



Aqua Nutrition

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About this chapter

We report the progress of our Aqua Nutrition business on a calendar-year basis. The data in this report cover our sustainability performance from 1 January 2022 to 31 December 2022.

Combining strengths for greater impact

At Cargill Aqua Nutrition, we find ourselves at the center of our industry's value chain, interacting every day with numerous stakeholders. We know their challenges, and we understand we are in a unique position to help them work more profitably and reduce their social and environmental impacts.

Our impact on sustainability topics is much greater when we design our programs with our partners at the forefront. Working together, we can combine their strengths with Cargill's technical know-how, market insights and global reach, and devise the sustainable practices and products the global market desires.

One example of that principle is our signature SeaFurther Sustainability™ program. Aiming to help reduce carbon emissions from salmon farming by 30% by 2030, we work with salmon farmers as well as ingredient suppliers to reduce greenhouse gas sources embedded in the value chain.

In a 2022 pilot, we teamed with eight United Kingdom crop farms to pilot a 1,000 tonne reduction through using regenerative agriculture practices. Our goal is to sign up more farmers, get to 10,000 tonnes in avoided emissions in 2023, and scale up further from there.

Most recently, World Wildlife Fund (WWF) and Finance Earth announced that Cargill Aqua Nutrition and other partners are bringing their expertise and unique insights to the development

of a new blue financing model, the Fisheries Improvement Fund. This is a crucial step. To reduce supply chain volatility, mitigate supply risk and enhance business value across the sector, the industry must support sourcing from sustainable fisheries through active engagement.

Additionally, we are expanding our range of next-generation feeds and technologies that help increase yields while minimizing environmental impacts. We're extensively using alternative ingredients like insect meal and algae oil, for instance, as well as using packaging that keeps many tonnes of plastic out of the environment.

In a world that is increasingly hungry for protein, aquaculture products must be a growing, healthy and sustainable part of the solution. With the help of our partners, we know that we are getting there.

I am delighted to invite you to read about our progress. Thank you!



Helene Ziv-Douki
Cargill Aqua Nutrition
President and Group Leader

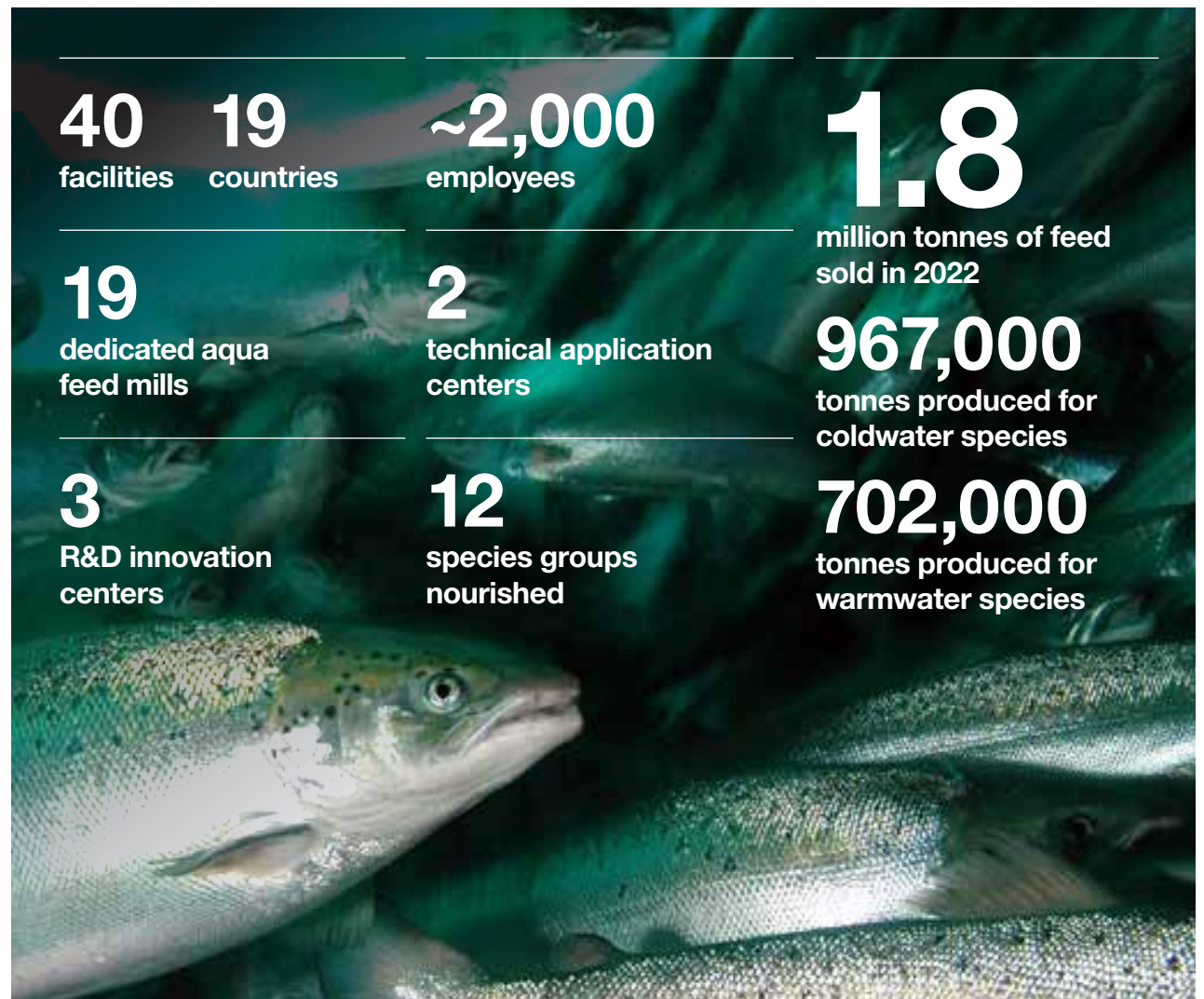
Supply chain overview

What we do

At Cargill Aqua Nutrition (CQN), we help our customers meet the world's growing demand for sustainably grown fish and seafood with high-quality feeds that are tailored to each species' nutritional needs, account for variation in environments, and address specific market requirements and ESG goals of our customers.

Cargill produces aquaculture feeds at 40 facilities. Nineteen of these facilities, across 12 countries, are dedicated to aquafeed production and are the focus of this report. The remaining 21 facilities are outside the scope of this report. They are primarily livestock feed or premix production sites, and their total aquafeed output accounts for less than 5% of our total aquafeed produced. Find out more in our [detailed report](#).

Throughout this report, we reference cold- and warmwater mills. Coldwater mills produce feed for salmonid species. Warmwater mills serve shrimp, tilapia, and other species. See [p. 71](#) for the categorization of each of our 19 aquafeed mills.



Our feed mills



Our species

Cargill Aqua Nutrition has 12 key species groups



Our brands



Our products embody the deep knowledge and expertise built over many years across Cargill, Purina and EWOS brands. As a trusted supplier to the international aquaculture industry, we provide producers with distinctive, proven products and services that drive productivity, sustainability and business growth.

Cargill® offers a full range of animal nutrition and management solutions for producers, feed retailers and feed manufacturers. Our global reach allows us to source the ingredients needed for high-quality aquafeed. Our feed formulation and mill management systems are recognized as the best in the industry.



EWOS® is a longtime leading brand in the aquaculture industry, with a well-earned reputation as a trusted feed provider in all major salmon farming regions, as well as in Vietnam with feed for tropical fish species.



Purina® brings more than 100 years of experience, providing a full program of easily digestible, high-energy nutrition for shrimp and fish.

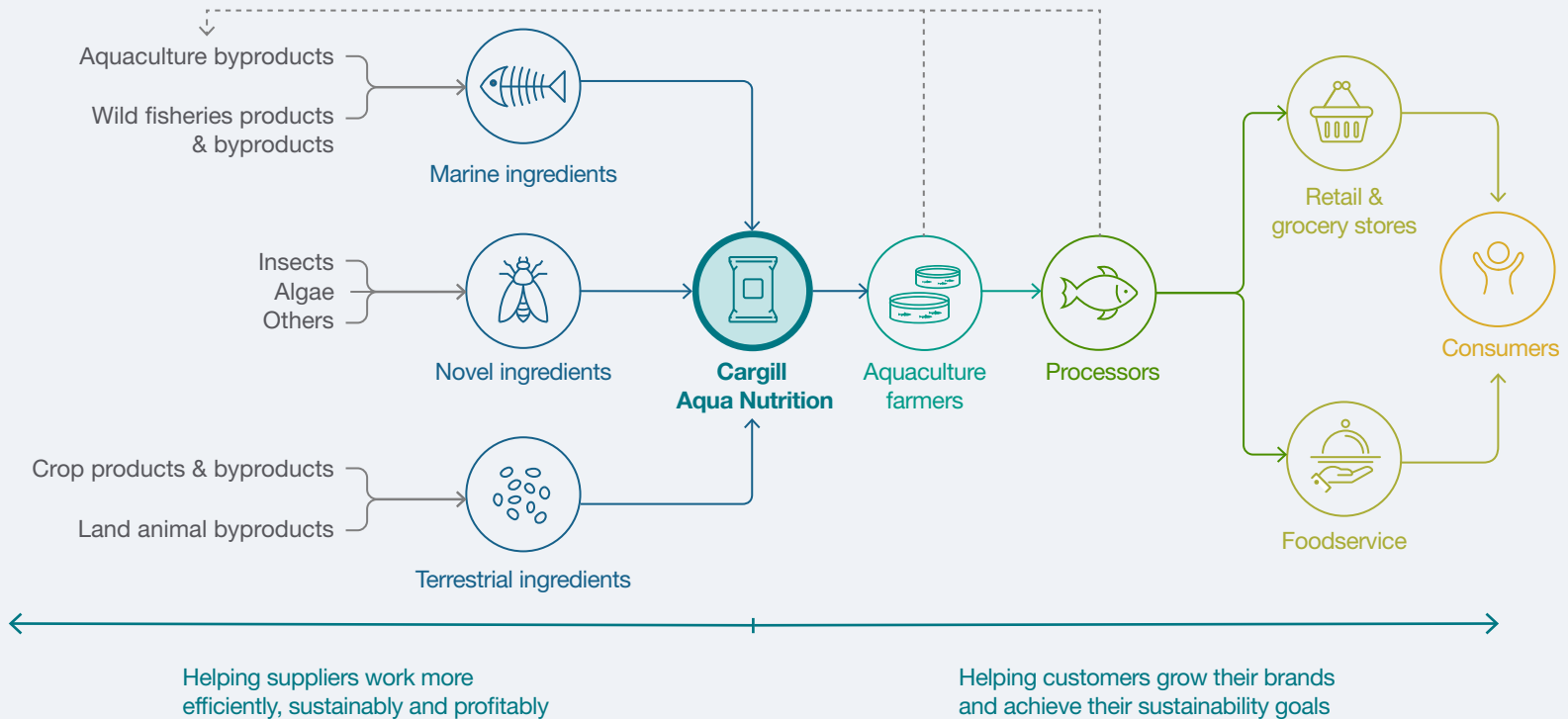


AQUAXCEL® starter feeds give young shrimp a great start in life and support farmer success with superior nutrition and modern extrusion technology.



LiquaLife®, engineered for shrimp post-larvae, uses microencapsulation technology that keeps nutrients intact until consumed. It increases feed availability and nutrient delivery while reducing water quality impacts.

Making a positive impact from the center of the value chain



Cargill Aqua Nutrition sources upstream ingredients, transforms them into nutrient-rich feed for global aquaculture production, and delivers it to our downstream farming customers, who produce the seafood that nourishes people around the world.

Thanks to the scale of our operations and our central position in the supply chain, we can impact the food system positively in all directions.

Backed by our decades of experience and Cargill's technical and market expertise, we are uniquely positioned to connect supply and demand, facilitate the exchange of best practices and information, and help our partners up and down the value chain work profitably while producing more food and using fewer resources.

Focus areas

Making progress that counts

Sustainability is a journey. Every day, we drive steady progress in the three core areas for our Aqua Nutrition business: product, people, and planet. Whether it's promoting the circular economy in our feeds, increasing the number of women in our leadership, or bringing down our greenhouse gas emissions, we're always working to do better.

Product

1.67 million tonnes of feed produced in 2022

Reused fish byproducts make up 59.7% of marine ingredients in our warmwater feeds, and 36.1% of marine ingredients in our coldwater feeds

33.4% sourcing from Fishery Improvement Projects

People

2,000+ employees in 19 countries

1/3 of our managers are women

100% of senior leadership hired from local communities

Planet

10.1% reduction in total energy use for coldwater feeds

11.8% reduction in absolute Scope 1 & 2 GHG coldwater feed emissions

1,000 tonnes of carbon saved using regenerative agriculture

Our 2023 goal: 10,000 tonnes of carbon saved

Product

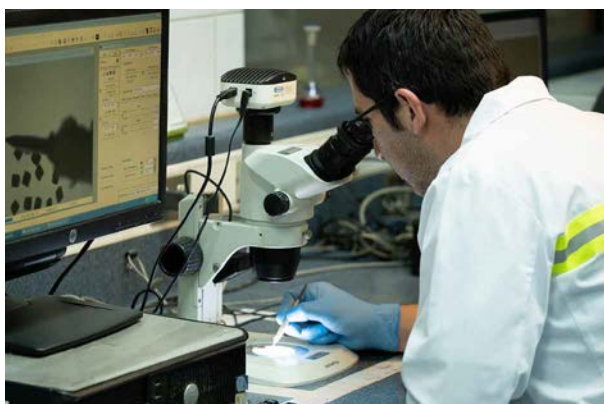
Optimizing our raw material use

Whether it's using byproduct ingredients or steadily reducing the use of ingredients with higher environmental impacts — we're always working to achieve maximal efficiency for our customers with minimal resource use.

We are committed to reducing food systems waste and reusing byproducts. In 2022, our warmwater feeds contained 68% ingredients from co-products. Co-products made up 49% of our coldwater feeds. Compared to 2021, our use of fish trimmings for oil and meal increased to 60% (up 6.5%) for oil and 36% (up 0.2%) for meal in 2022. These shifts happened against the backdrop of the Ukraine conflict, which caused a sharp rise in raw material prices.

We are steadily working to increase our engagement with Fishery Improvement Projects (FIPs), our mechanism to mitigate fisheries' impacts and build more sustainable marine ingredient supply chains.

We are at the forefront of innovation in sustainable terrestrial raw materials. Through our SeaFurther™ Sustainability program, we are pioneering the use of regenerative agriculture practices in raw materials for global aquaculture. Pilot programs started in recent years have yielded positive results and are being scaled up as of 2023 (p. 79).



Promoting fish health to lower aquaculture's environmental footprint

Keeping farmed fish and shrimp stocks healthy lowers environmental impacts. Helping as many animals as possible reach harvest preserves resources and drives sustainable growth for our customers and their communities. Cargill supports fish health and welfare with functional feeds that support animals' immune systems and deliver medication as necessary.

In 2022, functional feed sales reached their highest level since 2017. Functional feeds aim to keep the fish healthy under stressful conditions, reducing the need for medication which is used if the fish become sick. At the same time, antiparasitic and antibiotic feed sales fell significantly across the board (by 43% and 71% respectively since 2017), except for Scotland. No antibiotic feeds were used by our customers in Norway.

We use antibiotics only on an as-needed basis. Antibiotics are only added to our feeds on demand from customers with a prescription for the treatment.

Driving responsible reductions in packaging

Cargill Aqua Nutrition is working toward the systematic reduction of packaging waste. We are reviewing our packaging practices and taking initiatives to reduce, reuse and recycle our packaging materials.

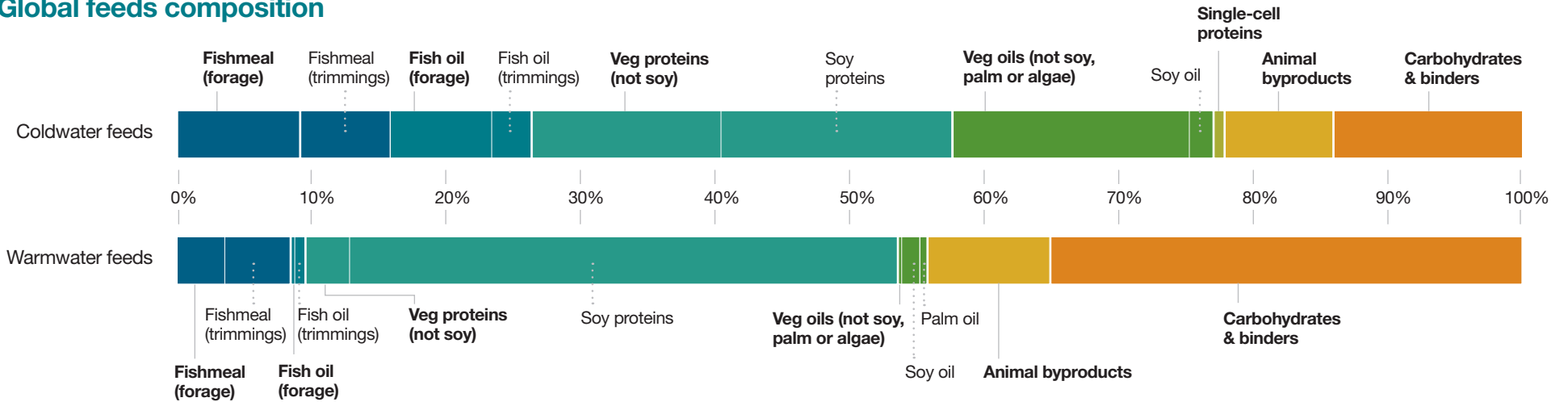
We mainly use plastic in packaging for finished goods. We can collect a limited amount from our customers for recycling. Due to risk of contamination, it is not good practice to use this packaging.

We have started using bags that contain 15% less plastic in Vietnam. These bags, used for our Nurcare and Aquaxcel brands, will keep tens of tonnes of plastic waste and thousands of tonnes of carbon out of the environment over the next few years. Each bag contains 15% less plastic. The move will save 72 tonnes of plastic in 2023 and 144 tonnes per year by 2030. And because making plastic bags takes energy, we'll contribute to prevent 2,500 tonnes of GHG emissions from all Cargill feed bags in Vietnam. We will continue to bring our plastic use down through similar initiatives for other brands and markets.

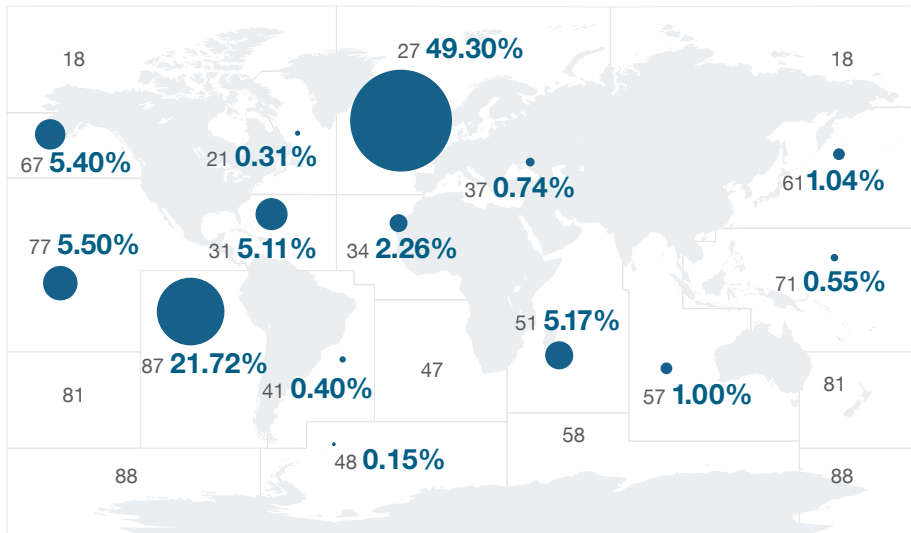


Our raw materials and their origins

Global feeds composition



Origins of marine materials

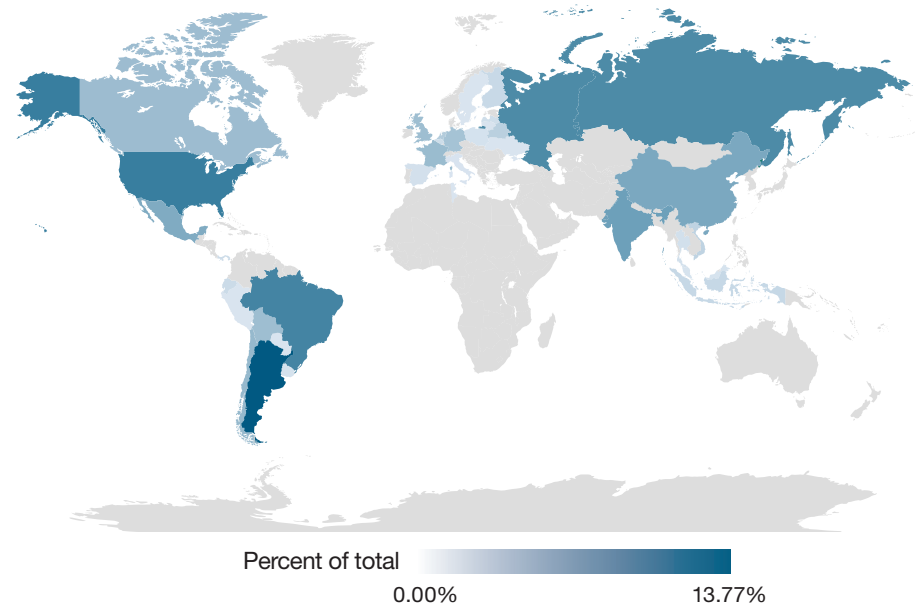


Not definable* 1.34%

FAO Major Fishing Areas

* Country of origin is known, but as many countries transgress multiple fishing areas, the Major Fishing Area is not always defined.

Origins of terrestrial materials



People

Creating equitable workplaces for our people in our aqua nutrition business

We offer our employees a safe, supportive working environment. We believe our purpose begins with our people. They deliver the quality goods and services our customers expect, and help us advance our sustainability goals.

2022 marked another year of progress toward gender parity. Women representation in our overall workforce, in management and administration, and in senior management increased significantly. The number of women on our global aqua leadership team (4 of 11) remained unchanged.

We have seen a significant increase in the number of women in our North Sea Supply Chain team, defying stereotypes about logistics-oriented businesses.

All of our leadership hires in 2022 came from local communities. There were no instances of child labor reported. We are working to have all of our suppliers sign our Supplier Code of Conduct, which addresses child labor. Ethics and anti-corruption training was completed by 78.8% of our employees.



20.2%
of our employees are women

100%
of senior leadership hired from local communities

30.4%
of our management and administration team are women

67%
women in North Sea Supply Chain team

36.4%
of our global aqua leadership team are women

Planet

Reducing our carbon emissions and embracing accountability



Our impact should be understood holistically.

We seek assurances at the factory and ingredient levels.

Our certifications cover both our marine and terrestrial raw materials, along with our processes and partnerships. We are actively engaging with NGOs, governments, academic institutions, technical partners and other companies to build a thriving, sustainable global aquaculture sector.

Standards, certifications and assurances

- Where appropriate, we apply International Organization for Standardization (ISO) standards for quality, environmental and food safety management, as well as Best Aquaculture Practices (BAP), Global G.A.P., and organic standards for industry-specific assurances as required by our markets.
- At the ingredient level, we prefer Marine Stewardship Council (MSC) and MarinTrust certifications for marine ingredients and ProTerra, the Roundtable for

Responsible Soy, and organic certifications for soy and palm ingredients.

- In 2022, 91% of our marine ingredients for coldwater feeds were certified or classified as improving in a recognized FIP, down slightly from 2021. We saw improvement in our warmwater feeds, with uncertified ingredients down to 33% of the total, compared to 40% in 2021. To increase the amount of certified sustainable marine ingredients available for our feeds, we are increasing our work with FIPs.
- We have been supplying our customers with feed that complies with the ASC Farm Standards since their launch for salmon, shrimp, and yellowtail. With the launch of the ASC Feed Standard in January 2023, our factory and sourcing teams are working to be ready for audits as soon as they can occur. We will start with our coldwater factories, and our warmwater factories will follow according to customer demand.

Managing our climate impact

- **Cargill Aqua Nutrition has been reporting on climate metrics and water usage since 2017.** During this time, we have improved our supplier data and made some emissions reductions in our own operations. This gives us a strong baseline to drive real GHG reductions throughout our value chains.
- **To date, our focus for emissions management has been on coldwater feeds.** This reflects the challenges of building up the data across complex supply chains. We are now in a position to reduce those emissions, while we start to improve our data for warmwater feeds.

- **Energy use in coldwater feed production continues to decrease compared to 2017.** This is true for energy used per tonne of feed produced and in total. It has enabled a 10.1% reduction in Scope 1 & 2 emissions, ahead of Cargill's corporate 2025 goal.
- **We have stabilized warmwater feed energy use per tonne, as well as Scope 1 & 2 emissions.** However, there was still a large increase since 2017. This has mainly been driven by significant process changes that led to higher energy use and emissions. Our teams are working to identify solutions.
- **So far, Scope 3 emissions have only been calculated for coldwater feeds.** We have been developing our supplier data for several years. Based on the best supplier database available for 2022, we report an

average Scope 3 footprint of 1.96 tCO₂e/t feed, compared to 2.54 tCO₂e/t in 2017. We do not claim this as an emissions reduction, but rather a reflection of better data calculations from our supply chain. We will seek to recalculate our 2017 baseline based on these improved data sets.

- **The SeaFurther initiative will be our focus for reducing Scope 3 emissions going forward.** We also aim to get Scope 3 data on warmwater feeds for 2023, and report on those results next year.
- **Water use in our factories has slowly increased over time since 2017.** This has mainly occurred in warmwater feed factories, but since 2022 also in coldwater factories. We are focusing our efforts on enabling a water-positive impact in our operations.

Programs and partnerships

Driving change across the value chain

What makes Cargill unique is our combination of global scale, technical expertise and more than 150 years of experience in many different supply chains. Whether it's supporting our suppliers with best practices, helping farmers produce the sustainable fish and seafood the market demands, or building coalitions with NGOs and industry associations—at Cargill Aqua Nutrition, we feel equally at home with all our partners and stakeholders. It's what allows us to make a positive impact across the value chain: upstream, downstream and in our own operations.



SeaFurther Sustainability

Scaling up early wins with an eye on 2030

Our goal: Help salmon farmers chart a path to lower emissions, with a program aiming to reduce their carbon emissions by at least 30% by 2030.

[Learn more](#) 

Feed and its use on farms can account for up to 90% of farmed salmon's carbon footprint. Applying our leverage as a leading global feed producer, we created SeaFurther™ Sustainability, our signature program for the sector. Taking advantage of our long-term expertise, wide-ranging network and privileged position at the heart of the value chain, our aim is to build a collaborative aquaculture supply chain that supports our customers in their sustainability goals.

Launched in 2021, SeaFurther takes a systematic approach to decarbonization. Making vital connections between suppliers and customers, and adding our own market insights and technical expertise, we work with our partners to track greenhouse gas emissions per kilogram of harvested fish, identify carbon “hotspots” and find ways to reduce or eliminate them.

2022 was a pivotal year for the program. We piloted SeaFurther with customers in Norway, Scotland and Chile, collaborating closely to come up with a tailored approach to fit the needs of each company.

SeaFurther's three pillars

Source

We work with our suppliers to develop and design our feed to minimize its carbon footprint while delivering optimized nutrition.

Optimize

We work with our customers to reduce energy use in feed production and farming, streamline transportation and logistics, and tailor our feeds to the fish and environments for which they are destined.

Care

We develop fish nutrition that promotes and enhances the health and welfare of farmed fish, keeping them healthier and growing more efficiently.



Regenerative agriculture pilot saves 1,000 tonnes of carbon

In 2022, we tested the concept of reducing feed emissions through regenerative agriculture practices. Our pilot program with eight U.K. farms, representing 1,500 hectares of rapeseed and wheat fields, achieved a 1,000-tonne carbon reduction. In 2023, we aim to expand the program, sign up more farmers and save 10,000 tonnes of carbon, while supporting the farmers' profitability.

Regenerative agriculture aims to restore the soil's health and resilience, using techniques like low- or no-tilling, planting cover crops to prevent runoff and oxidation, crop diversity, and pollinator strips. As a result, the soil can sequester more carbon, instead of being a source of emissions. Reducing the carbon footprint of crops grown in it. Healthy soil also holds more water, which makes it drought-resilient and supports more biodiversity, both above and below ground.

Scaling up the regenerative agriculture approach is also key to lowering the aquaculture sector's overall carbon footprint, said Dave Robb, Cargill's Program Lead for SeaFurther Sustainability. “This is a practice we believe in as a key part of decarbonization of aquaculture value chains. The point now is to build longer-term relationships with suppliers and customers and expand our network, so that together, we can generate more benefits at scale along the value chain.”

Our goal for 2023:
Save 10,000 tonnes of GHG

Kames Fish Farming: Producing more, emitting less

Located in Kilmelford, Scotland, Kames Fish Farming, Ltd. is known for its omega-3-rich steelhead trout. The 50-year-old family business was one of the first two companies to pilot Cargill’s SeaFurther Sustainability program.

“We are proud to lead the way,” said Cate Cannon, Sustainability Manager at Kames. “Carbon efficiency will only be fully achieved if we work together across the whole supply chain, so it’s fantastic that this initiative—and open communication—are happening rapidly and at scale.”

After compiling a comprehensive carbon footprint inventory together, we identified raw materials for feed conversions (the amount of feed required to grow the fish) and energy use on the farm as hotspots that were ripe for action. In the first year, Kames focused on energy use, optimizing boat use on the farm and reducing diesel emissions. Along with improving feed conversion rates, it was a choice that, in a year with high fuel costs, would make an immediate financial impact.

Working through SeaFurther, Kames saw a 3.3% reduction in absolute greenhouse gas emissions (GHG) in 2021-22, despite a 60% production increase compared to 2020.

As a next step, Cargill and Kames are working to identify suppliers in Kames’ supply chain who can start working with regenerative- agriculture-based feed sources, so that we can make a five-year plan for reductions.

Reducing aquaculture’s carbon footprint

Although most carbon emissions from farmed fish and seafood stem from the raw materials mix, several other factors can be addressed to reduce its carbon footprint. Improved reporting can help identify and remedy

emissions hotspots. The example below shows reductions achieved by one of our SeaFurther pilot customers in their 2022 production.

Example of harvested fish emissions



Source: SeaFurther pilot with Kames Fish Farming Ltd.

“This is not a one-solution-fits-all program, but more of a personalized journey plan with a thoughtful and conscientious team providing tailored guidance. They have helped us make a substantial difference in our emissions without impacting our overall business.”

Cate Cannon Sustainability Manager at Kames



3.3% reduction in GHG emissions while production increased by **60%**

New feeds to deliver lower footprint

In the past, marine ingredients—like fishmeal and fish oil derived from wild-caught fish—were a big component of aquaculture feed. But as the industry grows, aquaculture will need more than the finite supply of marine ingredients to produce enough seafood.

Cargill is helping supplement those marine ingredients with novel inputs like insects and algae oil. Why? Those alternatives offer essential nutrients without further impacting ocean ecosystems.

Take, for example, the recent expansion of our **partnership with Innovafeed**[®], a growing producer of insect meal. This increases the options we can offer customers across novel ingredients and sustainable feeds. Through this collaboration, Innovafeed continues to produce insect meals for salmon feeds, and we are able to add more of their products to our feeds. Beyond being a high-quality feed offering, Innovafeed's insect meal can save up to 16,000 tons of CO₂e for every 10,000 tons of insect protein, depending on the composition of the feed. Our long-term commitment to this partnership has enabled Innovafeed to invest and scale up its production, which will further enable us to incorporate even greater volumes going forward.



For algal oils, we work with the major suppliers to the aquaculture sector and our customers to find ways to include these supplies of long-chain omega-3 fatty acids in our aquafeeds, helping to reduce the reliance on fish oil and increasing the omega-3 content in harvested farmed fish. In early 2022, we committed to incorporating algal oil in all our Norwegian feeds effective almost immediately. This gave a clear signal of our commitments to this ingredient, which is important to our suppliers and our customers to develop the markets.

We are continuing to work further with our customers and their customers to build the market signal for greater novel ingredient use, encouraging increased production and expanding availability. With a combination of conventional and novel ingredients, we will grow our raw material basket sustainably, to support the continued growth of sustainable aquaculture globally.

“A contract of this size and scope for insect ingredients in aquafeed is a first in our industry and marks a major milestone in favour of more sustainable and efficient animal feed, thanks to novel ingredients and insects, more specifically.”

Clément Ray
Innovafeed's co-founder and CEO

Fishery Improvement Projects

Promoting ocean stewardship



We are on a journey to source our marine ingredients produced from wild-caught fish from fisheries that are third-party certified as responsibly or sustainably managed. This is important because according to the Food and Agriculture Organization (FAO), the world is close to its maximum sustainable wild-caught fish production. As it stands today, 35% of the world's fisheries are overexploited and many others are at their maximum sustainable limits.³⁶

At Cargill, we help protect wild fish stocks. We do this by substituting marine ingredients with terrestrial ones, by prioritizing trimmings and byproduct material over whole forage fish material as much as possible, and by maximizing the proportion of responsibly produced marine ingredients certified by organizations such as MarinTrust and Marine Stewardship Council (MSC).

Over the last 20 years, we reduced our use of marine ingredients for the average global salmon feed composition by 80%. In 2022, 41% of our total marine ingredients by volume were sourced from trimmings, as opposed to forage fish. In 2022, 91.4% of the marine

ingredients for our coldwater feeds were from certified or improver program sources. At the same time, 32.7% of the marine ingredients for our warmwater feeds were not certified. The latter is a significant improvement over 2021, but a wide margin for progress remains.

But we don't just want to improve our own supply chain. Our ambition is to use our leverage as a large global feed producer to improve ocean health overall, and to support the sustainable growth of the aquaculture industry. To achieve that goal, we must engage fisheries that are not yet sustainable. We do this by directly supporting credible Fishery Improvement Projects (FIPs) around the world.

By working with FIPs, we help our customers produce the sustainable products the market demands, while also helping drive progress for the fisheries sector as a whole. FIPs reduce fisheries' impact on ecosystems and generate increased benefits for the local communities that rely on them. Over time, FIPs can help restore fish stocks in the areas where they operate, ensuring a long-term supply of fish for food and livelihoods.

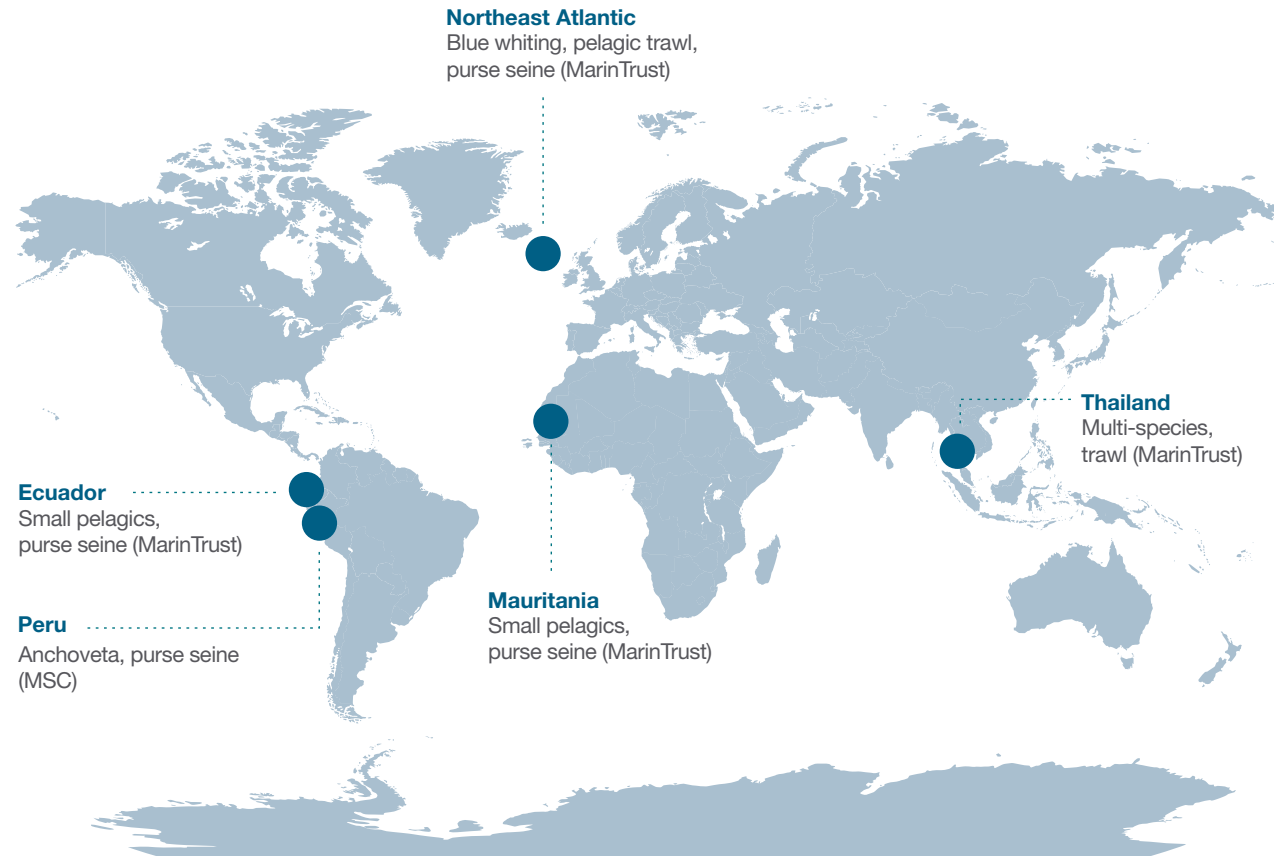
Each FIP is different, but what they all have in common is collaboration. Working with NGOs including the Sustainable Fisheries Partnership (SFP) and the World Wildlife Fund (WWF), local government agencies, industry associations, and often even retailers and our competitors, we create tailored solutions to suit the environmental and socio-economic needs of places as diverse as Peru, Mauritania, and Thailand. In each case, we convene stakeholders, analyze the baseline situation, formulate remedial actions, and create timebound pathways toward sustainable operations and, ultimately, certification.

“The support-not-avoid approach is something we take seriously. By actively engaging fisheries in credible improvement programs, we're simultaneously advancing ocean health while securing a long-term supply of material for a growing aquaculture industry.”

Taylor Voorhees
CQN Sustainability Leader

³⁶ FAO. 2022. The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation. Rome, FAO. <https://doi.org/10.4060/cc0461en>

FIPs we supported in 2022 and their certification goals



Cargill joins WWF and Finance Earth in new Fisheries Improvement Fund

At the 2023 Global Seafood Expo in Barcelona, World Wildlife Fund (WWF) and Finance Earth (FE) announced the launch of an innovative blue finance mechanism, known as the Fisheries Improvement Fund (FIF), to fund the implementation of FIPs. We are proud to be part of this initiative, along with other major companies

including Skretting, Mars Incorporated, Costco Wholesale, Sodexo and philanthropic partners such as the Walmart Foundation.

The FIF will combat the worldwide decline of fisheries by providing support for FIPs in collaboration with

experienced partners on the ground. The new fund aims to spur more than \$100 million in new investments by 2030. Read more about [Fisheries Improvement Fund - Finance Earth](#).

How we innovate

Maximizing performance, minimizing environmental impact

Driving incremental progress to create sustainable aquaculture. Whether it is at our own R&D facilities or in the field with our farmer partners and suppliers, we are always working on new ways to optimize our feeds, save resources, and support our customers and the animals in their care.

In testing alone, over
40,000 fishes
and almost

400 tonnes
of GHG emissions
have been saved in live salmon sampling



Digital scanner revolutionizes salmon sampling

Salmon farmers need to know how their fish are performing during their growth process. In the past, that meant sacrificing animals for chemical analysis, which could take weeks and was costly in terms of wasted resources and lost revenue. That is no longer necessary because Cargill launched SalmoNIR, a handheld scanner designed to analyze live salmon samples for important quality parameters, including fat content, omega 3, and color. The device provides two great advantages:

- Samples can be taken from live fish, which reduces the need for sacrifice and preserves biomass.
- Scans provide immediate answers about conditions in the cages, enabling farmers to track fish quality in real-time. This raises efficiency and saves resources.

Developed by the Cargill Innovation Center in Dirdal, Norway, SalmoNIR can contribute greatly to fish health, revenue and lowering a farm's environmental footprint. In testing, we took more than 40,000 samples of live salmon, representing approximately 140 tonnes in wet weight. Preserving these animals saved almost 400 tonnes of GHG emissions.



Innovation in the field

Micro-pellet shrimp feed keeps water cleaner

For shrimp farmers, water quality can be the difference between success and failure. The same is true for feed quality. Good feed not only helps shrimp grow quickly but also helps keep the water clean.

Thanks to advanced extrusion technology, Cargill's new shrimp feed comes in micro-pellets as small as 0.5 millimeters in Indonesia. Made from high-quality raw materials and fortified with health-boosting vitamins and minerals, the pellets help shrimp grow quickly and support their immune systems—especially in the crucial early development stages when mortality is high.

Because the pellets leach less and take longer to dissolve, it is easier to control—and reduce—the amount of feed delivered to ponds. This, in turn, means cleaner water, less need for water treatment, healthier shrimp, and more revenue.

Sustainable solutions for land-based salmon

As the demand for seafood increases, land-based aquaculture is one of the ways to ensure sustainable growth, and feed is a critical component. Cargill is expanding our tailor-made, sustainable feed options for land-based salmon production.

Working with Norwegian farming company **Salmon Evolution**, we developed a custom-designed feed for salmon grown in tanks. Based on continuous data analysis during production, we updated our models for growth and feed optimization for use in partially recycled water. As a

result, we saw excellent production results along with minimal impacts on water quality.

Lessons learned from our collaboration with Salmon Evolution are ready to be applied at scale in the growing land-based aquaculture sector. In 2022, we also teamed up with another Norwegian customer, **Havlandet**, to pilot the same approach with cod, trialing several varieties of our feed products. Initial results were promising.

Another new feed, **EWOS CLEAR™** is formulated for land-based salmon hatcheries. Because water quality is crucial during salmon's early life stages, CLEAR was designed to reduce pellet degradation and maximize nutrition, allowing growers to produce more smolt using less

feed. The raw materials were carefully selected to ensure good, safe and sustainable nutrition, so that smolts are robust and ready to perform well when transferred to sea.



Innovation inside our own operations

Expanding our sea sites in Dirdal

Oltesvik and Gråttnes, our sea sites in Dirdal, Norway, are used to run verification trials for nutritional models and full-scale ingredient documentation. As we expand our R&D activities, the Oltesvik site has been upgraded from 4 to 12 cages. As a result of our increased trial capacity, fish production is projected to increase to 1,400 tonnes in fiscal year 2024 and 3,000 tonnes in fiscal year 2025, with stocking of new fish slated for September 2023. Investing in increased feed efficiency reduces our products' environmental footprint because it helps farmers produce more fish with less feed.

Driving yields and saving resources with Essential Nitrogen

Not all proteins are created equal. Some are vital to growth, others are not. In many cases, the difference-maker is nitrogen which is central to amino acids, the building blocks of protein. Nitrogen also fills other digestive needs for aquafeed. Getting nitrogen right can mean optimizing the nutrient balance and helping fish stay healthy and grow quickly.

Cargill Aqua Nutrition has long been at the forefront of nutritional modeling and feed design. Since the 1990s, our precursor company EWOS, acquired by Cargill in 2015, used advanced data to track our products' performance. Efficiency in aquafeeds not only means higher yields and revenue for the grower, but also growing more biomass with less feed, which reduces resource and energy use, and cuts down on waste and carbon emissions.

By integrating Essential Nitrogen in our formulations, we're creating the next generation of feeds. It's how we drive

even more efficiency, increase productivity and decrease aquaculture's environmental footprint.

Supporting aquaculture startups

Since 2018, Cargill has supported HATCH Blue, the world's first accelerator program for climate-smart aquaculture startups. So far, Hatch has funded 39 companies, 40% of which are female led. These companies have raised more than \$100 million.

How we manage sustainability

Cargill Aqua Nutrition has our own dedicated sustainability management.

We are aligned with corporate strategies. Cargill Aqua Nutrition is part of Cargill's animal nutrition and health enterprise. A group sustainability lead and a sustainability signature program lead centralize sustainability management. Together with sustainability staff embedded in local and regional businesses, they collaborate on implementation with commercial teams. This structure allows us to address global priorities as well as local issues, including customer and stakeholder engagement, market and ecosystem conditions, raw material impacts and other relevant topics. We continue to build capacity and expand our capabilities to address sustainability issues and accomplish our goals.

Where our most salient risks occur

The matrix below indicates where the most salient risks from our material sustainability topics occur in our value chain, from supplies of raw materials (upstream),

through our mills and operations (production) and to end use at farming facilities through the fish to the ultimate consumer (downstream).

	Upstream	Production	Downstream
Business ethics	●	●	●
Food safety	●	●	●
Health and safety	●	●	●
Over-fishing	●		
Deforestation	●		
Plant raw materials	●		
Human rights	●	●	
Labor practices	●	●	
Emissions to air and water		●	●
Energy		●	
Water		●	●
Waste		●	●
Local communities		●	●
Feed efficiencies			●
Animal health			●
Antibiotics and medicines			●
Animal husbandry and welfare			●
Farmer livelihoods			●
Human health and nutrition			●

Accountability through policy and certification

It is Cargill Aqua Nutrition's ambition to have the most sustainable aquafeed supply chain in the world. Among our primary tools toward that goal is our Supplier Policy, which stipulates that those who sell raw materials to us must abide by our sustainability principles and have environmental and social risk management procedures in place. The policy sets out our expectations on environmental and social performance, aligned with third-party standards where applicable. Each year, we conduct audits to ensure our suppliers meet the requirements.

We use the power of certifications to demonstrate compliance, both for our own products and suppliers. We set the same clear and consistent standards internally, for our sourcing teams, and externally, for our suppliers.

- We work toward compliance with emerging human rights legislation such as the UK Modern Slavery Act (2015) and the Norwegian Transparency Act.
- Our feed mills are certified to a variety of international standards. We have multi-sector certifications for environmental management, food safety and occupational health and safety, and certifications tailored specifically to the seafood industry. The majority of our feed mills are certified under the Best Aquaculture Practices (BAP) Feed Mill Standard. We are preparing for certification under the Aquaculture Stewardship Council (ASC) Feed Standard, launched in January 2023.
- For our marine ingredients, we source preferentially from fisheries that are already managed responsibly. An increasing share of our marine ingredients is certified by MSC and/or MarinTrust. We also support Fishery

Improvement Projects (FIPs) that are working toward those same certifications in the Northeast Atlantic, Mauritania, Peru, Ecuador and Thailand. In 2023, we joined the launch of the Finance Earth Fisheries Improvement Fund with WWF, Mars and Skretting, with the goal of generating \$100 million fund for FIPs.

- Our terrestrial ingredients fall under Cargill's broader sustainability policies, goals and commitments on climate, land, water and people.
- As demand grows for novel ingredients such as insect meals and algal oils, which can alleviate pressure on fisheries and terrestrial biomes, we are forming partnerships to facilitate their commercialization. We work with our customers, research institutions, ingredients makers and retailers to shape the market conditions for greater novel ingredient use.



Progress through partnerships

Stakeholder engagement is key to any successful sustainability program. That's why, to achieve maximum global impact, we partner with our diverse stakeholders and often with others in the industry. We are proud of our membership in initiatives that bring together NGOs, governments, academic researchers, standards holders, and other industry members.

Full membership



Global Roundtable on Marine Ingredients [↗](#)



North Atlantic Pelagic Advocacy Group [↗](#)



SeaBOS [↗](#)

Committee representation



Task Force I CEO-level sponsor [↗](#)



Task force III leader [↗](#)



Sustainability Committee [↗](#)



Governing Body Committee [↗](#)



Social and Ethical Committee [↗](#)



Stakeholders Council [↗](#)



Feed Standard Steering Committee [↗](#)



BAP Vanguard Feed and GHG Working Groups [↗](#)

Associate membership and general partnership and participation



Global Salmon Initiative (GSI) [↗](#)



Ocean Disclosure Project (ODP) [↗](#)



Global Dialogue on Seafood Traceability (GDST) [↗](#)



Sustainable Fisheries Partnership (SFP) [↗](#)



United Nations Global Compact (UNGP) [↗](#)



Millennial Salmon project [↗](#)