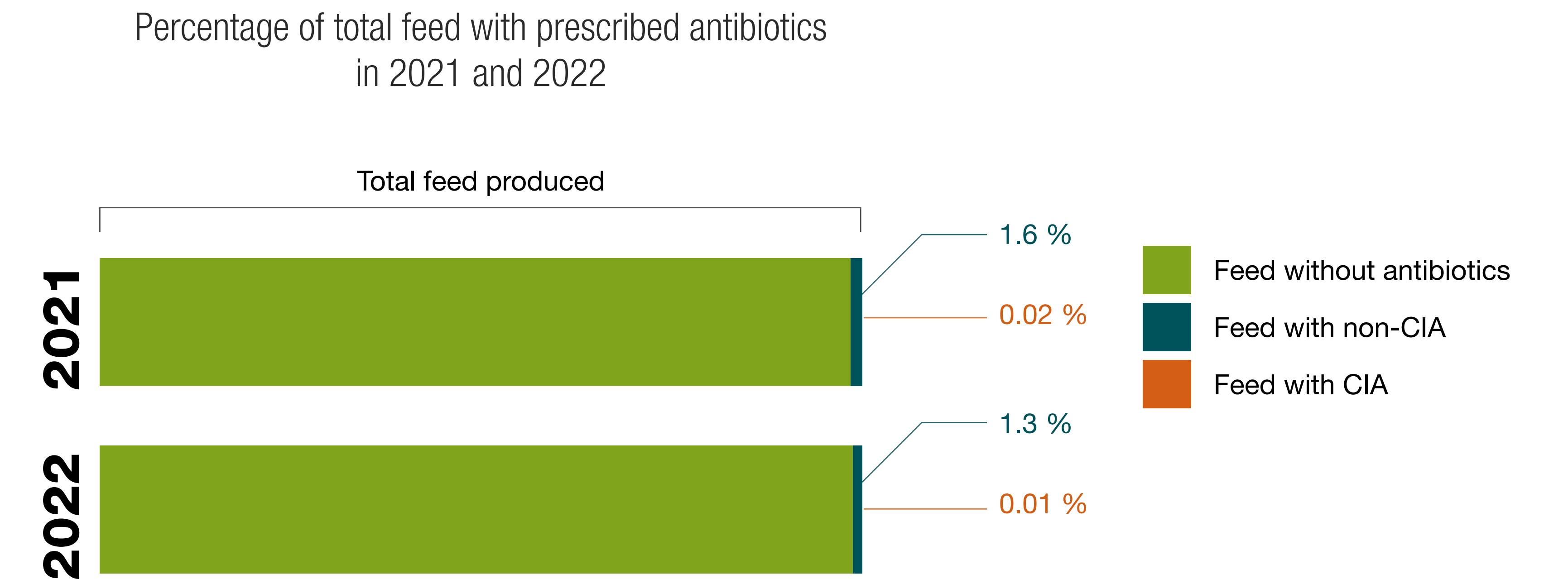
As in previous years, different antibiotics are incorporated in feed depending on local regulations. The largest volume comes from florfenicol, oxytetracycline and trimethoprim/sulfadiazine, which are not classified as CIAs. In lower volumes, antibiotics classified as CIA - erythromycin, flumequine or oxolinic acid have been administered.

In close collaboration with our customers, several initiatives have been started in our OpCos to ensure best-practice and reduce antibiotic dependence:

- Testing diseases prevention programs to reduce antibiotic treatments in areas where we identify challenges
- Development of technical customer support in bacteriology including antibiotic sensitivity assessment (antibiograms) in countries where that has not been standard procedure
- Awareness campaigns to support farmers to use antibiotics in a responsible way, including an app to calculate the dose fast and accurately
- Continuous health education with farmers including vaccination

In 2022 we started building a real-time overview of antibiotic-containing products we sell across our business. With this in place, we can react faster, identify geographical area differences and connect colleagues across the world to learn from each other.

In general, the aquaculture industry has been reducing antibiotics over many decades, and naturally there are yearly differences in antibiotic usage depending on disease outbreaks. Even in challenging circumstances with high summer temperatures and scarcity of water, farmers managed their production with less antibiotics with better farm practices.



The application of prescribed antibiotics per country as a percentage of total feed produced in 2022

%	Norway	France	Spain	Italy	North America	Australia	Chile	Total
Feed with CIA	0.003	0.009	0.013	0.36	0.03	0	0	0.01
Feed with non-CIA	0.04	0.20	0.53	0.45	2.21	0.07	8.68*	1.31
<b>Total</b>	<b>0.04</b>	<b>0.21</b>	<b>0.55</b>	<b>0.81</b>	<b>2.24</b>	<b>0.07</b>	<b>8.68</b>	<b>1.32</b>

\*The main reason for the high usage of antibiotics in Chile is to address Salmonid rickettsial septicaemia (SRS) challenges, as traditional vaccines and therapies have proved inefficient in dealing with this particular bacterial disease. The latest figures provided by the Chilean authority (Sernapesca) before the publication of the report, revealed that SRS was responsible for 95% of the antimicrobials used in sea water during the first half of 2022. The main reason for the usage in North America is to treat critically endangered strains of Pacific salmon which became infected with bacterial kidney disease (BKD). Apart from antibiotics, no other solutions have succeeded.



## RoadMap 2025 - Health & Welfare

### Armor - tailored for skin health

Skretting Norway has reported results of its functional feed, Armor, together with our customer Nordlaks in the north of Norway. Fish fed Armor showed significantly less damage to skin and 50% lower mortality.

Over several winter seasons in Norway, farmers have experienced significant challenges with wounds and reduced skin health. Skretting Norway worked to address these challenges based on new and established knowledge of skin and feed ingredients.

“Nordlaks, like most other players in the industry, experiences that classic and atypical winter sores that are important causes of reduced welfare and mortality in salmon in the sea phase. We therefore wanted to try Armor. This gave good results,” said Camilla Robertsen, Fish Health Biologist at Nordlaks.



### Bafador - old technology in a modern industry

Bacteria that may cause issues during stressful situations are naturally present in fish and shrimp farm environments. Stressors can include a change in temperature, season and handling. These events can allow for opportunistic bacteria to develop and cause issues.

In 2022 Skretting and Proteon worked to develop a new feed additive in India. The feed additive contains naturally occurring organisms - called phages, to target specific bacteria.

Used ahead of challenges, the product can support fish to cope with challenges from aeromonas and pseudomonas. When natural health solutions can be applied it reduces dependence on antibiotics and ensures that they will function as desired against future challenges.



## RoadMap 2025 - Health & Welfare

### Cermaq and Skretting work to reduce Chile's antibiotic use

Chile is the second-largest producer of farmed salmon in the world, and the sector has historically used relatively high amounts of antimicrobials during the marine stage of production, mainly florfenicol (FFC), to control SRS.

Through a new collaborative project, Skretting has been working with Cermaq to establish viable ways in which Chilean salmon farming can reduce its antibiotic use. Together, the industry partnership is looking at ways to optimise the FFC treatment regime against SRS in terms of the medicine dose and duration of treatments. The aim of these endeavours is to avoid the use of high doses of FFC when it's not necessary.

This project is seeking to capitalise on both companies' knowledge on FFC pharmacology and their unique SRS field experience.

The hope is that together – and with the introduction of other management best-practices – this will become part of Cermaq's holistic strategy to manage SRS.

The project is currently evaluating test feed treatments in Atlantic salmon, including different FFC doses and special medicine carrier feeds.

Furthermore, discussions have begun about the possibility of using this close working collaboration to tackle other disease challenges, including tenacibaculum.

“Antibiotic reduction is a key element in our fish health strategy in Cermaq Chile to secure the sustainability of Chilean salmon industry,” said Berta Contreras, Technical Manager at Cermaq Chile. “We really appreciate initiatives from our feed suppliers supporting this goal.”



## Meeting the precise phosphorous requirements of farmed shrimp

Phosphorus is one of the most important minerals in food crop production, as a core component of fertilisers and also in animal nutrition. All vertebrates have a basic requirement for it – for the formation of bones and teeth, and to make protein for the growth, maintenance and repair of cells. Therefore, for farmed fish and shrimp, inorganic phosphorus must be supplied in sufficient quantities to meet their growth and health requirements.

At the same time, it is important that these phosphorous requirements are not exceeded to minimise the risk of excess phosphorus causing damage to environments and ecosystems. In aquaculture, for example, the oversupply of phosphorus can lead to eutrophication of water and harmful algal blooms, particularly in shrimp ponds where the water exchange is limited.

Furthermore, with an estimated 90% of inorganic phosphorous being used in the global food chain to fertilise crops, the amount available for other uses, such as aquaculture, is limited.

Thus, to sustainably produce enough nutritious food to feed the planet, this valuable resource must be used as efficiently and responsibly as possible.

To ensure the shrimp farming and shrimp feed sectors contribute to this aim, Skretting has conducted R&D work to precisely determine shrimp species' phosphorus requirements at different life stages – to safeguard fast growth rates and maintain health, and also how to best use the raw materials available to meet those requirements.

Through this programme, which was conducted over four years and involved many documented trials, Skretting determined that it could uphold the industry-leading performance of its extruded shrimp feeds while using 37% less inorganic phosphorus. Consequently, it is also able to reduce the environmental phosphorus inputs of its customers' farms.

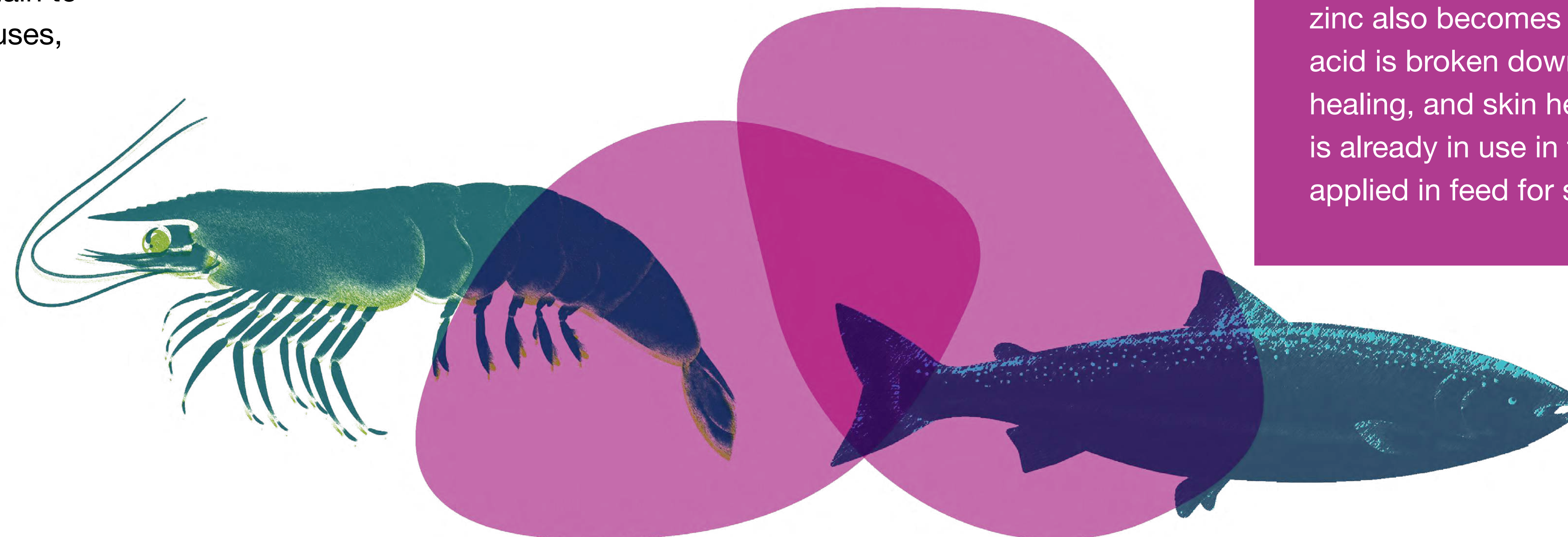
## Phytase improves the uptake of phosphorus and zinc in salmon

Salmon need phosphorus to grow, and Skretting has not only optimised the phosphorus requirements for shrimp, but also revealed a new way to maximise the available phosphorus from other sources in salmon feed, and thereby increase efficiency.

Phytase is an enzyme that can unlock phosphorus bound up in phytic acid, which is indigestible to animals with a single-compartmented stomach. If added to feed, a significant portion of plant-bound phosphorus becomes available.

“By adding phytase to feed, we are mimicking what bacteria does in the rumen of cows,” says Marcus Søyland, Product Manager for closed aquaculture systems in Skretting Norway. “When salmon can obtain more of the phosphorus they need from plant materials, we can reduce the amount of added phosphorus and ease the demand for this already limited resource.”

Less added phosphorus in the feed also means a reduced release of phosphorus to the environment. As an extra bonus, zinc also becomes more available for absorption when phytic acid is broken down. Zinc plays a crucial role in wound healing, and skin health is an increasing challenge. Phytase is already in use in feed for freshwater trout, and will now be applied in feed for salmon, both in freshwater and seawater.



## RoadMap 2025 - Health & Welfare

### Skretting AI Guayas Research Station - taking shrimp farmers to the forefront of sustainable food production

In 2022, aiming to fast-track the shrimp farming industry's introduction of more sustainable and innovative feeds, Skretting Aquaculture Innovation (AI) opened its Guayas Research Station in Guayaquil, Ecuador.

The new EUR 6.1 million facility – a world-class R&D station that is fully dedicated to shrimp farming – establishes the ideal platform for Skretting to further expand its knowledge of shrimp nutrition and health, and to apply this intelligence on-the-ground in one of the global seafood economy's most important shrimp producing regions.

Incorporating the latest technologies, the station comprises fully-equipped laboratories and state-of-the-art experimental units that will perform critical trials on whiteleg shrimp (*Litopenaeus vannamei*). Additionally, it houses a number of tanks that will allow multiple studies to be conducted in conditions that mimic commercial production environments.

Skretting AI Guayas Research Station will study all stages of shrimp production – from larvae through to harvest size animals. Simulations and evaluations will include health and welfare parameters, as well as growth and feed efficiency. Another key focus area is the digestibility of new and existing feed ingredients and balanced diets. For this purpose, sophisticated biotechnologies will be implemented and further developed.

The new station's team will have the on-hand support of Skretting's global network of scientific experts and its overarching global research units. Together, they will help Skretting AI Guayas Research Station better understand how shrimp can be helped to grow faster and larger and be more resilient to disease and environmental challenges so that innovations can be developed that turn these crucial findings into practical industry solutions.






Opening the new facility, Skretting's Innovation Director, Alex Obach, said, "I am delighted that Skretting AI Guayas Research Station is now open for business. This world-class facility underlines our commitment to Ecuador and the wider global shrimp market. Not only will it allow us to work much closer with the local producers, but by establishing a pipeline for the delivery of new solutions that improve farming performance and efficiency, it will ensure that shrimp producers everywhere can increasingly contribute to global food and nutritional security."



## RoadMap 2025 Climate & Circularity

This pillar of RoadMap 2025 is primarily focused on reducing our greenhouse gas (GHG) emissions. To do this, we utilise science-based targets to set our ambitions for reducing emissions through energy efficiency programs and sustainable ingredient sourcing, incorporating life-cycle assessment methodologies as well as utilising new ingredients.

We also address the responsible use of natural resources, biodiversity and ecosystems in compound feed ingredients. In this section, we will discuss the dilemmas, the opportunities and the partnerships we have in place to ensure we can reach our ambitious targets.

Our targets 	Our progress 
Committed through Science-Based Targets initiative (SBTi) to a reduction of 30% of scope 1 and 2 emissions compared with 2018 baseline	23% increase (explanation and disclosure in following pages) 
Committed through Science-Based Targets initiative (SBTi) to a reduction of 39% of scope 3 emissions compared with 2018 baseline	16% increase (explanation and disclosure in following pages) 
Increase renewable energy use in our operations	54.7% of electricity is renewable, increasing from more than 40% in 2021 



**SCIENCE  
BASED  
TARGETS**

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

As early adopters of Science Based Targets, in 2020 we committed to reduce our emissions on scopes 1, 2 and 3.

# RoadMap 2025 - Climate & Circularity

## Skretting's total carbon footprint

The following figures present, for the first time, the carbon footprint numbers for our scope 1 & 2 and 3 emissions from 2018 to 2022. The figures also show the carbon footprint numbers for our two largest business units (BUs) - salmon and Latin America.

Looking at our total carbon footprint first, we see that the absolute carbon footprint over all three scopes has increased over the past years. However, the specific carbon footprint per tonne of feed produced has decreased by approximately 5%. This means that efficiency has increased while, mainly due to increase in production, these gains are being outcompeted by business growth in absolute terms. This is a dilemma, because a reduction to our product footprint numbers needs to be achieved but in addition, a decoupling of growth from impact needs to be realised to bring the absolute footprint down.

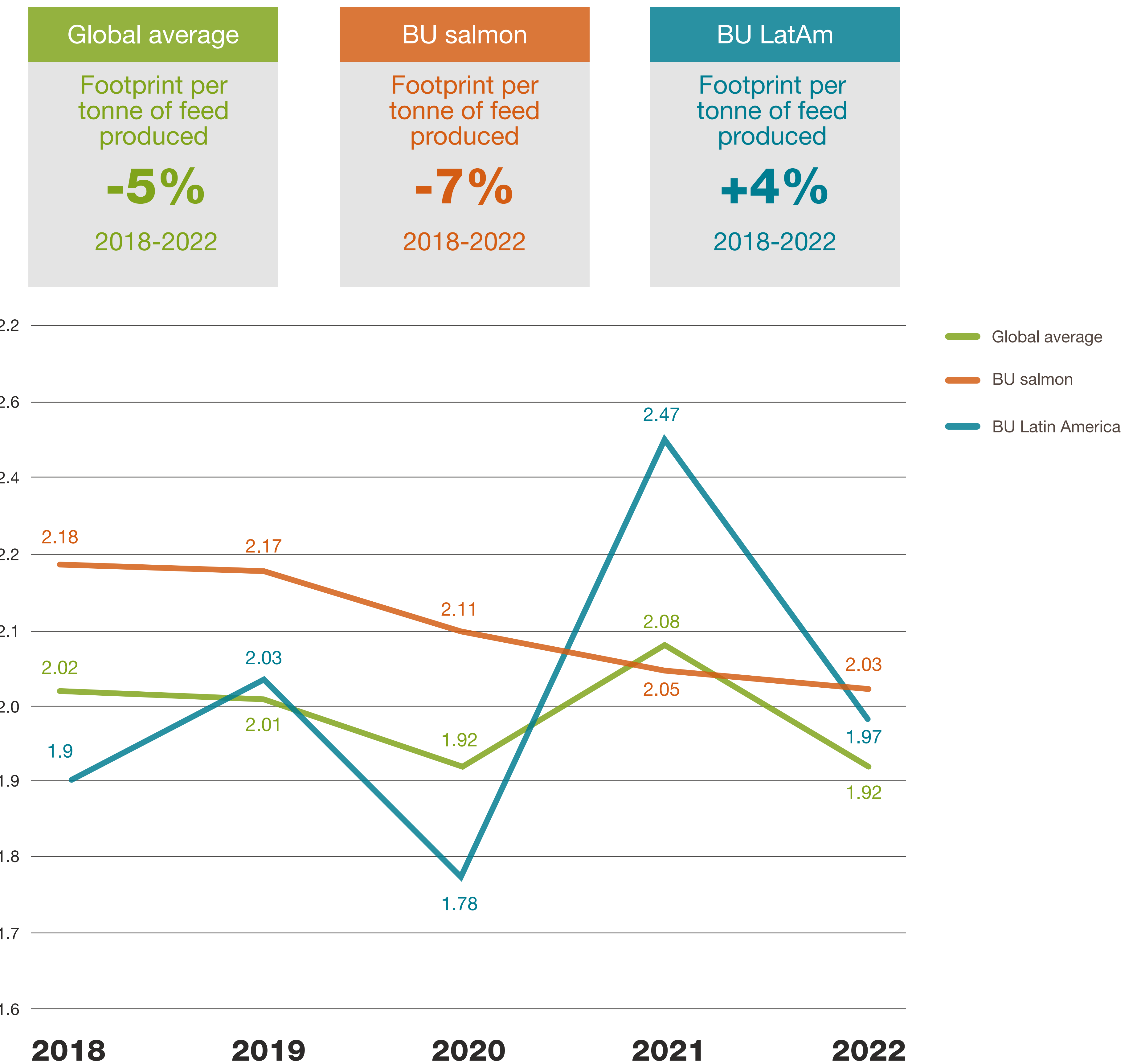
When we examine our business units with highest production and as highest contributors to our carbon footprint, we see different developments. In our salmon business, both the absolute (ktonne CO<sub>2</sub>e) and relative carbon footprints (tonne CO<sub>2</sub>e/tonne feed produced) have reduced significantly over all three scopes between 2018 and 2022. This is a very positive direction that we need to continue in the years to come. While part of this reduction is due to a slight reduction in volumes, it shows a significant reduction effect, for example caused by different raw material sourcing (scope 3) and increased energy efficiency (scope 1 and 2).

In Latin America, the numbers look different. Due to significant business growth in Ecuador, the feed volumes grew, driving the increase to our carbon footprint numbers. The increase is mainly caused by this volume growth, given the specific carbon footprint per tonne of feed produced increased by only 4% over the same time period. This growth also causes the overall increase of the absolute carbon footprint for Skretting as a whole.

Despite the numbers heading in the wrong direction compared to the baseline year 2018, we see that even with significant growth between 2021 and 2022, the scope 3 carbon footprint stagnated or even slightly decreased over this past year for our business in Latin America. This shows that footprint reductions can be achieved despite increasing the production volumes.

We need to actively address the dilemma outlined and find solutions to decouple growth and impact. Analysing and learning from the improvements made in the salmon business, for example, and creating synergies within the other business units will help us doing this. We believe that improving the data, analysing it, and drawing the right conclusions based on it are crucial to reducing Skretting's overall carbon footprint.

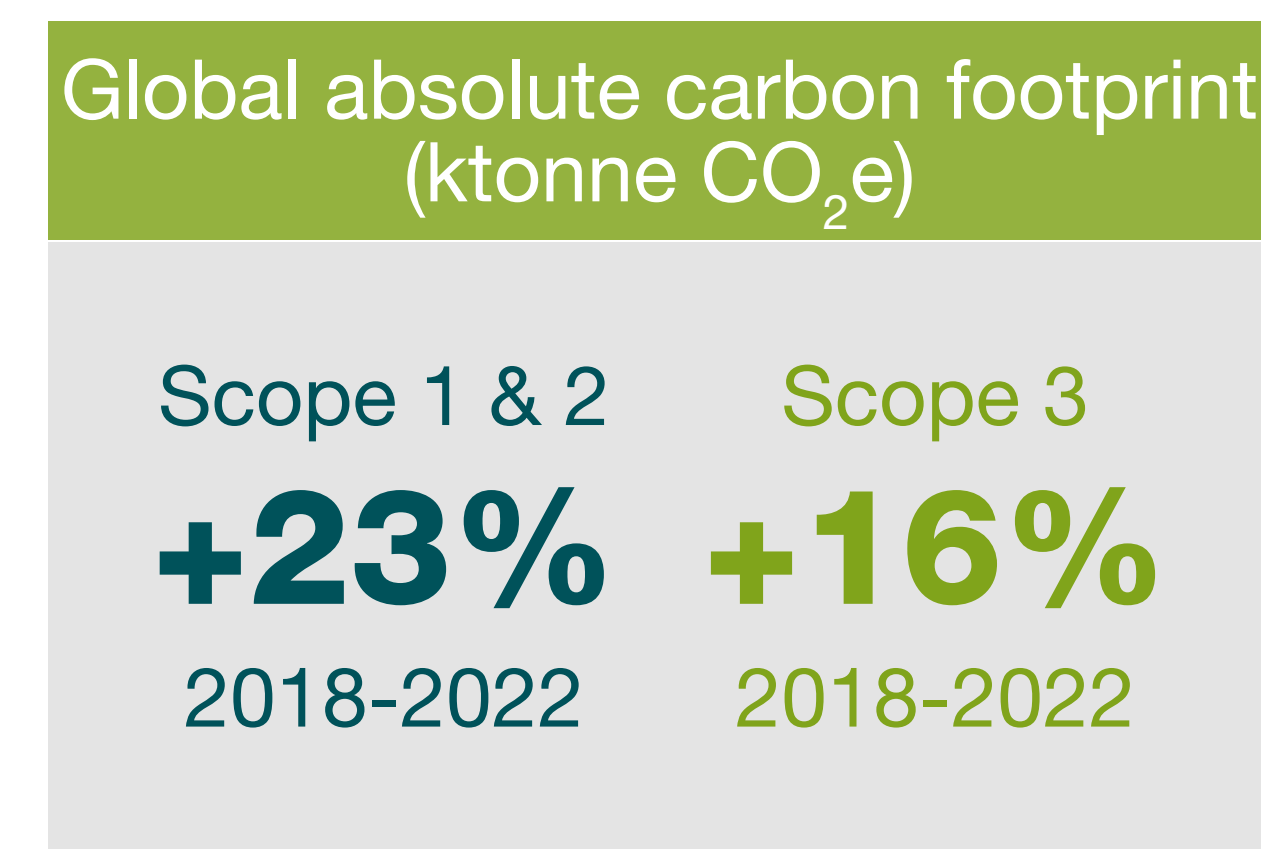
At the same time, awareness must continue to be raised within the company and across all business functions, which will be a clear focus in 2023. The data and transparency improvements already made in 2022 will support us on this journey.



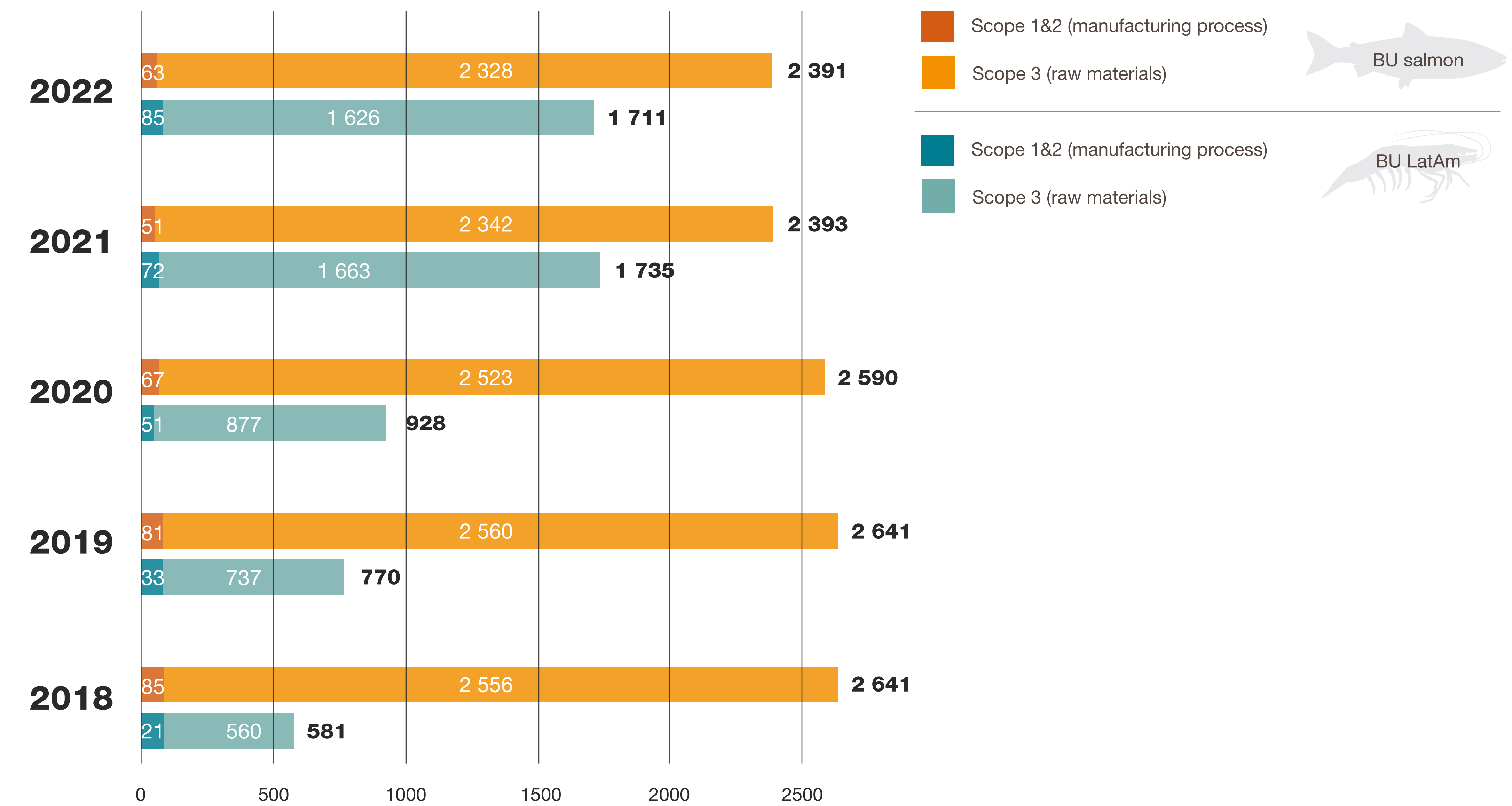
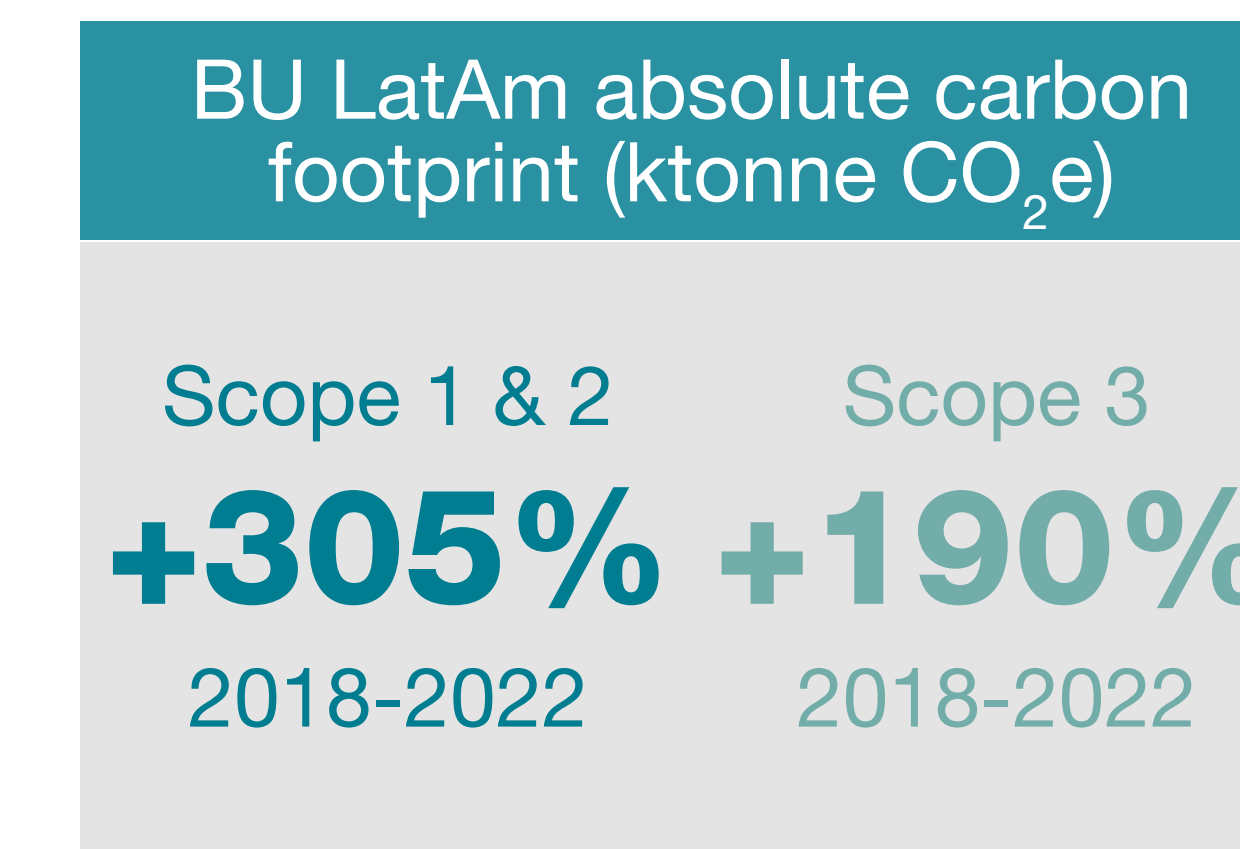
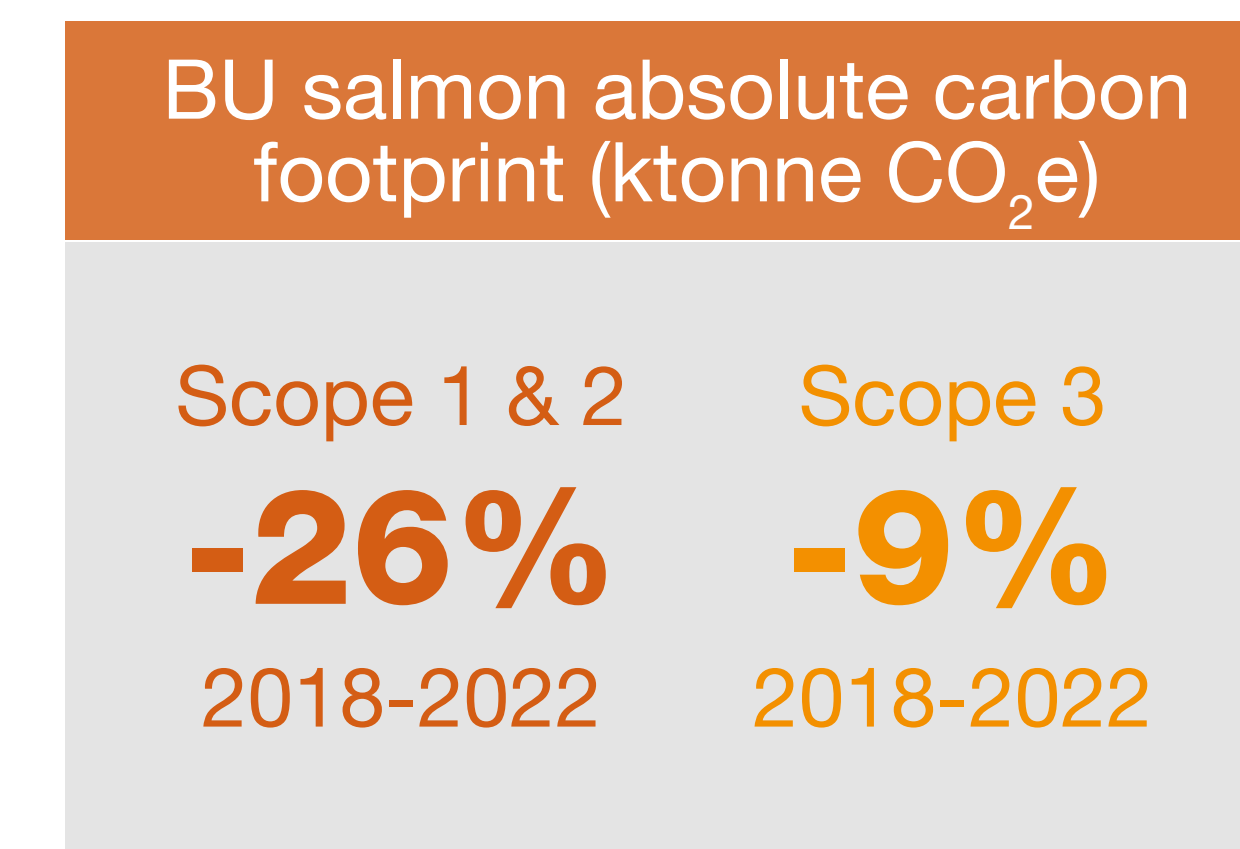
Skretting's global carbon footprint relative to feed produced from 2018 to 2022

# RoadMap 2025 - Climate & Circularity

## Skretting's absolute carbon footprint



Skretting's total absolute carbon footprint at factory gate including scope 1, 2 and 3 from 2018 to 2022 (ktonne CO<sub>2</sub>e)



Skretting's BU salmon and BU Latin America absolute carbon footprint at factory gate including scope 1, 2 and 3 from 2018 to 2022 (ktonne CO<sub>2</sub>e)

# RoadMap 2025 - Climate & Circularity

## Scope 1 & 2 - Improving our own operations

Despite numerous hurdles over the past year, Skretting managed to keep a focus on energy efficiency activities and CO<sub>2</sub>e reduction. Since 2018 our mature OpCos, like BU Salmon (Australia, Canada, Chile and Norway) and BU Southern Europe (France, Italy, Spain and Turkey), made significant reduction in CO<sub>2</sub> emissions and energy (both specific and absolute terms).

These OpCos are operating in consolidated markets and have a history of continuous improvement with a focus on efficiency. They are setting the path for our other OpCos to follow.

As shown, scope 1 and 2 emissions increased in 2022 when compared to 2021. The scope 1 increase is directly correlated with the increase in shrimp feed volume. The specifics of shrimp feed production make it more energy demanding than the fish feed production process. On the other hand, Scope 2 footprint is not highly affected because we are using electricity from renewable sources in our factories in Ecuador.

Increase in scope 2 emissions is related to change in the electricity emission factor in Skretting Norway, from location based to market based (from 0.016 kg CO<sub>2</sub>e /kWh to 0.402 kg CO<sub>2</sub>e/kWh). Skretting Norway consumes 20% of the total electricity in Skretting. Therefore, the effect of the conversion factor change had a significant impact on the overall Skretting scope 2 result. Our Norwegian factories are the leaders of energy efficiency in Skretting, and the local team has already begun exploring options to decarbonise the electricity utilised in our Norwegian factories. Currently, our factory in Stokmarknes is the most energy efficient fish feed plant in Skretting. Read more in the [Nutreco sustainability report](#).

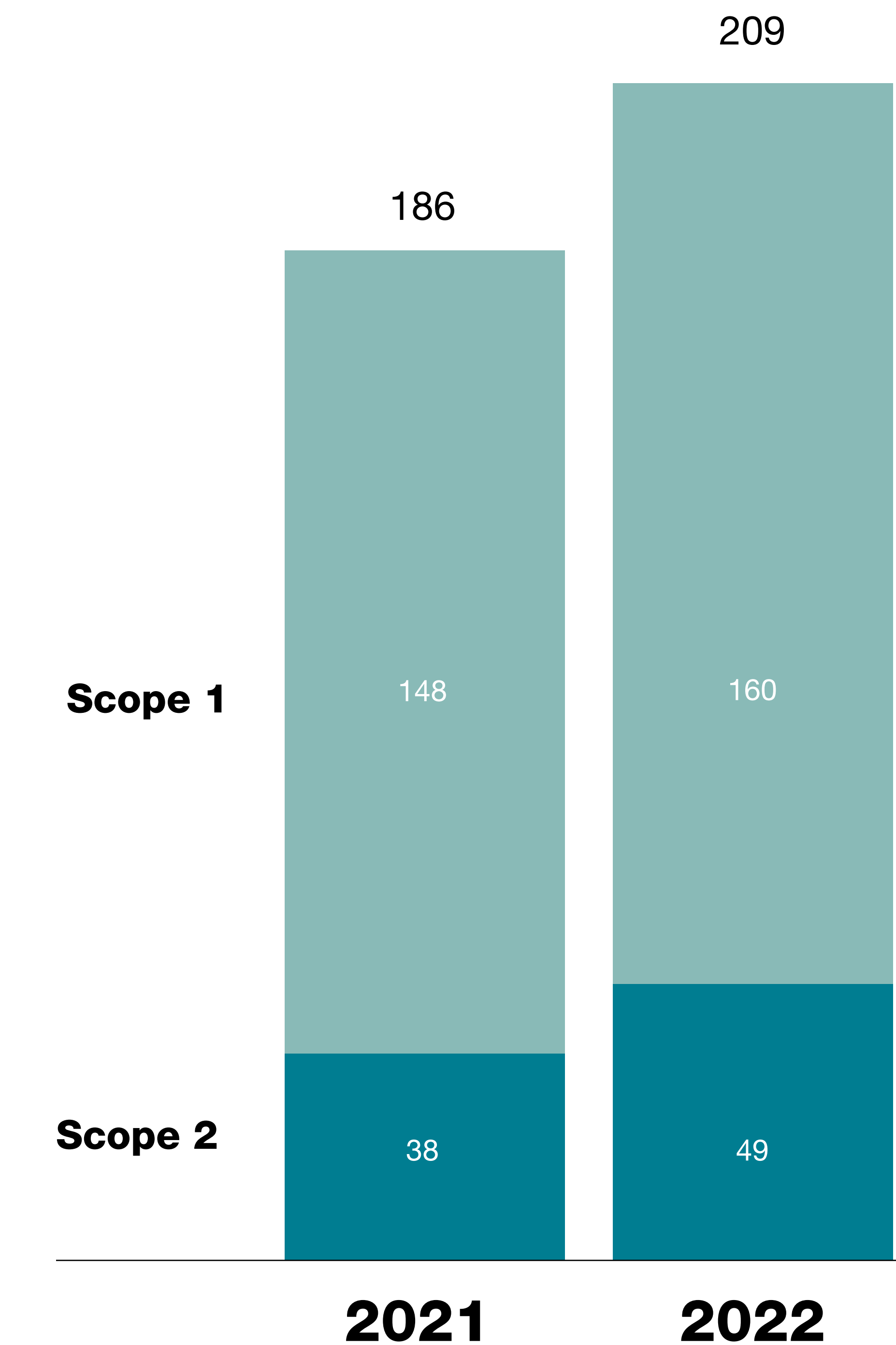
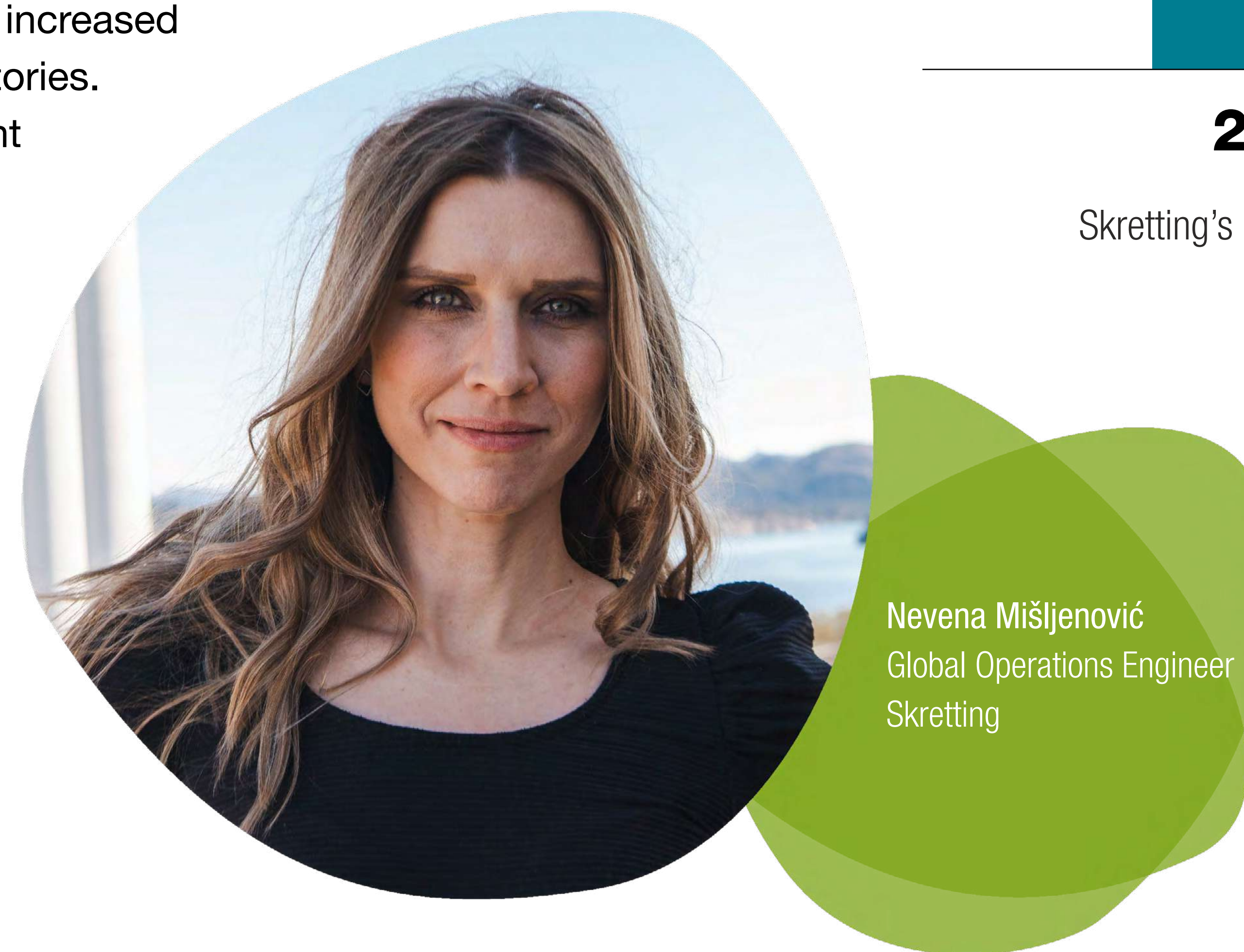
Skretting will keep growing in the future. At the same time, we are committed to reducing our emissions in line with the Science Based Targets Initiative. We are aware that there is no simple and single solution for this problem, so we have started several initiatives across the company to tackle Scope 1 and 2 emissions.

Our approach for Scope 1 reduction includes upgrading our boilers to operate with the less polluting fuel sources, optimisation of dryers and reducing steam usage. For Scope 2 reduction we are developing a cost beneficial plan for de-carbonisation of electricity considering different alternatives like on-site power purchase agreements (PPAs), off-site PPAs and buying energy attribute certificates (EACs) where other alternatives are not feasible.

For us, it is most important that every factory has an energy target, measurement of energy consumption of the main users, to use data to better understand energy flows and make decisions about energy use. Previously we identified gaps in energy monitoring systems in some of our factories. 2022 was a year of closing these gaps.

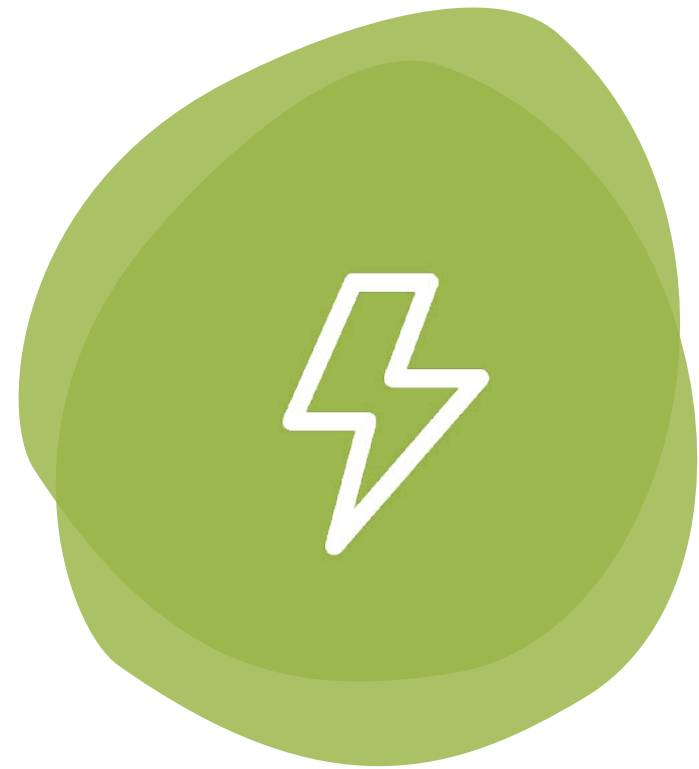
We improved energy monitoring and increased energy reporting frequency of all factories.

Improvements in energy management systems and good data quality are foundation for any future progress in energy efficiency.

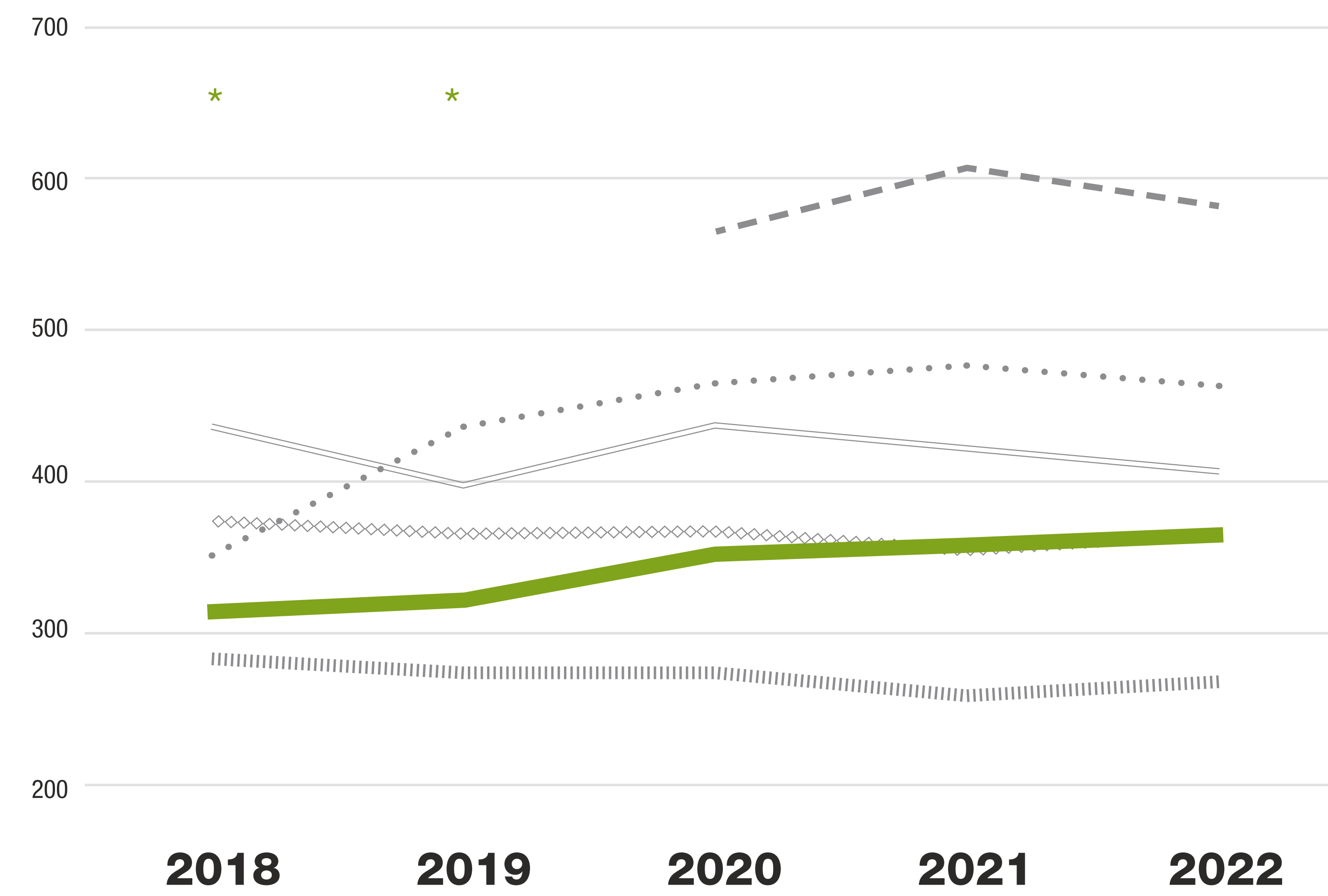


Skretting's scope 1 and 2 CO<sub>2</sub> emissions in ktonnes

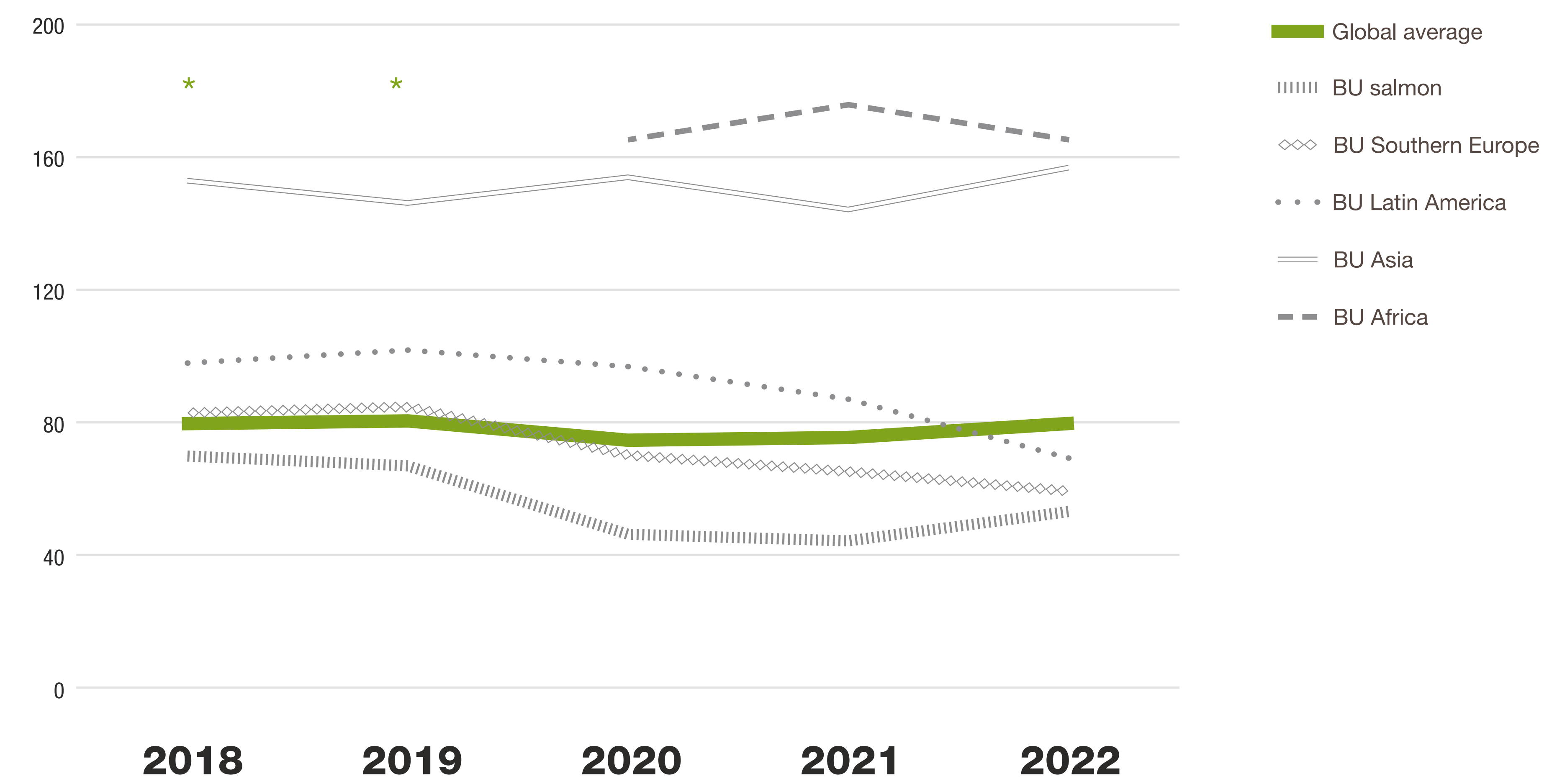




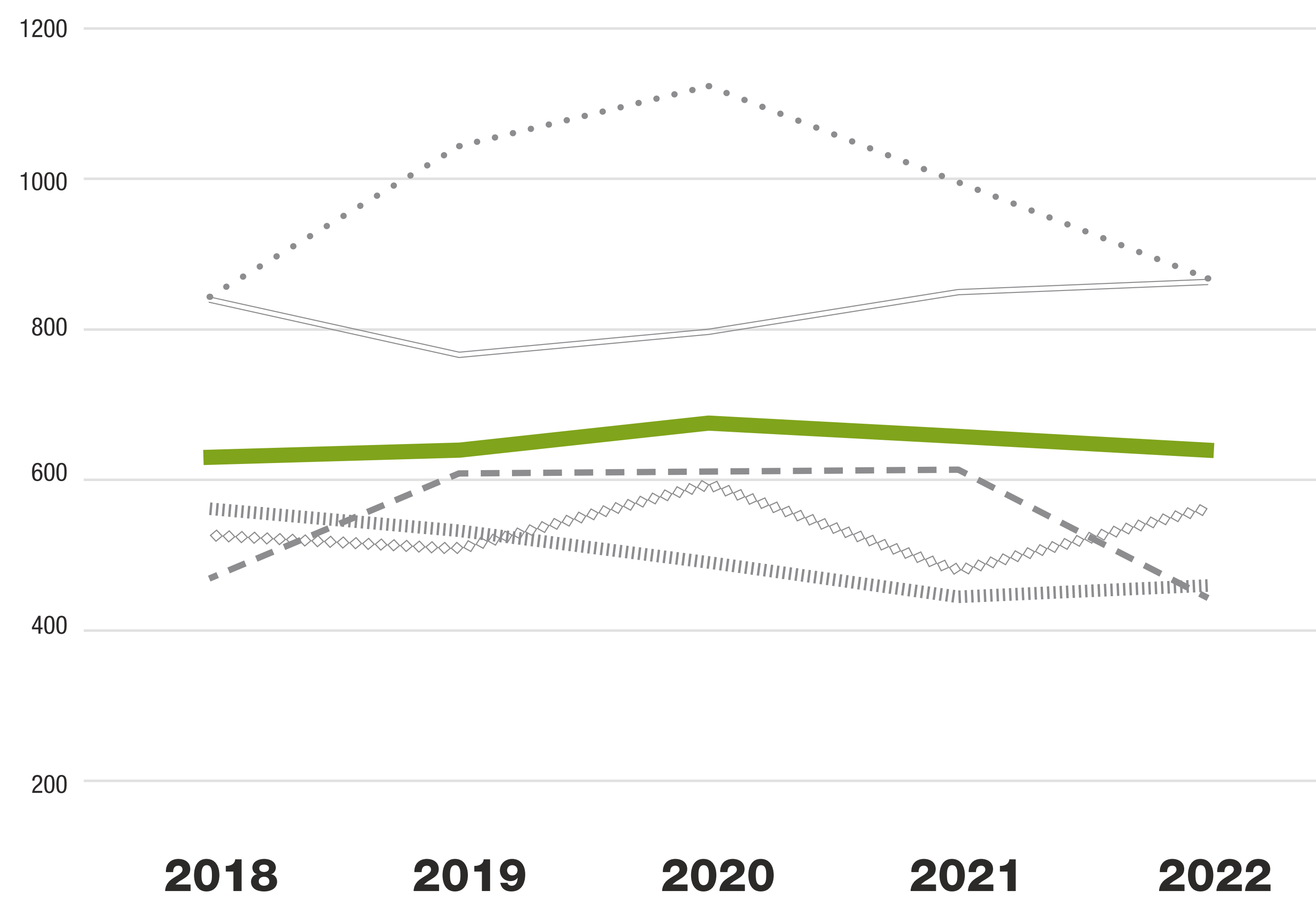
Specific energy consumption - kWh / tonne per BU



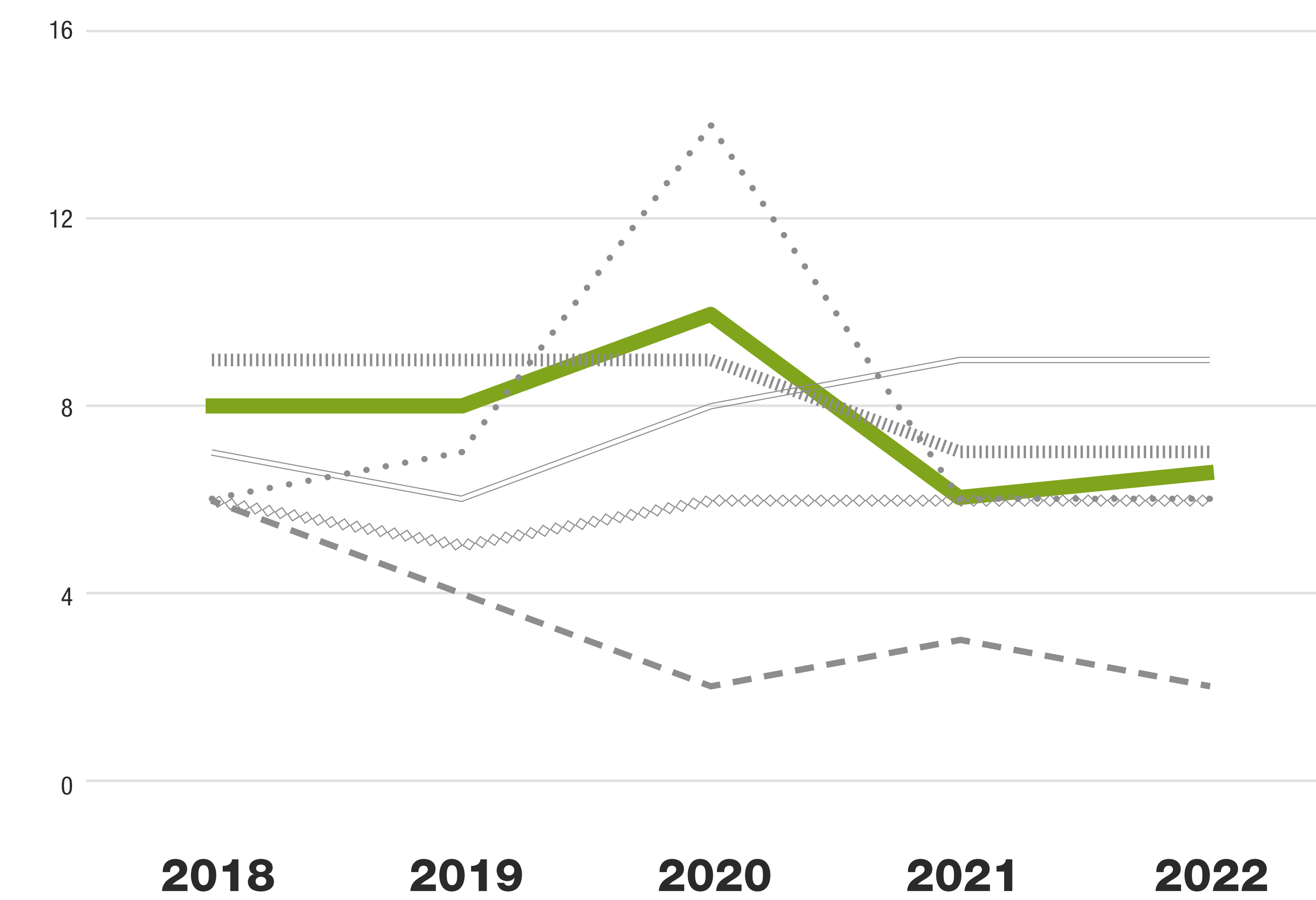
GHG emissions - kg CO<sub>2</sub>e / tonne per BU



Water use - litres / tonne per BU



Waste - kg / tonne per BU



# RoadMap 2025 - Climate & Circularity

## Scope 3 emissions on a global and regional level

In 2022, our scope 3 carbon footprint was approximately 4 810 ktonnes of CO<sub>2</sub>e. This is approximately 1.3 times the greenhouse gas emissions of a city like Amsterdam.

Looking at the scope 3 split by region and business unit we see that the highest contributors to our scope 3 are our salmon business (approximately 44%) and our business in Latin America (approximately 35%). This correlates with the volumes of feed produced in these regions and business lines, but is also influenced by different diets and ingredient sourcing.

Compared to our baseline in 2018, our scope 3 footprint increased by approximately 16%. This is due to our strong growth in Latin America, which counteracts the reduction success achieved for example in BU salmon, where scope 3 emissions were reduced by approximately 9% within the same time period.

This is a dilemma that we are facing today as business growth almost always increases the scope 3 carbon footprint, so that reduction efforts need to be even stronger in order to achieve any reduction success at the company level in absolute terms.

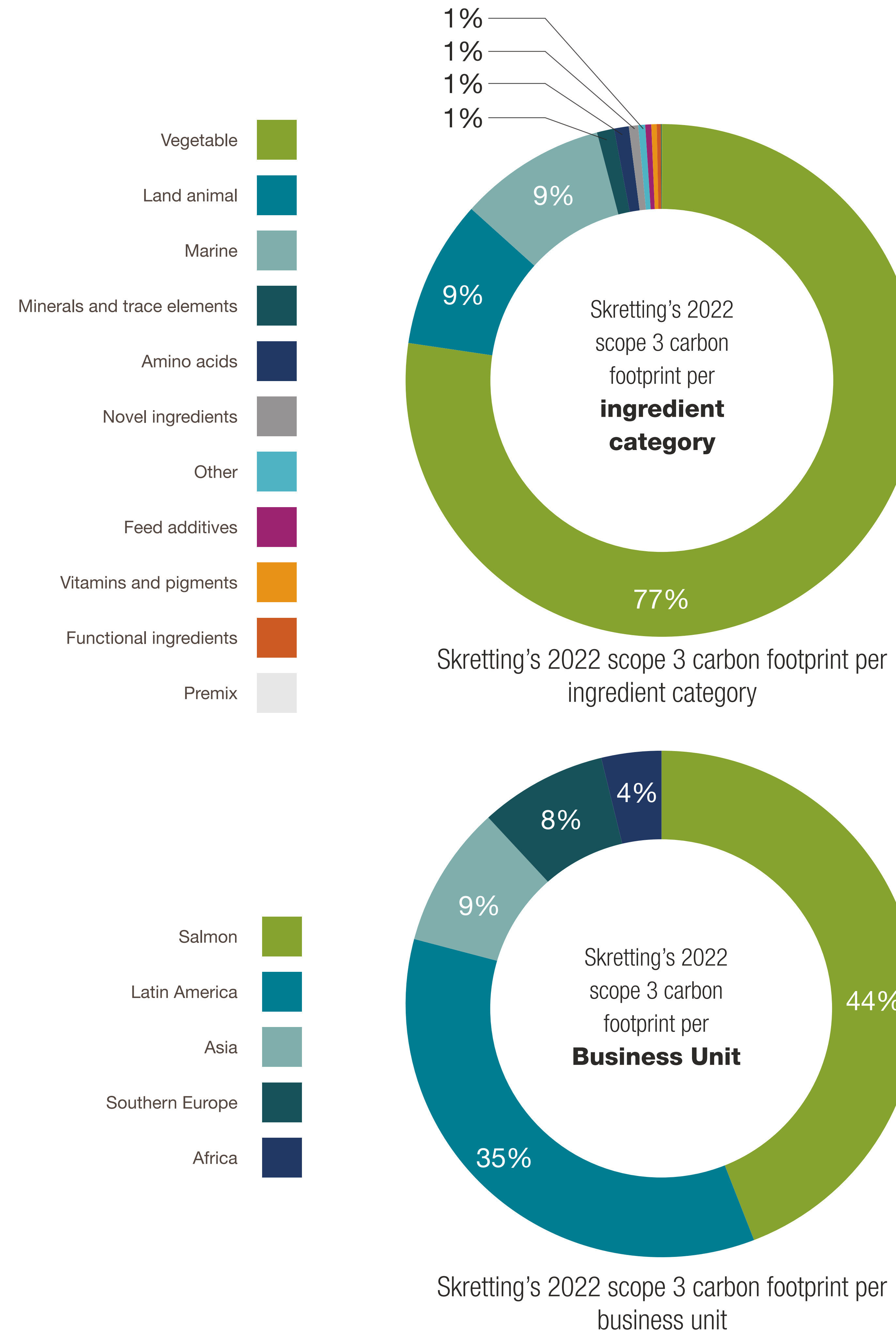
Looking at our scope 3 footprint from an ingredient perspective, we see that most of it (approximately three quarters) is linked to vegetable ingredients.

This is mainly due to land management practices for growing the crops on the fields but also due to land use change that happened up to 20 years ago.

Nevertheless, other factors play a role too, for example energy use for processing the crops into feed ingredients (for example soybeans into soybean meal and oil). Ingredients are unique, and depending on which raw material we are looking at, the carbon footprint drivers behind can be quite different.

Land animal proteins (such as animal meal) and marine ingredients (such as fish meal or fish oil) each contribute approximately 9% to our scope 3 footprint. Microingredients play only a minor role, mainly due to low volumes used in feed.

When we dive deeper into our ingredient footprint, we see that soy-based ingredients make the highest footprint share, followed by rapeseed oil and wheat-based ingredients. The top 10 ingredients comprise almost two thirds of Skretting's scope 3 footprint. This is where we will focus in order to make progress in our scope 3 reduction.



# RoadMap 2025 - Climate & Circularity

## Focusing our efforts on our supply chain

In 2021, Nutreco defined its internal footprint database, which maps all our purchased ingredients with quality assured LCA metrics, aligned with leading LCA standards. The database covers seven different environmental impact categories that are the most relevant for feed products, including the carbon footprint, but also other metrics like water footprint or land use indicators.

In 2022 the focus was on connecting this database to different internal data systems. This is important, because integrations enable us to automate calculations and report the footprint of our products and company. In addition, we can then share this information between business functions and OpCos where the reduction efforts ultimately need to take place.

A significant milestone reached in 2022 was the finalisation of our scope 3 carbon footprint dashboard. This enables us to calculate and track our footprint, while also providing valuable insights into the regions in which we are operating, and which of our local operations, ingredients, and suppliers contribute the most to our corporate carbon footprint.

A second milestone was to better integrate these footprint metrics into our feed formulation software. We completed this in 2022, which gives us a powerful tool to ecodesign our products in future by considering footprint metrics next to price and nutritional quality in product formulation.

This integrated solution also helps us to calculate product footprints in a more automated way, and to understand how different formulation choices will impact our footprint on product level. The integration is now available for all our OpCos and already actively used in our key markets in Europe, North and South America and Australia.

We have also developed an internal tool with which we can calculate the full cradle-to-gate footprints of our products by simply selecting the product packaging, location of the plant and outbound transport information and adding it to the raw material footprint of a specific formulation.

In addition, we have put further focus on gathering supplier LCA data and streamlined this data collection approach based on our scope 3 dashboard insights. In 2022, we requested LCA data from 32 global suppliers via a dedicated LCA data collection and quality assessment template.

When it comes to carbon footprint reporting, in 2022 we have further improved our reporting templates. These are actively used to report carbon footprint values of our products, both on demand and on a regular basis. The reporting templates have been well received by our customers as they give transparent insights into the main drivers behind the footprint, not only per product, but also per life cycle stage or raw material contributions. In addition, the calculation methodology and used data sources are documented.

Marcel Görmer  
Technical Lead Sustainability Metrics  
Nutreco



Significant climate & circularity milestones in 2022



## RoadMap 2025 - Climate & Circularity

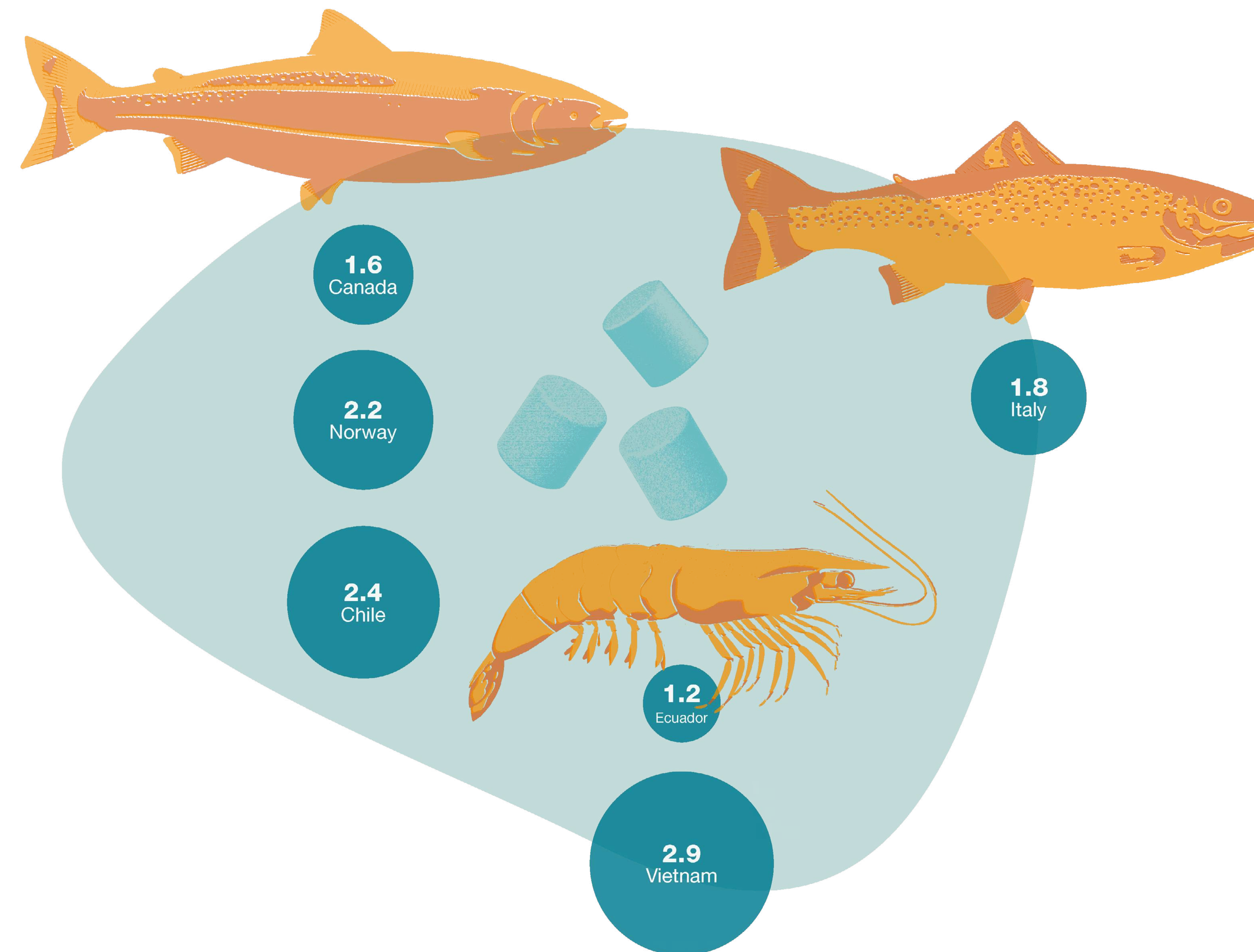
### The carbon footprint of our products

The carbon footprint of our feed can differ significantly depending on the species, but also on the regions and markets where feed is produced and sold.

The difference based on species can be due to the different nutritional requirements within their specific environments, which has a subsequent influence on the type of ingredients that are required in the feed. In addition to nutrition, we have to consider the biophysical characteristics of the feed itself, in order to reduce feed loss and optimise feed uptake, for example.

Moreover, purchasing and regulatory conditions can be quite different in the different regions and countries of the world, which impacts the feed composition, raw material availability and origins, and subsequently the feed footprint.

To provide further insights into these differences and the main causes, the carbon footprint for a range of Skretting feeds is shown on this page. Further on, we take a closer look at the drivers of the differences in carbon footprint per region (for example a salmon feed produced in Canada, Chile and Norway) and also a comparison between species (salmon feed, shrimp feed, trout feed).



The carbon footprint of specific Skretting feed products produced for (L-R) salmon, shrimp and trout in different countries (kg CO<sub>2</sub>e / kg feed)

## The impact of location on the carbon footprint

### Salmon diets

When we examine one specific global salmon diet produced in different countries (Canada, Chile, Norway) as a reference, the carbon footprint from cradle-to-gate [including ingredient production (including land use change), transportation to feed facility, feed manufacturing, packaging and packaging end-of-life] fluctuates between approximately 1.6 kg CO<sub>2</sub>e/kg feed (Canada) and approximately 2.4 kg CO<sub>2</sub>e/kg feed (Chile). This is mainly due to different raw material sourcing, but also because of different ingredients used in the diets. In Canada, the protein source is to a significant extent derived from animal by-products, that come with a comparatively low specific raw material footprint. Further, the vegetable-based proteins and the oil-based ingredients are predominantly locally sourced. This also results in the fact that the land use change share in the Canadian diet is lowest (approximately 16% of the overall footprint) compared to the other two salmon diets.

In Chile, significant amounts of animal by-products are used in the salmon diet. However, largely due to vegetable oil and vegetable protein sourced from South America, with a potential high land use change footprint linked to them, the overall feed footprint is higher than the Canadian or Norwegian value. The land use change share contributes to almost half of the overall diet's carbon footprint in this case.

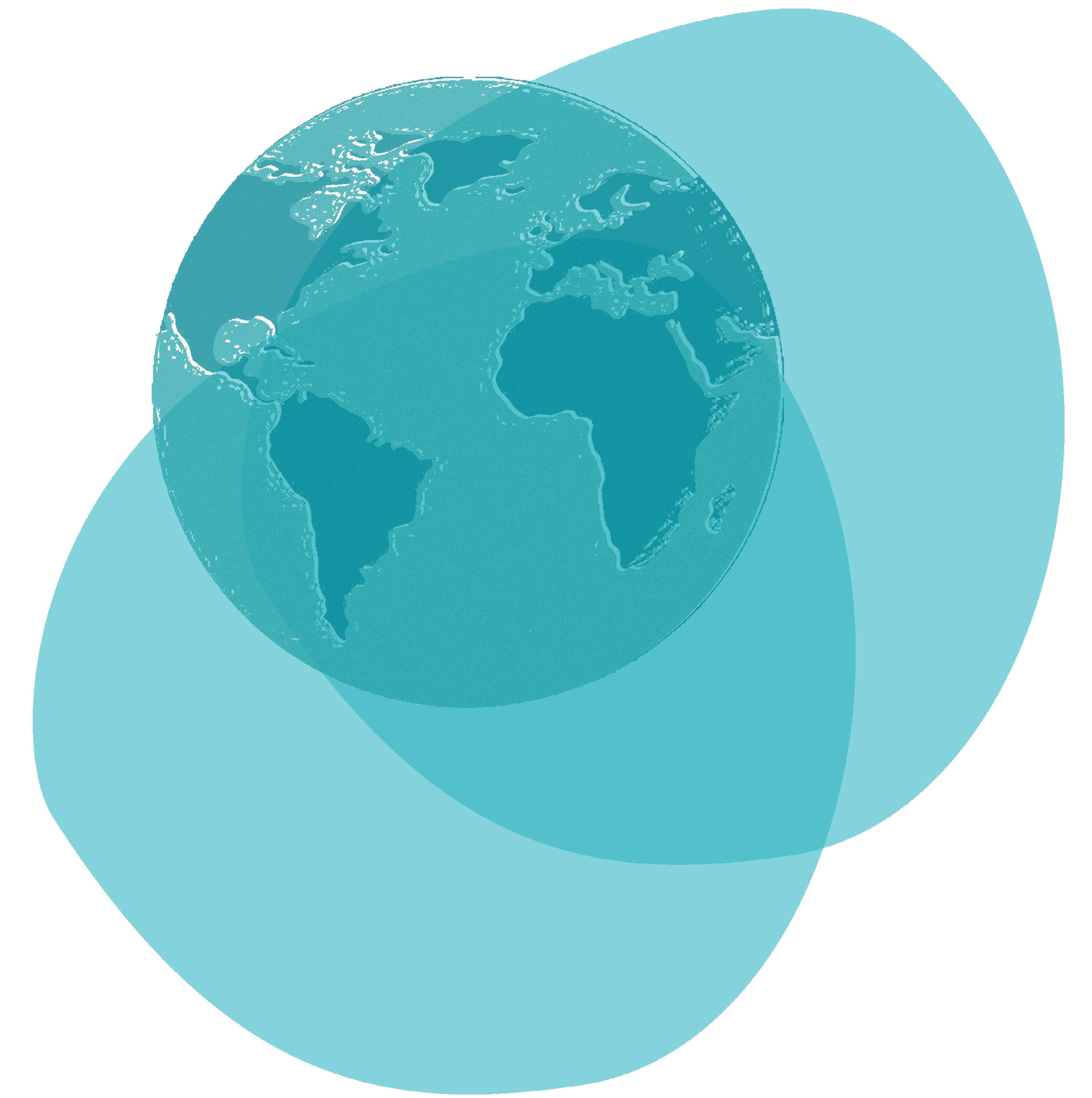
In Norway, no animal by-products are used in the diet, primarily due to market acceptance, which results in a generally higher footprint compared to the Canadian diet. Some of the vegetable ingredients that are used instead are also carrying some land use change share that contributes to the overall carbon footprint. However, despite using more vegetable ingredients, due to sourcing them from specific suppliers with a lower land use change footprint linked to their products, or from Europe, the land use change footprint is lower than, for example, in the Chilean diet, and this results in a lower overall carbon footprint.

Looking at the footprint related to inbound logistics, despite the difference not being so large, we can identify a lower footprint for the Canadian diet. This is due to that in Canada, ingredients with highest inclusion are sourced locally.

### Shrimp diets

Looking at the examples for shrimp diets, the differences in the carbon footprint between the grower diet produced in Ecuador and the diet produced in Vietnam are larger than the ones between the salmon diets. The vegetable protein component and the manufacturing is significantly higher for the diet produced in Vietnam. The key influencing parameter in this case is a high inclusion of soy-based ingredients from South America, which comes with a high land use change related carbon footprint that contributes a significant component of the footprint.

Vegetable-based ingredients also contribute the biggest share in the carbon footprint of the Ecuadorian diet, but due to sourcing from other regions, the land use change share is much lower which results in a much lower carbon footprint of the overall diet. The differences in the footprint related to feed manufacturing are largely due to more energy efficient processes in the Ecuadorian facilities, resulting in a lower specific energy consumption (lower kWh/tonne feed produced) but also due to differences in the energy sources, as the share of renewable energy sources in Ecuador is significantly higher than in Vietnam.



# RoadMap 2025 - Climate & Circularity

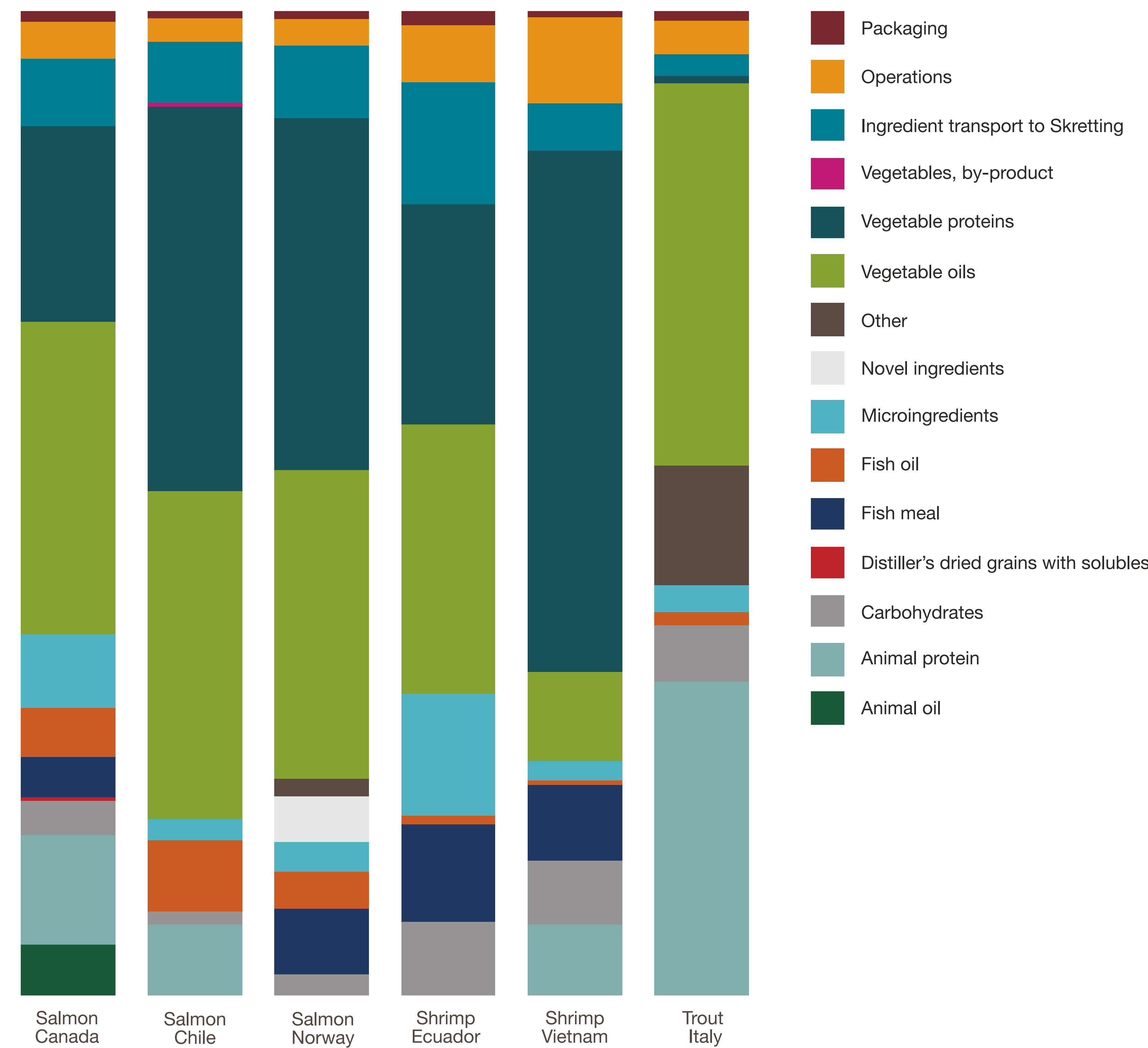
## Footprint drivers between different species

Footprint drivers between the species are primarily due to different feed compositions and the origin of ingredients.

For example, there is a relatively high inclusion of animal by-products in the trout diet that contribute to the carbon footprint. In addition, more poultry-derived animal protein is used, which comes with a higher specific carbon footprint compared to other animal by-products. Minimal vegetable protein ingredients are used in the trout diet and thus this ingredient group contributes the least to the carbon footprint compared to the salmon or shrimp diets.

The shrimp and trout diets also contain more carbohydrates, which explains a slightly higher carbon footprint due to this type of ingredients, despite carbohydrates generally contributing a lower specific footprint compared to for example most vegetable proteins or oils.

Vegetable oils play a similar significant role in salmon diets as in the trout diet, both in terms of volume but also carbon footprint. Despite similar inclusion of vegetable oil used for example in the Canadian salmon diet and in the Italian trout diet, the oil in Italy is sourced from the European market while in Canada most is sourced locally and linked to a lower carbon footprint (in total, but also land use change related). For the Italian diet, the carbon footprint linked to ingredient transport to the plant is lowest across all diets presented, as most ingredients are sourced within Europe.



Skretting's carbon footprint: percentage contribution per sample diet. Each bar represents the entire footprint per diet.

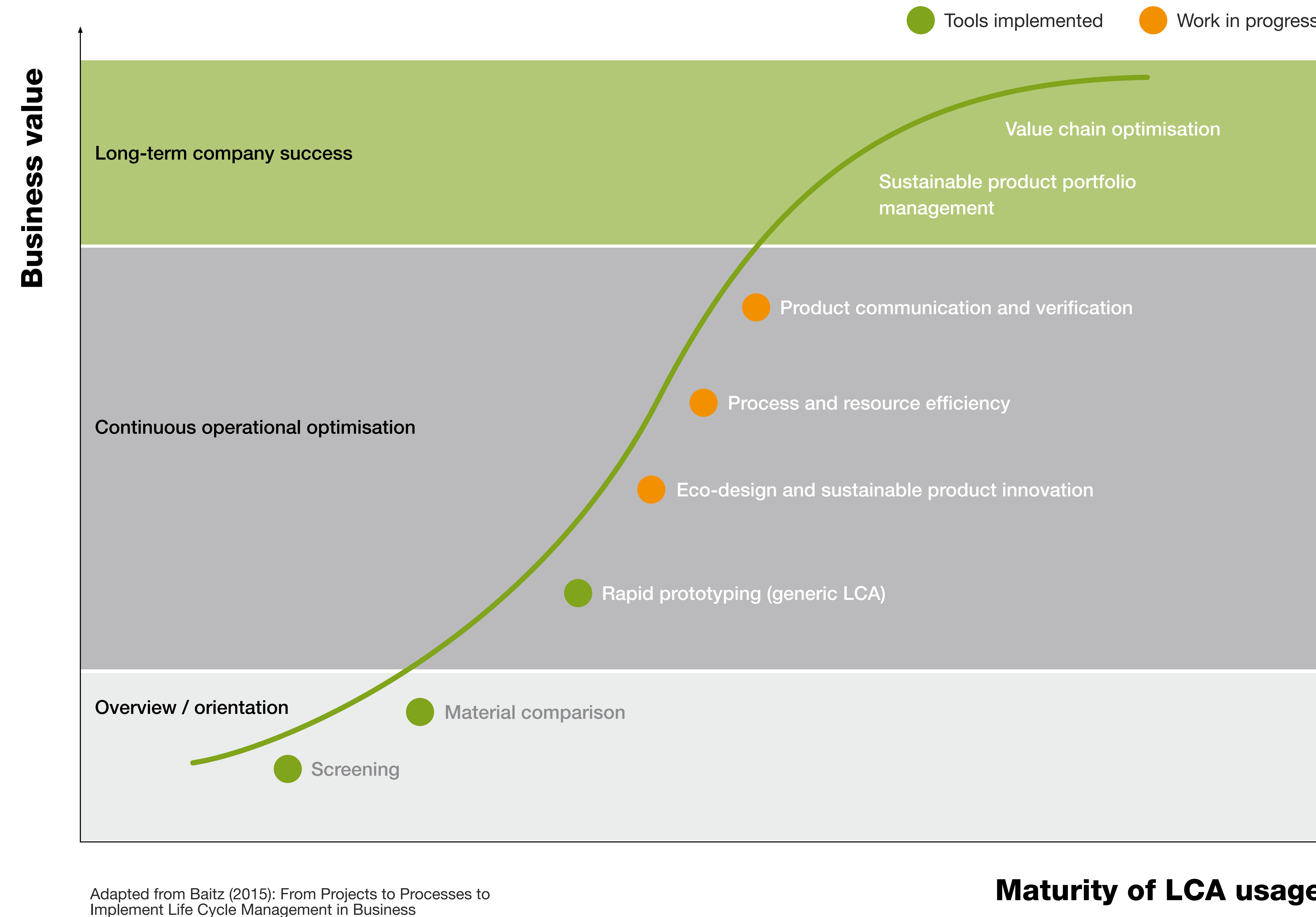
# RoadMap 2025 - Climate & Circularity

## The LCA learning curve

Incorporating the LCA methodology into our business is a long-term process rather than a one-time task that we can simply tick off. For long term success, integrating a new mindset around life cycle thinking and management demands a stepwise approach and needs to involve almost all functions of the business. Data improvements over time will help to make calculations and decisions more robust and meaningful.

Looking at the LCA maturity curve, we have left the orientation phase. With the tools in place, we know about the general footprint drivers of Skretting, our main products and feed ingredients. Furthermore, by connecting LCA data to internal data systems, we are already able to increase the automation in calculating carbon footprint data for different products.

Despite this progress, we are still far from being at the top of the curve. The current focus lies on further optimisation/ automation and certification of processes to more efficiently calculate the footprint of our products in order to meet the increasing customer/stakeholder requests. At the same time, the collection of primary data has begun with a structured approach to reduce data uncertainties and to make better sourcing decisions. The external verification of our calculation setup has also been initiated, and we plan to get this process finished in 2023.



The LCA maturity curve

# RoadMap 2025 - Climate & Circularity

## LCA Challenges

We are facing five core challenges when it comes to LCA - here is what they are and how we are going to address them.

# 1

### Comparing apples to apples

LCA is still relatively new in the broad business environment, and standardisation is an ongoing process.

Robust and comparable data is urgently needed in order to make reliable decisions. This is true for all stakeholders of the value chain.

To deliver reliable numbers to our customers we are following the leading LCA standards, in particular the Product Environmental Footprint standard (PEF), specifically the PEF Category Rules for Feed (PEFCR Feed), based on ISO 14040/44 standards.

We plan to get our LCA approach 3rd party verified in 2023.

# 2

### Knowing ingredient origins

LCA is a data-intensive process, and the results can only be as good as the quality of data that is going into it.

Having good supply chain transparency is key to reduce the uncertainty behind LCA results. For vegetable ingredients in particular, it is not enough to know where our tier 1 suppliers are sitting. We need to trace back to the places of crop production, where a big share of the footprint is created.

We have this information available for the majority of our soy and palm oil ingredients, and want to extend this to other vegetable ingredients (for example wheat, rapeseed, barley) in 2023. At the same time we are planning to integrate this information into our central data systems in order to use it for more automated and accurate footprint calculations.

# 3

### Obtaining more primary data

An important aspect that is often not well addressed when footprint metrics are calculated and communicated, is data quality. Our current scope 3 baseline and the ingredient-related footprint of our products, is mainly based on averages or secondary data. While this is aligned with LCA standards and we take out information only from quality assured LCA databases, averaged data comes with uncertainties.

To generate more accurate calculations and to differentiate better performing suppliers, we need more primary data. We have already begun to request primary data from key suppliers in 2022 but will increase this collection effort significantly in 2023. To create a level playing field and collect data that is comparable, we have developed a specific data collection template including a data quality questionnaire. We also have an internal data quality check procedure to guarantee alignment of supplier LCA data with the leading LCA standards before we take any primary data into our footprint database. We also want to introduce a data quality KPI into our systems that shall allow us to track, validate and consistently reduce data uncertainty.

# 4

### Considering all impacts and the full life cycle

Following the life cycle mindset, knowing the footprint of our products is great, but not enough. There is a risk of shifting environmental burdens downstream, for example if we optimise the footprint of our feed it may become less digestible. In some cases, increasing the footprint of feed might be even beneficial when this leads to a footprint reduction downstream.

To quantify and capture this, we need to set up models that enable us to calculate the environmental impacts from feed digestion and end-of-life on-farm. In 2023 we are planning to build such a model and connect it to our feed footprint calculation system.

# 5

### Dealing with highly volatile raw material prices

The current market is challenging as prices of raw materials are fluctuating. This not only has direct influence on purchasing but also on the sustainability choices, and ultimately on the cost of the feed.

Sustainable procurement often needs longer term commitments which can be challenging in such a volatile market. We believe that incorporating external costs by environmental damage can be a lever and provide a fairer level playing field between low footprint ingredients compared to some high footprint (but low cost) conventional alternatives.

In 2023, we are looking into introducing a carbon price for raising this awareness and also consider it in business cases together with customers and suppliers.



# RoadMap 2025 - Climate & Circularity

## Skretting Italy – a sustainability frontrunner

Over the years Skretting Italy has been recognised as a sustainability frontrunner in Skretting. Last year was particularly successful for the team in Mozzecane regarding their KPIs. The team implemented many improvement projects in the plant that resulted in reduction of energy, CO<sub>2</sub>e, and water per tonne of feed. A continuous focus on dryer optimisation, regular housekeeping and successful implementation of our operational excellence project were key components of the success. In addition, CO<sub>2</sub>e reduction was enhanced by on-site solar electricity generation and replacement of a small service diesel boiler with an electric boiler.

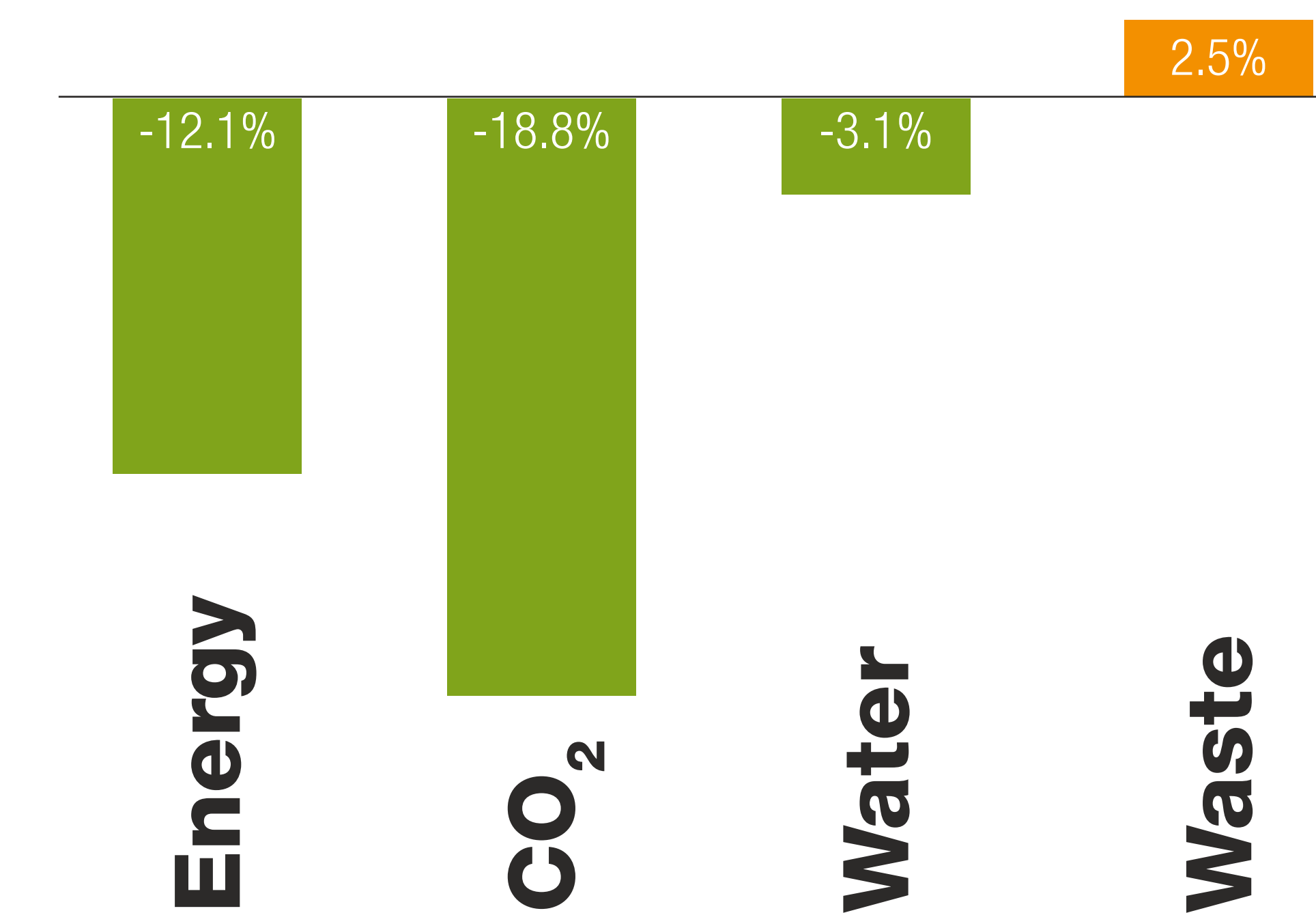
“Maintaining a focus on energy efficiency is the way we work, and not an isolated event,” says Giorgio Ronca, Industrial Manager. “One of the important activities last year was an upgrade of our energy management system. Now we have enough data resolution to identify even a small improvement opportunity in our plant and make decisions about energy projects based on a detailed analysis of energy data. In addition, there are two other ‘magic words’ that have allowed us to obtain these results, involvement and synergy.

Involvement of all production operators, and synergy with the other departments that are part of the value chain. This will be fundamental for future continuous improvement of our energy performance.”

Skretting Italy observed a 2.5% increase in waste per tonne. At the same time, the team introduced post-industrial (PI) recycled material in their polyethylene (PE) bags. The bags are made from three layers of PE with the recycled content in the middle between the two layers of virgin PE. This was a challenging project because many aspects had to be considered to guarantee feed safety.

The most important was to ensure that the source of the PI material is traceable and not contaminated. Skretting Italy ensured compliance with the regulations and carried out a risk assessment that has been approved by the veterinary control authorities. We are proud to share that around 50% of a bag is made from recycled PE without increasing the thickness of the bag. Skretting Italy also uses buckets made from 75% polypropylene post consumption recycled content.

“With around 105 tonnes of bags and over 3 000 buckets purchased in 2022, Skretting Italy recycled over 50 tonnes of plastic,” says Adamo Caldori, Purchasing Responsible at Skretting Italy. “We are fully committed to the Nutreco Sustainability RoadMap 2025, and improving the circularity of plastic material is an important step in this journey.”



Specific energy, CO<sub>2</sub>e, water and waste per tonne of feed at Skretting Italy in 2022 compared to 2021



Members of the team from Skretting Italy. Left to right: Giorgio Ronca, Geremia Schiavino, Luca Battistoli, Severino Bauce

# RoadMap 2025 - Climate & Circularity

## Skretting Norway named PwC's 2022 Climate Winner

Every year, PwC in Norway prepares a climate index, which is an overview of the climate activities and reporting of the largest companies in Norway. Of the 100 largest companies, only 11 companies ended up in category 1 — and Skretting Norway is one of them.

To be awarded the top position, companies must show that they are cutting their emissions in line with the requirements of the Paris Agreement, in addition to excellent and publicly available climate reporting.

“Skretting has made it easy to understand the climate impact the company has had throughout its value chain over the past three years, while at the same time they can show impressive results by cutting their emissions in line with the requirements of the Paris Agreement” says John Wikström, head of strategy and sustainability at PwC Bergen.

Skretting has a long tradition in sustainability reporting, particularly in Norway, and Skretting Norway has set clear and long-term goals for reducing greenhouse gas emissions.

“We have built a lot of expertise in sustainability in recent years. It's nice to get recognition for the work we've done. PwC's climate index shows that Skretting Norway reports climate impact in a way that people can understand. We believe that it is about measuring and working purposefully to reduce greenhouse gas emissions from our production and within our supply chain. In addition, we must be open about the work we do — including the difficult parts,” says Skretting Norway's sustainability and public relations manager Leif Kjetil Skjæveland.

2018 is the baseline year for Nutreco's commitment to the Science Based Target Initiative. For 2021, the year that PwC evaluated, Skretting Norway's fish feed had a reduction of 27% from 2018 in CO2 emissions per kg of feed. For 2022 the reduction is 46% compared to our baseline year 2018.

“Fortunately, we see that we can do a lot when we work together with others instead of going alone. So we are looking forward to PwC's coming climate index for this year too”, says Skjæveland.

Skretting Norway's CO<sub>2</sub> emission reduction compared to 2018 baseline

2021  **27%**

2022  **46%**

In PwC's Climate Index, the companies in category 1 are distinguished by the following:

- Open and good reporting of the company's greenhouse gas emissions at least three years back in time
- Clear specification of which sources of emissions are included in the calculations
- Climate accounting that includes all significant emissions in scope 1, 2 and 3
- Reporting showing cuts in carbon intensity and/or absolute emissions
- Average emissions cuts over the past three years, which are in line with the requirements and expectations of the Paris Agreement
- Emission cuts appear to be permanent and not temporary

# RoadMap 2025 - Climate & Circularity

## ACT! Actions to help improve the world

What do a Swedish environmental activist, a 70s rock star and a new Norwegian law have in common? The answer is the word ACT! and it has become Skretting Norway's practical way of kicking off their new sustainability actions.

Greta Thunberg has asked us to stop the “blah, blah, blah” and instead act as if the house is on fire. Sir Bob Geldof said that “if you act instead of just thinking about doing something, then it will happen”. And finally, The Norwegian Transparency Act of 2022 says that all large Norwegian companies should carry out human rights due diligence in its own business and value chain.

That is why Skretting Norway has chosen to call their sustainability work ACT! There are currently 12 actions customers can select to start working on — together with Skretting. In short it has actions to reduce the green house gas emissions in the supply chain and to select raw materials that are more footprint friendly, plus ways to move more towards a circular economy. And finally it is about social responsibility and governance.

“When we started our work to find out concrete actions that we in Skretting could implement for sustainability a few years ago, we first thought that we could launch a special green feed to the market. We have abandoned this mindset, because we believe that sustainability work requires collaboration, and that different companies will emphasise different focus areas and have different capacity for action. In addition, it will probably turn out that some of the measures we think are good today may not be that effective, while there will be other excellent initiatives that we have not seen the contours of yet,” says Leif Kjetil Skjæveland, Sustainability and Public Relations Manager in Skretting Norway.

## It's about beginning

“Our customers have ambitious sustainability targets, and to help meet them, we need to get started. We think it's about beginning. It's about us being able to make a difference together with our suppliers and our customers. And it is about having as concrete activities as possible. Nature is practical and concrete, and so must our sustainability work be,” says Mads Martinsen, director sustainability and product development in Skretting Norway.

A success factor is also the ability to quickly take on new initiatives, which can inspire ourselves, our customers, and our suppliers to drive the businesses in a more environmentally-friendly direction and improve working conditions in our supply chain.



Leif Kjetil Skjæveland  
Sustainability & Public Relations Manager  
Skretting Norway

## The current 12 actions

The following are the initial suggestions for ESG activities that Skretting Norway and their customers will carry out together:

1. Reduce Land Use Change (LUC) for the raw materials we source
2. CO<sub>2</sub> reduction by working close with selected suppliers in our value chain
3. Help develop more novel ingredients so we can have a larger and more versatile ingredient basket
4. Include raw materials with a lower footprint or from a circular economy
5. Social programs to improve the situation where we source our ingredients
6. Lower emissions and less use of phosphorus and zinc by including phytase in the feed
7. Sludge handling to utilise this valuable resource
8. Health monitoring as a tool to prevent that a fish dies unnecessarily as nothing is as wasted as a dead fish
9. Sustainability reporting to ensure that our and the customer's governance is transparent and to measure that we move in the right direction
10. Certificate of origin for renewable electricity
11. Transport with lower CO<sub>2</sub> with hydrogen powered trucks for feed transport (land-based)
12. Carbon offsets with local tree planting as an additional solution to lowering scope 1, 2 and 3

## RoadMap 2025 - Climate & Circularity

### Skretting Chile enters Clean Production Agreement with SalmonChile

In Chile, the promotion of cleaner production is promoted and coordinated by the National Council for Clean Production (NCCP), an institution under the Ministry of Economy. One of the goals of NCCP is to contribute to reducing greenhouse gases through its main management instrument, the Clean Production Agreement (APL).

The purpose of the Clean Production Agreement coordinated by SalmonChile is to move ahead with real and tangible solutions to reduce the environmental gaps in salmon farming in Chile, specifically regarding carbon footprint and the generation of solid waste.

The agreement is in line with RoadMap 2025, as an important part of the value chain of the national aquaculture industry, responsible for feeding a growing population.

Skretting Chile adheres to four of the seven goals set forth in the APL, with an 87,54% progress in terms of achievable actions as of the date of this report:

- Goal 1: Skretting Chile implements a corporate management with a focus on sustainability.
- Goal 2: Skretting Chile sets a mitigation goal for its GHG emissions to be achieved at the end of its implementation.
- Goal 3: Skretting Chile has a waste implementation system and guidelines for adding circular economy into its operations.
- Goal 5: Skretting Chile designs new circular business models as a supplier to the salmon producing companies.

The APL certification ends in the second half of 2023, and Skretting Chile has verified and delivered evidence that ensures compliance of the goals with committed actions, designating the right employees to work on the concrete development of strategic plans for the future.



## RoadMap 2025 Good Citizenship

This pillar of RoadMap 2025 is primarily focused on diversity and inclusion. We will address this by ensuring we empower local communities with best practices and technology to ensure that aquaculture offers a sustainable path to healthy living.

In addition, we address good citizenship internally, ensuring that we continue to be a diverse and inclusive employer.

We aim for our teams to reflect the diverse and global society we live and work in, and to be the change we want to see. We want everyone to thrive in an environment where we feel valued and respected, in a culture that brings out the best in all of us.

To help us succeed in Feeding the Future, we welcome everyone as valued members of our family, with equal opportunities to be the best we can. We respect people for who they are and embrace diversity, listening to and learning from each other's unique perspectives.

### Our targets



30% women in senior leadership by 2025

### Our progress

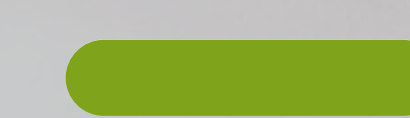


22% women in leadership



Implement the Taking the Stage program

Over 200 women leaders took part in Taking the Stage in 2022 on a Nutreco level



# RoadMap 2025 - Good Citizenship

## Progress towards our goals

During 2022, we continued to focus on our three key D&I areas:

- **Balanced gender representation.** By 2025, our goal is to have 30% representation of women in leadership positions. We are currently at 22%, which means we will need to accelerate this progress to reach our ambition. We have specific recruitment targets aimed at improving female representation and we review them as part of our internal reporting and audit process. We also put special focus on improving gender representation in our talent pipeline.
- **Increased nationality representation.** We continued to perform strongly in this area. During 2022, the number of nationalities represented across our business in Skretting grew to 73.
- **A culture that promotes inclusion.** In 2022, our pulse survey included one D&I question, but not the full set required for an inclusion index. We also launched a new set of company values to align better with our Nutreco strategy and our parent company SHV's core values and to support our purpose of Feeding the Future. Our new value of "inclusion" provides a stronger platform to promote inclusive behaviours and culture. One example of how we visibly promoted inclusion in 2022 was by creating female dressing rooms in our Operations facilities. This small change is foundational for hiring more women in Operations.

## Partnership between Skretting Chile and the Inspiring Girls Chile Organisation

For the second year running, Skretting Chile has collaborated with Inspiring Girls to hold talks between women industry leaders and teenage girls from several educational establishments of the Los Lagos region.

In 2022, women leaders of the aquaculture industry were included, representing a number of Skretting Chile's customers. The leaders provided professional "speed dating" sessions with girls of school age from educational institutions in the south of Chile - the first partnership of Inspiring Girls Chile outside the Chilean capital.

The project, which is in line with our pillar of Good Citizenship, aims to promote professional ambition among the students, reinforce self-confidence and foster connections with women who are leaders of different areas, in this case, with salmon farming industry. In addition, the organisation provides training to the speakers on "impact communication techniques", helping in the development of soft skills to achieve effective communication with the students.



Inspiringgirls 

## RoadMap 2025 - Good Citizenship

### Committing to remove plastics from the oceans

It is estimated that eight million tonnes of plastic pollution enter the oceans every year. It is also estimated that marine plastic pollution generates a cost of up to 2.5 trillion dollars each year. With the aim to promote actions to reduce ocean plastics pollution and as part of SeaBOS's transformation efforts for a healthy ocean, in 2022 Skretting and Nutreco again participated in a coastal clean-up for marine plastics. In addition to removing pollution from beaches, we used the opportunity to communicate the challenge that ocean plastics present for the marine environment, as well as show that individual actions can have an impact.

Colleagues from the Skretting global and local offices in Norway, in addition to Australia, Canada, Chile, Ecuador, France and Vietnam joined the initiative. In total, more than 260 colleagues contributed to remove approximately 3,670 kilograms of pollution from the beach and waterways during the activity, which represented an increase of 56% and 465% respectively compared to 2021.



Clean up activities around the world (top to bottom: Vietnam, Chile and Canada)

Check out this video from the clean-up by the Skretting Vietnam team



## RoadMap 2025 - Good Citizenship

### A new era for Rwandan aquaculture

Gishanda Fish Farm is a new socio-economic aquaculture development initiative introducing the innovation and skills capable of accelerating sustainable food production in the Akagera National Park region of Eastern Rwanda. Opened in October 2022, the initiative is also aiming to create employment opportunities for surrounding communities, and an accessible source of locally-produced protein.

Supported and co-funded by the Netherlands Enterprise Agency (RVO) and Skretting and Nutreco's parent company SHV, the catalytic partnership project is the brainchild of conservation organisation Akagera National Park and public-private initiative FoodTechAfrica.

"It may seem an unusual move for a conservation organisation to be building and running a fish farm. However, our goal at African Parks is to leave a legacy of sustainability, for both communities and protected areas. This project addresses sustainable land use, biodiversity conservation and improving community lives," said Ladis Ndahiriwe, Park Manager of Akagera National Park.

Located six miles from the main gate of Akagera National Park, Gishanda will utilise the latest recirculating aquaculture system (RAS) and solar technology to sustainably farm and harvest fish.

The facility will demonstrate that catfish production is an accessible protein option for communities, and that besides producing essential nutritious food, tilapia farming can serve as a model of circular agriculture with the farm effluent fertilising an on-site organic vegetable farm.

It's estimated that 1 million tilapia fingerlings will be made available annually for commercial sale to bolster the Rwandan aquaculture sector, and that a further 300 000 to 400 000 will be used for restocking lakes in the region, thereby generating locally-viable sources of protein and economic growth on a national scale.

In the long-term, and alongside producing a high-quality strain of tilapia fingerlings, Gishanda will produce up to 30 tonnes of 350-500 gram market-ready tilapia annually. At least 10% of this will be supplied locally at affordable prices to combat local nutritional deficits.

Training and upskilling are at the heart of the project, with the aspiration for Gishanda to become a national learning hub for the aquaculture sector.

As such, it will partner with educational and government institutions as well as the private sector to address skills gaps as the national aquaculture industry grows.



Three catfish demonstration ponds have been built onsite to teach household level catfish farming to community members. Additionally, pond supplies (lining) and assistance will be provided to the local population – to develop catfish farming for nutritional and enterprise purposes.

Partnering with organic farming experts in Rwanda, Gishanda will also develop a demonstration farm to teach local farmers methods in sustainable agriculture.

The garden will also be offered as a business to a selected community cooperative who will benefit from hands-on technical, sales and financial training to develop a viable and sustainable business.

Nutreco Middle East and Africa is acting as a key sponsor and feed partner for all aquaculture activities at Gishanda.

Gishanda is the second fish farm of its kind in Rwanda. In 2019, FoodTechAfrica developed and opened Lakeside Fish Farm in Bugesera.



## RoadMap 2025 - Good Citizenship

### Collaborative effort towards ASC certification of red seabream

In recent years, there has been a growing concern about the sustainability of seafood and the impact of farming on the environment. One way to address this issue is by obtaining certifications for sustainable seafood products. Our customer successfully obtained Aquaculture Stewardship Council (ASC) certification for red seabream, becoming the first in the world to do so. Skretting Japan played a key role in encouraging and supporting our customer in this process.

As part of our commitment to sustainability, we have been advocating for eco-certifications for sustainable seafood products. We believe that this is essential for preserving marine ecosystems and ensuring the long-term viability of the seafood industry.

When we learned that our customer was interested in obtaining eco-certification for red seabream, we provided them with the necessary guidance and support. We helped them prepare the necessary documentation, and we were present during the audit to provide assistance and answer any questions.

Our efforts paid off, and our customer successfully obtained the eco-label certification for red seabream. This was a significant achievement, not only for our customer but for the seafood industry as a whole. It demonstrated that it is possible to fish sustainably and still be profitable. With this experience, we offered the eco-label solution to other customers, and we now have a second red seabream farmer ASC certified.



Following the certification, our customers have been successfully selling the certified fish to nation-wide supermarkets or restaurants. This shows that there is a growing demand for sustainably sourced seafood, and that eco-certifications can be an effective way to meet that demand.

Overall, the successful eco-label certification was a collaborative effort between Skretting Japan and our customers. We were committed to supporting our customer in their efforts to obtain eco-certification, and we were proud to be a part of this groundbreaking achievement.

Moving forward, we will continue to advocate for eco-certifications for sustainable seafood products and support our customers in their efforts to obtain them.

“This is just the beginning. We will continue our efforts to contribute to society and the development of the aquaculture industry, and aim to make the aquaculture industry more sustainable,” said Masaki Urata, President of Urata Suisan.



Masaki Urata  
President, Urata Suisan

### Collaborating with a local NGO to provide food for those in need

In a world where access to food is not a given for everyone, initiatives to help people facing financial hardship are essential. One such initiative is the food bank, which provides food and other necessities to those who cannot afford them. In 2022, Skretting Japan collaborated with a local NGO to provide food for those in need.

Our colleagues brought various types of food to contribute to the food bank. These included canned food, packaged food, vegetables they had grown themselves, baby food and much more. We were able to distribute food to many people who were struggling to make ends meet. The food bank not only helped to address hunger, but it also provided much-needed relief to families who were facing financial hardship.

We also asked our customers to donate fish, which we used to make lunch boxes that we distributed to people facing financial hardship. By donating fish, our customers could make a contribution to the community, and this helped to build a sense of unity and purpose among everyone involved.

The food bank initiative also had other benefits. It helped to reduce food waste by encouraging people to donate unused food that would otherwise have been thrown away.

This activity showed that small initiatives can have a significant impact on people's lives and that community involvement is essential to the success of such initiatives. We hope to continue collaborating with our local NGO and our customers to address issues related to poverty and hunger in our community.



## RoadMap 2025 - Good Citizenship

### Collaboration with the University of Stavanger

The collaboration between the InGenious program at the University of Stavanger and Skretting was established in 2022. InGenious is a challenge-based program, where students work on different cases provided by industry or public sector which must be linked with at least one UN Sustainable Development Goal.

In 2022, the masters students taking the course in “Green Transition – IND 570” worked on a case presented by Skretting. The challenge was how to reduce CO<sub>2</sub> emissions by 30% across our three Norwegian factories, while keeping production volume and profitability.

The students were supervised by Professor Ruth Beatriz Pincinato and Skretting Global Operations Engineer Nevena Mišljenovic.

“It was valuable for students to deal with a real-life challenge and work on a case that needs to satisfy environmental, economic, technical and ethical criteria at the same time,” said Beatriz. “We also got a chance to visit the Skretting factory in Stavanger and get an insight into feed production process, the main emission sources and aquaculture challenges in general.”

The University of Stavanger aims to be an open and inclusive university committed to delivering exceptional education, conducting ground-breaking research, and promoting innovation. Our shared vision is driven by our responsibility to facilitate a sustainable transition. The InGenious program serves as a platform to engage the industry in our study programs and bridge the gap between the academic world and the corporate sector, complementing our strategy and mission. “We were extremely grateful for the opportunity to collaborate with Skretting, which proved to be a valuable learning experience for our students,” said Nelly Narges Karimi, Program Leader University of Stavanger.

Having a chance to get in touch with fresh ideas and new methods for assessing GHG emission problem was useful for Skretting. “It was great to get an insight into new technologies available, many still on small scale or in development, but very promising,” said Nevena. “Seeing how different groups of students approached the same challenge from different angle was very interesting.”



From left to right: Can Özkan, Nora Rahimi, Edem Kojo Bessie Blay, Ruth Beatriz Pincinato, Nevena Mišljenovic, Mandana Pourmomen Jorshari



## Ingredient deep dive

The ingredients that we use in our feeds are a fundamental component of our sustainability objectives, with 96% of our total emissions coming from scope 3 ingredients. In this chapter, we take a deep dive into our ingredients, with a focus on soy and marine, and we also describe measures and collaborations in place to minimise our impact.

## From sustainable raw materials to high-performance nutritional solutions

The production of fish and shrimp feed is an intricate matter. Strict criteria regulate the physical quality of the pellets, and sophisticated process equipment is needed. Raw material procurement is a big cost driver, so a significant part of the feed production research aims to increase both raw material flexibility and functionality.

Every improvement in product technology can lead to better quality, increased efficiency and a more sustainable process. We produce more than 3 million tonnes of feed each year, which means that even small improvements can add up to big numbers.

### Our targets



### Our progress



Source 100% of marine ingredients from sources audited and certified by MarinTrust or MSC

84% of our whole fish and trimmings are MarinTrust, MSC or MarinTrust-FIP certified



All purchased soy will be deforestation-free by 2025

97% of our purchased soy is in class A or B according to our sourcing policy



Ensure that by 2022, all agricultural vegetable products are traced back to the country where they were cultivated, to use in a risk filter and for footprinting requirements

We have traceability for soy and palm ingredients to the country where they are cultivated. Unfortunately, we have not yet successfully implemented a traceability system for other vegetable ingredients due to the complexity of supply chains and the significant increase in administration that comes with it, both for us and our suppliers. In 2023 a team will be set up to take this further.



5-10% of feed ingredients come from alternative novel sources

Important increase on the use of novel ingredients used in 2022, bringing the total to 1% in Skretting



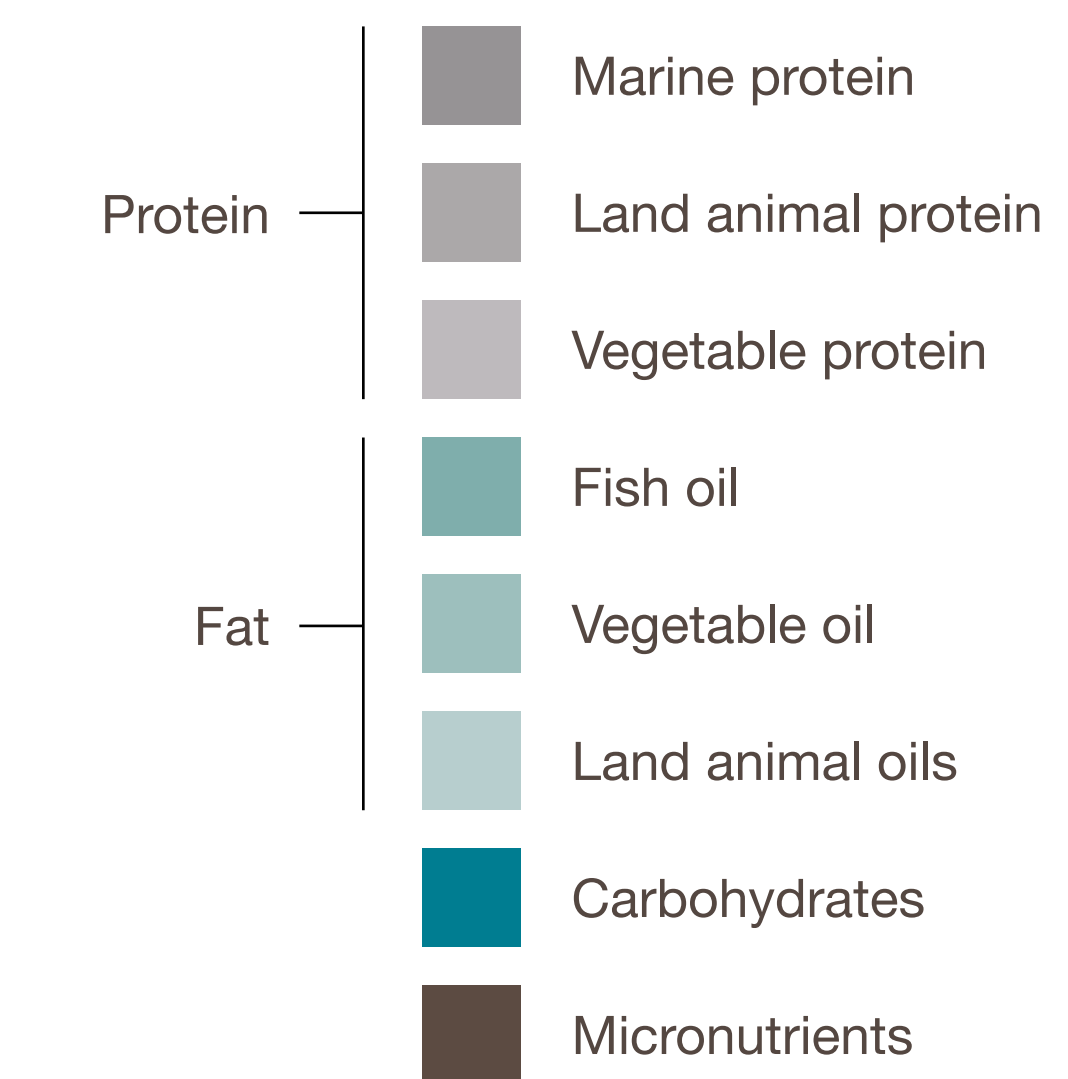
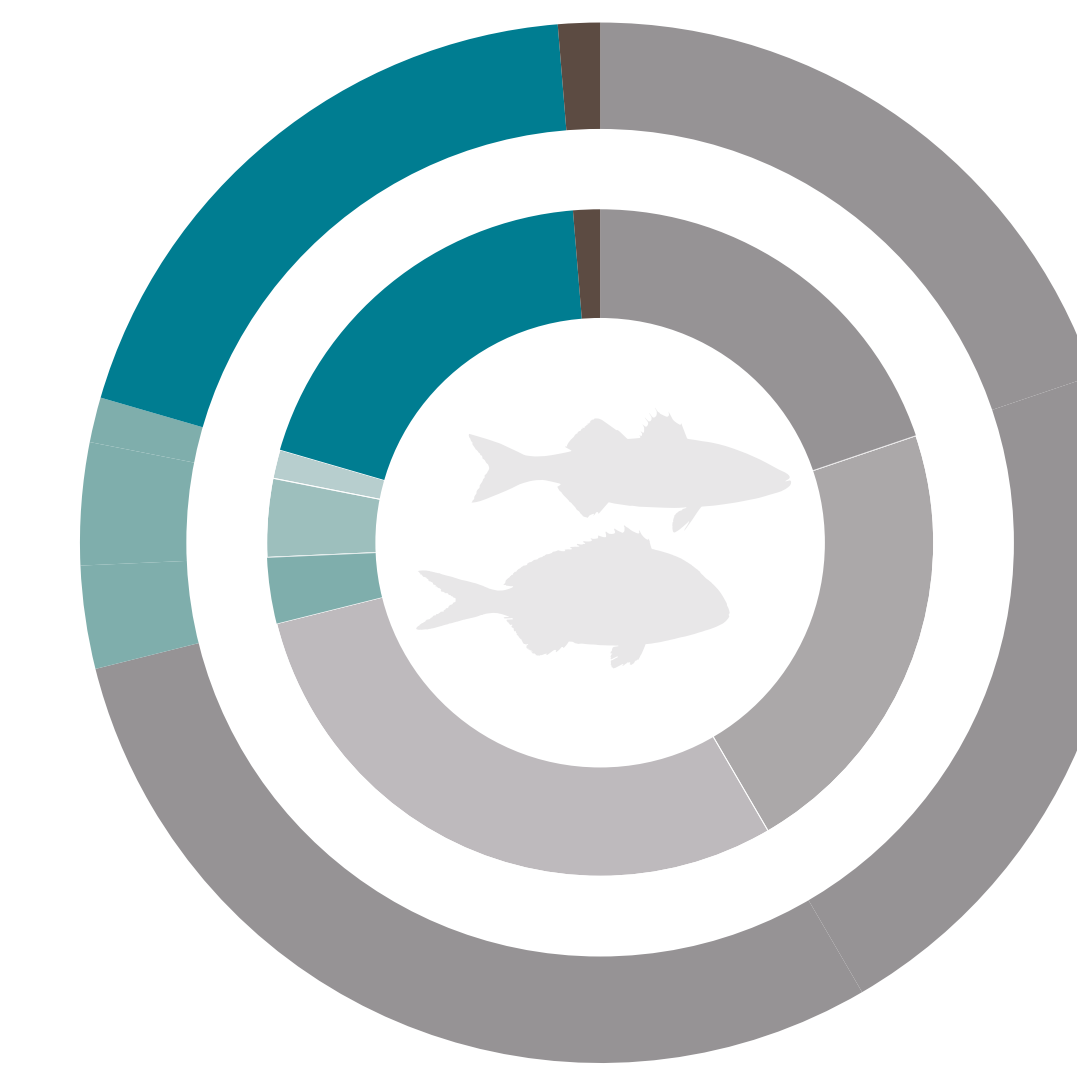
# What ingredients are in Skretting feed?

Average ingredients in Skretting grower feed per species

	Primary raw material	Ingredient group	Typical examples	average % inclusion in feed				Average Skretting
				Salmon	Sea bass & Sea bream	Shrimp <sup>2</sup>	Tilapia	
<b>Protein</b>	Wild capture and farmed fish and crustaceans	marine proteins	fish meal, crustacean meal	13.2	19.8	11.3	1.2	<b>12.6</b>
	By-products from farmed land animals	land animal proteins <sup>1</sup>	poultry meal	13.3	21.8	4.5	9.6	<b>10.2</b>
	Agricultural crops	vegetable proteins	wheat gluten, corn gluten, soybean meal, soy protein concentrate, rapeseed meal, sunflower meal, lupin, faba	33.3	29.5	43.1	41.6	<b>35.4</b>
<b>Fat</b>	Wild capture, algae, farmed fish and crustaceans	fish oil, algal oil	fish oil, algal oil	9.7	3.2	1.5	0.3	<b>5.7</b>
	Agricultural crops	vegetable oils	rapeseed oil, soybean oil, camelina oil	18.1	3.8	2.6	0.2	<b>9.0</b>
	By-products from farmed land animals	land animal oils <sup>1</sup>	poultry oil	1.5	1.4	0.0	0.0	<b>0.9</b>
<b>Carbohydrates</b>	Agricultural crops	starch raw materials	wheat	9.0	19.2	29.5	42.2	<b>19.5</b>
<b>Micronutrients</b>	Various	vitamins minerals pigments	vitamin premixes, mineral premixes, pigments	1.9	1.3	7.5	4.9	<b>6.7</b>

<sup>1</sup> Use of land animal by-products will depend upon market acceptance and legislation

<sup>2</sup> Level of starch raw materials will be different in extruded and pelleted feed



## Procurement milestones in 2022

The last three years have been extremely challenging for the procurement and supply chain teams. At the beginning of 2022, with the end of COVID-19 in most of the world, we thought we would be in calmer waters. Then the war started in Ukraine.

In times of stress, the priority for procurement is availability, ensuring we have the right nutrients available at the right location, to ensure supply to our customers can continue uninterrupted. With prices staying at high levels compared to the 'normal' levels of 2019, alternative ingredients and suppliers are our focus, to spread the risk and keep costs down. This has created opportunities for several novel ingredients to become more competitive. With new suppliers and ingredients, we are careful to ensure our quality levels, sustainability requirements and ambitions are met and continuously improved.

We have made a number of specific improvements in 2022:

- We have created a specialist team to strengthen our LCA Platform and tackle the Scope 3 Science Based Targets that we have set
- We launched our marine sourcing policy, describing in an open and transparent way (as we did for soy and oil palm) what 'good' looks like for sourcing marine products, and providing a step plan for our purchasing team
- We launched our sustainable packaging handbook, helping us improve our packaging material while maintaining the feed quality and often reducing the overall packaging cost

### **A call to strengthen collaboration with our suppliers**

The procurement team in Skretting has long term partnerships with many suppliers. We develop new markets and ingredients together and aim to grow our joint business every year. The large number of suppliers choosing to join us at AquaVision 2022 demonstrates that Skretting is a trusted and valued partner.

The impact of these strong relationships has been clearly demonstrated in challenging times. Even over the last three years, we have never had to stop operations because of a raw material shortage. Relationships like this are built over years and depend on open communication and trust.

While the past years have been difficult, unfortunately the years ahead already appear just as challenging. A recession, climate change and the pressure on biodiversity are looming and we need to act. Therefore, this is a call to action to our suppliers, to join us in tackling these challenges. We are seeking five key commitments from our suppliers:

- Reduce the carbon footprint of your own operations and value chain
- Sign-up for Science Based Targets and take action to stay within the Paris Agreement emission targets
- Provide better (primary) data on the ingredients sold
- Improve and increase traceability back to country of primary production
- Further identify and mitigate the environmental and social risks across the supply chain

For us to realise our targets, we need our suppliers to take bold steps to curb their carbon emissions and work with Skretting and the industry, to tackle these challenges together. We are eager to engage, applaud those in our value chain who step up, and will ensure that those who take significant steps in the right direction will see their business with Skretting increasing.



Robert van den Breemer  
Procurement Director  
Macro Ingredients  
Nutreco

## Introducing our new Supplier Sustainability Manager

With 96% of our feed's total emissions coming from scope 3 ingredients and factors beyond our control, reducing them will require close collaboration with our suppliers. In 2022 we welcomed Job van Mil to the procurement team in his role as Supplier Sustainability Manager to facilitate this collaboration. We would like to use this opportunity to introduce Job and his view on supplier engagement.



Job van Mil  
Supplier Sustainability Manager  
Nutreco

As Supplier Sustainability Manager, I support the procurement department to ensure that we reach our ambitious sustainability targets. There are two focus areas for the coming years that require close collaboration with our supply chain partners: due diligence and scope 3 reductions.

It is no longer enough to rely on a signed Supplier Code of Conduct to cover our due diligence, so more sophisticated risk assessments and mitigation methods need to be applied. We strive to accelerate the risk recognition and mitigation process through the roll-out of EcoVadis, which will be a key step in improving our due diligence.

Over 2022, the procurement and sustainability departments collaborated to create a scope 3 program, in which we outline the strategies to reduce our scope 3 emissions. I would like to elaborate on one specific strategy: supplier engagement.

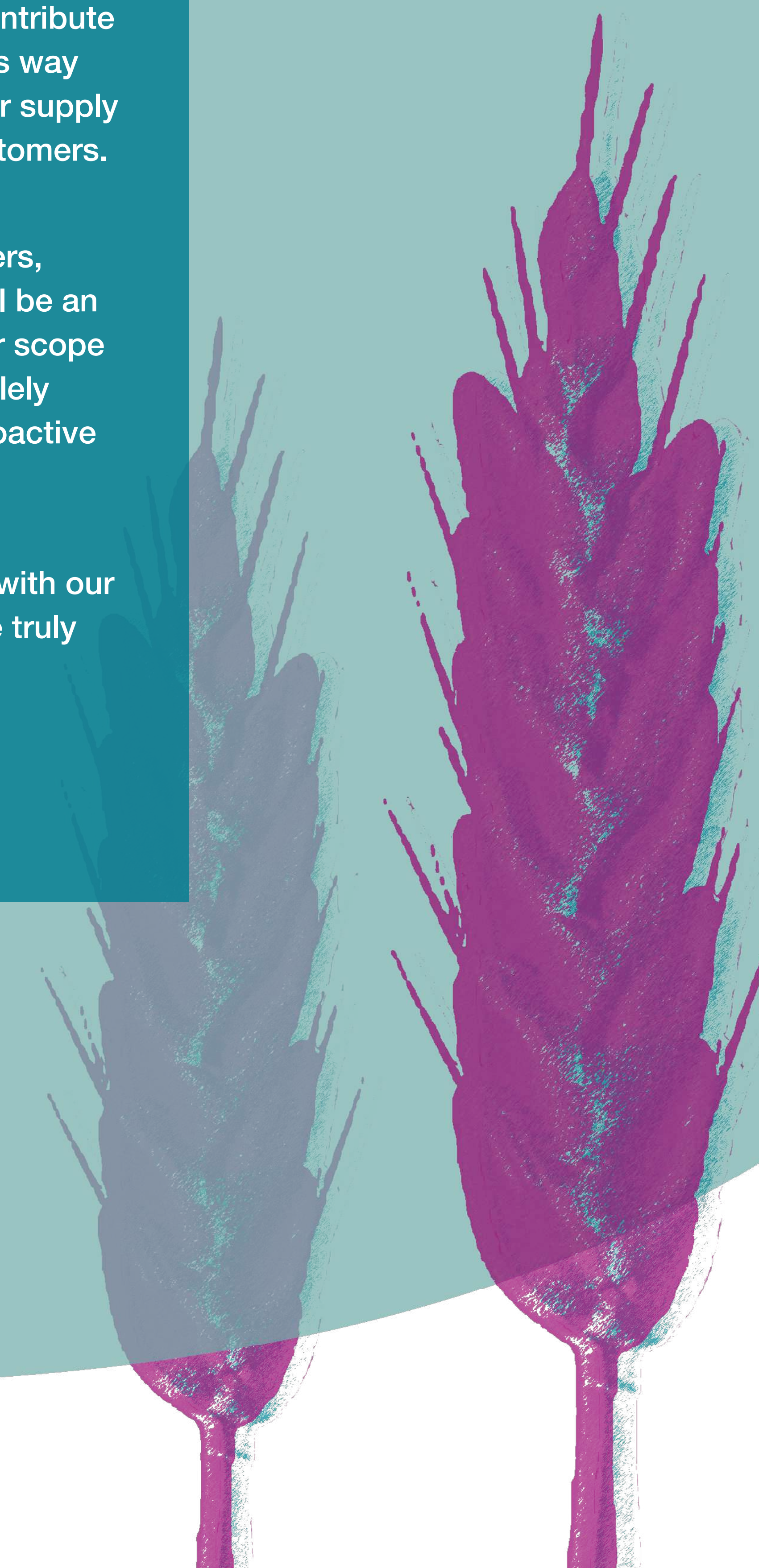
During supplier engagement, the aim is to act as the liaison between procurement, suppliers and our LCA experts to gain a better understanding of the footprint of our ingredients.

In conversations with our suppliers, we will request product specific footprint data, also called primary data which reflects the specific productive reality of our suppliers. By collecting primary data in a standardised way, we will be able to identify areas where there is a potential to reduce the ingredient's footprint.

However, primary data collection is only part of the supplier engagement journey. Skretting, as part of Nutreco, has set Science-Based Targets and we will request the suppliers that contribute most to our scope 3 to do the same. This way we align emission reduction goals for our supply chain with our own and those of our customers.

Building strong connections with the sustainability departments of our suppliers, relevant stakeholders and customers will be an important factor for success for both our scope 3 program and our due diligence. Not solely for gathering data, but also to inspire proactive communication on sustainability issues occurring in the supply chain.

Only by strengthening the collaboration with our suppliers, not by excluding them, will we truly improve our supply chain sustainability.



## Flexibility in the use of raw materials – progress and challenges

Following the publication of our 2021 Sustainability Report, we had hoped the raw material situation would ease as the impacts of the COVID-19 pandemic softened. Unfortunately, this has not been the case. The challenges imposed by the pandemic have been replaced with those associated with the ongoing war in Ukraine. Together, Ukraine and Russia are estimated to account for 25% of global wheat exports in 2021, as well as being major producers of sunflower, maize and phosphates. Additionally, the current fishing season in Peru is impacting the marine ingredient market, and the predicted 2023 El Niño will likely worsen the situation.

During raw material scarcity situations, Skretting's deep understanding of the value of each raw material and the nutritional requirements of fish and shrimp, coupled with our relationships with suppliers becomes invaluable. Since last year, we have successfully introduced nine protein and starch sources, entirely new to Skretting, with more undergoing R&D evaluation. The use of alternative omega-3 oils has also increased significantly from 2021 to 2022 to mitigate the impact of continued fish oil availability and price challenges. Beyond this, we have focused on long term supply security through innovative solutions, such as the use of enzymes to extract as much nutritional value as possible from ingredients, whilst also reducing discharge into the environment.

However, aquaculture feed production is not only about understanding the needs from a nutritional perspective, but also from quality perspective. Often feed is transported long distances, meaning maintaining pellet integrity is key. Traditionally, wheat has been used as the primary starch source to support physical quality of feeds, but by applying cross functional knowledge we have been able to successfully replace a relevant part of wheat demand in some geographies with alternative starch sources without impacting on quality.

Moving forward, price will continue to be one of the main challenges. Ingredient prices often follow one another and so, whilst we may be able to increase flexibility, this is not necessarily reflected as a decrease in overall feed price. This constant focus does, however, ensure security of supply and reduce exposure to price vulnerability of individual ingredients.



Samuel Eggington  
Global Formulation Manager  
Skretting AI



# Understanding sourcing in different markets

Reflections from our team and suppliers

## Working together for sustainability goals

In severe market circumstances, it is not always easy for suppliers to align with our relatively high sustainable sourcing policy in the region. However despite the challenges, we continue to hope for earlier development, like the inclusion of alternative ingredients.

Our region is traditionally heavily dependent on fish meal and fish oil for warm water fish species. Although we face challenges in daily operations, we are aware it is important to remember that we are one Skretting, one Nutreco, and one planet. As such, we are in the same boat.

Even though the competition is severe and there may be raw materials which do not meet the Nutreco criteria, we keep a dialogue with suppliers regarding aligning with our requirements. Through information and collaboration, we believe we can influence external stakeholders and provide our voice that there is clear demand.

We have found that when we help each other and work together toward our goal, we can find a solution that we did not expect.

In the past, we have been successful in increasing the inclusion of certified fishmeal / LAPs / vegetable ingredients while maintaining performance and quality, with significant support from internal and external stakeholders.

We learn from best practice in OpCos all around the world and take advantage of the global expertise and innovative minds. Recently sustainability has received more attention in Japan and through global and local experience, we will be able to support customers who have an interest in sustainable aquaculture.

However, we are not able to do it alone, we are all connected in the supply chain. For that, it is crucial and appreciated to have the support and understanding of our customers, suppliers, consumers, colleagues, and communities around us.

## Building sustainability awareness in Japan

In most Asian countries, including Japan, the attention to sustainable action in fishery and farming is gradually increasing, but it's still not satisfactory, especially in the aspect of the visible ways such as the acquisition of certificates.

It may take a much longer time to cement these actions, as that will never be achieved by a single part of the value chain, and the recognition by the end-consumer would be one of the most important factors to accelerate such efforts despite the slow-paced spread.

Against this background, however, we're pleased to kick off more advanced action with the Skretting team and some of our loyal partners here step-by-step. For one, we have launched a Fishery Improvement Project (FIP) for Japanese sardine, which is one of the most important species in the domestic aquaculture industry, with a fishmeal manufacturer, a purse-seine fisherman in Japan toward MSC. We strongly expect this project could contribute to a stable supply of marine resources in the future.

Now, our challenge is how do we expand that circle to other stakeholders. Also, we would like to mention that the development of the consultation system to address a higher level of sustainability, which is not enough in Asia, would also be very important.



Yosuke Sakurai  
Procurement Manager  
Skretting Japan



Yoshiaki Tatsumi  
Assistant Manager Protein Meal  
and NGFI Section Grain and  
Feedstuff Department  
Kanematsu Corporation

## Working with customers to drive sustainability in Italy

The sustainability and circularity themes are certainly the hottest topics in recent years. Addressing these started out as a significant challenge for Skretting Italy, as it was not easy to explain our mission to our suppliers and how we wanted to reach our goals.

Bringing them on board was not easy at all in the beginning, as nobody had a ready solution to offer. Thankfully, our enthusiasm inspired our collaborators to the point that they themselves, in some cases, provided innovative proposals. The maturity and the sensitivity of suppliers were crucial for this journey.

We know now that sustainability and circularity doesn't necessarily mean cost saving. In fact, buying packaging with a minimum 50% of recycled plastic, for example, costs even more than 100% virgin material.

COVID-19, followed by the Ukraine-Russia conflict and the subsequent severe disruptions to the supply chain, has seen raw materials prices and logistic rates increase to never-before-seen levels. This has made the sustainability path even more challenging and forced some withdrawal.



Adamo Caldori  
Purchasing Responsible  
Skretting Italy

This was true in the case of marine ingredients, where the price difference between certified and non-certified sources was sometimes so high that we needed to force a temporary stop to remain competitive. On the positive side, the need for greater competitiveness has provided further acceleration to the "re-use" culture by pushing the demand for by-product ingredients (for example from the poultry and pork, fish, and baking industries) higher and higher.

Big efforts have been placed on keeping the supply chain as short as possible to reduce the carbon emission of logistics; and high emphasis has been dedicated to new ingredients (for example insect and algae).

These days, we speak the same language as our suppliers, and together we are aware that challenges and dilemmas are not finished. At the same time, we are tuned in to the fact that in sustainability and circularity there are future opportunities.

## A culture of sustainability

At Berlin Packaging, we do our part to fight climate change by minimising our environmental impact and offering sustainability-focused products and services to our clients across all end-use markets and geographies.

That's not easy, because the response from the market, especially in Italy, is not ready to pay more for a sustainable packaging as it is now. Huge investments to produce lighter containers with high performance must be incorporated in prices and this is not in line with customers' expectations.

Working with Skretting Italy was acknowledgement that we were going in the right direction, and provided further motivation to stay focused on the matter to take advantage of any other innovation which can bring improvement to the sustainability and circularity targets.

We pledge to promote a culture of sustainability throughout the packaging value chain, from our customers to our suppliers, within our teams, and in the local communities in which we operate.

Berlin Packaging's success as a global packaging leader depends on our ability to serve a wide range of markets and geographies. Diversity, equity, and inclusion are critical enablers of our business model and our commitment to these values is unwavering – across all our work around the world.

We strive to create sustainable growth by promoting the values of integrity and respect, and by earning trust with all our internal and external stakeholders alike.



Fabrizio Mondolfo  
General Manager  
Berlin Packaging Industrial Italy

# Soy ingredients

## Soy & Oil Palm Sourcing Policy – reflecting on progress so far

Our 2020 Soy and Oil Palm Sourcing Policy shows our commitment to achieving a deforestation-free supply of soy and oil palm ingredients by 2025. The policy categorises soy and palm ingredients into four different classes based on deforestation risks and shows which sustainability certificates can be used to mitigate these risks. This classification system guides our purchase team as we aim to source deforestation-free soy and oil palm ingredients by the end of 2025.

Through close collaboration with our suppliers we are gaining an increased understanding of the origins of our soy. Despite these gains, we still see large complexities within our supply chains. We are pleased to see the EU acting on deforestation, with a 2022 ruling mandating due diligence on select imported commodities, including soy, to ensure their deforestation-free origins. We believe that this will force the industry to create 100% traceable deforestation-free supply chains. Hopefully, these supply chains will not only be available to our EU-based companies, but also our other businesses across the globe.

We have set intermediate goals towards a deforestation-free supply chain by the end of 2025. In 2022, we committed to only source Class A, B or C. This means that we will not source from high risk countries without relevant certifications. In many cases we covered this intermediate goal by purchasing Round Table on Responsible Soy Association (RTRS) credits for our high deforestation risk soy volumes. Through the purchase of RTRS credits, we support farmers that are deforestation free. Unfortunately, 3% of our total soy purchases originated from high risk regions without any certification making these volumes non-compliant with our sourcing policy’s 2022 goals.

However, 97% of the purchases were compliant with the intermediate goal and we do see a continued decrease in uncertified, high risk, soy products - from 14% in 2020 to 3% in 2022. We will work together with our business and suppliers to decrease this number to 0% in 2023 so we are fully compliant with our sourcing policy.



Progress towards meeting sourcing objectives in our marine sourcing policy in 2022 as a percentage of purchases

Classification	Description	2022	2021	2020
Class A	The soy or palm oil ingredient is traceable back to a country or region with a low risk of deforestation or is from a region with a high risk of deforestation but purchased through a certification scheme which verifies no deforestation occurred (segregated supply-chain).	62	60	68
Class B	The soy or palm oil ingredient is traceable back to a country or region with a high risk of deforestation. For Class B, it must be purchased through a certification scheme with a defined cut-off date, using either mass-balance or credits.	35	32	18
Class C	The soy or palm oil ingredient is traceable back to a country or region with a high risk of deforestation and must be purchased through a certification scheme that verifies no illegal deforestation occurred.	0	0	0
Class D	The soy or palm oil ingredient is traceable back to a country or region with a high risk of deforestation but purchased without any certification related to deforestation.	3	8	13
Unknown	It was not possible to trace the soy or palm oil ingredient to the country it was cultivated in.	0	0	1

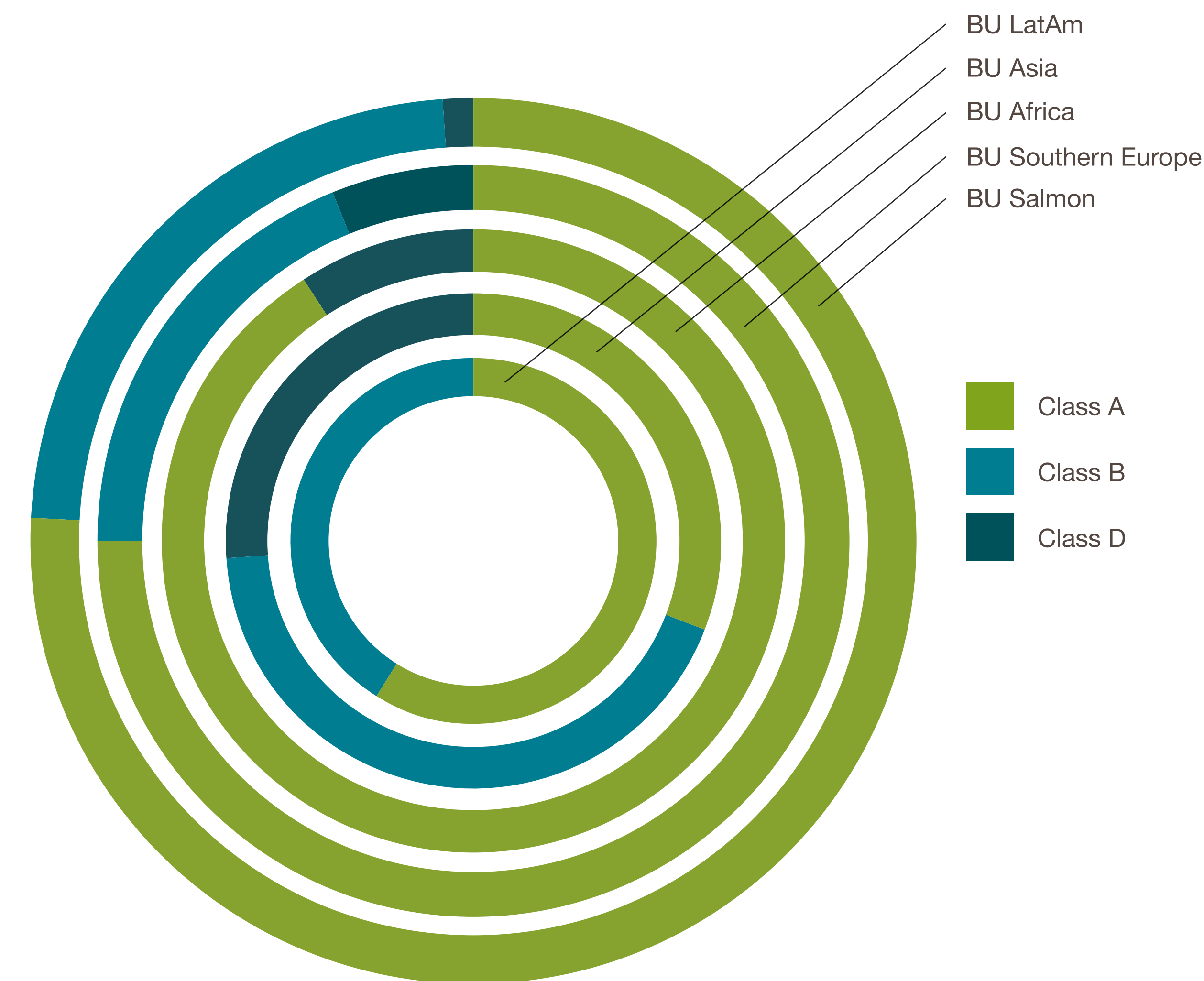
## Breakdown of soy purchases in 2022

A large proportion of the soy purchased by business units salmon, southern Europe, Africa and LatAm classified as class A and B in 2022. This is partly achieved by sourcing segregated deforestation-free soy from high-risk countries and partly by sourcing from countries with a low risk for deforestation. In particular, the Skretting businesses in Africa achieved an impressively high share of class A soy by sourcing from such low-risk countries. We also observe a relatively large share of class D soy for the business unit Asia. We are actively engaging with our supply chains in Asia to make sure we improve next year on our road to deforestation-free soy.

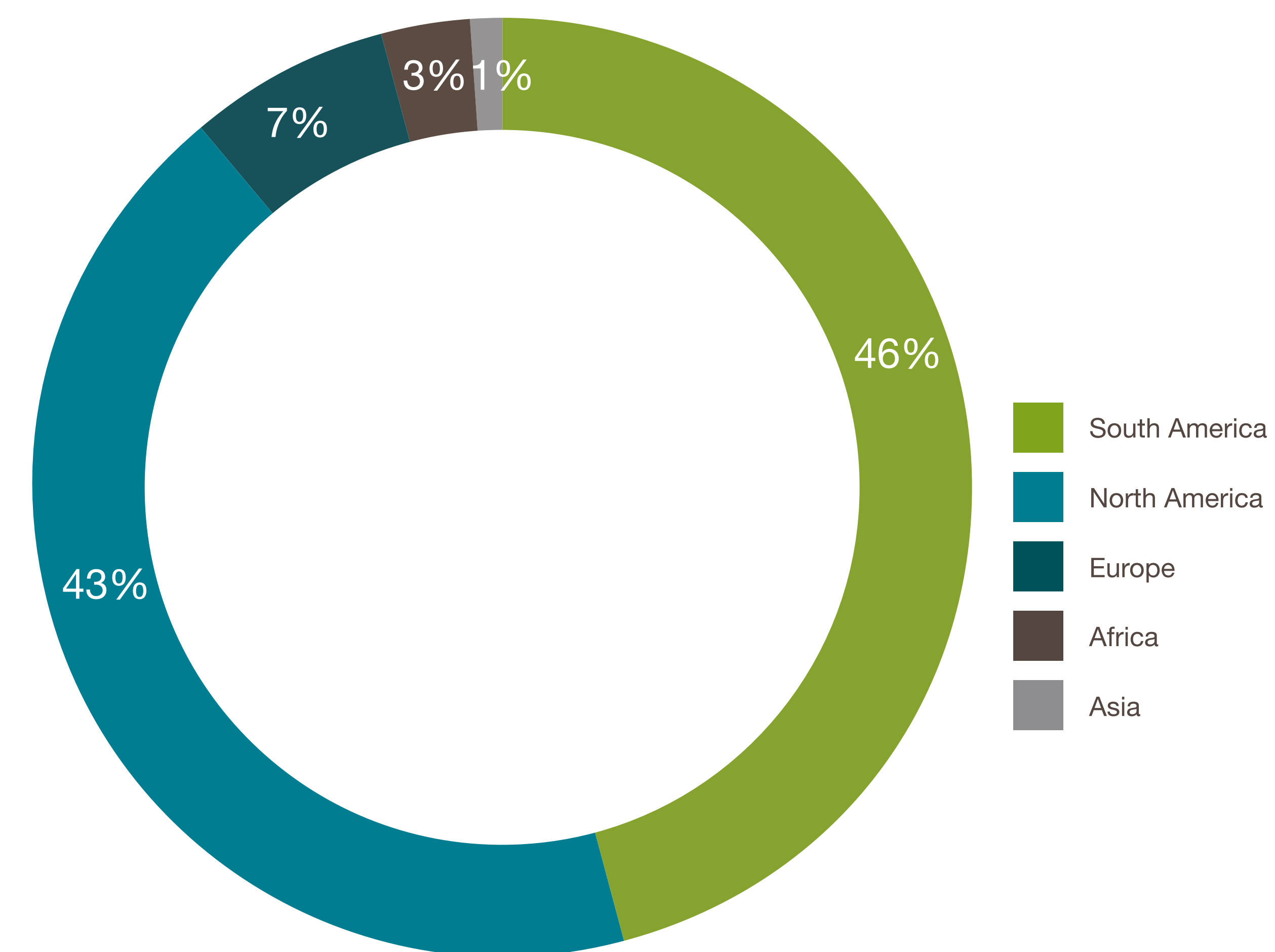
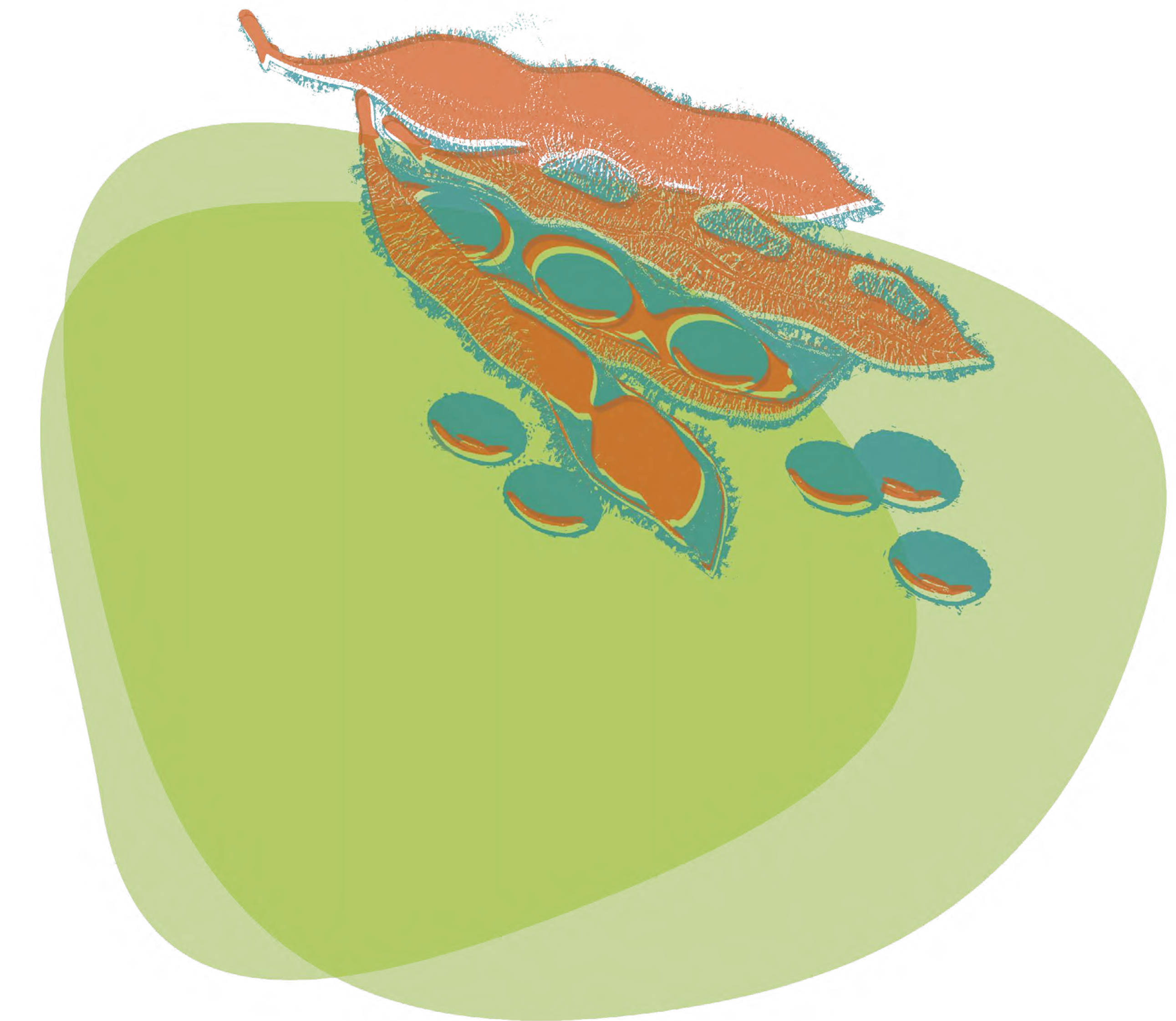
Segregated deforestation-free soy supply chains are primarily available for non-GMO soy and we struggle to find segregated deforestation free GMO soy products. Therefore, class B seems to be the best achievable class for the GMO soy products, which explains the high shares of class B soy for many of our businesses.

Soy classification (%) purchased per business unit in 2022

Business Unit	Classification			
	A	B	C	D
Salmon	76	23		1
Southern Europe	76	19		6
Africa	91			9
Asia	31	43		26
LatAm	59	41		



Classification of soy purchased per business unit in 2022



Global soy sourcing region in 2022

## CJ Selecta takes new steps towards sustainable soy

Four years ago, the newly formed sustainability department of CJ Selecta set ambitious goals, with seven steps to strengthen sustainability. These steps included a greenhouse gas report, the promotion of research in non-GMO seed programs, becoming Amazon biome free, measuring carbon footprint and conducting farm audits. The steps were published in the first GRI report in 2020.

Today, CJ Selecta can look back at four years of tremendous progress, which has inspired new and far more ambitious goals for the next era of Brazilian soy. Possibly the biggest and most transformative leap forward has been on traceability.

“We belong to a large and complicated ecosystem of value chains, so in order to make real progress towards sustainability it is vital that we, our partners and clients have access to tools for tracing our products,” says Guilherme Tancredi, CJ Selecta’s CEO.

To facilitate better traceability, CJ Selecta is in the middle of launching its brand-new app Soy Trace™, which gives valuable insight to everyone who purchases their products in the value chain.

SoyTrace’s primary functions are to:

- Ensure that products are truly deforestation free
- Enable clients to make informed choices: know about carbon footprint, logistics and quality traits
- Inform users about the products, their origins and the importance of protecting precious nature, including sensitive Brazilian biomes

“We have many sustainability ambitions, but there is no doubt that zero-deforestation is at the very core of our business. In a world of conflicting and confusing information, true traceability is key.

Additionally, to get full traceability of soy suppliers, we strive to accurately measure the carbon footprint of soy protein concentrate, and also reduce it.” Tancredi emphasises that there are an untold number of challenges that come with making real progress towards sustainability, and there is nothing better to illustrate than the complex value chain to trace, monitor and engage in this elaborate market.

“Partners like Skretting are crucial for at least two reasons. Firstly, they are the ones that give our efforts value, by making measurable progress part of their purchasing policies. Secondly, we help keep each other accountable – and push each other towards new sustainable frontiers.”



Guilherme Tancredi  
CEO  
CJ Selecta





## Marine ingredients

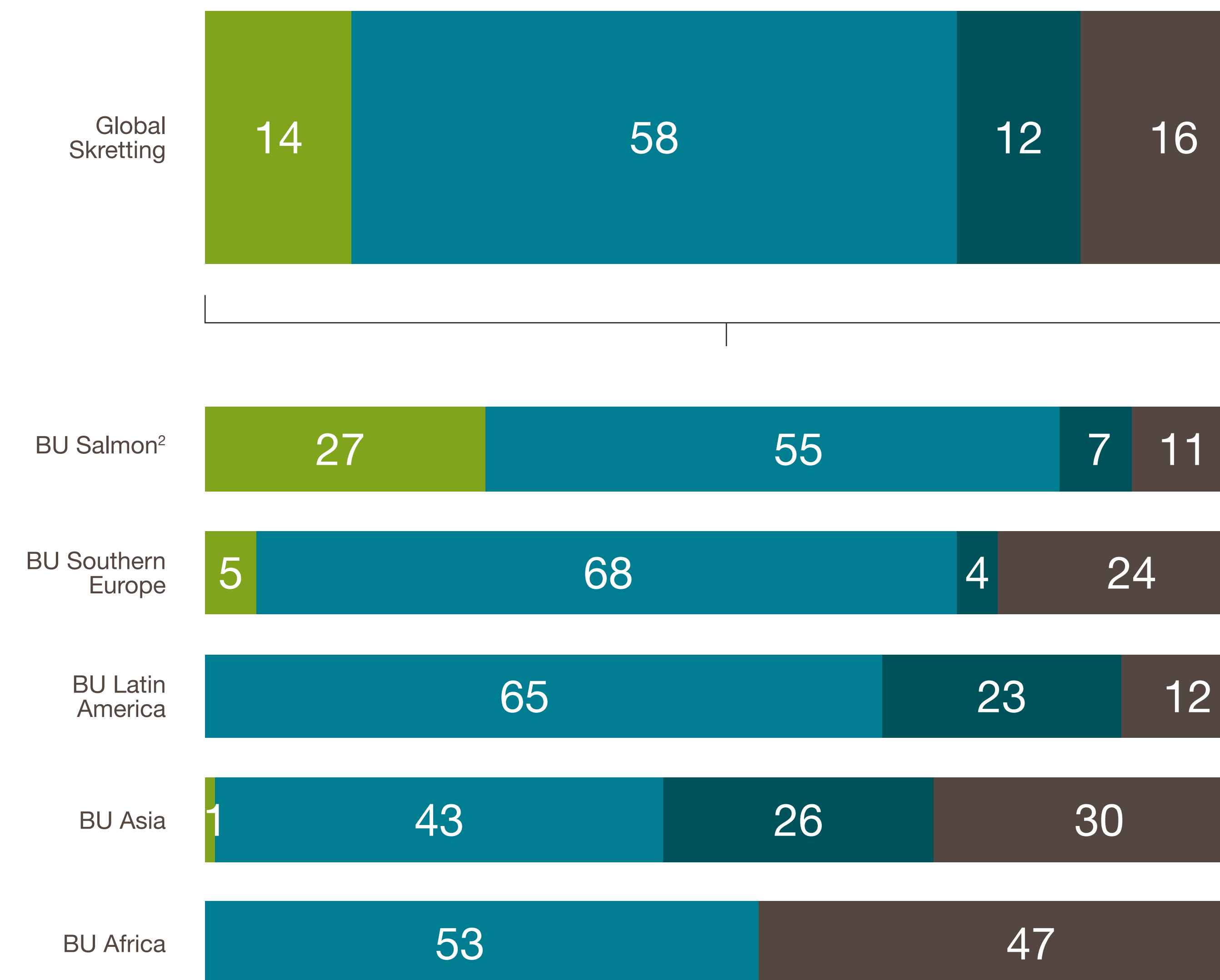
### Meeting our marine ingredient sourcing ambitions

It is our ambition that by 2025 all fish meal and fish oil we use originates from fisheries that are managed according to the FAO Code of Conduct for Responsible Fisheries. This means that our suppliers must be able to demonstrate that the fish meal and fish oil is certified according to the MarinTrust standard (which includes Marine Stewardship Council certification) or be participating in a fishery improvement project (FIP) with the aim of becoming MarinTrust certified.

In addition to the progress specified in our sustainability reports, and supporting our commitment to provide more transparency, we commit to publish the origin and environmental sustainability of wild-caught and farmed seafood sourced by our global operations through the Ocean Disclosure Project, a clear step forward from our previous disclosure which was only for our Norwegian operations.

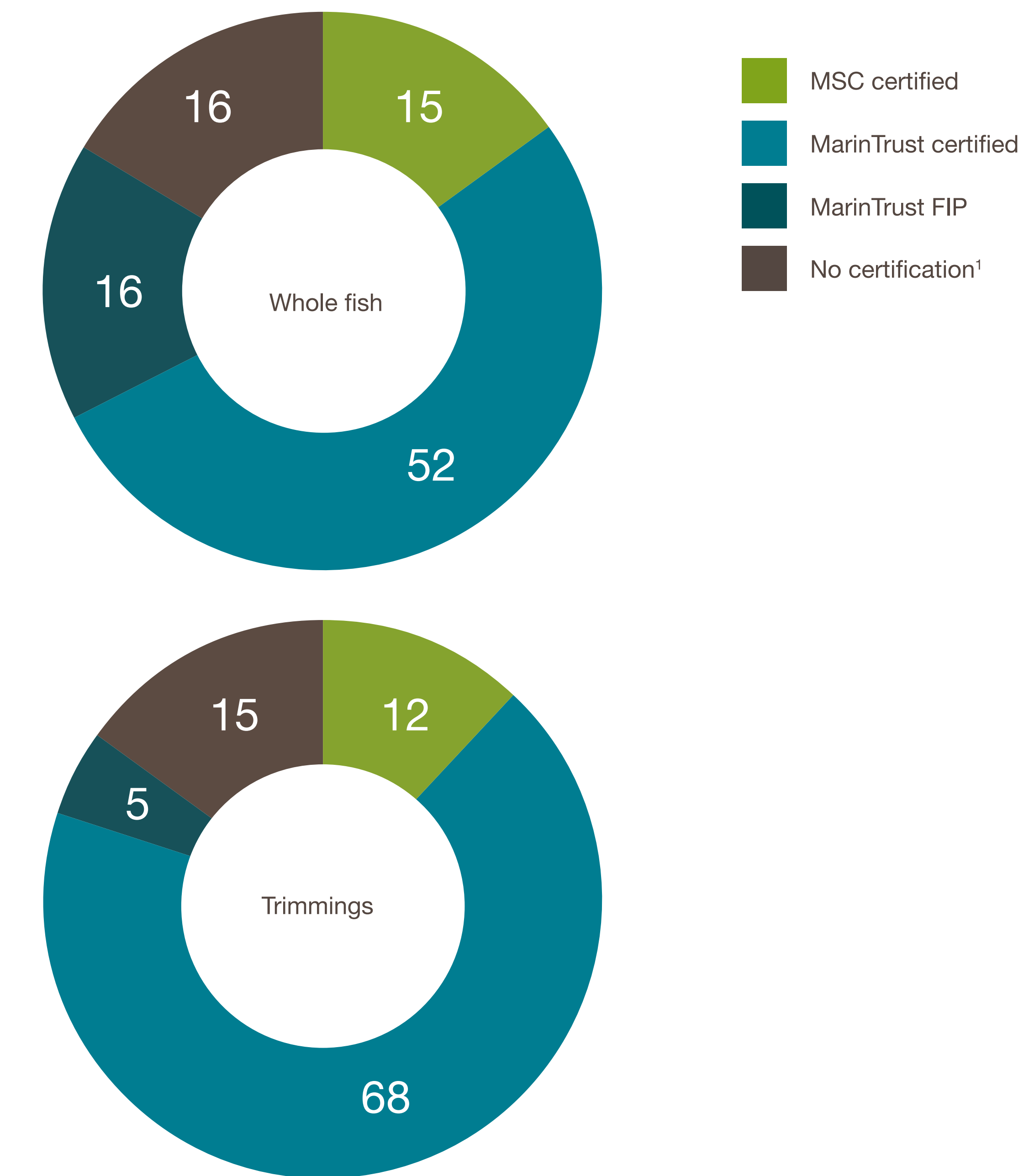
In 2022, 84% of fish meal and fish oil originating from whole fish that was purchased by Skretting came from fisheries certified according to the MarinTrust or MSC programmes, or from fisheries that were part of a MarinTrust FIP. This is a slight increase compared to 2021 (82%). The increase comes from more fisheries entering fishery improvement projects.

The salmon producing countries in Skretting (Norway, Canada, Chile and Australia) use the highest share of certified marine ingredients. Both Asia and Africa have a significantly lower share of certified marine ingredients. In Asia and Africa there are fewer local fisheries certified, and less market pressure regarding certification status of marine ingredients. In Latin America and Asia the share of marine ingredients coming from fishery improvement projects are higher than in other areas in Skretting.



1. Includes registrations where data are lacking on certification status  
 2. Salmon represents Norway, Canada, Chile and Australia

Certification status (%) of Skretting marine ingredient purchases on a global and BU level



Certification status (%) of Skretting purchases of whole fish and trimmings in 2022

## Progress on our marine sourcing policy

In 2022, Nutreco and Skretting published a responsible sourcing policy for marine ingredients. We did this to solidify our commitment to protect the ocean and ensure that fish stocks caught for direct or indirect human consumption are fished within clearly defined, sustainable limits.

To achieve our ambitions, we strive to ensure that our marine feed ingredients come from sustainable sources in the short- and long-term. In practical terms, we have defined different sustainability classes for the main groups of marine ingredients (whole fish, by-products from wild fish and by-products from aquaculture). For details on the different sustainability classes, please consult our sourcing policy.

Last year was the first in which we have been able to make a complete progress report on our marine sourcing ambitions. For whole fish, 68% originates from MarinTrust programme or MSC. The share originating from fishery improvement projects is slightly above the maximum target (16% compared to maximum of 15%). There are challenges in reaching our targets. Several important fisheries have lost their MSC certification (blue whiting, Atlantic herring and Atlantic mackerel). In certain areas where we operate (in particular Asia and Africa) certification of local fisheries is often lacking. This can be due to that the certification programs are not so well known in these areas, combined with less pressure from markets to certify these fisheries.

When it comes to by-products from wild fish and by-products from aquaculture we are well on track to meet our targets. The main challenge here is that information related to the origin can be missing or of poor quality.

Progress on our marine ingredient sourcing policy in 2022 compared with targets

Whole fish		
Marine ingredient type	Target	2022
Sustainability class A+ and A	85%	68%
Sustainability class A-	Maximum 15%	16%
Sustainability class B <sup>1</sup>		16%
Sustainability class C <sup>1</sup>		
By-products wild		
Marine ingredient type	Target	2022
Sustainability class A+ and A	50%	81%
Sustainability class A-	50%	4%
Sustainability class B <sup>1</sup>		15%
By-products aquaculture		
Marine ingredient type	Target	2022
Sustainability class A+ and A	50%	78%
Sustainability class A-		
Information lacking		22%

<sup>1</sup> Include also where data on origin is missing

Read our Marine Ingredients Sourcing Policy



## Quantifying whole fish and by-products

The processing of fish for human consumption gives rise to a by-product that is not used in the final seafood product. Offcuts generated after processing are valuable as a raw material from which fish meal and fish oil is often produced. It is estimated that roughly a third of fish meal produced is made from seafood by-products from fish for human consumption. The use of by-products, or trimmings, is increasing as more whole fish are used for direct human consumption, and society becomes more successful at collecting the material and fuelling the bioeconomy.

We have mapped the origin of marine ingredients in Skretting coming from both whole fish and by-products. Over the last five years, the average use of by-products was 35%. In 2022, 39% of our ingredients came from by-products for human consumption.

Twenty-nine species make up 95% of our marine ingredients in 2022 originating from whole fish. The most important species are small pelagic fishes from fishing areas Pacific Southeast, Atlantic Northeast and Atlantic Eastern Central. Small pelagic fisheries are the most important source for both fishmeal and fish oil.

The remaining 5% originate from an additional 46 species. There are several reasons for the relatively large number of species registered. In all fisheries there will be a certain amount of by-catch. When the by-catch is at low levels it will be part of the legal fishery.

In some areas the manufacturer of marine ingredients are instructed to register all by-catch by law. This means that when we receive a consignment of marine ingredients, easily more than 10 species will be declared that might only constitute a low percentage of the delivery.

Another factor is that many fisheries are multi-species fisheries, especially in more tropical areas. In this case, there can be a large species diversity and single species fisheries are not common.

It can also be a challenge to identify all fisheries in a detailed and correct way. Our suppliers can often declare that the origin is anchovy or sardine. However there are many different anchovy and sardine species. This can make it a challenge to identify the specific fishery.

Twenty-seven species make up 95% of Skretting purchases of marine ingredients in 2022 originating from trimmings. In addition, 46 more species of fish are registered as the origin of fish meal and fish oil from trimmings, but in low volumes (< 5%).

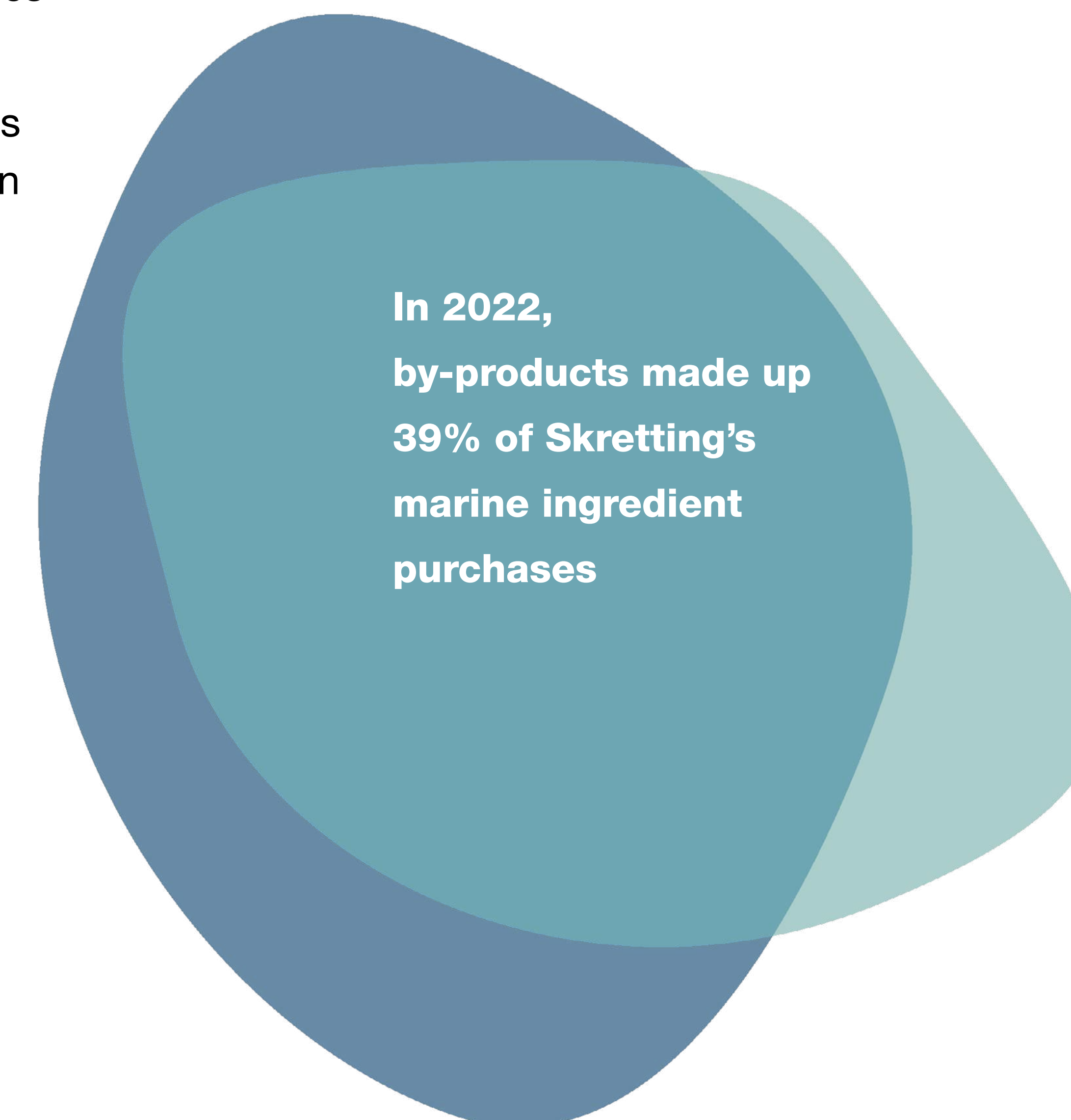
Marine ingredients from different tuna species are common. This is due to the tuna canning industry. The industrial processing of tuna makes it possible with efficient use of the trimmings. The species registered as origin of marine ingredients from trimmings reflect fisheries important in human consumption. Hake, cod, pollock and different mackerel species are all important.

We also see trimmings from small pelagic fishes like anchovy, sardines and sprat. Marine ingredients from farmed species like Atlantic salmon are also becoming important. In 2022 Atlantic salmon was the most important source of fish oil originating from trimmings.

We cannot establish with certainty the FAO fishing area for these species because the country of processing might be different from where the original catch was landed.

Percentage of marine ingredients in Skretting originating from whole fish and trimmings

Year	Whole fish	Trimmings
2018	74	26
2019	71	29
2020	57	43
2021	63	37
2022	61	39
<b>Average</b>	65	35





Species and fisheries that make up 95% of purchases of fishmeal and fish oil in Skretting in 2022 and which originated from whole fish

Species	Latin name	Fishmeal (%)	Fish oil (%)	Country of origin	FAO fishing area
Peruvian anchoveta	<i>Engraulis ringens</i>	25.2	15.0	Chile, Peru, Ecuador	87
South American Pilchard	<i>Sardinops sagax</i>	8.9	17.5	Chile, Peru, Ecuador	87
Chub Mackerel	<i>Scomber japonicus</i>	7.5	1.9	Mexico, Ecuador, Peru, Chile	87
Blue whiting	<i>Micromesistius poutassou</i>	7.0	3.7	Norway, Denmark, Faroe Islands, Iceland	27
European sardine	<i>Sardina pilchardus</i>	6.7		Mauretania, Morocco, Turkey	34
Chilean anchoveta	<i>Engraulis ringens</i>	6.3	5.5	Chile	87
Anchovy		5.1	3.9	Several	
Atlantic Herring	<i>Clupea harengus</i>	4.1	5.8	Norway, Denmark, Faroe Islands, Iceland	27
European Sprat	<i>Sprattus sprattus</i>	3.7	8.8	Denmark, Norway	27
Capelin	<i>Mallotus villosus</i>	3.2	7.0	Iceland	27
Sandeel	<i>Ammodytes tobianus</i>	2.5	3.9	Denmark, Norway	27
Frigate tuna	<i>Auxis thazard</i>	2.1		Ecuador	87
Common Searobin	<i>Prionotus carolinus</i>	1.7		Ecuador	87
Boarfish	<i>Capros aper</i>	1.6		Denmark, Ireland, Norway	27
Sardine	<i>Sardinella spp</i>	1.1		Several	
Menhaden	<i>Brevoortia patronus</i>	1.2	3.3	USA, Mexico	31
Norway pout	<i>Trisopterus esmarkii</i>	1.2	0.8	Denmark, Norway	27
Pacific jack mackerel	<i>Trachurus symmetricus</i>	1.0		Chile, Peru	87
Shortfin scad	<i>Decapterus macrosoma</i>	0.6		Ecuador	87
Other		0.6	2.7	Several	
Atlantic horse mackerel	<i>Trachurus trachurus</i>	0.5		Denmark, Norway	27
Shrimp		0.5		Several	
Atlantic Salmon	<i>Salmo salar</i>		3.9	Chile, Norway	farmed
Pacific Anchoveta	<i>Cetengraulis mysticetus</i>		1.8	Mexico, USA	87. 77
Sardine	<i>Sardinella spp</i>	1.1	1.7	Vietnam, Philippines	71
Pacific jack mackerel	<i>Trachurus symmetricus</i>		3.5	Chile, Ecuador, Mexico	87. 77
Indian oil sardine	<i>Sardinella longiceps</i>	0.4	2.7	India, Oman	57
Pollock	<i>Pollachius virens</i>		1.1	USA	67
Yellowfin tuna	<i>Thunnus albacares</i>		1.0	Mexico, Oman, Philipines, Ecuador	71.77.57.87

Species and fisheries that make up 95% of purchases of fishmeal and fish oil in Skretting in 2022 and which originated from by-products

Species	Latin name	Fishmeal (%)	Fish oil (%)	Country of processing
Skipjack tuna	<i>Katsuwonus pelamis</i>	23.0	3.0	Ecuador, Spain
Yellowfin tuna	<i>Thunnus albacares</i>	20.7	2.4	American Samoa, Philippines, Papa New Guinea, Thailand, Ecuador, Mauritius, Spain
Atlantic herring	<i>Clupea harengus</i>	11.9	22.0	Canada, Denmark, France, Iceland Italy, Norway, UK
Atlantic mackerel	<i>Scomber scombrus</i>	7.8	8.2	Denmark, Iceland, Norway, Spain, UK
Capelin	<i>Mallotus villosus</i>	5.9	3.8	Iceland, Norway
Sardine	<i>Sardinella spp</i>	4.7	2.1	Several
Other		3.1	5.7	Several
Tuna	<i>Thunnini spp</i>	2.3	0.8	Ecuador, Portugal, Spain
Jackmackerel	<i>Trachurus symmetricus</i>	2.1	1.1	Chile
Blue whiting	<i>Micromesistius poutassou</i>	1.5		France, Norway
Splendid Ponyfish	<i>Eubleekeria splendens</i>	1.4		Vietnam
Cod	<i>Gadus morhua</i>	1.3		Denmark, France
Shortfin Scad	<i>Decapterus macrosoma</i>	1.3		Ecuador
Orange-spotted Spinefoot	<i>Siganus guttatus</i>	1.2		Vietnam
Albacore	<i>Thunnus alalunga</i>	1.2	0.6	Spain
Chub Mackerel	<i>Scomber japonicus</i>	1.1	0.8	Ecuador
Yellowstripe Scad	<i>Selaroides leptolepis</i>	1.1		
Hake	<i>Merluccius spp</i>	1.0		Ecuador, France
Sprat	<i>Sprattus sprattus</i>	1.0	0.6	Denmark, Norway
Pacific thread herring	<i>Opisthonema libertate</i>	0.7		Ecuador, Mexico
Peruvian anchoveta	<i>Engraulis ringens</i>	0.6	1.8	Peru
Pacific Anchoveta	<i>Cetengraulis mysticetus</i>	0.6		Peru, Ecuador
Atlantic salmon	<i>Salmo salar</i>	0.5	37.2	Chile, Italy, Latvia, Norway, UK
Coho Salmon	<i>Oncorhynchus kisutch</i>		2.2	Chile
Rainbow Trout	<i>Oncorhynchus mykiss</i>		1.4	Norway
Sandeel	<i>Ammodytes spp</i>		1.3	Denmark, Norway
Pollock	<i>Pollachius pollachius</i>		1.3	USA

## Dependence on marine feed ingredients

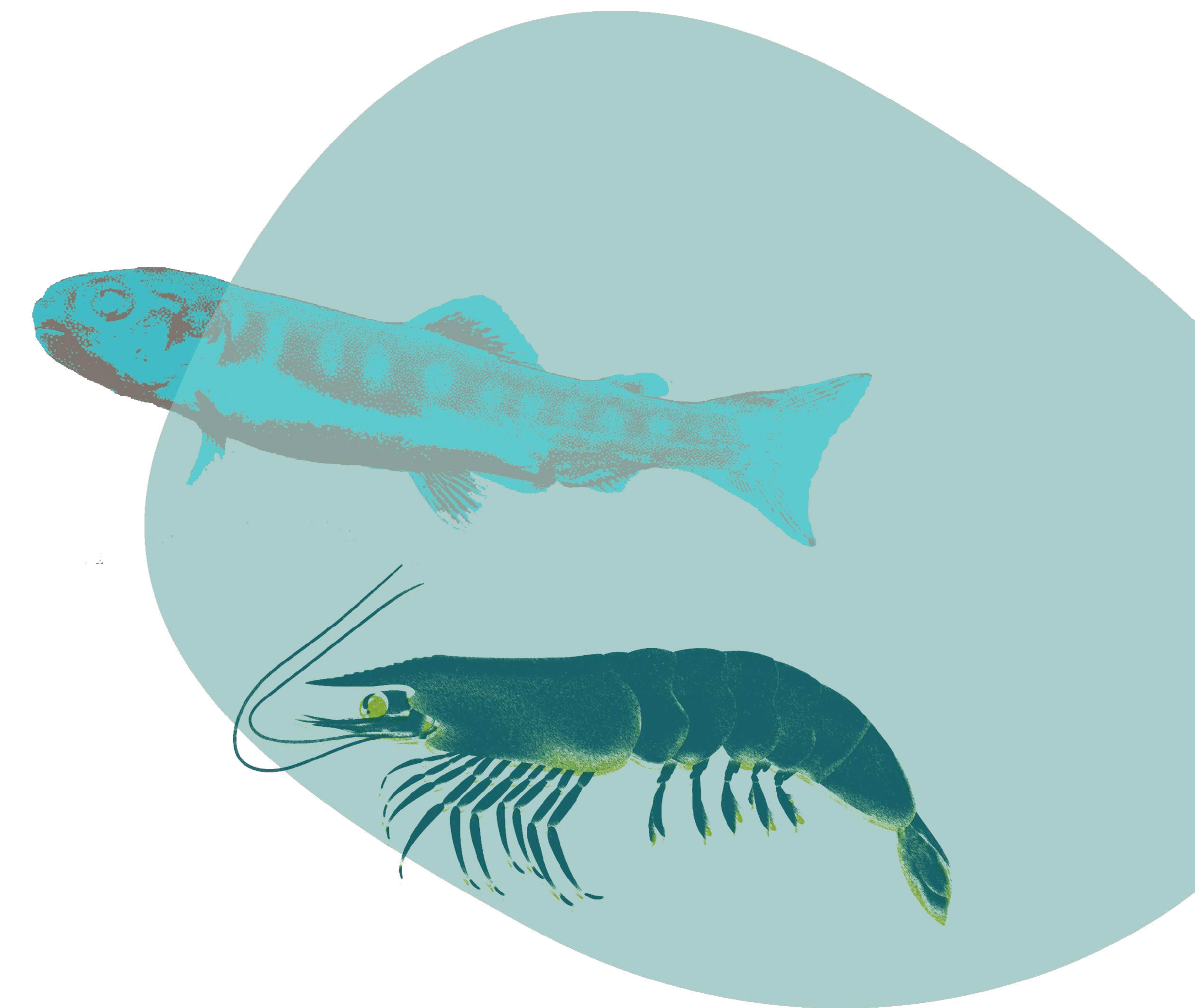
Fish meal and fish oil from wild fish are both finite resources that are shared across a range of users with increasing demands, from direct human consumption to aquaculture to pig and poultry production. We promote the efficient use of these resources, producing increasing amounts of farmed fish and shrimp from a given input of fish meal and fish oil.

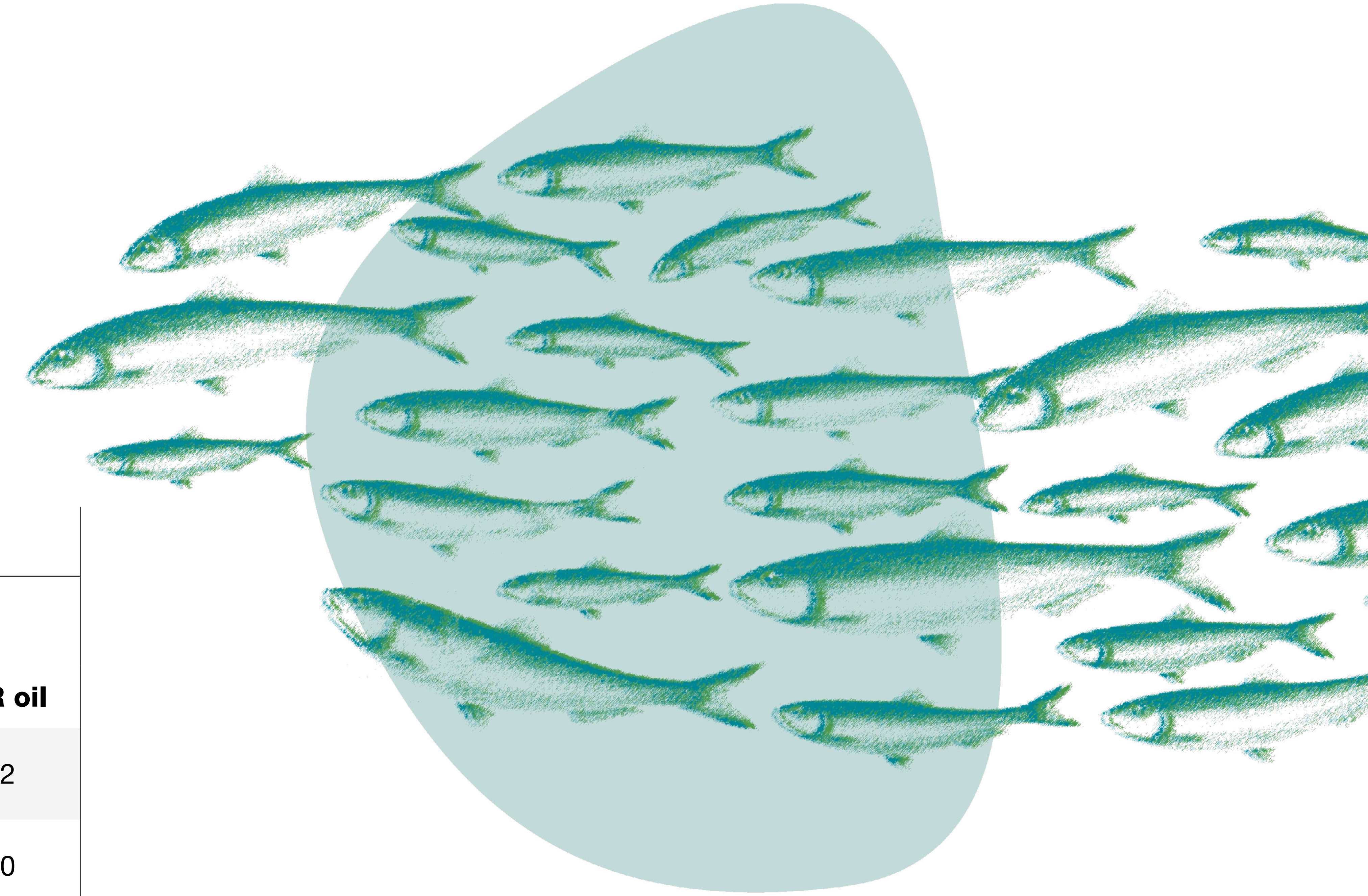
The use of wild fish in aquaculture is commonly expressed as the forage fish dependency ratio (FFDR). It is calculated based on the use of fish meal and fish oil originating from wild fish. Marine ingredients originating from trimmings are not considered. The FFDR is the amount of wild-caught fish used to produce the amounts of fish meal and fish oil required to produce one kilogram of farmed fish.

The exact FFDR will be dependent on the amount of marine ingredients in the feed, the amount of marine ingredients originating from trimmings and the economic feed conversion factor (FCRe).

Estimated Skretting global average FFDR for Atlantic salmon, sea bass and sea bream, shrimp and tilapia

	Atlantic salmon		Sea bass & Sea bream		Shrimp		Tilapia	
	2021	2022	2021	2022	2021	2022	2021	2022
<b>FFDR: fish meal (FFDRm)</b>	0.37	0.40	0.46	0.54	0.23	0.24	0.04	0.01
<b>FFDR: fish oil (FFDRo)</b>	1.46	1.40	0.11	0.04	0.03	0.00	0.05	0.00
<b>Global economic feed conversion: FCRe</b>	1.30	1.30	2.00	2.00	1.50	1.50	2.00	2.00
<b>FFDRm fish</b>	0.48	0.52	0.92	1.08	0.35	0.36	0.08	0.02
<b>FFDRo fish</b>	1.90	1.82	0.22	0.08	0.05	0.00	0.10	0.00





Estimated averages for Forage Fish Dependency Ratio (FFDR) for Atlantic Salmon farmed in Norway and Chile

	Norway					Chile				
	Feed		FCRe	Salmon		Feed		FCRe	Salmon	
	FFDR meal	FFDR oil		FFDR meal	FFDR oil	FFDR meal	FFDR oil		FFDR meal	FFDR oil
<b>2022</b>	0.42	0.96	1.30	0.55	1.25	0.26	1.48	1.30	0.34	1.92
<b>2021</b>	0.43	1.09	1.30	0.56	1.42	0.25	1.46	1.30	0.33	1.90
<b>2020</b>	0.44	1.39	1.30	0.57	1.81	0.19	1.57	1.30	0.25	2.04
<b>2019</b>	0.35	1.52	1.30	0.46	1.98	0.27	1.46	1.30	0.35	1.90
<b>2018</b>	0.42	1.24	1.30	0.55	1.61	0.34	1.41	1.30	0.44	1.83

Calculation:

FFDRm = (forage fishmeal in feed % \* eFCR) / 24%

FFDRo = (forage fish oil in feed % \* eFCR) / 5%

## Opportunities in the marine ingredient sector

Marine ingredients, mostly fishmeal and fish oil, have been key to animal feed for several decades, although their use has shifted from pig and poultry as the main users in the 1980s, to aquaculture now using over 70%. This is due to the vast growth in aquaculture over the last decades and aquaculture being able to utilise the nutritional properties of marine ingredients better than other farming sectors. The consumption of marine ingredients, and in particular fish oil in pharmaceutical and petfood manufacturing sectors, has also been growing. The use of marine ingredients by these sectors is due to marine ingredients' nutritional properties and availability at scale: with 5 million metric tons of fishmeal and 1.1 million metric tons of fish oil produced every year, marine ingredients offer predictability in terms of volume and benchmark status in terms of nutrition.

There are several opportunities in the marine ingredients sector. One of those is circularity: although most of the fish caught from the wild and farmed is for human consumption, generally less than 50% of that biomass is eaten.

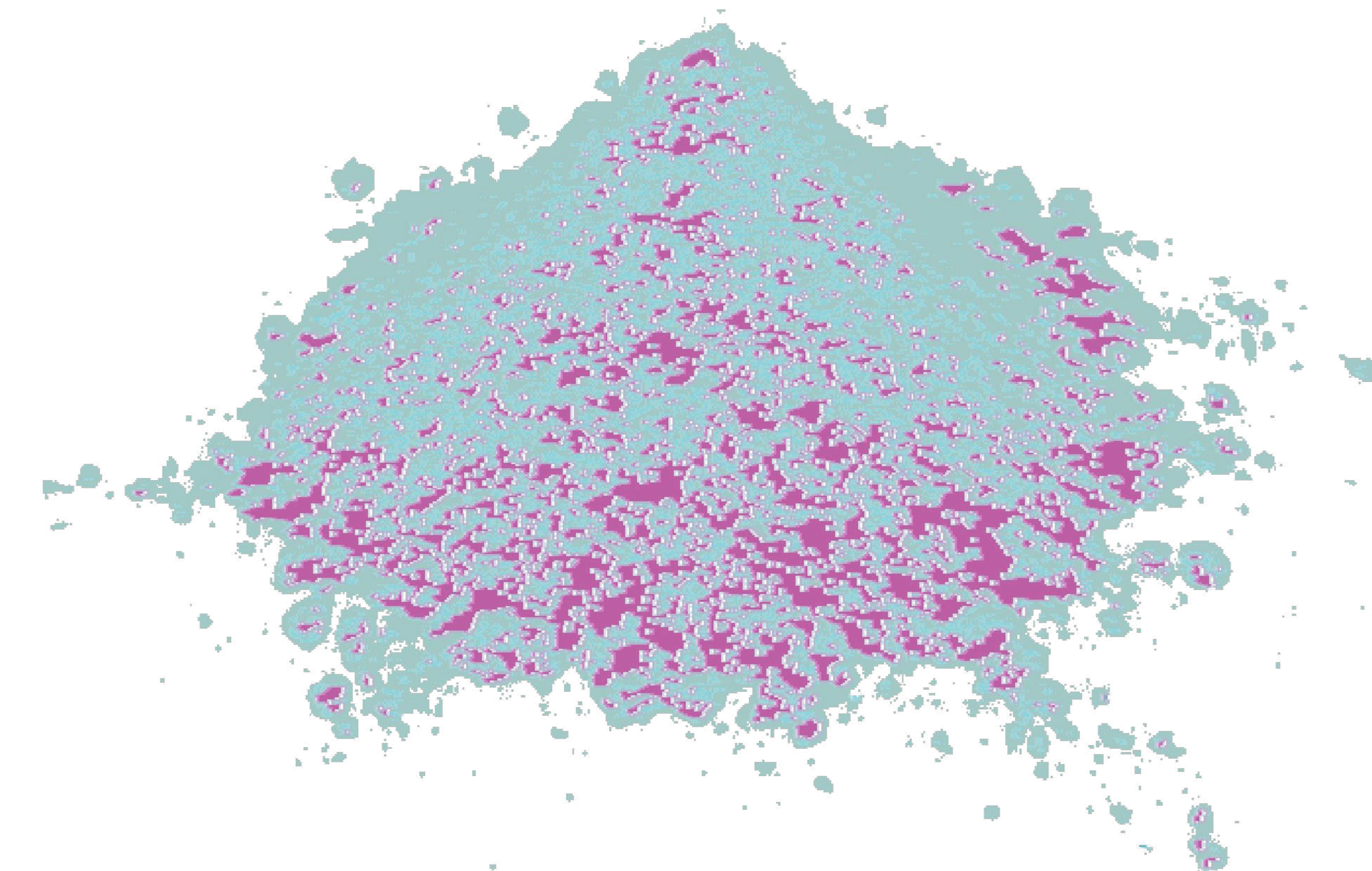
There is therefore a considerable amount of biomass available for repurposing. Already one third of fishmeal and fish oil comes from fish by-products. With projected industry growth in aquaculture, there is a clear opportunity for future growth in the raw material base for marine ingredients. Whole fish thinking is the way forward and marine ingredients is one of the sectors that can help make this ambition a reality.

Another opportunity is for the marine ingredients industry to demonstrate its positive impacts and contribution to global food security. This is an exciting challenge which IFFO has embraced by starting a life cycle assessment project based on a publicly available third-party comparable metrics system: the Global Feed Life cycle assessment Institute (GFLI) database.

Rather than being focused on a single metric, like carbon footprint, it considers 19 different impact categories. Addressing regional challenges is another priority: this cannot be done alone and requires a collective approach based on fisheries management and pre-competitive principles.



Petter Martin Johannessen  
Director General, IFFO



## Mauritanian small pelagics FIP progress

Mainly comprising sardines, as well as sardinella, pilchards, horse mackerel, chub mackerel and bonga shad, Mauritania's small pelagic fishery improvement project (FIP) was initiated in 2017 through a partnership formed between the country's fisheries authority, the Mauritanian oceanographic and fisheries research institute (IMROP), local businesses and international fishmeal and fish oil producers.

With the fishery consisting of artisanal and coastal purse-seine and pelagic trawl vessels that target the aforementioned species in Mauritanian waters, the FIP mainly aims to support the country's government in working towards robust management and the long-term sustainability of the resource. It has been working with scientists to improve data collection on the fishery, landings and stocks, in order to improve the knowledge of stock status and hence enable management to make informed, sustainable decisions.

To enhance the information available, the FIP is supporting two key work areas:

- Dockside and factory sampling, with the FIP providing support to IMROP enumerators to collect catch data and samples for species and size composition analysis
- Data entry for previous paper logbooks, with the FIP continuing to provide support for the data entry of large quantities of paper logsheets from vessels, dating back several years. This is a valuable endeavour, as it provides time series data on catch and effort

Initial analysis of 2022's sampling rate indicate Mauritania will have met or exceeded the minimum sampling rate set by CECAF (FAO) for the third consecutive year. Furthermore, in November 2022, it supported the Small Pelagic Management Plan (PAP-PP or Plan d'Aménagement de Pêche-Petits Pélagiques) and its validation by the Ministry of Fisheries, effectively making it the official planning and policy document for the fishery.

The PAP-PP covers a wide range of topics related to fishery management, including but not limited to, assessment and management of resources, ecosystem and bycatch, monitoring and research, control of landings and fishing/processing capacity, surveillance and enforcement system, different fleets and supply chains, socio-economic issues and employment, food security, contribution to trade and GDP, regional coordination and co-management, as well as the necessary means, finance, capacity and timeframe for implementation.

Moving forward, key objectives for the fishery are:

- Better align removals from the stocks with sustainable yield levels to facilitate the recovery of depleted stocks, with both a regional and a national focus
- Reduce capacity in the system, specifically fishing effort, fleet size and type, as well as the number of fish meal factories, to match the more sustainable level of landings
- Enhance management responsiveness to the stocks by increasing and improving research and monitoring
- Gradually orient landings towards more Mauritanian and socio-economically beneficial supply chains, with fish meal production gradually shifting towards using by-products
- Improve regulation, monitoring, and surveillance to ensure compliance with quotas and other regulations, reduction or elimination of bycatch and ETP impacts, reduction of fishing pressure on juveniles and spawning areas, among others

The FIP received an external peer review of the project from MarinTrust in December, which recommended continuation of the FIP in the Improver Programme and provided suggestions for the workplan. It also continues to receive a grade A (advanced progress) from FisheryProgress, which evaluates and measures projects' progress to understand the rate at which they are improving.

At the beginning of 2022, Skretting committed to the small pelagics FIP in Mauritania as part of our commitment to be part of the solutions to the challenges faced by our industry.

The upgrade to "A" Grade by FisheryProgress proves that the FIP is going on the right direction, but at the same time we want to contribute to accelerate improvements on social and environmental indicators to support the sustainable production of marine ingredients from Mauritania.



Jo Gascoigne  
Coordinator Morocco &  
Mauritania FIP

## NAPA: Using market forces to press for sustainably-managed pelagic fisheries

The consistent inability of Northeast Atlantic coastal states to find an agreed solution that delivers long-term, sustainable management of their shared pelagic fish stocks is of increasing concern to seafood supply chains.

Established in 2020, in response to the continuing dispute over the region's mackerel quota allocations, the North Atlantic Pelagic Advocacy Group (NAPA) now comprises more than 60 leading retailers and supply-chain businesses from across the world, including Skretting, all of which are publicly committed to the responsible sourcing of sustainable seafood. NAPA also has a number of affiliate member associations. This collective is using its voice to advocate for long-term, science-based management of Northeast Atlantic pelagic stocks.

Over time, the quota dispute has resulted in annual catches well above the advised level for the three commercially important species of mackerel, Atlanto-Scandian (Norwegian spring-spawning) herring and blue whiting. NAPA's aim is to establish sustainability in these fisheries by securing an agreement on total allowable catches (TACs) in line with scientific advice, as well as long-term science-based fisheries management strategies.

The coalition is united in wanting to be able to source pelagics from this region providing that long-term, science-based management practices are in place that are supported by coastal states' decision-makers. It intends to help deliver these aims through a fishery improvement project (FIP) for mackerel and herring (launched in April 2021), and also a MarinTrust Improver Programme (IP) for blue whiting (launched in October 2021). Both with three-year timelines, the FIP and IP serve to drive political will while holding key actors and decision-makers to account.

"Our FIP aims are very simple. They are to get the fisheries in a position where they can get Marine Stewardship Council certification if they wish, and to do that we need to agree an allocation mechanism, follow the scientific advice and commit to long-term management," said NAPA Project Lead Dr Tom Pickerell.

According to Pickerell, the close involvement of commercial businesses and the broader industry has been recognised as a vital component in the delivery of FIPs since they were established, with the market pull incentivising better policy decisions.

This has been crucial because, as has been seen in the Northeast Atlantic, it's often very difficult to establish consensus among the coastal states. Without agreement on sustainable allocations, each state has been allocating its own share of the total recommended catch. Unfortunately, the collective sum of these allocations has been much higher than the scientific advice – meaning fishing fleets are catching at unsustainable levels.

The Northeast Atlantic mackerel and herring FIP comprises three core action points:

- Sustainable harvest strategies
- Effective means for dispute resolution between coastal states
- Science-based decision-making by all management parties

To ensure full transparency of its work, the FIP is independently-audited and follows MSC certification criteria as benchmarks for sustainable practices. But Pickerell highlighted that what's key – or the "teeth" – behind this FIP is the sourcing statements that NAPA members have issued, some of which include the warning that they will stop purchasing from these fisheries.

"These sourcing statements are quite novel as often these decisions are private to the businesses involved. But by having the individual companies' positions published, we are setting a very clear set of consequences," Pickerell said.

Indeed, if the FIP were to fail in this regard, NAPA would expect these companies to honour their sourcing statements. Moreover, it fears the risk of these stocks actually becoming overfished would dramatically increase and require rebuilding on top of everything else.

### Skretting's position

Despite the setback in 2022, the level of commitment and attention that the project is gaining reaffirm the confidence that it is possible to set total fishing effort in line with scientific advice by 2024. It will be important that we continue adding market pressure to drive decisions based on scientific advice for sustainable fisheries.

For now, we will continue purchasing blue whiting as long as the FIP is in place. We do this because by maintaining involvement we can drive change. But should progress falter, or the FIP fail, there is a risk that the blue whiting fishery will not qualify according to our marine ingredient sourcing policy.



Dr Tom Pickerell  
NAPA Project Lead

## Novel ingredients

In tumultuous times in particular, the priority for our procurement team is availability - ensuring we have the right nutrients available at the right location to ensure uninterrupted supply to our customers.

With commodity prices remaining high, we are focused on alternative ingredients and suppliers to spread the risk and keep costs down. This has created opportunities for several novel ingredients to become more competitive.

In 2022 we made important progress in novel ingredients, increasing our overall inclusion rate from 0.064% to 1% of total raw materials purchased.

The volume increase was partially due to our increased usage of omega-3 alternatives, such as algae and omega-3 canola oil. Several of these oils are now commercially available and implemented in most of our aquafeed businesses. We saw good tailwind behind the introduction of novel vegetable raw materials, such as horse bean starch and concentrated maize distillers' grains, and we are pleased that these products, developed specifically for the feed industry, are finding their way into aquafeed diets.

Skretting was only able to achieve this progress through a constant focus on novel market opportunities. We fully utilise our global procurement, quality assurance and R&D resources to identify, develop and implement ingredients that fit into our novel strategy, which is to focus first and foremost on low-footprint and right-cost ingredients.

**In 2022, our overall inclusion of novel ingredients grew from 0.064% to 1% of total raw materials purchased**

Mette Lütcherath  
Category Manager Novel Ingredients  
Nutreco



## Bringing novel ingredients to commercial scale

Collaboration between start-ups and large corporates is key for fostering innovation in sustainable aquafeed. The corporate brings decades of experience in scale up and fish nutrition, and start-ups help corporates to develop new sustainable products.

This is exactly what happened with our collaboration with Skretting. EniferBio got off to a flying start in validating PEKILO® single cell protein in salmon feed after winning the 2020 Nutreco Feed & Food Tech Challenge. The prize was a digestibility trial in salmon. The trial proved that the protein digestibility of PEKILO® was comparable to the digestibility of fishmeal.

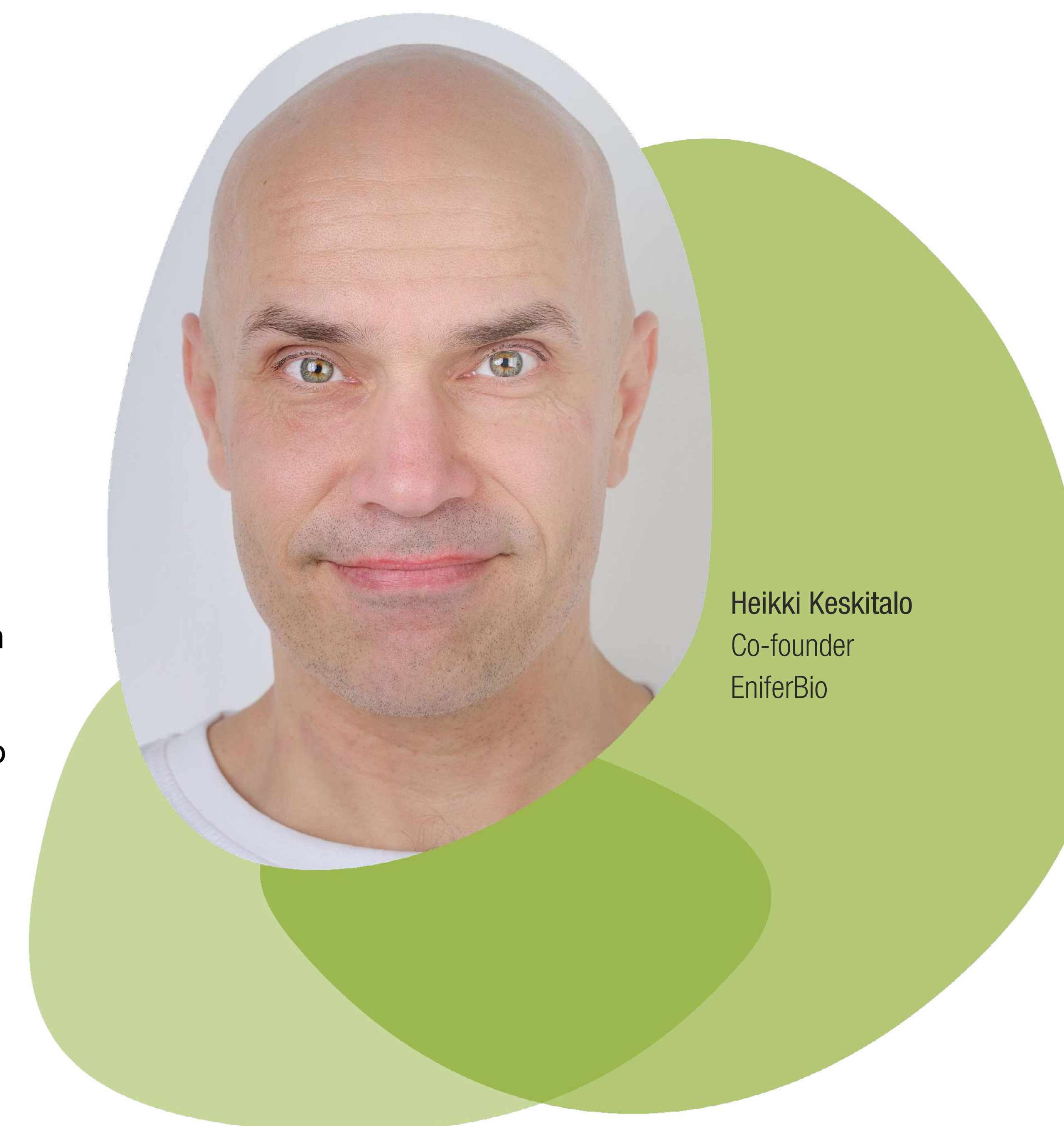
Now the collaboration has reached a new level and Skretting is finalising a large-scale salmon growth trial which will validate the feed formulation at the right inclusion rate of PEKILO® protein for salmon. The goal is to proceed to an offtake agreement, a key milestone for the investment decision of the full industrial scale (10 kT/a) PEKILO® protein plant that is currently planned to be built in France in the coming years.

Currently, European salmon farming is dependent on imported protein ingredients. A dramatic increase in European protein crop farming is not likely because of the temperate climate.

However, scaling PEKILO® protein production is quite straightforward due to its previous 15-year operational history at industrial scale. The biggest challenge for a start-up like eniferBio is get conservative partners in the commodities industries convinced to team up with us. A major focus for eniferBio has been the bioethanol industry having the largest suitable raw material base for the PEKILO® production.

The offtake agreement would significantly speed up the investment decision for the first PEKILO® production plant, which in turn would be an important reference for the following production plants. For example, Europe's largest bioethanol plants have an annual production capacity of 500 million litres of ethanol or more. The distillation residue from one such plant alone could support the production of ~50 kT of PEKILO® protein and make a sizeable impact even at the scale of Norwegian aquaculture and Skretting. This would be a prime example of sustainable circular economy within Europe with a positive impact on land use.

EniferBio has been very satisfied with the collaboration with Skretting to date. The interaction with the team at Skretting has been just excellent and we look forward to more future highlights.



Heikki Keskitalo  
Co-founder  
EniferBio



### Seeding innovation for the future of aquaculture

Nuseed is a global leader in seed development. Established in Australia in 2006, Nuseed expanded to Europe and the Americas to cultivate the power of plants for sustainable seeds, energy, and nutrition.

Aquaterra® Advanced Omega-3 demonstrates this commitment to revolutionary innovation. Nuseed developed the world's first canola-based source of DHA and EPA. There is gap between how much omega-3 oil the ocean can supply and how much more aquaculture needs to support fish health. Feed inclusion rates for these essential nutrients have declined as production has increased over the past twenty years, yet study after study indicates the benefits of high omega-3 content for fish health and fillet nutrition.

The United Nations Sustainable Ocean Coalition is calling on aquaculture to increase seafood production six-fold by 2050, as wild caught fish cannot reproduce fast enough to meet the protein demands of a growing population. Novel sources of long-chain fatty acids are vital to expanding our business without adding pressure to marine resources.

As leaders in sustainable food production Aquaterra® is well aligned with Skretting's goals and values. Just one to two hectares of Nuseed Omega-3 Canola produces as much DHA as 10,000 kg of wild caught fish oil. This crop can double the current supply of long-chain fatty acids on less than 5% of existing canola producing land.

A significant challenge for novel ingredients is proving efficacy and gaining market entry. Skretting has been an instrumental partner in introducing Aquaterra® to salmon feeds by testing and validating the quality of this oil before launching into commercial scale production and advising on best formulations to increase total omega-3 while improving key sustainability indicators, including FFDRo and GHG.

Since the commercial launch in 2020, Aquaterra has become an important tool for reducing dependence on foraged fish oil in Skretting's Chilean and Canadian operations. The partnership will continue to expand as Nuseed gains regulatory approval in additional salmon production markets.



Katrina Benedicto  
Sustainability & Marketing Director  
Nuseed Nutritional



## Progress through collaboration

Engaging with internal and external stakeholders is key to ensuring we invest the right focus and effort in continuous improvement and dealing with the complex issues that face the future of sustainable food.

We asked some of our customers and other stakeholders to share their sustainability journey. Sharing knowledge and experience guides our sustainability efforts to ensure we can make the maximum impact in the areas in which we operate.

## AquaVision: With united action, aquaculture can overcome its biggest challenges

Once again in 2022, AquaVision was held in Stavanger. AquaVision is the global aquaculture business conference that is organised biennially by Skretting and Nutreco. Attended by industry leaders and change-makers from across the world, AquaVision 2022 represented the 14th edition of the event – held 26 years after the first.

With the focus firmly fixed on navigating the future and expanding the possibilities of the aquaculture value chain, AquaVision 2022 sought to inspire actors to work towards a food system that can sustainably feed a world population that will reach 10 billion by 2050.

Setting the scene, Keynote Speaker Professor Joseph Stiglitz, the Nobel Prize-winning economist, insisted that some of the main sources of the global food supply have not lived up to the fundamental requirement of providing sufficient products for the world population to consume in a stable and resilient way. In this regard, AquaVision attendees heard first-hand how aquaculture faces the triple-headline challenge of huge population growth, climate change and social impacts. They also learned why it is imperative that all production systems are enabled to collectively produce vast quantities of additional food that is both climate-friendly and that makes more positive contributions to human well-being.

Nutreco CEO Fulco van Lede told AquaVision 2022 that sustainably feeding the ever-growing world population is a challenge that no single organisation could, or should, face alone. Instead, he said the required “blue food” supply growth rates can only come from committed collaborations that span the entire value chain. Van Lede advocated that transparency, trust and accountability are essential requirements from all stakeholders and also that the value chain is far stronger when it is united in its actions.

“Our story has to be about collaboration, and about showing that, if we want to drive transformational changes for our industry, we must work closer together as suppliers, feed producers, farming companies, NGOs, certification bodies and other relevant stakeholders across the value chain. We know that we have not done enough and that we must do more – better and faster,” he said.

The AquaVision 2022 programme also included guest speakers from the Monetary Authority of Singapore, IKEA, Mintel Group, AKVA Group, SalMar Aker Ocean, Glunashrimp, Mayank Aquaculture and Lattice Consulting.

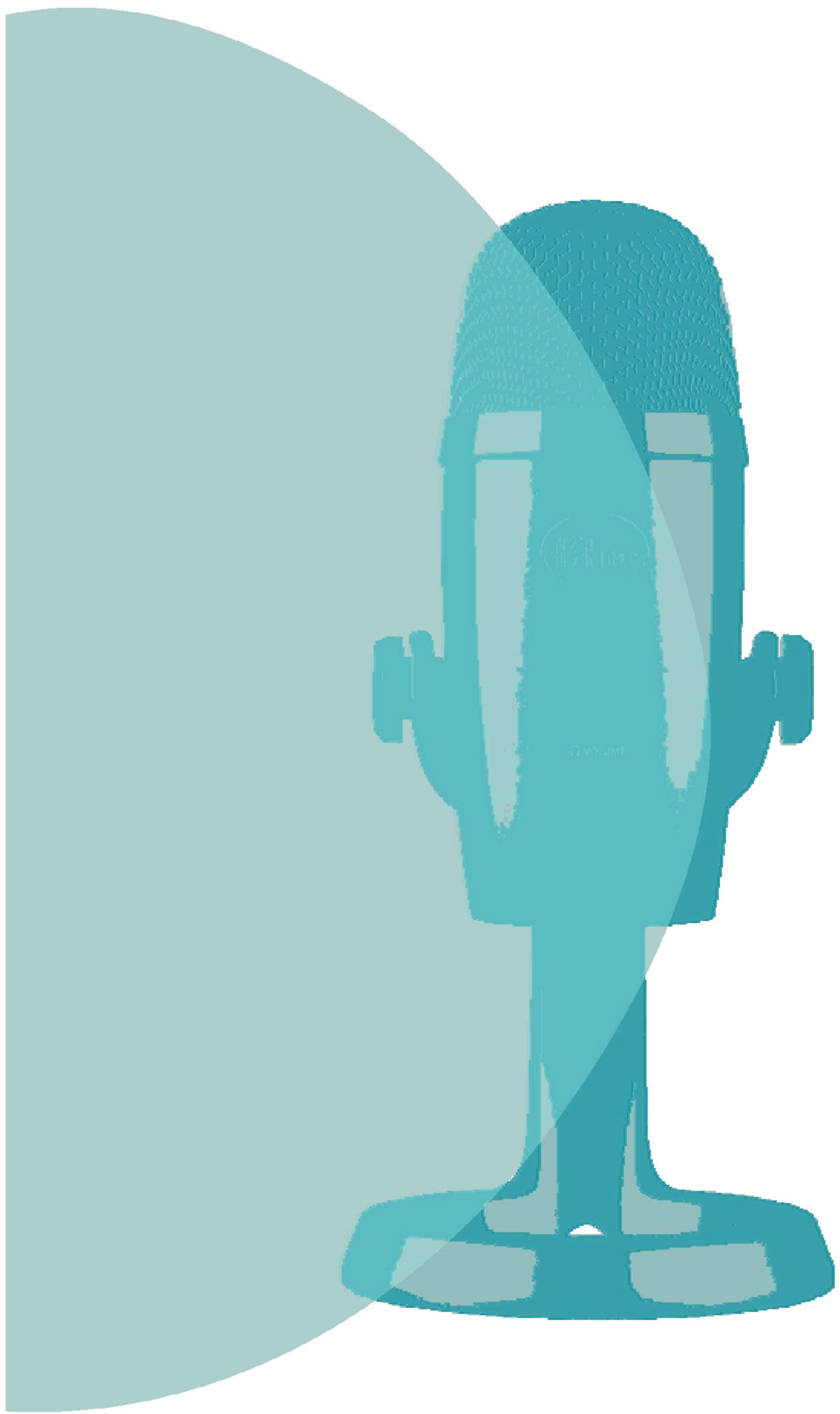


Speakers at AquaVision 2022, top to bottom: Skretting CEO Therese Log Bergjord; Nutreco CEO Fulco van Lede; Fisheries Scientist and Science Communicator Emily de Sousa; Farmer and Aquaculture Expert Dr Manoj Sharma; audience members during AquaVision 2022



## Passing the mic

On the following pages we share insights from many of our different stakeholders and collaborators. Here's a preview...



Wolfgang Harten  
General Manager  
Grupo Almar



Tore Eliassen  
Head of Sustainable Development  
Cermaq Group



Árni M. Mathiesen  
Independent Chair  
Global Roundtable on Marine Ingredients



Sophie Ryan  
CEO  
GSI



Dan Lee  
Standards Coordinator  
Global Seafood Alliance



Alexandra Warrington  
Senior Coordinator Feed Standard  
Aquaculture Stewardship Council



Eduardo Solar  
Licenses and Sustainability  
AVRAMAR



Egil Magne  
CEO  
Pelagia AS



Martin Exel  
Managing Director, SeaBOS



Libby Woodhatch  
Executive Chair  
MarinTrust Governing Body Committee



Emese van Maanen  
Managing Director  
ProTerra Foundation



Carlos Montero Castaño  
Senior Fisheries Program Manager  
Pathways & Small Pelagics  
Program Development Team  
Marine Stewardship Council

## Championing ‘purposeful’ production in Ecuador

Ecuador’s sizeable, fast-growing, and strategically located shrimp industry has a key role to play in meeting the world’s rising requirement for protein. Grupo Almar wants to be part of the solution, and as one of Ecuador’s largest producers, it’s a responsibility that we intend to live up to through our commitment to what we call “purposeful aquaculture”, which involves implementing positive, far-reaching actions across our operations so that future generations may benefit.

In this regard, and one area in which we’ve already led the way, is in making sure that the people who work at Almar have good working conditions. Unfortunately, this still isn’t a given in this part of the world, but for us, it’s mandatory. The accommodations and facilities we provide are of very high standards. This results in more committed employees; and employees are an integral part of what we are building. It’s the Almar way.

Another aspect of our approach is working closely with the communities where we are present; we recognise that local stakeholder involvement on various programmes is crucial to our long-term success.

Underpinning all our sustainability efforts are our four pillars: Environment, Employees, Community and Certifications. To support endeavours in these areas, we have made several important commitments. A main commitment is neutral impact in the water. This is particularly significant as we operate one of the largest recirculating systems in the world for shrimp aquaculture grow-out. Other significant pledges include protecting Ecuador’s mangroves and replacing the group’s use of fossil fuels with renewable energy.

Specifically related to feed, Grupo Almar is looking at ways in which we can verify the full traceability of all ingredients used in our feeds.

These actions are all central to our purposeful aquaculture philosophy, and through collaborative initiatives with other industry stakeholders, including Skretting Ecuador, we’re now seeking pathways to accelerate these sustainability efforts in 2023 and beyond.



Wolfgang Harten  
General Manager  
Grupo Almar

## Sustainability is a priority

Aquaculture must drive the blue transformation in alignment with the United Nations Sustainable Development Goals and the European Green Deal, and as an essential part of the European blue economy.

Being aware of this challenge, sustainability has become a priority for AVRAMAR, and this is reflected in all our functional areas and our entire value chain.

This priority is a direct result of an increasing social awareness reflected in:

- Increasing demands from our customers
- The inclusion of sustainability criteria in the risk evaluation of financial operations
- An increasingly demanding European regulatory framework

In this setting, we are facing five challenges that extend to the whole aquaculture sector:

- Ensuring the use of sustainable raw materials in the feed, and reducing the dependency of protein from extractive origins
- Improving animal welfare, especially during harvest
- Applying preventive measures and vaccines in order to reduce the use of antibiotics
- Reducing the use of plastics
- Replacing fossil fuel

Taking all these factors into consideration, feed is a key element in our commitment towards sustainability. Therefore, we make strict demands to our providers, such as the sourcing of raw materials with certificate of origin and the development of formulations that include novel ingredients. This is why our close collaboration with Skretting is crucial, as their strong R&D expertise allows them to adapt their feed to our sustainability needs.



Eduardo Solar  
Licenses and Sustainability, AVRAMAR



## The need for transparency

Cermaq Group AS is a leading global producer of aquaculture salmonids. With headquarters in Oslo, Norway, Cermaq has operations in Chile, Canada and Norway, and sales around the world.

As we are growing aquaculture to meet the need for low carbon footprint proteins, we focus on growing together with stakeholders where we operate. Our feed partners are essential to the positive development of salmon farming, and we will engage with them to ensure that we create strong solutions throughout our value chain.

The emissions from feed ingredients and production are the highest source of greenhouse gas (GHG) emissions in our value chain. Therefore, understanding of the emissions from our feed is crucial both to setting a climate emissions target and to achieving that climate target. In particular, tracking and reporting the emissions from feed on an annual basis is a key part of understanding how to reduce our emissions. In close partnerships with our feed suppliers and with shared ambitions we can ensure that we work on the hot spots in our value chain.

The aquaculture industry also has a great opportunity in moving towards more circular business practices. We need to utilise resources better and work with partners to create sustainable business models. A circular mindset is important and regulations and business models that support this is something that we support wholeheartedly. Our feed partners are essential to this work through optimising the raw materials used and exploring new ingredients and by-products that can reduce the overall resource use.

To achieve the key goals of both Cermaq and Skretting we need transparency and data. In parallel we must work with governments and other stakeholders to build and develop strong governance systems. Cermaq therefore welcome the stricter reporting regimes that will drive the topics of data and transparency forward. We look forward to continuing to engage with our feed suppliers to ensure that the salmon we put on the table has had the lowest impact journey possible. Skretting has been a strong partner in this work, and we have great expectations to their contributions going forward.

CERMAQ



Tore Eliassen  
Head of Sustainable Development  
Cermaq Group

## The sustainability vision, challenges and possibilities from a supplier perspective

Pelagia processed 1,300,000 tonnes of fish in 2022. The goal is to create value from the entire fish. Divided into our four divisions, Food, Feed, Hordafor and Health, the Pelagia group generated NOK 11.2 billion of revenue in 2022. As one of the largest fish producers in the world, Pelagia has the possibility to influence both human resources and the environment. We will use our responsibility to manage this position in the most sustainable way.

### Our Vision

Pelagia's raw materials are the world's most sustainable marine protein and oil sources. Our landing and handling of these materials must utilise the entire fish to the lowest footprint as possible until the products are handed over to the customer.

Our conduct determines how we create value together. To make an impact, Pelagia systematically accentuates our partner's conduct towards their employees.

### Challenges and opportunities

Pelagia's production processes are energy intensive. The same goes for our logistics operations who distribute large volumes both at land and at sea. Today, Pelagia uses fossil fuels and renewable energy. We are in the process of switching our energy sources from fossil to renewable. Several of the alternatives to fossil fuels, especially at sea, are still immature but we also see great opportunities. New energy sources such as burning self-produced bio-oil, electric boilers, high-temperature heat pump technology and zero emissions are examples of measures that Pelagia is now introducing.

High volumes of fish for human consumption are exported unprocessed. Exporting processed fish (fillets) will reduce shipping volume while keeping valuable by-products in Norway, which is a source to produce desired raw materials domestically. To increase processing, resources like new technology, development, testing, and trials are required in parallel with full production. In recent years, Pelagia has invested considerable sums in developing and solving these challenges. This will continue in the coming years. Cooperation between private corporations and public sector is important to succeed with increased domestic processing. The opportunities that lie in increased processing are significant, both for added value per fish, reduced shipping, and higher employment.

As a significant corporation in the fish industry, Pelagia has a desire to gain access to the best expertise and we must be able to recruit employees from 100% of the population. Men and women must have equal access to all positions in Pelagia. In cases where there is a proportional difference between women and men, we will analyse the reasons and assess if Pelagia can take measures to ensure access to the best expertise.



Egil Magne  
CEO  
Pelagia AS

## United Nations Global Compact

Skretting, through Nutreco, is member of the United Nations Global Compact programme, which supports companies seeking to conduct their business responsibly through the alignment of their strategies and operations with its Ten Principles on human rights, labour, environment and anti-corruption. The UN Global Compact also encourages companies to take strategic actions to advance broader societal goals, such as the UN Sustainable Development Goals, with an emphasis on collaboration and innovation.

The UN Global Compact has a Sustainable Ocean Business Action Platform that convenes leading actors from business, academia and government institutions to determine how ocean industries can advance progress towards the Sustainable Development Goals (SDGs). The Action Platform has, in consultation with more than 300 stakeholders worldwide, developed the Sustainable Ocean Principles to emphasise the responsibility of businesses to take necessary actions to secure a healthy and productive ocean.

As signatory of these principles, Skretting recognises the urgency and global importance of healthy oceans and a sustainable aquaculture industry and will take action to promote the wellbeing of the ocean for current and future generations.

The Sustainable Ocean Principles provide a framework for responsible business practices across ocean sectors and geographies, serving as a common reference point on ocean sustainability. They build upon and supplement the Ten Principles of the UN Global Compact, covering ocean health and productivity, governance and engagement, and data and transparency.

The ocean is vital to the well-being and prosperity of humankind. To achieve the world community's ambitions as laid out in the Sustainable Development Goals, there is a need to expand our use of the ocean to produce food, energy, raw materials and transportation. Carrying out these activities in a sustainable manner will contribute to reducing global warming and environmental degradation, while also ensuring a healthy ocean that can provide significant opportunities for business and global economic growth.

As described in Sustainable Development Goal 14: Life Below Water, there is an urgent need to protect and restore the health of the ocean, which is rapidly deteriorating due to increasing temperatures, acidification, the depletion of natural resources, and pollution from land and sea. Businesses have a shared responsibility, alongside government and civil society, to take necessary actions to secure a healthy ocean.

## Global Roundtable on Marine Ingredients

The Global Roundtable on Marine Ingredients was launched by the Sustainable Fisheries Partnership (SFP) and IFFO – the Marine Ingredients Organisation in 2021. It now gathers 13 value chain representatives and aims at increasing the availability of responsibly sourced marine ingredients and driving environmental and social improvements in fisheries.

Based on a strong coalition of organisations which have embraced collaboration as a powerful means to drive change at a pre-competitive stage, the Global Roundtable has agreed that the focus, to start with, should be on three tangible projects: West Africa, South and Southeast Asia and a global project focusing on analysing the marine ingredients industry's environmental impacts through a life cycle assessment.

Addressing regional challenges is a long-term ambition which relies not only on the industry's willingness to benchmark local practices against those assessed against international guidelines, but also on local regulations and regional cooperation on shared fish stocks. Developing a better understanding of regional and local market forces is central to those projects as they will determine which infrastructure could be put in place to ensure food security locally. Entering into dialogue with local stakeholders is another key factor of success. In this respect, Global Roundtable Members believe in the Fisheries Improvement Project model, which, first and foremost, gives priority to a multi-stakeholder approach and demands accountability.



Árni M. Mathiesen  
Independent Chair  
Global Roundtable on Marine Ingredients



## SeaBOS

Seafood Business for Ocean Stewardship (SeaBOS) is a science-industry initiative founded in 2016. It consists of ten of the world's largest seafood companies collaborating with science to implement a joint vision to support more sustainable seafood production and improved ocean health. The initiative connects capture fisheries with feed producers and aquaculture businesses across Asia, Europe, and North America.

Pre-competitive collaboration is at the heart of SeaBOS. Spanning cultural and geographical boundaries, the aim of SeaBOS is to develop science-based solutions to address key challenges and provide leadership, guidance, stewardship, and best practice for others to use.

Working with Nutreco/Skretting and our members to lead a global transformation of the seafood sector is an ambitious task. That is why it is of critical importance that we have committed and engaged members who take action in their own operations and value chains – and who are not afraid to share their lessons learned.

As a founding member of SeaBOS, Nutreco has been leading the SeaBOS task force on Illegal, Unreported and Unregulated (IUU) fishing and modern slavery from the outset.

Over the past five years, SeaBOS has contributed to a number of activities, from accelerating traceability in seafood value chains together with the Global Dialogue on Seafood Traceability, to piloting a project on electronic monitoring on fishing vessels, a project led by Nutreco.

We will continue to work with partners to create transformational change. The importance and value of working together to make the feed industry and seafood value chains more sustainable cannot be overstated. We have come a long way, but there is still important work to be done. Having Nutreco onboard as a committed and pro-active member on this journey is a strength to our collaboration and helps us move forward on our mission for ocean stewardship.

To address IUU fishing and modern slavery risks specifically, SeaBOS has created:

- A toolkit which companies can tailor to meet their specific needs, outlining policies and guidance procedures to establish a framework to deal with the issues
- Voluntary procurement actions, which addresses issues ranging from responsible raw materials sourcing and mechanisms to help eliminate forced, bonded and child labor, to protocols for auditing and compliance and advancing traceability.
- Risk analyses created by SeaBOS scientists mapping key risks for labor abuse and IUU fishing at port, at sea, and associated with transshipment, and with identified key risk drivers.

The objective of this work is to help identify and mitigate risks and strengthen the overall sustainability and labor performance of seafood operations.



Martin Exel  
Managing Director, SeaBOS



Sophie Ryan  
CEO, GSI

### Global Salmon Initiative

Aquaculture is the fastest growing food system in the world, and for good reason. Coupling many health benefits associated with consuming seafood, a smaller environmental footprint, and lower greenhouse gas emissions compared with land animals - blue foods – both wild and farmed fish- can be a crucial component in tackling sustainability, health and development challenges across the global food system.

What's more, demand is likely to continue increasing. The High Level Panel for a Sustainable Ocean Economy found that the ocean has the potential to deliver six times more nutritious and responsible food by 2050 if managed responsibly.

It's this point of being managed responsibly which is crucial. Like all food systems, growing demand poses both opportunities and challenges for production. For aquaculture to deliver on its potential of providing nutritious and sustainable food, it will require greater transparency, greater ongoing innovation along with thoughtful investments and effective policies. To be successful this requires collaboration on all levels.

The aquaculture sector has proven experience in mobilising responsible production, and many producers thrive in an ecosystem of continuous improvement. So how can we maximise this potential? By working together to improve environmental performance we can make progress faster, and improve how we share our story and build trust in our operations with our stakeholders.

This is how we work in GSI. We use the critical mass of industry to set ambitious goals to motivate accelerated progress, create dedicated expert task forces to share best practices and problem solve on environmental challenges, and provide a framework for members to report transparently against consistent and aligned metrics to show progress being made. Working collectively across focus areas like improving feed efficiencies, improving fish health and welfare, and lowering carbon emissions, GSI members are adopting best-practices, investing in R&D and technology advancements, and above all enacting sustainability commitments that can make real differences in how we produce healthy, sustainable food.

This year, GSI is reaching our 10-year milestone, and while we have made measurable progress there is still a lot more to be done. The challenges are complex and continually evolving, but if we focus on the data – being transparent, and combining expertise – we have the knowledge to overcome them. Yes, there is the option to work individually, but to see change at the speed and scale the food system requires, working collaboratively is going to give us a better chance of succeeding.

## MarinTrust continuing to expand

Standards must continually develop to remain both credible and relevant, and 2022 has been no exception for MarinTrust as we move closer to the 2023 launch of version 3 of the MarinTrust factory standard.

During 2022, this development process saw workshops focusing on by-products and social criteria, two key areas for enhancement in v3, followed by extensive trials and pilots in the field. Having the MarinTrust programme, with its three key components (the factory standard, the chain of custody standard, and the Improver Programme) embedded in Skretting's sourcing policy is central to MarinTrust's recognition throughout the value chain and, as a stakeholder, Skretting has contributed to this development process to help balance market needs with accessibility.

During 2022 the MarinTrust Programme continued to expand, with 21 new sites achieving the factory standard, taking the total to 165 globally, 17 new Chain of Custody certificate holders, taking the total to 86, and 10 new accepted Improver programme sites. All these contribute to our strategic objective to have 75% of all marine ingredients produced globally either fully certified, in assessment, in application, or accepted on to our Improver Programme by 2025, increasing the provision of responsibly sourced marine ingredients for aqua feed.

One of the main contributors to this has been our Improver Programme and in 2022, for the first time ever, a fishery and its associated fish meal and fish oil production sites gained certification following their journey on the MarinTrust Improver Programme with the Panamanian fish meal and fish oil production plants. The sourcing from the Panama small pelagics fishery demonstrated full compliance, and just gained MarinTrust certification after significant assessed and peer reviewed improvements.

These successes can only be achieved through collaborative efforts involving industry and government and the aquafeed value chain is pivotal in helping support and drive these improvements.



Libby Woodhatch  
Executive Chair  
MarinTrust Governing Body Committee





Dan Lee  
Standards Coordinator  
Global Seafood Alliance



## Best Aquaculture Practices (BAP) - Human development, seafood and aquafeed

When it comes to investing in human development and wellbeing, three areas have been identified as giving the most bang for your buck: vaccination, contraception, and nutrition – areas that are of fundamental importance because they underpin healthy, productive lives and female empowerment. Thus, when it comes to considering positive impact, it's clearly through nutrition that the seafood and aquafeed industries have their biggest roles to play. Indeed, the vision of my own organization, Global Seafood Alliance (GSA), is 'a world that embraces the role of responsible seafood in meeting global nutrition needs.' And if seafood production is to expand, it can only do so on the back of an expanding and sustainable aquafeed industry. To ensure progress towards this end, I urge the aquafeed industry to prioritise:

1. Supporting efforts to control negative impacts of aquafeed ingredient production. This may involve staying engaged with, rather than retreating from, some controversial industries so that they can be steadily improved.
2. Maintaining support for the responsible management of marine resources for example, through certification programs like MarinTrust and through engagement in fishery improvement projects (FIPs) especially in areas such as West Africa where weak management is reducing fishery yields and impacting local communities.

3. Taking the lead in supporting responsible, certified, DCF (deforestation and conversion-free) sourcing of terrestrial crop ingredients and, on the basis that 'what gets measured gets managed', support efforts to identify and measure carbon footprints and other impacts in general so that progress towards low impact feeds can be made. Aquafeed can lead the way here and show other animal feed sectors how to align supply chain forces to deliver positive change.
4. Supporting 3rd party certification of feed mills and new initiatives such as GSA's Vanguard Standard for Ingredient Sourcing and Climate Action.
5. Challenging popular misconceptions. Few people understand that the main negative impacts of aquaculture, as shown by life cycle analysis, occur on the land not the water and are often due to crop production for aquafeed ingredients. Aquaculture should be defended against critics whose objections amount to victimising fish farms simply because they are the highly visible 'new kids on the block' among well-established food systems.

It is encouraging to observe a consumer trend towards diets with lower impacts. The aquafeed industry can support this trend and ensure that seafood production expands responsibly, to the benefit of world nutrition, sustainable food systems and climate action.

## Robust sustainability frameworks to generate resilient ocean environments and businesses

The Marine Stewardship Council welcomes Skretting's sustainability targets and commitments, and applauds the integration of sustainability goals as core elements of your business.

The feed industry plays a crucial role connecting ocean health, fishing and processing activities with the development of important seafood sectors such as aquaculture, among others. It is therefore a fundamental tenet of this sector to operate within robust sustainability frameworks to generate resilient ocean environments and businesses.

The targeting of small pelagic low trophic species, which often play key ecological roles in their ecosystems, and which are heavily impacted by climate change, makes the feed industry highly dependent on best available science. Thus, collaboration and investment on research and highly efficient fisheries management is fundamental for the successful performance of companies in this sector.

This cannot be achieved without strong partnerships within supply chains and in the pre-competitive space with other companies and organisations. Our challenges are global and solutions need a global approach too. For that purpose, MSC seeks to contribute to all possible solutions that enhance ocean health for this and future generations.

Based on the FAO Code of Conduct for Responsible Fisheries and recognised as an indicator in the United Nations' Global Biodiversity Framework, with scientific evidence and independent third-party assessments at our core, the MSC certification program provides the highest level of assurance to support progress towards environmental sustainability in an operational, efficient, and transparent manner.

MSC is a tool and works with engaged partners to achieve ends we all share. Leading companies like Skretting are crucial to generate real impacts and to achieve common sustainability goals. To that end, MSC encourages Skretting, and all other actors of the feed industry, to enhance the application of measurable targets, to proactively pursue their compliance, to engage in improvement projects to facilitate the transition to sustainable fisheries and management everywhere, and to strengthen the partnerships with credible science-based assurance systems, such as MSC, to help deliver impacts on the water, transparent accountability and resilient businesses.



Carlos Montero Castaño  
Senior Fisheries Program Manager  
Pathways & Small Pelagics  
Program Development Team  
Marine Stewardship Council

## ProTerra - sectorial challenges

The links between raw material production and deforestation, use of agrochemicals and infringements of indigenous peoples' rights have been well publicised. The legal frameworks within producing countries vary, with some land and indigenous communities being protected by national legislation, while other legislation allows expansion into primary forest and grassland.

Many commodities are also being targeted by new legislations, particularly in Europe, the UK and the USA, where the plan for new due diligence legislation has received intense discussions. These kinds of due diligence frameworks put the onus on downstream users of regulated raw materials to prove their supply chains are free of exploitation, and are not contributing to deforestation and land conversion (whether illegal or legal in the producing country).

No single mechanism in isolation can solve problems as complex as those posed within the raw material supply chains. Instead, a combination of direct supply chain approaches and whole system initiatives are needed. Certification forms a key part of this suite of mechanisms, addressing different challenges, and being an enabler to some of the other mechanisms. For example, certification goes beyond the minimum requirements for the actors within the system, as defined by national legislation.

Also, the transparency it can grant within the supply chain enables companies to identify the origins of their raw materials, and therefore where they may wish to invest in landscape-based initiatives.

### **The need for greater transparency**

Transparency within the supply chains remains a significant blocker to organisations being able to gain a full understanding of their own potential impact.

For many companies, not even continent level traceability is currently available. The flow of this information often stops at the points in the supply chain where mixing of different batches tends to take place. Without this view of risk exposure within their supply chains, companies lack certainty as to how responsible their supply chain is, and are unable to make informed decisions on how they can best apply pressure or funnel incentives to influence the system.

### **The role that certification plays**

Every business has a role to play in ensuring environmentally and socially responsible supply chains develop sustainably. Whilst other pathways towards a more sustainable system focus on wider industry transformation, certification is the main direct approach for a company to address the responsibility of the raw materials currently within their supply chain.

Sustainability certification standards/management programmes contribute to minimising nature loss and maintaining/improving the quality of the land used. As such, chain of custody sustainability standards also enable companies to make externally auditable claims on the origin of their raw materials, and how responsible their supply chain is.

By providing a mechanism for information and evidence to flow down the value chain, chain of custody certification fills an essential gap in current due diligence processes within the sector. By defining terms that can vary hugely across the industry and creating a reference point for what good looks like, certification schemes also give the industry something to align behind, even if the certification itself is not adopted. This is particularly true for the definition of deforestation and land conversion, which varies considerably across the industry, and can have a profound effect on reporting and baselining.

For an end user company, sustainably certified raw materials within the supply chain brings:

- A standard of environmentally and ethically responsible raw materials within the supply chain which goes above the minimum requirements laid out by national legislation
- Greater certainty for the business when making public claims, with traceability of materials back through the value chain which has been verified by external auditors
- Contributory evidence to demonstrate due diligence has been undertaken within their own supply chain to meet emerging due diligence requirements
- Increased knowledge of the origins of the material within their direct supply chain
- A clear reference for what is expected from suppliers, defining what they see as sustainable

The ProTerra standard only certifies producers who meet requirements to address a spectrum of environmental and social issues, including deforestation and land conversion, biodiversity, farming practices (including bans on use of harmful pesticides and GMO crops), labour practices, and FPIC. In addition, ProTerra only operates physical chain of custody schemes.



Emese van Maanen  
Managing Director  
ProTerra Foundation



## Tackling difficult feed challenges through ASC certification

Seafood can only be farmed responsibly if the 'upstream' potential negative environmental and social impacts associated with the manufacturing of aquafeed and its raw materials are monitored, reduced or prevented. This is a challenge for all feed companies and, through its responsible sourcing policy, Skretting has committed to improving its own practices, whilst acknowledging in this report that there is still much to be done.

Transparent certification offers a credible and accountable way of recognising and rewarding responsible practices. The ASC Feed Standard takes the ASC's approach to responsible aquaculture at farm level and extends it to the feed mills that manufacture aquafeed. It covers legal, social, and environmental requirements for both the feed mill's own operations and for the suppliers of ingredients used in their feed production.

Feed companies must work with their suppliers to conduct due diligence into the production of their raw materials.

When considering deforestation risks for soy and palm, 30% of tropical deforestation due to agricultural conversion is considered legal, according to the laws of the country of production. For crops grown in non-tropical areas such as wheat and corn, the main problem is usually ecosystem/land conversion rather than deforestation – for instance, grasslands rather than forests being converted into agriculture fields.

ASC requires feed mills to ensure their no-deforestation commitments are applied across all major plant ingredients and that their implementation is part of a more comprehensive no-land conversion approach.

Forced and child labour are critical issues to address in supply chains, but are particularly difficult to mitigate, address and monitor within fisheries.

Among the many and comprehensive social requirements of the ASC Feed Standard, feed mills must ask probing questions of their marine ingredient suppliers to convey the need for better policies and checks regarding human rights abuses on board fishing vessels.

The ASC Feed Standard offers a standardised approach to supply chain risk assessment, as well as requiring greater transparency and accountability through public reporting. By working towards ASC certification, Skretting is demonstrating its commitment to holistically addressing its more challenging environmental and social impacts.



Alexandra Warrington  
Senior Coordinator Feed Standard  
Aquaculture Stewardship Council

# Transparency & trust

Transparent supply chains can drive more responsible practices and concerted efforts for the sustainable development of aquaculture. They also enable consumers to access the information they need to trust their seafood.

As aquaculture assumes an expanding role in meeting consumer demand for seafood products, it is only natural that the quality and safety of products come under the scrutiny of national and international organisations responsible for food safety, and that consumers are demanding more food quality and safety information. We have made transparency and trust core pillars of our work at Skretting.

Read on to find out more.



## Traceability, a key component for building transparency and trust

A traceability system allows us to identify the origin of our products all the way from the field to the consumer. Changes to the product, for example if it has been transformed or processed are included in the system. Traceability in the feed sector is directly related to food safety, sustainability, ethics, and commercial responsibility. The existence of an adequate and integrated traceability system, covering all feed ingredients, is essential for us to carry out an effective risk assessment throughout the production chain.

Traceability must be done both up and down. This means we must be able to trace products from the agricultural field to the final product and the other way around. By law, companies must be able to trace one step back and one step forward in the value chain.

Skretting demands that suppliers who manufacture, process, pack or hold feed ingredients destined for our facilities maintain and share specific information (key data elements or KDEs) for certain critical tracking events (CTEs) in the feed supply chain. This framework forms the foundation for effective and efficient tracing and clearly communicates the information that Skretting needs to perform such tracing.

Key numbers for the system includes the **lot number** for each consignment of each ingredient, and the **batch number** of finished product. From these numbers we can trace from a specific delivery of an ingredient, to the product it was used to produce, which batch was delivered to a customer, and vice versa.

We can also gain information about the supplier, ingredient type, analytical results, certifications and more. Sometimes this information is electronically available, and sometimes manually available in our systems.

Some of the most important key data elements provided by the traceability keys include:

- Supplier data (name, address, country). In the case that the manufacturer of the feed ingredient is different from the supplier, it is variable how easily available this information is
- Information linked to the origin of the feed ingredients where available, including country of origin of primary production (agricultural products). Registration of this information is dependent upon how we evaluate the risk of the primary feed ingredient

Specifically for marine ingredients we also receive:

- Manufacturer information (name, location and validity and certification schemes)
- Country of origin (country where the batch was processed)
- Species that make up the batch, including the common name in English and the Latin name. When a complete list of by-catch is declared, species that in total constitute less than 5% of the batch can be recorded as “other”
- Certification status such as Marine Stewardship Council (MSC), MSC Fishery Improvement Project (Comprehensive), MarinTrust, MarinTrust Fishery Improvement Project, no certification
- Type of product (whole fish or by-product)
- FAO fishing area

Information requested from our suppliers is stored in Skretting’s enterprise resource planning (ERP) system. The data are usually transferred via documentation that corresponds with the batch to be delivered. Traceability data as of today are not electronically transferred to us from our suppliers, although this is something that we want to prioritise in the short term.

The data can be verified in several ways. In the case of supplier audits, verification of traceability data is an important part of the audit. Verification can also be obtained through analyses from external laboratories, verified by certification schemes and independent surveyors. The type of verification used will be partially dependent upon how critical the information is.

The value of the traceability system will be dependent upon how it is integrated with the quality management system. Skretting works to secure that the integration is completed, and the traceability system is linked with areas like:

- Risk analyses and product recall procedures
- Feed ingredient approval, feed ingredient supplier and manufacturer approval
- HACCP analyses
- Responsible sourcing policies
- Analytical results of feed ingredients and finished products

## Transparency & Trust

### Supply chain corporate social responsibility assessment

In 2022, Skretting implemented the [EcoVadis](#) IQ and Ratings programs, which helps us understand and mitigate sustainability risks among our suppliers, so we can continuously improve on environmental and social topics across the value chain. EcoVadis is one of the tools used to embed sustainability into our procurement processes, including category management, sourcing, supplier risk assessment, and supplier performance. The EcoVadis IQ software enables us to conduct four different supplier risk assessments:

- Environmental risk
- Labor and human rights risk
- Ethics risk
- Sustainable procurement risk

The risk level for each of these topics is based on the geographic location of the supplier, and the industry the supplier operates in. When combining these four risks with the relative spend level of the supplier, we can prioritise further actions to high-risk suppliers. Suppliers cumulatively contributing to 66% of Skretting's 2022 spend have been assessed, highlighting 33 high-risk suppliers.

In 2023 we will engage with these suppliers to further evaluate the risk through the EcoVadis Ratings platform. Within EcoVadis Ratings, suppliers will be required to return a sustainability questionnaire and provide proof for their answers. The information provided is then evaluated by EcoVadis and the supplier is scored accordingly. This allows us to analyse the robustness of our supplier's sustainability policies in a standardised way. The assessment also highlights which areas each supplier covers, and which areas require improvement.

In 2022, 183 of Nutreco's suppliers had an EcoVadis rating available, many of which supply to the Skretting business as well, and we aim to increase this number over 2023.

The logo for EcoVadis, featuring the word "ecovadis" in a lowercase, sans-serif font. The letter "v" is stylized with a green leaf-like shape integrated into its right side.

### Norwegian Transparency Act

On July 1 2022, the Norwegian Transparency Act entered into force with the aim of enhancing the accountability of larger Norwegian corporations in addressing potential human rights violations in their operations and those within their supply chains. In response to this new law we began a pilot of EcoVadis at our Skretting Norway business.

We performed the risk assessment as described above, and this revealed 12 high-risk suppliers that require further attention in 2023. We will request an EcoVadis Ratings assessment from these suppliers, so we are able to identify any material gaps. We are happy to see that two of Skretting Norway's high-risk suppliers have recently performed an EcoVadis Ratings assessment, both scoring above the average EcoVadis score with one even being in the top 1% best scoring companies on the platform. Regardless of the scores, we will pursue corrective actions on any material shortcomings identified during the process.

We recognise that the Norwegian Transparency Act is only one of the many due diligence laws to come in many of the countries where we operate, therefore we are designing policies and processes to be able to comply with all these laws.



## About Skretting

Skretting is the global leader in providing innovative and sustainable nutritional solutions for the aquaculture industry. Skretting has production facilities in 17 countries, and its 3,798 employees manufacture and deliver high-quality feeds from hatching to harvest for more than 60 species. In 2022, Skretting produced 3 million tonnes of aquaculture feed.

The head office is in Stavanger, Norway. Skretting is the aquaculture business line of Nutreco, which is headquartered in Amersfoort, the Netherlands. Nutreco is owned by SHV Holdings, a privately-owned Dutch trading company, regarded as one of the world's largest private trading groups. SHV is a highly diversified company, with interests in transport, retail, oil, food and financial services. It currently employs around 60,000 people and operates in 58 countries.

## About Skretting

### The vision that inspires us

Together with our customers, suppliers and partners, we lead innovation to ensure access to more sustainable, healthier and safer seafood for the world's growing population.

### Our purpose

Feeding the Future continues to be a meaningful purpose for us at Skretting. We hope that you see why after reading this report!

OUR PURPOSE

*Feeding  
the Future*

### The values we live by

We updated our company-wide values in 2022. The new values of trust, inclusivity, curiosity, integrity and passion reflect our purpose of Feeding the Future and underpin our fundamental beliefs and the guiding principles of how we do business.



### Our people

The collective experience, knowledge and talents of our people has helped us achieve considerable success while also progressing the aquaculture industry on a global scale. We strive to be the company where the best people in the industry want to work.

We are an equal opportunity employer; people are considered for all roles without regard to race, colour, religious creed, gender identity, nationality, citizenship status, age, physical or mental disability, sexual orientation, marital, parental, military status or any other status protected by applicable local law.

Skretting's total number of employees, shown in total, by gender and by region

	2022		2021	
	Men	Women	Men	Women
<b>Total number of permanent employees</b>	3 117	682	2 582	656
<b>Number of employees by region (permanent and temporary)</b>				
Africa	436		156	
Asia Pacific	1 683		935	
Europe	696		830	
North America	199		176	
South and Central America	1 264		1 141	

Number of nationalities working at Skretting

2022	2021
73	56

Gender balance in senior management

2022	2021
22%	28%

## Ethics & Compliance

When the Russian army invaded Ukraine in February 2022, we were confronted with several ethical issues regarding Skretting's business related to Russia.

Our primary concern was to ensure the safety and well-being of our Nutreco colleagues in both Ukraine and Russia. Second, the Skretting and Nutreco organisation strives to be a "good corporate citizen" in response to the war taking place in Ukraine. Having consulted some of our key stakeholders, we made the choice to stop selling our products to Russia and Russian-controlled territories.

During the year we made further efforts to embed Nutreco's Ethics & Compliance (E&C) program in the Skretting business. We improved the method of E&C reporting from Operating Companies to the Managing Director (MD) of each Business Unit. The MDs are now provided with data and insight into risks as well as the effectiveness and embedding of our E&C program in their BU every six months. This ensures their full accountability and support for an effective E&C culture within their organisations.

The Code of Conduct and its accompanying e-learning course were revamped in the new branding with a new introduction of our CEO and a new part on HSE. We relaunched the Code of Conduct e-learning to all employees who had not completed it in the last 2 years. We also conducted further risk assessments and training activities, particularly on topics covered by our Competition Law Compliance and Anti-Bribery and Corruption policies.

Furthermore, E&C has worked with the communications, procurement and sustainability departments to respond to the requirements of the Norwegian Transparency Act as well as various certification and prequalification initiatives focusing on responsible business conduct.

For more detailed information on our E&C efforts, please see the 2022 [Nutreco Sustainability Report](#).



Olav Kjeldstad  
Ethics & Compliance Director

## Occupational health and safe work

The efforts to enhance our reporting culture and transparency have resulted in an increase of our total recordable frequency rate (TRCF) and potential serious injury/fatality (PSIF) rates. Reliability on data has also improved with IT integration. In 2022, we have recorded 2.02 TRCF in the last twelve months. We expect to see an improvement in 2023.

The increase in PSIF and TRCF is mainly driven by a more transparent reporting culture and a more convenient way of reporting.

For more detailed information on our E&C efforts, please see the [2022 Nutreco Sustainability Report](#).

Incidents in Skretting in 2022

	2022	2021
Serious Injuries and Fatality Injuries (SIF)	3 (1 fatality*)	1
Potential Serious Injury/Fatality (PSIF)	168	50
Total Recordable Frequency rate (TRCF)	2.02	1.23
Proactive reporting of Hazards (Hi) and Recognition (T1)	3 259 (0.82 per FTE)	74 (0.02 per FTE**)

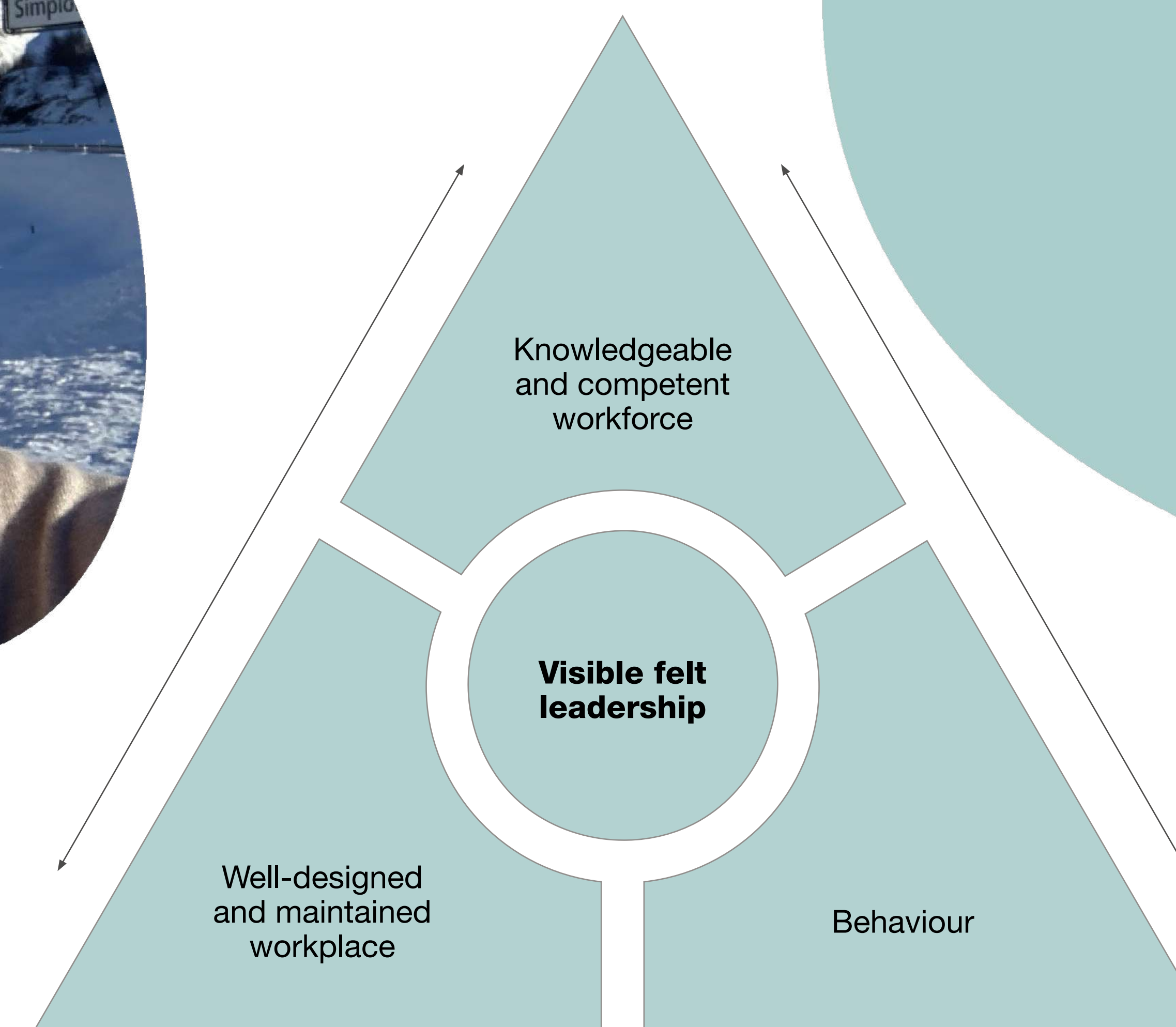


Alexandre Bolay  
Nutreco Global HSE Director

### The loss of a colleague at work in 2022

A colleague lost his life at work in Ecuador in 2022. This has significantly impacted the way Nutreco operates. More than ever, safety has become a topic without compromise. Huge investments in training and equipment improvement have been made and driven by top management globally and locally.

On a global level, the accident has accelerated the creation and review of our standards for safety and machine safety design. We have enhanced the skills of our operations in Hazard Identification and Risk Assessment. We have also strengthened the reporting of unsafe conditions and behaviours, to enhance our awareness to the risk.



NuSAFE principles overview

## Our operations and research facilities

**1 SKRETTING CENTRAL OPERATIONS**  
 Head office: Skretting  
 Head office: Skretting Aquaculture Innovation (AI)

**1 SKRETTING NORWAY**  
 Location/s: Stokmarknes, Averøy and Stavanger  
 Feed for: Atlantic salmon, seawater trout, cod, halibut, catfish and wrasse

**2 SKRETTING FRANCE**  
 Location/s: Vervins and St Hervé  
 Feed for: Freshwater trout, sea bass, sea bream, turbot, salmon, catfish, tilapia, sturgeon, eel, carp and shrimp

**3 SKRETTING ITALY**  
 Location/s: Mozzecane  
 Feed for: Freshwater trout, sea bass, sea bream, sturgeon, eel, catfish and carp

**4 SKRETTING CHILE**  
 Location/s: Osorno and Parga  
 Feed for: Atlantic salmon, pacific salmon, freshwater and ocean trout, tilapia, shrimp and yellowtail amberjack

**5 SKRETTING SPAIN**  
 Location/s: Cojóbar  
 Feed for: Freshwater trout, sea bass, sea bream, turbot, sole, meagre, eel, carp, catfish, amberjack and sturgeon

**6 SKRETTING CANADA**  
 Location/s: Vancouver and St Andrews  
 Feed for: Atlantic salmon, arctic char, pacific salmon, sable fish, sturgeon, trout, halibut and tilapia

**7 SKRETTING JAPAN**  
 Location/s: Imari  
 Feed for: Yellowtail, red sea bream, bluefin tuna, amberjack, striped jack, sea bass, freshwater and seawater trout, coho salmon

**8 SKRETTING AUSTRALIA**  
 Location/s: Hobart  
 Feed for: Atlantic salmon, chinook salmon, barramundi, yellowtail kingfish, abalone, prawn, freshwater and seawater trout

**9 SKRETTING EGYPT**  
 Location/s: Belbies  
 Feed for: Tilapia, catfish, mullet, carp and sea bass

**10 SKRETTING USA**  
 Location/s: Salt Lake City  
 Feed for: Barramundi, char, catfish, hybrid striped bass, koi, largemouth bass, pacific salmon, sturgeon, steelhead, tilapia and trout

**11 SKRETTING TURKEY**  
 Location/s: Güllük  
 Feed for: Freshwater trout, carp, sea bass and sea bream

**12 SKRETTING VIETNAM**  
 Location/s: Ho Chi Minh City and Long An Province  
 Feed for: Black tiger shrimp, whiteleg shrimp, giant freshwater prawn, red tilapia, snakehead, climbing perch, pangasius, sturgeon, Asian sea bass, grouper, cobia, clown featherback, snakeskin gourami and pompano

**13 SKRETTING CHINA**  
 Location/s: Zhuhai  
 Feed for: Whiteleg shrimp, black tiger shrimp, trout, sea bass, snakehead, golden pompano, catfish and sturgeon

**14 SKRETTING NIGERIA**  
 Location/s: Ibadan  
 Feed for: African catfish and tilapia

**15 SKRETTING ECUADOR**  
 Location/s: Guayaquil x 3  
 Feed for: Shrimp, tilapia and trout

**16 SKRETTING HONDURAS**  
 Location/s: San Francisco de Yojoa  
 Feed for: Shrimp and tilapia

**17 SKRETTING INDIA**  
 Location/s: under construction  
 Feed for: Whiteleg shrimp, sea bass, tilapia



Global overview of Skretting operations & research facilities

## Certifications

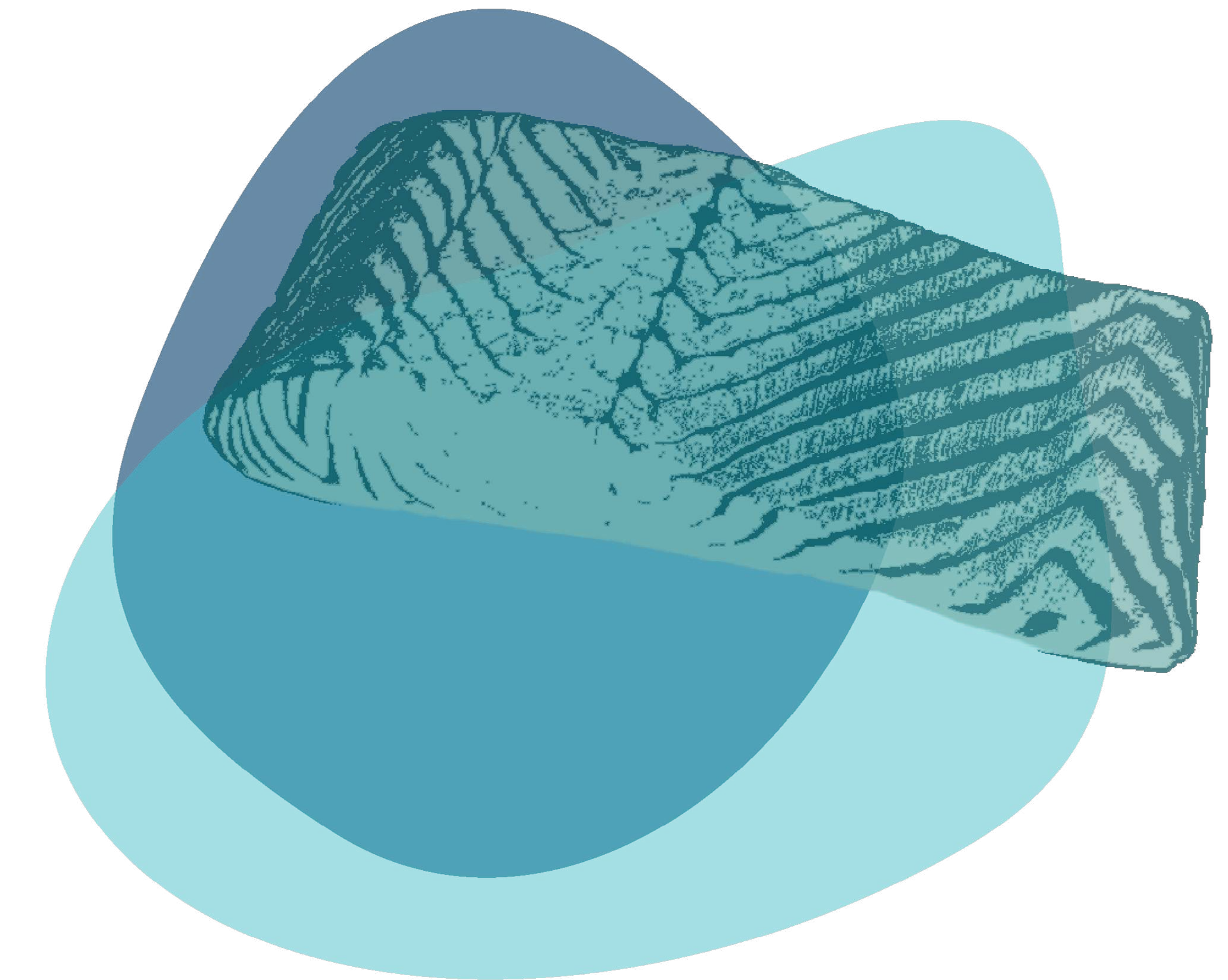
In 2022, our OpCos continued to work closely with third party independent bodies, customers and local authorities to ensure compliance with standards, regulations and certifications to guarantee the consistent formulation and production of high-quality nutritional solutions for fish and shrimp.

Skretting OpCos are certified to a number of ISO standards which help us ensure that we have consistent quality systems and continuous improvement. We are also certified according to private standards that are important for our customers to gain market access. In 2023 we will work to prepare for compliance with the new ASC Feed Standard.

To the right is an overview of certifications and compliance held by our OpCos. Nutrace® is Skretting's company-wide management programme that ensures feed-to-food quality and safety. All internal operations are audited, and all suppliers undergo a comprehensive evaluation and approval process to ensure premium-quality, renewable and responsibly managed resources. We conduct robust analyses of all approved raw materials - at delivery, throughout the formulation process, and up to the point of feed delivery.

Global overview of Skretting certifications

Operating Company	ISO 9001	ISO 17025	ISO 14001	ISO 22000	ISO 45001	Global GAP	ASC (compliant)	BAP	HACCP	Local certifications
Aquaculture Innovation	■	■								
Australia	■		■			■	■	■	■	FeedSafe
Canada	■					■	■	■	■	Organic
Chile	■		■			■	■	■	■	
China	■									
Ecuador	■					■	■	■	■	Naturland (100%) Local HACCP Certificate Punto verde (local environmental certification)
Honduras	■					■	■	■	■	
Egypt	■		■	■	■					
France	■					■	■	■	■	RCNA (french GMP) (100%) FQC (Carrefour) (50%) Label Rouge
Italy	■		■			■	■	■	■	
Japan	■							■		
Nigeria	■									
Norway	■		■	■	■	■	■	■	■	Debio Økologisk (organic certified)
Spain	■		■	■	■	■	■	■	■	Halal CIPA (French market)
Turkey	■					■	■	■	■	Halal
USA	■								■	
Vietnam	■					■	■	■	■	

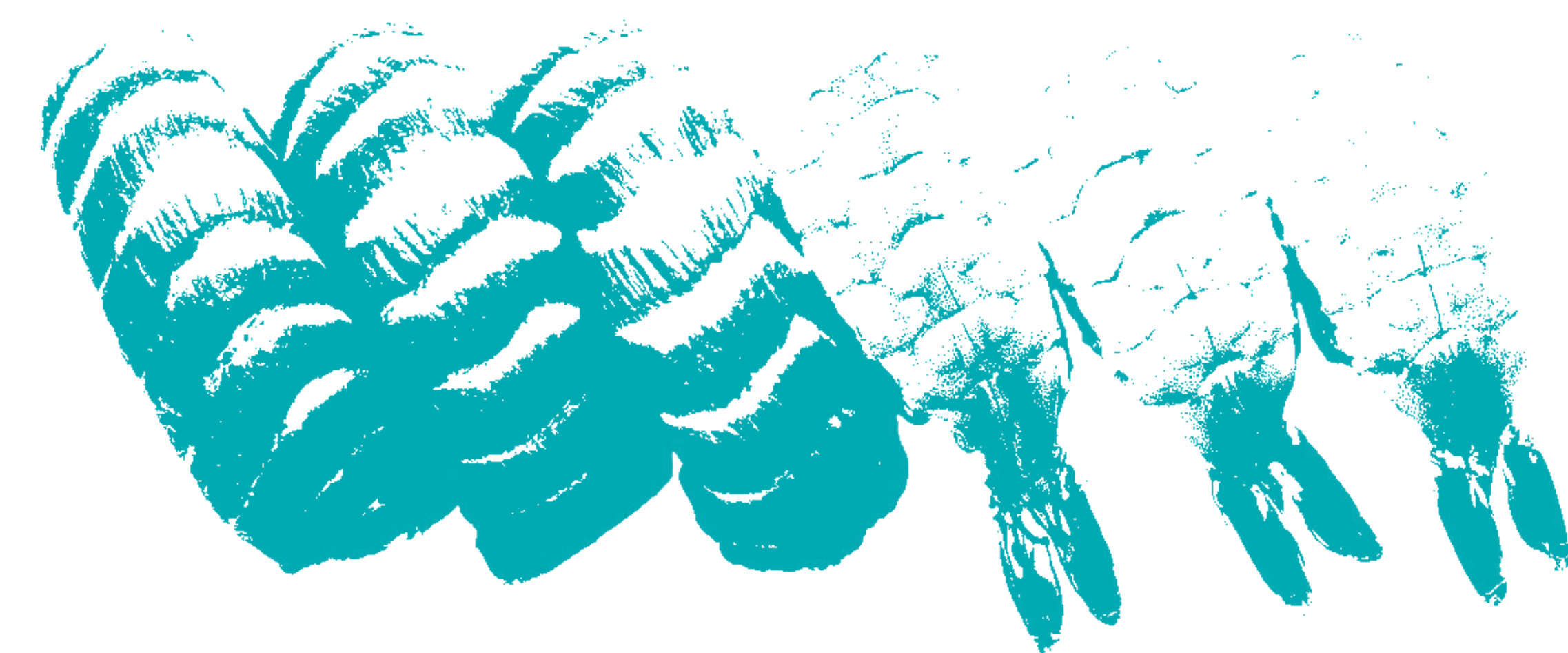




## Stakeholder engagement

We believe that engaging with internal and external stakeholders is key to ensuring we invest the right focus and effort in continuous improvement and dealing with the complex issues that face the future of sustainable food. Through active conversations with several stakeholder groups, we benefit from their diverse perspectives as we explore our solutions. We identify our stakeholders as any group or individual that Nutreco and Skretting affects through our activities, products and services or who, in turn, may affect Nutreco's ability to achieve its goals.

Using this definition, we recognise six main stakeholder groups: Employees, government, external platforms for specific sustainability topics, food retail and services, academia and NGOs.



Skretting's global stakeholder groups and how we interact with them

Stakeholder group	Concerns and expectations	How we engage and how often
<b>Employees</b>	<ul style="list-style-type: none"> <li>• What is the company strategy?</li> <li>• What is our financial performance?</li> <li>• What is the company going to do around cost cutting?</li> <li>• Do we need to close our factory?</li> <li>• How can I make a (international) career at Nutreco?</li> </ul>	<ul style="list-style-type: none"> <li>• Regular (local) town hall meetings</li> <li>• Monthly broadcasted interviews with leadership</li> <li>• Nutranet (intranet) announcements</li> <li>• Divisional strategy updates (annual or bi-annual)</li> <li>• Annual European Works Council</li> <li>• Regular local Works Council</li> </ul>
<b>Government</b>	<ul style="list-style-type: none"> <li>• Protection of consumer and animal health</li> </ul>	<ul style="list-style-type: none"> <li>• Showing leadership through continuous organisation of and participation in relevant stakeholder platforms, focusing on solutions</li> <li>• Launching nutritional solutions</li> </ul>
<b>Platforms for specific sustainability topics</b>	<ul style="list-style-type: none"> <li>• Deforestation for commodity production</li> </ul>	<ul style="list-style-type: none"> <li>• Developing soy and palm sourcing policy in alignment with RoadMap 2025</li> </ul>
<b>Food retail and foodservice</b>	<ul style="list-style-type: none"> <li>• GHGs and novel ingredients</li> </ul>	<ul style="list-style-type: none"> <li>• Engaging with supply chain to increase novel ingredients</li> </ul>
<b>Non-governmental organisations (NGOs)</b>	<ul style="list-style-type: none"> <li>• Overfishing ocean species for marine ingredients supply</li> <li>• Deforestation for soy commodity production</li> </ul>	<ul style="list-style-type: none"> <li>• Engaging in FIPs</li> <li>• Collaborating on platforms that address specific concerns</li> </ul>
<b>Academia</b>	<ul style="list-style-type: none"> <li>• R&amp;D collaboration and validation of animal performance on circularity, health (AMR reduction) and welfare, and emissions reduction</li> </ul>	<ul style="list-style-type: none"> <li>• Setting up or intensifying collaborative projects</li> <li>• Engaging with over 80 academic institutions around the world</li> </ul>

## Global stakeholder platforms



### MarinTrust

MarinTrust, formerly known as the Global Standard for Responsible Supply (IFFO RS) has become the leading independent business-to-business certification programme for the production of marine ingredients. Skretting is a member of the MarinTrust governance board. The main purpose of the standard is:

To ensure that whole fish used come from fisheries managed according to the FAO Code of Conduct for Responsible Fisheries.

To ensure no Illegal, Unreported and Unregulated (IUU) fishery raw materials are used.

To ensure pure and safe products are produced under a recognised Quality Management System, thereby demonstrating freedom from potentially unsafe and illegal materials.

To ensure full traceability throughout production and the supply chain.



### Sustainable Fisheries Partnership

Skretting is a sponsor of the Sustainable Fisheries Partnership (SFP). This non-profit organisation fills a specific gap between industry and the marine conservation community, utilising the power of the private sector to help less well-managed fisheries meet the environmental requirements of major markets. Their work is organised around two main principles: making available up-to-date information on fisheries for the benefit of major buyers and other fisheries stakeholders; and using that information to engage all stakeholders along the supply chain in fisheries improvements and moving toward sustainability. SFP operates through two main principles: information and improvement.



### Global Salmon Initiative

An important way in which Skretting is helping advance the salmon sector is through its membership of the Global Salmon Initiative (GSI). In partnership, GSI salmon farmers and feed companies have committed to working precompetitively together to accelerate progress towards ever increasing standards of sustainability for the farmed salmon industry, and to driving progressive innovation in the feed sector.

Skretting is a proud Associate Member of GSI. These are organisations that have a shared interest in the continued growth and prosperity of the farmed salmon industry as well as a shared commitment to improving the sustainability of the sector.

Associate Members work closely with the GSI members on specific projects where shared knowledge and collaborative working will support accelerated progress.



### ProTerra Foundation

Skretting is member of the ProTerra Foundation which is a not-for-profit organisation that advances and promotes sustainability at all levels of the feed and food production system. A commitment to full transparency and traceability throughout the supply chain and concern for corporate social responsibility and the potential detrimental impact of herbicide-resistant, genetically modified crops on ecosystems and biodiversity is at the heart of everything we do.

Independent third-party certification is central to the Proterra Foundation. ProTerra certification ensures that high quality supplies of crops, food, and feed are independently certified and produced with improved sustainability.



## UN Global Compact

Nutreco is a member of The United Nations Global Compact programme. This is a non-binding United Nations pact to encourage businesses worldwide to adopt sustainable and socially responsible policies, and to report on their implementation. The UN Global Compact is a principle-based framework for businesses, stating ten principles in the areas of human rights, labour, the environment and anti-corruption. Under the Global Compact, companies are brought together with UN agencies, labour groups and civil society. Nutreco has been a member since 2015.



## SeaBOS

In 2022, Skretting continued to be a key contributor to the Seafood Business for Ocean Stewardship (SeaBOS) initiative. CEOs from the 10 largest global seafood companies have joined forces through SeaBOS to create transformative change. The work is divided into five task forces: (1) Illegal, Unreported and Unregulated (IUU) Fishing & Modern Slavery, (2) Transparency and Traceability, (3) Improving Regulations, (4) Internal Governance and (5) Innovation.



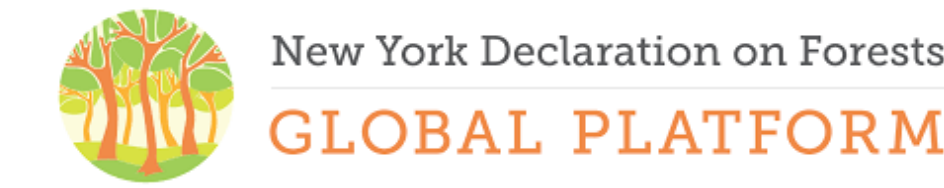
## Round Table on Responsible Soy

Nutreco is member of the Round Table on Responsible Soy (RTRS), which is a civil organisation that promotes responsible production, processing and trading of soy on a global level. RTRS encourages current and future soybean to be produced in a responsible manner to reduce social and environmental impacts while maintaining or improving the economic status for the producer through the development, implementation and verification of a global standard.



## Roundtable on Sustainable Palm Oil

Nutreco has been a member in good standing of the Roundtable on Sustainable Palm Oil (RSPO) since near its inception. Committed to this multi-stakeholder platform, we purchase green palm certificates for all our palm oil products excluding kernel oil.



## New York Declaration on Forests

Skretting is a signatory of the New York Declaration on Forests (NYDF), which is a voluntary and non-binding international declaration to take action to halt global deforestation. It was first endorsed at the United Nations Climate Summit in September 2014, and by October 2017 the NYDF supporters grew to include over 191 endorsers: 40 governments, 20 sub-national governments, 57 multi-national companies, 16 groups representing indigenous communities, and 58 NGOs. These endorsers have committed to doing their part to achieve the NYDF's 10 goals and follow its accompanying action agenda.



## Aquaculture Stewardship Council

Established in 2010, the Aquaculture Stewardship Council (ASC) is a robust and credible environmental/social standard in the farmed seafood sector. It currently has over 1.6 million tonnes of farmed seafood independently certified and compliant to the standard. Nutreco's Sustainability Director sits on the Supervisory Board of the ASC. Currently Skretting is a member of the steering committee overseeing the work related to develop an ASC Feed Standard.



## Global Aquaculture Alliance

Skretting is a member of the Global Aquaculture Alliance (GAA), an international non-profit organisation that promotes responsible aquaculture practices through education, advocacy and demonstration. For over 20 years, GAA has demonstrated a commitment to feeding the world through responsible and sustainable aquaculture.

It does this by providing resources to individuals and businesses worldwide who are associated with aquaculture and seafood. They improve production practices through partnerships with countries, communities and companies, as well as online learning and journalism that has an active readership in every country of the world.



## Sustainable Shrimp Partnership

Skretting is a founding member of the Sustainable Shrimp Partnership (SSP), a group of leading companies who share one mission: to make shrimp aquaculture a clean, stable, and successful practice for the world. In order to reach that goal, the leaders have set a clear and ambitious plan to elevate the whole sector to the next level.



## GlobalGAP

Skretting is member of GlobalGAP, an organisation that has developed criteria for food safety, sustainable production methods, worker and animal welfare, and responsible use of water, compound feed and plant propagation materials. Skretting is also a member of the technical committee that oversees the GlobalGAP aquaculture standard.



## European Feed Manufacturers' Federation

Nutreco is a member of the European Feed Manufacturers' Federation (FEFAC) Sustainability Committee, which meets two or three times each year in Brussels, Belgium, to address sustainability initiatives associated with the European feed industry.

A positive outcome of this committee was the roll-out of the FEFAC Soy Sourcing Guidelines, which lay out the minimum criteria that purchasing feed mills could incorporate when making their soybean, soybean meal and soy concentrate purchases.



## The North Atlantic Pelagic Advocacy Group

The North Atlantic Pelagic Advocacy Group (NAPA) was created as a sector wide, multi-stakeholder initiative of partners to build a shared, global and non-competitive solution to complex sustainability issues in the Northeast Atlantic Pelagic fisheries.

NAPA represents retailers, foodservice companies and suppliers from EU and non-EU countries with the shared aim of sourcing sustainable and certified seafood in order to supply a growing demand for eco-labelled fish products.

To achieve this, NAPA is seeking an agreement on total allowable catches for Northeast Atlantic Pelagic fisheries in line with scientific advice, and for a long-term science-based management agreement.

## Cerrado Manifesto Statement of Support Group

Established in 2017, Nutreco was one of 23 founding member signatories to the Cerrado Manifesto Statement of Support Group (SoS). The SoS has become the world's largest business-driven group calling for immediate action in defence of the Cerrado by supporting local and international stakeholders.

Today, there are 132 company signatories to the SoS across agro-industrial, farming and food processing, finance, packaged consumer goods, retail and foodservice and other supporter groups. Its key focus in 2019-2020 is to support the activity of the Brazilian Grupo de Trabalho do Cerrado (GTC) by accelerating the transition to deforestation and conversion-free soy production and to share knowledge and action plans with key Chinese companies and stakeholders.



## The Global Roundtable on Marine Ingredients

Founded in 2021, Skretting is a member of the Global Roundtable on Marine Ingredients. The initiative aims at taking action based around the framework of the UN Sustainable Development Goals. Additionally, it works to provide a single value chain contact point to contribute to existing platforms aimed at ensuring sustainable management of fisheries providing marine ingredients.

The Roundtable will foster and support precompetitive efforts by members to:

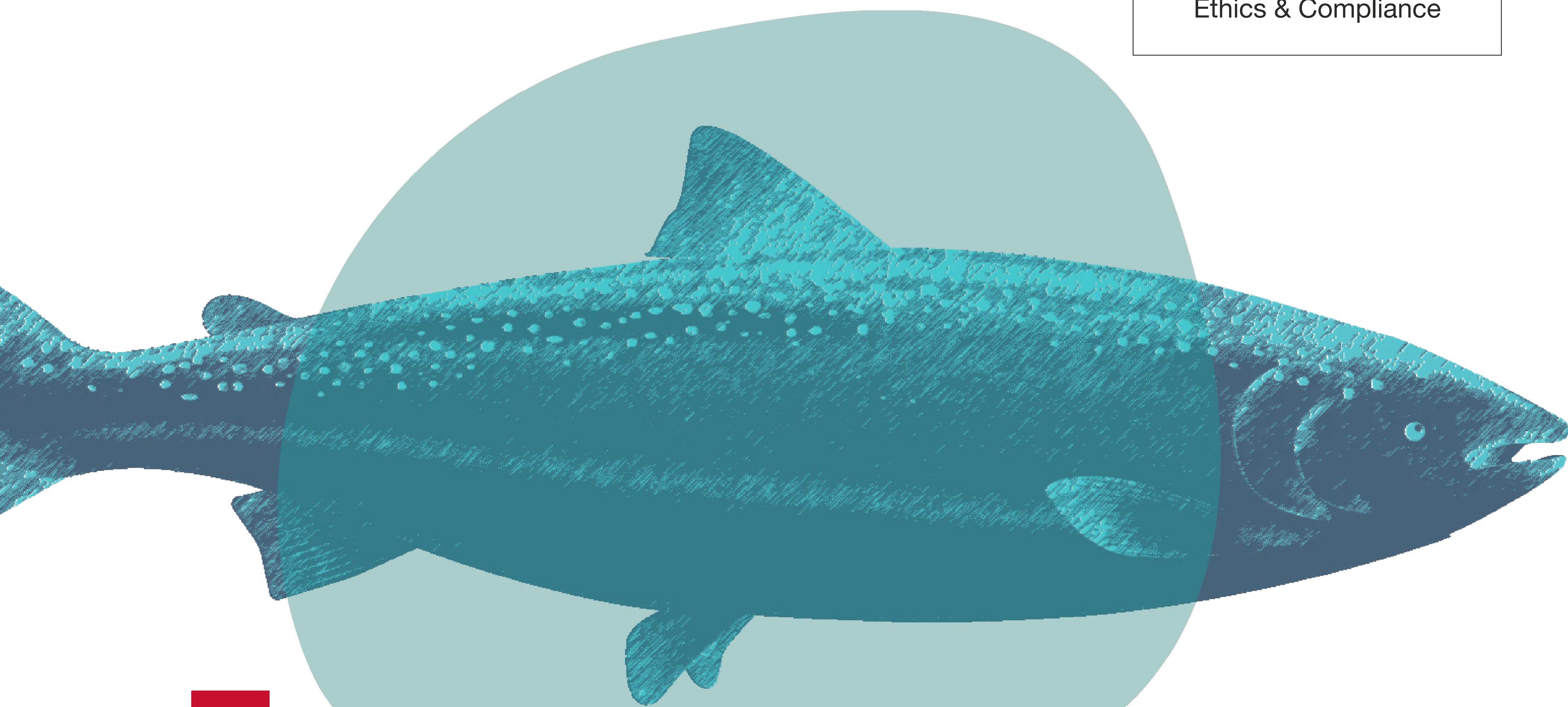
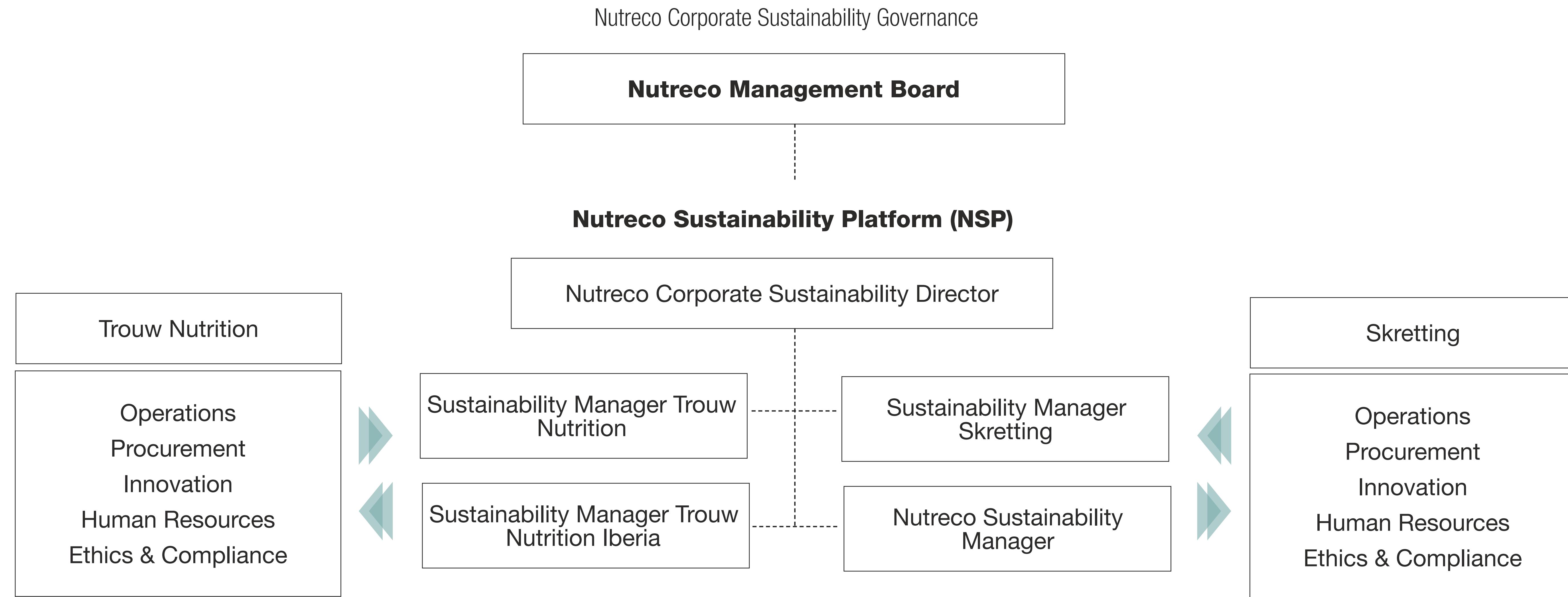
- Identify and agree on ways to further improve the availability of sustainable marine ingredient materials.
- Investigate the potential of new raw material sources, such as mesopelagic species and others.
- Catalyse and support existing and new fisheries improvement projects.
- Understand and address urgent social issues and enhance social responsibility in key fisheries and regions.
- Maintain a global overview of the state of the resources and industry.

The first priority for the Roundtable is West Africa, where production of marine ingredients (both direct and through by-products) has grown dramatically over the last decade, and a number of economic and social challenges have been identified. Southeast Asia is another geographic priority, where multispecies fisheries pose unique management challenges, and some fisheries are tainted by human rights and labour abuses. The Roundtable will also address other important topics such as life cycle assessments and potential new raw material sources.

# Governance

Nutreco's Sustainability function is led by the company's CEO. The Corporate Sustainability Director reports to the CEO and chairs the Nutreco Sustainability Platform (NSP). The NSP is where the sustainability aspects of our strategy are developed, and where sustainability issues are addressed. It is made up of five individuals, three of whom represent the businesses.

The functional directors in the Trouw Nutrition and Skretting business lines are responsible for the implementation of sustainability activities aimed at achieving the targets set out in RoadMap 2025, working with teams in our businesses throughout the world.



## Double materiality

In anticipation of the sustainability reporting requirements outlined in the EU Directive in the CSRD, which will be in force for disclosures related to 2024, Nutreco decided in 2022 to move forward and perform a materiality assessment taking into account the double materiality principle. Double materiality in reporting accounts not only for how a company affects the environment and society, but also how the environment and society impact the company's financial value. A sustainability topic meets the criteria of double materiality if it is material from the impact perspective (inside-out) and from the financial perspective (outside-in).

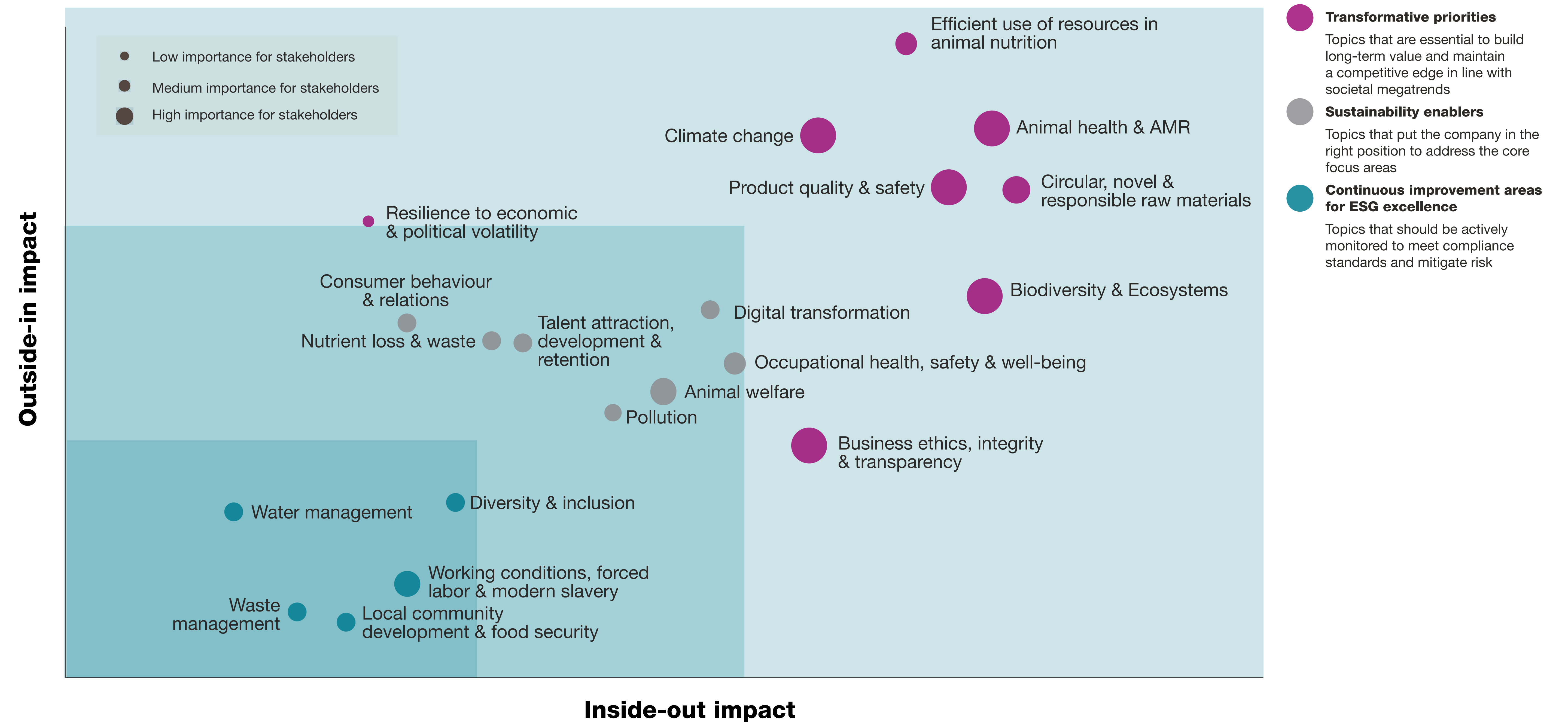
Through the double materiality assessment in 2022, we identified key internal and external stakeholders to engage in the different phases of the assessment. We considered a broad representation across geography, business line and relationship with Nutreco in order to reflect diverse internal and stakeholder perspectives through the process. We gathered input from these internal and external stakeholders about their prioritisation of sustainability topics through in-depth interviews and workshops.

In line with the double materiality principles, our discussion with stakeholders focused on both the impact and financial perspective of each topic.

We identified the following highly material topics for Nutreco:

- Efficient use of resources in animal nutrition
- Animal health and AMR
- Climate change
- Product quality and safety
- Circular novel and responsible raw materials
- Biodiversity and ecosystems
- Business ethics and transparency
- Resilience to economic and political volatility

The results of our materiality assessment further confirm the areas of focus in our RoadMap 2025. In 2023, we will further implement the insights of our double materiality assessment into our 2025 RoadMap and sustainability strategy.



Visual description of the outcomes of Nutreco's double materiality assessment

We hope you enjoyed reading our Sustainability Report for 2022.

Please get in touch if you have any questions or comments!

