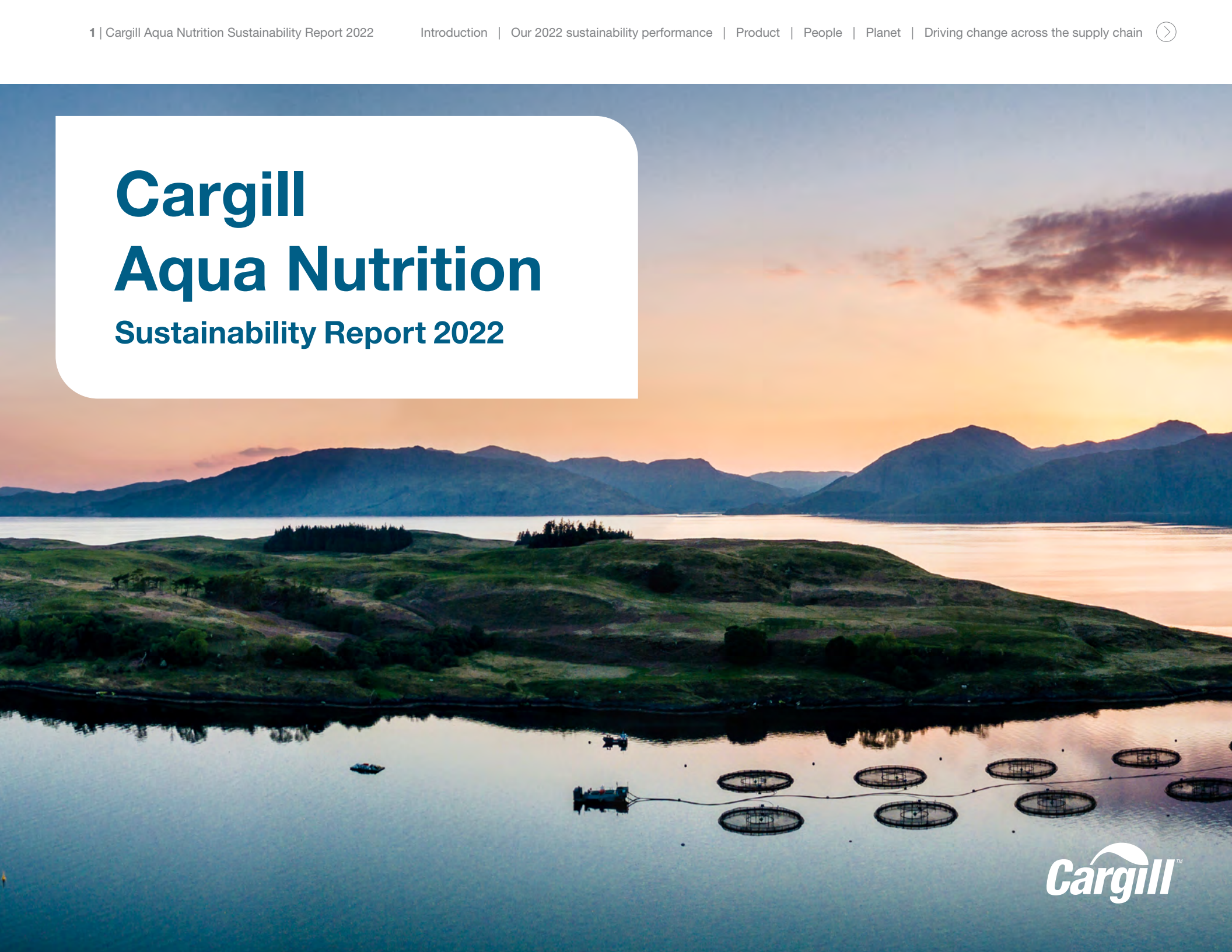


Cargill Aqua Nutrition

Sustainability Report 2022



Combining strengths for greater impact



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

We always keep that fact in mind when we think about sustainability. Our impact is much greater when we design our programs with our partners at the forefront. Working together, we can combine their strengths with Cargill's technical know-how, market insights and global reach, and devise the sustainable practices and products the global market desires.

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

Since the lion's share of aquaculture's carbon footprint stems from the mix of raw materials in feed, we teamed up with eight United Kingdom (U.K.) farms to pilot the same regenerative agriculture practices Cargill is already applying in the U.S. at scale. In 2022, the participating farms achieved a 1,000-tonne carbon reduction. Our goal is to sign up more farmers, get to 10,000 tonnes in avoided emissions in 2023, and scale up further from there. This is just one of the many actions we are taking. Within our own operations, we are also steadily driving down our own GHG emissions.

Most recently, World Wildlife Fund (WWF) and Finance Earth announced that Cargill Aqua Nutrition and other

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

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

In a world that is increasingly hungry for protein, aquaculture products must be a growing, healthy and sustainable part of the solution. As anybody who is involved in sustainability knows, there is no one single solution. Getting the job done will require relentlessly driving incremental improvements and working as an industry. But with the help of our partners, we know that we are getting there.

I am delighted to invite you to read about our 2022 progress in this report.

Thank you!

Helene Ziv-Douki
Cargill Aqua Nutrition
President and Group Leader

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Product

1.67 million tonnes of feed produced in 2022

Reused fish byproducts make up 59.7% of marine ingredients in our warmwater feeds

36.1% of marine ingredients in our coldwater feeds

33.4% sourcing from Fishery Improvement Projects

People

2,000+ employees in 19 countries

1/3 of our managers are women

100% of senior leadership hired from local communities

Planet

10.1% reduction in total energy use for coldwater feeds

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

Our 2025 goal: 10% reduction in absolute Scope 1 & 2 GHG

1,000 tonnes of carbon saved using regenerative agriculture

Our 2023 goal: 10,000 tonnes of carbon saved

About this report



This is Cargill Aqua Nutrition (CQN)’s fourteenth annual sustainability report—our sixth 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. CQN 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 on a calendar-year basis. The data in this report covers our sustainability performance from 1 January 2022 to 31 December 2022. The last published report covered 1 January 2021 to 31 December 2021.



Cargill produces aquaculture feeds at 40 facilities. Nineteen of these factories, across 12 countries, are

dedicated to aquafeed production and are the focus of this report. The remaining 21 facilities are outside the scope of this report. They are primarily livestock feed or premix production sites, and their combined aquafeed output accounts for less than 5% of our total aquafeed production.

Throughout this report, we reference cold- and warmwater mills. Coldwater mills produce feed for salmonid species. Warmwater mills serve shrimp, tilapia, and other species. See [page 6](#) for the categorization of each of our 19 aquafeed mills.



We use broadly known, transparent reporting standards, reporting with reference to the GRI Standards. A dashboard structure streamlines our presentation. For clarity, we have indicated the GRI Universal Standard 2021 and CQN reporting disclosures for all data families in the dashboards.

In June 2022, GRI published GRI 13, reporting standards specific to the agriculture, aquaculture and fishing sectors. Compliance with these standards is required beginning in January 2024 for those who wish to do so. We intend to continue using GRI as a guide for reporting our sustainability performance and progress.



Cargill reports externally on material topics through our 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 environments, and address specific market requirements and ESG goals of 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.

40 facilities
in 19 countries

**19 dedicated
aqua feed mills**

**3 R&D
innovation centers**

**2 technical
application
centers**

~2,000 employees

**1.8 million
tonnes of feed**
sold in 2022

Nourishing
12 species groups

Feed production

Total feed produced (t)	Coldwater	Warmwater	Group Total
2022	966,649	702,446	1,669,095
2021	1,102,769	732,347	1,835,116
2020	1,152,637	667,831	1,820,468
2019	1,236,491	643,097	1,879,588
2018	1,030,842	560,729	1,603,156
2017	984,638	661,802	1,646,440
2016	930,774	532,496	1,520,347
Change from 2017 (%)	-1.83%	+10.6	+1.4
Total feed sold (t)	2022 939,450	886,276	1,825,726
Number of feed mills	2022 6	13	19

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

Our species

Cargill Aqua Nutrition has 12 key species groups

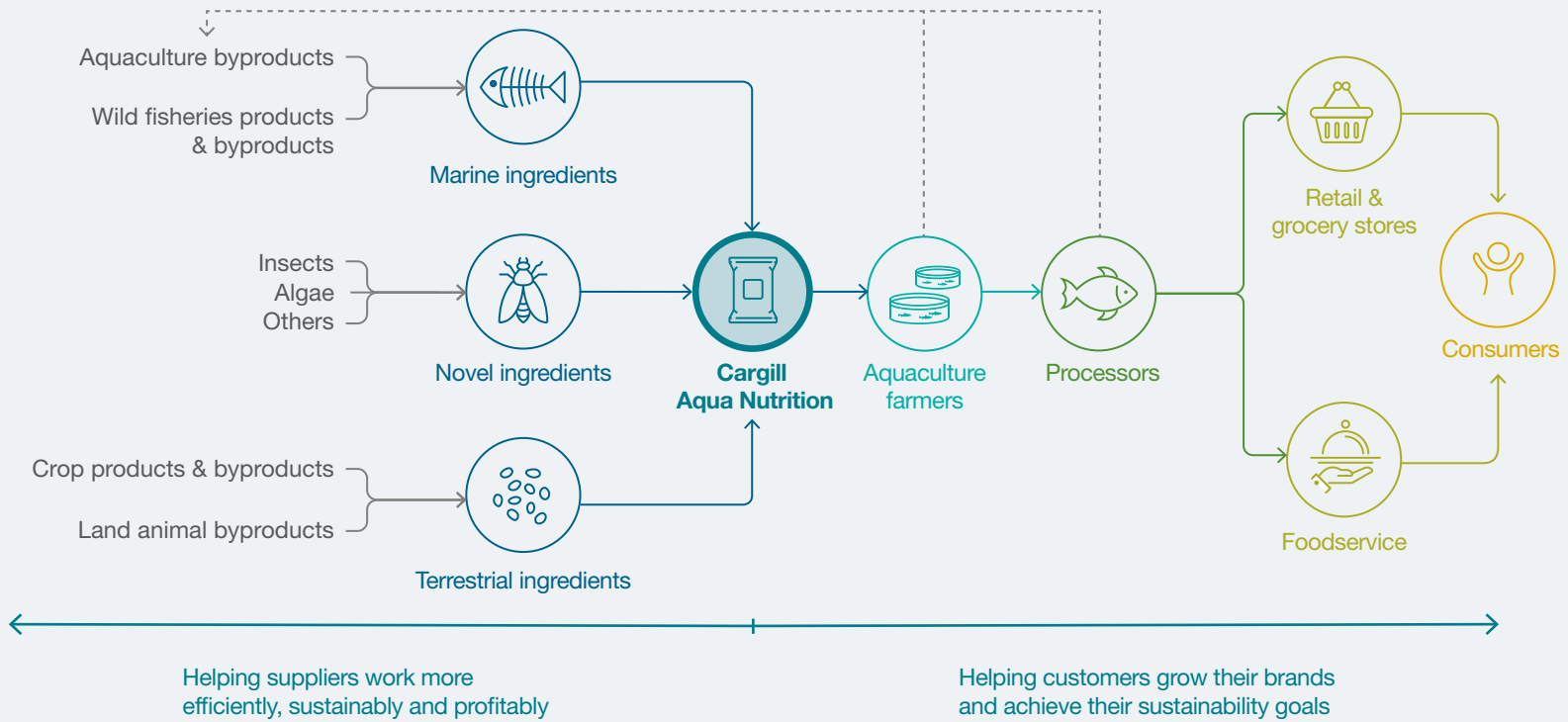
- Shrimp
- Salmon
- Trout
- Tilapia
- Pompano
- Barramundi
- Striped Bass
- Flounder
- Yellow Tail
- Snakehead
- Crab/Crayfish
- Alligator

● Coldwater
● Warmwater

Our feed mills



Making a positive impact from the center of the value chain



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

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

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

Our brands

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



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



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



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



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



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



Making progress that counts

Product People Planet

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



The data presented in this report demonstrates our performance on the key indicators that are material to our business, with clarity on our reporting boundaries, calculation assumptions, and context where needed.

Product

Optimizing our raw material use

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

This section presents detailed data about feed composition in 2022, with special focus on marine ingredients. Since splits vary significantly between salmonid and other species, they are reported separately.

- **We are committed to reducing food systems waste and reusing byproducts.** In 2022, our warmwater feeds contained 68.3% ingredients from co-products. Co-products made up 48.9% of our coldwater feeds. Compared to 2021, our use of fish trimmings for oil and meal increased to 59.7% (up 6.5%) for oil and 36.1% (up 0.2%) for meal in 2022. These shifts happened against the backdrop of the Ukraine conflict, which caused a sharp rise in raw material prices.
- **We are steadily working to increase our engagement with Fishery Improvement Projects (FIPs),** our mechanism to mitigate fisheries' impacts and build more sustainable marine ingredient supply chains. Through FIPs, we are building supply chains that can be certified in the future by MarinTrust and MSC (p. 24). We support the novel funding mechanism for future FIPs developed by WWF and Finance Earth (p. 25).
- **Our use of materials from FIPs rose to 33% in 2022 (p. 24).** This increase is mainly due to a newly

established northeast Atlantic FIP for blue whiting, which brought that fishery back into our sourcing network following earlier issues.

- **We are at the forefront of innovation in sustainable terrestrial raw materials.** Through our SeaFurther™ Sustainability program, we are pioneering the use of regenerative agriculture practices in raw materials for global aquaculture. Pilot programs started in recent years have yielded positive results and are being scaled up as of 2023 (p. 22).

The KPIs reported in the Appendix can be mapped to the GRI 301-1 (p. 38-40) and CQN 3-80 (p. 41) indicators.



For our marine raw materials, species comprising less than 2% of the total are aggregated into the Miscellaneous species category. For each species identified, countries supplying less than 2% of the total tonnage are not listed. We report to the [Ocean Disclosure Project](#) and are currently in the process of reporting for the 2020-22 period, emphasizing Cargill's commitment to transparency. For our terrestrial raw materials, countries supplying less than 1% of the total are not listed, except for soy and palm producers.

Reused fish byproducts and trimmings make up

59.7%

of our marine ingredients for warmwater feeds

36.1%

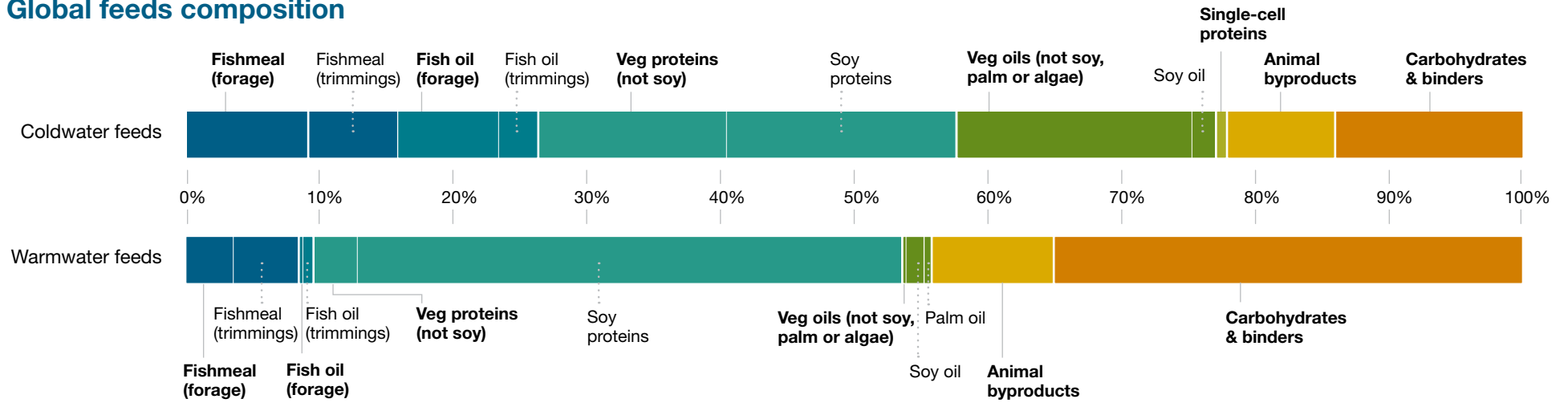
of our marine ingredients for coldwater feeds

160%

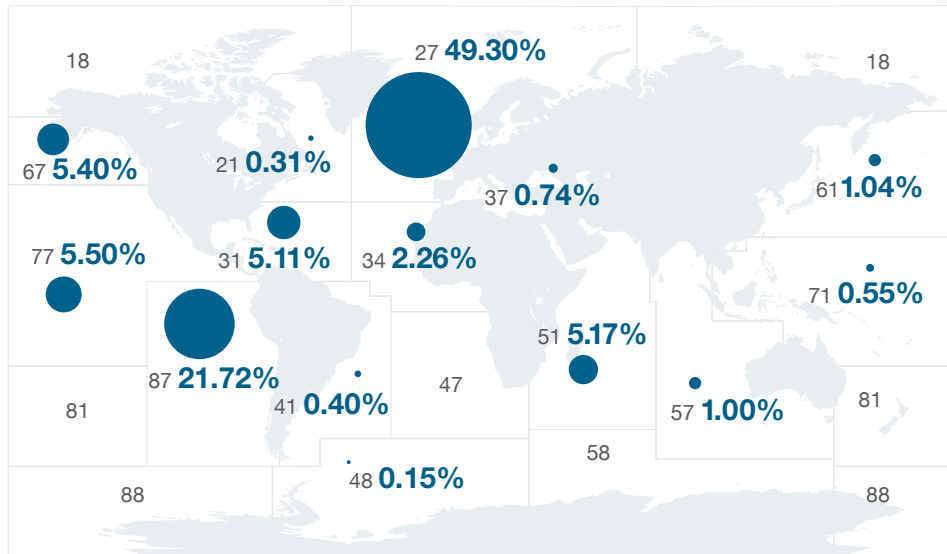
increase in sourcing from Fishery Improvement Projects

Our raw materials and their origins

Global feeds composition



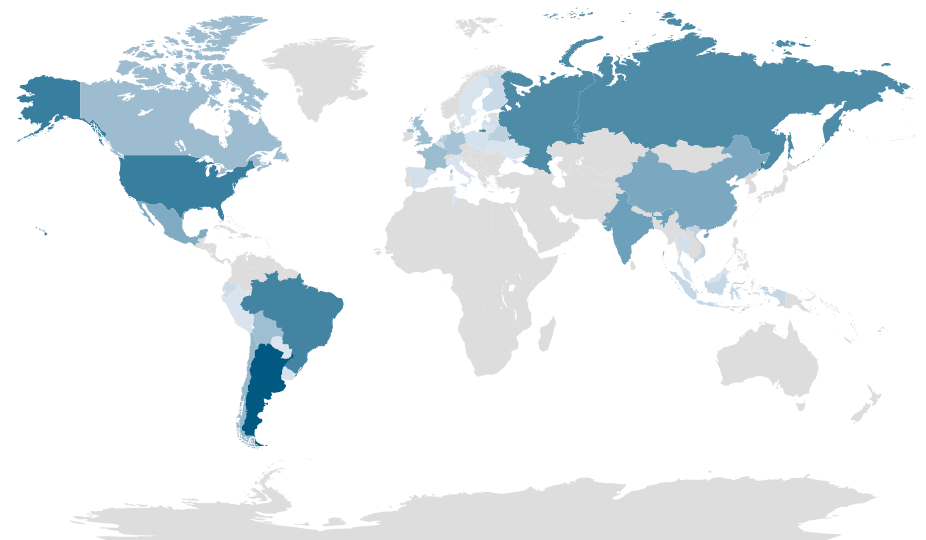
Origins of marine materials



Unknown* 1.34% [FAO Major Fishing Areas](#)

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

Origins of terrestrial materials



Percent of total 0.00% 13.77%

Promoting fish health to lower aquaculture's environmental footprint

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

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

We use antibiotics only on an as-needed basis. Antibiotics are only added to our feeds on demand from customers with a prescription for the treatment. For instance: due to a pathogen outbreak, 0.15% of 2021 sales in Mexico were antibiotic feeds. Because this outbreak has since subsided, 2022 sales in Mexico were antibiotics-free again.

The KPIs reported in the Appendix (p. 42) can be mapped to the CQN 3-87, CQN 3-88, and CQN 3-89 indicators.



Functional feeds help keep fish healthy, reducing the need for medication such as antibiotics

71% reduction
in coldwater antibiotic feed sales since 2017

Driving responsible reductions in packaging

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

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

We have started using bags that contain 15% less plastic in Vietnam. These bags, used for our Nurcare and Aquaxcel brands, will keep tens of tonnes of plastic waste and thousands of tonnes of carbon out of the environment over the next few years (p. 28). We will continue to bring our plastic use down through similar initiatives for other brands and markets.

The KPIs relating to packaging and waste are reported in the Appendix (p. 43) and can be mapped to the indicator CQN 3-91.

15% reduction of plastic in new packaging used in Vietnam



People

Creating equitable workplaces for our people in our aqua nutrition business



20.2%
of our employees are women

30.4%
of our management and administration team are women

36.4%
of our global aqua leadership team are women

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

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

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

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

The KPIs reported in the Appendix can be mapped to the GRI 102-8 (p. 43), GRI 202-2 (p. 43), GRI 205-2 (p. 43), GRI 408-1 (p. 15), and CQN 4-80 (p. 45) indicators.

100%
of senior leadership hired from local communities

67%
women in North Sea Supply Chain team

Child labor

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 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.



Planet

Reducing our carbon emissions and embracing accountability



Our impact should be understood holistically. In a world whose demand for fish and seafood is growing year-over-year, how do our actions contribute to progress on a global scale? The following section reports on the third-party assurances we adhere to and our results lowering greenhouse gas emissions.

We seek assurances at the factory and ingredient levels. Our certifications cover both our marine and terrestrial raw materials, along with our processes and partnerships. We are actively engaging with NGOs, governments, academic institutions, technical partners

and other companies to build a thriving, sustainable global aquaculture sector ([p. 32](#)).

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 Cargill Aqua Nutrition are connected with those of Cargill as a whole, our suppliers, our customers, and their customers. Success is determined by how well we link up our efforts and collaborate across the value chain.

Standards, certifications and assurances

- Where appropriate, we apply International Organization for Standardization (ISO) standards for quality, environmental and food safety management, as well as Best Aquaculture Practices (BAP), Global G.A.P., and organic standards for industry-specific assurances as required by our markets.
- At the ingredient level, we prefer Marine Stewardship Council (MSC) and MarinTrust certifications for marine ingredients and ProTerra, the Roundtable for Responsible Soy, and organic certifications for soy and palm ingredients.
- In 2022, 91.37% of our marine ingredients for coldwater feeds were certified or classified as improving in a recognized FIP, down slightly from 2021. We saw improvement in our warmwater feeds, with uncertified ingredients down to 32.75% of the total, compared to 40.3% in 2021. To increase the amount of certified sustainable marine ingredients available for our feeds, we are increasing our work with FIPs.
- We have been supplying our customers with feed that complies with the ASC Farm Standards since their launch for salmon, shrimp, and yellow tail. With the launch of the ASC Feed Standard in January 2023, our factory and sourcing teams are working to be ready for audits as soon as they can occur. We will start with our coldwater factories, and our warmwater factories will follow according to customer demand.

The KPIs reported in the Appendix can be mapped to the GRI 301-1 ([p. 38-40](#)) and CQN 1-80 ([p. 45-46](#)) indicators.

Managing our climate impact

- **Cargill Aqua Nutrition has been reporting on climate metrics and water usage since 2017.** This report uses that year as a benchmark. 2017 is also the baseline for Cargill's corporate climate targets (p.16). Since 2017, we have improved our supplier data and made some emissions reductions in our own operations. This gives us a strong baseline to drive real GHG reductions throughout our value chains.
- **To date, our focus for emissions management has been on coldwater feeds.** This reflects the challenges of building up the data across complex supply chains. We are now in a position to reduce those emissions, while we start to improve our data for warmwater feeds.
- **Energy use in coldwater feed production continues to decrease compared to 2017.** This is true for energy used per tonne of feed produced and in total. It has enabled a 10.1% reduction in Scope 1 & 2 emissions, ahead of Cargill's corporate 2025 goal.
- **We have stabilized warmwater feed energy use per tonne, as well as Scope 1 & 2 emissions.** However, there was still a large increase since 2017. This has mainly been driven by significant process changes that led to higher energy use and emissions. Our teams are working to identify solutions.
- **So far, Scope 3 emissions have only been calculated for coldwater feeds.** We have been developing our supplier data for several years. Based on the best supplier database available for 2022, we report an average Scope 3 footprint of 1.96tCO2e/t feed, compared to 2.54tCO2e/t in 2017. We do not claim this as an emissions reduction, but rather a reflection of better data calculations from our supply chain. We will seek to recalculate our 2017 baseline based on these improved data sets.
- **The SeaFurther initiative will be our focus for reducing Scope 3 emissions going forward.** We also aim to get Scope 3 data on warmwater feeds for 2023, and report on those results next year.
- **Water use in our factories has slowly increased over time since 2017.** This has mainly occurred in warmwater feed factories, but since 2022 also in coldwater factories. This trend will require attention from our manufacturing teams.



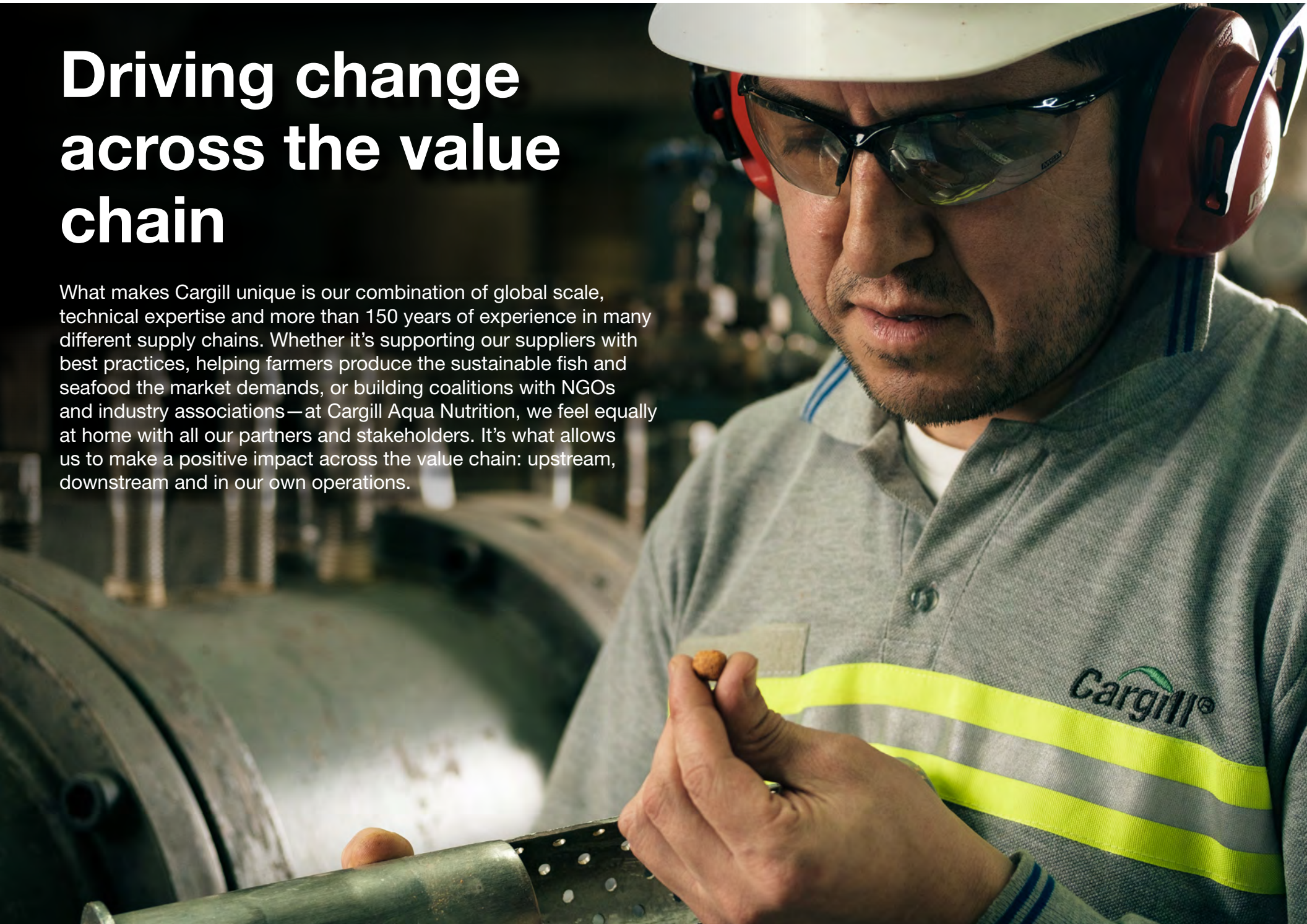
The KPIs reported in the Appendix can be mapped to GRI 302-1/302-2/302-3/302-4 (p. 47), GRI 305-1/305-2/305-4 (p. 48), and CQN 3-83 (p. 49) indicators.

10.1%
reduction in Scope 1 & 2
emissions for coldwater feed

GHG emissions patterns generally follow those of energy use, with coldwater factories demonstrating lower total and relative emissions and warmwater factories demonstrating much greater emissions compared to 2017. Emissions were calculated using the relevant conversion factors from the International Energy Agency (IEA). These account for annual changes in fuel use for generating electricity in each country, together with the global conversion factors for each direct fuel. Cargill continues reporting Scope 1 & 2 emissions based on market-based account factors, including the European national residual mixes. This has had a large impact on the GHG emissions associated with our Norwegian operations in particular, where the national production mix is 4.49 gCO2/kWh but the national residual mix is 404.91 gCO2/kWh in 2021 (<https://www.aib-net.org/facts/european-residual-mix>). Our focus in Scope 3 data gathering for coldwater feeds has been on the headline figure of Global Warming Potential Including Land Use Change, reported in tonnes of carbon dioxide equivalents, using the European Union's Product Environmental Footprint Category Rules for Feed for Food Producing Animals (v4.2) as guidance.

Driving change across the value chain

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



SeaFurther Sustainability

Scaling up early wins with an eye on 2030



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

[Learn more](#)

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

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

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

At the same time, we field-tested our approach with suppliers. Working with eight farms in the U.K., we introduced regenerative agriculture practices in the production of raw materials for aquafeeds, and reduced greenhouse gas emissions by a combined 1,000 tonnes. Our goal for next year is to scale up, engage with a larger number of suppliers, and achieve a 5,000-tonne carbon reduction. It's the first step on the way to enable our customers to achieve our intermediate target of a 15 percent reduction in GHG by 2026.

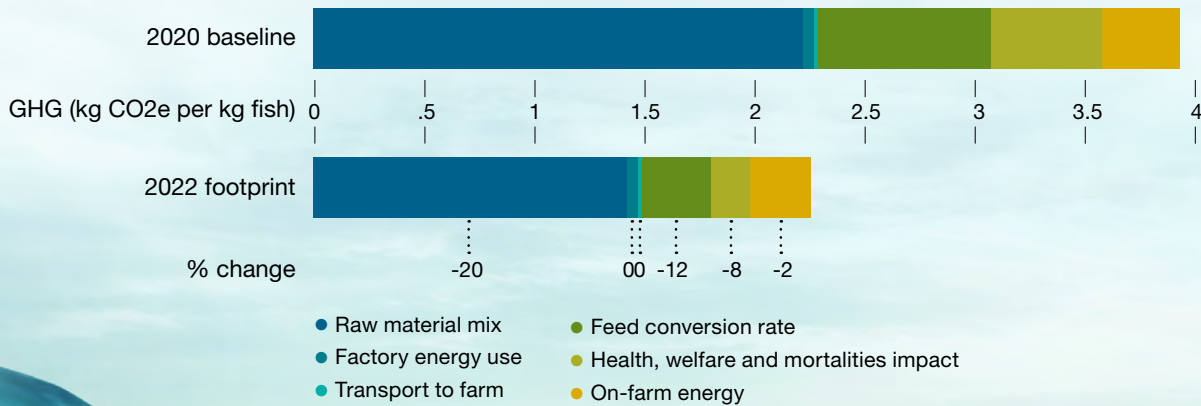


SeaFurther Sustainability

Reducing aqua farming's carbon footprint

Although most carbon emissions from farmed fish and seafood stem from the raw materials mix, several other factors can be addressed to reduce its carbon footprint. Improved reporting can help identify and remedy emissions hotspots. The example below shows reductions achieved by one of our SeaFurther pilot customers in their 2022 production.

Example of harvested fish emissions



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

Kames Fish Farming: Producing more, emitting less

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

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

After compiling a comprehensive carbon footprint inventory together, we identified raw materials for feed conversions (the amount of feed required to grow the

fish) and energy use on the farm as hotspots that were ripe for action. In the first year, Kames focused on energy use, optimizing boat use on the farm and reducing diesel emissions. Along with improving feed conversion rates, it was a choice that, in a year with high fuel costs, would make an immediate financial impact.

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

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

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

Cate Cannon
Sustainability Manager
at Kames



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

SeaFurther Sustainability

Regenerative agriculture pilot saves 1,000 tonnes of carbon

Since most of aqua farming's carbon footprint originates upstream, when feed is produced, some of the most effective steps to lower emission also target that area. One approach to decarbonizing terrestrial ingredients is through regenerative agriculture.

In 2022, we tested the concept. Our pilot program with eight U.K. farms, representing 1,500 hectares of rapeseed and wheat fields, achieved a 1,000-tonne carbon reduction. In 2023, we aim to expand the program, sign up more farmers and save 5,000 tonnes of carbon, while supporting the farmers' profitability.

Regenerative agriculture aims to restore the soil's health and resilience, using techniques like low- or no-tilling, planting cover crops to prevent runoff and oxidation, crop diversity, and pollinator strips. As a result, the soil

becomes a carbon sink instead of a source of emissions, reducing the carbon footprint of crops grown in it. Healthy soil also holds more water, which makes it drought-resilient and supports more biodiversity, both above and below ground.

“Regenerative and sustainable practices must be commercially viable, too. We must look at them with production in mind. The project acknowledges this, which is why I was keen to get involved.”

Alan Petch
Early participant of regenerative agriculture

For Cargill, introducing regenerative practices in the aqua feed supply chain is a relatively small step. Through our [RegenConnect™](#) program, we are already applying the same techniques on a larger scale in North America.

Scaling up the regenerative agriculture approach is also key to lowering the aqua farming sector's overall carbon footprint, said Dave Robb, Cargill's Program Lead for SeaFurther Sustainability. “This is a practice we believe

Cargill's deforestation-free commitment

Cargill is committed to deforestation- and conversion-free (DCF) sourcing across our agricultural supply chains by 2030, including in aqua nutrition. All soy ingredients in our coldwater feeds have used material-certified 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. Learn more about our deforestation and conversion-free approach [here](#).

in as a key part of decarbonization of aquaculture value chains. The point now is to build longer-term relationships with suppliers and customers and expand our network, so that together, we can generate more benefits at scale along the value chain.”

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



New feeds to deliver lower footprint

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

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

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



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

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

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

Clément Ray
Innovafeed's co-founder and CEO

Promoting ocean stewardship through Fishery Improvement Projects



FIPs reduce their impact on ecosystems and generate increased benefits for the local communities that rely on them. Over time, FIPs can help restore fish stocks in the areas where they operate, ensuring a long-term supply of fish for food and livelihoods.

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

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

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

Over the last 20 years, we reduced our use of marine ingredients for the average global salmon feed

composition by 80%. In 2022, 41% of our total marine ingredients by volume were sourced from trimmings, as opposed to forage fish. In 2022, 91.4% of the marine ingredients for our coldwater feeds were from certified or improver program sources. At the same time, 32.7% of the marine ingredients for our warmwater feeds were not certified. The latter is a significant improvement over 2021, but a wide margin for progress remains.

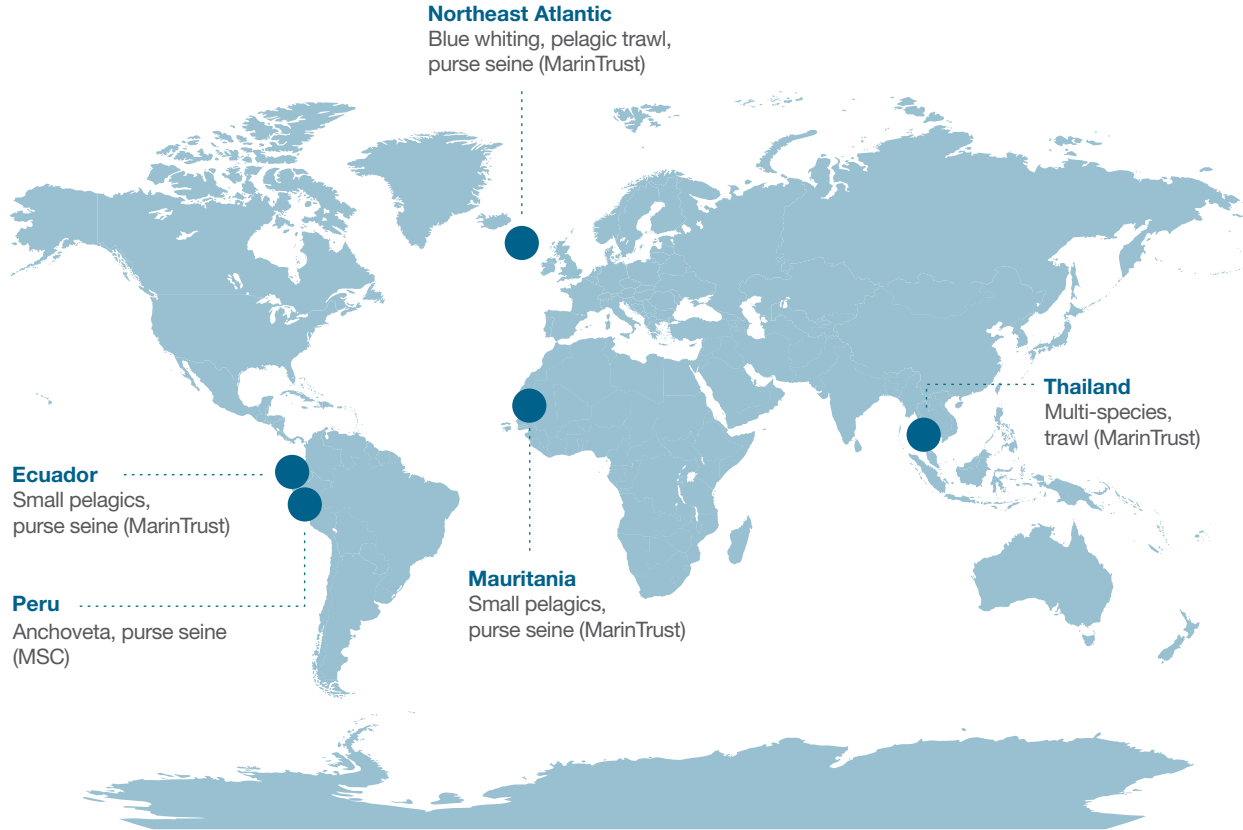
But we don't just want to improve our own supply chain. Our ambition is to use our leverage as a large global feed producer to improve ocean health overall, and to support the sustainable growth of the aquaculture industry. To achieve that goal, we must engage fisheries that are not yet sustainable.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

By working with FIPs, we help our customers produce the sustainable products the market demands, while also helping drive progress for the fisheries sector as a whole.

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

Taylor Voorhees
CQN Sustainability Leader

FIPs we supported in 2022 and their certification goals



Cargill joins WWF and Finance Earth in new Fisheries Improvement Fund

At the 2023 Global Seafood Expo of Barcelona, World Wildlife Fund (WWF) and Finance Earth (FE) announced the launch of an innovative blue finance mechanism, known as the Fisheries Improvement Fund (FIF), to fund the implementation of FIPs. We are proud to be part of this initiative, along with other major companies including Skretting, Mars Incorporated, Costco Wholesale, Sodexo and philanthropic partners such as the Walmart Foundation.

The FIF will combat the worldwide decline of fisheries by providing support for FIPs with the support of experienced partners on the ground. The new fund aims to spur more than \$100 million in new investments by 2030. Read more about [Fisheries Improvement Fund - Finance Earth](#).

How we innovate: Maximizing performance, minimizing environmental impact

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

Innovation in the field

Micro-pellet shrimp feed keeps water cleaner

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

Thanks to advanced extrusion technology, Cargill's new shrimp feed comes in micro-pellets as small as 0.5 millimeters in Indonesia. Made from high-quality raw materials and fortified with health-boosting vitamins and minerals, the pellets help shrimp grow quickly and

support their immune systems—especially in the crucial early development stages when mortality is high.

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

“We are committed to improving the livelihoods of farmers and contributing to Indonesia’s economic growth. The new micro-pelleted shrimp feed helps produce high-quality shrimp in shorter cultivation periods and in larger quantities.”

Chia-Ye Siam
Managing Director for Malaysia and Indonesia





Digital scanner revolutionizes salmon sampling

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

- Samples can be taken from live fish, which preserves biomass.
- Scans provide immediate answers about conditions in the cages, enabling farmers to intervene right away when problems occur. This raises efficiency and saves resources.

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

In testing alone, over
40,000 fishes
 and almost
400 tonnes
 of GHG emissions
 have been saved in live salmon sampling

Sustainable solutions for land-based salmon

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

Working with Norwegian farming company **Salmon Evolution**, we developed a custom-designed feed for salmon grown in tanks. Based on continuous data analysis during production, we updated our models for growth and feed optimization for use in partially recycled water. As a result, we saw excellent production results along with minimal impacts on water quality. Lessons learned from our collaboration with Salmon Evolution are ready to be applied at scale in the growing land-based aquaculture sector. In 2022, we also teamed up with another Norwegian customer, **Havlandet**, to pilot the same approach with cod, trialing several varieties of our feed products. Initial results were promising.



Another new feed, **EWOS CLEAR™** is formulated for land-based salmon hatcheries. Because water quality is crucial during salmon's early life stages, CLEAR was designed to reduce pellet degradation and maximize nutrition, allowing growers to produce more smolt using less feed. The raw materials were carefully selected to ensure good, safe and sustainable nutrition, so that smolts are robust and ready to perform well when transferred to sea.

Innovation inside our own operations

Saving plastic and carbon with lighter bags

Making sustainable products starts with the right design mindset. In our case, it's not just about the feed itself, it's about the full package—literally. With that in mind, we introduced new, lighter bags for our Nurcare and Aquaxcel brands in Vietnam. Each bag contains 15% less plastic. The move will save 72 tonnes of plastic in 2023 and 144 tonnes per year by 2030. And because making plastic bags takes energy, we'll contribute to prevent 2,500 tonnes of GHG emissions from all Cargill feed bags in Vietnam. (p. 13)



By 2030:
 Lighter Nurcare and Aquaxcel bags will save
2,500 tonnes
 of GHG emissions

Packaging reduction is set to be a growing focus area for Cargill Aqua Nutrition in the coming years. Lessons learned in Vietnam will serve us going forward, as we reduce plastic use in other markets.

Expanding our sea sites in Dirdal

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

Driving yields and saving resources with Essential Nitrogen

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

Cargill Aqua Nutrition has long been at the forefront of nutritional modeling and feed design. Since the 1990s, our precursor company EWOS, acquired by Cargill in 2015, used advanced data to track our products' performance. Efficiency in aquafeeds not only means higher yields and revenue for the grower, but also growing more biomass



with less feed, which reduces resource and energy use, and cuts down on waste and carbon emissions. By integrating Essential Nitrogen in our formulations, we're creating the next generation of feeds. It's how we drive even more efficiency, increase productivity and decrease aquaculture's environmental footprint.

Supporting aqua startups

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

Governance

A solid foundation for daily action

Cargill Aqua Nutrition takes a holistic value chain approach to sustainability. 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.





How we manage sustainability

Cargill is committed to nourishing the world in a safe, responsible and sustainable way. At Cargill Aqua Nutrition, 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, 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.

Cargill Chief Sustainability Officer, Pilar Cruz leads corporate sustainability efforts, including

the development of global policies, commitments and programs. Learn more about Cargill's corporate sustainability approach [here](#).

Cargill Aqua Nutrition has our own dedicated sustainability management. We are aligned with corporate strategies, but the materiality of the aqua nutrition industry requires specific strategies. Cargill Aqua Nutrition is part of Cargill's animal nutrition and health enterprise. A group sustainability lead and a sustainability signature program lead centralize sustainability management. Together with sustainability staff embedded in local and regional businesses, they collaborate on implementation with commercial teams. This structure allows us to address global priorities as well as local issues, including customer and stakeholder engagement, market and ecosystem conditions, raw material impacts

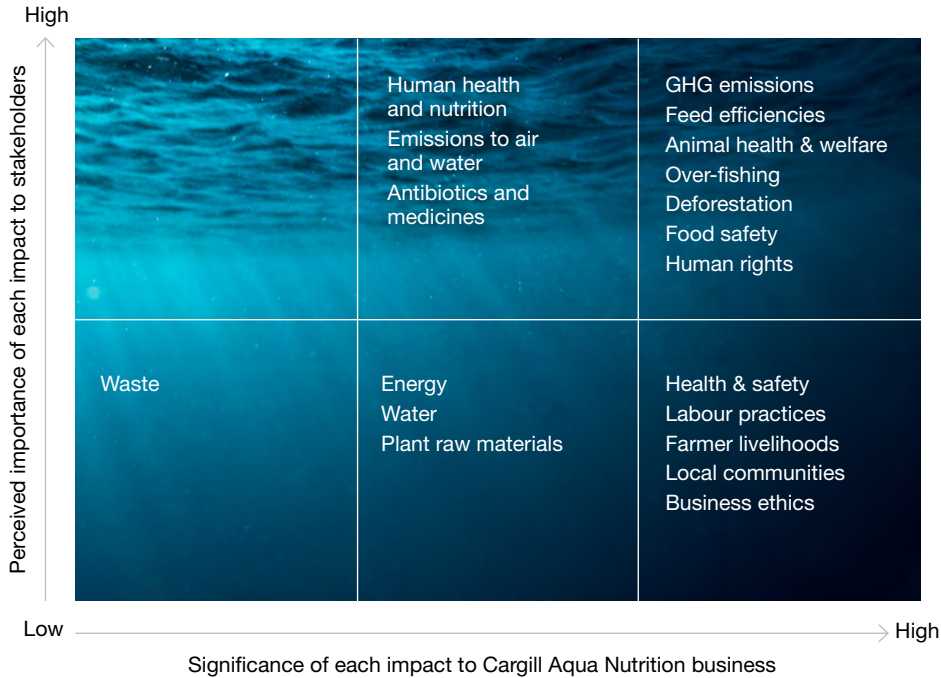
and other relevant topics. We continue to build capacity and expand our capabilities to address sustainability issues and accomplish our goals.

We report on our sustainability progress annually

At the corporate level, Cargill reports externally on material topics through our ESG report. The company's individual businesses produce supply chain reports annually and/or biannually. These reports, our supply chain grievance dashboards, and other public information can be found on our [Reporting Hub](#).

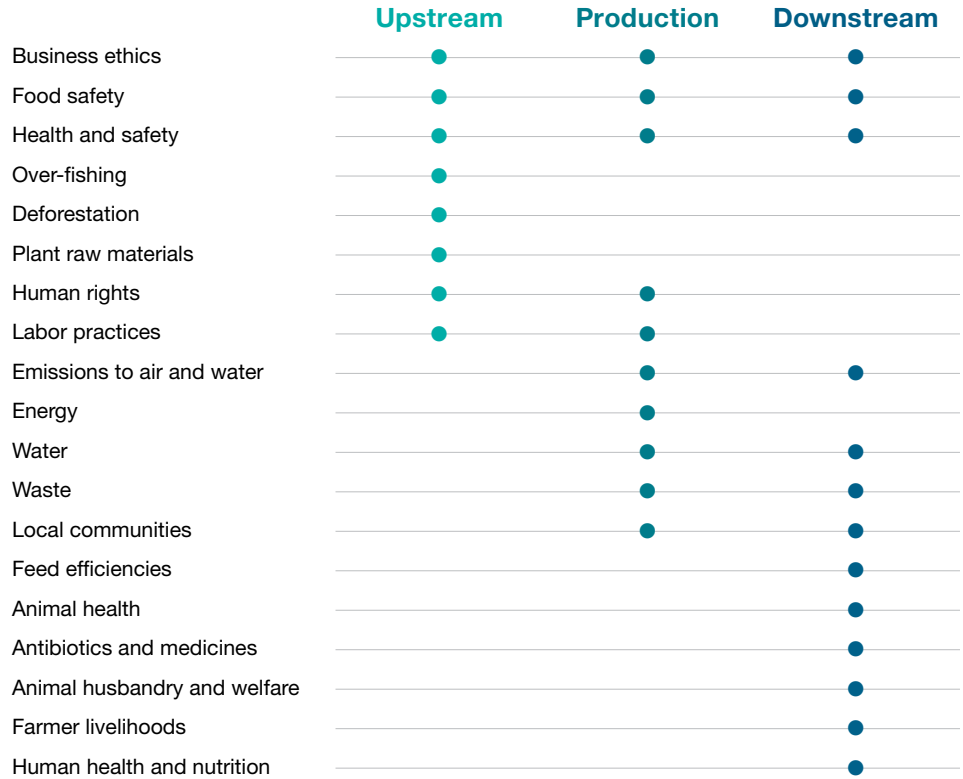
Cargill Aqua Nutrition materiality

We use our materiality matrix to prioritize topics we must be managing or measuring. 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 operations. The topics arise at various points in our value chain, which can make them challenging to manage directly.



Where our main impacts occur

The matrix below indicates where the main impacts from our material sustainability topics occur in our value chain, from supplies of raw materials (upstream), through our mills and operations (production) and to end use at farming facilities through the fish to the ultimate consumer (downstream).



Accountability through policy and certification

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

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

- We work toward compliance with emerging human rights legislation such as the UK Modern Slavery Act (2015) and the Norwegian Transparency Act.
- Our feed mills are certified to a variety of international standards (p. 45). We have multi-sector certifications for environmental management, food safety and occupational health and safety, and certifications tailored specifically to the seafood industry. The majority of our feed mills are certified under the Best Aquaculture Practices (BAP) Feed Mill Standard. We are preparing for certification under the Aquaculture Stewardship Council (ASC) Feed Standard, launched in January 2023.
- For our marine ingredients, we source preferentially from fisheries that are already managed responsibly. An increasing share of our marine ingredients is certified by MSC and/or MarinTrust. We also support Fishery Improvement Projects (FIPs) that are working toward those same certifications in the Northeast Atlantic, Mauritania, Peru, Ecuador and Thailand. In 2023, we joined the launch of the Foundation Earth Fisheries Improvement Fund with WWF, Mars and Skretting, with the goal of generating \$100 million fund for FIPs.
- Our terrestrial ingredients fall under Cargill's broader sustainability policies, goals and commitments on climate, land, water and people.
- As demand grows for novel ingredients such as insect meals and algal oils, which can alleviate pressure on fisheries and terrestrial biomes, we are forming partnerships to facilitate their commercialization. We work with our customers, research institutions, ingredients makers and retailers to shape the market conditions for greater novel ingredient use.





Progress through the power of partnerships

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

Full membership

The **Global Roundtable on Marine Ingredients** works to drive environmental and social improvements in key fisheries around the world. Focus regions include West Africa and South and Southeast Asia.

The **North Atlantic Pelagic Advocacy Group** convenes stakeholders in mackerel, herring and blue whiting fisheries. We were a key voice in positioning these fisheries to regain MSC certification.

The **SeaBOS** initiative is founded on cross-sector collaboration within the global seafood industry, involving nine of the world's largest seafood companies representing over 10% of the world's seafood production. Together with leading scientists across disciplines and universities, they explore transformative risks and opportunities for the global seafood industry and key impact areas.



Committee representation

Task Force I CEO-level sponsor

We support and advise this task force, which addresses IUU fishing, endangered species and forced labor in the 10 member companies' supply chains.

Governing Body Committee

We help shape the program's direction, ensuring its standards are rooted in the best available science and applicable in our operating regions.

Stakeholders Council

We provide counsel to the Board and Secretariat to help ensure robust implementation of the ProTerra Standard.

Task force III leader

The task force engages governments in the transition toward sustainable seafood production and mechanisms for antibiotics reduction in aquaculture.

Social and Ethical Committee

We help manage the development and implementation of robust criteria for the program, focusing on human rights and social welfare.

Feed Standard Steering Committee

We are assisting in ASC's new feed standard development, contributing expertise to ensure certification requires strict controls at the mill and through the supply chain.

Sustainability Committee

We work on the key issues of sustainability of feeds in Europe. Activities have included developments on LCA work for the PEFCR Feeds and GFLI, the update of the FEFAC Soy Sourcing Guidelines in 2021 and development of the FEFAC Feed Sustainability Charter 2030.

BAP Vanguard Feed and GHG Working Groups

We contributed to the development of a Vanguard standard beyond the existing BAP feed standard, focusing on sustainable raw materials. Additionally, we helped develop a standard for GHG calculations for feed through the BAP Vanguard program.

Associate membership and general partnership and participation

Global Salmon Initiative (GSI)

As an associate member of the GSI, we work to support sustainable development of salmon aquaculture through the feed and biosecurity task forces and communicating on progress.

Global Dialogue on Seafood Traceability (GDST)

We utilize GDST's standard to inform our data collection on marine ingredients, as well as communications on origin, sustainability, and volume to offer complete traceability.

Sustainable Fisheries Partnership (SFP)

We support SFP's fisheries sustainability research, and collaborate to drive success in FIPs, improve marine ingredient sustainability, protect human rights, and monitor our overall performance in sourcing fish meal and oil.

Ocean Disclosure Project (ODP)

We have submitted our marine ingredients use data to ODP since 2017 to increase the transparency of our performance.

United Nations Global Compact (UNGP)

We contributed to the development of the UNGP publication *Setting Science-Based Targets in the Seafood Sector: Best Practice to Date*, published in 2022 as an output of the Ocean Stewardship Coalition.

Millennial Salmon project

We partner with research institutes, novel ingredient suppliers, and a grocery retailer to launch the Millennial Salmon project, a four-year research initiative to drive 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
Total fishmeal		15.8%	See p. 38	Total fishmeal	8.5%	See p. 38
	of which trimmings meal	6.5%	See p. 39	of which trimmings meal	5.0%	See p. 39
Total fish oil		10.6%	See p. 38	Total fish oil	1.1%	See p. 38
	of which trimmings oil	3.0%	See p. 39	of which trimmings oil	0.8%	See p. 39
Vegetable proteins		31.3%	Argentina, Belgium, Brazil, Chile, China, Finland, France, Hungary, India, Russia, U.K., U.S.	Vegetable proteins	44.0%	Argentina, Bolivia, Brazil, Canada, China, India, Mexico, U.S., Vietnam
	of which soy proteins	17.2%	Argentina, Bolivia, Brazil, Chile, China, Finland, India, Russia, U.S.	of which soy proteins	40.9%	Argentina, Bolivia, Brazil, Canada, China, Ecuador, India, Mexico, U.S.
Vegetable oils		19.4%	Argentina, Belarus, Canada, Chile, European Union, France, Netherlands, Russia, Uruguay	Vegetable oils	2.2%	China, Malaysia
	of which soy oil	1.8%	Argentina, Belgium, Chile, European Union, Netherlands, Spain	of which soy oil	1.9%	Brazil, China, Ecuador, Panama
	of which palm oil	0.0%	Indonesia	of which palm oil	0.3%	Indonesia, Malaysia
Single cell proteins	0.8%	Brazil, France, Italy	Single cell proteins	0.0%	U.S.	
Animal byproducts	8.1%	Argentina, Brazil, Canada, Chile, England, France, Germany, Spain, U.S.	Animal byproducts	9.1%	Canada, Chile, China, India, Indonesia, Mexico, U.S.	
Carbohydrates & binders	14.1%	Argentina, Canada, Chile, Germany, Hungary, Latvia, Poland, Romania, U.K., U.S.	Carbohydrates & binders	35.1%	Argentina, Brazil, Canada, China, Ecuador, India, Indonesia, Mexico, Panama, U.S.	
Total co-products*	48.9%		Total co-products*	68.3%		
Total co-products excluding soybean meals	31.2%		Total co-products excluding soybean meals	27.3%		
Total novel ingredients**	4.61%		Total novel ingredients**	0.0%		

* 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
	Fishmeal*	Total (t)	145,934	57,310	203,244
		Forage fish	58.5%	41.5%	53.7%
		Trimmings	41.5%	58.5%	46.3%
	Fish oil	Total (t)	98,374	7,457	105,831
		Forage fish	72.0%	31.6%	69.2%
		Trimmings	28.0%	68.4%	30.8%
	Marine ingredients total	Trimmings	36.1%	59.7%	41.0%

*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
Capelin (<i>Mallotus villosus</i>)	Denmark, Iceland, Norway	17.50%
Blue whiting (<i>Micromesistius poutassou</i>)	Denmark, Faroe Islands, Iceland, Norway	13.58%
South American pilchard (<i>Sardinops sagax</i>)	Chile, Japan, Mexico, Other, Panama, Peru	11.10%
Peruvian anchoveta (<i>Engraulis ringens</i>)	Chile, Peru	10.49%
Gulf menhaden (<i>Brevoortia patronus</i>)	U.S.	7.05%
European sprat (<i>Sprattus sprattus</i>)	Denmark, Norway	6.88%
Indian oil sardine (<i>Sardinella longiceps</i>)	Oman	5.88%
Atlantic herring (<i>Clupea harengus</i>)	Denmark, Faroe Islands, Iceland, Norway	5.05%
Araucanian herring (<i>Strangomera bentincki</i>)	Chile	5.04%
Sandeel (<i>Ammodytes sp.</i>)	Denmark, Norway	4.25%
European pilchard (<i>Sardina pilchardus</i>)	Mauretania, Morocco	4.15%
Chilean jack mackerel (<i>Trachurus murphyi</i>)	Chile	3.19%
Norway pout (<i>Trisopterus esmarkii</i>)	Denmark, Norway	1.55%
European anchovy (<i>Engraulis encrasicolus</i>)	Georgia, Other	1.50%
Boarfish (<i>Capros aper</i>)	Denmark, Ireland, Norway	1.11%
Miscellaneous species	Chile, China, Denmark, Ecuador, Iceland, Mexico, Morocco, Norway, U.K.	1.67%

Sources by forage species and origin: warmwater feeds



Species	Countries of origin	Percent of forage fish total
Anchovy / Anchoveta (<i>Engraulis ringens</i>)	Peru	31.13%
Gulf menhaden (<i>Brevoortia patronus</i>)	U.S.	18.73%
South American pilchard (<i>Sardinops sagax</i>)	Mexico	5.32%
Indian oil sardine (<i>Sardinella longiceps</i>)	India	4.54%
Miscellaneous species	Ecuador, Norway, Peru, Philippines, Thailand, U.S., Vietnam	40.27%

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, U.K.	35.77%
Capelin (<i>Mallotus villosus</i>)	Denmark, Iceland, Norway	14.39%
Atlantic mackerel (<i>Scomber scombrus</i>)	Denmark, Iceland, Ireland, Norway, U.S.	12.61%
Alaska pollock (<i>Theragra chalcogramma</i>)	Denmark, U.K.	4.80%
Chilean jack mackerel (<i>Trachurus murphyi</i>)	Chile	4.17%
Blue whiting (<i>Micromesistius poutassou</i>)	Ireland, Norway	3.00%
Brazilian sardinella (<i>Sardinella brasiliensis</i>)	Brazil	1.40%
Indian oil sardine (<i>Sardinella longiceps</i>)	India	1.29%
Mixed whitefish*	Denmark, France, Iceland, Ireland, Norway, U.K.	14.72%
Miscellaneous species	Argentina, Brazil, Chile, Denmark, France, Iceland, Ireland, India, Morocco, Norway, U.K., U.S.	10.54%

* Trimmings from facilities processing a variety of whitefish, 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, Thailand, Vietnam	23.93%
Skipjack tuna (<i>Katsuwonus pelamis</i>)	Ecuador, Mauritius, Peru, Vietnam	20.82%
Indian oil sardine (<i>Sardinella longiceps</i>)	India	7.95%
Chub mackerel (<i>Scomber japonicus</i>)	Ecuador, Peru	7.78%
Pangasius (<i>Hypothalamus sp.</i>)*	Vietnam	5.85%
Humboldt squid (<i>Dosidicus gigas</i>)	Peru, South Korea	3.65%
Atlantic salmon (<i>Salmo salar</i>)*	Chile	3.11%
Thread herring (<i>Opisthonema sp.</i>)	Ecuador, Peru	2.53%
Peruvian anchoveta (<i>Engraulis ringens</i>)	Peru	2.25%
Whiteleg shrimp (<i>Litopenaeus vannamei</i>)*	Vietnam	1.30%
Chilean jack mackerel (<i>Trachurus murphyi</i>)	Ecuador, Peru	1.19%
Common dolphinfish (<i>Coryphaena hippurus</i>)	Ecuador, Peru	1.18%
Miscellaneous species	Colombia, Ecuador, Peru, Thailand, Vietnam, U.S.	18.46%

* Trimmings derived from farmed species.

Marine ingredient indices

Marine dependency ratios: coldwater



	2022	2021	2020	2019	2018	2017	2016	2015
Marine Protein Dependency Ratio (MPDR) feed	0.35	0.32	0.38	0.33	0.42	0.52	0.51	0.45
Marine Oil Dependency Ratio (MODR) feed	0.47	0.45	0.50	0.47	0.45	0.48	0.47	0.48
Global eFCR^a	1.30	1.30	1.31	1.25	1.36	1.23	1.27	1.24
MPDR fish	0.46	0.42	0.50	0.42	0.58	0.64	0.64	0.56
MODR fish	0.61	0.58	0.65	0.58	0.61	0.59	0.60	0.59

Forage fish dependency ratios: coldwater



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

Forage fish dependency ratios: warmwater



	2022	2021	2020	2019
FFDRm (feed)	0.12	0.25	0.23	0.15
FFDRo (feed)	0.05	0.08	0.10	0.10
FFIF	0.11	0.22	0.19	0.13
eFCR^b	1.50	1.50	1.50	1.50
FFDRm (fish)	0.18	0.38	0.34	0.22
FFDRo (fish)	0.08	0.12	0.16	0.15
FIFO	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% ^c

FFDRm (warmwater) = (forage fishmeal in feed % * eFCR) / 22.2% ^d

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

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)

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

^b 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)

^c 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.

^d 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.

^e 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
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%
2016	28.5%	–	–
2015	18.8%	–	–
2014	20.6%	–	–
2013	16.5%	–	–

Percent sales of anti-parasitic feed sales

	Canada	Chile	Norway	Scotland	Coldwater total
2022	0.44%	0.30%	0.86%	4.65%	0.96%
Change from 2017	-76%	-56%	-75%	129%	-43.5%
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%
2016	0.99%	0.59%	1.71%	4.59%	2.8%
2015	1.75%	0.61%	3.26%	3.96%	2.7%
2014	1.22%	0.89%	3.44%	2.91%	2.2%
2013	1.51%	2.47%	3.56%	1.64%	2.1%

Percent sales of antibiotic feed sales

	Canada	Chile	Norway	Scotland	Coldwater total
2022	1.20%	8.37%	0.00%	0.10%	1.85%
Change from 2017	-43%	-12%	0%	+414%	-71%
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%
2016	1.56%	8.61%	0.00%	0.02%	5.35%
2015	2.66%	14.13%	0%	0.06%	9.49%
2014	1.89%	10.83%	0%	0.02%	7.47%
2013	2.08%	11.13%	0%	0.00%	8.06%

Workforce

	Coldwater	Warmwater	Group total*
Total employees	752	1205	1957
Women employees	156	240	396
Men employees	596	965	1561
Employees – women proportion (%)	20.7%	19.9%	20.2%

* Group total is larger than the sum of coldwater and warmwater due to some personnel covering both groups.

Gender parity in management & leadership

	Coldwater	Warmwater	Group total
Management and administration employees	328	776	1104
Number of women in management and administration	126	210	336
Proportion of women in management and administration (%)	38.4%	27.1%	30.4%
Senior management* employees	29	36	65
Number of women in senior management	7	8	15
Proportion of women in senior management (%)	24.1%	22.2%	23.1%
Global leadership team** employees	11		11
Number of women in Global Leadership	4		4
Proportion of women in Global Leadership (%)	36.4%		36.4%

* 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
Number of senior leadership employees hired from the local community	29	36	65
Proportion of senior leadership employees hired from the local community (%)	100%	100%	100%

Worker integrity

Ethics and anti-corruption training

	2022	2021	2020	2019
Global leadership team trained (number)	11	10	3	3
Global leadership team trained (percent)	95.2%*	90.9%	37.5%	37.5%
Employees trained (number)	567 & 975	492	385	328
Employees trained (percent)	78.8%	21.1%	20.8%	18.2%

* Two training courses now comprise our business ethics and anti-corruption training program. With 11 Global leadership team (GLT) members, this provides up to 22 total training opportunities. One GLT member, providing administrative support, was not assigned one course, resulting in 21 actual training opportunities; 20 out of 21 were completed, resulting in the reported training completion rate of 95.2%. For other employees, the two training courses were assigned based on job function, and created 1,550 total training opportunities. With 1,542 courses completed across 1957 employees, this results in the reported training completion rate of 78.8%.

Whistle-blowing incidents

There were 23 whistle blower cases submitted in 2022 across Cargill Aqua Nutrition through our Ethics Open Line (EOL). Twenty-one of the 23 cases were resolved by March 2023, and there are 2 related cases that are still under investigation.

Packaging and waste

Total packaging materials (tonnes) for goods sold

	Coldwater	Warmwater*	Group
Bulk bags	1,139.7	17.3	1,157.0
Polyethylene bags	1,094.0	271.5	1,365.4
Polypropylene bags	2,156.0	30,692.1	32,848.1
Paper bags	0.0	126.0	126.0
Total bags	4,389.6	31,106.9	35,496.5
Pallets	239.4	167.8	407.3
Miscellaneous items	2,548.3	10,473.8	13,022.1
Total packaging	7,177.3	41,748.6	48,925.9

The miscellaneous section covers all other items which have historically been single use, such as glue, labels and pallets. Pallets can be reused by our customers. Reducing packaging materials is an emerging priority for CQN. We are working to collect and report more detailed data in the future.



Sustainability assurances

Factory certifications

Certification standards by facility location	Region	Country	ISO 9001	ISO 14001	ISO 22000	ISO 45001	Global G.A.P.	BAP	Organic
Americas		Canada	•			•	•	•	•
		Chile	•	•	•	•	•	•	
		Ecuador					•	•	
		Mexico							
		USA					•	•	
Asia		China						•	
		India			•			•	
		Indonesia			•			•	
		Thailand						•	
		Vietnam	•	•		•	•	•	
Europe		Norway	•	•	•	•	•		•
		Scotland	•	•	•	•	•**	•	•
Total plants certified[†]			9	7	7	7	9	12	4

[†] Some countries have more than one facility and not all facilities are certified to the same level within a country.

^{**} Scotland is certified by UFAS, which is recognized as equivalent to Global G.A.P.





Sustainability assurances *continued*

Ingredient certifications

Certification standards for our marine ingredients	None	MarinTrust IP	MarinTrust	Comprehensive MSC* FIP	MSC*
Coldwater feeds					
Forage fish	10.96%	17.86%	18.28%	9.56%	43.34%
Trimming	4.50%	3.00%	13.91%	48.37%	30.22%
Total	8.63%	12.50%	16.70%	23.56%	38.61%
Warmwater feeds					
Forage fish	36.14%	1.36%	62.50%	31.17%	24.67%
Trimming	27.61%	17.29%	52.26%	0%	11.25%
Total	32.75%	10.86%	56.39%	12.57%	16.66%
Group total					
Forage fish	14.56%	15.50%	69.94%	12.66%	40.67%
Trimming	12.41%	7.36%	80.23%	33.63%	24.43%
Total	13.68%	12.16%	74.16%	21.26%	34.01%

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

Certification standards for our soy and palm ingredients: coldwater feeds

		Canada	Chile	Norway	Scotland	Coldwater total
Soy products	Certifications	n/a**	RTRS credits	Donau Soja, Europe Soya, Pro-Terra, SSAP*	ProTerra, Organic	
	% certified	n/a	100%	100%	100%	100%
Palm oil	Origins	n/a	Argentina, Bolivia, Brazil, Chile	Finland, Russia, Brazil, U.S.	Belgium, Brazil, China, European Union, India, Netherlands, Spain	
	Certifications	n/a	n/a	n/a	RSPO	
	% certified	n/a	n/a	n/a	100%	100%
	Origins	n/a	n/a	n/a	Indonesia	

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

** n/a indicates no use of soy or palm oil products in 2022 by this business group.

Energy use for feed production

Energy use for coldwater feeds



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

Energy use for warmwater feeds



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

Energy use for group total feeds

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

Scope 1 & 2 Greenhouse gas emissions

	2022	2021	2020	2019	2018	2017
Scope 1 & 2 GHG emissions for coldwater feeds production						
Absolute Scope 1 & 2 GHG emissions (tCO2e)	70,425	77,644	63,418	77,397	73,210	79,849
Absolute Scope 1 & 2 GHG change relative to 2017 (%)	-11.8%	-2.8%	-20.6%	-3.1%	-8.3%	-
Average Scope 1 & 2 GHG intensity (tCO2e/t feed produced)	0.073	0.070	0.055	0.063	0.071	0.081
Average Scope 1 & 2 GHG change relative to 2017 (%)	-10.1%	-13.1%	-32.2%	-22.8%	-12.4%	-
Scope 1 & 2 GHG emissions for warmwater feeds production						
Absolute Scope 1 & 2 GHG emissions (tCO2e)	80,674	88,002	66,627	76,340	69,348	43,426
Absolute Scope 1 & 2 GHG change relative to 2017 (%)	+85.8%	+102.6%	+53.4%	+75.8%	+59.7%	-
Average Scope 1 & 2 GHG intensity (tCO2e/t feed produced)	0.115	0.120	0.100	0.119	0.124	0.066
Average Scope 1 & 2 GHG change relative to 2017 (%)	+74.0%	+82.1%	+52.0%	+80.9%	+88.5%	-
Scope 1 & 2 GHG emissions for group feeds production						
Absolute Scope 1 & 2 GHG emissions (tCO2e)	151,099	165,647	130,045	153,737	142,558	123,274
Absolute Scope 1 & 2 GHG change relative to 2017 (%)	+22.6%	+34.4%	+5.5%	+24.7%	+15.6%	-
Average Scope 1 & 2 GHG intensity (tCO2e/t feed produced)	0.091	0.090	0.071	0.082	0.089	0.077
Average Scope 1 & 2 GHG change relative to 2017 (%)	+17.6%	+17.2%	-6.9%	6.6%	15.8%	-



Global warming potential of feeds produced

**Global warming potential:
Coldwater feed raw materials
delivered to the factory**

	GWP I_LUC	
	Raw materials (tCO ₂ e)	Raw materials (tCO ₂ e/t)
2022	1,873,266	1.96
2021	2,535,792	2.07
2020	3,001,619	2.60
2017	2,497,984	2.54

**Global warming potential:
Coldwater finished feeds
ready to leave the factory
(not including packaging)**

	GWP I_LUC	
	Raw materials (tCO ₂ e)	Raw materials (tCO ₂ e/t)
2022	1,943,691	2.04
2021	2,613,436	2.14
2020	3,072,261	2.67
2017	2,564,062	2.61

Water use in feed production

**Water use in coldwater
feed production**

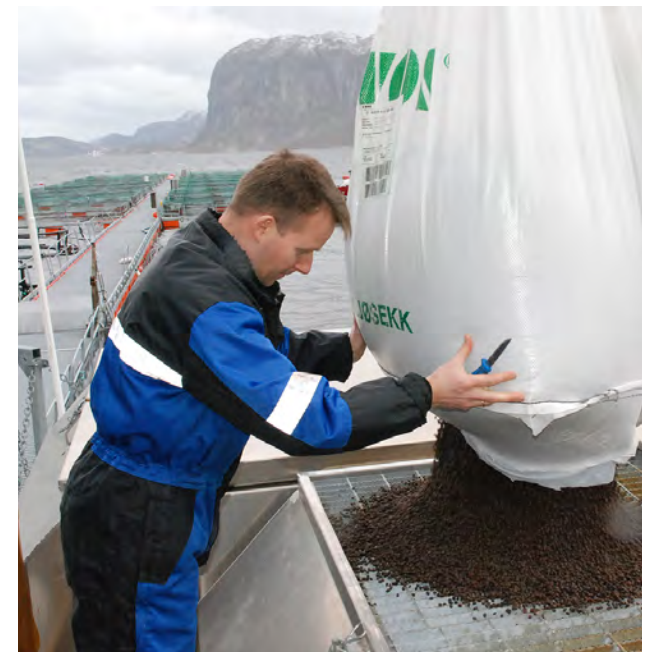
	Total water use (liters)	Water use (liters per tonne feed made)
2022	474,205	491
2021	514,040	466
2020	538,698	467
2019	500,101	404
2018	444,550	431
2017	493,850	503

**Water use in warmwater
feed production**

	Total water use (liters)	Water use (liters per tonne feed made)
2022	341,720	486
2021	330,846	452
2020	290,610	435
2019	275,803	448

**Water use in total
feed production**

	Total water use (liters)	Water use (liters per tonne feed made)
2022	815,925	489
2021	844,886	460
2020	829,308	456
2019	775,904	419





GRI Index

An abridged version of this report has been incorporated into the corporate 2021 Cargill ESG Report, which can be accessed on our website, www.cargill.com.

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/.

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