

# Cargill Aqua Nutrition

## Sustainability Report 2023



# Persistence for the long term



This past year has shown us the importance of continuing to improve ocean health as an industry. The global aquaculture sector is getting more complex as market dynamics, geopolitical factors and environmental conditions add uncertainty and disruption. From the cancellation of Peru's main anchovy fishing season last year to the limited availability and rising costs of certain raw materials, we have rarely seen such turbulence. But we are supporting our customers through the uncertainty and partnering across the industry to address this for the future.

By 2050, we will gain another 2 billion people. It will take all types of protein to feed this growing population. Seafood, and salmon in particular, is a very important part of that equation. Today 2% of caloric intake and 15% of protein intake comes from marine food. Farmed salmon is a healthy source of protein that has a low greenhouse gas profile. This is an opportunity for our industry.

When it comes to the long-term sustainability of global aquaculture—especially given the projected growth of the sector and its role in nourishing the world—it's crucially important that we engage the full value chain to find comprehensive solutions to grow the industry while improving animal welfare and sustainability. There is no other way to make real progress.

In 2023, we worked with suppliers and customers to scale up regenerative agricultural practices in a major way and captured more than 12,000 tonnes of CO<sub>2</sub> equivalent, up from 1,000 tonnes the year before. We also continue to work across an ecosystem of organizations to set high standards and drive progress on key environmental and social indicators, including preparing this year to earn Aquaculture Stewardship

Council certification for our feed mills. We are a member of SeaBOS and an active participant in its Keystone Dialogues, with strong focus on protecting both oceans and human rights. And we are partnering closely with our customers to continuously and significantly improve animal health and survivability, as well as reducing feed conversion ratios, which are key contributors to aquaculture sustainability.

We believe strongly in engaging with issues, acknowledging areas for improvement and persisting in the hard work to make progress over the long term—rather than walking away when there's a problem.

Staying the course and persisting over the long term: it's what we have done at Cargill for 159 years. And it's an approach that helped us earn a top-five ranking in the latest [Seafood Stewardship Index](#) from the World Benchmarking Alliance, the highest of any aquafeed company.

In addition to detailed data about our sustainability progress, this report includes many other examples of how we are partnering with stakeholders from across global aquaculture to find answers to improve sustainability while growing this important industry. We are proud to share it with you and grateful for your continued partnership.

**Helene Ziv-Douki**  
President and Group Leader  
Cargill Aqua Nutrition

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# Highlights of our 2023 performance

## Product

More than one-third of our total marine ingredients were fish byproducts and trimmings

More than half of marine ingredients were certified, and additionally, nearly one-third were from a Fishery Improvement Project

Use of novel ingredients in our coldwater feeds increased 15% above the year before

## People

Six out of 14 roles on our Global Leadership Team are held by women, bringing us nearly to parity

The number of women in senior management increased by more than one-quarter above the year before

97% of ethics training opportunities were completed by employees

## Planet

Energy use per tonne of production in our coldwater mills is down 8.6% compared to 2017

Our coldwater feeds had a Scope 3 footprint of 1.89 tCO<sub>2</sub>e per tonne including land use change, a reduction of greater than 25% compared to 2017

Water use efficiency improved 4.4% compared to 2022



## About this report

Welcome to Cargill Aqua Nutrition's (CQN) fifteenth annual sustainability report—our seventh including warmwater feeds. Our disclosure commitment started back in 2009, when EWOS published its first sustainability report. Since then, we have used this document to share our environmental and social sustainability performance, as well as our goals for continued progress. Cargill believes in the need for safe and sustainable seafood. Through this report, we invite stakeholders to hold us accountable for achieving progress against that vision.



We report annually on a calendar-year basis. The data in this report cover our sustainability performance from 1 January 2023 to 31 December 2023. The last published report covered 1 January 2022 to 31 December 2022. The data presented in this report demonstrate our performance on the key indicators that are material to our business, with clarity on our reporting boundaries, calculation assumptions, and context where needed. In many cases, we report on performance relative to 2017 as a baseline, aligning with Cargill corporate ESG reporting.

Cargill produces aquaculture feeds at 34 facilities. Of these, 16 are primarily livestock feed or premix production sites, and their combined aquafeed output has historically accounted for less than 5% of our total annual aquafeed production. For this reason, these multi-use facilities have previously been excluded from the scope of our annual reporting. We continue this approach in 2023, reporting on our mills solely dedicated to aquafeed production, and only those that were in operation for the full calendar year. This totals 18 mills across 12 countries.

Throughout this report, we reference coldwater and warmwater mills. Coldwater mills produce feed for salmonid species. Warmwater mills serve shrimp, tilapia, and other species. See [page 6](#) for the categorization of each of our 18 aquafeed mills.

We use broadly known, transparent reporting standards, reporting with reference to The Global Reporting Initiative (GRI) Standards. A dashboard structure, located in the Appendix, streamlines our presentation. GRI has recently published GRI 13, reporting standards specific to the agriculture, aquaculture and fishing sectors. CQN is considering how to align with these requirements going forward, but we continue to use GRI Universal Standard 2021 and CQN-specific reporting disclosures as a guide for all data families.

Cargill reports externally on material topics through our annual ESG report. These reports, our supply chain grievance dashboards, and other public information can be found on our [Reporting Hub](#).

# 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 specific environments and markets, and meet the ESG goals of Cargill and our customers.

As part of Cargill, one of the world's largest food, agriculture and commodities trading companies, our purpose is to nourish the world in a safe, responsible and sustainable way.

**34 facilities**  
in 15 countries

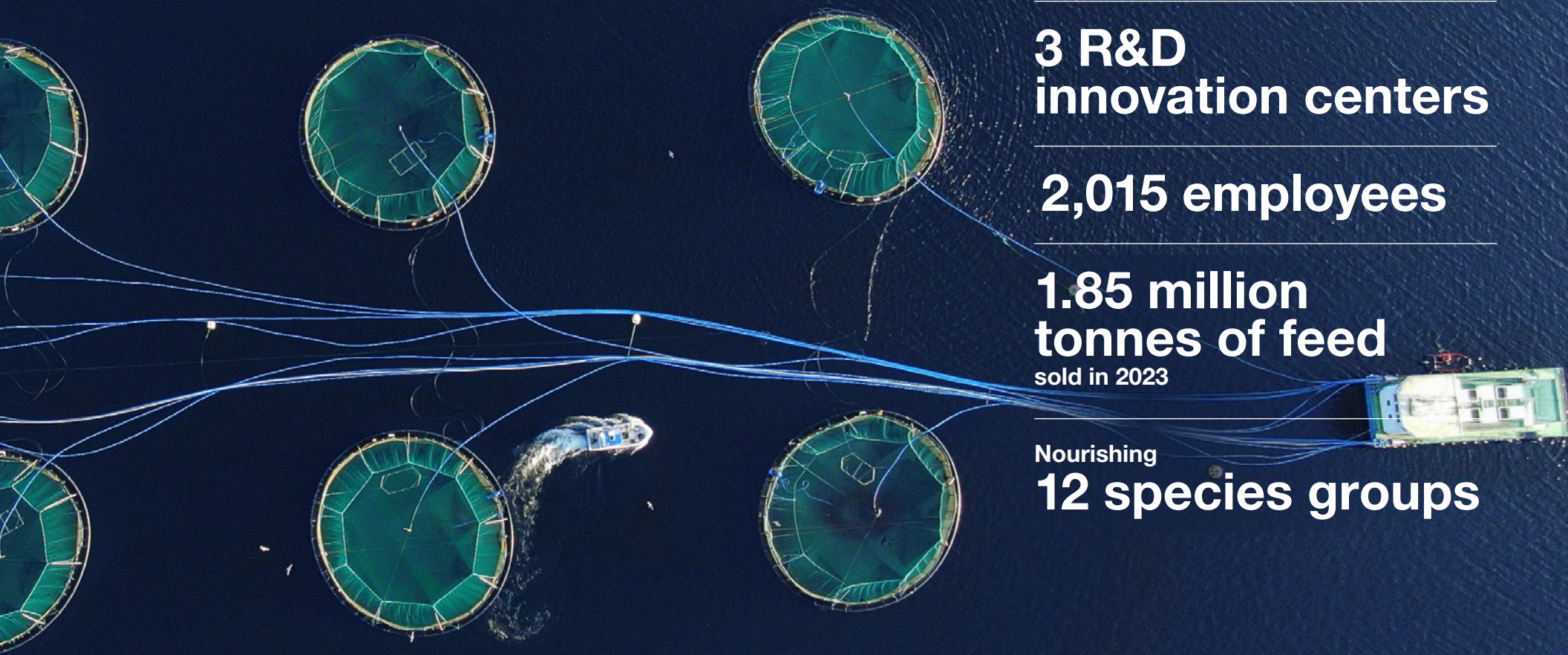
**18 dedicated aquafeed mills**

**3 R&D innovation centers**

**2,015 employees**

**1.85 million tonnes of feed**  
sold in 2023

Nourishing  
**12 species groups**



## Feed production

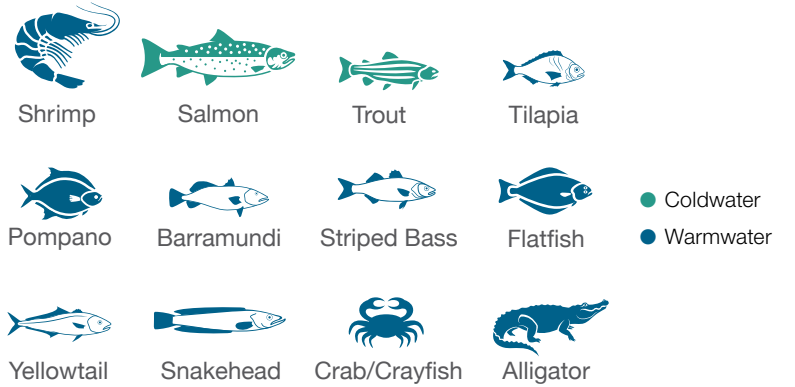
Total feed produced (t)	Coldwater	Warmwater	Group Total	
<b>2023</b>	<b>1,099,863</b>	<b>690,663</b>	<b>1,790,527</b>	
<b>2022</b>	966,649	702,446	1,669,095	
<b>2021</b>	1,102,769	732,347	1,835,116	
<b>2020</b>	1,152,637	667,831	1,820,468	
<b>2019</b>	1,236,491	643,097	1,879,588	
<b>2018</b>	1,030,842	560,729	1,603,156	
<b>2017</b>	984,638	661,802	1,646,440	
<b>Change from 2017 (%)</b>	11.7%	4.4%	8.8%	
<b>Total feed sold (t)</b>	<b>2023</b>	1,068,908	783,345	1,852,253
<b>Number of feed mills</b>	<b>2023</b>	6	12	18

These KPIs can be mapped to GRI indicators 102-7 and 102-8.

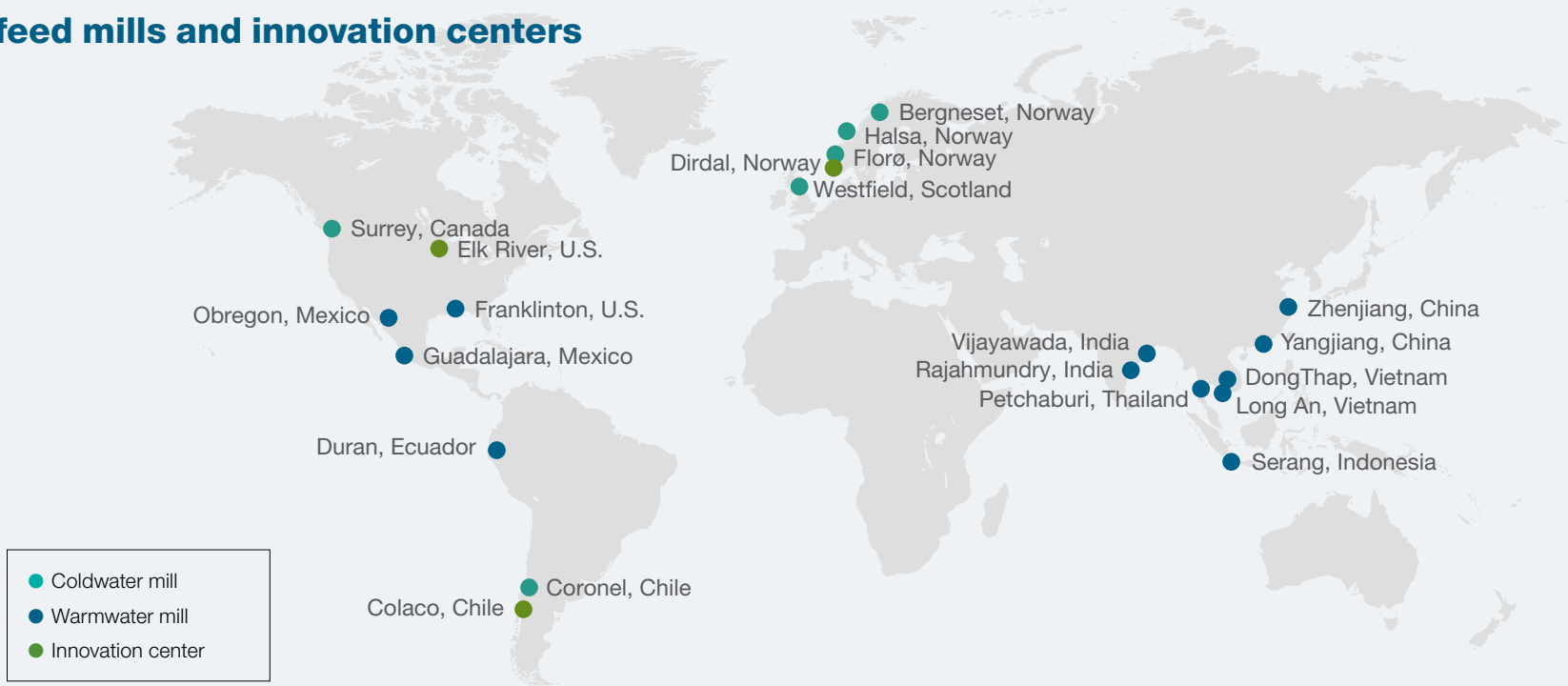
## Our species

Cargill Aqua Nutrition has 12 species groups

### Key Species



## Our feed mills and innovation centers



● Coldwater mill
● Warmwater mill
● Innovation center

## Our global 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. Across the world, we have many regional brands serving local customers. Five global flagship brands make up our globally relevant portfolio.



**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.



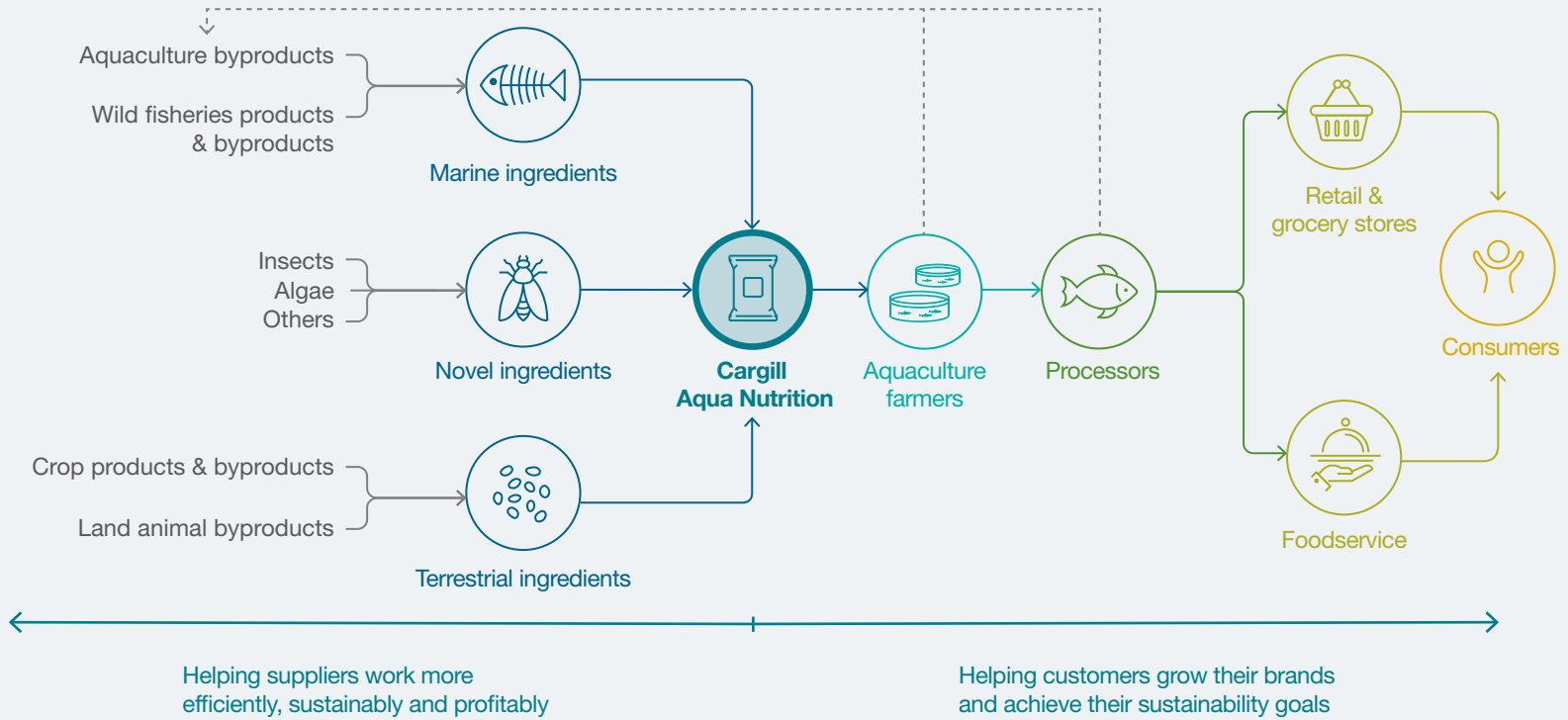
**AQUAXCEL**® extruded nutritional solutions maximize the growth potential of shrimp and strengthen their health in any culture system.



**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



CQN 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.





## How we manage and govern sustainability

At the corporate level, Cargill has global sustainability policies, commitments and programs, led by Cargill Chief Sustainability Officer **Pilar Cruz**. Cargill reports annually on sustainability progress at the corporate level through the company's ESG report. Learn more about all dimensions of our corporate sustainability approach [here](#).

Within this corporate-level context, CQN takes a holistic value chain approach to sustainability as part of Cargill's Animal Nutrition & Health enterprise. Every day, we work to protect both marine and terrestrial ecosystems

and support our customers and suppliers in achieving their own business and sustainability goals. We organize ourselves to drive progress in all facets of our business and make a positive impact from the world's oceans to the food on people's plates.

As CQN, we have historically placed our sustainability emphasis on marine and terrestrial ingredients, as well as helping farmers improve their efficiency. Today, our scope is considerably broader both inside our operations and across the value chain. We account for all the resources we process and use, and work to minimize our global footprint, considering social impacts as well as environmental ones.

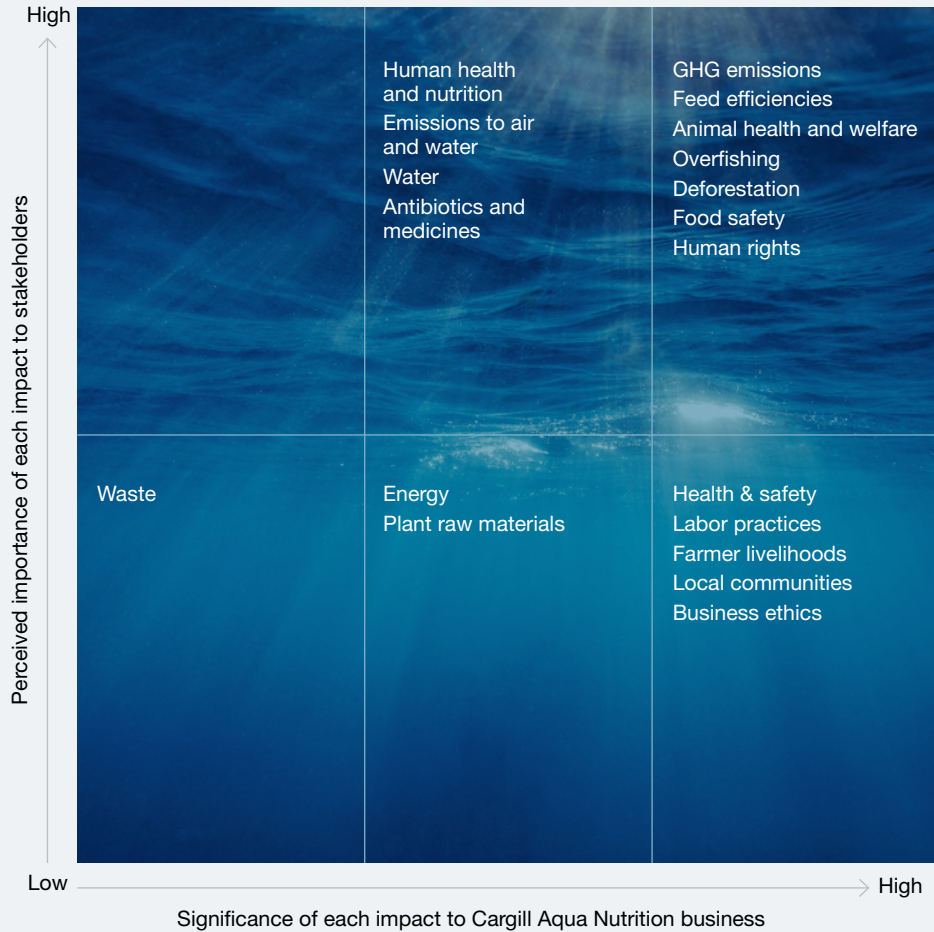
CQN has our own dedicated sustainability management program. It is aligned with Cargill's corporate approach, although the materiality of the aqua nutrition industry requires specific strategies. A group sustainability lead and a sustainability signature program lead centralize sustainability management in CQN. Together with sustainability staff embedded in local and regional parts of the business, they collaborate on implementation with CQN's 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, incorporating a continuous improvement approach to the work we do.

To ensure the integrity of the products we offer, we demand that suppliers follow CQN's [Sourcing Policy](#) and Cargill's [Supplier Code of Conduct](#). The Sourcing Policy 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. It 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 many of the leading certification systems in our industry to demonstrate how both our own products and the materials we source from suppliers were made. We set the same clear and consistent standards internally, for our sourcing teams, and externally, for our suppliers. More information about where we use such certifications are detailed throughout this report.

# Our materiality

We use the materiality map below to prioritize topics we must measure and manage as a business. Currently, we direct our attention to the topics with the highest potential sustainability impacts using a precautionary approach to the issues, but our ultimate goal is to directly manage all the impacts shown across our business. The topics arise at various points in our value chain, which can make them challenging to measure and manage directly. The related matrix below indicates where the main impacts from these topics occur, from supplies of raw materials (upstream), through our mills and operations (production), to end use at farming facilities through the fish to the final consumer (downstream).





# Achieving progress across many dimensions

## Product People Planet

We know that positive impact can take many forms, and across our global Aqua Nutrition business, we seek to improve how we do things and the legacy we leave when we go home at the end of the day. We take a data-driven approach, making sure we can measure our impact and use that information to keep learning and achieve even more tomorrow.

This progress shows up in several ways: improving products so they do more for our customers as they produce the seafood the world needs; protecting people and fostering positive working relationships; and safeguarding the shared natural resources on which CQN and humanity depend. To do this, we lean on Cargill's global capabilities and the dedication of CQN's 2,000 employees around the world, who show up each day prepared to reach higher.



# Product

## Innovating across our portfolio to accomplish more

Every day, we seek to improve the feeds we sell. That includes enhancing the sustainability of our existing feed ingredients, as well as developing entirely novel ingredients to unlock new possibilities. In all cases, we aim to deliver greater impact to our customers so they can improve fish health and performance while reducing impact.

To demonstrate our journey of making our ingredients more sustainable, average feed composition and raw material origin data for 2023 are given below, with greater detail presented in the Appendix. Because nutritional requirements differ between salmonids and the group of species we refer to as “warmwater”—shrimp, tilapia, and others—the ingredient composition of their feeds differs. For this reason, we report on them separately.

- **Circularity is an important aspect of sustainability, and we seek to use ingredients derived from other food production sources, known as co-products.** In 2023, a complicated year for sourcing raw materials, we held relatively steady on co-product ingredients in our feeds. For coldwater, 49.7% of raw materials were co-products. For warmwater, this was 68.2%—slightly below the prior year but still above the 64.5%, we achieved in 2021. We reduced total fishmeal and fish oil inclusion, including by a full 1.5 percentage points for coldwater fish oil compared to last year. However, the share of trimmings in both fishmeal and fish oil declined, driven by challenges in coldwater. Still, 34.5% of all marine ingredients used in 2023 were trimmings.

- **Sourcing from certified suppliers and Fishery Improvement Projects (FIPs) is a key contributor to our sustainability approach.** Shortages in marine raw materials, due in part to the closure of the Peruvian anchoveta fishery, drove 2023 prices to all-time highs. However, our sourcing teams were prepared, and our overall share of certified or improving marine ingredients declined only slightly. We sourced significantly higher volumes of blue whiting—which was accepted into the MarinTrust Improver Program in late 2021—and its share of our total forage fish sourcing for coldwater feeds more than doubled, from 13.6% in 2022 to 30.6% in 2023. See more details on our commitment to marine ingredient sustainability on [page 31](#), including the certifications we leverage, the FIPs we support, and the partnerships to advance them both.

- **To meet the growing need for sustainable feeds, we are constantly developing novel ingredients.** In 2023, we advanced partnerships and sourcing with novel raw material suppliers for both proteins and oils. Our most promising developments for proteins include those derived from insects, single-cell organisms like yeast and bacteria, and fermented soy. For oils—typically more challenging to use as marine ingredient replacements because of fish oil’s unique fatty acid profile—we continue to work with suppliers to expand algal oil production and are excited about the development of oil from camelina, a cover crop that can provide both winter income for farmers and important omega-3s for the fish our customers feed.

The KPIs reported below can be mapped to the GRI 301-1, CQN 3-80, and CQN 3-91 indicators.

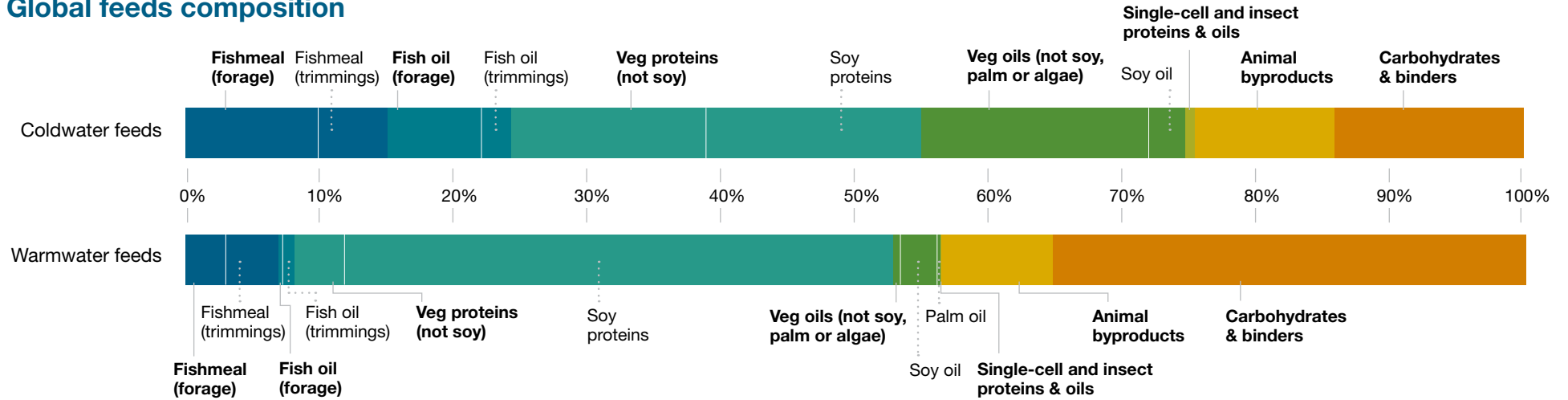
**34.5%**  
of our total marine ingredients were fish byproducts and trimmings

**51.9%**  
of marine ingredients were certified, and an additional **32.6%** were from a Fishery Improvement Project

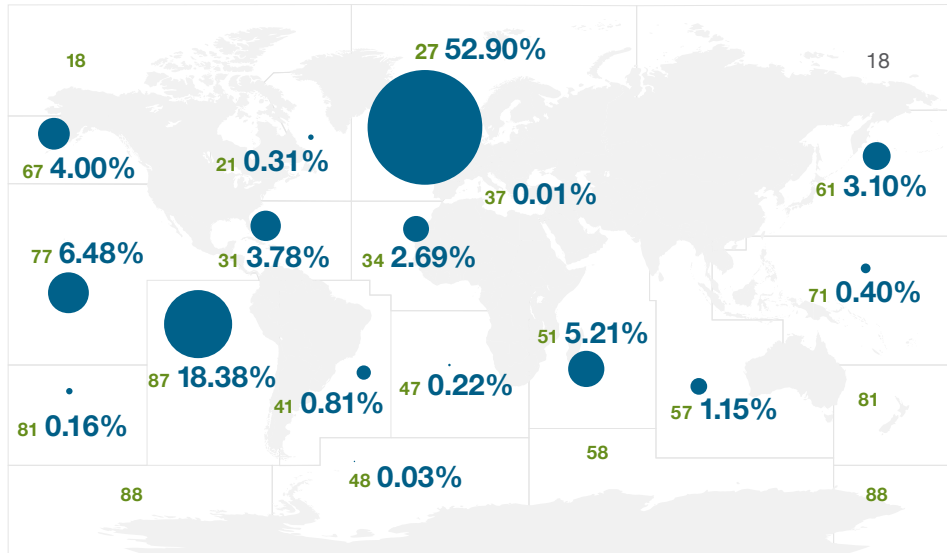
Novel ingredients made up **5.3%** of our coldwater feeds

# Our raw materials and their origins

## Global feeds composition



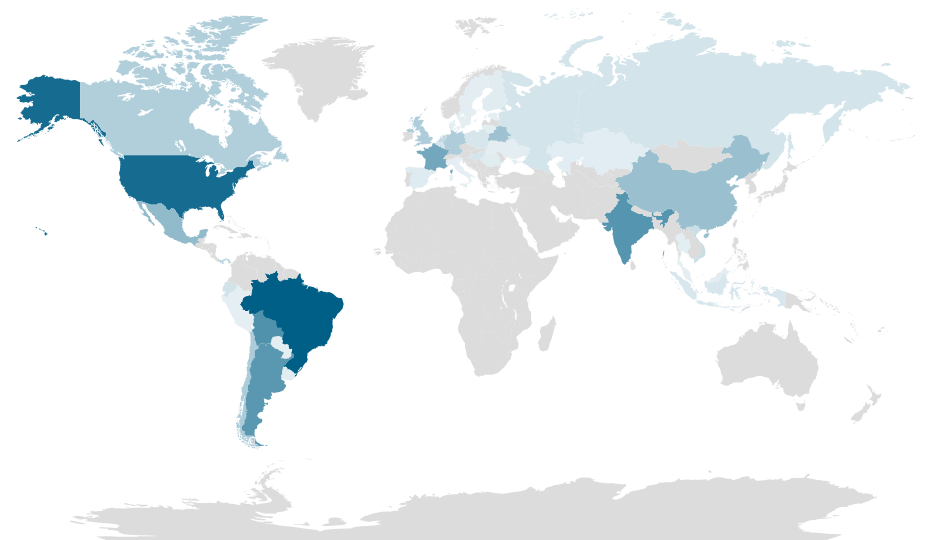
## Origins of marine materials



Not definable\* 0.66% **FAO Major Fishing Areas**

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

## Origins of terrestrial materials



Percent of total 0.00% 13.77%

# A growing portfolio of novel ingredient options

As aquaculture plays an expanded role in the world's diet, the ingredients used in aquafeed will need to expand, too. Although the marine and terrestrial ingredients of today will still play a role, a range of novel ingredients are already creating more flexibility for producers to meet their sustainability goals while optimizing nutrition and performance.

CQN has been at the forefront of discovering, commercializing and scaling these types of ingredients with our partners, and this past year saw progress on several fronts. We lean on our innovation capabilities and knowledge of animal health and performance, as well as the broad reach of Cargill and our relationships across global food and agriculture. In a market context where prices for traditional fishmeal and fish oil have spiked toward all-time highs, our offerings in this area make us an ideal partner for our customers as they formulate the right feeds with the right results for their farming environments.

## Algal oil

Two years ago, we committed to include omega-3 fatty acids from algal oil in all our Norwegian feeds. Now, we are working with supplier partners to see how this ingredient, which offers a nutritional cornerstone of aquaculture diets, can be scaled up and produced with a smaller footprint.

For instance, most algal oil is produced through fermentation, and Cargill sells key inputs to this process

such as sugars. Although currently algal oil may have a higher carbon footprint than fish oil, it's possible to lower that by sourcing sugars through regenerative agricultural initiatives like those that underpin our SeaFurther™ Sustainability program (see [page 26](#)). Energy for the fermentation process and fermenters' operations also offer openings for carbon reductions. We are exploring these possibilities with leading algal oil producers.

## Soy protein concentrate

Our close, multi-year partnership with U.S.-based Houdek helped the company scale up a soy protein concentrate called ME-PRO®. Made through a special fermentation process, ME-PRO has a higher protein content than other concentrates and a potentially lower environmental impact in feeds through reduced phosphorous emissions. It is ProTerra certified and uses non-GM soy. CQN currently buys a significant share of ME-PRO, and we see positive potential to scale up.

## Single-cell proteins

What if you could pull proteins out of thin air? That's the promise of our research in this area, where we are working with research partner [Gas 2 Feed](#) to develop fermentation processes where single-celled organisms like bacteria or yeasts consume CO<sub>2</sub> and hydrogen, converting them into proteins that are suitable for use in aquaculture. In the future, production of such proteins could be co-located near some of Cargill's plants that offer a steady supply of renewable CO<sub>2</sub>.





## Insect proteins

The rich protein content of insects and their resource-efficient production make them a competitive choice for fish feed formulations. We are continuing to scale up our partnership with insect ingredient pioneer Innovafeed, whose high-quality insect meal in aquafeed saves up to 16,000 tonnes of CO<sub>2</sub> for every 10,000 tonnes of insect protein. We are also exploring how insect compost can serve as a fertilizer for cropland, potentially building new cycles in the circular economy. And we are looking beyond aquaculture to how insects can benefit terrestrial species like swine and poultry, with sustainability benefits for Cargill Animal Nutrition customers in these segments.

## Camelina oil

This is another promising novel ingredient, as camelina can be grown as a winter cover crop, generating income for farmers while also providing ecosystem benefits as part of a crop rotation. The oil from camelina—which makes up more than one-third of the seed—is also high in omega-3 fatty acids. Preliminary life cycle analysis shows that it can have a smaller carbon footprint than other oils. We are currently working with partners on field trials for camelina in the U.S. and expect the first commercial volumes of oil to come from these trials this year, which we will use to explore various feed applications. At the start of 2024, Cargill also announced [a \\$2.5 million grant to the University of Minnesota](#) to continue research into winter camelina for various industrial and agricultural uses.

“At Cargill, we are using our strategic position in the global food supply chain to explore alternative protein choices, invest in new technologies, and source sustainable raw materials. We are able to capitalize on our dual role as a raw material producer and feed producer to pioneer transformative approaches in the industry.”

**Ted Andreas Mollan**  
CQN Supplier Development Manager

## Tradeoffs with ingredient choices

At CQN, we have a goal to help create a more sustainable future for aquaculture. Yet it's important to remember that there are tradeoffs to every choice in seeking to do that.

For instance, many of our customers and other stakeholders are rightly focused on reducing the carbon footprint of feed ingredients. Marine ingredients like fishmeal and fish oil may offer some of the lowest footprints available, but if we draw exclusively from them, we risk overtaxing key fishery resources. Finding a balance is therefore important.

Likewise, we can focus on reducing the footprint of aquafeed as much as possible, but feed still needs to perform at a high level: keeping fish strong and helping them reach their full potential. Otherwise, we risk using more resources to grow smaller fish that produce less protein for human consumption. This is one reason we are focused through SeaFurther on a goal of reducing the farmgate footprint of our customers' salmon, not just the feed those salmon eat.

In this pursuit of balance and optimization, we can help our customers find the best possible set of answers so they can produce more using less and meet the needs of consumers in a more sustainable way.



## Giving shrimp farmers a boost of precision

Ecuador is the world’s largest market for shrimp production. Over the past decade, we have helped shrimp farmers adopt an ecosystem of technologies to help them improve the sustainability and profitability of their operations. This year, we focused on breakthroughs in feed delivery and precision nutrition that will help farmers continue to improve environmental and economic performance. Here’s how it works:



### Better feed distribution

Automatic feeders deliver feed to different parts of the pond at ideal times



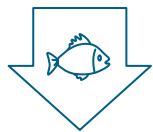
### Precision formulation

A better balance of nutrients reduces ammonia in shrimp excretion



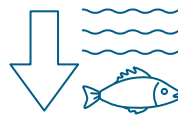
### Higher shrimp performance

Farmers can regularly see increases in weekly shrimp growth by weight



### Fewer marine resources

Feed formulations can use fewer marine ingredients than conventional feeds



### Lower environmental impact

Shrimp ponds put less pressure on surrounding coastal ecosystems



## Solving our customers' challenges in a changing environment



Even as we work with customers to mitigate climate impact in aquaculture supply chains, we know that the context in which they operate is already shifting. We are directing our innovative spirit toward designing solutions that will help customers navigate changes in both the industry and the world at large. To do so, we

lean on Cargill's broad global capabilities for Research & Development (R&D), which includes world-class facilities, activity across a wide cross-section of food and agriculture systems, and more than 2,500 passionate experts working every day on the next big breakthrough.

### Enabling Ecuador's shrimp farmers to ADAPT

Cargill is constantly monitoring weather climate patterns and predictions, and as the climate changes with stronger events like El Niño, rainfall may become more intense or more frequent in local areas. This can pose a challenge for shrimp farmers because heavy rainfall can affect levels of crucial minerals like calcium, magnesium, potassium and sodium in their ponds. Although shrimp can often adapt to these ionic imbalances, they expend a lot of their energy to do so, which can hamper their growth and even increase mortality.

We leaned on our micronutrition and health expertise for both shrimp and other species, leveraged our in-house data science capabilities to examine extensive data from our farmer partners, and consulted more than 40 research papers to find an answer to this challenge. Our ADAPT Osmo technology provides the right balanced supplement ions, vitamins, antioxidants and amino acids, to improve the direct and indirect osmoregulation mechanism in shrimp while also enhancing general nutrition. As a result, the shrimp are less stressed and can keep their energy focused on staying healthy and growing, helping farmers be more successful in conditions of ionic imbalance or low salinity.



## Helping salmon farmers go with the FLOW

Underwater feeding has many benefits, from being more energy efficient to allowing continuous feeding at different depths leading to higher productivity. In waterborne feeding systems, the feed spends several minutes in water before being delivered to the fish, increasing the loss of nutrients to the water. These lost nutrients are a sunk cost both literally and figuratively—sinking to the sea floor and weighing on farmers' performance, profitability and sustainability.

To counter this loss of nutrients, we developed the FLOW technology under our EWOS brand. This patented coating process helps keep pellets intact until just the right moment—after traveling hundreds of meters through the water-filled feeding pipes and arriving in the pens to be eaten by the salmon. Our testing showed that nutrient leakage can be cut in half when the FLOW coating process is used for feed, preventing a material loss for farmers and improving utilization of the valuable nutrients in our feeds.

We are also exploring how FLOW can be used in recirculating aquaculture systems (RAS). Here, producers will experience additional benefits from FLOW. That's because any nutrients that leak out of feeds in this production environment are lost resources for fish growth and need to be filtered out of the water, which adds more costs. FLOW will also work for other species, opening further opportunities to apply this technology.

## Stocking up on feed research

This past year, we completed the \$1.6 million expansion of our R&D facilities at the Oltesvik site for our Cargill Innovation Center in Dirdal, Norway, which included an expansion from four cages up to 12. In the latter part

of the year, we stocked these new cages with fish and began operating the site at increased trial capacity. This will give us significantly more flexibility as we run trials to develop aquafeeds for changing conditions like raw material prices and availability, as well as specific customer formulations. We can carry out advanced nutritional trials at full scale, which make the scientific, economic and sustainability information from those trials much more valuable. All this continues to strengthen our ability to deliver more sustainable nutrition options to our customers so they can be more successful.

“With state-of-the-art facilities and world-class researchers, the innovation center in Dirdal lays the foundation for Cargill to offer its customers advice and fish feed of the highest class.”

**Megan Hobbs**  
CQN R&D Leader



# Continued progress on packaging



One area where we believe we can make a tangible positive impact on the environment is through our packaging materials. Most of our use of plastics comes in this area, where we package our finished aquafeed products. We are working to systematically reduce packaging materials and waste, while using recycled materials where possible to further cut our footprint.

Often, we cannot directly collect and reuse packaging from customers because of the risk of biological contamination. However, we are exploring ways to reuse bags in some limited instances where we can be sure of protecting against biosecurity risks. And we are incorporating recycled materials that have been reprocessed from other sources.

## Staying ‘in the loop’

Our business in Norway worked during the past year with our bag supplier Thrace Polybulk to prepare to start using a recycled bulk aquafeed bag for our EWON brand of feeds that meets our specifications while being made of 30% recycled plastics.

Recent test runs showed that these In the Loop bags performed as intended, with no observable difference for our operations teams compared with traditional bags. This year, we will continue to explore how we can scale up use of these In the Loop bags.

## Fewer plastics in Vietnam

In Vietnam, Cargill’s broader animal nutrition business—including aquaculture—has been on a multi-year journey to reduce plastics present in feed packaging. The team has now achieved a reduction of about 700 tonnes of plastics per year, which corresponds to a 1,200-tonne reduction in greenhouse gas emissions.

### How did they do it?

Through a combination of:



Redesigning feed bags



Shifting some products to bulk packaging based on customer needs



Using specialized ingredients to maintain the required strength of the bags—while maximizing recycled resin usage

Going forward, the team is targeting a goal of cutting plastics by 2,000 tonnes annually, combining the approaches above with the exploration of reusable large bags and renewable resin feedstocks. Meanwhile, they have also begun exporting their packaging ideas to our businesses in other countries.

**The KPIs related to packaging can be mapped to the CQN 3-91 indicator.**

# People

## Creating equitable workplaces for people across our aqua nutrition business



People are at the center of everything we do. A safe, supportive working environment enables our workforce to deliver the quality goods and services our customers expect, and help us advance our sustainability goals. We also expect the same from our supply chain partners. To that end, we are working to advance diversity, equity, and inclusion in our own business and safeguard the rights of those in and around our supply chains. In 2023, we reinforced our commitment to respecting human rights by conducting detailed risk assessments of high-risk supply chains (see the next page).

Gender parity and women’s empowerment is a corporate priority: in 2016, Cargill signed onto the Paradigm for

Parity Coalition, committing to achieving gender parity across all levels of corporate leadership by 2030. CQN has consistently made progress against this goal, and in 2023, we took a significant step by increasing the proportion of women in our Global Leadership Team to 42.9%—a jump of 6.5 percentage points compared to 2022.

We also increased the proportion of women in management and senior management positions. In our coldwater business, women holding senior management roles rose considerably—from 24.1% in 2022 to 30% in 2023—and in combination with an increase in the warmwater business, this translated to an increase of more than 6 percentage points for CQN in total, reaching 29.3% in 2023.

In line with our Cargill value to do the right thing, we administer business ethics trainings to all employees—the specifics of which vary based on job function. In 2023, more than 97% of ethics trainings opportunities were completed by our employees, and 93% of trainings for our Global Leadership Team were completed.

At Cargill, we work to eradicate child labor from our operations and supply chains. We implement appropriately designed due diligence systems that are intended to identify, prevent and remediate child labor. We will not hire individuals under the legal working age or the mandatory age of schooling (whichever is lower). Cargill workers under the age of 18 will not be assigned work that is mentally, physically or socially dangerous or that deprives them of the opportunity to attend school.

We address child labor in our ingredient supply chains by working with our suppliers. Our Supplier Policy requires ingredient suppliers to abide by local laws and regulations on this issue and with the International Labour Organization (ILO) Minimum Age Convention No. 138 and ILO Worst Forms of Child Labor Convention No. 182. We are working to have all our suppliers sign this policy.

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**42.9%**  
of our Global Leadership Team are women, up from 36.4% in 2022

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**29.3%**  
of employees in senior management are women, up from 23.1% in 2022

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**97%**  
of ethics training opportunities were completed by employees

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In 2023, we reinforced our commitment to respecting human rights by conducting human rights assessments of high-risk supply chains. These helped us to deepen our understanding of risks in CQN raw material supply chains and identify opportunities to collaborate with peers and other stakeholders to improve the aqua ingredients sector as a whole. We are also aligning our priorities with existing multi-stakeholder initiatives, such as SeaBOS (see [page 37](#)) and the Global Roundtable on Marine Ingredients (GRMI—see [page 38](#)), and helping to build additional initiatives—such as one with the ProTerra Foundation focused specifically on guar production in India.

Our work in this area is not new: for example, we have been guided since 2015 by the U.K. Modern Slavery Act. This paved the way for ensuring compliance with more recent and comprehensive legislation—such as the Norwegian Transparency Act and those emerging from the European Union—and with certifications emphasizing human rights due diligence.

One example is our work with GRMI. As a member, we are working toward improving our industry’s understanding of the social risks of marine ingredient production in Mauritania and using our collective leverage to realize advancements—see [page 39](#) for details on the impacts achieved thus far. CQN is also working toward certification with the newly launched Aquaculture Stewardship Council (ASC) Feed Standard in several regions where we operate, which requires intensive social responsibility due diligence of our suppliers. These workstreams are helping shape our approach to more systematic risk assessment and mitigation activities for deployment across our supply chains.





## Supporting communities and smallholder farmers

Aquaculture is a vital industry in many communities, both for nutrition and for commerce. In 2023, through Cargill's global partnership with CARE, we supported small-scale tilapia producers in Honduras with industry insights and technical assistance.

CARE conducted a market analysis to help farmers understand what consumers wanted and enhance the connection between buyers and sellers. The study revealed a consumer preference for red tilapia instead of black, as well as the food safety standards and supply volumes required for local tilapia production to enter more demanding markets. In response, the project helped to form two new associations to allow these small-scale producers to sell more collectively than they could individually, whether to the market or at local food fairs and other venues.

We also helped deliver trainings to producers and municipal technicians on best feeding practices and host workshops on adding value to harvested fish. Through the training, participants were able to produce nearly 18 tonnes of tilapia, selling the majority to the market with enough for home consumption and even for local donations to help others in the community. This year, CARE and Cargill will work with these tilapia producers to expand their use of automatic aerators, oxygen meters and collection centers.

# Planet

## Reducing our carbon emissions and embracing accountability



We seek to drive improvements across our operations and supply chains, while also providing a model for the aquaculture industry to reduce its impacts on climate and ecosystems. And so, we strive every day within our business to reduce greenhouse gas emissions, raise efficiency and do more with less. It's core to what we do. That includes our signature SeaFurther Sustainability program, where we engage with customers and suppliers from our unique position in the supply chain.

Our climate goals align with Cargill's corporate targets. Cargill aims to achieve absolute reductions in Scope 1 & 2 emissions by 10% by 2025, and Scope 3 emissions per tonne of goods by 30% by 2030, both relative to a 2017 baseline. Our efforts in CQN are connected with those of Cargill as a whole, our suppliers, our customers, and their customers.

Meanwhile, we use common frameworks, best practices and broad collaboration to be a catalyst for progress

well beyond the factors in our direct control. We are committed to using sustainable ingredients, and that means working with partners to ensure that a steady supply of such ingredients is available. This includes work on Fishery Improvement Projects (FIPs), certification programs, research initiatives and more.

### Standards, certifications and assurances

- For our feed mills, we leverage certifications to demonstrate our commitment to operating with professionalism. The International Organization for Standardization (ISO) standards assure quality, environmental and food safety management. Best Aquaculture Practices (BAP), GlobalG.A.P., and organic standards give us industry-specific assurances as required by our markets.
- We have been supplying our customers with feed that complies with the ASC Farm Standards since they have been launched for each species. With the ASC Feed Standard coming into effect in January 2023, our factory and sourcing teams have worked through the year to be ready for audits as soon as they can occur. The order in which our feed mills are certified will follow customer demand, and we expect our first mills to be certified in 2024.
- For our marine ingredients, we prefer Marine Stewardship Council (MSC) and MarinTrust certifications. For soy and palm ingredients, we look primarily to ProTerra, the Roundtable for Responsible Soy (RTRS), and organic certifications. Details of our certified sourcing can be found in the Appendix.

Energy use per tonne of production in our coldwater mills is down

**8.6%**  
compared to 2017

Our coldwater feeds had a Scope 3 footprint of

**1.89 tCO<sub>2</sub>e**  
per tonne including land use change

Water use efficiency improved

**4.4%**  
compared to 2022



## Managing our climate impact

- CQN has been reporting on climate metrics and water usage since 2017. We continue to use that year as a baseline, as it aligns with Cargill's corporate climate baseline and targets. Data availability and quality has been a key focus, and we have made important strides in improving the information we get from our suppliers. We can then use these data to work across the value chain to identify hotspots and target action for improvement.
- Our focus for energy use and emission reductions has centered on our coldwater feed production, as the data, technology, and market dynamics of implementing changes are more conducive than for our warmwater mills. This has resulted in continued progress for our coldwater production. After a few years of our performance in warmwater trending in the wrong direction, we are beginning to stabilize. We are continuing to strategize how best to reduce impact in these geographies.
- Total energy use in coldwater feed production increased by 134,000 GJ from 2022 to 2023, reflecting an increase in total feed production. However, our efficiency continued to improve, and energy use per tonne of production is now down 8.6% compared to 2017. Our total Scope 1 & 2 emissions are flat compared to 2017, but our emissions per tonne of feed produced is down 9.2%.
- For warmwater production, both energy use and Scope 1 & 2 emissions remained generally flat in 2023 compared to 2022. These figures are still elevated compared to 2017 in terms of both total emissions and emissions per tonne of feed produced.
- 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 2023, we report an average Scope 3 footprint of 1.89 tCO<sub>2</sub>e/t feed including land use change (LUC) for raw materials delivered to our factories, compared to 1.96 in 2022 and 2.54 in 2017. For finished feeds, not including packaging, the total Scope 1, 2 & 3 footprint of our feeds was 1.96 tCO<sub>2</sub>e/t, down from 2.61 in 2017.
- Our SeaFurther Sustainability program continues to drive our work to reduce emissions. Read all that we achieved in 2023 beginning on [page 26](#).
- After a few years of steady increases, we improved our water use performance in 2023. While total water used in our coldwater mills increased slightly, total use in warmwater mills finally declined and the efficiency of use—as measured by cubic meters used per tonne of feed produced—improved for both coldwater and warmwater mills. Our operations teams will continue exploring how to drive further improvements in this area.



# Getting energy efficient across our operations

Cargill has a companywide goal to reduce absolute greenhouse gas emissions in our operations by 10% by 2025, against a 2017 baseline. In line with this target, we are implementing numerous solutions across our network of plants to lower our energy use and use renewable energy. Here's a snapshot of some of those implementations in 2023.

## Reduced energy use



### Halsa, Norway

Installation of a heat pump for one of our dryers is helping reduce energy consumption.



### Florø, Norway

We switched from a gas boiler to electric at this location, which had a positive impact in energy efficiency. We also initiated work around behavior-based energy conservation, which helped reduce energy consumption.



### Serang, Indonesia

We cut energy use at this location through a combination of behavior-based energy conservation and performance improvements with the site's dryer.

## Using less impactful sources of energy



### Bergneset, Norway

We started buying Guarantee of Origin (GoO) renewable energy while also running the location's dryer partially on natural gas during the high season.



### Dirdal, Norway

Our hybrid sea site working boat at this R&D location is running far better than anticipated when we launched it a little over a year ago. Whereas we thought it would run half on fuel and half on electric, it has run approximately 95% on electricity so far.



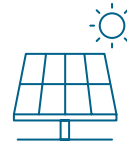
### Westfield, U.K.

This year, our longstanding GoO purchases at this site were confirmed to have a reduction on greenhouse gas emissions, too. Our purchases of green power have reduced Scope 1 & 2 emissions almost to zero.



### Surrey, Canada

Nearly 100% of the energy use at this location comes from hydroelectricity.



### Petchaburi, Thailand

Solar panels provide 10% or more of the energy for this location.



### Coronel, Chile

All of the electricity used at this location is from renewable wind and biomass sources.



## SeaFurther Sustainability

# Picking up speed toward 2030

A key goal of our signature sustainable aquaculture program is to enable our customers to reduce the footprint of their farmed seafood by at least 30% by 2030.

Aquaculture products are a key fixture in the human diet, and yet like participants in all sectors, aquaculture companies must find ways to lower their carbon footprints. CQN is well-positioned to help our customers solve this challenge, with our scientific expertise on formulation and fish health, our access to the full breadth of Cargill for achieving scale in sustainable ingredients, and our close relationships with farmers and other ingredient suppliers. That's why we created the SeaFurther Sustainability program.

Feed is typically the largest component of farmed salmon's footprint and where we have directed the

bulk of our focus. Through raw material selection and supplier interventions, we can reduce the footprint of the feeds we make—and we're proud to share those 2023 achievements in this section. But by also remaining laser-focused on fish nutrition and formulation, we can continue supporting the health, welfare, and feed conversion efficiency of our customers' fish. Improving the carbon efficiency of farmed seafood is complex work, and by leveraging our program pillars of Source, Optimize, and Care, SeaFurther is leading the way.

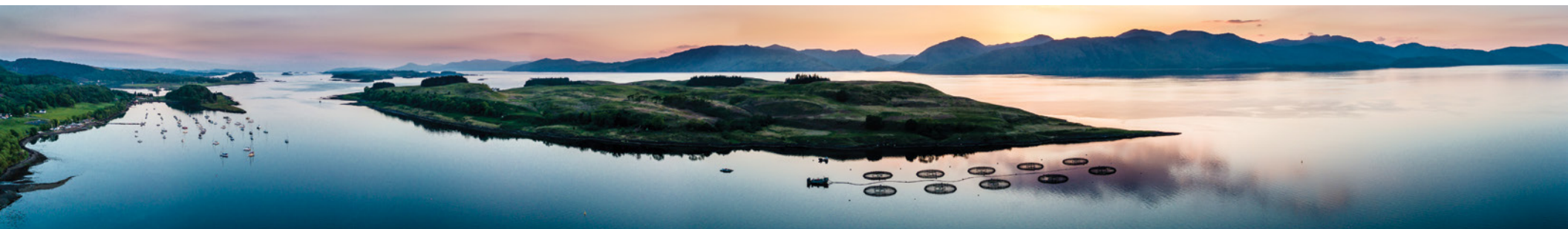
This year, we worked with others in Cargill to significantly scale up the carbon insets we source from our farmer partners growing crops like wheat and rapeseed in the U.K., passing those carbon savings on to customers to help them meet their sustainability goals. We also laid the groundwork to expand inset sourcing from a broader set of crops and geographies thanks to our connectivity to Cargill teams around the globe, particularly the Cargill RegenConnect® program. And we collaborated with SustainCERT and Soil Capital to produce a [white paper](#) that examines ways to monitor decarbonization in intricate agricultural systems—so we can ensure that the impact of investments in sustainability are fairly and credibly attributed along the value chain.

Although feed ingredients are a significant source of carbon, there are a number of other ways we can

help customers reduce the footprint associated with the salmon they deliver to consumers' plates. We can enable their fish to stay healthier and convert more feed to meat. We can tailor feeds for our customers' specific farming environments. And we can work together to help customers operate their farms more energy efficiently. Our partnerships with customers of all sizes are providing the learning to go even further in the upcoming year, building out value chain interests from crop farm through to retail.

All this is happening at a pivotal time. We have shown that achieving carbon reductions of 30% or more with customers is possible, but it takes planning and extensive coordination up and down the supply chain. We are engaging in conversations with customers now for supply chain actions over the next few years, so we get on a pathway to meet our goals together. To help ensure we get there, we have set an intermediate goal of 15% reduction across customers' feed footprint by 2026.

“Although 2030 may still be several years away, there is often a two-year turnaround time to work with crop growers and source the insets we need. There are relatively few decision points along the way to capture the window of opportunity. Now is the time for bold action, and we are working with our customers and suppliers to take it,” said Dave Robb, SeaFurther Sustainability Program Lead.



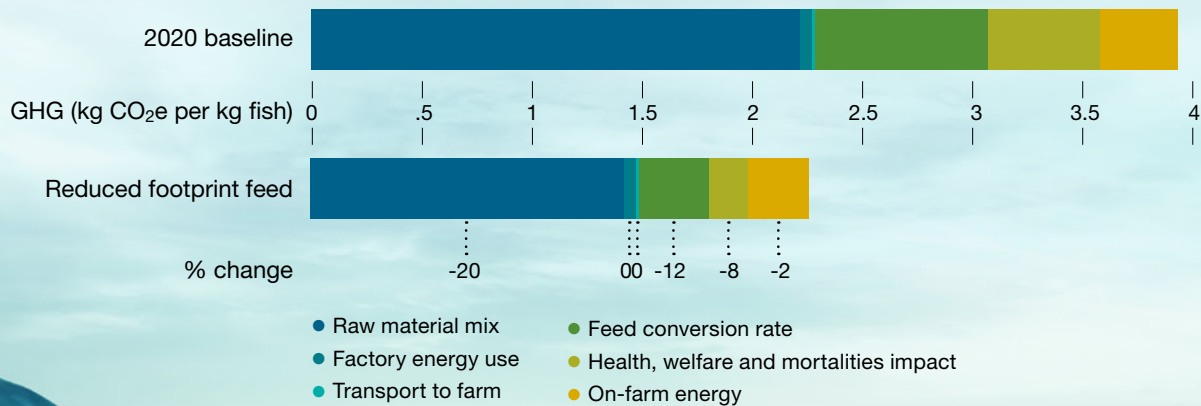
## SeaFurther Sustainability

# How we can achieve reduction goals together

The SeaFurther program was designed around CQN's strengths from our position at the heart of aquaculture supply chains, so we can maximize impact for our customers.

What is the potential of this approach? Depending on a customer's operations and goals, there are several factors we can use to help them achieve a 30% reduction or more in their carbon footprint per kilogram of fish produced. We work closely with customers to identify and address emissions hotspots while also developing a long-term plan. It requires close partnership, because some of those factors are controlled in customers' operations, while others extend all the way back up the supply chain to the source of feed ingredients.

### Example of harvested fish emissions



## 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.

## SeaFurther Sustainability

# Scaling up environmental benefits with regenerative agriculture



Regenerative agriculture is a critical pathway to lower the carbon footprint and improve ecosystem services of terrestrial feed ingredients. Cargill is a market leader in this emerging space, particularly through Cargill RegenConnect®, which works with farmers to implement regenerative practices like cover crops and reduced tillage that provide environmental benefits like improved soil health. CQN is using this Cargill expertise to source carbon insets that can help our customers reduce the carbon footprint of their farmed fish.

These regenerative practices put nature to work to store carbon in the soil, making agriculture part of the solution to mitigating and adapting to climate change. They also have environmental benefits in terms of soil health, water quality and water use, biodiversity, and farmer livelihoods. By encouraging these practices, we are offering farmers a new stream of revenue to keep their operations resilient for both today and tomorrow.

After successful pilots in 2022, we scaled up SeaFurther's regenerative agriculture reach considerably in 2023. We worked with 42 farms in the U.K. covering more than 5,000 hectares of wheat and rapeseed production to capture 7,265 tonnes of CO<sub>2</sub> equivalents. To this, we added 8,150 tonnes of CO<sub>2</sub>e of regenerative agricultural insets from France and exceeded our 2023 target of 10,000 tonnes.

In 2024, we will build on this success, targeting 45,000 tonnes of CO<sub>2</sub>e reductions. With the support of Cargill's broad global reach, we are looking further afield to find additional crops and geographies that will enable us to continue ramping up our carbon and ecosystem services program. This will give our customers even more options as we work together to reduce aquaculture's footprint.

“We are using Cargill's global know-how in regenerative agriculture to scale up what we can deliver for CQN customers.”

**Ted Andreas Mollan**  
CQN Supplier Development Program

2023 highlights of our SeaFurther sourcing in the U.K.:

**42 farms**

**5,000+ hectares**

**7,265 tonnes**  
CO<sub>2</sub>e reductions

Additionally, we sourced  
**8,150 tonnes**  
of CO<sub>2</sub>e insets from France  
for a total of  
**15,415 tonnes**  
of CO<sub>2</sub>e reduced for our customers

**Our goal for 2024:**  
Save  
**45,000 tonnes**  
of CO<sub>2</sub>e



## SeaFurther Sustainability

# Thinking bigger with Lerøy Seafood Group



With a history going back to 1899, Lerøy Seafood Group takes a long-term view—and sustainability is a core part of that perspective. As one of the world’s leading producers of salmon, the Norway-based company delivers 1.75 billion meals a year to the plates of consumers. Lerøy and CQN share a commitment to sustainability, and we partner to reduce the carbon footprint of the fish Lerøy produces and help Lerøy meet its other goals around fish health, certified marine ingredients and more.

Our two companies took this partnership to the next level this year through SeaFurther. In 2023 alone, we helped Lerøy shrink its carbon footprint from our feed by 3.5% using carbon insets, a reduction of 12,000 tonnes of CO<sub>2</sub> equivalents and a key step forward in the larger journey. During the course of the year, we also shifted all the marine ingredients in the feed we supply to Lerøy to being either certified or sourced from a Fishery Improvement Project (FIP). And we continued to include insect proteins and algal oil in that feed as well.

These steps are part of a longer-term cooperation that includes work on regenerative agriculture, novel feed ingredients, reformulation and water use so that Lerøy can meet its goals. Working together, we are aiming to reduce the carbon footprint of Lerøy’s harvested fish by a bold 46%. This showcases Lerøy’s commitment to being a leader in the industry by supporting the scale-up of commercial sustainability in a major way.

“Lerøy’s vision is to become the leading global supplier of sustainable high-quality seafood. A key focus area to achieve our vision is feed performance and sustainability,” said Jørgen Skeide, Feed Manager for Lerøy. “We set annual goals on CO<sub>2</sub> emissions, certification, forage fish dependency, value chain circularity, and inclusion of novel ingredients—and publish them in our yearly report. Lerøy is very happy with the change of pace in sustainability work on feed, and we are confident that the close collaboration with Cargill will ensure we will reach our ambitions in an effective and holistic manner.”

“Lerøy is very happy with the change of pace in sustainability work on feed, and we are confident that the close collaboration with Cargill will ensure we will reach our ambitions in an effective and holistic manner.”

**Jørgen Skeide**  
Feed Manager, Lerøy Seafood Group



# Cargill's commitment to DCF terrestrial ingredients

All soy ingredients in CQN's coldwater feeds have been material-certified deforestation- and conversion-free (DCF) through physical flow or credits since 2020. We rely on certifications like those from the ProTerra Foundation and the Roundtable for Responsible Soy to help us deliver feeds that prioritize land conservation.

At the corporate level, Cargill is committed to DCF sourcing across our agricultural supply chains by 2030, including for high-priority supply chains like soy from South America. In late 2023, we announced an accelerated timeline to eliminate deforestation and land conversion from our direct and indirect supply chains for in-country origination of soy, corn, wheat and cotton in Brazil, Argentina and Uruguay by 2025. Learn more about Cargill's approach to sustainable land use [here](#).

# Our commitment to sustainable marine ingredients

Our ambition is to use our leverage as one of the largest global feed producers to improve ocean health and to support the sustainable growth of the aquaculture industry. To do this, we are on a journey to source all our marine ingredients from sources that continually align with scientific understanding of what is sustainable.



In 2023:

**34.5%**  
of total marine ingredients by volume were sourced from trimmings, which have less impact on fisheries than ingredients from forage fish

**89.5%**  
of marine ingredients in our coldwater feeds were from certified or FIP sources

**62.2%**  
of marine ingredients in our warmwater feeds were from certified or improver program sources

While we have made important progress, the complexity of supply chains and limited availability of sustainable raw materials means the realization of this ambition remains ahead of us. To measure and track progress, we have set an interim goal of sourcing all marine ingredients from certified or improving sources by 2025. Here is a closer look at the details and benefits of such marine ingredients.

### Certified sources

Each certification plays a role in the ecosystem of fisheries’ sustainability. We rely on the most respected—MarinTrust and Marine Stewardship Council (MSC)—to ensure the marine ingredients we use meet our sustainability principles.

MarinTrust is a factory certification standard, ensuring responsible manufacturing and raw material sourcing when processing fish into fishmeal and fish oil. MSC is a fisheries certification standard, focusing rigorous criteria on fishing practices and management.

By leveraging both certifications, we address sustainability at each step before marine ingredients arrive at our feed mills.

### MarinTrust

Eligible marine raw materials can be from whole fish or byproducts, and are from an MSC-certified fishery or one approved by independent auditors as meeting the MarinTrust standard.

- **Responsible fisheries management:** Fishing operations in certified supply chains employ practices that reduce risk of illegal, unreported, and unregulated fishing and meet key requirements of the U.N. FAO’s Code of Conduct for Responsible Fisheries
- **Traceability and transparency:** Certified organizations maintain robust traceability, back to the source, ensuring transparency and accountability in the supply chain through an audited chain of custody
- **Responsible operations:** Certified processing facilities follow environmentally responsible practices, such as proper waste management and preventing pollution to surrounding ecosystems
- **Social accountability:** Certified sources encourage fair labor practices and safe working conditions

### Marine Stewardship Council

The MSC Fisheries Standard assesses if a fishery is well-managed and sustainable, reflecting the most up-to-date understanding of internationally accepted fisheries science and management.

- **Healthy fish stocks:** Certified fisheries ensure fish populations are not overfished
- **Minimized environmental impact:** Fishing practices for certified fisheries must avoid significant harm to habitats and non-target species
- **Effective management:** Certified fisheries have effective management based on a full ecosystem approach with specific provisions for low-trophic-level species
- **Continuous improvement:** Certified fisheries must adapt practices to reflect new scientific understanding and evolving environmental conditions

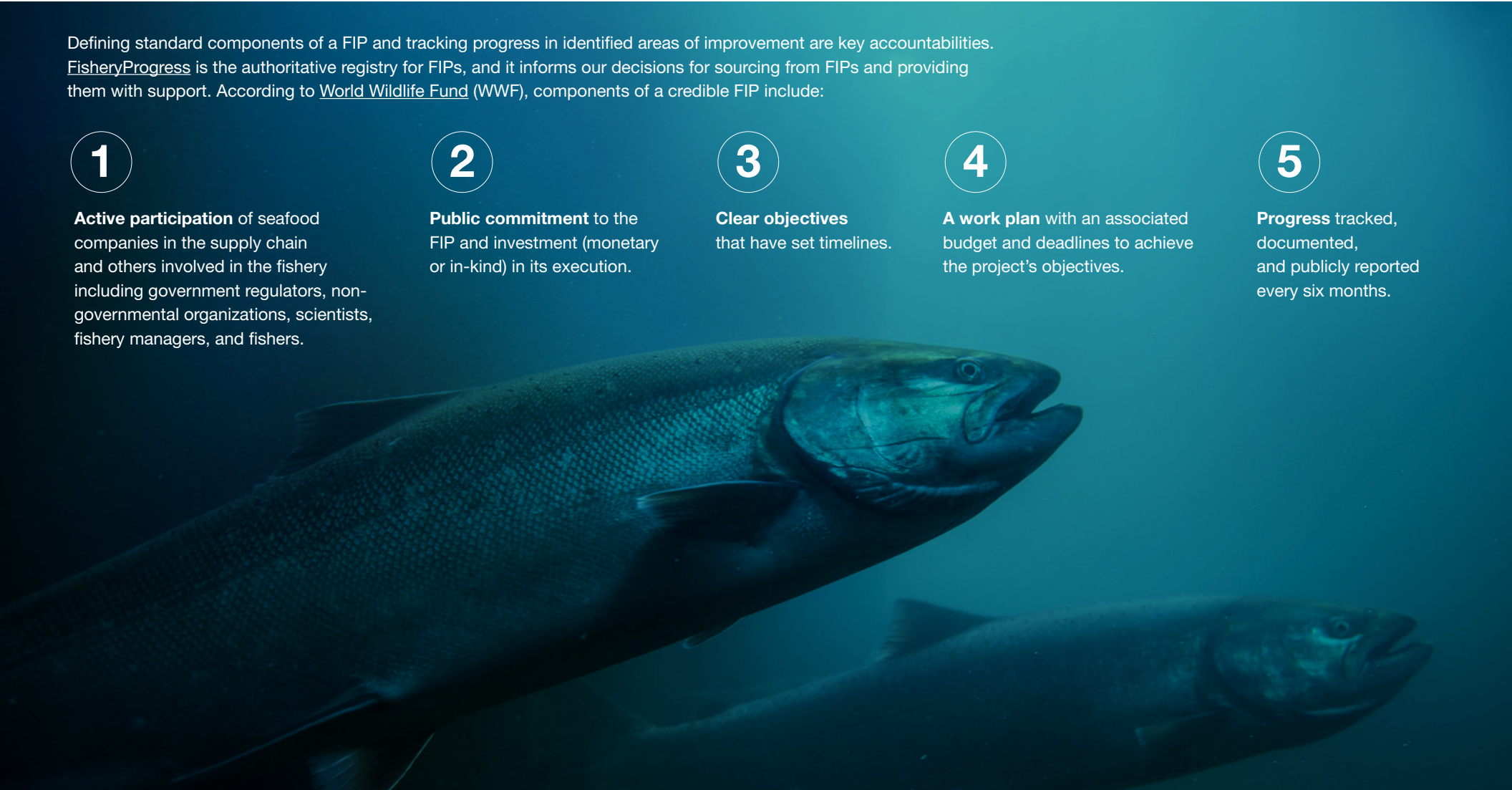
We encourage you to learn more by visiting the websites of [MarinTrust](#) and the [Marine Stewardship Council](#).



# How do Fishery Improvement Projects work?

With time-bound commitments to achieve sustainability certifications and mechanisms in place to verify progress along the way, credible Fishery Improvement Projects (FIPs) are a vehicle for improvement on the water while also ensuring the fishery has the resources to implement changes. Our engagement with fisheries that have room for improvement is a critical tool to drive that improvement forward. By working with the fishing sector, ingredient processors, standards holders, NGOs, researchers, and governments, we help create and resource credible FIPs in key sourcing areas around the world. Their success simultaneously advances ocean health and secures future supply of sustainable raw materials.

Defining standard components of a FIP and tracking progress in identified areas of improvement are key accountabilities. [FisheryProgress](#) is the authoritative registry for FIPs, and it informs our decisions for sourcing from FIPs and providing them with support. According to [World Wildlife Fund](#) (WWF), components of a credible FIP include:



- 1**  
**Active participation** of seafood companies in the supply chain and others involved in the fishery including government regulators, non-governmental organizations, scientists, fishery managers, and fishers.
- 2**  
**Public commitment** to the FIP and investment (monetary or in-kind) in its execution.
- 3**  
**Clear objectives** that have set timelines.
- 4**  
**A work plan** with an associated budget and deadlines to achieve the project's objectives.
- 5**  
**Progress** tracked, documented, and publicly reported every six months.

# Key FIPs we support



For the FIP off the coast of **Mauritania**, where seas are heavily fished, we have focused on provision of the European pilchard for fish oil, reserving other key species for direct human consumption in local and export markets. This will help ensure a balance between drawing on the fishery to support aquaculture around the globe and providing essential nutrition for local communities. We also worked through the [Global Roundtable on Marine Ingredients](#) to advocate for greater participation in this FIP as well as key progress in other areas like [human rights](#).

Meanwhile, a FIP that we previously supported off the coast of **Panama** became certified under [MarinTrust](#) in [late 2022](#). The FIP focused mainly on Pacific anchovy and Pacific thread herring. Improvements include a new management plan, total allowable catches, and trainings for fishers to help protect vulnerable species. Panama is a vivid demonstration of how a credible FIP can make a tangible positive impact for key fishing resources.

## FIP highlights in 2023

We saw continued progress across the FIPs we support around the globe.

In **Ecuador**, the fishery is now very close to certification. Though certification was expected in 2023, one species in the complex did not pass all clauses during the assessment. A formal request for an extension was made and subsequently approved, and the revised FIP deadline is now October 2025. We will continue to monitor progress. In the meantime, we were pleased to see the

Ecuador FIP hailed by [Premios Verdes](#) as an important conservation project in its annual global listing.

The **Northeast Atlantic** FIP saw continued dialogue among governments for the coastal nations surrounding this crucial fishery, although no details were agreed upon in terms of how catch quotas will be shared among them and the nations deferred further negotiation until 2024. We are disappointed in this delay and continue to [strongly advocate for governments](#) to establish quota-sharing agreements through our membership in the [North Atlantic Pelagic Advocacy Group \(NAPA\)](#).



## A new finance mechanism for advancing fishery improvements

Innovation for sustainability takes many forms, including the models we use to fund and drive sector-wide efforts. In 2023, we joined with World Wildlife Fund (WWF), Finance Earth (FE) and several other major companies to conceptualize, design and launch the Fisheries Improvement Fund (FIF), an innovative blue finance mechanism to accelerate progress with FIPs. The FIF, which is managed by Finance Earth, aims to catalyze more than \$100 million in new funding for fisheries improvement by 2030, enabling trusted partners on the ground to realize improvements on the water through a range of tools, technologies and local partnerships.



The new FIP will be the first to be supported by the FIF, initially utilizing funding provided by a repayable finance provider. With every tonne of marine ingredients that CQN and other participating companies buys from the FIP, a levy will be paid that contributes to ongoing FIP delivery and eventually repays the initial investment. Meanwhile, WWF will be working jointly with actors from the artisanal and industrial fishing sectors, government representatives, NGOs and scientists to contribute to the FIP's overall objective. This includes implementing an ecosystem-based approach to fisheries management and reducing both bycatch and illegal, unreported and unregulated (IUU) fishing. As with all FIPs, tracking mechanisms and reporting deadlines through the registration with FisheryProgress will keep stakeholders on track to achieve these outcomes—in this case, by March 2029.

“Cargill has been a cornerstone partner in development of the Fisheries Improvement Fund. Their commitment to pay a volume-based fee was critical to enabling the launch of the FIF and will provide necessary support for implementation of the pilot FIP in Chile.”

**Lucy Holmes**  
Senior Director of Blue Finance for WWF US

CQN was also asked to lend our commercial, supply chain and marine ingredient expertise to test and prove the financing model in a pilot project in Chile. In March 2024, an important step in this pilot was announced. A new FIP in the Central-South region focusing on anchoveta and sardine was formally registered and approved with FisheryProgress, the authoritative FIP database.

### How do you create and run a FIP?

All FIPs should take the same stepwise approach. [Sustainable Fisheries Partnership \(SFP\)](#) and [WWF](#) recommend the same general steps, which include elements of the following:

- 1 **Identifying the fishery**—this includes a supply chain analysis to understand who is involved
- 2 **Developing the FIP**—the fishery is compared to the MSC Fisheries Standard, a scope is defined, and stakeholders are recruited to participate
- 3 **Launching the FIP**—A name is chosen, participants and a work plan are made public, and a budget is adopted
- 4 **Implementing the FIP**—Stakeholders act to address the fishery's weak points, tracking progress
- 5 **Improvements in practices and management**—This points to modifications and impacts
- 6 **Improvements on the water**—Outcomes like reduced fishing mortality, habitat impacts and bycatch show that the change in practices is working



# Engaging stakeholders across the sector



With the world more connected and interdependent than ever, participants and stakeholders throughout entire value chains must work together to produce results with lasting global impact. That's why we partner with our suppliers and customers to design sustainability solutions and why we are active contributors to an ecosystem of initiatives gathering diverse stakeholders.

Our involvement with two groups—SeaBOS and the Global Roundtable on Marine Ingredients—highlights what can be achieved by working together. We are proud of our membership in these and the other initiatives listed in this section. Because ultimately, the sustainable seafood we seek can only be achieved by bringing together the NGOs, policymakers, researchers, standards holders, and companies that have a hand in delivering that seafood to the world's plates.



## Using scientific collaboration to solve systemic issues

We take a science-based approach to sustainability, and we are proud to work with others in the industry to use science in creating change. The Seafood Business for Ocean Stewardship (SeaBOS) brings together nine of the world's largest seafood companies with leading scientists to drive a science-based global transformation toward sustainable seafood production and a healthy ocean. We are a proud member of this group and a leading participant in its task forces and dialogues, which are catalysts for action on some of global aquaculture's most pressing topics.

In 2023, SeaBOS Vice Chair and CQN President Helene Ziv-Douki attended the latest CEO summit in Busan, South Korea, and heartily endorsed the [Busan Statement](#). Among the outcomes of this year's dialogue was the launch of two new keystone projects: first, to investigate antimicrobial resistance in aquaculture settings, and second, to use collective action to advance traceability and transparency in fishing supply chains along the west coast of Africa to address the risks of illegal, unreported and unregulated (IUU) fishing and modern slavery.

The latter topic is one we are already focused on through our work with a FIP off the coast of Mauritania (see [page 34](#)), as well as work with the Global Roundtable on Marine Ingredients (see [page 39](#)). To help accelerate collaboration and progress, this year CQN's Dave Robb took over leadership of the larger [SeaBOS task force](#) on IUU fishing and modern slavery, issues that are both prevalent in fisheries off the west coast of Africa. [Research has shown](#) considerable overlap between these two unacceptable issues, and CQN is committed to do our part in ending both (see [page 21](#) for our approach to human rights). Although the solutions will vary depending on each location, we believe that concerted action by industry, governments and local communities can solve the problem. We are optimistic about the potential of the new traceability keystone project sponsored by SeaBOS that will get underway in 2024.

"We are proud to have Cargill as a member of SeaBOS, and we are grateful for the contributions of CQN President Helene Ziv-Douki as SeaBOS Vice Chair this past year," said Wenche Grønbrekk, SeaBOS Director of Strategy

and Partnerships. "With our mission to lead a global transformation towards sustainable seafood production and a healthy ocean, Cargill's ambition is helping drive our collective efforts forward. Now that we are embarking on a new Keystone Project in West Coast Africa, SeaBOS members' efforts to ensure sustainable sourcing of marine ingredients from the region will be further enhanced. The expertise of Cargill will be a great resource in helping us deliver on our commitments and lead Task Force I with the aim to reduce IUU fishing and eliminate modern slavery in seafood supply chains."

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"With our mission to lead a global transformation towards sustainable seafood production and a healthy ocean, Cargill's ambition is helping drive our collective efforts forward."

**Wenche Grønbrekk,**  
SeaBOS Director of Strategy and Partnerships

## An ecosystem of organizations driving change

Because sustainability issues are often much larger than any one company's supply chain, collective action—supported by NGOs, academic researchers, and governments—can be a necessary foundation for driving change. That's why CQN has long worked with multiple stakeholders across a range of sustainability topics, strengthening work activities and creating greater impact than any organization could achieve alone. A leading example of this approach is in the sustainability of marine ingredients—a focal point in aquaculture feeds.

For nearly 20 years, we have worked with the Sustainable Fisheries Partnership (SFP), a leading NGO in the seafood space. We were an early adopter of their [FishSource](#) program to analyze the sustainability of the fisheries in our sourcing network. Since 2013, we have provided funding for the publication of SFP's [Reduction Fisheries Report](#), which provides important insights into the stocks and management of key fishery resources around the world. And in recent years, our shared goal of improving the sustainability of fisheries has us collaborating on developing and supporting FIPs.

Seen as important tools in assuring responsible supply of marine ingredients and seafood, certification programs are ideal partners in the work to measure and deliver

CQN has long worked with multiple stakeholders across a range of sustainability topics, strengthening work activities and creating greater impact than any organization could achieve alone.



on our sustainability goals. We have long leveraged the Marine Stewardship Council (MSC), an important end goal for many fisheries improvement efforts. More recently, the development of the MarinTrust program has spanned the value chain from fisheries to fishmeal and oil production mills, assuring a certain minimum level of responsible fishing entering the supply chain (see more about these programs on [page 32](#)). CQN holds seats on MarinTrust's Governing Body Committee and Social & Ethical Committee, providing inputs on standards development and program strategy.

While NGOs and certification programs can help set the bar for sustainability, it's up to the industry to deliver. As members of the trade organization IFFO (The Marine Ingredients Organisation), we work closely with our peers to have a strong voice, aligned on the

need for developing responsible fishmeal and fish oil supply chains. IFFO's continuous tracking of fisheries, regulations, and markets helps companies like us develop sustainability strategies and work programs to implement them.

It was these and other partnerships that—in 2021—led to a collaboration breakthrough: the Global Roundtable on Marine Ingredients (GRMI). Established and jointly run by SFP and IFFO, GRMI comprises 14 members—CQN among them—working to increase the availability of sustainable marine ingredients, with a particular focus on understanding and addressing the surrounding systemic environmental and social factors at play.

A key area of shared interest among group members is sustainable fisheries in West Africa. As fish oil production

has grown in the region over the past several years, it's become clear that the environmental and governance requirements vary across national boundaries. A FIP was established in 2018 to develop a MarinTrust

certified supply chain of fish oil from Mauritania—an action financially supported by CQN. With a clear plan for improvement, the FIP provided CQN the confidence we needed to begin sourcing material. With several

organizations as participants in both the FIP and in GRMI, the roundtable quickly decided to form a West Coast Africa working group with a priority to support and communicate the work of the FIP.



As human rights risks emerged in connection with West African fisheries, the need for an independent assessment became clear. In 2023, GRMI engaged Partner Africa, a social auditing and advisory NGO, to carry out a human rights impact assessment. The assessment focused on Senegal and Mauritania, and identified a number of actual and potential human rights impacts associated with small pelagic fisheries off the coast of the two countries, resulting in the publication of the [Track the Fish report](#). It's an important analysis that will inform how we can make joint progress in this region, even as individual companies like CQN work directly through the FIP we support.

Cargill also encouraged SeaBOS to establish their new keystone project for the west coast of Africa (see [page 37](#)), which will also look at tuna and octopus fisheries in this region as well as the small pelagics of interest to Cargill. Here, we will build on the experiences in the three fisheries to try to deliver potential improvements across them all—with a 2025 timeframe to concentrate energy.

By creating a broader network of stakeholders, we hope there will be considerable synergies across the initiatives to address the challenges in this area. This will strengthen the resilience of fisheries for local communities and export markets alike, generating local economic value and a bright future for those who depend on these ocean resources.

# Collaborating for greater sustainability impact

## Membership

**NAPA** formed in 2020 to encourage and help build solutions for improved management of the mackerel, herring and blue whiting fisheries in the North Atlantic. Despite strong messaging from this group, a stalemate persists between state governments, making our continued efforts more important than ever.

We are a key voice in the multi-stakeholder **Global Roundtable on Marine Ingredients**, working to drive environmental and social improvements in key fisheries globally. Current focus regions include West Africa and South and Southeast Asia.

As proud members of the **Marine Ingredients Organisation (IFFO)**, we support the body's efforts to advocate for responsible use of marine resources for fishmeal and fish oil production.

## Committee representation

As members of SeaBOS, we work with leading industry companies and sector researchers to advance global seafood sustainability. CQN president Helene Ziv-Douki is **SeaBOS Vice Chair**. Through 2023 we continued to be the **Task Force III Leader**, addressing antimicrobial resistance, and have transitioned into 2024 as the **Task Force I Leader** to address IUU and human rights at sea. We are also key members of the newly developed **Keystone Project on West Coast Africa**.

Holding a seat on both the **Governing Body Committee** and the **Social & Ethical Committee**, we are helping shape the direction of the MarinTrust program and ensure its standards and their implementation are rooted in the best available science and are applicable on the ground in our sourcing and operating regions.

Active since 2021, the **IDH Aquaculture Working Group on Environmental Footprint** aims to improve measurement and reduction of the environmental footprint of farmed seafood products. Cargill is actively working with IDH to explore membership in this working group.

On the **ProTerra Foundation's Stakeholders Council**, we provide recommendations to the Board and Secretariat, and expert advice that helps companies embed their sustainability strategies and gives other stakeholders assurance of the robust implementation of the ProTerra Standard. We are also members of the **MRV Committee**, developing a process by which deforestation and human rights requirements could be verified in our supply chains.

We have a seat on the **FEFAC Sustainability and Fish Feed Committees**, engaging in work on key issues of sustainability of feeds in Europe, including LCA work for the PEFCR Feeds and GFLI, updating the FEFAC Soy Sourcing Guidelines, and the FEFAC Feed Sustainability Charter 2030.



## Associate membership and general partnership and participation

As an associate member of the **Global Salmon Initiative**, we work to support sustainable development of salmon aquaculture through the feed and biosecurity taskforces and communicating on progress.

We continue growing our engagement with **World Wildlife Fund (WWF)**—leveraging their expertise across fisheries, aquaculture, markets and finance, traceability, and communications. Our current collaborations include developing a large-scale FIP in Chile and an innovative financing mechanism for fisheries improvement.

Our relationship with **Sustainable Fisheries Partnership (SFP)** is an example of how industry and NGOs can support one another. We continue to fund their fisheries sustainability research and FIPs they help manage, and they provide us with analysis and expertise on improving marine ingredient sustainability and protecting human rights, and monitor our overall performance in sourcing fishmeal and oil.

We continue our partnership in the **Millennial Salmon project**. Working together with research institutes, novel ingredient suppliers, and a grocery retailer, the research initiative is driving the continued commercialization of insect meal and algal oil as feed ingredients.





# Appendix

## Key Performance Indicators



## Marine and non-marine raw materials

### Global feeds composition

Global averages of ingredient group composition	Coldwater			Warmwater		
	Ingredient category	Average inclusion	Countries of origin	Ingredient category	Average inclusion	Countries of origin
<b>Total fishmeal</b>		15.5%	See <a href="#">page 44</a>	<b>Total fishmeal</b>	6.9%	See <a href="#">page 44</a>
	<b>of which trimmings meal</b>	5.1%	See <a href="#">page 45</a>	<b>of which trimmings meal</b>	3.9%	See <a href="#">page 45</a>
<b>Total fish oil</b>		9.1%	See <a href="#">page 44</a>	<b>Total fish oil</b>	1.2%	See <a href="#">page 44</a>
	<b>of which trimmings oil</b>	2.1%	See <a href="#">page 45</a>	<b>of which trimmings oil</b>	0.8%	See <a href="#">page 45</a>
<b>Vegetable proteins</b>		30.7%	Argentina, Belgium, Brazil, Chile, China, Finland, France, Hungary, India, Russia, U.S.	<b>Vegetable proteins</b>	44.6%	Argentina, Bolivia, Brazil, Canada, China, India, Mexico, U.S.
	<b>of which soy proteins</b>	16.0%	Argentina, Bolivia, Brazil, China, Finland, India, Paraguay, U.S.	<b>of which soy proteins</b>	40.9%	Argentina, Bolivia, Brazil, China, Ecuador, India, Mexico, U.S.
<b>Vegetable oils</b>		19.6%	Argentina, Belarus, Belgium, Chile, Denmark, European Union, France, Netherlands, Russia, U.K.	<b>Vegetable oils</b>	3.6%	Argentina, Bolivia, Brazil, China, Ecuador, India, Indonesia, Malaysia, Mexico, Other, Panama, Thailand
	<b>of which soy oil</b>	2.6%	Argentina, Brazil, Chile, European Union, Paraguay	<b>of which soy oil</b>	3.0%	Argentina, Bolivia, Brazil, China, Ecuador, India, Mexico, Other, Panama, Thailand
<b>of which palm oil</b>	0.0%	n/a		<b>of which palm oil</b>	0.2%	Indonesia, Malaysia
<b>Animal byproducts</b>	10.3%	Argentina, Brazil, Canada, Chile, England, France, Germany, Spain, U.S.		<b>Animal byproducts</b>	8.3%	Brazil, Chile, China, India, Indonesia, Italy, Mexico, Other, Spain, U.K., U.S.
<b>Carbohydrates &amp; binders</b>	14.1%	Argentina, Canada, Chile, Germany, Lithuania, Other, Poland, Romania, U.K.		<b>Carbohydrates &amp; binders</b>	35.3%	Argentina, Brazil, Canada, China, Ecuador, India, Indonesia, Mexico, Other, Panama, U.S., Vietnam
<b>Total co-products*</b>	49.7%			<b>Total co-products*</b>	68.2%	
<b>Total co-products excluding soy meals &amp; concentrates</b>	33.6%			<b>Total co-products excluding soy meals &amp; concentrates</b>	27.7%	
<b>Total novel ingredients**</b>	5.3%			<b>Total novel ingredients**</b>	0.1%	
<b>of which single cell and insect meals and oils</b>	0.7%			<b>of which single cell and insect meals and oils</b>	0.1%	

\* Our designation of ingredients as co-products follows the guidance of the European Feed Manufacturers' Federation

\*\* Novel ingredients are defined as ingredients introduced to the formulation from 2015 onwards

## Marine ingredient sources

Sources by forage and trimmings	Ingredient	Source	Coldwater	Warmwater	Group
	<b>Fishmeal*</b>	Total (t)	162,528	49,017	211,545
		Forage fish	66.9%	44.2%	61.6%
		Trimmings	33.1%	55.8%	38.4%
	<b>Fish oil</b>	Total (t)	95,892	8,220	104,111
		Forage fish	76.8%	32.0%	73.3%
		Trimmings	23.2%	68.0%	26.7%
	<b>Marine ingredients total</b>	Trimmings	29.4%	57.6%	34.5%

\* Fish hydrolysates and press cakes are included in fishmeal use

### Sources by forage species and origin: coldwater feeds



Species	Countries of origin	Percent of forage fish total
<b>Blue whiting (<i>Micromesistius poutassou</i>)</b>	Denmark, Faroe Islands, Iceland, Norway	30.64%
<b>South American pilchard (<i>Sardinops sagax</i>)</b>	Chile, Japan, Mexico, Panama	12.18%
<b>Peruvian anchoveta (<i>Engraulis ringens</i>)</b>	Chile, Peru	10.12%
<b>Atlantic herring (<i>Clupea harengus</i>)</b>	Denmark, Iceland, Norway	8.90%
<b>European sprat (<i>Sprattus sprattus</i>)</b>	Denmark, Norway	7.08%
<b>Indian oil sardine (<i>Sardinella longiceps</i>)</b>	India, Oman	6.77%
<b>Sandeel (<i>Ammodytes sp.</i>)</b>	Denmark, Norway	3.97%
<b>European pilchard (<i>Sardina pilchardus</i>)</b>	Mauretania, Norway	3.74%
<b>Gulf menhaden (<i>Brevoortia patronus</i>)</b>	U.S.	3.62%
<b>Capelin (<i>Mallotus villosus</i>)</b>	Denmark, Iceland, Norway	3.07%
<b>Araucanian herring (<i>Strangomera bentincki</i>)</b>	Chile	2.13%
<b>Chilean jack mackerel (<i>Trachurus murphyi</i>)</b>	Chile	2.03%
<b>Japanese anchovy (<i>Engraulis japonicus</i>)</b>	China, Japan	1.96%
<b>Norway pout (<i>Trisopterus esmarkii</i>)</b>	Denmark, Norway	1.06%
<b>Miscellaneous species</b>	Chile, Denmark, India, Ireland, Mexico, Morocco, Norway, South Africa	2.74%

### Sources by forage species and origin: warmwater feeds



Species	Countries of origin	Percent of forage fish total
<b>Gulf menhaden (<i>Brevoortia patronus</i>)</b>	U.S.	22.00%
<b>Pacific anchoveta (<i>Cetengraulis mysticetus</i>)</b>	Peru	9.90%
<b>Peruvian anchoveta (<i>Engraulis ringens</i>)</b>	Ecuador, Norway, Peru, U.S.	7.19%
<b>Indian oil sardine (<i>Sardinella longiceps</i>)</b>	India	1.91%
<b>Sardine (<i>Sardinella sp.</i>)</b>	Mexico	1.79%
<b>Japanese anchovy (<i>Engraulis japonicus</i>)</b>	China	1.21%
<b>Miscellaneous species</b>	China, Ecuador, India, Morocco, Norway, Other, Thailand, U.S., Vietnam	56.00%

For our marine-origin raw materials, species making up less than 1% of the total are aggregated into the Miscellaneous species category with mixed catches where the percent of species was not known. For each species identified, all countries supplying tonnage are listed. For our terrestrial-origin raw materials, the countries supplying less than 1% of the total are not listed, except for soy and palm producers, which have all supplying countries listed. Where an origin country is listed as Other, an unknown split between multiple known origins prevents accurate allocation.



## Marine ingredient sources *continued*

### Sources by trimmings species and origin: coldwater feeds



Species	Countries of origin	Percent of trimmings total
Atlantic herring ( <i>Clupea harengus</i> )	Denmark, Faroe Islands, Iceland, Ireland, Norway	43.73%
Atlantic mackerel ( <i>Scomber scombrus</i> )	Denmark, Faroe Islands, Iceland, Ireland, Norway, U.K.	15.95%
Capelin ( <i>Mallotus villosus</i> )	Denmark, Iceland, Norway	6.36%
Alaska pollock ( <i>Theragra chalcogramma</i> )	U.S.	4.89%
Chilean jack mackerel ( <i>Trachurus murphyi</i> )	Chile	4.02%
Argentine hake ( <i>Merluccius hubbsi</i> )	Argentina	1.38%
Blue whiting ( <i>Micromesistius poutassou</i> )	Ireland, Norway, U.K.	1.30%
Peruvian anchoveta ( <i>Engraulis ringens</i> )	Peru	1.23%
Mixed whitefish*	Denmark, Iceland, Ireland, Morocco, Norway, U.K.	16.00%
Miscellaneous species	Argentina, Brazil, Chile, India, Ireland, Mexico, Morocco, Norway, Philippines, U.S.	5.15%

\* Trimmings from facilities processing a variety of white fish, typically a selection from cod, haddock, plaice, etc., but the breakdown of the inputs is not known.

### Sources by trimmings species and origin: warmwater feeds



Species	Countries of origin	Percent of trimmings total
Yellowfin tuna ( <i>Thunnus albacares</i> )	Ecuador, Mexico, Peru, Philippines, South Africa, Thailand, Vietnam	19.09%
Skipjack tuna ( <i>Katsuwonus pelamis</i> )	Ecuador, Mauritius, Peru, Vietnam	15.44%
Chub mackerel ( <i>Scomber japonicus</i> )	Ecuador, Peru	14.07%
Peruvian anchoveta ( <i>Engraulis ringens</i> )	Ecuador, Peru	7.99%
Pacific bonito ( <i>Sarda chiliensis</i> )	Ecuador, Peru	7.44%
Thread herring ( <i>Opisthonema sp.</i> )	Ecuador	5.74%
Indian oil sardine ( <i>Sardinella longiceps</i> )	India	5.62%
Humboldt squid ( <i>Dosidicus gigas</i> )	Argentina, Ecuador, Peru, South Korea	4.66%
Atlantic salmon ( <i>Salmo salar</i> )	Chile	4.47%
Chilean jack mackerel ( <i>Trachurus murphyi</i> )	Ecuador, Peru	3.27%
Pangasius ( <i>Hypophthalmus sp.</i> )	Vietnam	1.51%
Common dolphinfish ( <i>Coryphaena hippurus</i> )	Ecuador, Peru	1.09%
Mixed fish	Thailand, Vietnam	6.26%
Miscellaneous species	Colombia, Ecuador, Norway, Peru, U.S.	3.36%

## Marine ingredient indices

### Marine dependency ratios: coldwater



	2023	2022	2021	2020	2019	2018	2017	2016	2015
<b>Marine Protein Dependency Ratio (MPDR) feed*</b>	0.60	0.61	0.54	0.59	0.56	0.42	0.52	0.51	0.45
<b>Marine Oil Dependency Ratio (MODR) feed*</b>	0.59	0.68	0.65	0.69	0.66	0.45	0.48	0.47	0.48
<b>Global eFCR<sup>a</sup></b>	1.30	1.30	1.30	1.31	1.25	1.36	1.23	1.27	1.24
<b>MPDR fish*</b>	0.78	0.80	0.71	0.77	0.70	0.58	0.64	0.64	0.56
<b>MODR fish*</b>	0.77	0.88	0.84	0.91	0.83	0.61	0.59	0.60	0.59

### Forage fish dependency ratios: coldwater



	2023	2022	2021	2020	2019	2018	2017	2016	2015
<b>Forage Fish Dependency Ratio: fishmeal (FFDRm)</b>	0.43	0.38	0.35	0.41	0.36	0.45	0.55	0.54	0.48
<b>Forage Fish Dependency Ratio: fish oil (FFDRo)</b>	1.40	1.51	1.44	1.58	1.50	1.40	1.46	1.44	1.48
<b>Feed Fish Inclusion Factor (FFIF)</b>	0.60	0.57	0.53	0.61	0.56	0.62	0.71	0.70	0.66
<b>Global eFCR<sup>a</sup></b>	1.30	1.30	1.30	1.31	1.25	1.36	1.23	1.27	1.24
<b>FFDRm fish</b>	0.56	0.49	0.45	0.54	0.45	0.62	0.68	0.69	0.60
<b>FFDRo fish</b>	1.82	1.96	1.87	2.08	1.88	1.90	1.80	1.83	1.84
<b>Fish In Fish Out ratio (FIFO)</b>	0.78	0.75	0.69	0.81	0.56	0.62	0.71	0.70	0.66

### Forage fish dependency ratios: warmwater



	2023	2022	2021	2020	2019
<b>FFDRm (feed)</b>	0.14	0.12	0.25	0.23	0.15
<b>FFDRo (feed)</b>	0.07	0.05	0.08	0.10	0.10
<b>FFIF</b>	0.13	0.11	0.22	0.19	0.13
<b>eFCR<sup>b</sup></b>	1.50	1.50	1.50	1.50	1.50
<b>FFDRm (fish)</b>	0.21	0.18	0.38	0.34	0.22
<b>FFDRo (fish)</b>	0.11	0.08	0.12	0.16	0.15
<b>FIFO</b>	0.19	0.16	0.33	0.29	0.20

#### Marine ingredient indices calculations

MPDR = fishmeal% \* 68% \* eFCR / 17.5%

MODR = (fish oil% + (fishmeal% \* 8%)) \* eFCR / 17.5%

FFDRm (coldwater) = (forage fishmeal in feed % \* eFCR) / 24% <sup>c</sup>

FFDRm (warmwater) = (forage fishmeal in feed % \* eFCR) / 22.2% <sup>d</sup>

FFDRo = (forage fish oil in feed % \* eFCR) / 5% <sup>e</sup>

FFIF = (forage fishmeal% + forage fish oil%) / (yield of fishmeal + yield of fish oil)

FIFO = (forage fishmeal% + forage fish oil%) \* eFCR / (yield of fishmeal + yield of fish oil)

\* During calculation of this year's Marine Protein and Oil Dependency Ratios, and error in prior years' calculations was identified. From 2019-2022, these ratios were mistakenly calculated using only the inclusion levels of fishmeal and fish oil from forage fish. The intention of Crampton et al. (2010), who devised the metric, was for all marine-derived protein and oil—"irrespective of purpose for which they were caught"—to be used in the calculation. Therefore, total fishmeal and fish oil inclusions – reflecting both forage-derived and trimmings-derived marine raw materials—have been used in the 2023 calculations. MPDR and MODR have also been recalculated for 2019-2022 using this approach.

<sup>a</sup> Estimated average global eFCR for salmonids based on in-house data, Tacon et al. (2022), and Seafood Watch (2021a,b,c,d).

<sup>b</sup> Estimated average global eFCR for warmwater species based on in-house data, Tacon et al. (2022), and value for *P. vannamei* in the ASC Shrimp Standard v1.1 (2019).

<sup>c</sup> Estimated average fishmeal yield based on Péron et al. (2010) and its use in the ASC Salmon Standard v1.3 (2019). Actual FFDRm can be considerably lower if actual oil yields are applied for each species used.

<sup>d</sup> Estimated average fishmeal yield based on the ASC Shrimp Standard v1.2 (2022). Actual FFDRm can be considerably lower if actual oil yields are applied for each species used.

<sup>e</sup> Estimated average fish oil yield based on ASC's allowance for 5% or 7% oil yields depending on the source of the oil, but to be conservative in this report, the lower yield has been used in this calculation. Actual FFDRo can be considerably lower if actual oil yields are applied for each species used.

## Feeds to support fish health

### Percent sales of health or health and performance functional feeds

	Coldwater	Warmwater	Group
2023	17.84%	0.46%	10.49%
2022	22.9%	0.51%	12.0%
2021	20.6%	0.7%	13.0%
2020	20.3%	1.1%	12.2%
2019	22.6%	3.2%	16.0%
2018	18.3%	–	–
2017	24.2%	8.7%	20.6%

### Percent sales of anti-parasitic feed sales

	Canada	Chile	Norway	Scotland	Coldwater total
2023	1.10%	0.39%	0.73%	4.75%	0.88%
Change from 2017	-41.33%	-41.69%	-78.59%	133.99%	-48.21%
2022	0.44%	0.30%	0.86%	4.65%	0.96%
2021	1.23%	0.21%	0.93%	4.52%	1.14%
2020	0.95%	0.30%	1.22%	3.73%	1.3%
2019	1.73%	0.09%	1.30%	3.58%	1.3%
2018	1.17%	0.29%	1.23%	2.61%	1.1%
2017	1.87%	0.67%	3.41%	2.03%	1.7%

### Percent sales of antibiotic feed sales

	Canada	Chile	Norway	Scotland	Coldwater total
2023	7.95%	7.84%	0.00%	0.00%	2.30%
Change from 2017	276.73%	-17.72%	0.00%	-100.00%	-64.12%
2022	1.20%	8.37%	0.00%	0.10%	1.85%
2021	1.53%	6.84%	0.00%	0.00%	1.52%
2020	2.86%	5.46%	0.00%	0.02%	1.25%
2019	3.08%	5.38%	0.00%	0.09%	1.49%
2018	2.75%	6.74%	0.00%	0.07%	2.24%
2017	2.11%	9.53%	0.00%	0.02%	6.41%



## Workforce

	Coldwater	Warmwater	Group total*
<b>Total employees</b>	832	1,183	2,015
<b>Women employees</b>	179	224	403
<b>Men employees</b>	646	958	1604
<b>Employees – women proportion (%)</b>	21.5%	18.9%	20.0%
<b>Total contractors</b>	0	0	0
<b>Women contractors</b>	0	0	0
<b>Men contractors</b>	0	0	0
<b>Contractors – women proportion (%)</b>	N/A	N/A	N/A

### Gender parity in management & leadership

	Coldwater	Warmwater	Group total
<b>Management and administration employees</b>	354	701	1,055
<b>Number of women in management and administration</b>	143	193	336
<b>Proportion of women in management and administration (%)</b>	40.4%	27.5%	31.8%
<b>Senior management* employees</b>	30	28	58
<b>Number of women in senior management</b>	9	8	17
<b>Proportion of women in senior management (%)</b>	30.0%	28.6%	29.3%
<b>Global Leadership Team** employees</b>			14
<b>Number of women in Global Leadership</b>			6
<b>Proportion of women in Global Leadership (%)</b>			42.9%

\* Senior management teams are the teams directly responsible for each country.

\*\* Global leadership team is the central team responsible for the management of Cargill Aqua Nutrition as a group.

### Local hires in senior leadership

	Coldwater	Warmwater	Group total
<b>Number of senior leadership employees hired from the local community</b>	30	26	56
<b>Proportion of senior leadership employees hired from the local community (%)</b>	100.0%	92.9%	96.6%

## Worker integrity

### Ethics and anti-corruption training

	2023	2022	2021	2020	2019
<b>Global Leadership Team trainings completed</b>	92.9%	95.2%	90.9%	37.5%	37.5%
<b>Employee trainings completed</b>	97.2%	99.5%	21.1%	20.8%	18.2%

### Whistle-blowing incidents

There were thirty-eight (38) whistle blower cases submitted in 2023 across Cargill Aqua Nutrition (CQN). Of these, eighteen (18) were anonymous reports and the remaining twenty (20) were cases where the Reporter identified themselves while raising their concern in the Ethics Open Line (EOL). Thirty-five (35) of the thirty-eight (38) cases were resolved by January 2024, and there are three (3) cases that are still under investigation.



## Packaging and waste

**Total packaging materials (tonnes) for goods sold**

	Coldwater	Warmwater*	Group
<b>Bulk bags</b>	1,197.3	18.0	1,215.3
<b>Polyethylene bags</b>	1,214.4	238.0	1,452.4
<b>Polypropylene bags</b>	954.6	35,134.2	36,088.8
<b>Paper bags</b>	0.0	18.0	18.0
<b>Total bags</b>	<b>3,366.3</b>	<b>35,408.1</b>	<b>38,774.4</b>
<b>Pallets</b>	290.6	202.1	492.7
<b>Miscellaneous items</b>	1,557.8	15,038.3	16,596.0
<b>Total packaging</b>	<b>5,214.6</b>	<b>50,648.5</b>	<b>55,863.1</b>



## Sustainability assurances

### Factory certifications

**Standards to which our facilities are certified to, by location**

Region	Country	ISO 9001	ISO 14001	ISO 22000	ISO 45001	GlobalG.A.P.	BAP	Organic
Americas	Canada	•			•	•	•	•
	Chile	•	•	•	•	•	•	
	Ecuador					•	•	
	Mexico							
	U.S.					•	•	
Asia	China						•	
	India			•			•	
	Indonesia			•			•	
	Thailand						•	
	Vietnam	•	•		•	•	•	
Europe	Norway	•	•	•	•	•		•
	Scotland	•	•	•	•	•**	•	•
<b>Total plants certified<sup>†</sup></b>		<b>9</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>9</b>	<b>12</b>	<b>4</b>

<sup>†</sup> Some countries have more than one facility and not all facilities are certified to the same level within a country.

<sup>\*\*</sup> Scotland is certified by UFAS, which is recognized as equivalent to GlobalG.A.P.





## Sustainability assurances *continued*

### Ingredient certifications

#### Standards to which our marine ingredients are certified to

	None	MarinTrust IP	MarinTrust	Comprehensive FIP	MSC*
<b>Coldwater feeds</b>					
<b>Forage fish</b>	14.03%	34.91%	17.46%	8.15%	25.45%
<b>Trimming</b>	2.06%	1.30%	45.58%	17.71%	33.36%
<b>Total</b>	10.50%	25.02%	25.74%	10.96%	27.78%
<b>Warmwater feeds</b>					
<b>Forage fish</b>	45.29%	5.85%	24.15%	0.00%	24.71%
<b>Trimming</b>	32.21%	25.55%	34.11%	0.00%	8.12%
<b>Total</b>	37.76%	17.19%	29.88%	0.00%	15.16%
<b>Group total</b>					
<b>Forage fish</b>	17.70%	31.50%	18.25%	7.19%	25.36%
<b>Trimming</b>	11.17%	8.63%	42.11%	12.36%	25.73%
<b>Total</b>	15.45%	23.60%	26.49%	8.97%	25.49%

\* MSC certified fishery shows that the fish were caught from a fishery that has been certified by MSC, but not necessarily by certified boats.

#### Standards to which our soy and palm ingredients are certified to: coldwater feeds

	Canada	Chile	Norway	Scotland	Coldwater total
<b>Soy products</b>	<b>Certifications</b>	n/a*	RTRS credits	EuropeSoya, Proterra, Non-GMO Project, SSAP	Organic, ProTerra
	<b>% certified</b>	n/a*	100%	100%	100%
	<b>Origins</b>	n/a*	Argentina, Bolivia, Brazil, Chile, Paraguay	Brazil, Finland, U.S.	Brazil, China, India, European Union
<b>Palm oil</b>	<b>Certifications</b>	n/a*	n/a*	n/a*	n/a*
	<b>% certified</b>	n/a*	n/a*	n/a*	n/a*
	<b>Origins</b>	n/a*	n/a*	n/a*	n/a*

\* n/a indicates no use of soy or palm oil products in 2023 by this business group

\*\* US Soy Export Council - US Soy Sustainability Assurance Protocol. SSAP is recognized according to FEAC's soy-sourcing guidelines (and therefore also accepted by Cargill).

## Energy use for feed production

### Energy use for coldwater feeds



Energy type	Energy source	2023	2022	2021	2020	2019	2018	2017
<b>Direct energy (GJ)</b>	Non-renewable	527,212	455,329	568,777	628,669	639,819	607,450	611,277
<b>Direct energy (GJ)</b>	Renewable	27,255	27,723	48,644	64,179	71,207	55,047	47,470
<b>Indirect energy (GJ)</b>	Non-renewable electricity	403,325	407,980	447,164	402,945	521,485	453,949	436,810
<b>Indirect energy (GJ)</b>	Renewable electricity	161,543	94,143	90,926	88,308	-	-	-
<b>Total energy use (GJ)</b>		1,119,335	985,175	1,155,510	1,184,101	1,232,511	1,116,446	1,095,557
<b>Change relative to 2017 (%)</b>		+2.2%	-10.10%	+5.5%	+8.1%	+12.5%	+1.9%	0.0%
<b>Energy per tonne feed made (GJ/t)</b>		1.018	1.019	1.048	1.027	0.997	1.083	1.113
<b>Change relative to 2017 (%)</b>		-8.6%	-8.4%	-5.9%	-7.7%	-10.4%	-2.7%	0.0%

### Energy use for warmwater feeds



Energy type	Energy source	2023	2022	2021	2020	2019	2018	2017
<b>Direct energy (GJ)</b>	Non-renewable	435,779	458,860	496,243	399,411	363,119	279,149	272,840
<b>Direct energy (GJ)</b>	Renewable	84,897	61,042	57,240	141,715	66,601	41,163	75,397
<b>Indirect energy (GJ)</b>	Non-renewable electricity	299,442	302,457	330,945	296,644	371,802	341,355	209,504
<b>Indirect energy (GJ)</b>	Renewable electricity	109,644	102,008	90,696	1,175	-	-	-
<b>Total energy use (GJ)</b>		929,762	924,366	975,124	838,945	801,522	661,667	557,741
<b>Change relative to 2017 (%)</b>		+66.7%	+65.7%	+74.8%	+50.4%	+43.7%	+18.6%	0.0%
<b>Energy per tonne feed made (GJ/t)</b>		1.346	1.316	1.332	1.256	1.246	1.180	0.843
<b>Change relative to 2017 (%)</b>		+59.7%	+56.1%	+57.9%	+49.1%	+47.9%	+40.0%	0.0%

### Energy use for group total feeds

Energy type	Energy source	2023	2022	2021	2020	2019	2018	2017
<b>Direct energy (GJ)</b>	Non-renewable	962,990	914,189	1,065,020	1,028,080	1,002,938	886,599	884,117
<b>Direct energy (GJ)</b>	Renewable	112,152	88,765	105,884	206,738	137,808	96,210	122,867
<b>Indirect energy (GJ)</b>	Non-renewable electricity	702,767	710,436	778,109	699,589	893,287	795,304	646,313
<b>Indirect energy (GJ)</b>	Renewable electricity	271,187	196,152	181,622	89,483	-	-	-
<b>Total energy use (GJ)</b>		2,049,096	1,909,542	2,130,634	2,023,046	2,034,033	1,778,113	1,653,297
<b>Change relative to 2017 (%)</b>		+23.9%	+15.5%	+28.9%	+22.4%	+23.0%	+7.5%	0.0%
<b>Energy per tonne feed made (GJ/t)</b>		1.144	1.144	1.161	1.111	1.082	1.109	1.029
<b>Change relative to 2017 (%)</b>		+11.2%	+11.2%	+12.8%	+7.9%	+5.1%	+7.7%	0.0%

## Scope 1 & 2 greenhouse gas emissions

### Scope 1 & 2 GHG emissions for coldwater feeds production

	2023	2022	2021	2020	2019	2018	2017
Scope 1 & 2 GHG emissions (tCO <sub>2</sub> e)	80,890	70,425	77,644	63,418	77,397	73,210	79,849
Scope 1 & 2 GHG change relative to 2017 (%)	0.0%	-11.8%	-2.8%	-20.6%	-3.1%	-8.3%	-
Scope 1 & 2 GHG intensity (tCO <sub>2</sub> e/t feed produced)	0.074	0.073	0.070	0.055	0.063	0.071	0.081
Scope 1 & 2 GHG change relative to 2017 (%)	-9.2%	-10.1%	-13.1%	-32.2%	-22.8%	-12.4%	-

### Scope 1 & 2 GHG emissions for warmwater feeds production

	2023	2022	2021	2020	2019	2018	2017
Scope 1 & 2 GHG emissions (tCO <sub>2</sub> e)	79,251	80,674	88,002	66,627	76,340	69,348	43,426
Scope 1 & 2 GHG change relative to 2017 (%)	+82.5%	+85.8%	+102.6%	+53.4%	+75.8%	+59.7%	-
Scope 1 & 2 GHG intensity (tCO <sub>2</sub> e/t feed produced)	0.115	0.115	0.120	0.100	0.119	0.124	0.066
Scope 1 & 2 GHG change relative to 2017 (%)	+73.9%	+74.0%	+82.1%	+52.0%	+80.9%	+88.5%	-

### Scope 1 & 2 GHG emissions for group feeds production

	2023	2022	2021	2020	2019	2018	2017
Scope 1 & 2 GHG emissions (tCO <sub>2</sub> e)	160,141	151,099	165,647	130,045	153,737	142,558	123,274
Scope 1 & 2 GHG change relative to 2017 (%)	+29.9%	+22.6%	+34.4%	+5.5%	+24.7%	+15.6%	-
Scope 1 & 2 GHG intensity (tCO <sub>2</sub> e/t feed produced)	0.089	0.091	0.090	0.071	0.082	0.089	0.077
Scope 1 & 2 GHG change relative to 2017 (%)	+16.2%	+17.6%	+17.2%	-6.9%	6.6%	15.8%	-





## Global Warming Potential (GWP) of feeds produced

GWP: Coldwater feed raw materials delivered to the factory	GWP excluding land use change		GWP including land use change	
	Raw materials (tCO <sub>2</sub> e)	Raw materials (tCO <sub>2</sub> e/t)	Raw materials (tCO <sub>2</sub> e)	Raw materials (tCO <sub>2</sub> e/t)
2023	1,589,346	1.39	2,158,677	1.89
2022	Not calculated	Not calculated	1,873,266	1.96
2021	1,663,025	1.36	2,535,792	2.07
2020	1,575,112	1.37	3,001,619	2.60
2017	1,380,306	1.40	2,497,984	2.54

GWP: Coldwater finished feeds ready to leave the factory (not including packaging)	GWP excluding land use change		GWP including land use change	
	Raw materials (tCO <sub>2</sub> e)	Raw materials (tCO <sub>2</sub> e/t)	Raw materials (tCO <sub>2</sub> e)	Raw materials (tCO <sub>2</sub> e/t)
2023	1,667,257	1.46	2,236,588	1.96
2022	Not calculated	Not calculated	1,943,691	2.04
2021	1,740,669	1.42	2,613,436	2.14
2020	1,645,701	1.43	3,072,261	2.67
2017	1,446,325	1.47	2,564,062	2.61

## Water use in feed production

Water use in coldwater feed production	Total water use (liters)	Water use (liters per tonne feed made)
2023	533,443,030	485
2022	474,205	491
2021	514,039,963	466
2020	538,697,864	467
2019	500,100,950	404
2018	444,549,848	431
2017	493,850,277	503

Water use in warmwater feed production	Total water use (liters)	Water use (liters per tonne feed made)
2023	303,641,840	440
2022	341,720	486
2021	330,846,236	452
2020	290,610,104	435
2019	275,803,182	448

Water use in total feed production	Total water use (liters)	Water use (liters per tonne feed made)
2023	837,084,870	468
2022	815,925	489
2021	844,886,199	460
2020	829,307,968	456
2019	775,904,132	419

## GRI Index

The following tables provide an index to GRI disclosures and customized reporting topics and impacts that we have identified as material in our operations. The full GRI Standards can be accessed at [www.globalreporting.org/standards/](http://www.globalreporting.org/standards/).

GRI Standard Number	GRI Standard Title	Disclosure Number	Disclosure Title	Page	GRI Standard Number	GRI Standard Title	Disclosure Number	Disclosure Title	Page
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CQN Customized Disclosures			
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