

thrive™



**CARGILL  
AQUA NUTRITION  
SUSTAINABILITY  
REPORT 2016**

Healthy seafood  
for future generations

## ABOUT US

**Cargill Aqua Nutrition is a world leader in aquaculture feed and nutrition. To deliver on our promise of healthy seafood for future generations, we commit to sustainable growth of the global aquaculture industry by creating better operations in a better workplace with better supply chains.**

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# Cargill Aqua Nutrition in brief

## Our vision: Healthy seafood for future generations

Cargill Aqua Nutrition (CQN) was born in October 2015, after Cargill acquired the salmon feed specialist company EWOS and combined it with its own warm-water aqua business to create a global leader in aquafeed and nutrition. We operate within Cargill Animal Nutrition, one of Cargill's five operating units.

The result of the integration is a world-class aquaculture nutrition business, which benefits from the two companies' collective nutrition expertise, global supply chain, and market insights. We support the growth potential for global seafood consumption and create new opportunities for customers, suppliers and employees alike.

The acquisition gave Cargill overnight entry into the salmon market, and made its animal nutrition business a leading player in the growing salmon feed industry, which is one of the most advanced and professionally managed segments in global aquaculture.

Cargill Aqua Nutrition now represents about 2 percent of Cargill's total revenue, which was US\$107.2 billion for fiscal year 2016. Our headquarters are in Bergen, Norway and Cargill's headquarters are in Minneapolis, Minnesota, USA. There are 38 facilities within Cargill Aqua Nutrition, some fully dedicated to aqua feed and others shared with Cargill Animal Nutrition operations. They leverage three aqua focused Cargill Innovation Centers (CIC), driving the research and development of the feed products and services.

### REPORT SCOPE

This report builds on previous reports from EWOS. Using the GRI framework, we will introduce Cargill Aqua Nutrition after the integration, but will focus in detail on the cold-water operations for salmon served by the EWOS brand. In 2017 we will work to collect data on the rest of Cargill Aqua Nutrition in order to report on the whole group in the future.

# 38

SPECIALIZED FACILITIES IN  
18 COUNTRIES

# 1.74

MILLION TONNES  
OF AQUA FEED IN 2016

# 3

DEDICATED INNOVATION CENTERS  
FOR AQUACULTURE

# 2,000+

TOTAL EMPLOYEES  
IN CARGILL AQUA NUTRITION

## OUR FEED OPERATIONS



### WE PRODUCE FEED FOR 3 KEY SPECIES IN 18 COUNTRIES



#### SALMON

Canada, Chile, Norway and Scotland



#### TILAPIA

China, India, Indonesia, Malaysia, Philippines, South Korea, Thailand, U.S.A. and Vietnam



#### SHRIMP

China, Honduras, India, Indonesia, Mexico, Nicaragua, Peru, Thailand, U.S.A., Venezuela and Vietnam

## MESSAGE FROM OUR PRESIDENT:

# Healthy seafood for future generations

Our sustainability focus in 2016 could be described as “extending good practices”. Within our own group of businesses, we have worked on extending sustainability practices from EWOS across Cargill Aqua Nutrition and engaging the broader business.



We are also working within the legacy EWOS facilities to increase engagement with sustainability, ensuring it becomes a part of everyday business.

Our senior management team is now aligned with sustainability

and together we have refreshed our materiality assessment, incorporating new markets and new stakeholders. This will bring us through 2017, ready to report for the full group. In parallel, we are continuing to refine the legacy EWOS reporting scheme, keeping it up to date and in line with company and stakeholder expectations. This 2016 report introduces Cargill Aqua Nutrition, whilst focusing on the data from the legacy EWOS businesses – in particular the cold-water group, making salmon feed.

In the traditional markets for EWOS, we still see a continued focus on marine ingredients in our materiality assessment, but there is also increasing attention on our terrestrial ingredient sourcing. However, consumers in new geographical markets focus more on regulatory issues, including food safety. Where we have seen the biggest uplift of engagement is within the social aspects of sustainability,

where labor practices and human rights have become more and more prominent.

New to our reporting this year is our focus on our value chains, downstream as well as upstream. It does not matter how well we do with respect to sustainability if our customers and their value chains do not find the benefits. Our transparent reporting on topics that are important downstream is designed to build trust, so that we can build stronger partnerships for the future.

In tandem with developing the aqua feed reporting, we have undertaken the significant task of transferring similar sustainability approaches across the whole of Cargill Animal Nutrition. This work continues in parallel with existing sustainability initiatives across the Enterprise.

The inspiration for these initiatives comes from Cargill, whose ambition is to be a leader within sustainability. “Sustainable Supply Chains” is one of five capabilities Cargill has chosen as critical for the future of the company. Through this capability, we will demonstrate global leadership across four focus areas: climate change, land use, water resources, and farmer livelihoods. As Cargill, we are uniquely positioned to leverage our scale, global insights and relationships to lead

## REPORTING HISTORY

2010-13

**Reporting jointly with Cermaq to GRI**

EWOS starts sustainability reporting as part of Cermaq.

2013-14

**EWOS Sustainability Reports 2013-2014**

EWOS published separate sustainability reports after being sold from Cermaq in 2013.

2015

**EWOS Sustainability Report 2015**

Following the acquisition of EWOS by Cargill, we published a retrospective sustainability report for the EWOS brand.

2016

**Cargill Aqua Nutrition Sustainability Report 2016**

This report is Cargill Aqua Nutrition's first sustainability report and focuses on our EWOS brand of salmon feeds.

2017

**Cargill Aqua Nutrition Sustainability Report 2017**

Next year, we aspire to expand our reporting beyond the EWOS brand and include other operations.

in developing sustainable supply chains. This in turn will allow us to become a significantly stronger partner of choice for our customers and their value chains, and work with them to unlock market opportunities. Cargill is well positioned to lead in these areas given our scale, global coverage and the diversity of our portfolio.

Looking at the environmental footprint in the value chain of food production, the feed part plays a unique role in our contribution: At least 80 percent of the footprint of our products, whether fish or animal feed, comes from the production of the ingredients we use (growing, catching, processing). Less than 10 percent comes from our production process – such as energy in milling and extrusion. Logistics covers the remaining 10 percent; from supplier to us and from us to farm.

The easiest parts for us to focus on are the production process (in-house) and the logistics – especially to farm. We have shown that by increasing energy efficiency in our factories we can reduce total energy requirement. We have also shown that by changing our energy mix and using more renewables (e.g. biomass, hydro-electricity) we can reduce our GHG footprint even further. The future requires a strategic focus on GHG for our key investments.

However, through Cargill we now have the chance to work on the 80 percent – at least for some crops. Deforestation-free soy and palm will help reduce the GHG footprint. Better production methods for other crops, such as rapeseed, will also have an impact. This is part of a bigger project run by Cargill which we will benefit from in the long run.

Someone once said: "If you want to go fast, go alone. If you want to go far, go together." In our international business,

we meet challenges that need to be resolved globally. In the marine sector, illegal, unregulated and unreported fisheries (IUU) are still not resolved. The issue of social rights for workers on fishing vessels is also unresolved. As an international buyer we need improved transparency throughout the seafood supply chain. These global issues need collective actions. In 2016, Cargill joined SEABOS (Seafood Business for Ocean Stewardship). One of the first statements from this group was that marine certifications need to be extended to include the social perspective of sustainability. In order to specifically address challenges in the supply chain of fishmeal in Asia, we have recently signed up for the Thailand based initiative "Seafood Task Force".

Transparency builds trust. The Global Salmon Initiative (GSI) is an industry-coordinated approach to increase reporting from the leading salmon farming companies. We are an associate member of GSI and supports this transparent approach through our reporting in accordance with GRI Standards.

This report builds on last year's model, where we combine indicator reporting with a deeper dive into material topics throughout our value chains. We hope you find the report informative and, as Cargill, we would always like to hear what you like, but even more importantly, what we can do better in our continued strive towards our vision: "Healthy seafood for future generations."



**Einar Wathne,**  
President of Cargill Aqua Nutrition



# Our value chain

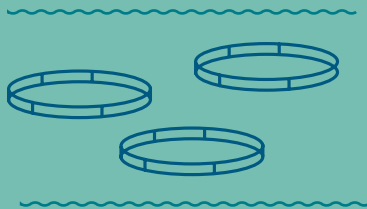
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DOWNSTREAM

## Better seafood

Healthy seafood for future generations

Our goal is to help aquaculture producers raise more seafood sustainably, to meet increasing global demand for healthy food. We work directly with producers to support fish health and welfare, and to help them achieve success.



2

IN HOUSE

## Better workplace

Empowering people – strengthening communities

Safety is always our top priority. We act on our commitment to respect people by being a responsible employer and enriching the communities where we operate to support economic development, improve education, and engage employees.



### Key figures from our reporting facilities

**2.7**

BILLION  
seafood meals from  
our salmon feed

**28%**

SALMON FEED  
market share

**760**

EMPLOYEES  
in salmon feed  
production facilities

**65%** ↓

REDUCTION  
in lost time from  
injuries since 2013



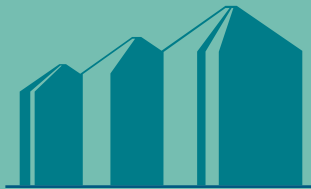
3

IN HOUSE

## Better operations

Making the most of our resources

We improve aquaculture sustainability by increasing the efficiency of feed production and feed conversion, formulating products and optimizing our processes to leave the least possible environmental impacts over the whole value chain life-cycle.



**0.5% ↑**  
 INCREASE  
 in energy used per  
 tonne feed since 2013

**9.8% ↓**  
 DECREASE  
 in GHG emissions  
 per tonne feed since 2013

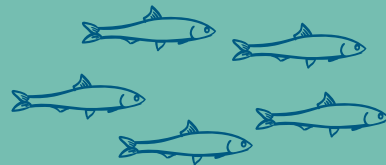
4

UPSTREAM

## Better supply chain

Capturing nutrients – sourcing responsibly

We harness Cargill's expertise in supplying nutrients to bring new and sustainable ingredients into our feed. When selecting and sourcing raw materials, we expect sustainably sourced ingredients from suppliers who adhere to our ethical standards.



**90%**  
 of marine raw  
 materials certified  
 to IFFO RS

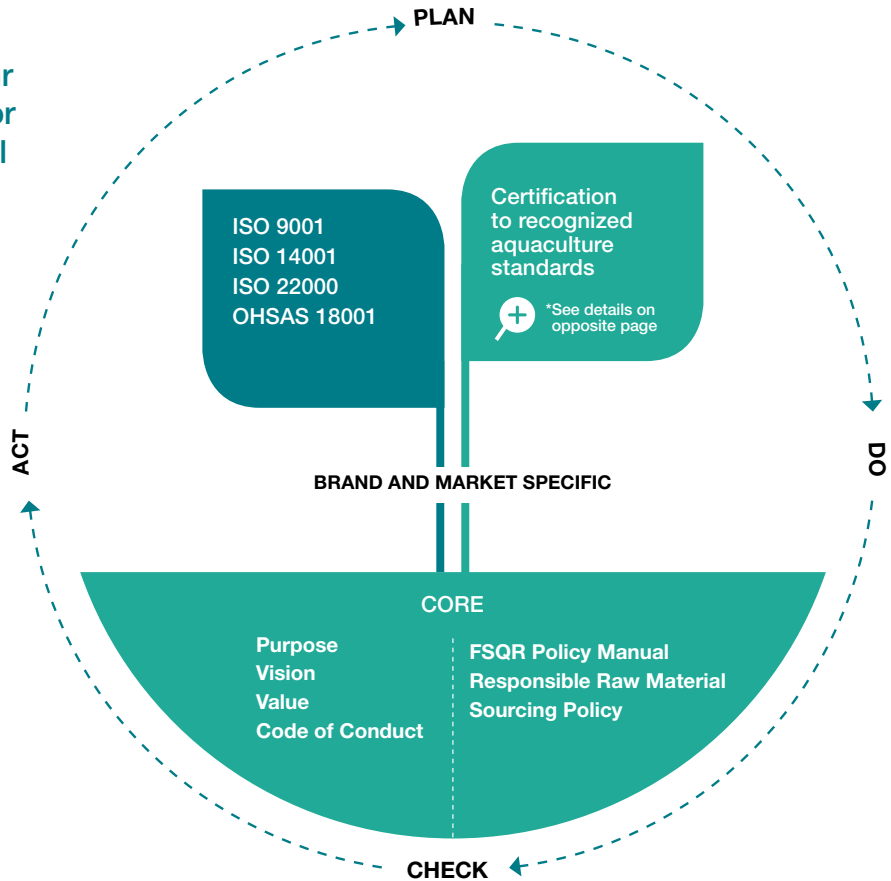
**74%**  
 of soy certified  
 ProTerra



# Integrated management

of food safety, quality, environment, health and safety.

The integrated management system has guided our cold-water feed activities for nearly a decade. It is pivotal to our EWOS brand and is set to permeate the rest of our operations.



## EWOS LEGACY

Our Integrated Management System (IMS) has been developed through years of serving the salmon industry with our EWOS branded feeds. It represents a systematic approach to managing food safety, quality, environmental issues, and health and safety. All EWOS brand salmon feed plants have been independently certified for several years to four international management standards for quality (ISO 9001); food safety (ISO 22000); environment (ISO 14001); and health & safety (OHSAS 18001).

## CARGILL APPROACH

As a trusted supplier of feed, Cargill has stringent procedures in place for the management of food safety, quality and regulatory issues in line with applicable laws, regulations and corporate commitments. These are embedded in the Food Safety, Quality and Regulatory (FSQR) Policy Manual, which sets the baseline for all our activities and has been integrated in the IMS, adding further strength to our EWOS brand offering.

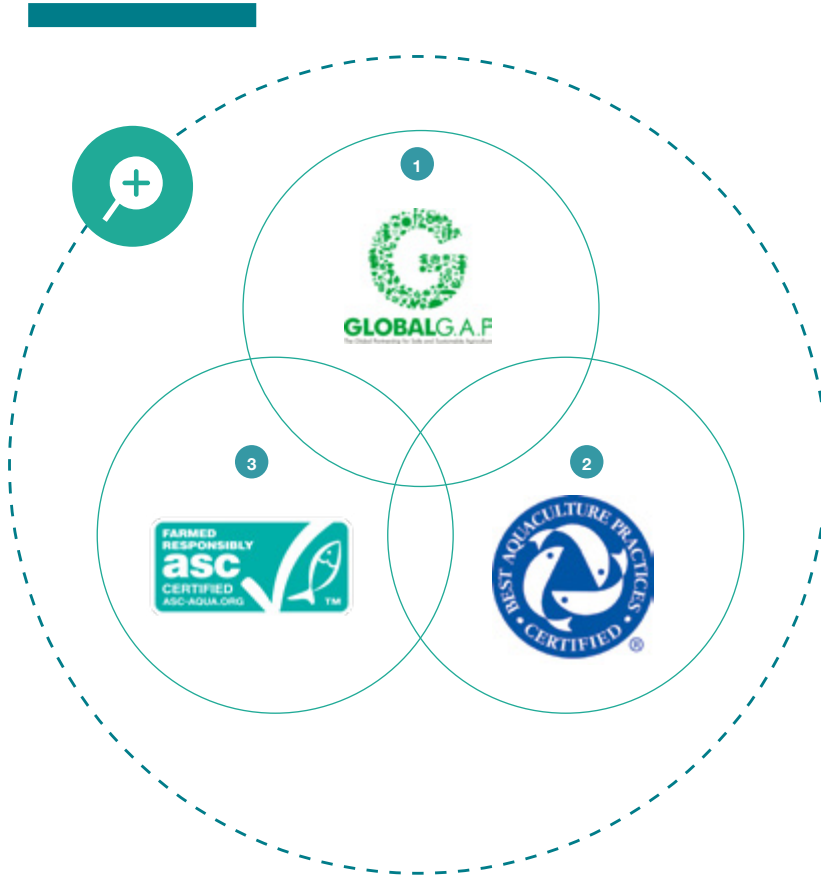
## COMBINED STRENGTH

We see certifications to international standards as a way to increase transparency. That way, we assure customers and consumers that our operations and products live up to high standards for quality and sustainability. We have therefore embarked on a journey to integrate our IMS throughout our activities and processes, leveraging the legacy of our EWOS brand across our entire organization.



# Certifications for aquaculture

are growing globally and can help the sustainable development of the industry, as well as improve transparency and trust.



We collaborate with others across the aquaculture industry to develop and promote best practices, supporting sustainable growth throughout the value chain.

- 1 GLOBALG.A.P. (Good Agricultural Practice)**  
 We apply the GLOBALG.A.P. Compound Feed Manufacturing Standard (CFM) to meet requirements from GLOBALG.A.P.-certified producers. Estimated proportion of total annual production: Salmon: 55%; Shrimp: 3%; Tilapia <1%
- 2 Best Aquaculture Practices (BAP)**  
 We supply BAP-certified feed according to local market requirements. Estimated proportion of global annual production: Salmon: 32%; Shrimp: 6%; Tilapia: 4%
- 3 Aquaculture Stewardship Council (ASC)**  
 We supply feed to ASC-certified producers on request and participate in the development of specific ASC standards for feed. Estimated proportion of global annual production: Salmon: 20%; Shrimp: 3%; Tilapia: 3%

## RECOGNIZED PROGRAMS

Cargill Aqua Nutrition promotes aquaculture best practices by attaining certification to recognized programs and by helping develop and raise sustainability standards across the industry. The three main certification programs for seafood producers are GLOBALG.A.P, BAP and ASC, which all cover our main species: salmon, shrimp and tilapia.

## STAMP OF APPROVAL

Demand for certified aquaculture products is high and growing, particularly in Europe and North America, but also increasingly in other markets. Consumers want to know more about their food and third party certification gives the assurance that aquaculture products live up to the expected high standards of food safety and sustainability. Third party certifications bring transparency, generating trust throughout the supply chain.

## OUR OFFERING

All EWOS brand salmon feed plants can supply feed that meets the requirements of the three certification programs, according to market demand. Our factories in Canada and Chile are certified to BAP and GLOBALG.A.P. standards allowing our customers to achieve the coveted 4 star standard. ASC compliant feeds are made on customer request. We are also bringing our expertise in responsible feed production to other markets, implementing standards in factories around the world to meet demand for certified feed.



# Why choose Cargill for aquaculture?

## EXPERIENCE

EWOS has been in the aqua feed market for almost 80 years, and Cargill has 120 years of experience in animal nutrition

## PARTNERSHIP

we work throughout our value chains to create mutual success, promote transparency and thus earn trust

## PERFORMANCE

excellent biological and financial performance, documented to earn customers' trust

## FISH HEALTH AND WELFARE

we deliver products that support the overall health and welfare of farmed seafood

## SERVICE

we add value to feed products for our customers through extended service and support



### Salmon

With a strong focus on research and innovation, we provide the scientifically validated feed products our customers need to support all stages of salmon production, sustainably.



### Shrimp

Our high-quality feed is designed to improve shrimp health and yield the highest possible shrimp weight in the shortest time.



### Tilapia

We go beyond feed production to provide tilapia farmers with technical support to help customers improve productivity.

# Our Products, Services & Solutions

Cargill Aqua Nutrition offers a wide portfolio of solutions for aquaculture producers. Salmon and shrimp feeds represent the largest share of production, but feed is also supplied for other species, especially tilapia.

Cargill provides innovative feed and nutrition solutions throughout the lifecycle of fish and shrimp production. As a trusted supplier to the international aquaculture industry, we provide seafood producers with distinctive, proven products, always with the goal of delivering great results 'in the water'. We meet the needs of the customers, leveraging our sustainability governance through the value chain.

## BUILDING THE EWOS BRAND

Cargill has been known to our customers through a range of market brands. Now, we are working through 2017 to streamline our combined offering behind the EWOS brand. We will be the leading market brand in aqua nutrition. Our other brands will not vanish overnight, but we will gradually unite our products, services and solutions under the EWOS brand. It stands for high quality service and feed products, backed up by decades of investment into fish nutrition and fish health research.

We **supply** feeds that meet customer needs for health and performance. This is evidenced by signature products like RAPID, which helps salmon farmers to increase productivity through faster growth rates (see p. 20). ROBUST, another proven product, helps to reduce the settlement of sea lice on salmon whilst supporting the immune system.

We **connect** with fish farmers to help them apply our products to the best effect. By developing digital services like HORIZON, we help our customers to apply

the EWOS Growth Index (EGI) – the most established benchmarking index measuring the growth of salmon (see p. 21). The recent launch of the myEWOS app brings EGI tools to their palms, along with feed planning, ordering and production reports (see p. 21).

We also **design** bespoke aqua feed and nutrition solutions in cases where our standard offering cannot suit the purpose. An example is our bespoke feed based exclusively on fish meal from IFFO RS certified Icelandic capelin for the Scottish fish farmer Loch Duart. In Norway, we supply customized feed to the largest producer of organic salmon, meeting strict requirements for the salmon diet.

# 931,000t

**SALMONID FEED  
PRODUCED IN 2016**

# 810,000t

**WARM-WATER FEEDS  
FOR SHRIMP, TILAPIA AND OTHER SPECIES**

# How we manage sustainability

## Sustainability is deeply embedded in our vision and the way we manage our operations.

All our activities are guided by Cargill's ethical guidelines, which together with our GreenBook (see p. 26) articulate our ethical standards, operating philosophies, corporate culture and expectations of employees. These support the precautionary principle towards sustainability promoted in the Rio Declaration on Environment and Development (1992).

### SUSTAINABILITY MANAGEMENT

Responsibility for driving sustainability practices throughout the global Cargill Aqua Nutrition operation ultimately lies with our President, who is supported by the Group Leadership Team (GLT). This team comprises Group Directors; Finance Director; Risk Management and Sourcing Director; Strategic Marketing Director; Operations Director; IT and HR Director. This approach ensures sustainability management from top to bottom and across our functions. A dedicated group Sustainability Manager brings leadership on sustainability issues and goals, oversees the monitoring of sustainability performance and reports to the GLT through the Strategic Marketing Director.

We also believe strongly in engaging employees and promoting responsible behavior from each and every one. This belief is embedded in Cargill Animal Nutrition's Five Big Goals (see p. 24), which serve as a measure of our development and performance and brings sustainability into everyday business.

### MONITORING AND REPORTING

Sustainability reporting against our material topics is currently reported on a monthly, quarterly or annual basis, depending on the topic and data, for our EWOS branded factories (Canada, Chile, Norway, Scotland and Vietnam). In 2017 this will be rolled out across the rest of our facilities. Our Sustainability Manager and Sustainability Analyst oversee and interpret the data and communicate developments to the GLT.

### REPORT SCOPE

In this report, in accordance with GRI Standards: Core option, we introduce the organization and operations as a whole, but focus on the EWOS branded feed and report in detail on our cold-water activities and one factory in Vietnam, for which we have the full data collection. EWOS Innovation has been integrated with Cargill Innovation Center (CIC) and is not covered in this report.

★ [For other notes to the reporting, please refer to p. 61](#)

### DEFINING MATERIALITY

In defining material sustainability topics, we identify the aspects with highest potential impacts to the sustainability of our operations and include additional aspects of high concern to our external stakeholders. We review the material topics annually based on input from stakeholders, scientific information, management considerations and sustainability performance. After nearly a decade of materiality assessments, we are confident that our materiality assessment reflects the most important topics that require our attention. However our annual review has led to added emphasis on Human Rights due to our presence in new regions of the world.

### UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

The UN Sustainable Development Goals (SDGs) represent a global partnership for development. As a major feed producer and contributor to food production – with operations worldwide – we are positioned to impact positively on several of the SDGs. Using the UN SDG Compass for guidance, we have embarked on a process to align our sustainability management and reporting with the SDGs. For this year's report, we have chosen to highlight the SDGs that mirror our material sustainability topics, but we positively contribute to other SDGs as well.

**OUR KEY SUSTAINABILITY TOPICS**

**OUR VALUE CHAIN**



**MAPPING SDGs**



★ More on the SDGs: [sustainabledevelopment.un.org](https://sustainabledevelopment.un.org)

**SELECTED TOPIC DESCRIPTIONS**

**Compliance**

Compliance with laws and regulations and our own policies is fundamental to our operations and also of critical importance for customers. We report non-compliances.

**Safety**

Everyone should go home safely at the end of the working day. We report on injuries and fatalities.

**Marine index**

Marine index describes the level of marine ingredient use in salmon feeds. It has historically been a focus of NGOs, although in recent years there is increased interest in responsible sourcing of the marine ingredients, rather than just the level.

**Traceability**

Traceability of supply chain has been in the spotlight with respect to both marine and terrestrial ingredients. Use of segregated or certified raw materials from recognised standards provides assurance to our stakeholders.

**Transparency of raw materials**

Transparency of raw materials and responsible sourcing of marine as well as terrestrial ingredients is of material importance to our stakeholders. We are committed to only using responsibly produced raw materials.

**Fish health and welfare**

Fish health and welfare is particularly important to our customers and supports better use of resources by ensuring more fish reach the market. We monitor progress by sales of health related feeds.

**Other topics**

We also monitor performance for a range of other topics from the GRI Standards reporting framework. However, not all are actively managed but are reported here for transparency. We recognize a need to focus on the topics we deem to be most material, and see them as a platform to expand our sustainability efforts in the future.

# Contributing with science

Our investments in R&D demonstrate our commitment to improving fish health and promoting sustainable practices throughout the aquaculture industry.

Feed plays a major role in improving fish health and achieving sustainable seafood production. A farmed fish consumes roughly 30,000 pellets in its lifetime, and every pellet is an opportunity for farmers to administer optimum nutrition and functional elements supporting fish health and welfare.

## CUSTOMER-FOCUSED

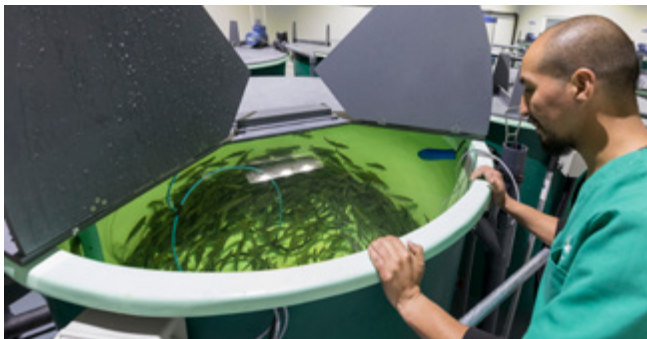
Based on the principle of customer-focused development, our strategic marketing, technology and R&D teams work closely together to understand customers' nutritional needs. This cross-functional collaboration allows us to respond quickly to immediate challenges, while also gaining foresight into emerging challenges and business opportunities.

## OPEN INNOVATION

Our R&D activities are also characterized by an open innovation approach. We collaborate with aquaculture companies, research institutions, universities and other industries to bring together leading expertise and talent pursuing common goals.

## INNOVATION CENTERS

Cargill Aqua Nutrition's R&D activities for aquaculture are centered around two Cargill Innovation Centers (CIC) in Chile and Norway, both focusing on cold-water species. A third CIC in Elk River, USA focuses mainly on terrestrial animals, but also has activities within warm-water aquaculture.



CARGILL INNOVATION CENTER CHILE

**Located:** Colaco  
**Established:** 2016  
**Employees:** 30

### Research focus:

- Health feeds
- Salmonid Rickettsial Septicemia (SRS)
- Sea lice
- Amoebic Gill Disease (AGD)

Established with a USD 10.5 million investment, the CIC in Chile is especially designed for carrying out fish health trials, allowing for faster progress in the development of diets to tackle the main health challenges affecting salmon farming. Thanks to targeted recruitment and an open innovation approach, it has brought together leading talent in research and academia in pursuit of innovative solutions to combat viruses, bacteria and parasites and improve fish health worldwide.



CARGILL INNOVATION CENTER NORWAY

**Located:** Dirdal  
**Established:** 1986  
**Employees:** 40

### Research focus:

- Fish nutrition
- Feed process technologies
- Functional feed

The CIC in Norway was originally established as EWOS' first research station. Equipped with a hatchery, fish tanks, laboratories, a pilot feed plant, and two sea farms, it focuses on the development of new diets for the aquaculture industry, through processing, raw material selection and nutritional improvements. Leveraging its advanced laboratories and more than 400 fish tanks, the CIC conducts extensive screening and testing of feed ingredients, including digestibility trials with live salmon.





# 1. BETTER SEAFOOD

## DOWNSTREAM

Aquaculture is a highly efficient method of food production. Delivering feed that supports fish nutrition and brings thriving growth through health and welfare, **we support the sustainable farming of delicious and healthy seafood.**





**NOURISHING THE WORLD**

As the human population is expected to reach 9.7 billion in 2050, global aquaculture must prepare to produce more seafood – sustainably – to contribute to food security and human health. This is a challenge we share with our customers. We aim to enable farmers to grow the supply of protein- and oil-rich, nutritious seafood and to ensure safe and sustainable practices throughout the aquaculture value chain.

**MEETING CONSUMER VALUES**

Consumers worldwide are increasingly conscious about the food they eat. We want to help educate consumers about the efficiency and favorable ecological footprint of farmed fish by reporting openly and supporting certification schemes. We adapt our feeds to regional preferences, and depend on consumers to accept new, sustainable raw materials that can secure the future for aquaculture.

**STRENGTHENING FARMER CAPABILITIES**

Good fish husbandry, based on knowledge and engagement, is a determinant of success in farming of fish and seafood. We work directly with aquaculture producers to help them increase yields and productivity through technology, innovation and training, along with providing technical support to diagnose issues and implement solutions.



**SUPPORTING FISH HEALTH**

Good fish health is the most important driver of productivity in the aquaculture industry. Our focus on research and innovation enables farmers to deliver well-balanced feed that matches the need of their fish and seafood, under any growing stage and condition. We also develop functional ingredients that strengthen the fish's immune system to help farmers support fish health and welfare through diseases and treatments.

**MAXIMISING RESOURCE EFFICIENCIES**

As with all activities, we have an impact on the planet. Through optimising our operations and formulating feeds which deliver healthy growth, we promote the most efficient transfer of nutrients from raw materials to seafood on the plate.

**TACKLING CLIMATE CHANGE**

Climate change and extreme weather conditions affect the marine and agricultural supply chains, as well as individual farmers and their facilities on coastlines around the world. Our approach to climate change is dual: We work to reduce greenhouse gas emissions related to our feed and operations, and we develop solutions to help farmers adapt to the new realities of global warming.

**FLEXIBILITY IN RAW MATERIALS**

Ensuring sustainable management of wild fisheries and agricultural supply chains is decisive in securing future access to raw materials for aquaculture. In Cargill Aqua Nutrition, we also add flexibility in our raw materials use by reducing our dependence on marine ingredients and leveraging Cargill's expertise to explore new sources of oils, protein and other nutrients.

**SUPPORTING TECHNOLOGY TRANSFER**

While the salmon industry is fairly young, it has become increasingly advanced, applying data collection, computer modeling and automated feeder technologies to improve productivity and reduce environmental impacts. We see significant potential in bringing knowledge and technology from salmon feeds and farming to other species.



DOWNSTREAM

# Better seafood

To support sustainable development of aquaculture, we need to understand the needs of our customers and their value chains. For them to be successful, we must provide efficient and timely products and services. We will use our knowledge and experience of modern aquaculture to bring better practices and thus greater sustainability to existing and new markets across the world.

## FEED EFFICIENCY [\(p. 54\)](#)

Efficient transfer of nutrients from raw materials into fish flesh helps to reduce the overall footprint of aquaculture. Feed is only part of what drives efficiency; other factors include feed and farm management as well as fish health.

PROGRESS

### 1.35 eFCR

Average economic Feed Conversion Rate

The eFCR averages across the cold-water group are derived from just a few customers, but it is also noted that whilst some farmers report very low eFCRs, many still face losses.

STATUS

Monitor

## CONTAMINANTS [\(p. 58\)](#)

We manage environmental contaminants according to food safety regulations, which have high margins of safety. But with our suppliers we work beyond this.

PROGRESS

### 50%

Reduction in PCBs and Dioxins since 2005

This takes us to 16 percent of the maximum allowed in feed, so amounts in the fish are negligible. Similar progress has been achieved with other contaminants.

STATUS

Continue to manage

## ANTIBIOTIC FEEDS [\(p. 55\)](#)

Antibiotics are added to feed on demand of customers in order to treat specific diseases under veterinary prescription. Reduced demand can indicate healthier stocks.

PROGRESS

### 32%

reduction since 2013

Feeds containing antibiotics represented 2.63 percent of sales in 2016. In Norway, no feeds containing antibiotics were sold.

STATUS

Monitor

## OTHER MEDICATED FEEDS [\(p. 55\)](#)

Use of medicines in feeds is controlled by veterinary prescription. Antibiotic feeds are reported separately, but the use of medicines against sea lice provides an indicator of the challenges faced by farmers.

PROGRESS

### 17%

increase in tonnage since 2013

The proportion of sales of medicated feeds increased by 41 percent from 2013 – 17 percent in tonnage. Now representing 2.96 percent of sales, this highlights disease control as a key challenge for farmers.

STATUS

Monitor

# Fish welfare is key to further industry growth

Growth in aquaculture is outpacing all other food production systems. Salmon farming can be part of the solution in meeting increasing food demand, if the industry succeeds in controlling sea lice and disease.

“Fish growth is deeply linked to fish health and welfare, and currently we are not seeing the long-term improvements in fish growth we hope for,” says John Harald Pettersen, Analyst Manager in Cargill Aqua Nutrition. His insights come from the company’s database covering production data for close to 1.5 million Atlantic salmon. “I believe the main reason is an increase in manual handling and treatments of salmon during important growth stages.”

Senior scientist Ragna Heggebø echoes his view. “This is a hot topic in the industry in Europe. There has been a surge in mechanical treatments for sea lice over the last year,” she says. “It is primarily driven by the fact that sea lice have become resistant to many of the medicinal treatments on the market. Environmental concerns from consumers over the use of medicines and chemicals in fish farming could also be a driving factor,” explains Heggebø.

## A SHIFT IN FEED FOCUS

Mechanical treatments for sea lice may include bathing the salmon in freshwater or warm-water to make the parasites release, or using freshwater or hot water jet streams to remove them by force. While the absence of medicines and chemicals has obvious environmental benefits, mechanical treatment systems cause stress to their fish and can directly impact their health. According to the Norwegian Veteri-

nary Institute, the mortality rate in salmon farms in Norway bounced back to near 20 percent in 2016, from 13–14 percent in 2012–2013. This corresponds with a more than fivefold increase in mechanical treatments, which also affect growth over the life cycle for surviving fish.

“The shift towards mechanical treatments presents us with a different challenge,” says Ewan Cameron, a former fish farmer, now Global Category Manager for products and services for cold-water species. “It is leading us to not only focus on solutions for rejecting sea lice but also on ways to help our customers support fish welfare and health through the treatments. We can strengthen the salmon’s immune system to respond to the handling, to heal wounds faster and in general help the fish recover faster,” he says.

## PREVENTION FIRST

The evident toll of treatments underlines the importance of keeping sea lice levels as low as possible in the first instance. Cameron increasingly sees farmers setting up integrated pest management systems, using cleaner fish, new pen technologies, different treatment methods and feed solutions to fight sea lice.

“Our EWOS ROBUST feed has become widely popular within integrated pest management plans,” he says,



explaining that it contains compounds that mask the salmon from sea lice. It also supports the fish's immune system and wound healing. Nevertheless, Cameron sees reasons to be cautious: "There is a general understanding in the industry that there is an increasing challenge to keep fish healthy and free from sea lice. ROBUST is a strong tool for this as part of an integrated health management system."

Cargill Aqua Nutrition is still working on adding to the powers of ROBUST. "We are investing heavily in research to find new and better anti-attachment compounds that we can add to the feed," says Ragna Heggebø. She highlights this as a core activity in the Sea Lice Research Center, a research partnership established in 2011 and funded by the Research Council of Norway. "The new Cargill Innovation Center in Colaco, Chile is a great asset in our research on sea lice. It has doubled our trials capacity, which means we can test far more compounds for long-term effects on sea lice attachment," Heggebø explains.

### TWO BUGS WITH ONE STONE

Cargill Aqua Nutrition is also looking to give ROBUST a wider application by adding components to help customers manage gill issues in their salmon populations. Prevalent in Tasmania, amoebic gill disease (AGD) has increasingly become a fish health issue in salmon farms in Europe and Chile. "We are currently planning trials to investigate ways to prevent the amoeba from transferring and infecting fish," says Heggebø.

Tapping into the company data, John Harald Pettersen also underlines that the human factor plays a major role in keeping fish healthy and productivity up. "From our data, we can see how engaged and knowledgeable farmers can affect fish growth when they move from one facility to the next. I think it's safe to say that good fish husbandry should be the number-one priority in ensuring fish health and welfare."

#### OFFERING FEED AND KNOWLEDGE

Cargill Aqua Nutrition brings a depth of knowledge with the EWOS feeds for specific challenges faced by salmon producers:

- Adaptations to changes in the environment
- Managing disease challenges
- Optimizing growth rates
- Improving fillet quality

#### SEA LICE UP – ANTIBIOTICS DOWN

Anti-sea lice feeds sales rose to about 2 percent of total EWOS feed sales in 2016, while sales of feed with antibiotics, which are only added in Chile and Canada fell from 4.7 percent in 2015 to 2.6 percent.

### HEALTH AND PERFORMANCE FEEDS IN 2016

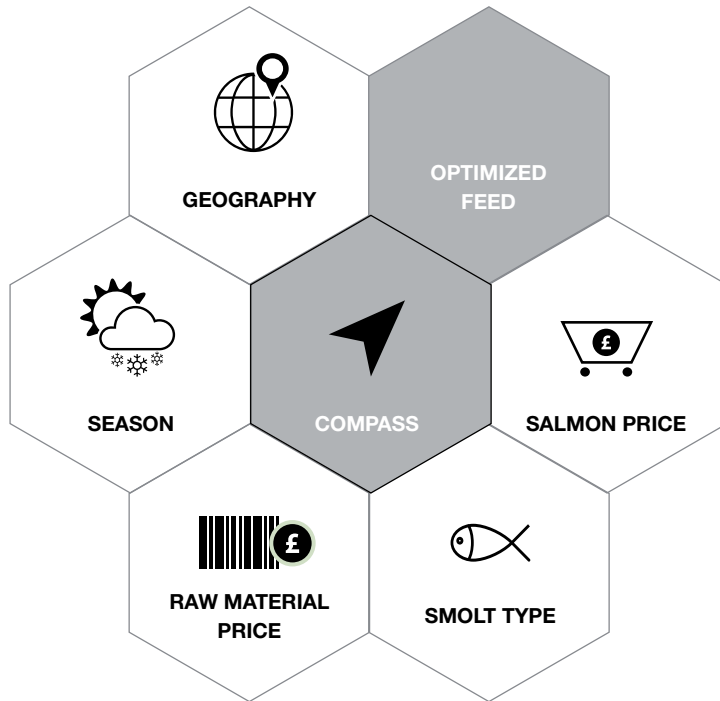
24%

Functional feed supporting fish health represented 24 percent of total sales and more than one third of sales in Scotland alone.

41%

Functional feeds supporting performance for increasing growth rates accounted for more than 41 percent of sales globally.

# Sustainable feed for any scenario



COMPASS is a concept for developing salmon feeds that has completely changed the approach to feed formulation. Traditionally, salmon feeds were designed to meet a fish's nutritional needs as defined by weight, which meant that many other variables that affect farmer productivity and profitability were overlooked. This changed with COMPASS.

Based on numerous trials and a wealth of data, the COMPASS development team discovered that optimizing the macronutrient balance in feed according to season and geography could impact salmon growth far more than was previously known. This delivers better use of nutrient resources to our customers, increasing their sustainability.

**“COMPASS can create or adapt feeds for any production scenario, based on local conditions, the cost of feed ingredients and the market value of salmon. We combine formulation with both biological and economic modeling to provide the best feed solutions for producers.”**

**KARI RUOHONEN**  
Global R&D manager in Cargill Aqua Nutrition

## TRAILBLAZER FEED

RAPID was the first feed to be developed using the COMPASS model and is our biggest selling feed in Norway. Salmon of the s0 generation fed RAPID in trials at the CIC in Norway have grown at record rates. After 15 months in the sea, the harvested salmon reached an average weight of 8.5 kg, with the biggest stretching to 16 kg. The recorded feed conversion rate was as low as 1.02, and 95 percent of the fish were classified Superior.

Two more COMPASS-designed feeds – SOLID and EXTRA – were introduced to the North Sea markets in 2016 and the concept is currently being implemented in Chile.



**“We’ve seen tremendous results – a very low feed conversion rate and high growth. Lately, with salmon prices soaring, there’s no doubt EWOS RAPID is paying off.”**

**JAN TERJE MIKALSEN**  
CEO of Kobbvågslaks, a small fish farming company in Northern Norway



#### myEWOS

In 2016, we launched the myEWOS app for smart phone and tablets, bringing feed planning, purchases and production reports to the palms of our customers. The app also features a tool that customers can use to extract reports and calculate EGI for different feeds, serving as a simple interface between farmers and the big data.

#### CARGILL NUTRITION SYSTEM

Cargill Aqua Nutrition runs an extensive raw materials evaluation program, putting a large number of raw materials through chemical, technical and biological tests each year. Ultimately, we use the most promising raw materials – up to 75 a year – in digestibility trials with salmon to assess how they affect fish metabolism and how available the nutrients are to the fish.

Cargill's proprietary nutrient formulating platform Cargill Nutrition System (CNS) is being rolled out across the aqua culture business and will be a valuable addition to our raw materials evaluation program. CNS combines real-time analysis of ingredients at the factories with research into nutrient application, and will allow us to deliver even more precise feed formulations. Covering over two million nutrient

samples and more than 200 ingredients, CNS supports our drive for more sustainable aqua feed ingredients.

**“CNS is a great match with COMPASS. Whereas COMPASS can predict how fish will respond to different nutrients and give us a target formulation, CNS provides us with the means to deliver that precise formulation – with speed and accuracy.”**

**PER KROGEDAL**  
Cargill Aqua Nutrition Formulation Technology Lead

#### POWER OF DATA

Cargill Aqua Nutrition has the world's largest database for salmon. It currently covers production data from close to 1.5 billion fish. Initially serving as the development platform for the proprietary EWOS Growth Index (EGI), the database has become a powerful tool for customers to plan their production strategy and compare results. By working with our feed consultants, farmers can use the EGI model to obtain the maximum potential from their fish and feed, and make real-time adjustments as needed to their feeding regimens. Our scientists are now examining the possibility of building similar growth indices for tilapia and shrimp, which would be an important step in the digitalization of the tilapia and shrimp industries.

#### CONTAINING CONTAMINANTS

Our stakeholders are concerned about certain contaminants, far below their risk limits. Food safety is of primary concern to us, and we work to help manage the levels of some compounds well below regulatory limits, most notably dioxins, PCBs and ethoxyquin.

#### Dioxins and PCBs:

##### **21% OF MAXIMUM SAFE LIMIT (EU)**

Dioxins and PCBs originate from heavy industry and combustion and enter the marine food chain through fishmeal and oil. Through reducing the share of marine ingredients in our feed, we have seen a 49 percent reduction in dioxins and PCBs in our feed since 2005.

#### Ethoxyquin:

##### **12% OF MAXIMUM SAFE LIMIT (EU)**

Ethoxyquin is an antioxidant added to fishmeal to stabilize it during transport and storage. Through working with our suppliers to manage their use of this product, and through using less fishmeal, we have reduced ethoxyquin levels by 44 percent since 2005.

★ [For more on contaminants, please refer to p. 45 and 58](#)

# Innovative Feed Management

Feed management enables farmers to get the greatest benefits from our products. Cargill leverages its expertise in nutrients and extensive global coverage to provide tilapia and shrimp farmers with the best feed solutions, adapted to local needs.

## iQUATIC FEED

### iQUATIC feed – smarter feed for smarter shrimp farming

Discovering that shrimp feed mainly at night has spurred growth in the use of automatic feeders in Ecuador. Equipped with microphones to detect when shrimps are eating, the automatic feed distributors can deliver more a precise amount of feed when the shrimp are hungry. Designed specifically for automatic feeders iQUATIC feed is re-engineered and optimized for maximum efficiency and nourishment, helping farmers raise larger, healthier shrimp. It has been developed in collaboration with Naturisa, Ecuador's second largest shrimp producer.

Data analytics through our digital platform of services and support maximize the opportunity the feed brings, helping our customers realise their full potential. On the ground and virtual technical services back up the package from design and installation through operation and improvements.

The total package brings healthier shrimp and increased survival, which also enable better water quality. This is achieved through better application and utilization of the feed resources by literally listening to our customers – the shrimp – as they feed. Getting more shrimp from the same feed resources is a great stride in improving sustainability of shrimp farming.

★ [Naturisa and Cargill are adding new shrimp feed capacity in Ecuador, see p. 34](#)

**“One of our key customers has seen a 20 percent reduction in feed conversion rate since 2013, showing how good the combination of the feeders with our feeds is.”**

**SEBASTIÁN RAMÓN FERNÁNDEZ**  
*Technical Specialist for Cargill Aqua Nutrition Ecuador*

## DEVELOPING CAPABILITIES IN LATIN AMERICA

### New arena for training and knowledge transfer

We are building technology application capabilities in Ecuador to support our shrimp businesses throughout Latin America. "It will have a regional focus on helping our customers increase productivity and reduce risk. This will also enable us to bring new products, services and solutions to market faster, supporting the customers' needs", said Martin Baertl, Marketing Manager.

The center will leverage broader Cargill capabilities to become the industry leading practitioner in best aquaculture practices and deliver nutritional excellence to our customers. It will be operated and totally funded by Cargill, located within Naturisa's farms, reinforcing our partnership with them in Ecuador.

### NEW SHRIMP FEEDS

In 2016, the collective strength of Cargill Aqua Nutrition came to display in our development of new feeds for shrimp. Our understanding of how micronutrients and functional ingredients behave in salmon spurred the development of two functional feeds which may come to market in 2017: SHRIMP ADAPT aims to relieve the stressful effects of fluctuating salinities, and SHRIMP RAPID is a first-generation extruded feed offering for higher productivity in shrimp farming.





# 2. BETTER WORKPLACE

IN HOUSE

We are committed to respecting people by being a safe and responsible employer, strengthening local communities and helping them *thrive*.



# Safety first

Ever received an email from one of our employees? Then you have surely noticed the footer “Put away your mobile device while driving. Return to your home safely.” It is there for a reason: Safety comes first across all Cargill operations.

Complete safety is one of Cargill Animal Nutrition’s Five Big Goals and a cornerstone of the company’s culture. It expresses the company’s determination to have everyone return home safely to their loved ones, every day. Safety – for employees, contractors, customers, suppliers and communities – has priority over productivity and profits.

Instilling the same uncompromising approach to safety in the former EWOS operations is an ongoing process and a learning experience for all parties, according to Fred Van-Haasen, who is the Global EHS (Environment, Health and Safety) Lead in Cargill Animal Nutrition. “I believe that we have introduced them to a safety approach, concepts and tools that will further strengthen and solidify their safety performance,” he says.

## LIFEsavers

As part of an 18-month integration plan, all former EWOS employees go through extensive safety training, with sessions on an almost monthly basis.

Centered around key topics – the 12 LIFEsavers – the training covers the most risk-prone activities and even extends to off-site safety. (see p. 26)

“We want everyone to get the same mindset for safety,” says Van-Haasen, explaining that the LIFEsavers are the essence of Cargill’s risk-based approach: “We are a big company that regrettably experiences fatalities from time to time. The LIFEsavers represent activities that account for 90 percent of our work-related fatalities over the last 15 years. If everyone learns these fundamentals, we will come a long way towards our goal of complete safety.”

In return, the integration process has opened new perspectives to Cargill. “We were relatively new to water based activities at the scale run in salmon farming and have added to our safety toolbox accordingly. We are also learning from EWOS’ environmental management and reporting.”

## FIVE BIG GOALS

Employee engagement is embedded in Cargill Animal Nutrition’s Five Big Goals, which constitute stepping stones for our success and the measure of our performance. By engaging all our employees and showing how everything we do connects and impacts on sustainability, we will get greater, faster and longer lasting results.

### 1. Complete safety

Everyone works to keep people, food and feed safe

### 2. Full engagement

Everyone understands how they fit and believes that they matter

### 3. Customer focus

Everyone knows how their actions support our customers’ success

### 4. Community enrichment

Everyone improves their communities for a better tomorrow

### 5. Sustainable growth

Everyone contributes to growing our business and deploying our capabilities



## IN HOUSE

# Better workplace

First we want to secure the workplace so that everyone goes home safely. We will provide a setting to deliver sustainable performance inside the business and with local communities. Sustainable practices will become the every-day norm for all of our workforce.

### **SAFETY FIRST** [\(p. 55\)](#)

Our goal is that everyone goes home safely at the end of their working day.

PROGRESS

## 25%

reduction in injury rate since 2013

1.58 injuries per 200,000 working hours is a 25 percent reduction from 2013. There were no work-related fatalities in Cargill Aqua Nutrition in 2016.

STATUS

**Maintain focus**

### **LOCAL COMMUNITIES** [\(p. 60\)](#)

We should be a good neighbor in the local communities where we operate. There should be zero complaints raised against us.

PROGRESS

## Improving

odor control

Cases of smells from our factories were raised in Scotland and Canada. We have solved the issues through investments in the local plants.

STATUS

**Maintain focus**

## CARGILL ANIMAL NUTRITION'S SAFETY PLEDGES:

- 1 We put safety above profits
- 2 We believe that every job can and must be done safely
- 3 We hold everyone responsible for stopping any unsafe activity

### **COMPLIANCE** [\(p. 53, 58, 59\)](#)

We are committed to complying with all local regulations across our operations.

PROGRESS

## 2

environmental cases  
0 food safety, product or social cases

Both incidences of environmental non-compliance cases were resolved quickly and closed with no fines following action by the local company. No food safety, product or social related cases were brought in 2016.

STATUS

**Increase focus**

### **EMPLOYEE ENGAGEMENT** [\(p. 27\)](#)

We aim to increase employee engagement in sustainability, and build sustainability into everyday work.

PROGRESS

## Successful

engagement program in Norway

We are looking to extend employee engagement programs across our organization, and develop sustainability leads.

STATUS

**Increase focus**

### MOVING AWAY FROM TWO-WHEELERS

Motorcycles have been the vehicle of choice for a large part of our operations in India and Vietnam. In a new initiative, all sales employees will now use only four-wheelers to increase their safety on the road. Moreover, we will step up training to make all employees safer driving.



### The GreenBook

The center of our culture and success for decades, the GreenBook has helped define, drive and lead us to where we are today. It creates engagement and reinforces our unique culture by helping employees understand how they fit and why they matter. Simply put, the GreenBook is our story explaining how our style of leadership, management and operating philosophies guide us to delivering better nutrition for better lives.

### NEW LAB IN DIRDAL, NORWAY

Cargill Innovation Center Norway's new laboratory facility features state-of-the-art technology for the handling of fumes, chemicals, biosecurity and emergencies. It opened in 2017 and will strengthen support of our pilot plant, fish trials and R&D while meeting stringent lab safety requirements.

### LIFE SAVERS



Electrical Work



Working at Heights



Hot Work



Bulk Material Handling & Storage



Excavation and Trench Work



Lockout Tagout-Energy Isolation



Confined Space Entry



Motor Vehicle-Traffic Safety



Lifting and Rigging Protection



Mobile Powered Equipment



Hazardous Materials



Railcar Safety

### FEWER DISTRACTIONS WHILE DRIVING

Driving is one of our highest-risk activities both at work and for leisure. Talking on a mobile phone may be the most distracting thing we do while driving. Effective 2017, Cargill has therefore banned all use of hand-held and hands-free devices while driving at work or commuting to and from work.

### SAFETY AT SEA



Many of Cargill Aqua Nutrition's customers have farms at sea that the commercial and technical teams regularly visit. Salmon farming takes place in cold temperature waters, with often unforgiving weather conditions. UK commercial and technical teams took part in an accredited safety at sea course, together with some customers who took advantage of the organized course.

# Engaging in common goals

The route to sustainability starts at home. Engaging employees at all levels has made our sustainability efforts more concerted and better coordinated in our operations in Norway.

*Least possible greenhouse gas emissions or reduced use of marine ingredients? Bespoke feeds or maximum energy efficiency in feed production? Just-in-time deliveries or less fuel use?*

There are many competing priorities in sustainability. This was clearly demonstrated when the team in Norway engaged its employees in defining sustainability ambitions and actions. Involvement from the entire value chain, from sourcing to customer service, highlighted the many interrelations and trade-offs in the company's management of sustainability issues: How selection of raw materials will impact on the carbon footprint of the feed; how differentiated feed offerings can affect energy use in production, and; how customers' expectations and facilities impact logistics and fuel use.

## CONNECTING THE DOTS

"We initiated the process to embed sustainability in every process and department," says Judith Tørvi, human resources manager at Cargill Aqua Nutrition. "We have high ambitions for sustainability, meaning we want to serve fish farmers with the best possible products and help them achieve sustainable food production today,

without sacrificing future generations' opportunities to do the same."

Unit by unit, Tørvi and her colleagues engaged employees in individual workshops to discuss sustainability topics and analyze their impacts in a life-cycle perspective on fish feed. Analyses were shared and reviewed in larger employee meetings, and later presented for the management group.

"The process created considerable engagement, and we were pleased to see that sustainability is top of mind among our people. Nevertheless, it helped connect dots in ways we have not done before," she says, explaining that bridging sustainability considerations across departments has resulted in a more holistic approach to sustainability management.

Tørvi says that the engagement process has already led to concrete results and new initiatives. "Apart from raising awareness and illuminating the relevance of sustainability in everyday decisions, we've seen tangible energy and cost reductions and changes in the way we prioritize raw materials," she points out.



**JUDITH TØRVI**  
Human Resources Manager

## New environmental initiatives in Norway:

- Shore-side electricity reduces emissions from vessels at berth
- Automated deliveries improve biosecurity and personnel safety
- More bulk deliveries reduce plastic packaging
- Optimization of lot sizes reduces inbound logistic for raw materials

## Renewed certification

In 2016, Cargill Aqua Nutrition Norway was certified to the revised 2015 edition of the Environmental Management Standard ISO 14001, which incorporates new and stricter requirements compared to previous versions. The employee engagement process was central to the certification.

# Working with farmers and communities

Since 2010, Cargill and its partners have trained more than 2.4 million farmers to create a more sustainable, food-secure future. We help farmers grow crops and raise livestock, fish and seafood in the most environmentally responsible ways, while improving their productivity, strengthening their communities and conserving resources.



INDONESIA

## Empowering small-scale fish farmers

In 2016, Cargill Aqua Nutrition and its starches & sweeteners sister business in Indonesia joined forces to empower small-scale fish farmers. We provided the initial small fish, feed and training to set up fish ponds to help 17 family farms in three communities scale up their operations. We are also helping to implement a breeding system.

The program is part of Cargill Indonesia's Rural Development Campaign, which is aimed at strengthening small-scale farmer livelihoods through skills training, technical guidance, working capital support and market access. It has been implemented since 2014 in communities near our business operations.



HONDURAS

## Health nutrition provides alternative income

CARE and Cargill have teamed up to strengthen the livelihood of smallholder farmers in Honduras while promoting health nutrition practices among their children and families. CARE piloted tilapia aquaculture ponds in two communities across the municipality Villanueva, and six Cargill fish specialists provided technical support and training for women leaders, teachers and families linked to local schools.

Once harvested, the fish were sold throughout the communities, providing rural families with an alternative income source while improving dietary diversity among school-age children. Data from the project shows a 15 percent increase in fish consumption among children aged 15 or younger in Villanueva.

INDIA

## Education, better food and clean drinking water

Cargill Animal Nutrition's team at the Rajahmundry plant in India is committed to strengthening the future for local children in their families. Projects include donations for the construction of class rooms and provision of nutritious food

– every day – to 250 school children in a local village. Furthermore, the team has supported projects to provide water purifiers to local schools and clean drinking water solutions for the district.



# 3. BETTER OPERATIONS

IN HOUSE

Working on the choice of raw materials, feed formulations and our production processes, **we continuously find ways to reduce the footprint of our operations.**



# Cutting energy use and emissions

## Cargill Aqua Nutrition UK's feed plant spearheads efforts to increase energy efficiency and productivity.

The lush green landscape of Westfield, Scotland inspires green ideas. Here, midway between Edinburgh and Glasgow, lies Cargill Aqua Nutrition's UK fish feed factory, surrounded by flowing grass and cereal fields on all sides. Seemingly just another factory from the outside, inside it is increasingly turning green and inspiring environmental improvements across our many factories.

### ENERGY USE HALVED

The greening of the plant started in 2014 when EWOS UK invested in a biomass boiler to phase out fossil fuels from its heating applications. The boiler was fully operational and running on wood chips in 2015, and the plant has since cut energy use and greenhouse gas emission per tonne of feed produced by more than half.

"The biomass boiler really kicked off improvements," says Mark Wright, Cargill Aqua Nutrition's regional manufacturing director. "We analyzed our entire production process and found that we could reduce both energy use and emissions by switching from black fuels to biomass."

Wright describes water as perhaps the single most important factor in energy improvements. Feed production requires energy for grinding and mixing raw materials and extruding the feed mix, but the most energy intense production steps are the cooking and drying stages. "We cook the feed mix by adding water and steaming it. And then we dry out much of the same water before extruding the final feed pellets," he explains. "The more water in the mix, the more energy we use to dry it."

### HUNTING ENERGY SOURCES

Fortunately, water is an excellent energy carrier. After the biomass boiler was installed and running, Wright and his team started hunting for excess heat that could be reclaimed and used in the production process. "We started by reclaiming heat from the boiler exhaust and using it to preheat hot water for our dryers. Next, we looked at our extruders, which use a lot of water for cooling. We now use heat from the extruders to keep oil ingredients warm and fluid," he says.

Efforts to increase energy efficiency have also led to improvements in electrical appliances, such as the mixers and extruders. "There is more to come," says Wright. "We are still searching for new ways to reclaim and save energy in our process. And we are considering technology to capture solar energy on our roofs."

The plant in Scotland is not alone in its search for energy efficient solutions. All operating companies in Cargill Aqua Nutrition have initiatives in place and share knowledge to increase energy efficiency. Wright recently assisted operations in Vietnam in installing a new production line and biomass boiler, and is looking to transfer green ideas to the plants in Norway, Chile and other parts of the world.

"Reducing energy and emissions is part of what makes us competitive," he says, "but it does not happen overnight. We have to work process by process, month by month, to get where we want."





**MARK WRIGHT**  
Regional manufacturing  
director at  
Cargill Aqua Nutrition

## IN HOUSE

# Better operations

Seeing our operations through a sustainability lens helps to optimize our processes and products while reducing resource use and emissions – often with the added benefit of cutting costs. As a global company, we work continuously to transfer and adapt new ideas and best practices within our manufacturing base. Our focus on energy and water efficiency is increasing through 2017.

### ENERGY [\(p. 51\)](#)

Our goal is to reduce energy per tonne of feed produced year on year through efficiencies in production and investments in equipment.

PROGRESS

**3.9%**

increase in energy use per tonne feed

Energy use was 1.03GJ per tonne feed across the group, an increase of 0.4 percent since 2013, and up 3.9 percent from 2015.

STATUS

🟢 **Increase focus with energy efficiency program**

### WATER [\(p. 51\)](#)

Managing amount of water used per tonne of feed reduces use of water and saves energy.

PROGRESS

**10%**

increase in water use per tonne feed

We introduced measurement in 2015, but did not actively manage water use through 2016. Water efficiency was affected by decreased production volume.

STATUS

🟢 **Increase focus**

### GREENHOUSE GAS EMISSIONS (GHG) [\(p. 52\)](#)

Our goal is to reduce scope 1 and 2 GHG emissions from our facilities, employing best practices across the group.

PROGRESS

**9.8%**

reduction since 2013

Our GHG emissions per tonne of feed are down 9.8 percent since 2013, despite an increase of 3.2 percent in 2016. Average scope 1 and 2 emissions are 55 kg CO<sub>2</sub>e per tonne feed across group, excl. Vietnam.

STATUS

🟢 **Increase focus**

### RECYCLING [\(p. 53\)](#)

Packaging is our main waste output. Inbound and outbound packaging on products is hard to re-use due to biosecurity issues, but can be recycled.

PROGRESS

**52.3%**

of packaging recycled

Recycling and reclaiming of packaging materials is increasing and currently at 52.3 percent – up from 46.8 percent in 2013. Total recycled or reclaimed in 2016 was 11,500 tonnes.

STATUS

🟢 **Increase focus on waste recycling**



# Life-cycle reporting



## Towards life-cycle assessments of feed.

More than a decade ago, we pioneered the use of an ecological footprint model (EF) for salmon feed. The EF model was developed in cooperation with researchers at the University of Dalhousie, Canada to describe the amount of productive ecosystem a human population requires to provide all resources consumed, as well as absorbing the resultant wastes. Since 2010, we have also reported the carbon footprint of our activities.

We are now looking to expand our reporting to full life-cycle assessments (LCA) of fish feeds, supported by Cargill's deep knowledge of raw materials and specific supply chains. Unlike ecological and carbon footprints, which measure impacts in land use or greenhouse gas emissions respectively, an LCA assesses a system's impacts on a wider range of topics, such as climate change, ozone depletion, acidification, resource depletion and toxicity. It is not the properties of the product itself that are under scrutiny, but the resources used and all processes involved in making the product.

LCA is a powerful tool that can support us in reaching a new level of sustainability by pinpointing areas for improvements along our value chain – from selection of raw materials, through formulation and feed production, to deliveries of finished feed. Furthermore, it will simplify the export of data to customers who want to develop their own LCA programs for their food products.

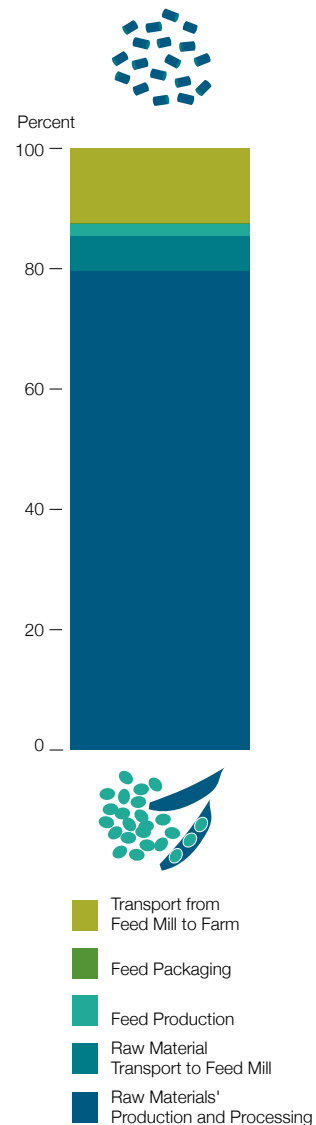
The European Commission is currently developing rules for Product Environmental Footprints (PEFs). Cargill Aqua Nutrition is fully involved in this process through a sub-project organized by the European Feed Manufacturers Federation (FEFAC). This project has highlighted a lack of data on raw materials, and we will in 2017 join the Global Feed LCA Institute, together with the Norwegian Seafood Federation, to increase the reliability of data on fishmeal and fish oil along with data on our other key raw materials.

Currently we only calculate scope 1 and 2 carbon emissions (see p. 52) with an average of 55kgCO<sub>2</sub>e/tonne feed produced.

### CHOICE OF RAW MATERIALS CARRIES MOST WEIGHT

Seafood is very efficient at converting feed to food, having a low feed conversion ratio (FCR). LCA helps to quantify the overall impacts and is becoming increasingly robust and accurate as the science develops. Raw material production typically represents 80–90 percent of the finished feed footprint – with transport and processing covering the rest.

The chart below shows the distribution of **value chain impacts** on climate change for a typical feed from Cargill Aqua Nutrition Norway, based on LCA data. It does not include impacts from land use change.





## Sizing up the human health benefits.

Seafood is a valuable dietary source of protein, omega-3 fatty acids, vitamins and minerals, with proven health benefits. A lack of any of these nutrients in human diets can impact negatively on our health, cause diseases and consequently lead to significant negative social and economic costs.

Footprinting models, however, commonly neglect the nutritional benefits and health impacts of food products. Cargill aspires to change that and is working with Forum for the Future, and joining the Food Reform for Sustainability and Health (FReSH), to develop methods that take the nutritional value into account when calculating the footprints of food.

### MAKING THE PELLET RIGHT THE FIRST TIME

Happy Pellet is our initiative to provide a consistently great customer experience. We want to ensure that customers and animals have complete confidence in the way that pellets look, smell, behave and perform. We do so by building and nurturing a culture of quality throughout our value chain.

Essentially, our goal is to always make the pellet right the first time to meet customers' expectations and limit rework, which otherwise involves additional energy use and a risk of losing nutrients. To this end, Happy Pellet is a platform to leverage the combined expertise of Cargill and EWOS. It includes a 7-step continuous improvement process and quality tools that have been deployed across all our regions. The improvement process covers the entire value chain – from understanding customer needs and selection of raw materials, to feed deliveries – to enable all of our plants to deliver pellets with consistent physical properties.

Through this focus on producing the right quality first time, we use less energy in manufacturing and ensure that more of the nutrients in the raw materials are delivered to the fish. This makes the value chain more sustainable by using fewer resources.



# New shrimp feed capacity

Improving sustainability through technology transfer in feeds.



## ECUADOR

In November 2016, Cargill Aqua Nutrition broke ground on what will become our largest shrimp feed plant when it is operational in 2018. Situated near Guayaquil, Ecuador's largest city, the plant will bring an annual capacity of 160,000 tonnes of feed to this important shrimp production market. Joining us in the project is Naturisa, Ecuador's second largest shrimp producer, which has also entered a 10-year agreement for the supply of 300,000 tonnes of shrimp feed. The new plant will leverage expertise from EWOS to replace traditional pelletizing with extrusion technology, making more efficient feeds.

The new facility will be Cargill's first in the area, and introducing the Cargill culture and our standards for health and safety is of a high priority. Local recruiting will commence in 2018, with

Cargill staff ensuring training of new employees. Project staff are also working closely with the local community to minimize any adverse impacts of the development.

**“Bringing the factory with extrusion technology will help us serve our customers’ needs better in Ecuador. There is a great potential for growth in this country and high quality feeds will support the farmers in achieving this.”**

**ANGEL GOMEZ**  
Managing director of LatAm North in  
Cargill Aqua Nutrition

## LOGISTICS

Same load, but less shipping



In Norway, 95 percent of our feed is delivered to salmon farmers by boat, the remainder by trucks. By optimizing ships, routes and lot sizes, and by helping our customers better predict the volumes they need, we have significantly improved our outbound logistics in recent years. From starting with eleven ships, we now operate seven bespoke vessels on regular routes from our feed factories to salmon farmers along the Norwegian coast, still delivering the same volumes. Cargill Aqua Nutrition leases the vessels, but covers the fuel costs. We have therefore invested in flow meters to allow for better control of fuel usage and support emission reductions.

We are also investigating the possibility of installing metering technology in larger silos at the farmers' facilities. To avoid tying up capital in feed inventories, most farmers prefer to order smaller volumes. Monitoring of feed inventories will allow us to further optimize shipping and keep feed supplies constant at each location, while charging our customers by the use of feed, not by delivery.



# 4. BETTER SUPPLY CHAIN

## UPSTREAM

Expanding our raw material basket is key to securing future growth for our customers and to help the global aquaculture industry to continue to *thrive*.



# Expanding our horizons

Our sourcing policy drives us to expand our raw materials basket, so we can supply our customers with efficient and sustainable feed.

We asked two of our experts for their views on raw material sourcing and the opportunities and challenges we face when sourcing feed ingredients.



## HELENE ZIV (HZ)

Risk Management and Sourcing Director

Oversees risk management and sourcing (RMS) for our Global Aquaculture Business, coordinates local RMS teams, and leads new ingredients projects



## TED ANDREAS MOLLAN (TM)

RMS Category Support Director  
Assesses and manages sustainability risks in raw material sourcing

### What is new in sourcing and our search for new ingredients?

**HZ:** The revision of our sourcing policy in 2016 was an important step to clarify our expectations to our suppliers and align sourcing processes. We are excited about our many initiatives in partnership with other Cargill businesses to develop new ingredients, such as alternative omega-3 sources from algae and rape seed, novel oils and new protein sources.

**TM:** We continue our work to find good, sustainable protein sources. As always, we are looking to reduce our dependence on forage fish ingredients, but we also want to show that they can be used sustainably. We are currently sponsoring and supporting a fishery improvement program in Peru, together with SNP and our key suppliers, in order to support sustainable management of the country's marine resources.

### What are the main challenges?

**HZ:** Pricing is one of the main issues with new ingredients. Prices for fishmeal and fish oil are highly cyclical. Good alternatives will dampen the cycles, but prices for fishmeal and fish oil are low so far in 2017, making new ingredients a larger investment. At Cargill we have a long-term view so we continuously work to widen the basket of ingredients available in order

to produce sustainable feed, independent of commodities cycles.

**TM:** Consumer acceptance is another issue and reason to work long term. We see several exciting opportunities in both proteins and oils, but the consumers sometimes think otherwise. Take insect meal, for example. It's a great, sustainable protein source, but some consumers are opposed to the notion of eating fish fed with insects.

### How do you approach sustainability in sourcing?

**HZ:** Collaboration across our organization and with the suppliers is key. We work closely with sustainability experts and customers to ensure that we source responsibly and meet customer and consumer expectations. This is verified by regular supplier audits. We also arrange supplier meetings to inform them of our ethical standards and sourcing policy, and to explore joint opportunities.

**TM:** From a sustainability perspective, there are pros and cons to most raw materials we use. Some groups would like to see us abandon marine ingredients, but fish oil and fishmeal provide a highly digestible source of important nutrients and come with smaller production and processing energy and carbon footprints than most alternatives, reducing the overall seafood



UPSTREAM

# Better supply chain

We are at the crux of sustainable seafood production, connecting raw material suppliers with seafood producers and consumers through our feeds. Our decisions to purchase are made on price, nutritional value, quality and availability, as well as assessments of the environmental and social impacts of producing the materials based on best available knowledge at the time. We are mindful that our decisions can affect not only our customers' success, but the reputation of the value chain.

footprint. We try to balance all impacts when making sustainability choices in our sourcing.

**How does being a part of Cargill affect raw material sourcing?**

**HZ:** For one, we benefit from the extensive Cargill network, which goes deep into the agricultural value chain. It's a great asset in our sourcing activities. Being part of Cargill also means we can move swiftly to industrialize good ideas and bring new ingredients into our feed. We can harness Cargill's expertise to capture co-products and nutrients – some of them may be regarded as waste – and utilize them in our feed. We are pioneers in Cargill's purpose: to be the leader in nourishing the world in a safe, responsible and sustainable way.

**TM:** It has opened a number of new opportunities. It has also been a step up the value chain. We have for instance been invited to sit down with some of the largest supermarket chains in the U.S.A. to discuss ways to utilize their food waste streams in fish feed. With our expertise and R&D capabilities in salmon feed, the EWOS brand has become a pilot for testing many new and sustainable ingredients. This will really benefit our customers' ability to produce more and even better food.

**MARINE INDEX** (p. 49)

Marine index is a key focus for salmon feeds. Our aim is to manage it, but within customer requirements.

PROGRESS

**31.4%**

of feed was marine ingredients

Total marine ingredients in 2016 was 31.4 percent of feed produced, against 28.4 percent in 2013 and 42.1 percent in 2010. We continue to innovate ways to achieve marine independence.

STATUS

**Innovate**

**SOY** (p. 50)

Soy is often associated with deforestation in the minds of consumers. We will source all soy products from responsible supply chains audited to standards successfully benchmarked by FEFAQ.

PROGRESS

**73.4%**

of soy certified ProTerra

73.4 percent of soy products bought in 2016 were ProTerra certified. We are exploring more options in other countries as new certification schemes become available.

STATUS

**Increase focus**

**TRIMMINGS** (p. 38, 49)

Our goal is to reduce dependency on forage fish through use of co-products from fisheries. We work with suppliers to develop quality ingredients.

PROGRESS

**33%**

of fishmeal and fish oil from trimmings

Trimmings meals and oil provided 33 percent of total marine ingredients in 2016 – up from 32 percent in 2013 and 21 percent in 2010. More than 90,000 tonnes of trimmings meals and oils were used in 2016.

STATUS

**Innovate**

**SUPPLIER AUDIT** (p. 47)

Supplier audits are an important aspect of verifying sustainable supply chains. We aim to audit all suppliers routinely.

PROGRESS

**21/28**

planned supplier audits carried out

In 2016, we carried out 21 of 28 planned audits due to changes in audit procedure as part of integration with Cargill.

STATUS

**Increase focus**



# A recipe for sustainability

Key developments and highlights in our raw material use in 2016

## RAW MATERIALS USED IN 2016



- Fishmeal 19.9%
- Fish oil 11.5%
- Vegetable proteins 30.0%
- Vegetable oils 16.8%
- Animal by-products 6.6%
- Carbohydrates and binders 15.1%

### SHARE OF MARINE INGREDIENTS REMAINED STABLE

We use a wide variety of raw materials to leverage local supply and international trade to meet the nutritional needs of the fish we want to feed. Cost is always important, as is complying with our sourcing policy. In 2016, fishmeal and fish oil accounted for 29.5 percent of our raw materials, compared to 42.1 percent in 2010. While favorable prices led to a slight increase in our use of fish meal, there were no major changes in terrestrial ingredients.

★ [For details on our raw materials use, please refer to p. 48](#)

## FISHMEAL AND FISH OIL BY FORAGE FISH SPECIES



- Anchovy (Chile, Peru) 29%
- Blue whiting (Denmark, Iceland, Norway, Faroe Islands, Ireland) 31%
- Capelin (Iceland) 3%
- Gulf menhaden (USA) 8%
- Norway pout (Norway) 2%
- Sand eel (Denmark, Norway) 2%
- Sardine (Chile, Panama) 9%
- Sprat (Denmark, Norway) 11%

### EXPANDING OUR SOURCING OF FISHMEAL AND FISH OIL

2016 is a testament to the importance of sound fishery management. A significant El Nino in the Pacific resulted in a large drop in the region's forage fisheries, but recent reports indicate that in 2017 the major fisheries are rebounding, largely thanks to a swift reduction in quotas of these well managed fisheries. Nevertheless, with less fishmeal and fish oil available from this region in 2016, we had to search further afield and source more of our marine raw materials from other fisheries. Most notable were the increases in sourcing from blue whiting and sprat fisheries in the North Atlantic.

# 33%

In 2016, trimmings accounted for 33 percent of the marine ingredients used in our EWOS branded feeds.

### TRIMMINGS STEADILY INCREASING

Cargill Aqua Nutrition is one of the world's largest users of upcycled protein and oil from fish trimmings. We are looking to further increase our trimming use, where feasible, collaborating with suppliers to improve the quality and availability of this sustainable ingredient. Use of trimmings is an excellent use of resources and supports certification to the ASC and BAP standards. We do not accept trimmings from IUU (Illegal, unreported and unregulated) fisheries.

★ [For details on marine ingredients please refer to p. 48](#)

### SOY SOURCING

In 2016, both soy and palm supply chains received strong criticism for showing poor control of individual producers' impacts on deforestation in Brazil and Asia. We did not use any of the affected suppliers directly and could document certification of our raw materials. Nevertheless, we will in 2017 intensify our efforts to uphold compliance with our sourcing policy and apply the FEFAC Soy Sourcing Guidelines to move to suppliers away from this hotspot. The FEFAC benchmark system has brought more options to our sourcing of soy products, allowing us to move to suppliers not associated with the deforestation issue, whilst still adhering to strict sustainability criteria.

★ [For details on soy sourcing, please refer to p. 50](#)





### FEEDKIND COMING ON-STREAM

Made from fermentation of methane gas, FeedKind is a new sustainable feed ingredient: a bacterial protein. It is a nourishing, natural, safe and non-GMO source of protein available in predictable volumes. It cannot replace the oil, vitamins and minerals present in fish-meal, but at the right price and availability, it can be an attractive alternative.

In April 2017 NouriTech and its lead investors Calysta and Cargill broke ground on what will be the world's largest facility for production of FeedKind. The new plant in Memphis, USA will produce approximately 200,000 metric tons of FeedKind annually, with the first industrial size deliveries expected in 2019. It builds on experiences from a pilot mill opened in the UK in September 2016.

### NEW OMEGA-3 OIL SOURCES

With limited volumes of fish oil available globally, we continue our search for ingredients that can replace fish oil as the major source of EPA and DHA, the two omega-3 fatty acids valued for their benefits on both human and fish health. Cargill is at the center of this search, with several promising projects that can deliver the omega-3 required to sustain the levels of EPA and DHA in farmed salmon that make it such a healthy option for people to eat.

Cargill already has access to alternative sources of omega 3, especially DHA, in the form of algae meals and oils. Whilst some customers display interest in these options, typically the cost disadvantage compared to fish oil is a distraction. Nevertheless, Cargill is also supporting an algae pilot facility at Technology Center Mongstad outside Bergen, Norway. The goal is to produce algae using light and captured CO<sub>2</sub> to produce omega-3 fatty acids. Developments in this area are exciting, with significant volumes of algae-based DHA oils already on the market.

Another interesting Cargill project involves the development of a new type of genetically modified rapeseed oil, Canola, that is rich in EPA and DHA and expected to be ready for the market after 2020. Market acceptance for GMO ingredients is low in Europe, but introduction in other regions may change the supply and demand dynamics for fish oil and increase the overall availability of omega 3.

### SOURCING POLICY AND SUPPLIER CODE OF CONDUCT UPDATE

In 2016, we updated our EWOS Brand Responsible Raw Material Sourcing Policy to combine previous EWOS and Cargill commitments and to standardize sourcing processes. The updated sourcing policy determines our position on raw materials and our expectations to support the EWOS brand. A similar policy is being deployed across the rest of Cargill Aqua Nutrition.

As part of the policy, we have also developed the Cargill Aqua Nutrition Supplier Code of Conduct, which is being introduced to all of our raw material suppliers in 2017. This lays out our expectations of suppliers with respect to key aspects of environmental and social impacts. Human rights throughout our supply chain are important and we are working with our suppliers to improve the status where required.

### OUR RAW MATERIAL GOALS

#### Marine ingredients

- We require that marine raw materials are derived from products which are not IUU.
- We require that the fish species and country of fishing area is registered and that the fish species is not listed in the IUCN Red Data list for the current year.
- All marine materials will come from fisheries adhering to FAO's Code of Conduct for Responsible Fisheries and by 2025 all material will be produced according to IFFO RS and MSC standards.

#### Terrestrial ingredients

- Cargill signed the New York Declaration on Forests and we will work towards a goal of zero deforestation in our supply chain by 2030, having halved it by 2020.
- We will source all palm oil products from responsible supply chains audited to standards such as RSPO or equivalent.
- For our EWOS brand, we will source all soy products from responsible supply chains audited to standards successfully benchmarked against the FEFCO Soy Sourcing Guidelines.

# Sustainable fisheries

We believe that marine ingredients can be sourced sustainably and work with our suppliers to source from fisheries and factories that are well managed. To this end, we also encourage our suppliers to seek certification to sustainability criteria, which improves transparency and trust.

Over the last decade, we have seen management improving for many large forage fisheries, and the number of certified reduction fisheries is growing. In 2017, 45 percent of fishmeal and oil produced globally was certified to IFFO RS and 14 percent of fish caught for all uses were certified to MSC. Factories processing trimmings into fishmeal and fish oil also hold IFFO RS certification, adding to the improvements made by this industry to support their customers' requirements for food safety and sustainability. Given the natural fluctuation in stocks and catches, this widens our options when sourcing for responsibly produced raw materials.



PERU

## SUPPORTING FISHERY IMPROVEMENT PROGRAM IN PERU

The fishing industry has made big steps to adopt IFFO RS and MSC certifications in recent years. In March 2017, the Peruvian anchovy fishery launched a major Fishery Improvement Program (FIP). Supported by the Peruvian National Fisheries Society (SNP) and the Center for Development and Sustainable Fisheries (CeDePesca), the program's goal is to assist the transition of the fishery and fishmeal factories to the certification standards of IFFO RS and MSC. The FIP will enable this important fishery to meet the highest standards of management to ensure sustainability – now and in the future.

Cargill Aqua Nutrition is a strong supporter of the program and will participate in the FIP advisory committee along with the feed producer Skretting. We are also considering joining more FIPs to help other fisheries become certifiable to IFFO RS and MSC standards. This includes early discussions around FIPs for some tropical fisheries to support our requirements in Asia and Latin America.

## SUSTAINABLE MARINE INGREDIENTS

# 90.7%

of marine ingredients from forage fisheries were certified to IFFO RS

# 89.6%

of all marine ingredients were certified to IFFO RS

## THAILAND



## TACKLING SOCIAL ISSUES IN THAILAND

Cases of slavery in Thailand have lifted social issues high on our agenda. In response to this, we stopped buying fishmeal from Thailand throughout 2016, except for in our local operations, where we focused on using more trimmings and have worked on options to reduce fishmeal in the feed. However, to help address the social issues rather than avoid them, we have opened discussions with the Seafood Task Force in Thailand and will in 2017 join as full members, enabling us to join activities on social and environmental developments in this important supply chain.



# OUR PERFORMANCE

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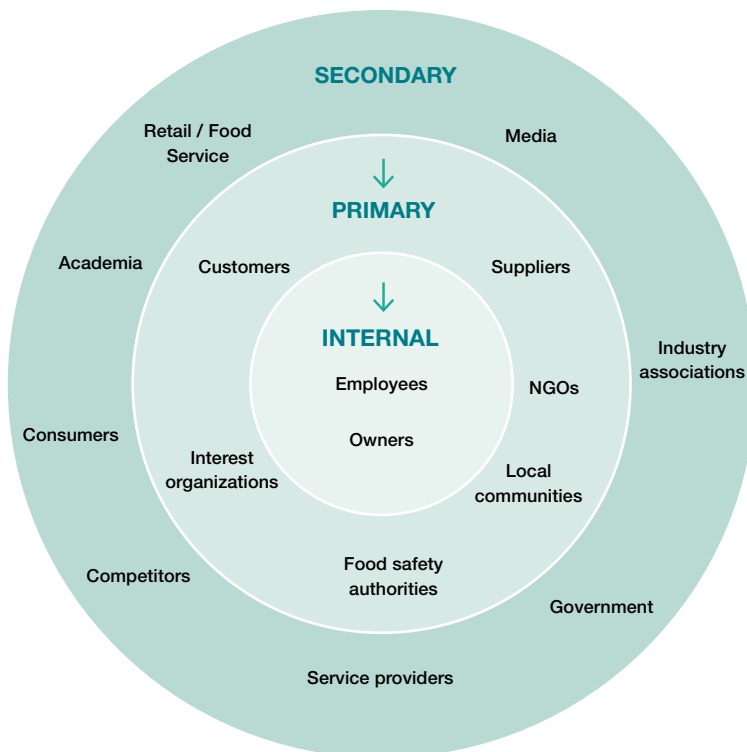




# Listening to our stakeholders

As a global supplier of feed for aquaculture and a critical part of the seafood supply chain, we interact with a highly diverse range of stakeholders. This highlights both the complexity and the importance of connectivity in our business.

Our approach to stakeholder engagement is to concentrate on entities or individuals that can reasonably be expected to significantly affect or be affected by the organization's activities, products, or services; and whose actions can reasonably be expected to affect the ability of the organization to successfully implement its strategies and achieve its objectives.



## ENGAGING WITH STAKEHOLDERS

Our key stakeholders are suppliers and customers, and these are clearly identified on a global and local level. We meet and communicate with stakeholders every day, and information from this is fed back into the organization at different levels as required. In addition, through a review of stakeholders' issues and feedback from the communities in which we operate, a stakeholder map was developed.

### Internal stakeholders

Dialogue with employees is continuous, through well-established local management structures and practices. Employee relations are comprehensively regulated by law. We apply common standards and values across our operations, exemplified by our GreenBook and ethical guidelines. In addition the Cargill Leadership Expectations were introduced in 2016 and these clearly set out the behaviours expected of our employees. The competence, engagement and efforts of all employees are crucial to the success of our business.

### Primary stakeholders

We have direct relationships with our customers, providing advice and services, and arranging local and regional customer conferences. Regular contact and technical reviews with customers ensure that we are well aware of and well positioned to attend to their specific needs and concerns. We also take part in customer associations, particularly the Global Salmon Initiative (GSI) where we can engage with many parties at once. We are increasingly engaged with independent third party certification schemes for feed and seafood.

Suppliers of feed raw materials are of key importance to us. A particular priority has been working with suppliers of marine ingredients where quality, safety and nutrition, as well as sustainability of the fisheries stocks, are addressed. If suppliers are not compliant with our standards for ethics and corporate social responsibilities, we will as a first step work with the supplier to obtain improvements based on a supplier development plan.

The emergence of voluntary standards for feed and fish producers has impacts across the supply chain. Such standards are often promoted publicly and so become demanded by food service and retail sectors. We participate in meetings and conferences with supplier communities, e.g. fish oil and fishmeal producers, to further enhance responsible sourcing – with a special focus on efficient use of by-products. We also engage with key third party certification bodies to share knowledge and assist in the development of aquaculture standards. In 2017, we joined a Fisheries improvement Project (FIP) in Peru, aiming to assist the transition of the fishery and fishmeal factories to the certification standards of IFFO RS and MSC.

Cargill Aqua Nutrition is represented on the Technical Committee for the development of the ASC feed standard, and regularly participates in IFFO meetings and Sustainable Fisheries Partnership (SFP) roundtables on fishmeal and fish oil in Europe and South America. Furthermore, we engage with the organizations supplying certificates on soy and palm oil products, such as RTRS, ProTerra and RSPO. Within animal welfare, we are reconnecting with the Royal Society for the Prevention of Cruelty to Animals (RSPCA) in the UK. We have previously assisted in the development of their RSPCA Assured (previously Freedom Food) standards, which are the highest welfare standards for farmed animals globally.

The NGO community working towards aquaculture is diverse, but focuses mainly on the impacts of raw material sourcing and application of feeds on farms. However, the number of NGOs working on social issues within aquaculture value chains is also increasing. Cargill Aqua Nutrition is selectively concentrating on those NGOs that seek constructive improvements in the industry. This includes wide groups of environmental organizations, labor organization and NGOs dedicated to other relevant topics. We work with the development

★ [For more on responsible sourcing and the Fisheries Improvement Project, please refer to p. 40](#)

★ [For more on certifications and sourcing, please refer to p. 9 and 48](#)

★ [For more on Sustainable Fisheries Partnership \[www.fishsource.org\]\(http://www.fishsource.org\)](#)

of industry standards based on multi-stakeholder involvement where various NGOs are represented.

We work to promote social and economic wellbeing of the communities we serve. We work in various communities to ensure access to safe, nutritious, affordable food, to promote economic development, to improve education. We also engage our employees in our efforts to build vibrant, stable operating communities.

### Secondary stakeholders

Cargill Aqua Nutrition sees industry associations necessary for ensuring sound regulatory framework for the aquaculture industry. In Europe, we work with FEFAC, where we hold a seat in the Fish Feed Committee and the Sustainability Committee. This gives access to inputs from organizations from member countries as well as trade organizations impacting the industry.

Cargill Aqua Nutrition is an associate member of the Global Salmon Initiative (GSI), and takes part in the GSI Feed Taskforce and the GSI Communications Task Force. Joint with peers and competitors, we are also engaged in the Seafood Business for Ocean Stewardship. The ambition is to lead a global transformation towards sustainable seafood production and a healthy ocean. The initiative will actively contribute to the United Nations Sustainable Development Goals (SDGs), and in particular Goal 14: *Conserve and sustainably use the oceans, seas and marine resources*.

Authorities and politicians are stakeholders at the local, regional and national levels who define the framework conditions for the industry. However, most other stakeholders expect us to perform and develop beyond legislated minimum standards. We actively engage with authorities and politicians, and take part in an open dialogue or information exchange to support the development and application of legislation as well as the development of our business. We believe transparent dialogue is a prerequisite for arriving at good and balanced decisions.

While we are a business-to-business organization, the feed supply chain is part of what shapes the reputation of the aquaculture industry and of farmed seafood. We strive to be transparent about what we do and how we perform, using dialogue, regular sustainability reporting and our web site to bring this information to the general public.

The retail and food service sectors are key to influencing consumers and the general public. If our sustainability activities are not communicated to these sectors, the end customer or potential customer will never be aware of our work. We are developing programs to address how to communicate on multiple issues at many levels, but this report is a major contributor to such information.

## MAJOR STAKEHOLDER CONCERNS

### The sourcing of soy from Brazil

The sourcing of soy protein concentrate from Brazil continued to be an area of concern for our stakeholders in 2016. The concern is linked to the association of soy with deforestation of the Amazon and Savannah regions.

Cargill has made an important commitment with the New York Declaration on Forests to do its part to end deforestation, endorsing the timeline to cut natural forest loss in half by 2020, and strive to end it by 2030. Cargill also backs the extension of the soy moratorium in the Brazilian Amazon Biome indefinitely, while the Forest code is fully launched.

As set forth in our Responsible Raw Material Sourcing Policy, Cargill Aqua Nutrition is

## MEMBERSHIP OF ORGANIZATIONS, STAKEHOLDER INITIATIVES, INDUSTRY ASSOCIATIONS

American Chamber of Commerce Norway

Aquaculture Stewardship Council (ASC)  
[www.asc-aqua.org](http://www.asc-aqua.org)

Bergen Chamber of Commerce

Best Aquaculture Practices (BAP)

[www.bap.gaaalliance.org](http://www.bap.gaaalliance.org)

European Feed Manufacturers Federation (FEFAC)  
[www.fefac.eu](http://www.fefac.eu)

FEFAC Soy sourcing guidelines

Global GAP  
[www.globalgap.org](http://www.globalgap.org)

Global GAP – Responsible Operations Standard

Global Salmon Initiative  
[www.globalsalmoninitiative.org](http://www.globalsalmoninitiative.org)

IFFO: The Marine Ingredients Association

IFFO-RS The Marine ingredients association responsible supply standard  
[www.iffonet](http://www.iffonet)

Norwegian Seafood Federation

PAQ (Label Rouge)

The ProTerra Foundation  
[www.proterrafoundation.org](http://www.proterrafoundation.org)

RSPO Round Table Responsible Palm Oil  
[www.rspo.org](http://www.rspo.org)

RTRS Round Table Responsible Soy  
[www.responsiblesoy.org](http://www.responsiblesoy.org)

SAG (Agriculture and Livestock Service, Chile)

Salmon Chile

committed to using deforestation free raw materials and to the New York Declaration on Forests. We will source soy products from Brazil, our main supplier, that are certified to ProTerra, RTRS or equivalent. Use of soy products from other countries can be approved given evidence that they are responsibly sourced or that the suppliers have development programs in place to achieve credible third-party certification.

The Aquaculture Stewardship Council (ASC), currently requires all soy to be certified to RTRS or ProTerra by June 2017. However, there are discussions to enable other schemes to be used where the risk of deforestation is lower, to remove the pressure from Amazonian sources of soy.

### Fish meal and oil sourcing for ASC certification for our customers

2016 saw an increase in the number of our customers achieving ASC certification on farming sites. The sourcing of fish meal and fish oil for ASC salmon standard compliant feed specifies the use of MSC or a level on the fish source score from the Sustainable Fisheries Partnership. We have worked with our suppliers to ensure availability of the right marine ingredients in feeds for our customers. Customer audits at our factories and proper documentation on these raw materials is part of this process.

Cargill Aqua Nutrition representatives also took part in stakeholder meetings through the ASC. As a member of the Technical Committee developing the new ASC Feed Standards, we work with a wide range of stakeholders represented on the Committee and are able to respond quickly to the changing demands. Anticipating the new standards, we are already working with our supply base to guide them towards future developments.

ASC species standards determine the maximum FFDR (Forage Fish Dependency Ratios) for both meal and oil. Echoing other certifications schemes, this puts pressure on feed producers to reduce the amount of fishmeal and oil derived from forage fisheries – even if their sustainability credentials are the highest. While we believe that fisheries can be sustainably managed, we have responded to these requirements by using more trimmings meal and oil where possible. We are also using and searching for alternative sources of protein and oils, especially for omega-3, which are key to meeting the expected growth of aquaculture.

### Ethoxyquin

The EU authorities regularly monitor the use and safety of all feed additives to ensure safety of the feed chain. Ethoxyquin is a legally permitted feed additive added to fish meal in order to prevent it from oxidation and self-igniting during storage and sea transportation. Increasing attention is being paid to the levels of ethoxyquin used in feed, and both the FDA and EFSA are looking to review approved levels of use.

The EU Commission will suspend the use of ethoxyquin as an antioxidant in animal feed until they can finally conclude on its safety for use. It has given an exemption for use in fishmeal through 30<sup>th</sup> September 2019, 31<sup>st</sup> December 2019 for other feed materials such as premixes, and 31<sup>st</sup> March 2020 for compound feed containing ethoxyquin.

Even though ethoxyquin is an approved feed additive and an antioxidant required for the safe transport of fish meal, we will take measures to avoid use of ethoxyquin in excess, given that alternatives can be found. We are exploring two ways to address this: By using less ethoxyquin and by finding viable alternatives. We have over the last decade succeeded in reducing ethoxyquin levels in our feeds by a combination of work with our suppliers to control their applications and reducing fishmeal inclusions in the feeds.

For transparency, on p.59 of this report we share performance data on ethoxyquin in our feed, which is well within current limits for compliance with regulations.

Soil association (Licencee and member of Aquaculture standards committee).

SSPO  
www.scottishsalmon.co.uk

Various national industry federations and trade associations, for example, AIC, UKAS, FHL

★ [For more on responsible sourcing, please refer to p. 39](#)

★ [For more on FFDR please refer to p. 50](#)

## CARGILL SUPPORTS

New York Declaration on Forests

Soy Moratorium in the Brazil Amazon Biome

For these organizations Cargill Aqua Nutrition may hold a position on the governance body, participate in projects and is a member.

Cargill Aqua Nutrition is a member of IFFO RS, RTRS and ProTerra.

Cargill Aqua Nutrition is an associate member of the Global Salmon Initiative (GSI), and takes part in the GSI Feed Taskforce and the GSI Communications Task Force.

★ [For more on our work to avoid contaminants, please refer to p. 21 and p. 59](#)

# Our performance on material topics

## Key to topic flags:

General disclosures

Economic disclosures

Environmental disclosures

Social disclosures

Codes relate to GRI Standard numbers and our customized indicators.

GRI 102-8

## GENERAL DISCLOSURES

### WORKFORCE

Our total workforce (employees and supervised workers) within our cold-water business has remained relatively stable for the last four years and totaled just over 1,000 at year-end 2016. Chile has the largest workforce, with Canada and Scotland relatively small in number by contrast. The majority of our employees work in the factories, in non-management roles. While 30 percent of our employees outside Vietnam work in management or administration roles, this share is only 9.5 percent in Vietnam.

The share of female employees has remained relatively stable since 2010. Our female staff tend to be more associated with management and administration roles and accounted for 18.6 percent of our workforce excl. Vietnam in 2016. The share of female employees in Vietnam is lower due to the relatively large staff of factory workers.

#### Total workforce 2016

	Canada	Chile	Norway	Scotland	Group (ex-VN)	Vietnam
Total – workforce	85	601	281	83	1,050	172
Total employees	82	325	274	79	760	157
Total supervised workers	3	276	7	4	290	15
Total indefinite or permanent employees	77	325	204	76	682	172
Total temporary or fixed term employees	5	0	73	3	81	0
Total full-time employees	80	325	274	72	751	172
Total part-time employees	2	0	5	7	14	0
Management and administration employees permanent	17	143	36	33	229	15
Other employees permanent	65	182	238	46	531	142
Female employees	16	51	54	16	137	20
Male employees	66	274	220	63	623	137
Female management / admin	35%	29%	25%	30%	29%	47%
Female senior management	22%	9%	22%	25%	17%	42%



**WORKFORCE COLLECTIVE BARGAINING**

The percentage of total employees covered by collective bargaining agreements remained relatively stable from 2015 and was 49 percent in 2016. In Vietnam, it was 100 percent, whilst in Scotland 0 percent.

**Employees covered by collective bargaining agreement**

% of employees	2013	2014	2015	2016
Canada	73	67	71	69
Chile	57	57	57	54
Norway	51	49	49	46
Scotland	0	0	0	0
Group ex VN	53	51	52	49
Vietnam	100	99	100	100

**MANAGEMENT STANDARDS**

Management standards are reported in the IMS section (see p. 8).

**SUPPLY CHAIN AUDITING**

Our control of our supply chain relies on our Responsible Raw Material Sourcing Policy, cascading through our Supplier Code of Conduct and verified by supplier audits. 2016 saw updates of the Sourcing Policy and Code of Conduct, integrating the legacy EWOS system with the Cargill one. This resulted in a delay in our supplier audits against targets.

**ECONOMIC DISCLOSURES**

**SALES AND PRODUCTION DATA**

2016 saw some challenges for the salmon industry globally, particularly in Chile, with an algal bloom in March resulting in a large decrease in the number of fish in the water. This had a knock-on effect on the total volume of feed required by customers later in the year. Also in Vietnam, the sales of feed for tilapia and snakehead decreased.

**ECONOMIC VALUE GENERATED AND DISTRIBUTED**

Investments in local communities are important to help develop the community and give back something. In 2016, our local management teams invested NOK 322,412 (approx. USD 38,000) back into local communities in Canada, Chile, Norway, Scotland and Vietnam. This was a low amount for these facilities and in general for Cargill Aqua Nutrition, reflecting the tough financial situation in 2016.

**FINANCIAL ASSISTANCE RECEIVED FROM GOVERNMENT**

In 2016, only Chile received significant assistance from the government, amounting to USD 1.26 million. USD 1 million of this was for training, and the rest was tax compensation for charitable donations.

**MINIMUM WAGES**

Minimum wage data is reviewed only for Vietnam, where it was felt by management that it was important to demonstrate compliance with legal minimums, as there is a perception that cheap labor may be exploited in this country. There is no difference in the wages shown by gender. In 2016, the legal minimum wage in Vietnam was 3,100,000 VND per month. Minimum entry wage paid by EWOS Vietnam was 3,320,000 VND in 2016. A number of EWOS Vietnam staff receive allowances in addition to the monthly base salary.

GRI 102-41

CUSTOMIZED #1

CUSTOMIZED #2

GRI 201-1

GRI 201-4

GRI 202-1

## PROPORTION OF LOCAL HIRES

Cargill Aqua Nutrition aims to use local management expertise where possible, but also encourages the movement of employees within the group to build experience and exchange knowledge. The majority of managers come from the country where the factories are located..

### Percentage of senior management from the local community (i.e. from same country) – 2016

	Canada	Chile	Norway	Scotland	Vietnam
Percent of senior management from local community	100	91	100	100	83

## ANTI-CORRUPTION TRAINING

The legacy EWOS businesses have applied a zero-tolerance policy for corruption and followed up with anti-corruption training of its employees, paying particular attention to management and staff most exposed to risks. 2016 saw further anti-corruption training in Canada and Vietnam, bringing management up to being fully trained. Management in Scotland, Chile and Norway already received full training in 2015.

## ENVIRONMENTAL DISCLOSURES

### MATERIALS USE

The use of fishmeal and fish oil was only slightly lower in 2016 compared to 2015, ending at 26.9 percent. There were no significant changes in our use of terrestrial ingredients from 2015 to 2016.

The table below provides an overview of our raw material use in 2016, countries of origin for terrestrial ingredients. Further details on marine ingredients are provided in the subsequent tables.

#### Group raw material categories by volume purchased in 2016

Ingredient Category*	Group Average (% of total)	Countries of Origin
Fishmeal	19.9	See below
Fish oil	11.5	See below
Vegetable Proteins	30.0	USA, Canada, Argentina, USA, China, Holland, Chile, Ukraine, Russia, UK, France, Belgium, Lithuania, India
<i>of which Soy Proteins</i>	16.4	Argentina, Brazil
Vegetable Oils	16.8	Canada, Chile, Argentina, Germany, Lithuania, Holland, Belgium, UK
<i>of which Soy Oil</i>	0.1	EU, China
<i>of which Palm Oil</i>	0.1	Indonesia, Malaysia, Papua New Guinea, Guatemala, Brazil
Animal by-Products	6.6	Canada, USA, Germany, France, Italy, Argentina, Brazil, Poland
Carbohydrates and Binders	15.2	Canada, USA, Vietnam, Chile, Germany, Poland, UK

In 2016, a significant El Nino resulted in a large drop in the biomass of the reduction fisheries in the Pacific. Good management of these fisheries resulted in a quick reduction of quotas, reducing the availability of fishmeal and fish, and leading us to source more of these ingredients from other regions, within the boundaries of the sourcing policy. Early reports show increased biomasses in the major fisheries in the Pacific, indicating that they are recovering after the natural pressure.

Total materials use is managed between the RMS and formulation teams.

GRI 202-2

GRI 205-2

GRI 301-1

\* Micro-ingredients and additives are not included

**Species and origins of forage fish derived fishmeal and fish oil used in EWOS branded feeds. Forage fisheries provide 67 percent of total marine ingredients.\***

Species	Country of Origin	% of Forage	IFFO RS	MSC	SFP Grade***
Anchovy	Chile, Peru	29	Y		B2 / C
Blue whiting	Denmark, Iceland, Norway, Faroe Islands, Ireland	31	Y**	2017	C
Capelin	Iceland	3	Y	2017	B2
Gulf menhaden	USA	8	Y		B1
Norway pout	Norway	2	Y		B1
Sand eel	Denmark, Norway	2	Y		B1 / C
Sardine	Chile, Panama	9	Y		n/a
Sprat	Denmark, Norway	11	Y		B1
Misc. species	n/a	5	n/a	n/a	n/a

\* Fisheries individually contributing less than 2 percent of the total fishmeal or fish oil are covered under Misc. species.

\*\* Blue whiting fisheries lost there IFFO RS certification during 2016, but have recovered it in 2017.

\*\*\* According to the SFP review of forage fisheries in August 2016 - n/a = not scored.

**Sources of fish by-products used to make fishmeal and fish oil for EWOS branded feed, by country of origin. Trimmings and offals provided 33 percent of marine ingredients used in 2016.**

Species	Country of Origin	% of fish by-products
Atlantic mackerel	Denmark, Iceland, Norway	10
Brazilian sardinella	Brazil	1
Capelin	Iceland	2
Hake	USA	2
Herring	Denmark, Iceland, Norway, UK	49
Jack mackerel	Chile	3
Sardine	India	2
White fish	Denmark, Iceland, Norway, UK, USA	24
Misc. species*	n/a	7

\* Species sourcing individually contributing less than 2 percent of total trimmings are summed in Misc. species.

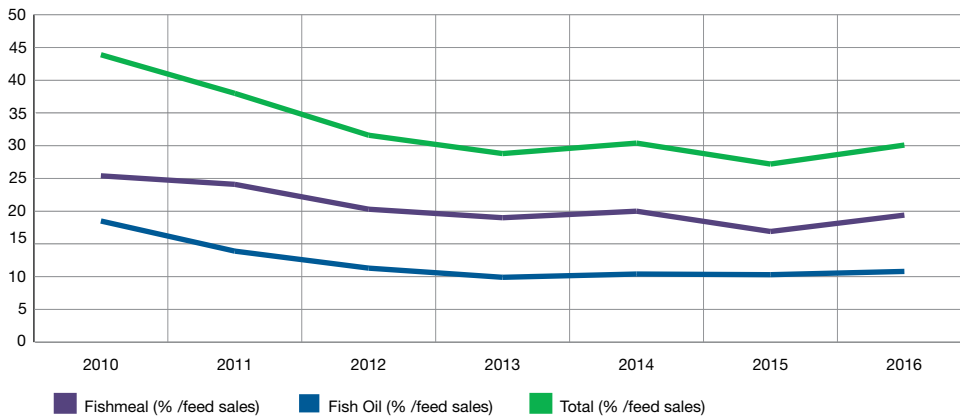
**MARINE INDEX**

The marine index is managed by the Risk Management and Sourcing team with the Formulation team. Whilst the average share of marine raw materials in the feed has remained relatively stable since 2013, it has been reduced from 55 percent in 2005 to 31.4 percent in 2016.

CUSTOMIZED #3

**Marine Index in Salmon feeds**

Percent (marine ingredients/ feed sales)



## MARINE NUTRIENT RATIOS

Marine protein and oil dependency ratios are shown for the group, excluding Vietnam which does not make salmon feed. These ratios were developed by EWOS (Crampton et al 2010) and demonstrate how much of the nutrient value from marine ingredients is transformed into farmed salmon. The 2016 values for marine protein are higher than 2015 due to the increased demand for RAPID, but the marine oil value is similar to 2015, still showing farmed salmon as a net producer of marine oils. There are country to country variations and the averages presented here take into account variations in formulation and eFCR locally.

MPDR = (fishmeal% \* 68% \* average eFCR) / 17.5%

MODR = (fishoil% + (fishmeal% \* 8%)) \* average eFCR / 19.7%

### Group average MPDR and MODR for 2016

	2015	2016
Global eFCR*	1.30	1.35
Marine Protein Dependency Ratio (MPDR)	0.83	1.02
Marine Oil Dependency Ratio (MODR)	0.74	0.84

The ASC calculates the marine nutrient ratios according to only the forage fish sourced meal and oil in the feeds. This provides a slightly different calculation, which also takes into account the source of the oil. The ASC only requires feed supplied to certified customers to meet their requirements, but across the group supplying cold-water feeds, in 2016 the average feeds were compliant with the demands of FFDRm < 1.35 and FFDRo < 2.95 (ASC Salmon Standards 2012 which are currently under review).

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

FFDRo = (forage fishoil in feed % x eFCR) / 5.0 or 7.0 depending on source of fish

### Group average FFDR for meal and oil in 2016

	2015	2016
Global eFCR*	1.30	1.35
Forage Fish Dependency Ratio (meal)	0.60	0.73
Forage Fish Dependency Ratio (oil)	1.70	1.97

## PLANT INDEX

Cargill Aqua Nutrition has developed a new data set for reporting use of soy and palm materials certified to specific standards. In 2017, we will put more emphasis on managing the soy purchasing in Chile, as more standards for soy have become available.

The plant index is managed between RMS and formulation.

### 2016 use of soy and palm products certified to 3rd party schemes

		Canada	Chile	Norway	Scotland	Group (ex-VN)	Vietnam
Soy products	total t	0	39317	87924	12073*	139314	121.74
		n/a	ProTerra	ProTerra	ProTerra & Organic		ProTerra
	%	n/a	8.7	100	100	74.2	80.5
Palm oil	total t	0	0	0	720	720	0
		n/a	n/a	n/a	RSPO		n/a
	%	n/a	n/a	n/a	100	100	n/a

\* Customer specific eFCRs will result in more accurate MPDR and MODR values.

\* Customer specific eFCR will give more accurate FFDR values.

CUSTOMIZED #4

\* A small volume of organic soy oil was used, the rest of the material was soy protein concentrate certified to ProTerra standards.  
n/a = not applicable

## WATER USAGE

The water used per kilo of feed sold was 0.506 liters/kg in 2016, slightly up from 0.46 liters/kg in 2015. We are conscious of the importance of water usage and potential negative impact of water discharge and have been collecting data since 2015 to support monitoring and follow up.

		Canada	Chile	Norway	Scotland	Group (ex-VN)	Vietnam
Total water used (liters)	2015	83,925,345	171,495,000	228,047,000	19,365,000	502,832,345	60,627,000
	2016	79,494,304	163,125,000	203,922,792	24,705,000	471,247,096	41,388,000
Water per tonne feed produced (liters/tonne)	2015	1156	498	406	168	460	919
	2016	1161	595	431	216	506	777
Water source	2016	Mains water	Mains water	Mains water	Mains water		Tanker water for offices, abstracted from river for production

GRI 303-1

## ENERGY USE

Total energy consumption (excl. Vietnam) decreased in 2016 due to lower feed volumes, yet energy use per tonne of feed increased by close to 4 percent and ended in line with our performance in 2013. The introduction of biofuel in Scotland in 2014 has significantly reduced our fuel oil consumption.

2016 saw significant energy improvements in Vietnam, where we have installed a new production line. Energy use per tonne of feed was down 9.3 percent from 2015 to 2016, mainly through reduced use of biomass (rice husk).

### Purchased Energy Consumption by Type, ex. Vietnam (GJ)

Energy Type	Energy Source	2013	2014	2015	2016
Indirect	Electricity	430,281	482,210	447,667	412,873
Direct	Biofuel	0	41,510	59,914	49,374
Direct	Diesel	1,349	1,307	2,644	2,186
Direct	Fuel oil	233,992	197,720	175,309	146,254
Direct	LPG	240,741	70,925	100,680	62,895
Direct	Natural gas	232,312	350,957	295,878	282,620
Direct	Propane	1,097	1,111	1,266	1,256
Total direct + indirect		1,139,771	1,145,740	1,083,358	957,458
Change year on year (%)		-3.8%	+0.5%	-5.4%	-11.6%
Energy per tonne feed (GJ/t)		1.024	1.018	0.990	1.029
Change year on year (%)		+2.6%	-0.5%	-2.8%	+3.9%

### Purchased Energy Consumption by Type, Vietnam (GJ)

Energy Type	Energy Source	2013	2014	2015	2016
Indirect	Electricity	14,102	22,832	26,665	23,871
Direct	Biomass (from rice husk)	75,335	104,282	119,477	83,141
Total direct + indirect		89,442	127,122	146,151	107,018
Change year on year (%)		+11.7%	+42.1%	+15.0%	-26.8%
Energy per tonne feed (GJ/t)		2.165	2.065	2.215	2.009
Change year on year (%)		-11.9%	-4.6%	+7.2%	-9.3%

GRI 302-1 / 302-3

## REDUCTION OF ENERGY CONSUMPTION

Work continues to increase energy efficiency and reduce emissions of greenhouse gases across our operations. Notable initiatives from 2016 were:

- **Canada:** Focus on turning off equipment and reducing drier temperature when not in use
- **Chile:** Reduced electricity use through optimising hammer mill screen size to the feed produced
- **Scotland:** Heat recovery modification on boiler to capture more heat and use it to heat water for pre-conditioner has direct saving on electricity
- **Vietnam:** Direct energy savings from new drier system based on heat recovery from boilers using biofuel

## GHG EMISSIONS (SCOPE 1 & 2)

We have reduced our total GHG emissions (excl. Vietnam) by close to 10 percent since 2013. Our factory in Scotland has been key to this, having reduced its GHG emissions by half since 2013 by a combination of installing a biomass boiler and the national energy mix for electricity changing to reduce coal fired power stations and use more renewables.

In Vietnam, we have seen an increase in GHG emissions, mainly driven by increased electricity use per tonne feed year on year from 2014. Electricity in Vietnam is mainly from coal fired power stations with significant GHG emissions.

### Greenhouse gas emissions, excl. Vietnam (scope 1 & 2)

	2013	2014	2015	2016
Total Scope 1&2 GHG emissions (tCO <sub>2</sub> e)	67,456	61,259	57,945	50,942
Average Scope 1&2 GHG intensity (tCO <sub>2</sub> e/t feed produced)	0.061	0.054	0.053	0.055
Change year on year (%)	+11.2	-11.3	-2.8	+3.2

### Greenhouse gas emissions, Vietnam (scope 1 & 2)

	2013	2014	2015	2016
Total Scope 1&2 GHG emissions (tCO <sub>2</sub> e)	1,375	2,226	3,443	2,917
Average Scope 1&2 GHG intensity (tCO <sub>2</sub> e/t feed produced)	0.033	0.036	0.052	0.055
Change year on year (%)	-21.8	+8.0	+30.7	+4.7
Increased 67% since 2013				

## ECOLOGICAL FOOTPRINT AND CARBON FOOTPRINT

We have been using ecological footprint models for our EWOS branded feed (excl. Vietnam) since 2005. These models cover the entire value chain for our feed, from production data for raw materials through processing to leaving the factory gate. We have not set targets for the footprints, but record values on an annual basis to monitor progress. As our footprinting models underwent a major review in 2012, we only present data since 2013.

In 2016, we saw an increase in the average ecological footprint. This was due to higher use of fishmeal as the marine environment is relatively unproductive compared to terrestrial farming systems. Thus, even trimmings meals – which represent about one third of our marine raw material use – count heavily in our footprint calculations.

The footprint model is only indicative and will be updated. This work is progressing in 2017 through engagement in LCA initiatives which will generate better data, not least on GHG Scope 3.

GRI 302-4

GRI 305-1 / 305-2 / 305-4

CUSTOMIZED #5

**Feed footprint calculations (excl. Vietnam)**

	2013	2014	2015	2016
Total feed ecological footprint (ha)	6,560,000	11,980,000	9,800,000	13,480,000
Average feed ecological footprint (ha/t)	5.89	10.64	8.96	14.48
Total feed GHG (Scope 3) (tCO <sub>2</sub> e)	1,870,000	1,930,000	1,750,000	1,510,000
Average feed GHG intensity (Scope 3) (tCO <sub>2</sub> e/t)	1.68	1.71	1.60	1.62
Average feed GHG footprint (Scope 1, 2 & 3) (tCO <sub>2</sub> e/t)	1.74	1.77	1.65	1.68

**RECLAIMING AND RECYCLING OF PRODUCTS**

This topic is managed by the Operations team. Recycling has increased by 6.5 percent since 2013, and recycling initiatives for big bags and similar materials are working well, especially in Scotland. However, options for re-use are limited due to biosecurity concerns, especially for output packaging.

We do not have data for reclaiming and recycling in Vietnam in 2016.

**Reclaiming and recycling, excl. Vietnam**

	2013	2014	2015	2016
Total packaging (t)	23,800	25,200	30,000	21,900
Total reclaimed, recycled or re-used (%)	46.8	45.8	55.5	52.3

**IMPACT ON BIODIVERSITY AT THE FACILITY**

Impact on biodiversity at the facility is no longer a material topic for Cargill Aqua Nutrition, as it was associated with the fish farming operations of EWOS Innovation which is now part of the global aquaculture R&D team in Cargill. The impact of our raw material sourcing on biodiversity is covered by our customized indicator #3.

**INITIATIVES TO MITIGATE ENVIRONMENTAL IMPACT**

Initiatives to mitigate the environmental impacts of our operations include:

**Canada:**

- Installed LED lights outside
- Redirected air from cooler into plant air scrubber to reduce emissions
- Better use of unprocessed feed from startup of run

**Chile:**

- Reduce non-recyclable waste and improved recycling across the company, with packaging recycling reaching 57 percent in 2016
- Improved water and energy use

**Norway:**

- Reduced use of packaging by introducing bulk to the Bergneset factory

**Vietnam:**

- Maintenance of boiler and two older lines continuing into 2017

**FINES FOR NON-COMPLIANCE WITH ENVIRONMENTAL SAFETY LAWS**

Across the group and including Vietnam, there were only two cases of non-compliances with environmental safety laws in 2016. These were both related to one site in Norway where there was a spill of vegetable oil. In total, less than 6 m<sup>3</sup> were spilt in the two cases and less than 1 m<sup>3</sup> reached the sea. The rest was contained on land. The cases were closed with no fines being imposed.

GRI 301-3

GRI 304-2

CUSTOMIZED #6

GRI 307-1

## FEED EFFICIENCIES

While the efficiencies of EWOS feeds are generally high, they also vary between markets. For this reason, we do not present group totals, but choose to present a snap shot of efficiencies from individual customers. They were provided by farmers from sites that use only EWOS branded feed and that are fully harvested out during the reporting period. These data reflect the performance of our products, but also the biological and other challenges faced by our customers.

### Examples of feed efficiencies from 2016

	Canada	Chile	Norway	Scotland
bEFI	117	102	122	94
bFCR	1.27	1.24	1.29	1.17
eEFI	132	110	130	98
eFCR	1.43	1.34	1.38	1.21

**bEFI:** biological performance of the EWOS Feed Index, a measure of growth rate, but not taking mortalities or feed losses into account. This is the potential of the feed to grow the fish.

**bFCR:** biological feed conversion rate: the amount of feed required to grow 1kg of fish, not taking into account mortalities or feed losses. The reflects the potential of the feed efficiency.

**eEFI:** economic EFI, taking mortalities and feed losses into account and so reflects the actual growth rate of the fish.

**eFCR:** economic FCR, taking mortalities and feed losses into account: the actual resource efficiency of the feed at creating salmon which will have reached the market.

## HEALTH FEED SALES

Health feeds are an important range of products which help support fish health and welfare. We define health feeds internally as feeds which have a differentiated function relating to fish health or fish health and performance. We use this customised indicator to track their sales as percentage of total sales to give us an indication of the success of these products in the market.

Health feeds have not been sold in Vietnam, but are being developed for future deployment in warm-water markets.

### Health feed sales as percent of total feed sales

	Canada	Chile	Norway	Scotland	Group (ex-VN)
2013	16.8	27.4	16.9	17.4	20.5
2014	14.0	26.6	23.4	23.2	23.9
2015	15.4	29.1	21.7	23.7	23.8
2016	13.4	25.9	22.8	33.7	24.4

## MEDICATED FEED SALES

Medications are only added to EWOS feeds on receipt of a veterinary prescription, detailing the product and dose to be added to a tonnage of feed. In Vietnam, it is not allowed for a feed company to add medicines to a feed; only farmers can do this.

This indicator covers medicines that normally relate to treatments against sea lice other than our specific functional feeds, which are not classed as medicines. Sales of feed containing antibiotics is reported separately below.

### Medicated feed sales (excl. antibiotics) as percent of total feed sales

	Canada	Chile	Norway	Scotland	Group (ex-VN)
2013	1.51	2.47	1.64	3.56	2.10
2014	1.22	0.89	2.91	3.44	2.22
2015	1.75	0.61	3.96	3.26	2.67
2016	0.99	0.59	4.59	3.09	2.96

CUSTOMIZED #7

CUSTOMIZED #8

CUSTOMIZED #9





## ANTIBIOTIC FEED SALES

Antibiotics are only added to EWOS feeds on receipt of a veterinary prescription, detailing the product and dose to be added to a tonnage of feed. In Vietnam, it is not allowed for a feed company to add antibiotics to feed; only farmers can do this.

This customized indicator shows the sales of feeds with antibiotics added to prescription relative to total feed sales. It reflects demand from customers.

### Feeds sold including antibiotics as percent of total feed sales

	Canada	Chile	Norway	Scotland	Group (ex-VN)
2013	2.08	11.13	0.00	0.00	3.87
2014	1.89	10.83	0.00	0.02	3.59
2015	2.66	14.13	0.00	0.06	4.67
2016	1.56	8.61	0.00	0.02	2.63

CUSTOMIZED #10

## SOCIAL DISCLOSURES

### OCCUPATIONAL HEALTH AND SAFETY

Occupational health and safety is managed within the Environmental Health and Safety part of the operations team. Our methods for measuring injury and occupational disease rates are laid out in the Cargill Injury and Illness Metric Criteria and Definitions and are reported here within the GRI reporting framework.

**Reportable Injury:** Any work-related injury or illness requiring medical treatment either at the location or outside the facility not defined as first aid.

**Lost Time Injury or Disease:** Any work-related injury or illness that results in an employee's inability to work one or more calendar days based upon a medical determination. This would include scheduled workday, non-scheduled workdays, weekends, vacation and holidays. Note: Lost time does not include the date of the injury or onset of illness.

**Lost Work Days:** The number of calendar days that an employee is unable to work because of a work-related injury or illness. Days counted would include schedule workdays, non-scheduled workdays, weekends, vacation and holidays. Note: The count of days does not include the date of the injury or onset of illness.

**Injury Rate:** The number of reportable injuries in the reporting period per 200,000 hours worked

**Occupational Disease Rate:** The number of occupational disease cases starting in the reporting period per 200,000 hours worked.

**Lost Day Rate:** The number of days lost through injuries or occupational diseases per 200,000 hours worked.

GRI 403-2



## INJURIES AND OCCUPATIONAL DISEASES – EMPLOYEES AND CONTRACTORS

### Lost time injury rate

We have not had any injuries reported for females at any facility since 2013. The number of injuries to males reflects proportion of males working in our factories, who are more exposed to risks. Chile had high use of contractors in the reporting period.

Injury Rate (number per 200,000 hours worked)		Canada	Chile	Norway	Scotland	Vietnam	Group
<b>Employees</b>							
Female	2013	0	0	0	0	0	0
	2016	0	0	0	0	0	0
Male	2013	5.51	1.58	3.36	0	1.41	2.18
	2016	5.81	1.5	1.53	3.85	0	1.61
<b>Contractors</b>							
Female	2013	0	0	0	0	0	0
	2016	0	0	0	0	0	0
Male	2013	0	4.51	0	0	0	4.45
	2016	0	2.39	0	0	0	2.36

### Occupational diseases

The last reported incident of occupational disease was in Norway for a male in 2013.

### Lost Day Rate – days lost per 200,000hr worked

The Lost Day Rate is calculated from the day after the accident. It reflects the total number of accidents and indicates their severity. We have not recorded any lost days among our female employees, and are pleased to see an overall decrease in the Lost Day Rate for our male employees.

Chile had high use of contractors in the reporting period.

Lost day rate (days per 200,000hrs worked)		Canada	Chile	Norway	Scotland	Vietnam	Group
<b>Employees</b>							
Female	2013	0	0	0	0	0	0
	2016	0	0	0	0	0	0
Male	2013	22	240	100	0	9	371
	2016	73	38	14	3	0	128
<b>Contractors</b>							
Total	2013	0	34	0	0	0	33
	2016	0	12	0	0	0	12

### Fatalities

There were no work-related fatalities in the reporting facilities in 2016, nor in the broader Cargill Aqua Nutrition during the reporting period.

## Absentee Rate

We report absentee rate as absent days relative to total working days, against a 2013 benchmark. Chile had high use of contractors in the reporting period.

### Absenteeism rates for 2016

	Absentee Rate in %	Canada	Chile	Norway	Scotland	Vietnam	Group
Employees							
Female	2013	1.4	2.6	3.7	0.2	1.8	2.6
	2016	0.7	3.3	4.6	0.2	0.2	2.5
Male	2013	3.6	1.8	5.1	2.9	0.7	2.7
	2016	3.1	0.7	4.8	3.3	0.3	1.9
Contractors							
Female	2013	0	6.8	0	0	0	6.8
	2016	0	15.9	0	0	0	15.9
Male	2013	0	1.8	0	0	0	1.8
	2016	0	0.9	0	0	0	0.8

## TRAINING

In 2016, an average of 1.6 percent of working hours were logged as training across the reporting facilities, with 1.76 percent for the cold-water activities. Of the latter, 46 percent was spent on management, reflecting the integrations process and the need to update management on new Cargill procedures. There are however large variations between facilities, and in Canada most of the time for training was spent on employees.

### Average hours of training per employee by gender and employee category

#### Average hours training per employee in category

	2013	2014	2015	2016
Total employee training	36.5	33.3	33.9	35.3
Total female training	56.7	45.9	37.7	38.4
Total male training	32.8	31.2	33.2	34.7
Management and admin training	57.6	41.7	56.9	56.8
Other employee training	31.2	31.4	27.7	26.6
Permanent employee training	36.7	32.4	34.2	34.7
Temporary or part-time employee training	21.7	23.5	17.2	23.9

## WHISTLE BLOWING

There were no whistle blowing incidents across the reporting facilities, including Vietnam, in 2016. This included anonymous incidents. The last incident was in 2014.

GRI 404-1

CUSTOMIZED #11



### FINES FOR NON-COMPLIANCE WITH FOOD SAFETY

There were no cases of non-compliance with food safety regulations in 2016. The last case of such non-compliance was in 2014.

### CONTAMINANTS

#### Managing food safety

EU legislation on raw materials, feed and fish makes sure consumers are well protected from risk, building in large safety margins. For two years running across the group we have had no regulatory non-compliance cases for food safety. To achieve this, we apply our integrated management system and FSQR Policy Manual to ensure our products comply with all applicable standards and regulations for contaminants. They encompass prerequisite programs for food safety in the manufacture of food and feed for animals (PAS 222) along with a Hazard Analysis (and) Critical Control Point (HACCP) system for monitoring and managing possible contaminants in our raw materials and feed. Based on risk assessments of suppliers, regions and raw materials, we run a continuous monitoring program, applying random sampling and external laboratory analysis according to risk levels for the following hazards:

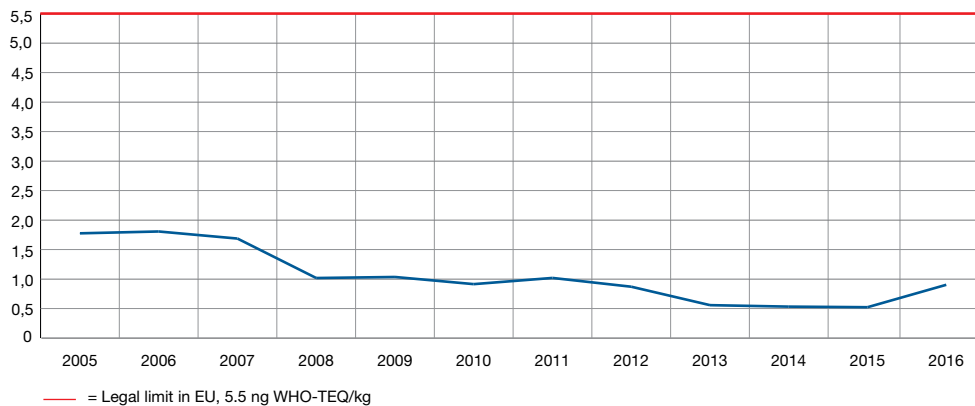
- Mycotoxins
- Pesticides
- Heavy metals
- Dioxins and PCBs
- Antibiotic residues
- Colorants and forbidden substances residues

#### Dioxins, PCBs and ethoxyquin

Our stakeholders are particularly concerned about the levels of dioxins, PCBs and the antioxidant ethoxyquin in salmon, which they enter with the marine ingredients used in feed. Through reducing the share of marine ingredients in our feed, and working with our suppliers to manage contaminants in their products, we have reached levels for dioxins, PCBs and ethoxyquin well below their respective maximum safe limits.

#### Dioxins and PCBs in feed

Sum Dioxins, Furans and Dioxin-like PCBs (ngWHO-TEQ/kg feed) \*



GRI 416-2

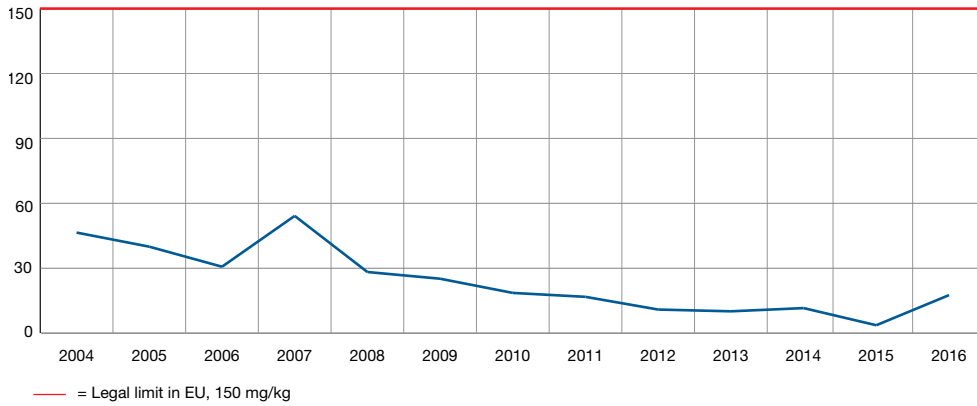
\* Average per year (excl. Vietnam)  
Feed legal limit in EU is 5.5 ngWHO-TEQ/kg

Nevertheless, we saw a slight increase in the level of dioxins and PCBs in 2016 due to more use of fish oil from Europe and less from South America after the El Nino affected forage fisheries there. Fish oil from South America contains less dioxins and PCBs, but still the feed was nearly 80 percent below the legal limit in the EU.



**Ethoxyquin in feed**

Ethoxyquin in Feed (mg/kg feed) \*



\* Average per year (excl. Vietnam).  
Feed legal limit in EU is 150mg/kg.

Similarly, we also saw a small increase in ethoxyquin levels due to more use of fishmeal in the average diet across Cargill Aqua Nutrition, but the content is still about 12 percent of the EU legal limit for feed. The increase in 2016 was related to increased use of fishmeal across our product mix.

**CHILD LABOR**

Cargill Aqua Nutrition respects the four fundamental principles and associated rights that are considered fundamental to social justice by the International Labour Organization (ILO). Furthermore, we also adhere to the OECD's Guidelines for Multinational Enterprises.

Cargill Aqua Nutrition has defined policies and standards that apply for the entire group, including: ethical and corporate responsibility guidelines, whistle blowing guidelines and sustainability principles directly related to social aspects. Our ethical and corporate responsibility guidelines state equal work opportunities, just treatment and a working environment free of discrimination.

Cargill Aqua Nutrition does not see any risk for incidents of child labor or for incidents of young workers being exposed to hazardous work. In Vietnam, records of all employees' government ID cards are kept, which list the date of birth. Vietnam fully complies with Vietnamese law on the age of employment.

**VIOLATIONS OF INDIGENOUS PEOPLES' RIGHTS**

There were no incidents of violations of indigenous peoples in 2016, or since records were started in 2010. Our factories are well established in the local communities where they are sited and generally not exposed to risks of violations of indigenous peoples.

**FINES FOR NON-COMPLIANCE WITH LAWS AND REGULATIONS – SOCIAL AND ECONOMIC**

There were no cases of non-compliance with such laws and regulations in 2016.

GRI 408-1

GRI 411-1

GRI 419-1

**LOCAL COMMUNITY COMPLAINTS**

Being a good neighbor is an essential part of doing business for Cargill Aqua Nutrition and any complaints are dealt with as quickly as possible, normally by the Operations Team. However, 2016 saw a steep rise in complaints about smell for our operation in Scotland. The source of the problem has been identified and requests for a new biofilter are being processed, which should solve the issue. There was also a single complaint about smell in Canada. Finally, a complaint about foam on the effluent water from one facility in Norway was resolved by changing cleaning procedures for the scrubber which was meant to prevent this. The incident was minor, with the foam rapidly dispersing, but was acted on quickly.

<b>Complaint</b>	<b>Canada</b>	<b>Chile</b>	<b>Norway</b>	<b>Scotland</b>	<b>Vietnam</b>
Environmental	0	0	1	10	0
Noise	0	0	0	0	0
Smell	1	0	0	0	0
Traffic	0	0	0	0	0
Other	0	0	0	0	0
<b>Total</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>10</b>	<b>0</b>

CUSTOMIZED #12

# Report scope and GRI index

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This report has been prepared in accordance with the GRI Standards: Core option. The following pages provide an index to GRI Standard and customised topics and impacts that we have identified as material in our operations.

## **REPORTING ENTITIES**

This report introduces Cargill Aqua Nutrition as a whole, but reports on data from the EWOS branded factories: cold-water operations based in Canada, Chile, Norway and Scotland and the relevant data for Vietnam. This is the first year reporting after the Cargill acquisition of EWOS and there are some changes in reporting following that. Notably, EWOS Innovation has not reported in 2016, as this was merged into Cargill Innovation Center. Where appropriate, 2013 is used as the benchmark year.

## **MANAGEMENT APPROACH**

The structure of Cargill Aqua Nutrition enables local and global management of topics and impacts. Local management drives the individual business, whilst cross-functional teams provide co-ordination and knowledge sharing across the group. These teams operate in areas such as raw material sourcing; factory operations; formulation; human resources; sales and marketing; and technology implementation. This structure allows global and local goals to be set where appropriate, as well as monitoring performance for the broader set of topics. More details on how individual topics are managed and where topic boundaries are set are provided in the report.

## **EXTERNAL ASSURANCE**

Cargill Aqua Nutrition has chosen not to seek external assurance for the Sustainability Report 2016, our first year of reporting in accordance with GRI Standards: Core option.

**GENERAL DISCLOSURES**

<b>GRI Standard Number</b>	<b>GRI Standard Title</b>	<b>Disclosure Number</b>	<b>Disclosure Title Individual disclosure items ('a', 'b', 'c', etc.) are not listed here</b>	<b>Core Options</b>	<b>Page</b>
GRI 102	General Disclosures	102-01	Name of the organization	Core	<a href="#">02</a>
GRI 102	General Disclosures	102-02	Activities, brands, products, and services	Core	<a href="#">11</a>
GRI 102	General Disclosures	102-03	Location of headquarters	Core	<a href="#">02</a>
GRI 102	General Disclosures	102-04	Location of operations	Core	<a href="#">03</a>
GRI 102	General Disclosures	102-05	Ownership and legal form	Core	<a href="#">02</a>
GRI 102	General Disclosures	102-06	Markets served	Core	<a href="#">03</a>
GRI 102	General Disclosures	102-07	Scale of the organization	Core	<a href="#">02 / 11</a>
GRI 102	General Disclosures	102-08	Information on employees and other workers	Core	<a href="#">46</a>
GRI 102	General Disclosures	102-09	Supply chain	Core	<a href="#">38 / 48</a>
GRI 102	General Disclosures	102-10	Significant changes to the organization and its supply chain	Core	<a href="#">02</a>
GRI 102	General Disclosures	102-11	Precautionary Principle or approach	Core	<a href="#">12</a>
GRI 102	General Disclosures	102-12	External initiatives	Core	<a href="#">44</a>
GRI 102	General Disclosures	102-13	Membership of associations	Core	<a href="#">44</a>
GRI 102	General Disclosures	102-14	Statement from senior decision-maker	Core	<a href="#">04</a>
GRI 102	General Disclosures	102-16	Values, principles, standards, and norms of behavior	Core	<a href="#">12 / 43</a>
GRI 102	General Disclosures	102-18	Governance structure	Core	<a href="#">12</a>
GRI 102	General Disclosures	102-40	List of stakeholder groups	Core	<a href="#">42</a>
GRI 102	General Disclosures	102-41	Collective bargaining agreements	Core	<a href="#">47</a>
GRI 102	General Disclosures	102-42	Identifying and selecting stakeholders	Core	<a href="#">42</a>
GRI 102	General Disclosures	102-43	Approach to stakeholder engagement	Core	<a href="#">42</a>
GRI 102	General Disclosures	102-44	Key topics and concerns raised	Core	<a href="#">12</a>
GRI 102	General Disclosures	102-45	Entities included in the consolidated financial statements	Core	<a href="#">02*</a>
GRI 102	General Disclosures	102-46	Defining report content and topic Boundaries	Core	<a href="#">02 / 61</a>
GRI 102	General Disclosures	102-47	List of material topics	Core	<a href="#">13 / 63</a>
GRI 102	General Disclosures	102-48	Restatements of information	Core	<a href="#">61</a>
GRI 102	General Disclosures	102-49	Changes in reporting	Core	<a href="#">61</a>
GRI 102	General Disclosures	102-50	Reporting period	Core	<a href="#">61</a>
GRI 102	General Disclosures	102-51	Date of most recent report	Core	<a href="#">61</a>
GRI 102	General Disclosures	102-52	Reporting cycle	Core	<a href="#">61</a>
GRI 102	General Disclosures	102-53	Contact point for questions regarding the report	Core	<a href="#">inside cover</a>
GRI 102	General Disclosures	102-54	Claims of reporting in accordance with the GRI Standards	Core	<a href="#">61</a>
GRI 102	General Disclosures	102-55	GRI content index	Core	<a href="#">62</a>
GRI 102	General Disclosures	102-56	External assurance	Core	<a href="#">61</a>
GRI 103	Management Approach	103-1	Explanation of the material topic and its Boundary	Core	<a href="#">13 / 63</a>
GRI 103	Management Approach	103-2	The management approach and its components	Core	<a href="#">12 / 61</a>
GRI 103	Management Approach	103-3	Evaluation of the management approach	Core	<a href="#">12</a>

\* As a privately owned company, Cargill does not openly disclose details to the level of Cargill Aqua Nutrition.



**ECONOMIC, ENVIRONMENTAL AND SOCIAL STANDARD DISCLOSURES**

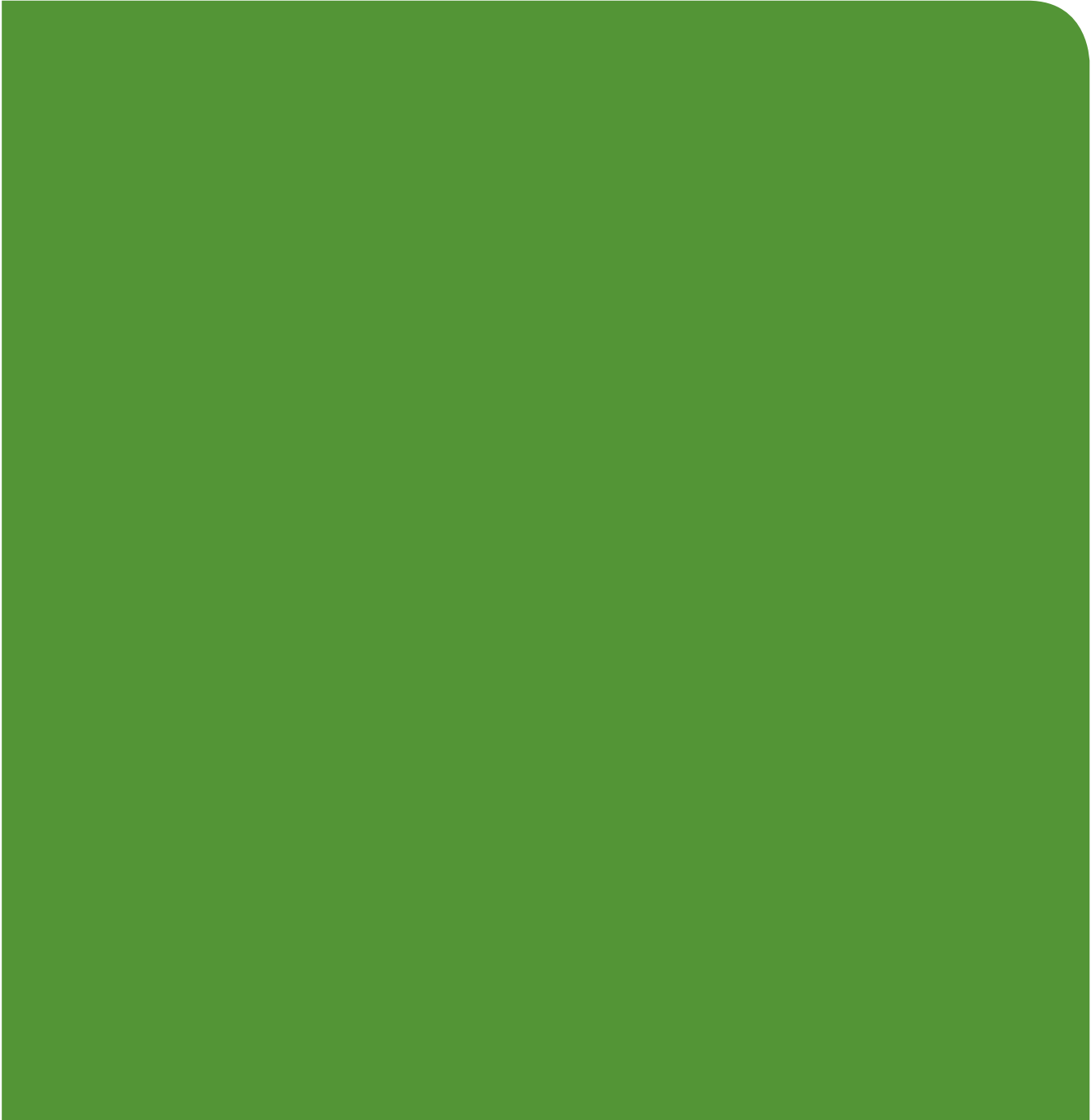
<b>GRI Standard Number</b>	<b>GRI Standard Title</b>	<b>Disclosure Number</b>	<b>Disclosure Title Individual disclosure items ('a', 'b', 'c', etc.) are not listed here</b>	<b>Topic Boundary</b>	<b>Page</b>
GRI 201	Economic Performance	201-1	Direct economic value generated and distributed	Local community	47
GRI 201	Economic Performance	201-4	Financial assistance received from government	Internal	47
GRI 202	Market Presence	202-1	Ratios of standard entry level wage by gender compared to local minimum wage	Local community	47
GRI 202	Market Presence	202-2	Proportion of senior management hired from the local community	Local community	48
GRI 205	Anti-Corruption	205-2	Communication and training about anti-corruption policies and procedures	Internal	48
GRI 301	Materials	301-1	Materials used by weight or volume	Upstream	48
GRI 301	Materials	301-3	Reclaimed products and their packaging materials	Upstream	53
GRI 302	Energy	302-1	Energy consumption within the organization	Internal	51
GRI 302	Energy	302-3	Energy intensity	Internal	51
GRI 302	Energy	302-4	Reduction of energy consumption	Internal	52
GRI 303	Water	303-1	Water withdrawal by source	Internal	51
GRI 304	Biodiversity	304-2	Significant impacts of activities, products, and services on biodiversity	Internal	53
GRI 305	Emissions	305-1	Direct (scope 1) GHG emissions	Internal	52
GRI 305	Emissions	305-2	Energy indirect (scope 2) GHG emissions	Upstream	52
GRI 305	Emissions	305-4	GHG emissions intensity	Internal	52
GRI 307	Environmental Compliance	307-1	Non-compliance with environmental laws and regulations	Internal	53
GRI 403	Occupation Health and Safety	403-2	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	Internal	55
GRI 404	Training and Education	404-1	Average hours of training per year per employee	Internal	57
GRI 408	Child Labor	408-1	Operations and suppliers at significant risk for incidents of child labor	Internal	59
GRI 411	Rights of Indigenous Peoples	411-1	Incidents of violations involving rights of indigenous peoples	Internal	59
GRI 416	Customer Health and Safety	416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	Internal	58
GRI 419-1	Socioeconomic Compliance	419-1	Non-compliance with laws and regulations in the social and economic area	Internal	59

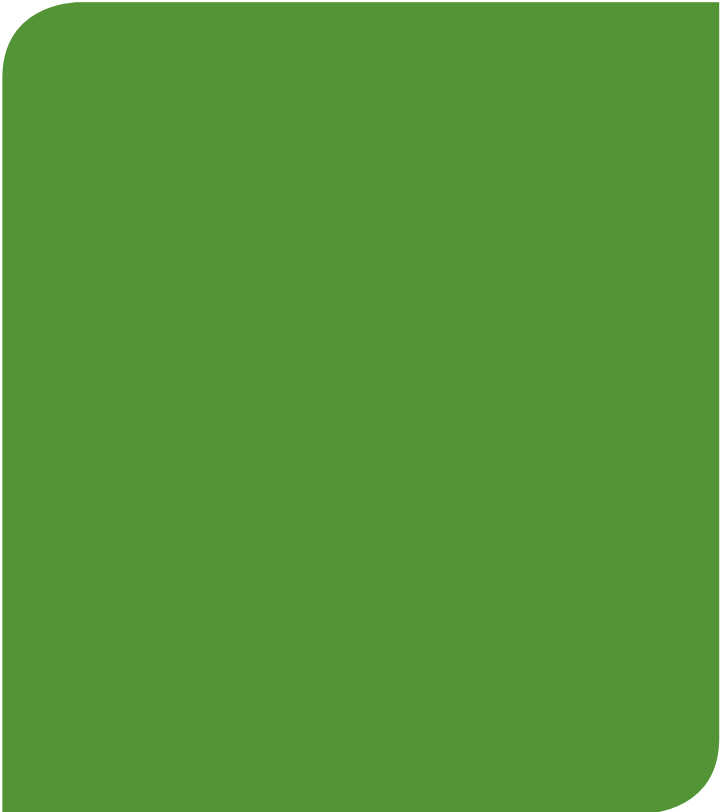
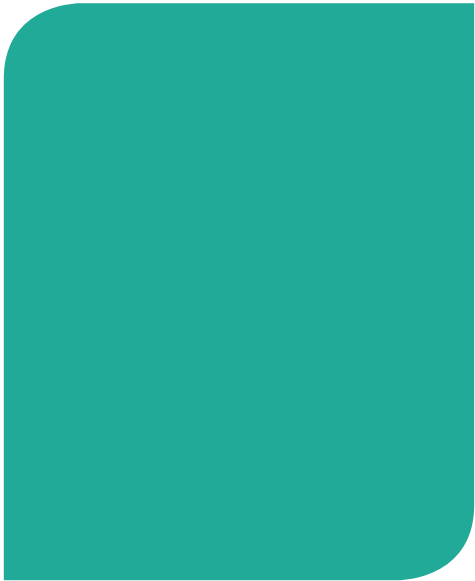
**CUSTOMIZED DISCLOSURES**

Customized	1	Management standards	Internal	8 / 47
Customized	2	Supply chain auditing	Internal	47
Customized	3	Marine index	Upstream	49
Customized	4	Plant index	Upstream	50
Customized	5	Ex-work ecological footprint	Internal	52
Customized	6	Mitigation of environmental impacts	Internal	53
Customized	7	Feed efficiencies	Downstream	54
Customized	8	Health feed sales	Downstream	54
Customized	9	Anti-sea lice feed sales	Downstream	54
Customized	10	Antibiotic feed sales	Downstream	55
Customized	11	Whistle blowing incidents	Internal	57
Customized	12	Local community complaints	Local Community	60

# Abbreviations

<b>AGD</b> amoebic gill disease	<b>FAO</b> Food and Agriculture Organization of the United Nations	<b>ILO</b> International Labour Organization	<b>SDG</b> Sustainable Development Goal
<b>AIC</b> Agriculture Industries Confederation	<b>FCR</b> feed conversion ratio	<b>IMS</b> integrated Management System	<b>SEABOS</b> Seafood Business for Ocean Stewardship
<b>ASC</b> Aquaculture Stewardship Council	<b>FDA</b> Food and Drug Administration (US)	<b>IUU</b> Illegal, Unreported, Unregulated	<b>SFP</b> Sustainable Fisheries Partnership
<b>BAP</b> Best Aquaculture Practices	<b>FEFAC</b> European Feed Manufacturers' Federation	<b>LCA</b> life cycle assessment	<b>SNP</b> Sociedad Nacional de Pesquería (Peruvian National Fisheries Society)
<b>bEFI</b> biological EWOS Feed Index	<b>FFDRm</b> forage fish dependency ratio meal	<b>MODR</b> marine oil dependency ratios	<b>SRS</b> salmonid rickettsial septicaemia
<b>bFCR</b> biological feed conversion rate	<b>FFDRo</b> forage fish dependency ratio oil	<b>MPDR</b> marine protein dependency ratio	<b>SSPO</b> Scottish Salmon Producers Organisation
<b>CARE</b> International humanitarian agency	<b>FHL</b> Norwegian Seafood Federation	<b>MSC</b> Marine Stewardship Council	<b>TEQ</b> toxic equivalents
<b>CIC</b> Cargill Innovation Center	<b>FIP</b> Fishery Improvement Program	<b>NGO</b> non-governmental organization (eNGO: environmental NGO)	<b>UKAS</b> United Kingdom Accreditation Service
<b>CNS</b> Cargill Nutrition System	<b>FReSH</b> Food Reform for Sustainability and Health	<b>NOK</b> Norwegian Krone	<b>UN</b> United Nations
<b>CQN</b> Cargill Aqua Nutrition	<b>FSQR</b> Food Safety, Quality and Regulatory	<b>OECD</b> Organization for Economic Co-operation and Development	<b>UNGC</b> United Nations Global Compact
<b>DHA</b> docosahexaenoic acid	<b>GHG</b> greenhouse gas	<b>PCB</b> polychlorinated biphenyl	<b>VND</b> Vietnamese Dong
<b>eEFI</b> economic EWOS Feed Index	<b>GlobalG.A.P</b> Good Agricultural Practice	<b>PD</b> pancreas disease	
<b>EF</b> Ecological footprint	<b>GMO</b> genetically modified organism	<b>PEF</b> Product Environmental Footprints PEF	
<b>eFCR</b> economic feed conversion ratio	<b>GRI</b> Global Reporting Initiative	<b>RSPCA</b> Royal Society for the Prevention of Cruelty to Animals	
<b>EFI</b> EWOS Feed Index	<b>GSI</b> Global Salmon Initiative	<b>RSPO</b> Roundtable on Sustainable Palm Oil	
<b>EFSA</b> European Food Safety Authority	<b>IFFO RS</b> The Marine Ingredients Organization Global Standard for Responsible Supply		
<b>EGI</b> EWOS Growth Index			
<b>EPA</b> eicosapentaenoic acid			





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