Salmon Farming Industry Handbook

2018

Forward-looking Statements

This handbook includes forward-looking statements that reflect Marine Harvest's current expectations and views of future events. These forward-looking statements use terms and phrases such as "anticipate", "should", "likely", "foresee", "believe", "estimate", "expect", "intend", "could", "may", "project", "predict", "will" and similar expressions.

These forward-looking statements include statements related to population growth, protein consumption, consumption of fish (including both farmed and wild), global supply and demand for fish (and salmon in particular), aquaculture's relationship to food consumption, salmon harvests, demographic and pricing trends, market trends, price volatility, industry trends and strategic initiatives, the issuance and awarding of new farming licenses, governmental progress on regulatory change in the aquaculture industry, estimated biomass utilization, salmonid health conditions as well as vaccines, medical treatments and other mitigating efforts, smolt release, development of standing biomass, trends in the seafood industry, expected research and development expenditures, business prospects and positioning with respect to market, and the effects of any extraordinary events and various other matters (including developments with respect to laws, regulations and governmental policies regulating the industry and changes in accounting policies, standards and interpretations).

The preceding list is not intended to be an exhaustive list of all our forward-looking statements. These statements are predictions based on Marine Harvest's current estimates or expectations about future events or future results. Actual results, level of activity, performance or achievements could differ materially from those expressed or implied by the forward-looking statements as the realization of those results, the level of activity, performance or achievements are subject to many risks and uncertainties, including, but not limited to changes to the price of salmon; risks related to fish feed; economic and market risks; environmental risks; risks related to escapes; biological risks, including fish diseases and sea lice; product risks; regulatory risks including risk related to food safety, the aquaculture industry, processing, competition and anti-corruption; trade restriction risks; strategic and competitive risks; and reputation risks.

All forward-looking statements included in this handbook are based on information available at the time of its release, and Marine Harvest assumes no obligation to update any forward-looking statement.

The Marine Harvest Salmon Farming Industry Handbook

The purpose of this document is to give investors and financial analysts a better insight into the salmon farming industry, and what Marine Harvest considers to be the most important value drivers.

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Introduction

01 Introduction

Salmon is the common name for several species of fish of the family Salmonidae (e.g. Atlantic salmon, Pacific salmon), while other species in the family are called trout (e.g. brown trout, seawater trout). Although several of these species are available from both wild and farmed sources, most commercially available Atlantic salmon is farmed. Salmon live in the Atlantic Ocean and the Pacific, as well as the Great Lakes (North America) and other land locked lakes.

Typically, salmon are anadromous: they are born in fresh water, migrate to the ocean, then return to fresh water to reproduce.

About 73% of the world's salmon production is farmed. Farming takes place in large nets in sheltered waters such as fjords or bays. Most farmed salmon come from Norway, Chile, Scotland and Canada.

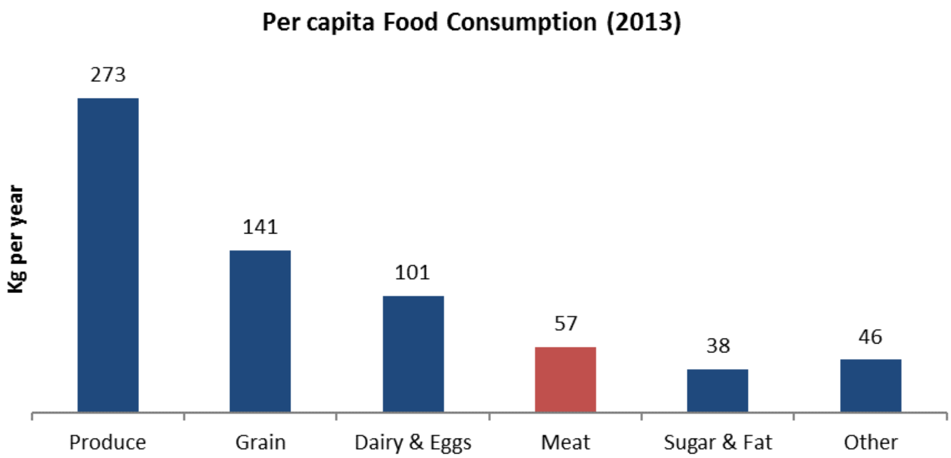
Salmon is a popular food. Salmon consumption is considered to be healthy due to its high content of protein and Omega-3 fatty acids and it is also a good source of minerals and vitamins.

02

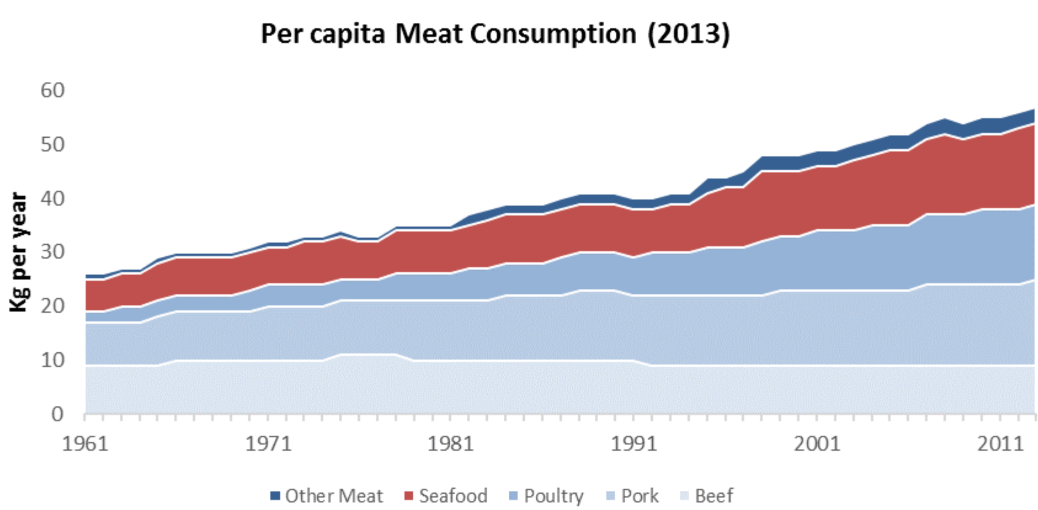
Positioning of salmon

02 Positioning of salmon

2.1 Seafood as part of food consumption



The average human eats around 656 kg of food each year. Most of this food is produce such as vegetables, fruits, and starchy roots. Animal protein, such as seafood, poultry, pork, and beef, amounts to just under 10% of the total diet.

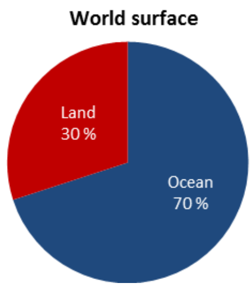


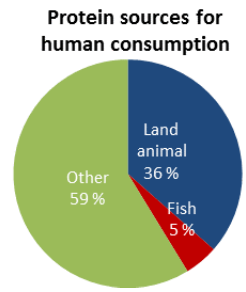
Meat as a food source has gradually become more important. The global per capita consumption has more than doubled since 1961, and the seafood segment is a big contributor to this increase.

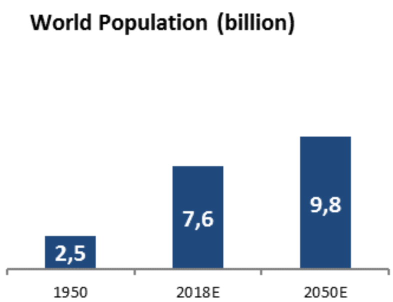
Sources: FAO (2013); FAOstat Food Balance Sheets

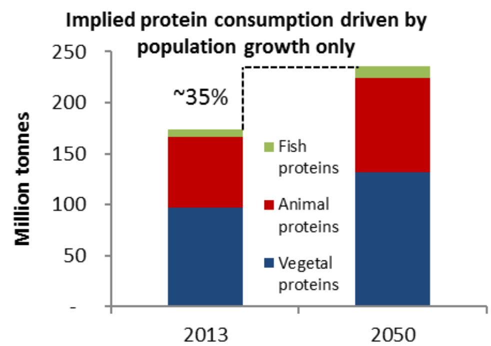
02 Positioning of salmon

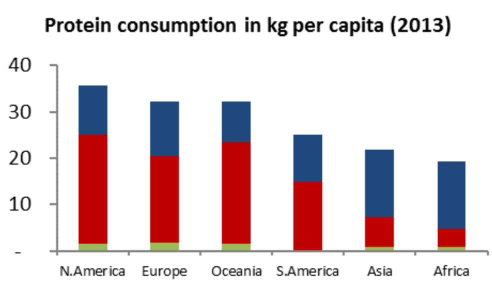
2.2 Seafood as part of overall protein consumption

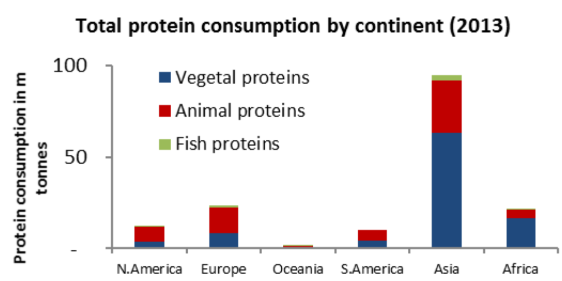












The UN estimates that the global population will grow to approximately 9.77 billion by 2050.

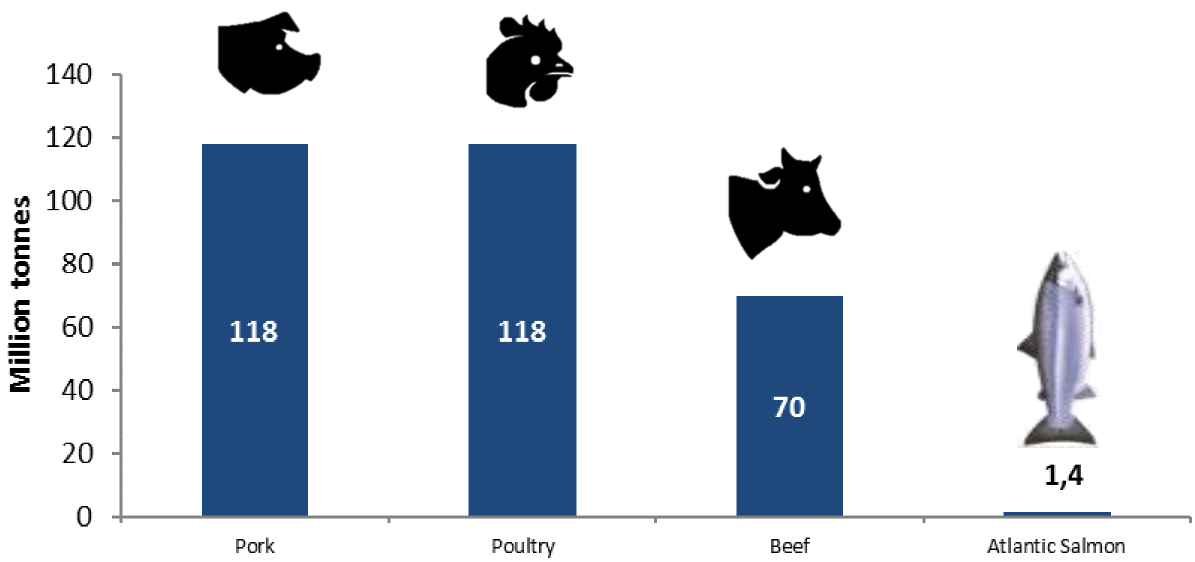
Although 70% of the Earth's surface is covered by the ocean, only 5% of the protein sources for human consumption is produced there.

Assuming consumption per capita stays constant, this implies a 35% increase in demand for protein. The UN however, estimates that the actual demand will double. We know that resources for increased land based protein production will be scarce, so a key question is how the production of protein sources from the sea can be expanded.

Sources: FAO (2013); FAOstat Food Balance Sheets, United Nations population data; *World Population Prospects: The 2017 Revision*

Positioning of salmon

2.3 Atlantic Salmon as part of overall protein consumption



Most animal protein in our diets comes from pork, poultry, and beef, with salmon production representing a small portion of global protein supply.

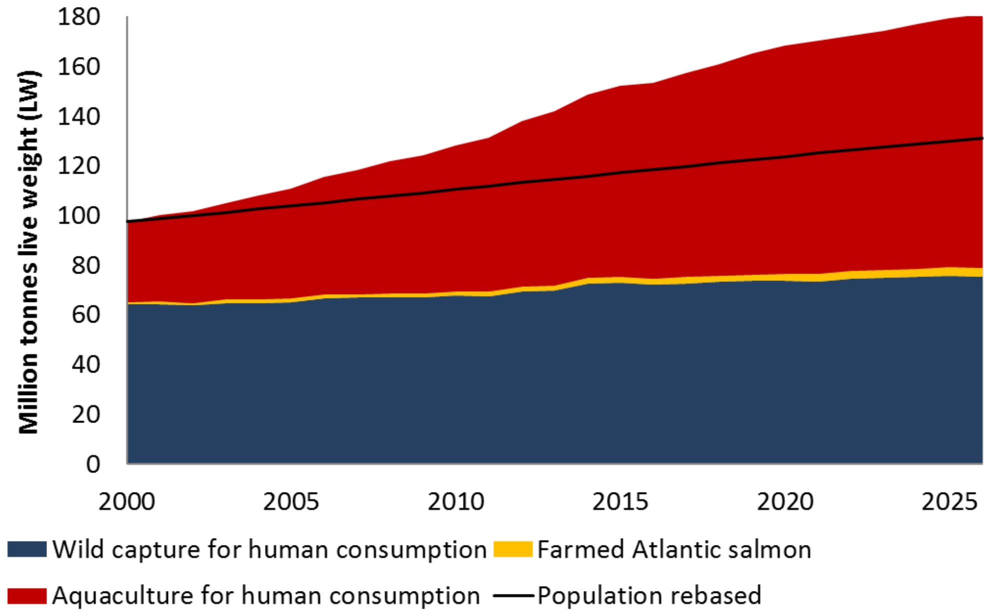
In 2017, FAO estimated a production of 118 million tonnes Carcass Weight Equivalent (CWE) of pork, 118 million tonnes Ready to Cook Equivalent (RTC) of poultry, and 70 million tonnes CWE of beef and veal.

In contrast, the total production of farmed Atlantic salmon was around 2 million tonnes (gwt). This corresponds to about 1.4 million tonnes in product weight. If we combine both the farmed and wild catch of all salmonids it amounts to 3 million tonnes (gwt) in 2017.

Sources: OECD-FAO (2016) *Agricultural Outlook 2016-2025, Kontali Analyse*

Positioning of salmon

2.4 Stagnating wild catch – growing aquaculture



Over the past few decades, there has been a considerable increase in total and per capita fish supply. As the fastest growing animal-based food producing sector aquaculture is a major contributor to this, and it outpaces population growth.

Great progress in breeding technology, system design and feed technology in the second half of the twentieth century has enabled the expansion of commercially viable aquaculture across species and in volume. In 2013-15, China alone produced 62% of global aquaculture output, while Asia as a whole accounted for 88%.

The World Bank developed a scenario analysis in their report *Fish to 2030* (2013) projecting that aquaculture will continue to fill the supply-demand gap, and that by 2030, 62% of fish for human consumption will come from this industry.

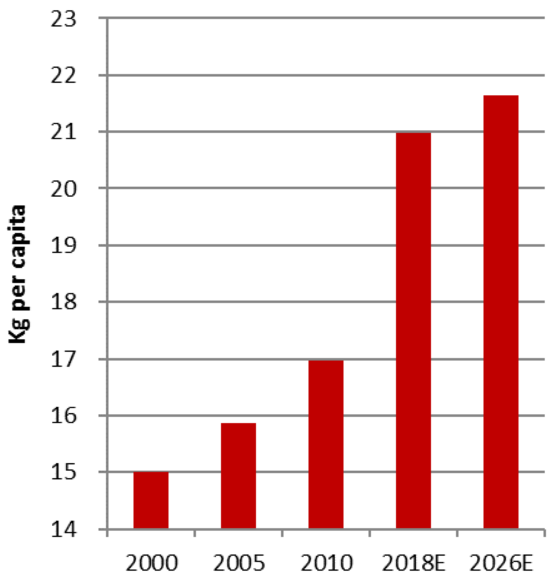
In 2016, aquaculture accounted for more than half of all fish supplies destined for direct human food consumption. However, fish has been estimated to account for only 5% of the global protein consumption (and about 12% of total fish and animal protein supply).

Sources: FAO (2013) *World Fisheries and Aquaculture,* OECD-FAO (2017) *Agricultural Outlook 2017-2026,* World Bank (2013) *Fish to 2030*

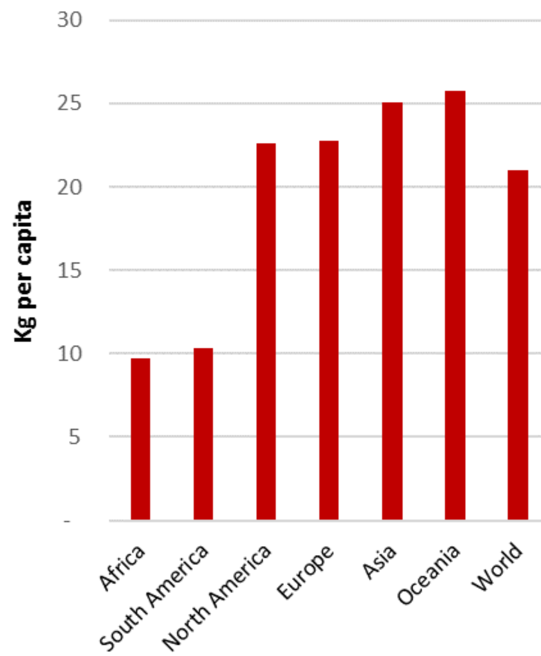
Positioning of salmon

2.5 Fish consumption

Development of global average fish consumption



Fish consumption per continent 2018E



Given the expected *production* growth of 13.5% during 2016–26 and the projected world *population* growth of 10.6% over the same period, we will most likely see a global increase in the average fish consumption level.

By 2026, per capita fish consumption is estimated to be 21.6 kg (vs. 9.9kg in the 1960s and 20.4kg in 2016). This is equivalent to another 23 million tonnes supply of seafood, which aquaculture is estimated to provide.

According to FAO, per capita consumption is expected to increase in all continents in the period 2016-2026. Asia is expected to have the highest growth, whilst only slight growth is anticipated in Africa. In general, per capita fish consumption is likely to grow faster in developing countries. However, more developed economies are expected to have the highest per capita consumption.

Sources: *FAO (2017);* The State of World Fisheries and Aquaculture OECD-FAO (2017) *Agricultural Outlook 2017-2026*

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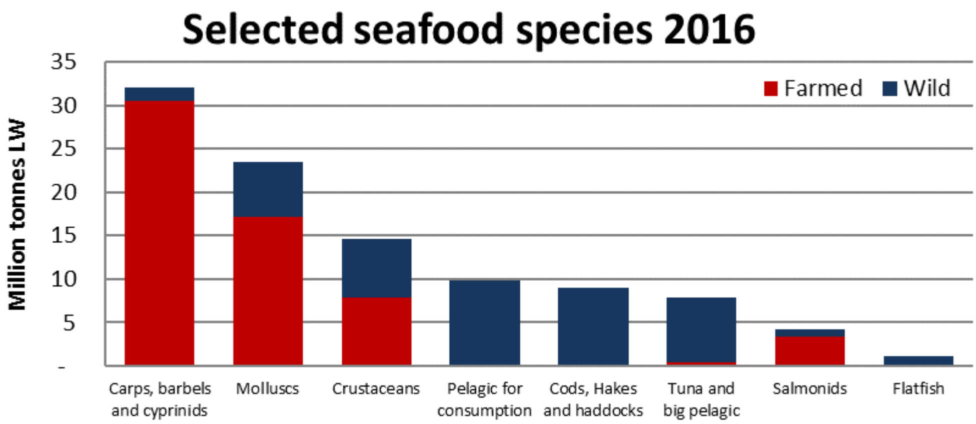
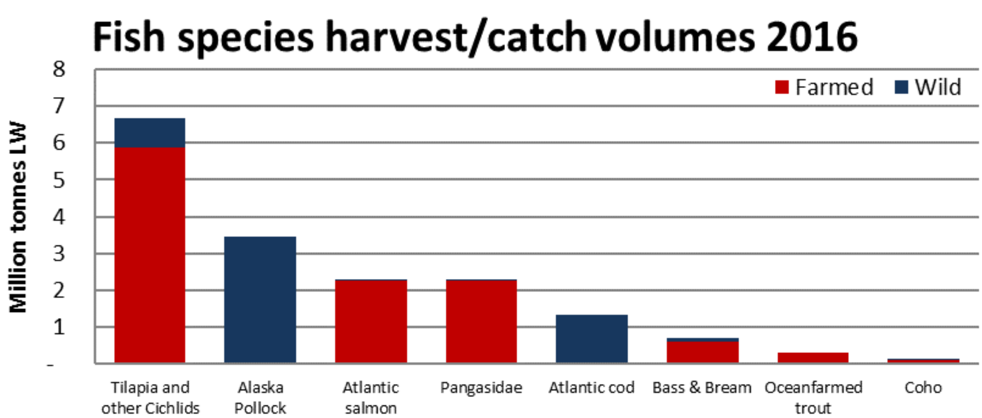
Positioning of salmon

2.6 Salmonids contribute 4.2% of global seafood supply



Although several of the salmon species are available from both wild and farmed sources, almost all commercially available Atlantic salmon is farmed. Even with an increase in production of Atlantic salmon of more than 800% since 1990, the total global supply of salmonids is still marginal compared to most other seafood categories (4.2% of global seafood supply). Whitefish is about ten times larger and consists of a much larger number of species.

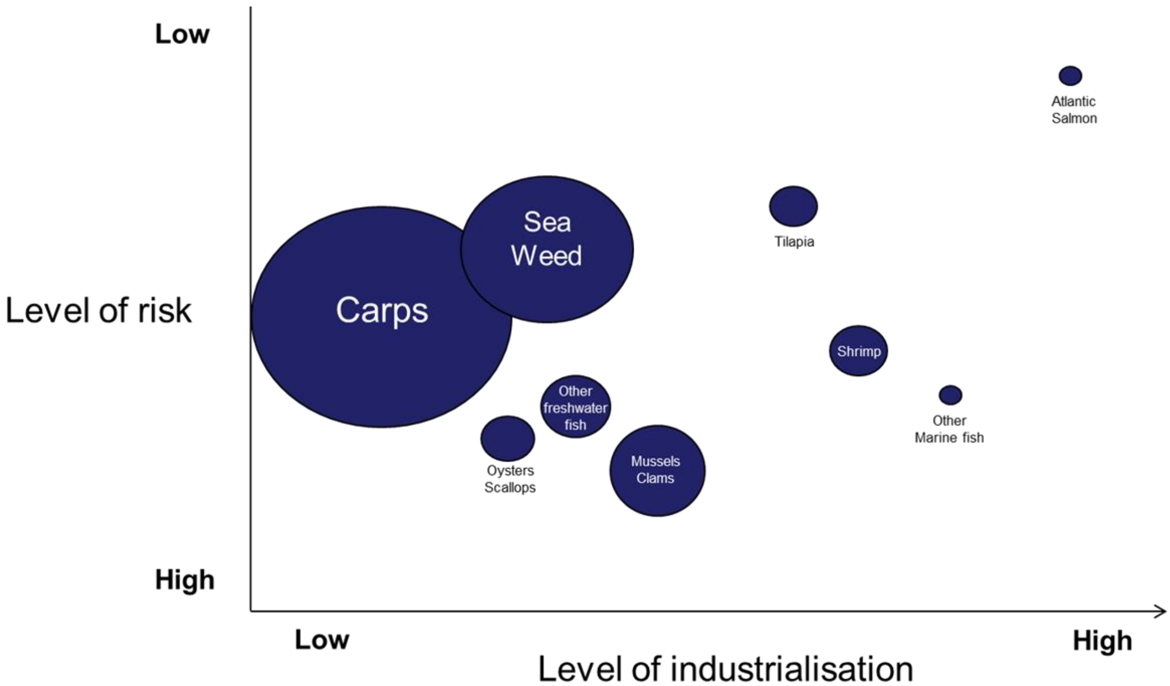


In 2016, more Atlantic salmon was harvested than Atlantic cod. However the harvest of Atlantic salmon was only about 22% of two of the largest whitefish species, tilapia and Alaska pollock.

Note: Live weight (LW) is used because different species have different conversion ratios
Source: Kontali Analyse

Positioning of salmon

2.7 Considerable opportunities within aquaculture



The illustration above shows that Atlantic salmon has the highest level of industrialisation and the lowest level of risk compared to other aquaculture species. The size of the circles indicates volume harvested.

Although Atlantic salmon is relatively small in harvest volume compared to other species, it is a very visible product in many markets due to the high level of industrialisation.

Source: Kontali Analyse

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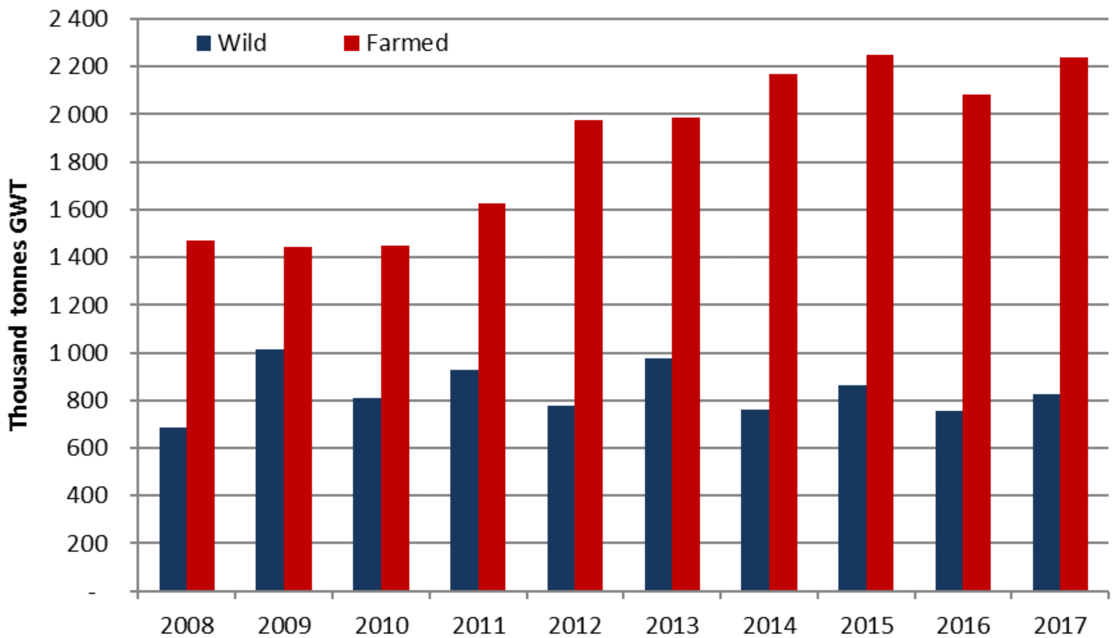
Positioning of salmon

2.8 Supply of farmed and wild salmonids



The general supply of seafood in the world is shifting more towards aquaculture as the supply from wild catch is stagnating in several regions and for many important species. Wild catch of salmonids varies between 700 000 and 1 000 000 tonnes gwt, whereas farmed salmonids are increasing. The total supply of salmonids was first dominated by farmed in 1999. Since then, the share of farmed salmonids has increased and has become the dominant source.

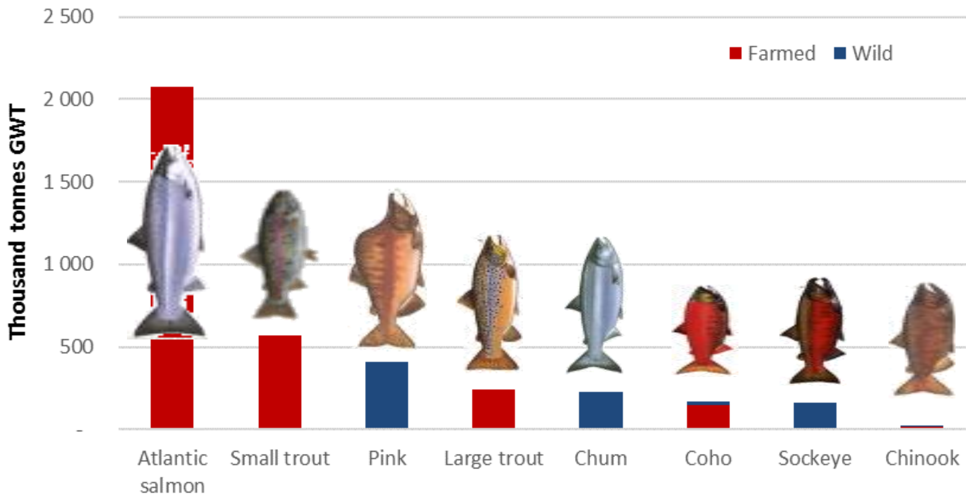
The total supply of all farmed salmonids exceeded 2.2 million tonnes (gwt) in 2017. The same year, the total catch volume of wild salmonids was a bit more than one third of farmed, with chum, pink and sockeye being the most common species.

About 20% of the total wild catch of salmon is imported frozen by China (from the US, Russia and Japan), and later re-exported as frozen fillets.

Source: Kontali Analyse

02 Positioning of salmon

2.9 Salmonids harvest 2017



Atlantic salmon: By quantity, the largest species of salmonids. Farmed Atlantic salmon is a versatile product, which can be used for a variety of categories such as smoked, fresh, sushi, as well as ready-made meals. The product is present in most geographies and segments. Due to biological constraints, seawater temperature requirements and other natural constraints, farmed salmon is only produced in Norway, Chile, UK, North America, Faroe Islands, Ireland, New Zealand and Tasmania.

Pink: Caught in USA and Russia and used for canning, pet food and roe production. Since quality is lower than the other species it is a less valued salmonid. The fish is small in size (1.5-1.7 kg) and is caught over a very short time period.

Large trout: Produced in Norway, Chile and the Faroe Islands, the main markets are Japan and Russia. Trout is mainly sold fresh, but is also used for smoked production.

Small trout: Produced in many countries and most often consumed locally as a traditional dish as hot smoked or portion fish. Small trout is not in direct competition with Atlantic salmon.

Chum: Caught in Japan and Alaska. Most is consumed in Japan and China. In Japan, it is available as fresh, while in China it is processed for local consumption and re-exported. Little chum is found in the EU market. Varied quality and part of the catch is not for human consumption.

Coho: Produced in Chile and is mostly used for salted products. It is a competitor of trout and sockeye in the red fish market. Although Russia has increased its import of this fish over the last few years, Japan remains the largest market.

Sockeye: Caught in Russia and Alaska. It is mostly exported frozen to Japan, but some is consumed locally in Russia and some canned in Alaska. Sockeye is seen as a high quality salmonid and is used for salted products, sashimi and some is smoked in the EU.

Chinook/King: Small volumes, but highly valued. Alaska, Canada and New Zealand are the main supplying countries. Most quantities are consumed locally. Chinook is more in direct competition to Atlantic salmon than the other species and is available most of the year.

Source: Kontali Analyse

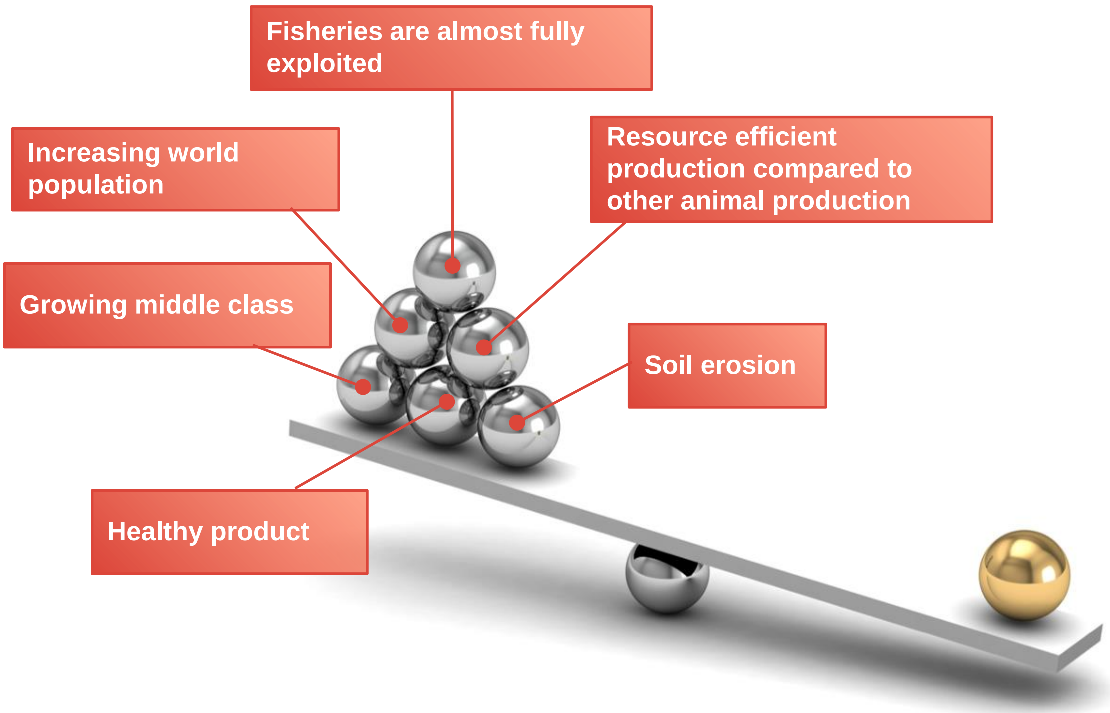
03

Salmon Demand

03

Salmon Demand

3.1 Macro demand trends



The global population is growing, resulting in an increased global demand for food. As the middle class is growing in large emerging markets, we especially expect consumption of high quality proteins to increase.

The health benefits of seafood are increasingly being promoted by global health authorities, and aquaculture is more resource efficient than agriculture.

The supply of wild fish has limited potential to meet this demand growth, and soil erosion means we need to investigate new ways of thinking about how to feed the world.

Atlantic salmon as a healthy, resource efficient and climate friendly product from the ocean fits well with these global trends.

03 Salmon Demand

3.2 A healthy product

Atlantic salmon is rich in the long chain omega-3, EPA and DHA, which reduce the risk of cardiovascular disease. Data also indicates that EPA and DHA reduce the risk of a large number of other health issues.

Salmon is nutritious, rich in micronutrients, minerals, marine omega-3 fatty acids, very high quality protein and several vitamins, and represents an important part of a varied and healthy diet. FAO highlights that: "Fish is a food of excellent nutritional value, providing high quality protein and a wide variety of vitamins and minerals, including vitamins A and D, phosphorus, magnesium, selenium and iodine in marine fish".

The substantial library of evidence from multiple studies on nutrients present in seafood indicates that including salmon in your diet will improve your overall nutrition, and may even yield significant health benefits. In light of global obesity rates, governments and food and health advisory bodies around the world are encouraging people of all ages to increase their seafood intake, with particular focus on the consumption of oily fish, such as salmon. The U.S. Department of Health and the US Department of Agriculture recommend an intake of at least 237 grams of seafood per week for Americans in general. The UK National Health Service, the Norwegian Directorate of Health and several other national health organisations, recommend eating fish at least twice a week.

Source: FAO, Marine Harvest, WHO, The Norwegian Directorate of Health (2011), Health and Human Services (2010), US Department of Health (2016) *Dietary guidelines for Americans 2015-2020*

03

Salmon Demand

3.3 Resource efficient production

Protein Retention	31 %	21 %	18 %	15 %
Energy Retention	23 %	10 %	14 %	27 %
Edible Yield	68 %	46 %	52 %	41 %
Feed Convertion Ratio (FCR)	1.1	2.2	3.0	4-10
Edible Meat pr 100 kg fed	61 kg	21 kg	17 kg	4-10 kg

To optimize resource utilization it is vital to produce animal proteins in the most efficient way. Protein resource efficiency is expressed as “Protein retention”, which is a measure of how much animal food protein is produced per unit feed protein fed to the animal. Salmon has a protein retention of 31%, which is the most efficient in comparison with chicken, pork, and cattle (see table above).

Energy retention is measured by dividing energy in edible parts by gross energy fed. Both cattle and Atlantic salmon has a high energy retention compared to pork and chicken.

The main reason why salmon convert protein and energy to body muscle and weight so efficiently is because they are cold-blooded and therefore do not have to use energy to heat their bodies. They also do not use energy standing up like land animals.

- Edible yield is calculated by dividing edible meat by total body weight. As much as 68% of Atlantic salmon is edible meat, while other protein sources have a higher level of waste or non-edible meat.
- Feed conversion ratios measure how productive the different animal protein productions are. In short, this tells us the kilograms of feed needed to increase the animal’s bodyweight by one kg. Feed for Atlantic salmon is high in protein and energy which accounts for the feed conversion ratio being even more favourable for Atlantic salmon than protein and energy retention when compared with land animal protein productions.
- Edible meat per 100kg of feed fed: The combination of the FCR ratio and edible yield, gives salmon a favourably high quantity of edible meat per kg of feed fed.

Source: *Ytrestøyl T., Aas T.S., Åsgård T. (2014) Resource utilisation of Norwegian salmon farming in 2012 and 2013. Nofima report 36/2014 pp. 35., Volden, H and N. I. Nielsen, (2011) NorFor-The Nordic feed evaluation system. Wageningen Academic Publishers. Energy and metabolizable protein supply, www.journalofanimalscience.org, Skretting (2012) Delivering SUSTAINABL*

Salmon Demand

3.4 Climate friendly production

In addition to its resource efficient production, farmed fish is also a climate friendly protein source. It is expected to become an important solution to providing the world with vitally important proteins while limiting the negative effect on the environment. There is for example less environmental impact in salmon production compared to other protein producers.

When comparing the environmental impact of farmed salmon to traditional meat production, the carbon footprint for the farmed salmon is 2.9 carbon equivalents per kilogram of edible product whilst corresponding figures are 2.7kg and 5.9kg of edible product for chicken and pork, respectively. Cattle's carbon footprint is as much as 30 carbon equivalents per kilogram of edible product.

Freshwater is a renewable but limited natural resource, and human activities can cause serious damage to the surrounding environment. In Norway**,** farmed Atlantic salmon requires 2,000 litres per kg of fresh water in production which is significantly less than other proteins.

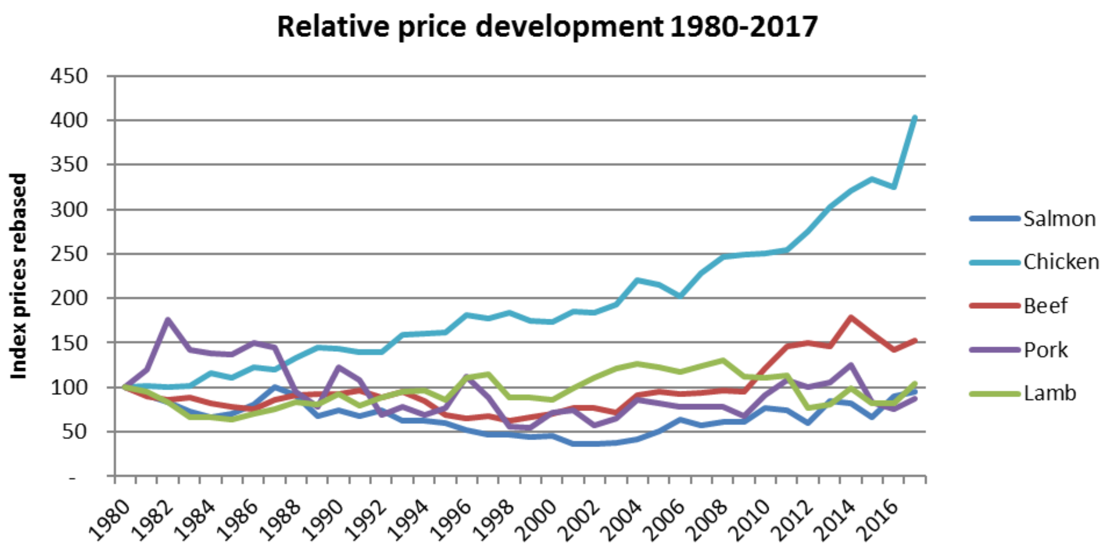
Carbon Footprint kg CO2/kg edible meat	2.9 kg	2.7 kg	5.9 kg	30 kg
Water Consumption litre/kg edible meat	2,000 litre (1)	4,300 litre	6,000 litre	15,400 litre

Note: 1) The figure reflects total water footprint for farmed salmonid fillets in Scotland, in relation to weight and content of calories, protein and fat .

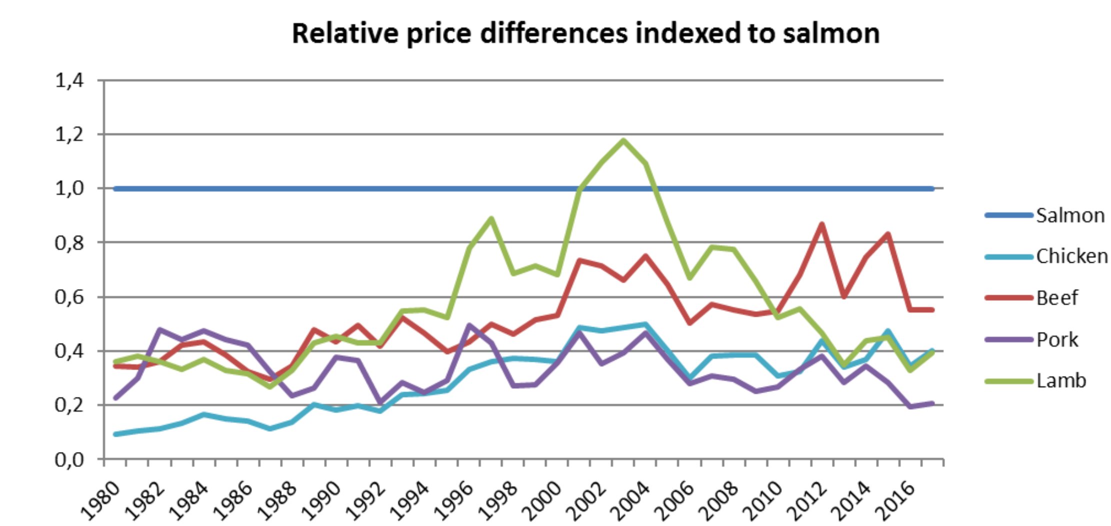
Source: Marine Harvest, Mekonnen, M.M. & Hoekstra A.Y. (2010), Ytrestøyl et. al. (2014), SINTEF Report (2009) Carbon Footprint and energy use of Norwegian seafood products, IME (2013). SARF. (2014) Scottish Aquaculture's Utilisation of Environmental Resources

Salmon Demand

3.5 Relative price development of protein products



Along with some other major food sources containing animal protein, like pork and lamb, salmon has become relatively cheaper over the past few decades.



Salmon has historically always been a rather expensive product in the shelves. Only lamb has had a higher relative price.

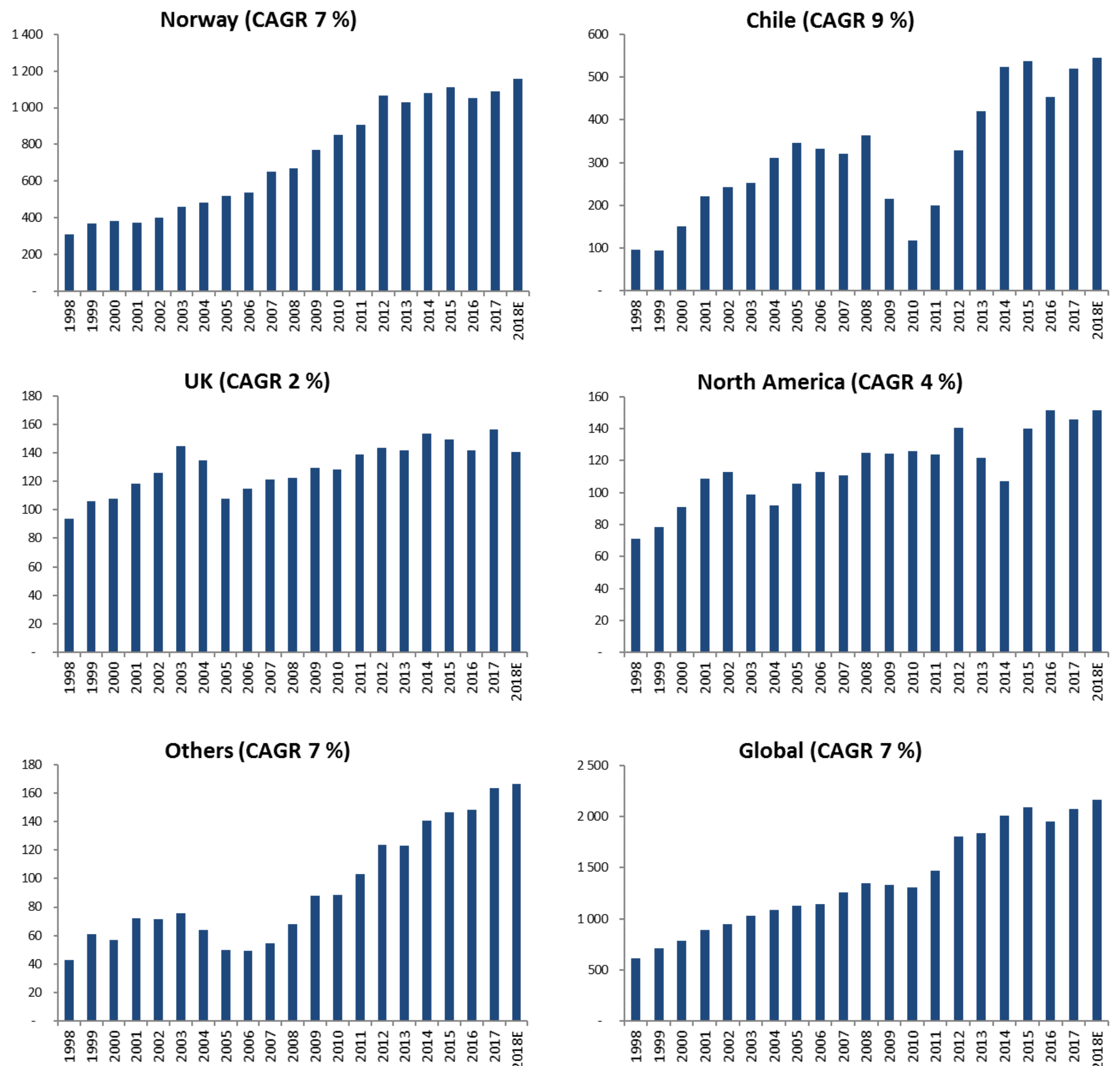
Source: International Monetary Fund, Marine Harvest

04

Salmon Supply

04 Salmon Supply

4.1 Total harvest of Atlantic salmon 1998-2018E

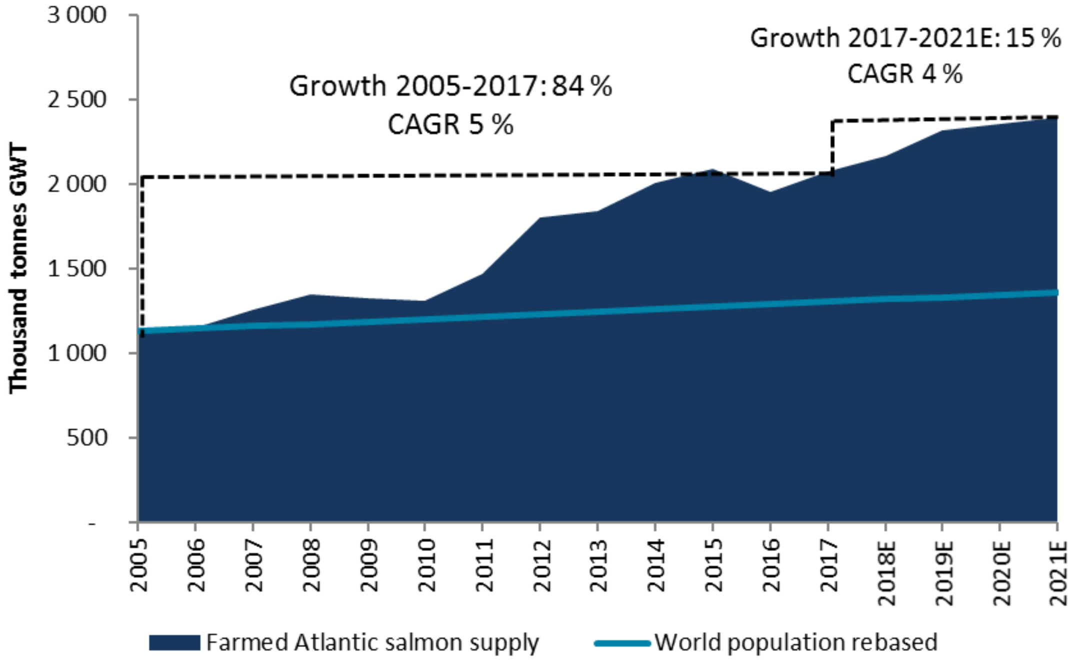


CAGR	Norway	Chile	UK	North America	Others	Total
1998-2018E	7 %	9 %	2 %	4 %	7 %	**7 %**
2008-2018E	6 %	4 %	1 %	2 %	9 %	**5 %**
2018-2021E	4 %	1 %	7 %	1 %	6 %	**3 %**

Note: Figures are in thousand tonnes gwt and "Others" includes the Faroe Islands, Ireland, Tasmania, Iceland and Russia.
Source: Kontali Analyse

Salmon Supply

4.2 Diminishing growth expected going forward



Supply of Atlantic salmon has increased by 417% since 1995 (annual growth of 8%). The annual growth has diminished in recent years with 5% growth in the period 2005-2017. Kontali Analyse expects growth to diminish further going forward and has projected a 4% annual growth from 2017 to 2021.

The background for this trend is that the industry has reached a production level where biological boundaries are being pushed. It is therefore expected that future growth can no longer be driven only by the industry and regulators as measures are implemented to reduce its biological footprint. This requires progress in technology, the development of improved pharmaceutical products, implementation of non-pharmaceutical techniques, improved industry regulations and intercompany cooperation.

Too rapid growth without these measures in place adversely impacts biological indicators, costs, and in turn output.

Note: Marine Harvest does not provide guidance of industry supply except from guidance depicted in quarterly presentations.

Source: Kontali Analyse, Population Division of the Department of Economic and Social Affairs of the United Nations, World Population Prospects: The 2017 Revision

Salmon Supply

4.3 Few coastlines feasible for salmon farming

The main coastal areas adopted for salmon farming are depicted on the above map. The coastlines are within certain latitude bands on the Northern and Southern Hemisphere.

A key condition is a temperature range between above zero and 18-20ºC. The optimal temperature range for salmon is between 8 and 14ºC.

Salmon farming also requires a certain current to allow a flow of water through the farm. The current must however be below a certain level to allow the fish to move freely around in the sites. Such conditions are typically found in waters protected by archipelagos and fjords and rule out several coastlines.

Certain biological parameters are also required to allow efficient production. The biological conditions vary significantly within the adopted areas and are prohibitive for certain other areas.

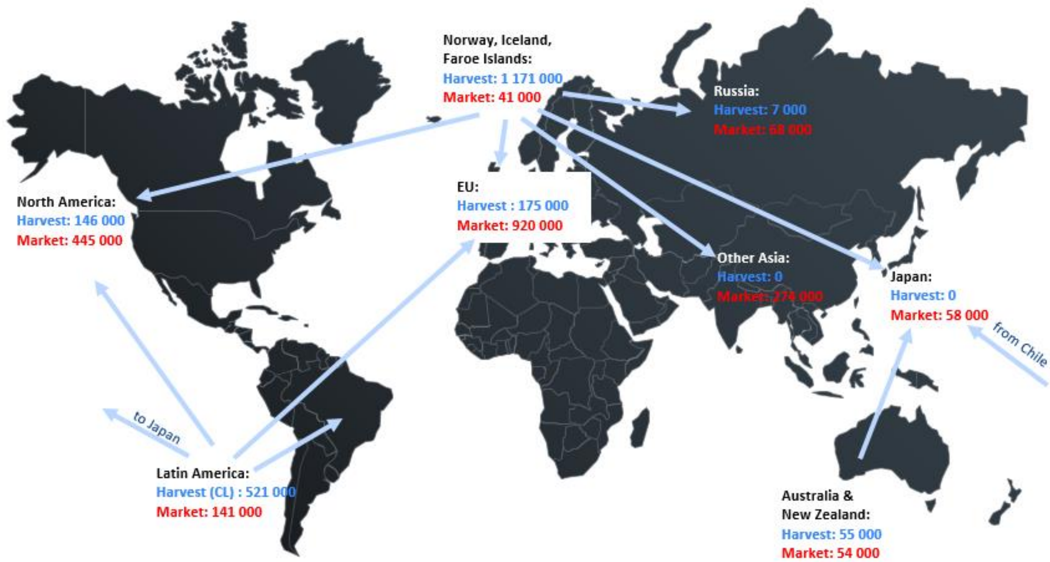
Political willingness to permit salmon farming and to regulate the industry is also required. Licence systems have been adopted in all areas where salmon farming is carried out.

05

Salmon Markets

Salmon Markets

5.1 Global trade flow of farmed Atlantic salmon



Historically, the main market for each production origin has been:

- Norway – EU, Russia and Asia
- Chile – USA, South America and Asia
- Canada – USA (west coast)
- Scotland – mainly domestic/within the UK (limited export)

Each producing region has historically focused on developing the nearby markets. As salmon is primarily marketed as a fresh product, time and cost of transportation has driven this trend.

A relatively high price differential is therefore required to justify cross Atlantic trade as this requires the cost of airfreight. Such trade varies from period to period and depends on arbitrage opportunities arising from short term shortage and excess volume from the various producing countries.

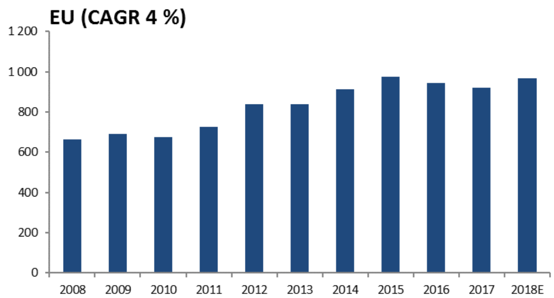
The Asian market is generally shared as the transportation costs are broadly similar from all producing regions.

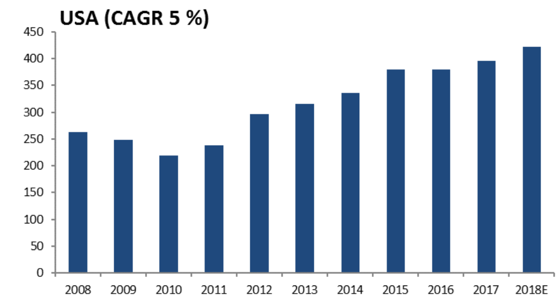
Distribution of frozen salmon is much more straightforward but this category is decreasing.

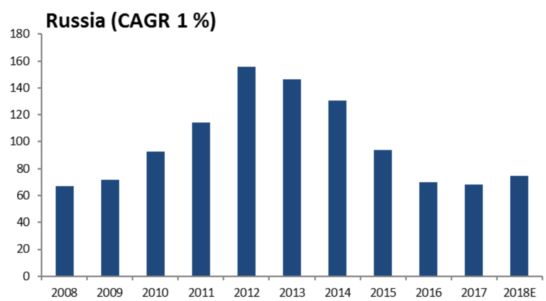
Note: Figures are from 2017 and in thousand tonnes gwt. Not all markets are included in the illustration.
Source: Kontali Analyse

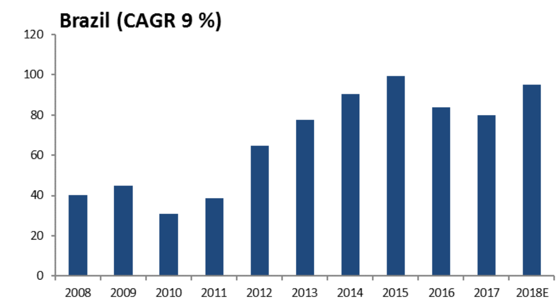
Salmon Markets

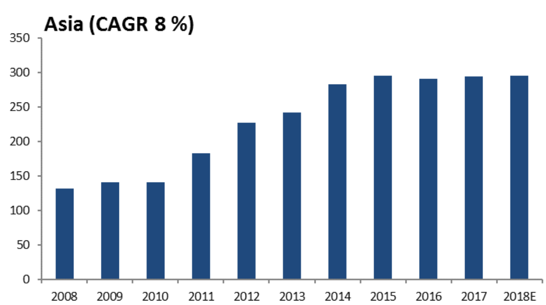
5.2 Farmed Atlantic salmon by market

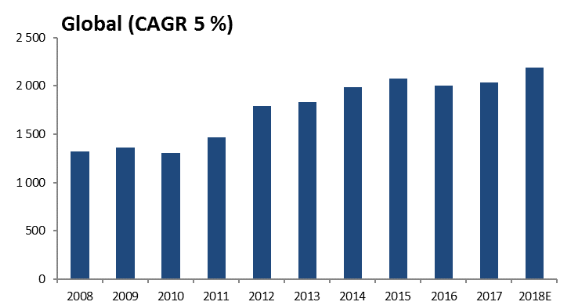










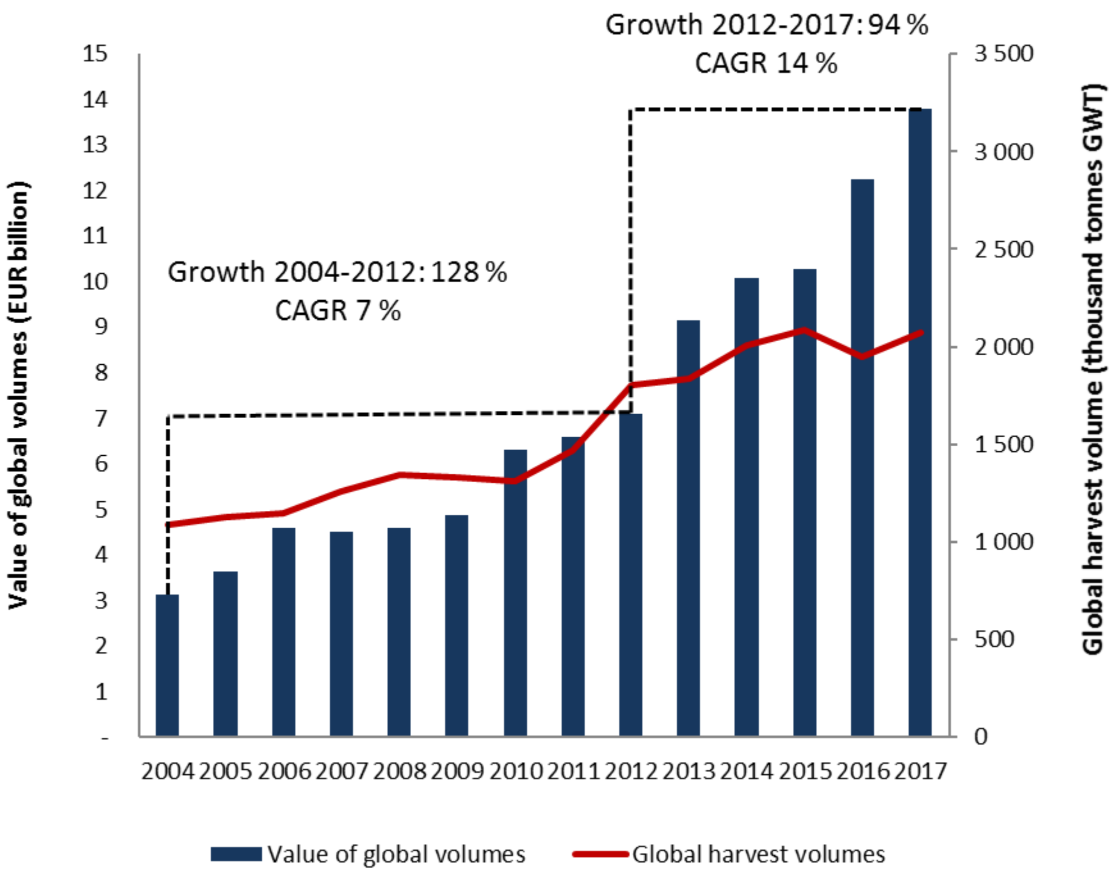


Europe (incl. Russia) and North America are by far the largest markets for Atlantic salmon. However, emerging markets are growing at significantly higher rates than these traditional markets. As all harvested fish is sold and consumed in the market, the demand beyond 2017 is assumed equal to supply (estimated by Kontali Analyse). The market for Atlantic salmon has on average increased by 5.2% in all markets over the last 10 years and by 6.6% over the last 20 years.

Source: Kontali Analyse

Salmon Markets

5.3 Development of value vs. volume

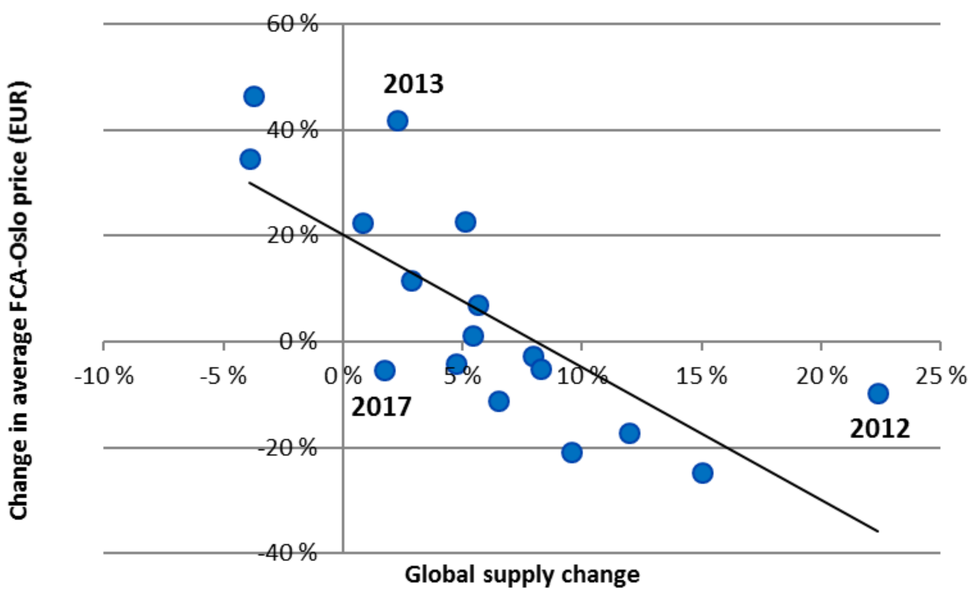


When analysing an average of the reference prices, the value of salmon sold in 2017 is 4.4 times higher than in 2004. During the same period the underlying volume has only grown by 91% (CAGR 5%). This is a good illustration for the strong underlying demand for the product.

Source: Kontali Analyse

Salmon Markets

5.4 Price neutral demand growth - historically 6-8%



	Global supply growth	Change in avg. price FCA Oslo
2001	15 %	-25 %
2002	8 %	-3 %
2003	7 %	-11 %
2004	6 %	7 %
2005	5 %	23 %
2006	1 %	23 %
2007	10 %	-21 %
2008	5 %	1 %
2009	3 %	12 %
2010	-4 %	35 %
2011	12 %	-17 %
2012	22 %	-10 %
2013	2 %	42 %
2014	8 %	-5 %
2015	5 %	-4 %
2016	-4 %	46 %
2017	2 %	-5 %

Analysing the data results in a linear correlation between global supply and change in the Nasdaq price from Norway. This accounted for 84% of the annual price development between 2000 and 2011. In 2012 and 2013 demand for salmon significantly overperformed.

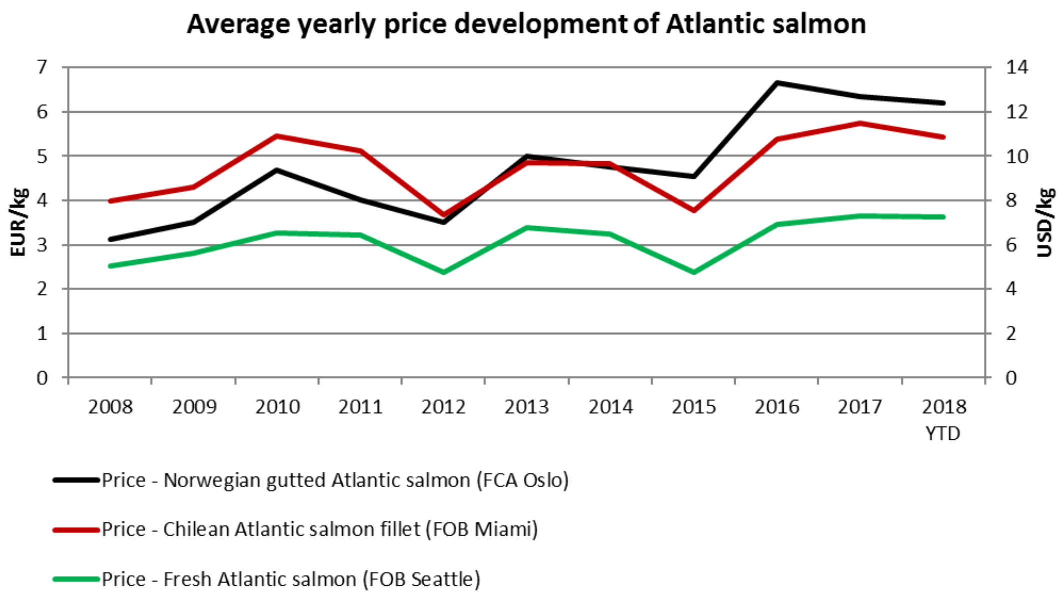
The price correlation across regional markets is generally strong for Atlantic salmon.

Growth in global supply of Atlantic salmon is estimated at 163% in the period 2000-2017 (annual CAGR 6%), varying between -4% and 22% annually. Variation in growth rates has been the main determinant for the variation in prices. Annual average prices have varied between EUR 2.42 (2003) and EUR 6.61 (2016).

Source: Kontali Analyse

05 Salmon Markets

5.5 Historic price development



Due to the long production cycle and the short shelf life of the fresh product (about 3 weeks), the spot price clears on the basis of the overall price/quantity preference of customers.

As salmon is perishable and marketed fresh, all production in one period has to be consumed in the same period. In the short term, the production level is difficult and expensive to adjust as the planning/production cycle is three years long. Therefore, the supplied quantity is very inelastic in the short term, while demand also shifts according to the season. This has a large effect on the price volatility in the market.

Factors affecting market price for Atlantic salmon are:

Supply (absolute and seasonal variations)

Demand (absolute and seasonal variations)

Globalisation of the market (arbitrage opportunities between regional markets)

Presence of sales contracts reducing quantity availability for the spot market

Flexibility of market channels

Quality

Disease outbreaks

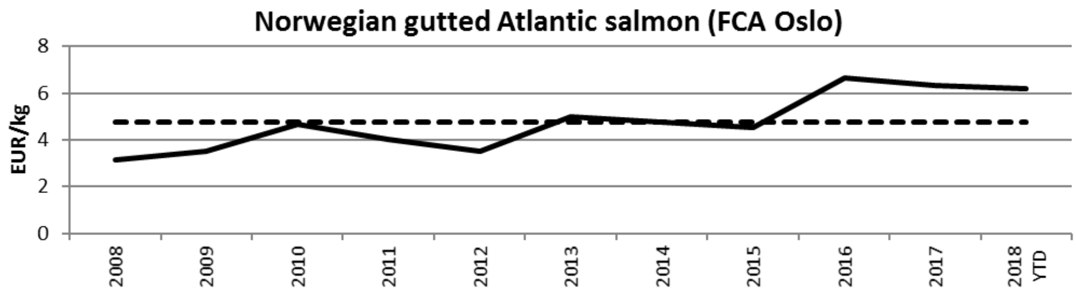
Food scares

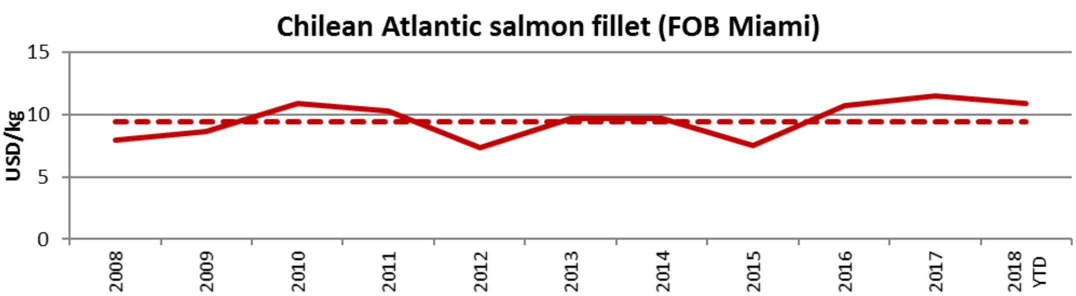
Comparing FCA Oslo, FOB Miami and FOB Seattle, there are clear indications of a global market as the prices correlate to a high degree.

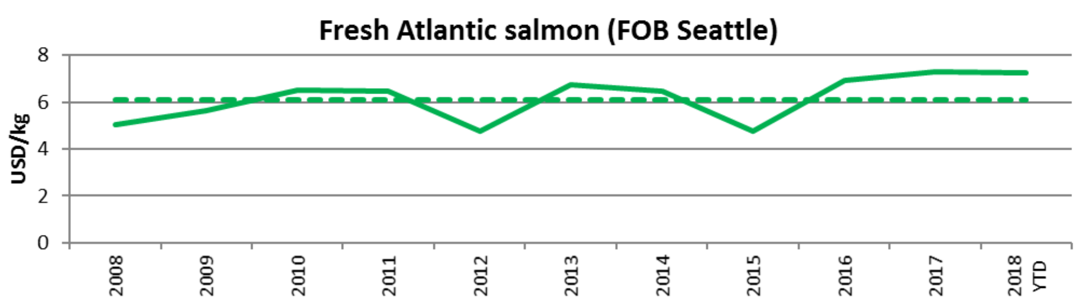
Source: Kontali Analyse

05 Salmon Markets

5.6 Historic price development by local reference prices





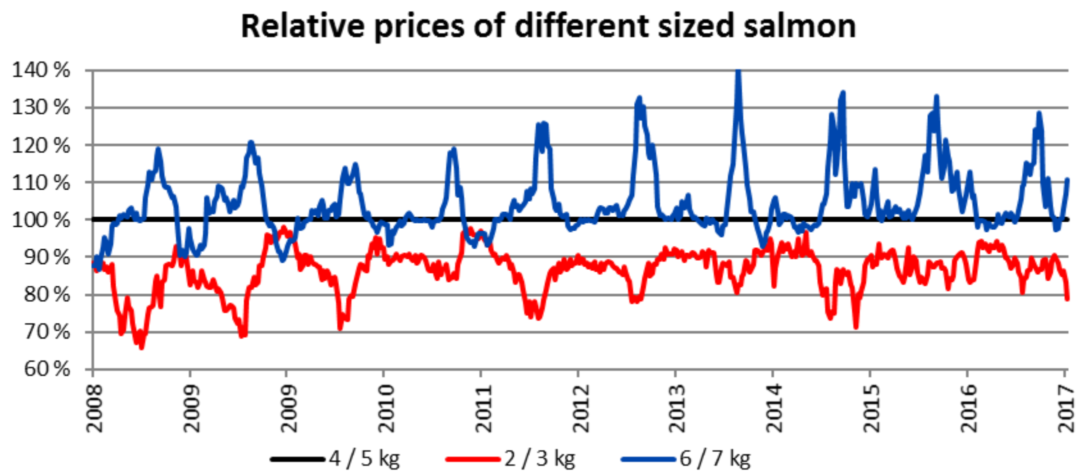


The three graphs show yearly average prices of salmon from 2008 to week 13 in 2018. As in most commodity industries, the producers of Atlantic salmon are experiencing large volatility in the price achieved for the product. The average price (gwt based) for Norwegian whole salmon since 2008 has been about EUR 4.8/kg (NOK 39.7/kg), for Chilean salmon fillet (2-3lb) USD 4.28/lb (USD 9.4/kg), and for Canadian salmon (8-10lb) USD 2.76/lb (USD 6.1/kg). The pricing of Scottish and Faroese salmon is linked to the price of Norwegian salmon. The price of Scottish salmon has normally a premium to Norwegian salmon. The price of the Faroese salmon used to trade with a small discount versus Norwegian salmon. However, due to geopolitical events in recent years salmon from Faroes now has a premium over Norwegian salmon in selected markets.

Source: Kontali Analyse

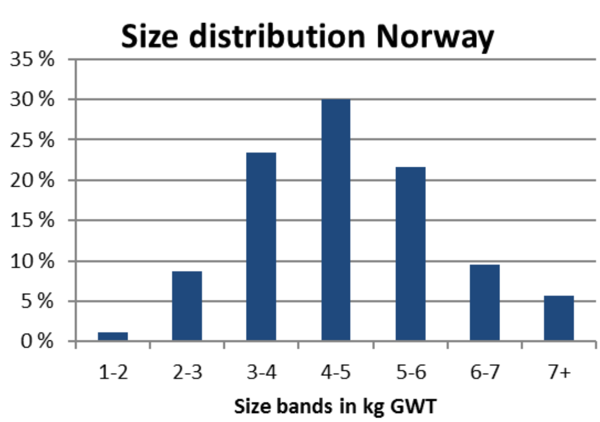
Salmon Markets

5.7 Different sizes – different prices (Norway)



The most normal market size for a salmon is 4/5 kg gwt. The reason for the different sized fish is mainly because salmon farming is a biological production process, where the fish has different growth cycles and the biomass represents a normal distributed size variation.

The markets for the different sizes vary, as can be seen in the above graph. The processing industry in Europe mainly uses 3-6 kg gwt but there are niche markets for small and large fish. As these markets are minor compared to the main market, they are easily disrupted if quantities become too high. Generally, small fish sizes are discounted and large sized fish are sold at premium.



In Norway over the past 5 years, we have seen a normal distribution on harvest size around the mean of 4-5 kg (gwt), where market risk and biological risk are balanced out. Drivers behind a smaller size can for instance be disease, early harvest when there is a need for cash flow or early harvest to realise ongoing capacity. Larger fish (6-7kg +) may be a result of economies of scale/lower production costs, production for niche markets or other market requirements.

Source: Kontali Analyse

06

Industry Structure

06

Industry Structure

6.1 Top 5-10 players of farmed Atlantic salmon

	Top 10 - Norway	H.Q.	Top 5 - United Kingdom	H.Q.	Top 5 - North America	H.Q.	Top 10 - Chile	H.Q.
1	Marine Harvest	210 200	Marine Harvest	60 200	Cooke Aquaculture	57 000	Salmones Multiexport	58 700
2	Salmar	135 200	Scottish Seafarms	31 000	Marine Harvest	39 400	Cermaq**	54 000
3	Lerøy Seafood	132 000	The Scottish Salmon Co.	25 300	Cermaq**	21 000	Marine Harvest	44 900
4	Cermaq**	48 000	Cooke Aquaculture	20 000	Northern Harvest	12 500	Empresas Aquachile	43 300
5	Grieg Seafood	40 900	Grieg Seafood	12 100	Grieg Seafood	9 600	Pesquera Los Fiordos	41 000
6	Nova Sea	40 700					Australis Seafood	39 100
7	Nordlaks	40 000					Camanchaca	30 800
8	Norway Royal Salmon	31 900					Blumar	27 000
9	Alsaker Fjordbruk	25 000					Nova Austral	24 500
10	Bremnes Seashore	24 000					Invermar	23 200
	Top 10	727 900	Top 5	148 600	Top 5	139 500	Top 10	386 500
	Total	1 087 000	Total	156 900	Total	145 500	Total	521 200
	Share of total	67 %	Share of total	95 %	Share of total	96 %	Share of total	74 %

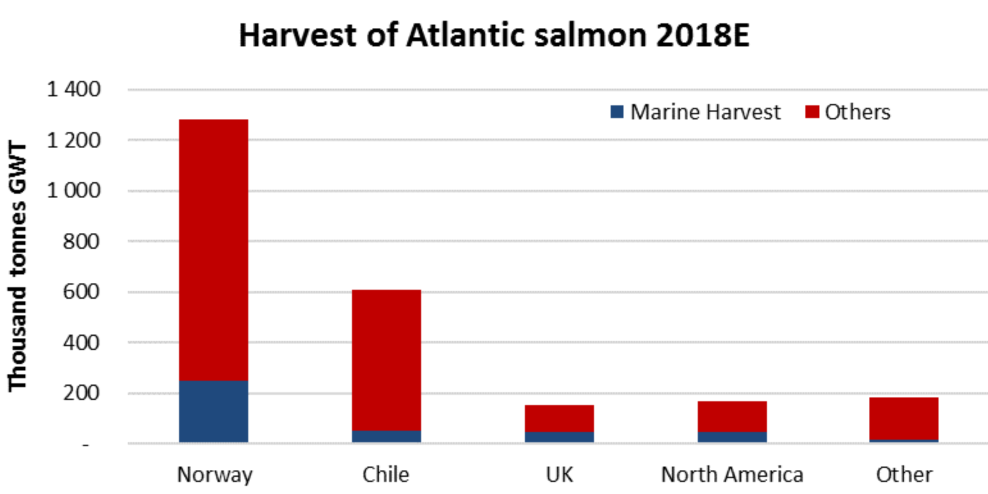
Note: All figures in tonnes GWT for 2017

* UK and North American industry are best described by top 5 producers.

** Cermaq is a fully owned subsidiary of Mitsubishi Corporation

The Marine Harvest Group represents the largest total production and produces around one fifth of the salmon produced in Norway, and about one third of the total produced in North America and the UK.

In Norway and Chile there are several other producers of a significant quantity of Atlantic salmon. In Chile, several of the companies also produce other salmonids, such as coho and large trout.

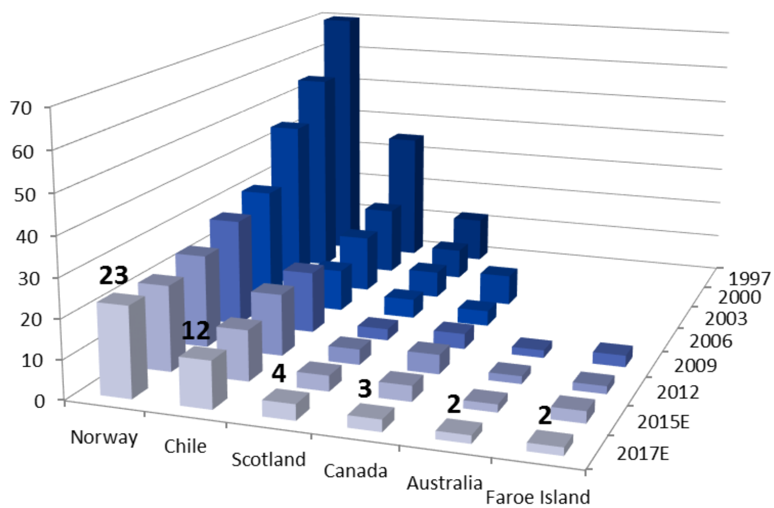


Note: 2018E volumes are Marine Harvest's guiding figures

Source: Kontali Analyse, Marine Harvest, Quarterly reports

Industry Structure

6.2 Number of players in producing countries



The graph shows the number of players producing 80% of the farmed salmon and trout in each major producing country.

During the last decade the salmon farming industry has been through a period of consolidation in all regions and this is expected to continue.

Historically, the salmon industry has been made up by many small firms. As illustrated above, this has been the case in Norway, and to some degree in Scotland and Chile.

The higher level of fragmentation in Norway compared to Chile is the result of the Norwegian government's priority for decentralised structures and local ownership. In Chile the government place fewer demands on ownership structures in order to grow the industry faster.

There is approx. 160 companies who own commercial licenses for salmon and trout in Norway, however some of these are controlled by other companies. The total supply is produced by around 100 companies (through themselves or subsidiaries).

There are approximately 1,320 commercial licenses for the on-growing of Atlantic salmon, trout and coho in Chile. Around 90% of these are held by 20 companies with the 10 largest firms accounting for 70% of the total licenses. Only between 300-350 licenses are in operation.

Note: See appendix for some historical acquisitions and divestments
Source: Kontali Analyse

07

Salmon Production and Cost Structure

07 Salmon Production and Cost Structure

7.1 Establishing a salmon farm

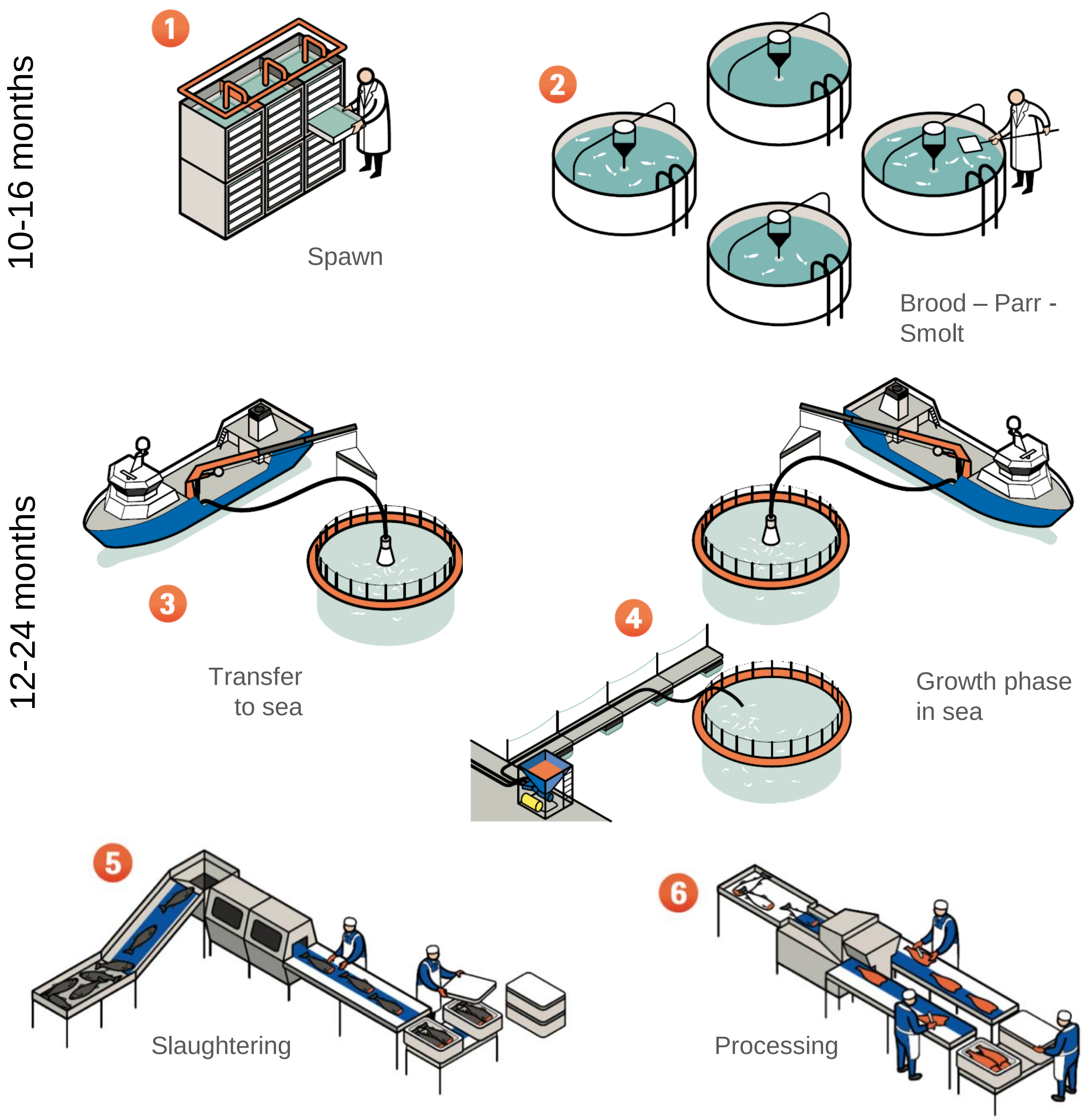
The salmon farming production cycle is about 3 years. During the first year of production the eggs are fertilised and the fish is grown to approximately 100-150 grams in a controlled freshwater environment.

The fish is then transported to seawater cages where it is grown to around 4-5 kg over a period of 12-24 months. The growth of the fish is heavily dependent on the seawater temperatures, which vary by time of year and across regions.

When it reaches harvestable size, the fish is transported to processing plants where it is slaughtered and gutted. Most salmon is sold gutted on ice in a box (gwt).

Salmon Production and Cost Structure

7.2 The Atlantic salmon life/production cycle



Note: See appendix for more information on the Atlantic salmon production cycle

Source: Marine Harvest

Salmon Production and Cost Structure

7.2 The Atlantic salmon life/production cycle

The total freshwater production cycle takes approximately 10-16 months and the seawater production cycle lasts around 12-24 months, giving a total cycle length on average about 3 years. In Chile, the cycle is slightly shorter as the sea water temperatures are more optimal with fewer fluctuations.

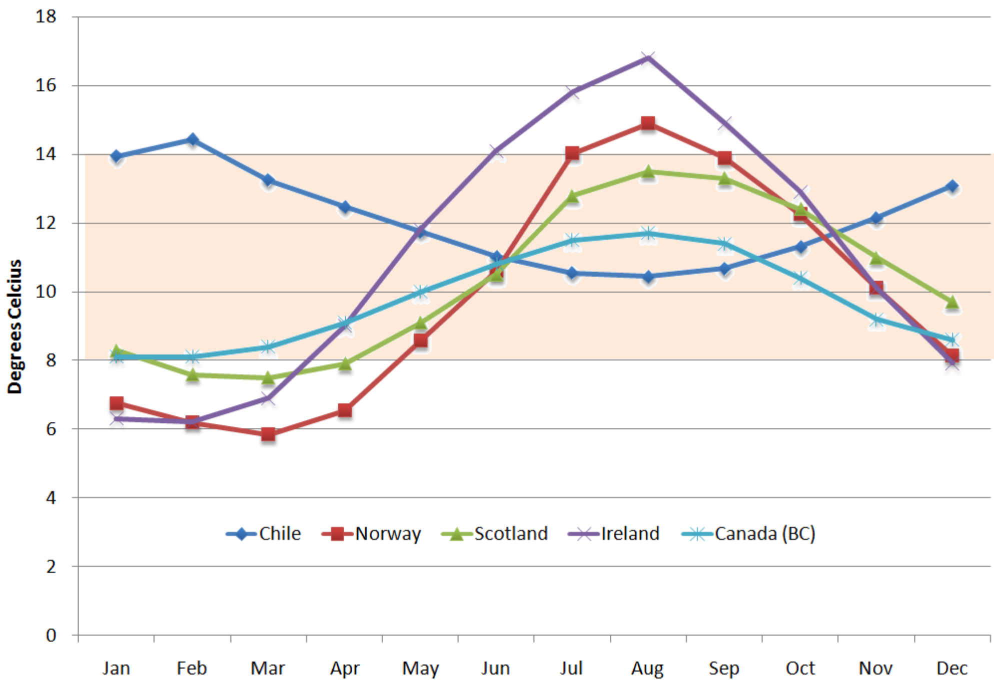
In autumn, the broodstock are stripped for eggs and the ova inlay takes place between November and March. The producer can speed up the growth of the juveniles with light manipulation which accelerates the smoltification process by up to 6 months.

In Norway, smolts are mainly released into seawater twice a year. Harvesting is spread evenly throughout most of the year, although most harvesting takes place in the last quarter of the year as this is the period of best growth. During summer the harvesting pattern shifts to a new generation, accordingly at this time the weight dispersion between the large and small harvested salmon is greater than the rest of the year.

After a site is harvested, the location is fallowed between 2 and 6 months before the next generation is put to sea at the same location. Smolts may be released in the same location with a two year cycle.

Salmon Production and Cost Structure

7.3 Influence of sea water temperature



The sea water temperatures vary considerably throughout the year in all production regions. While the production countries in the northern hemisphere see low temperatures during the beginning of the year and high temperatures in autumn varying as much as 10ºC, the temperature in Chile is more stable varying between 10ºC and 14ºC. Chile has the highest average temperature of 12ºC, while Ireland has 11ºC and the three other regions have an average temperature of about 10ºC.

As the salmon is a cold-blooded animal (ectotherm), the temperature plays an important role in its growth rate. The optimal temperature range for Atlantic salmon is 8-14ºC, illustrated by the shaded area on the graph. Temperature is one of the most important natural competitive advantages that Chile has compared to the other production regions as the production time there historically has been shorter by a few months.

With high seawater temperatures, disease risk increases, and with temperatures below 0ºC, mass mortality becomes more likely, both of which cause the growth rate to fall.

Source: Marine Harvest, www.seatemperature.org

Salmon Production and Cost Structure

7.4 Production inputs

Eggs

There are several suppliers of eggs to the industry. Aquagen AS, Fanad Fisheries Ltd, Lakeland and Salmobreed AS are some of the most significant by quantity. In addition to these suppliers, Marine Harvest produce it's own eggs based on the Mowi strain.

Egg suppliers can tailor their production to demand by obtaining more or less fish for breeding during the preceding season. Production can easily be scaled. The market for salmon eggs is international.

Smolt

The majority of smolt are produced "in-house" by vertically integrated salmon farmers. This production is generally for a company's own use, although a proportion may also be sold to third parties. A smolt is produced over a period of 6-12 months from the eggs being fertilised to a mature smolt with weight of 60-100 grams. There has been a trend that smolts (post smolt) are increasing in size in order to shorten the time at sea (100-1,000 grams).

07 Salmon Production and Cost Structure

7.4 Production inputs

Labour

According to The Directorate of Fisheries the Norwegian aquaculture industry employed 7 578 people in 2016. A Nofima report stated that 15 000 people were employed in businesses involved in activities connected with the aquaculture industry in 2013. In total there are over 22 000 people employed full time either directly or indirectly by the aquaculture industry in Norway.

According to the Scottish Salmon Producers Organisation (SSPO), almost 2 500 people are employed in salmon production in Scotland. The Scottish Government estimates that over 8 000 jobs are generated directly or indirectly by the aquaculture industry.

Estimates on Canadian employment say that around 14 000 people are employed in aquaculture, where Canada's farmed-salmon industry provides more than 10 000 jobs. Direct employment in Chilean aquaculture (including processing) was estimated at around 30 000 people in 2014.

The Marine Harvest Group has a total of 13 233 employees in 24 countries worldwide (31 Dec 2017).

In Norway, salaries and levels of automation are highest in the Group, while the opposite is the case in Chile. Salaries in the UK and Canada are lower than in Norway.

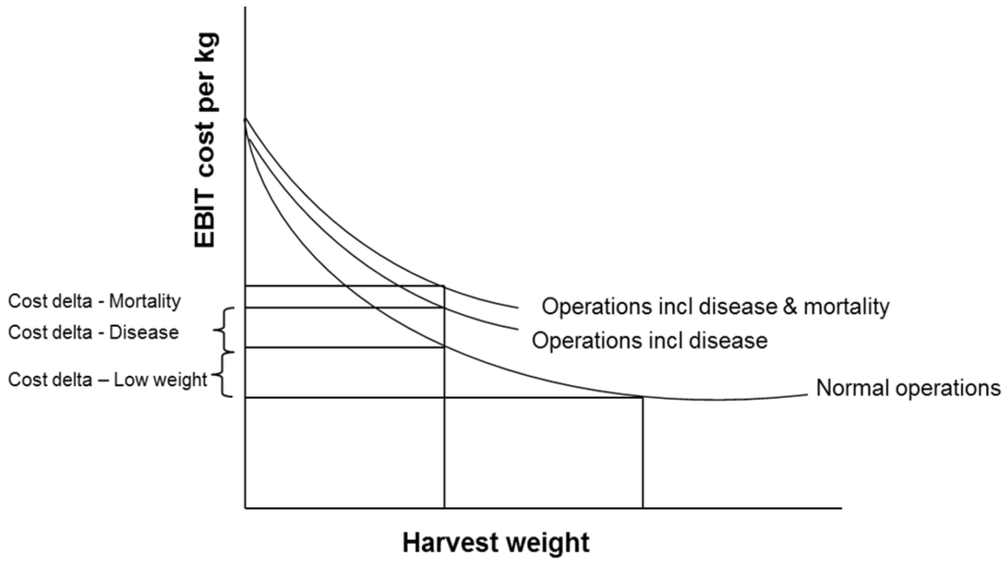
Electricity

Electricity is mainly used in the earliest and last stage in the salmon's life cycle. To produce a good quality smolt, production normally takes place in tanks on land where the water temperature is regulated and/or recirculated which requires energy (accounting for 4-5% of smolt cost in Norway). The cost of energy consumption will depend on the price of electricity and the temperature. A cold winter will demand more electricity to heat the water used in the smolt facility. The size of the smolt will also affect the electricity consumption as a larger smolt has a longer production cycle in the smolt facility. When the salmon is processed energy is consumed. However, this depends on the level of automation (2-3% of harvest cost in Norway).

Source: Marine Harvest, Kontali Analyse, Directorate of Fisheries, SSPO, Government of Canada, Estudio Situación Laboral en la Industria del Salmón", Silvia Leiva 2014

Salmon Production and Cost Structure

7.5 Cost component – disease and mortality



EBIT costs per kg decline with increasing harvest weight. If fish is harvested at a lower weight than optimal (caused by diseases for example), EBIT costs per kg will be higher.

During the production cycle, some mortality will occur. Under normal circumstances, the highest mortality rate will be observed during the first 1-2 months after the smolt is put into seawater, while subsequent stages of the production cycle normally have a lower mortality rate.

Elevated mortality in later months of the cycle is normally related to outbreaks of disease, treatment of sea lice or predator attacks.

There is no strict standard for how to account for mortality in the accounts, and there is no unified industry standard. Three alternative approaches are:

Charge all mortality to expense when it is observed

Capitalise all mortality (letting the surviving individuals carry the cost of dead individuals in the balance sheet when harvested)

Only charge exceptional mortality to expense (mortality, which is higher than what is expected under normal circumstances)

It is not possible to perform biological production without any mortality. By capitalising the mortality cost, the cost of harvested fish will therefore reflect the total cost for the biomass that can be harvested from one production cycle.

7.6 Accounting principles for biological assets

Biological assets are measured at fair value less cost to sell, unless the fair value cannot be measured reliably.

Effective markets for the sale of live fish do not exist so the valuation of live fish implies establishment of an estimated fair value of the fish in a hypothetical market. Fair value is estimated by the use of a calculation model, where cash inflows are functions of estimated volume multiplied with estimated price. Fish ready for harvest (4 kg GWT, which corresponds to 4.8 kg LW) is valued at expected sales price with a deduction of costs related to harvest, transport etc. to arrive at back-to-farm prices. For fish not ready for harvest (i.e. below 4 kg GWT), the model uses an interpolation methodology where the known data points are *i)* the value of the fish when put to sea and *ii)* the estimated value of the fish when it has reached harvest size. The valuation reflects the expected quality grading and size distribution.

Broodstock and smolt are measured at cost less impairment losses, as the fair value cannot be measured reliably.

The change in estimated fair value is recognised in profit or loss on a continuous basis, and is classified separately (not included in the cost of the harvested biomass). On harvest, the fair value adjustment is reversed on the same line.

Operational EBIT

Operational EBIT and other operational results are reported based on the realised costs of harvested volume and do not include the fair value adjustments on biomass.

Salmon Production and Cost Structure

7.7 Economics of salmon farming

The salmon farming industry is capital intensive and volatile. This is a result of a long production cycle, a fragmented industry, market conditions and a biological production process which is affected by many external factors.

Over time, production costs have been reduced and productivity has increased as new technology and techniques have improved. In recent years, costs have trended upwards due to several factors including rising feed costs, biological costs and more stringent regulatory compliance procedures.

Reported revenues: Revenues are a gross figure; they can include invoiced freight from reference place (e.g. FCA Oslo) to customer, and have discounts, commissions and credits deducted. Reported revenues can also include revenues from trading activity, sales of by-products, insurance compensation, gain/loss on sale of assets etc.

Price: Reported prices are normally stated in the terms of a specific reference price e.g. the Nasdaq price for Norway (FCA Oslo) and UB price for Chile (FOB Miami). Reference prices do not reflect freight, and other sales reducing items mentioned above. Reference prices are for one specific product (Nasdaq price = sales price per kg head on gutted fish packed fresh in a standard box). Sales of other products (frozen products, fresh fillets and portions) will cause deviation in the achieved prices vs. reference price. Reference prices are for superior quality fish, while achieved prices are for a mix of qualities, including downgrades. Reference prices are spot prices, while most companies will have a mix of spot and contract sales in their portfolio.

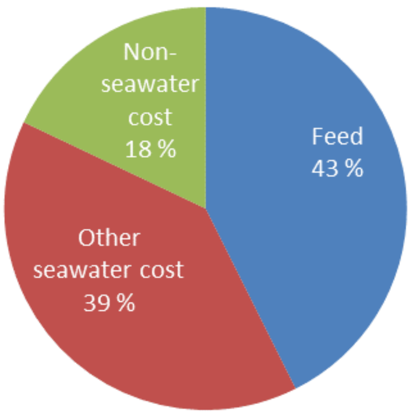
Quantity: Reported quantity can take many forms. Quantity harvested = Fish harvested in a specific period in a standardized term; e.g. Gutted Weight Equivalent (gwt), which is the same weight measure as Head-on-Gutted (HOG), or Whole Fish Equivalent (WFE), the difference being gutting loss. Quantity sold can be reported using different weight scales:

- Kg sold in product weight.
- Kg sold converted to standard weight unit (gwt or WFE).
- Quantity sold could also include traded quantity.

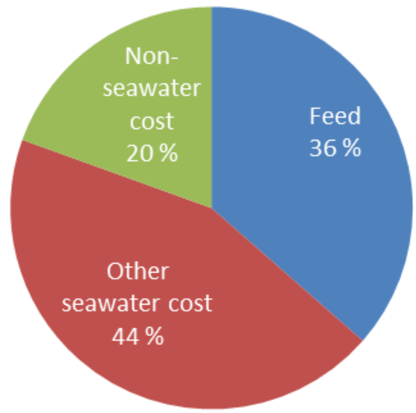
Salmon Production and Cost Structure

7.8 Cost structure for Marine Harvest in 2017

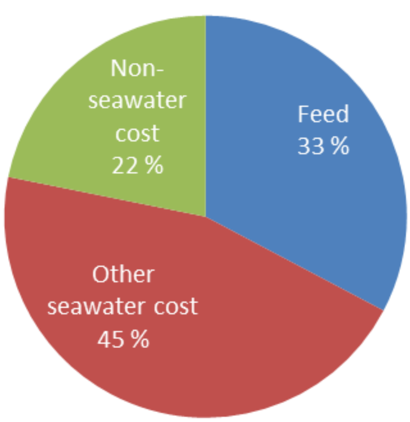
Norway (NOK)



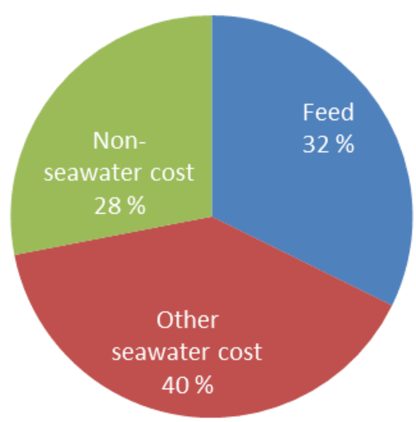
Canada (CAD)



Scotland (GBP)



Chile (USD)



Salmon Production and Cost Structure

7.9 Production costs for Marine Harvest in 2017

The figures below illustrate the main cost components and their relative importance in the farming of salmon in the four biggest regions. The cost level is chosen for illustration purposes.

	Norway (EUR)	Canada (CAD)	Scotland (GBP)	Chile (USD)
Feed	1,70	1,73	1,71	1,45
Primary processing	0,33	0,35	0,27	0,44
Smolt	0,35	0,47	0,36	0,65
Salary	0,24	0,40	0,25	0,19
Maintenance	0,16	0,19	0,17	0,19
Well boat	0,15	0,12	0,24	0,20
Depreciation	0,13	0,21	0,22	0,15
Sales & Marketing	0,03	0,01	0,04	0,03
Mortality	0,06	0,05	0,16	0,06
Other	0,81	0,95	0,96	0,76
Total*	3,97	4,48	4,39	4,12

Feed: As in all animal production, feed makes up the largest share of the total cost. The variation in costs between the countries is based on somewhat different inputs to the feed, logistics and the feed conversion ratio.

Smolt: Atlantic Salmon Smolt today is largely produced at land-based hatcheries either in flow through or RAS systems. The smolt is produced and kept in fresh water until it weighs around 100g and then delivered to grow-out sites in sea water. The UK has the highest costs as there has been low scale production in both land based systems and tanks. Chile historically used lakes for this production but gradually migrated to land-base systems finishing the use of lakes in 2014. In Norway there has been a shift from production in lakes to large scale production in land-based systems.

Salary: Salary levels differ between the production regions but in general the salary cost is low as automated production means the cost of labour cost is a minor part of the total cost.

Well boat/processing: Transportation costs of live fish, slaughtering, processing and packing are all heavily dependent on quantity, logistics and automation.

Other operational costs: Other costs include direct and indirect costs, administration, insurance, biological costs (excluding mortality), etc.

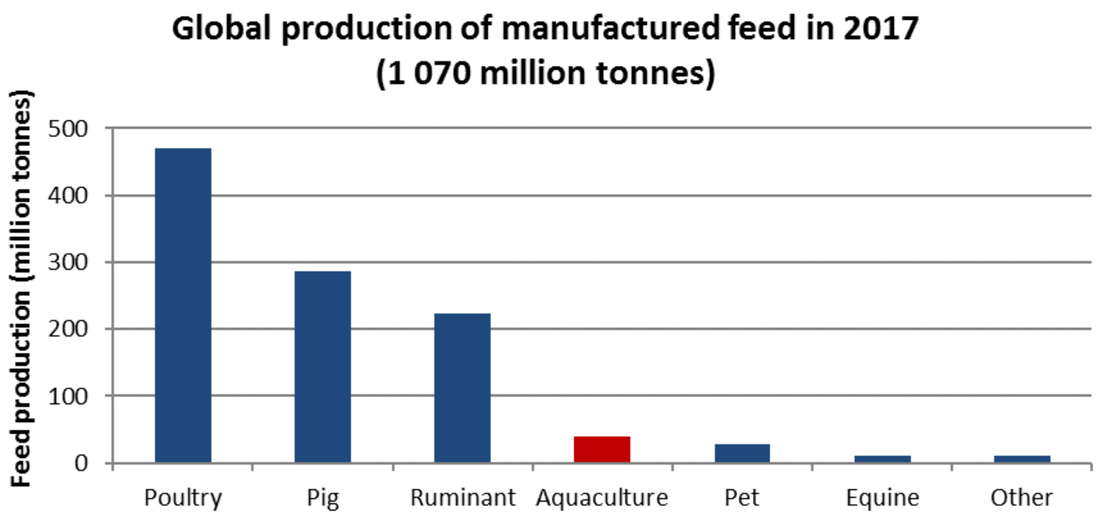
08

Feed Production

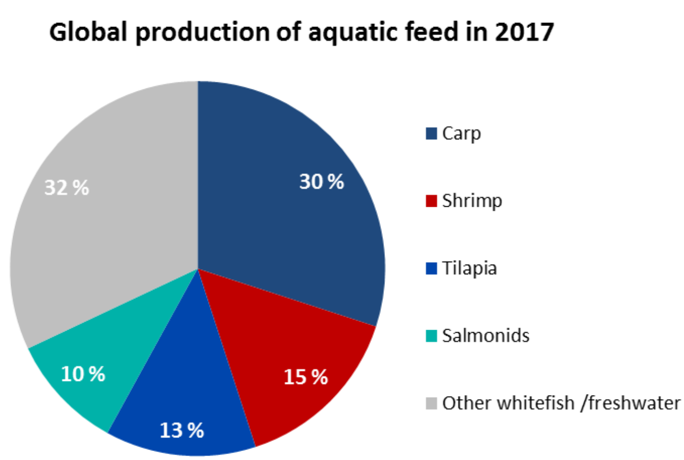
08

Feed Production

8.1 Overview of feed market



The global production of manufactured feed was around 1,070 million tonnes in 2017. The majority is used for land living animals, where more than 90% is used in the farming of poultry, pig and ruminants. Only 4%, or 40 million tonnes, of the global production of manufactured feed was used in aquatic farming.

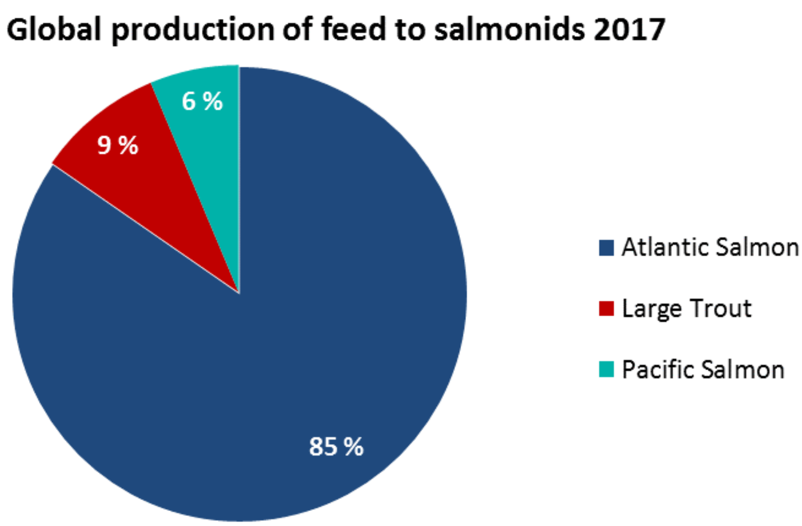


Most aquatic feed produced globally is used for carp as this is the predominant fish species. Feed for salmonids only accounts for 10% of the total production of aquatic feed.

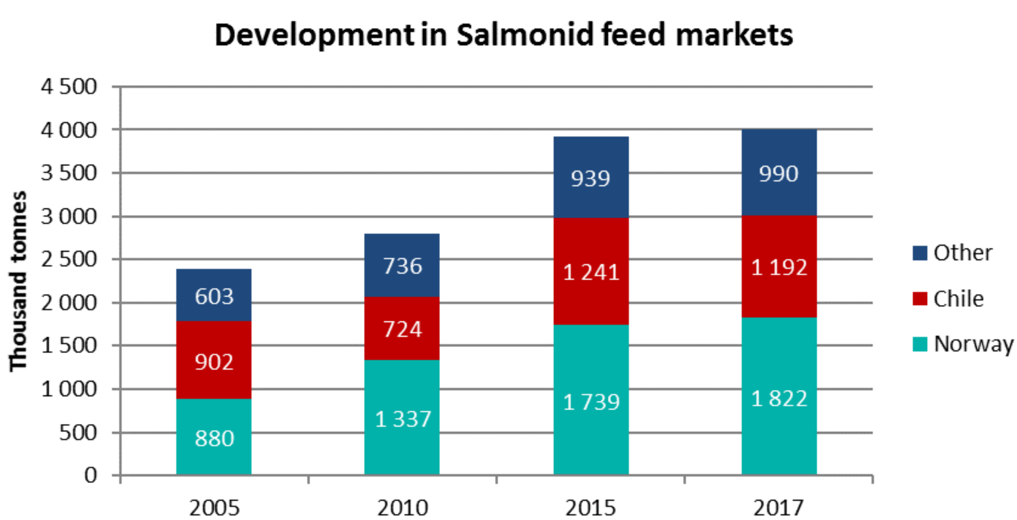
Source: Kontali Analyse

08 Feed Production

8.1 Overview of feed market



Atlantic salmon is the most farmed species of salmonids and is therefore the largest consumer of salmonid feed.

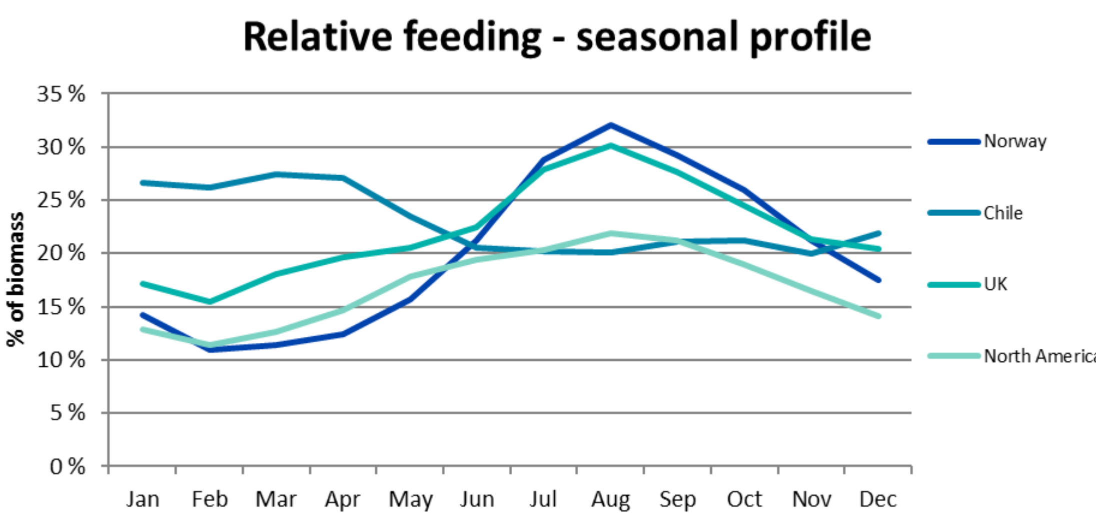


Most of the feed used in farming of salmonids is produced close to where it is farmed. Norway used 46% of the global feed directed towards the salmonid segment in 2017 and Chile used 30%.

Source: Kontali Analyse

08 Feed Production

8.2 Relative feeding (*)



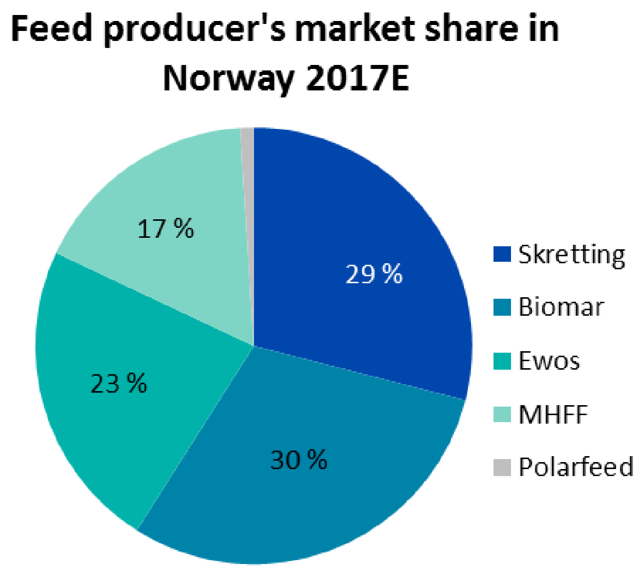
The production of feed around the world varies as there are large deviations in sea temperature. Norway has the largest seasonality in production. The low season is from February to April, the high season is from July to September, with mid season in between. Production in the low season can be as low as only 30% of the high season. Feed is considered a perishable product with a shelf life normally up to a maximum of one year. As the turnover of feed is usually high the shelf life is not considered an issue in large operations.

*Relative feeding: (Feed sold or fed during a month) / (Biomass per primo in month)

Source: Kontali Analyse

08 Feed Production

8.3 Salmon feed producers



During the last decade, the salmonid feed industry has become increasingly consolidated. Since 2008, three producers have controlled the majority of the salmon feed output; Skretting (subsidiary of Nutreco which has been acquired by SHV), Ewos and BioMar (subsidiary of Schouw). The companies all operate globally.

In mid-2014, Marine Harvest began production of feed from its new feed plant. The plant produced 305,174 tonnes in 2017 compared to a global salmonid feed production of around 4 million tonnes. Marine Harvest's market share has more than doubled between the end of 2014 to 2017.

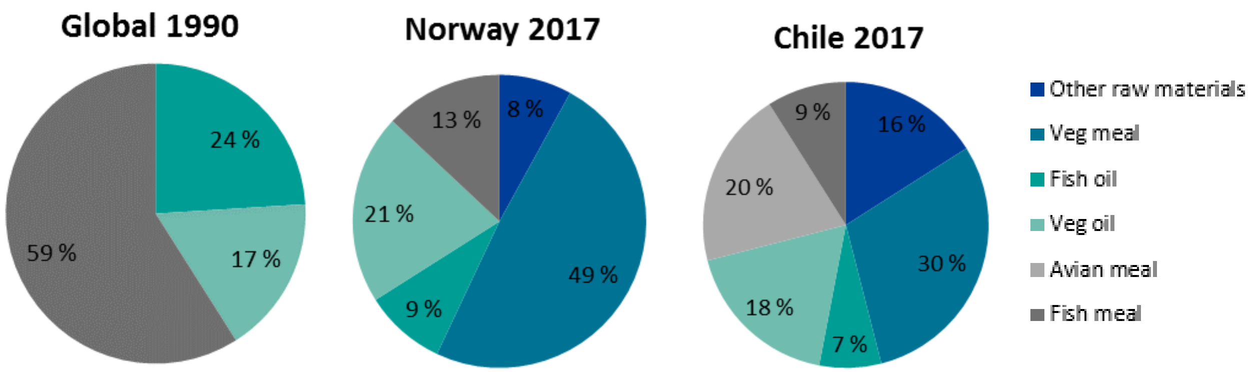
The major cost elements when producing salmonid feed are the raw materials required and production costs.

The feed producers have historically operated on cost-plus contracts, leaving the exposure of raw material prices with the aquaculture companies.

Source: Marine Harvest

Feed Production

8.4 Salmon feed ingredients



Typical feeding patterns throughout the growth cycle

Growth intervals	0.1 – 0.2 kg	0.2 – 1 kg	1 – 2 kg	2 – 3 kg	3 – 4 kg	4 – 5 kg
Feed consumption (Norway)	0.08 kg	0.75 kg	1.00 kg	1.05 kg	1.10 kg	1.20 kg
Time, months	2	4	4	3	2	2

Atlantic salmon feeds should provide proteins, energy and essential nutrients to ensure high muscle growth, energy metabolism and good health. Historically, the two most important ingredients in fish feed have been fish meal and fish oil. The use of these two marine raw materials in feed production has been reduced and replaced with ingredients such as soy, sunflower, wheat, corn, beans, peas, poultry by-products (in Chile and Canada) and rapeseed oil. This substitution is mainly due to heavy constraints on the availability of fish meal and fish oil.

Atlantic salmon have specific nutrient requirements for amino acids, fatty acids, vitamins, minerals and other lipid- and water soluble components. These essential nutrients can in principle be provided by the range of different raw materials listed above. Fish meal and other raw materials of animal origin have a more complete amino acid profile and generally have a higher protein concentration compared to proteins of vegetable origin. As long as the fish receives the amino acid it needs it will grow and be healthy and the composition of its muscle protein is the same irrespective of the feed protein source. Consequently, feeding salmon with non-marine protein sources results in a net production of marine fish protein.

During the industry's early phases, salmon feed was moist (high water content) with high levels of marine protein (60%) and low levels of fat/oil (10%). In the 1990s, the feed typically consisted of 45% protein, made up mostly of marine protein. Today, the marine protein level is lower due to cost optimisation and the availability of fish meal. However, the most interesting development has been the increasingly higher inclusion of fat. This has been possible through technological development and extruded feeds.

Source: www.nifes.no, Holtermann

Feed Production

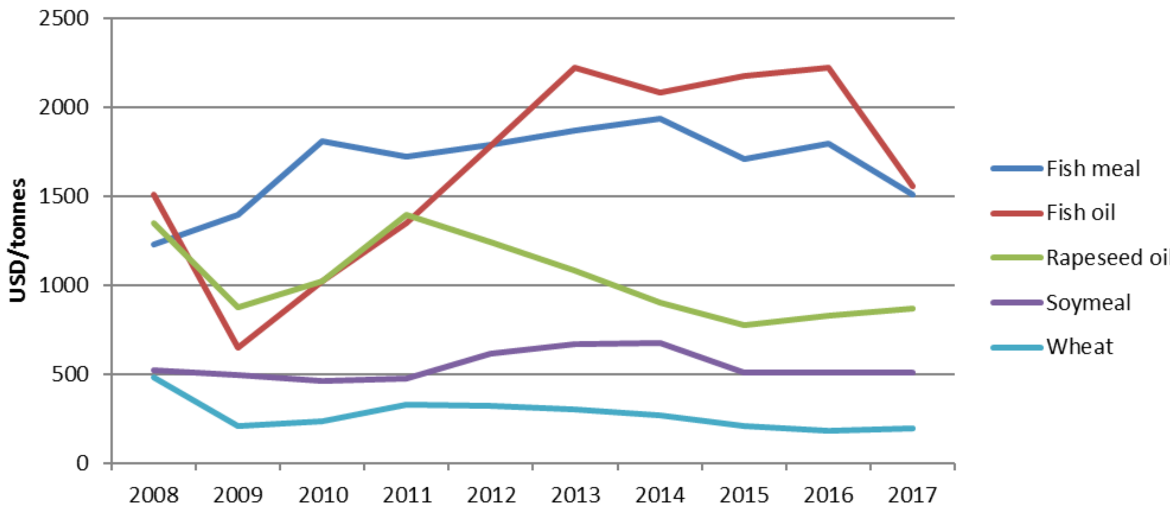
8.4 Salmon feed ingredients

Feed and feeding strategies aim to grow a healthy fish fast at the lowest possible cost. Standard feeds are designed to give the lowest possible production cost rather than maximised growth. Premium diets formulated for the best growth rate are being used in situations where the difference between sales price and production cost make these diets profitable.

Feeding control systems are used at all farms to control and optimise feeding. The feeding is monitored for each net pen to ensure that the fish is fed to maximise growth (measured by the Relative Growth Index - RGI). At the same time the systems ensure that feeding is stopped immediately when the maximum feed intake has been provided to prevent feed waste. The fastest growing fish typically also have the best (i.e. lowest) feed conversion ratio (FCR).

Feed Production

8.5 Feed raw material market



Fish oil: Since 2009 fish oil prices have increased. The average price of fish oil was about USD 1 550 per tonne in 2017.

Fish meal: Fish meal has also seen an increasing trend in price. On average, fish meal has been more expensive, but over the last couple of years fish oil has surpassed fish meal on price.

Rapeseed oil: Up until 2011, rapeseed oil and fish oil had a correlating price development. However, in the last few years there has been a decreasing trend in the price of rapeseed oil.

Soy meal: Soy and corn have traditionally been very important vegetable protein sources in fish feed. As a consequence of demand from China increasing faster than the increase in soy production and more corn used for energy purposes, the price for soy meal (and other vegetable proteins) has increased. Parallel to this, there has been an increase in genetic modified (GM) production of soy and corn. Non-GM products have been sold with a premium making them more expensive. The average price in 2017 was USD 509 per tonnes.

Wheat: Prices for wheat have remained stable over the years with generally good production and supply/demand in balance.

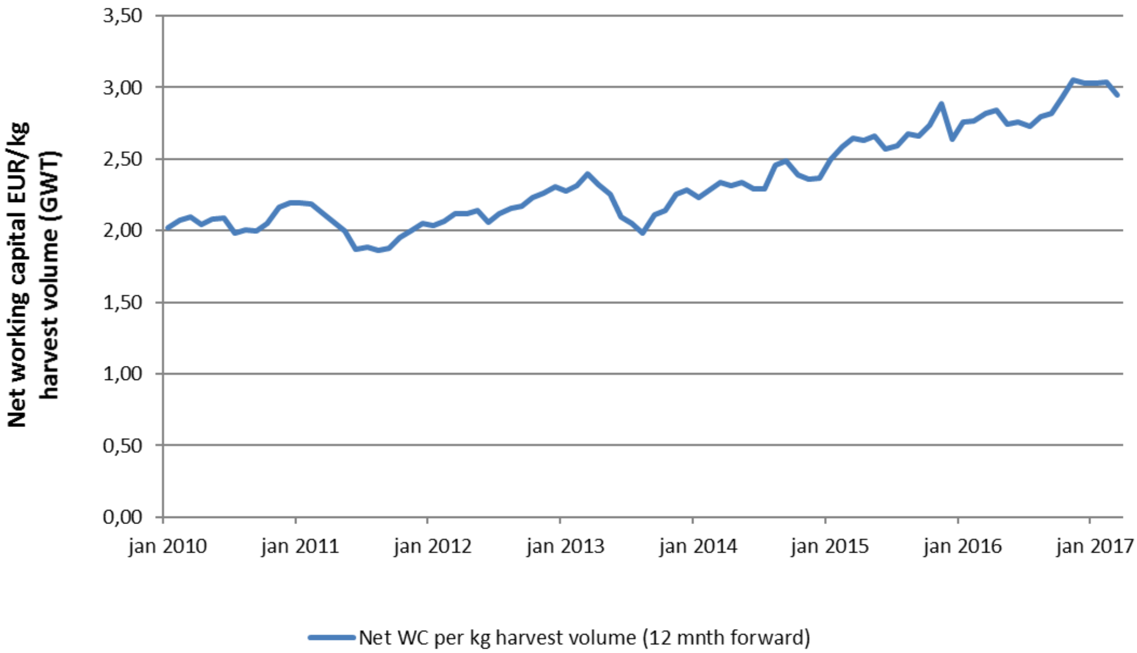
Source: Holtermann

09

Financial Considerations

09 Financial Considerations

9.1 Working capital



The long production cycle of salmon requires a significant working capital in the form of biomass.

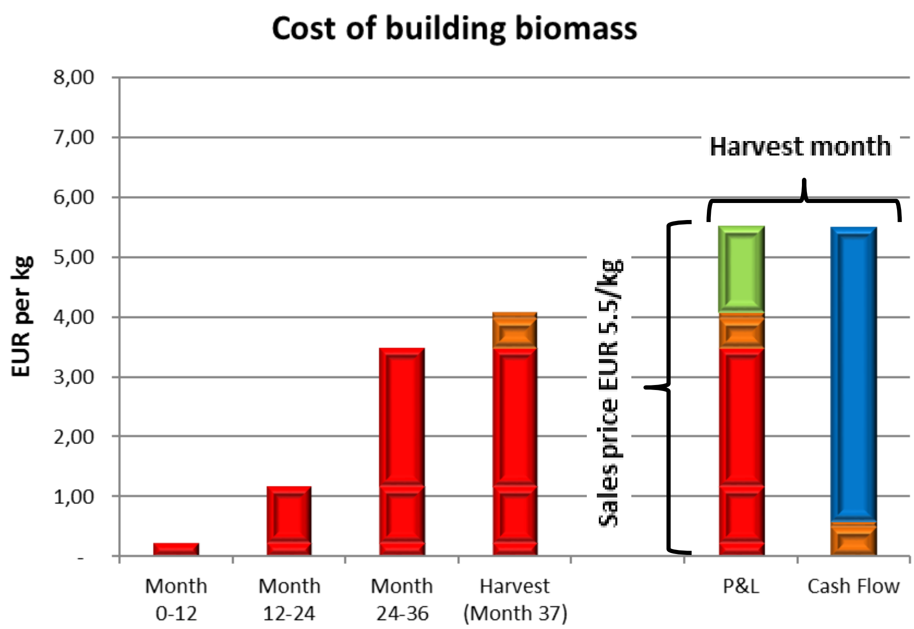
Working capital investments are required for organic growth, as a larger “pipeline” of fish is needed to facilitate larger quantities of harvest. On average, a net working capital investment of approximately EUR 3/kg is required, split between the same year of harvest and one year preceding harvest, to obtaining an increase in harvest volume of 1 kg. The working capital requirement has increased over time, and fluctuates with variations in exchange currencies.

Net working capital varies during the year. Growth of salmon is heavily impacted by changing seawater temperatures. Salmon grows at a higher pace during summer/autumn and more slowly during winter/spring when the water is colder. As the harvest pattern is relatively constant during the year, this leads to a large seasonal variation in net working capital. For a global operator, net working capital normally peaks around year-end and bottoms around mid-summer.

Source: Marine Harvest

09 Financial Considerations

9.1 Working capital



For illustration purposes, the farming process has been divided into three stages of 12 months. The first 12 month period is production from egg to finished smolt. After this, 24 months of on-growing in the sea follows. After the on-growing phase is over, harvest takes place immediately (illustrated as "Month 37"). In a steady state there will at all times be three different generations at different stages in their life cycle. Capital expenditure is assumed equal to depreciation for illustration purposes. The working capital effects are shown above on a net basis excluding effects from accounts receivables and accounts payables.

At the point of harvest there has been costs to produce the fish for up to 36 months, some costs to produce the smolt two years ago, further costs incurred to grow the fish in seawater and some costs incurred related to harvest ("Month 37"). Sales price covers the costs and provide a profit margin (represented by the green rectangle).

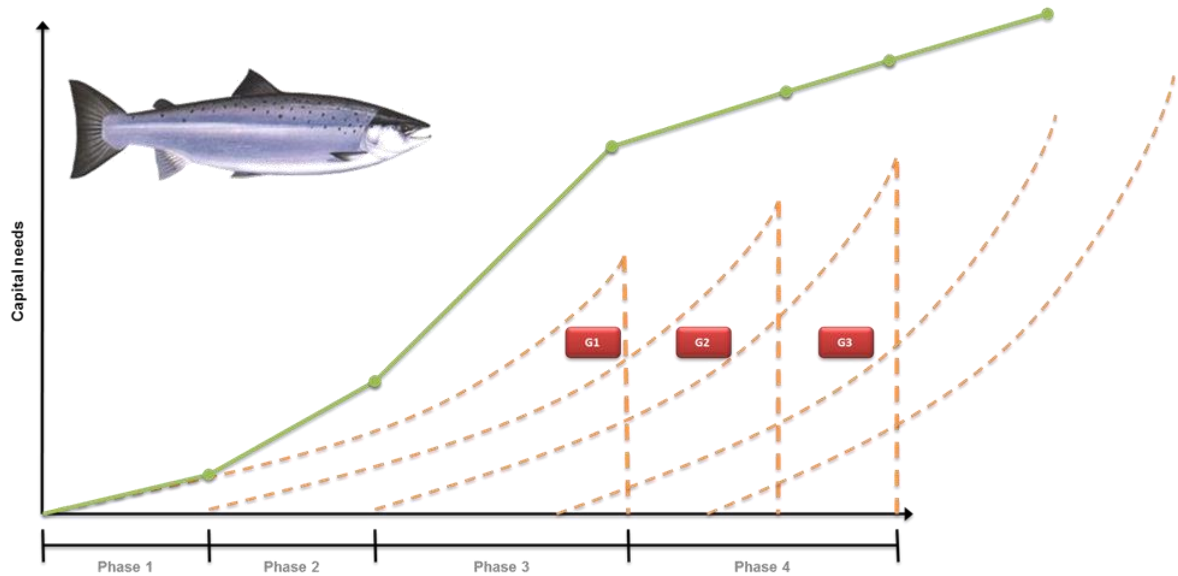
Cash cost in the period when the fish is harvested is not large compared to sales income, creating a high net cash flow. If production going forward (next generations) follows the same pattern, most of the cash flow will be reinvested into salmon at various growth stages. If the company wishes to grow its future output, the following generations need to be larger requiring even more of the cash flow to be reinvested in working capital.

This is a rolling process and requires substantial amounts of working capital to be tied up, both in a steady state and especially when increasing production

Source: Marine Harvest

09 Financial Considerations

9.1 Working capital



The illustration above shows how capital requirements develop when production/biomass is being built from ”scratch”. In phase 1, there is only one generation (G) of fish produced and the capital requirement is the production cost of the fish. In phase 2, the next generation is also put into production, while the on-growing of G1 continues, rapidly increasing the capital invested. In phase 3, G1 has reached its last stage, G2 is in its on-growing phase and G3 has begun to increase its cost base.

At the end of phase 3, the harvest starts for G1, reducing the capital tied-up, but the next generations are building up their cost base. If each generation is equally large and everything else is in a steady state, the capital requirement would have peaked at the end of phase 3. With a growing production, the capital requirement will also increase after phase 3 as long as the next generation is larger than the previous (if not, the capital base is reduced). We see that salmon farming is a capital intensive industry.

To equip a grow-out facility you need cages (steel or plastic), mooring, nets, cameras, feed barge/automats and boats.

Source: Marine Harvest

Financial Considerations

9.2 Capital return analysis

Investments and payback time (Norway) - assumptions

- Normal site consisting of 4 licenses

- Equipment investment: MEUR 3.5 - 4.5
- Number of licenses: 4
- License cost (second hand market) MEUR: 40 (~MEUR 10 per license)
- Output per generation: ~4 000 tonnes gwt
- Number of smolt released: 1 100 000

- Smolt cost per unit: EUR 1
- Feed price per kg: EUR 1.3 (LW)
- Economic feed conversion ratio (FCR): 1.2 (to Live Weight)
- Conversion rate from Live Weight to gwt: 0.84
- Harvest and processing incl. well boat cost per kg (gwt): EUR 0.4

- Average harvest weight (gwt): 4.5kg
- Mortality in sea: 15%

- Sales price: EUR 5.5/kg

To increase capacity there are many regulations to fulfil.

In this model, we focus on a new company entering the industry and have used only one site for simplicity. Most companies use several sites concurrently, which enables economies of scale and makes the production more flexible and often less costly.

Also for simplicity, in this model smolts are bought externally. Smolts are usually less costly to produce internally, but this depends on production quantity.

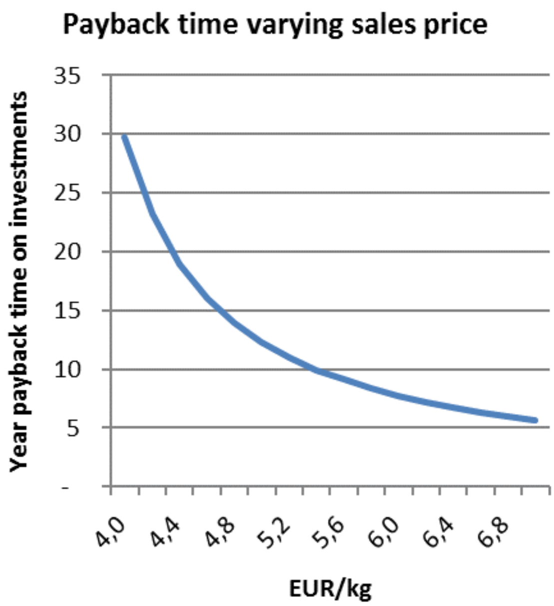
The performance of the fish is affected by numerous factors including feeding regime, sea water temperature, disease, oxygen level in water, smolt quality, etc.

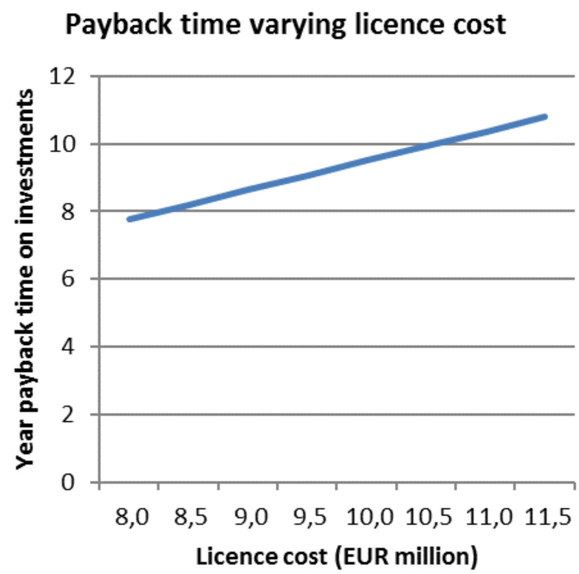
The sales price reflects the average sales price from Norway over the last five years.

Source: Marine Harvest, Kontali Analyse

Financial Considerations

9.2 Capital return analysis





Results

Because of the simplifications in the model and the low, non-optimal production regime, production costs are higher than the industry average. Due to high entry barriers in terms of capital needs and falling production costs with quantity, new companies in salmon production will experience higher average production costs. During the production of each harvest the working capital needed at this farm, given the assumptions, would be peaking at around MEUR 12 (given that the whole harvest is harvested at the same time).

With a sales price at the average level in the period 2013-2017, payback time for the original investments would be around 9.5 years. This result is very sensitive to sales price, license cost and economic feed conversion ratio (FCR).

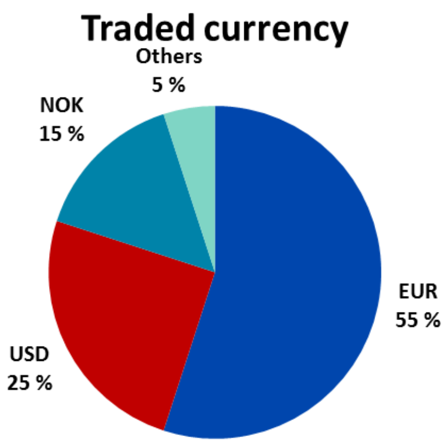
The sales price of EUR 5.5/kg is based on the average price in Norway in the 5-year period 2013-2017.

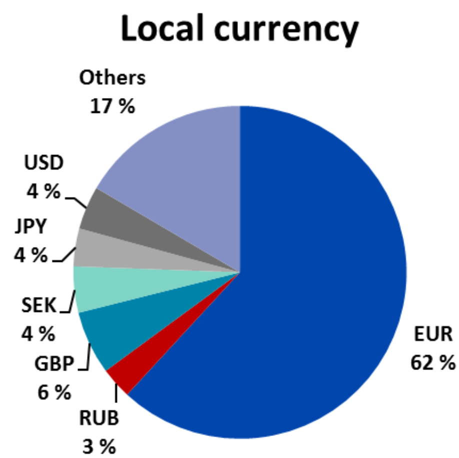
Source: Marine Harvest

Financial Considerations

9.3 Currency overview

Norwegian exposure vs foreign currency[1]





Exporters deal in the traded currency, while the customer has an exposure to both. For example a Russian processor trades salmon in USD, but they sell their products in the local currency, rubles (RUB).

Most Norwegian producers are exposed to currency fluctuations as the majority of the salmon they produce is exported. Most of the salmon is exported to countries within the EU and traded in EUR. The second largest traded currency is USD. Some players in countries in Eastern Europe, the Middle East and some Asian countries prefer to trade salmon in USD rather than in local currency.

The price of salmon quoted in traded currency will compete with other imported goods, while the price of salmon quoted in local currency will compete with the price to consumers of products that are produced domestically.

There is a currency risk involved in operating in different currencies, and therefore many of the largest industry players hedge currencies often with back-to-back contracts. The currency risk arising from salmon sales denominated in the traded currency is usually absorbed by the exporter, while the currency risk in local currency is absorbed by the customer.

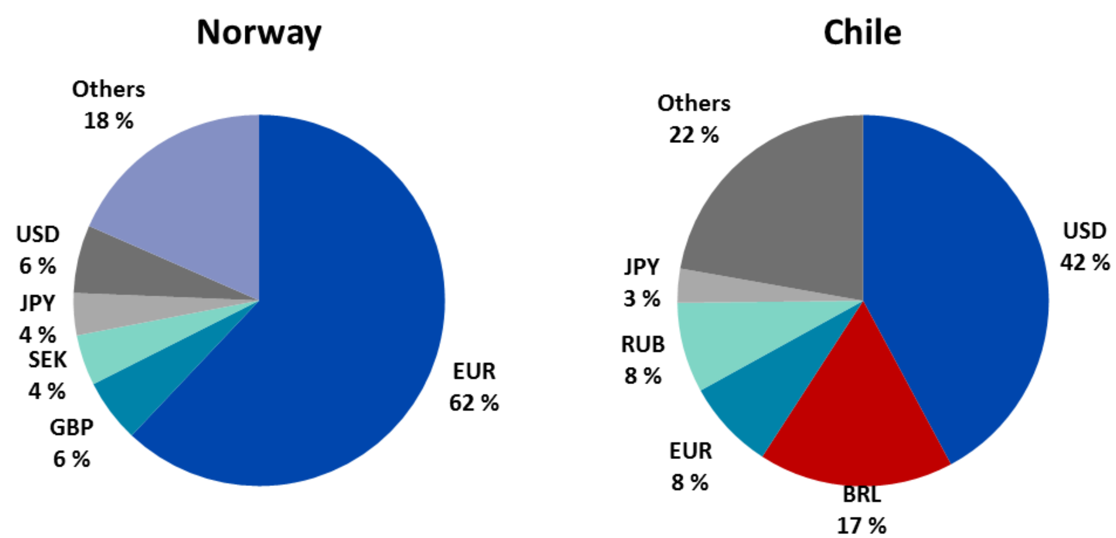
Source: Kontali

Note: (1) The table shows exposure against local currency weighted against total export volumes

Financial Considerations

9.3 Currency overview

Exposure against local currency – 2017[1]



Europe is the largest market for Norwegian produced salmon, so EUR is the predominant currency for Norwegian salmon producers. Russia is an important salmon market, however, due to the trade sanctions the exposure to the Russian RUB is limited. Other markets have therefore recently increased its direct exposure.

Key markets for Chilean produced salmon are the USA and Brazil, so exposure to USD and BRL (Brazilian real) in local currency terms is followed closely. The exposure to RUB has increased over the years as the Russian market has become more important for Chilean exporters.

Feed production: Currency exposure

The raw materials required to produce feed is as a rule of thumb quoted in USD (approx 70%) and EUR (approx 30%), based on long term average exchange rates. The raw materials generally account for 85% of the cost of producing feed. The remaining costs, including margin for the feed producer, are quoted in local currency.

Secondary Processing: Currency exposure

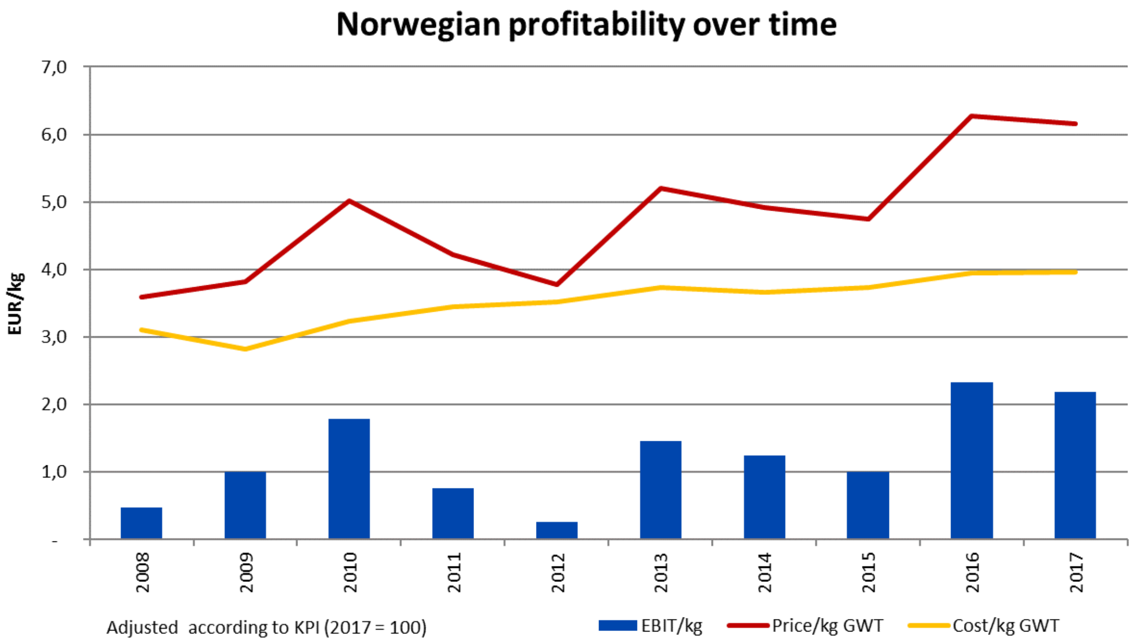
The biggest market for value added products is Europe, hence the vast majority of currency flows are denominated in EUR, both on the revenue and cost side. In the US and Asian processing markets currency flows are denominated largely by USD and EUR on the revenue side whilst costs are denominated in USD, EUR and local currency.

Source: Kontali

Note: (1) The table shows exposure against local currency weighted against total export volumes

Financial Considerations

9.4 Price, cost and EBIT development in Norway



A falling trend in the price of salmon from 1993-2004 was due to supply growth being higher than the structural growth in demand.

As a result of the cost benefits of industrialisation, consolidation and economies of scale, combined with improvements in the regulatory framework and fish health improvements, the cost curve also had a falling trend in this period.

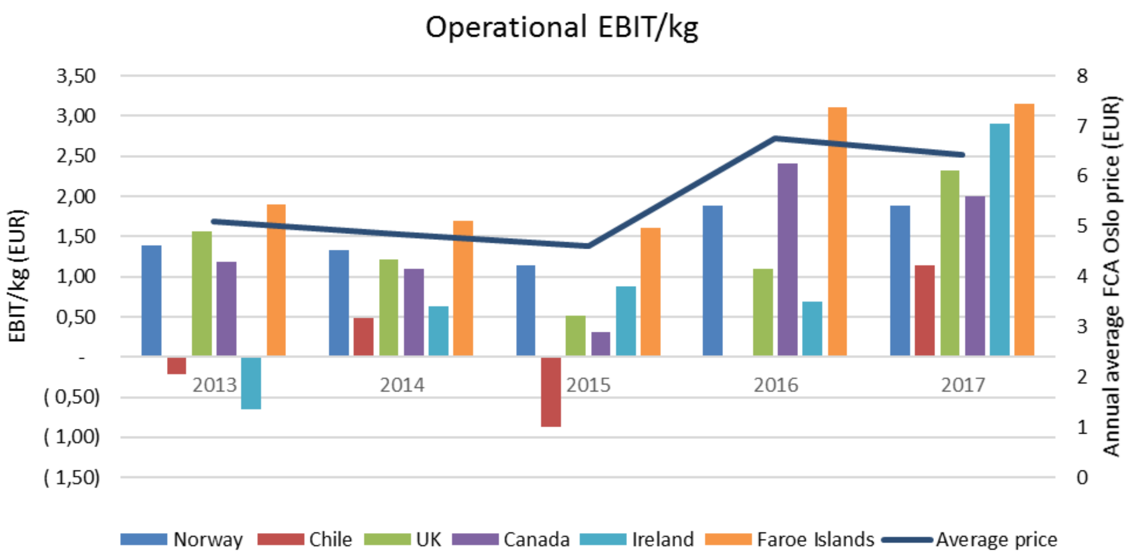
In the last decade product innovation, category management, long term supply contracts, effective logistics and transportation has stimulated strong demand growth for salmon, in particular in the European markets. In recent years, costs have trended upwards due to several factors including rising feed costs, biological costs and more stringent regulatory compliance procedures.

The average EBIT per kg for the Norwegian industry has been positive with the exception of a few shorter periods. The last 10 years it has been EUR 1.3 per kg in nominal terms (EUR 1.6 per kg the last 5 years).

Source: Kontali Analyse, Norges Bank, NOK has been converted to EUR using the historical yearly foreign exchange rate found in the Appendix

Financial Considerations

9.5 Effects of geographical diversification



The illustration above depicts Marine Harvest's performance across different countries over the last 5 years. In all regions, the biological risk is high and this impacts cost significantly from period to period. The variance in EBIT per kg is high, however, the geographic specific risk can be diversified with production across regions.

10

Barriers to Entry - Licenses

10 Barriers to Entry – Licenses

Due to biological constraints, seawater temperature requirements and other natural constraints, farmed salmon is only produced in Norway, Chile, Scotland, the Faroe Islands, Ireland, Iceland, Canada, USA, Tasmania and New Zealand.

Atlantic salmon farming began on an experimental level in the 1960s and evolved into an industry in Norway in the 1980s and in Chile in the 1990s.

In all salmon producing regions, the relevant authorities have a licensing regime in place. In order to operate a salmon farm, a license is the key prerequisite. The licenses constrain the maximum production for each company and the industry as a whole. The license regime varies across jurisdictions.

10 Barriers to Entry – Licenses

10.1 Regulations of fish farming in Norway

License and location

Fish farming companies in Norway are subject to a large number of regulations. The Aquaculture Act (17 June 2005) and the Food Safety Act (19 December 2003) are the two most important laws, and there are detailed provisions set out in several regulations which emanated from them.

In Norway, a salmon farming license allows salmon farming either in freshwater (smolt/fingeling production) or in the sea. The number of licenses for Atlantic salmon and trout in sea water was limited to 1015 licenses in 2017. Such limitations do not apply for licenses in fresh water (smolt production), which can be applied for at any time. Farming licenses in sea water can use up to four farming sites (six sites are allowed when all sites are connected with the same licenses). This increases the capacity and efficiency of the sites.

New licenses in the sea are awarded by the Norwegian Ministry of Trade, Industry and Fisheries and are administered by the Directorate of Fisheries. Licenses can be sold and pledged, and legal security is registered in the Aquaculture Register. Since 1982, new licenses have been awarded only in limited years.

The production limitations in Norway are regulated as "maximum allowed biomass" (MAB), which is the defined maximum volume of fish a company can hold at sea at all times. In general, one license sets a MAB of 780 tonnes (945 tonnes in the counties of Troms and Finnmark). The sum of the MAB permitted by all the licenses held in each region is the farming company's total allowed biomass in this region. In addition, each production site has its own MAB and the total amount of fish at each site must be less than this set limit. Generally, sites have a MAB of between 2.340 and 4.680 tonness.

The Norwegian coast was on October 15th 2017 divided into 13 geographical areas of production. The level of sea lice in these areas decide if the MAB can increase, stay the same or decrease in these areas. At the end of 2017 the government announced the condition for growth on existing licenses. 8 of 13 areas were defined as “green” and can grow by 6 % every second year. All companies were offered a 2 % growth on existing licenses, in addition to a maximum 6 % growth for sites complying with very strict environmental standards.

The government announced their plan for the auction of new licenses early 2018. The auction is scheduled to be held before summer, and there are approx. 15 000 tonnes available in the auction.

In total, the growth in all production areas could represent 23 870 tonnes, depending on the upcoming auction. This include both growth on existing biomass and the auction.

2 of the 13 areas were defined as “red” in 2017. Due to implementation of different models and the new system, reduction in production capacity will not be imposed before 2019.

10 # Barriers to Entry – Licenses

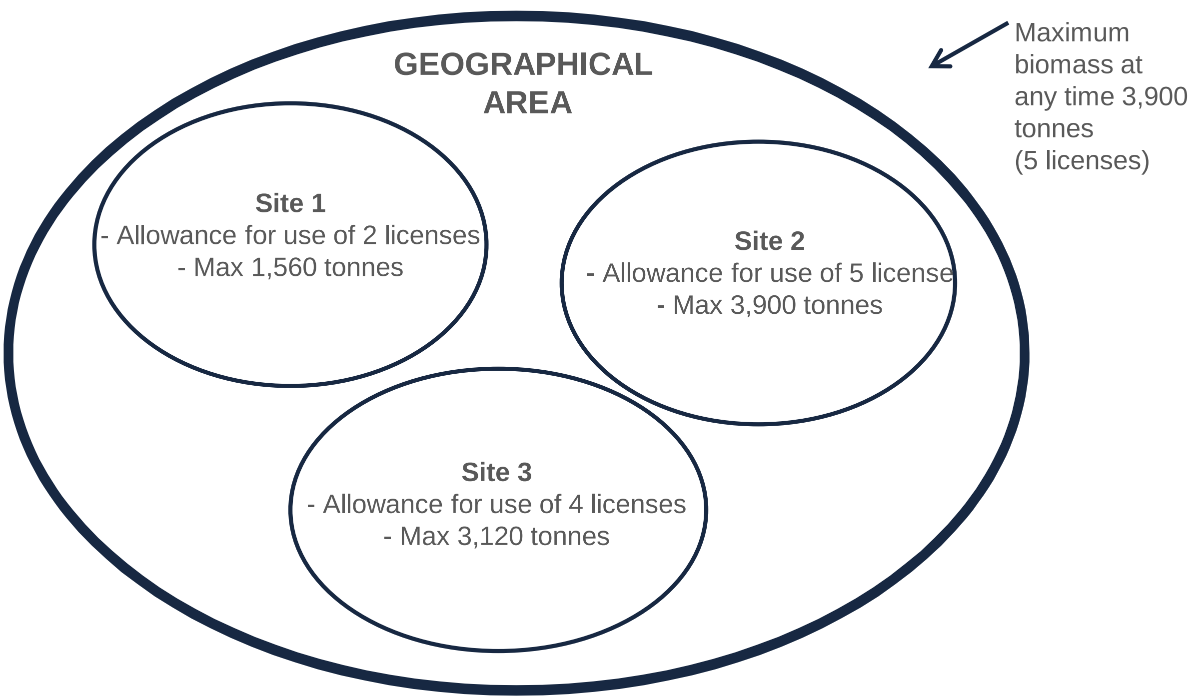
10.1 Regulations of fish farming in Norway

Access to licenses

Until November 2015, a company had to apply for approval from the Government if they got control of more than 15% of the total licenced biomass in Norway. Such approval could be given if specific terms regarding the applicant's R&D activity, fish processing and apprenticeships in coastal regions were met. This act on ownership limitation was removed in November 2015 but it is still the case that no one company in the industry can control more than 50% of the total biomass in any of the regions of the Directorate of Fisheries.

The figure below depicts an example of the regulatory framework in Norway for one company:

- Number of licenses for a defined area: 5
  - Biomass threshold per license: 780 tonnes live weight (LW)
  - Maximum biomass at any time: 3,900 tonnes (LW)
- Number of sites allocated is 3 (each with a specific biomass cap)
  In order to optimise the production and harvest quantity over the generations of salmon, the license holder can operate within the threshold of the three sites as long as the total biomass in sea never exceeds 3,900 tonnes (LW).
- There are also biomass limitations on the individual production sites. The biomass limitation varies from site to site and is determined by the carrying capacity of the site.



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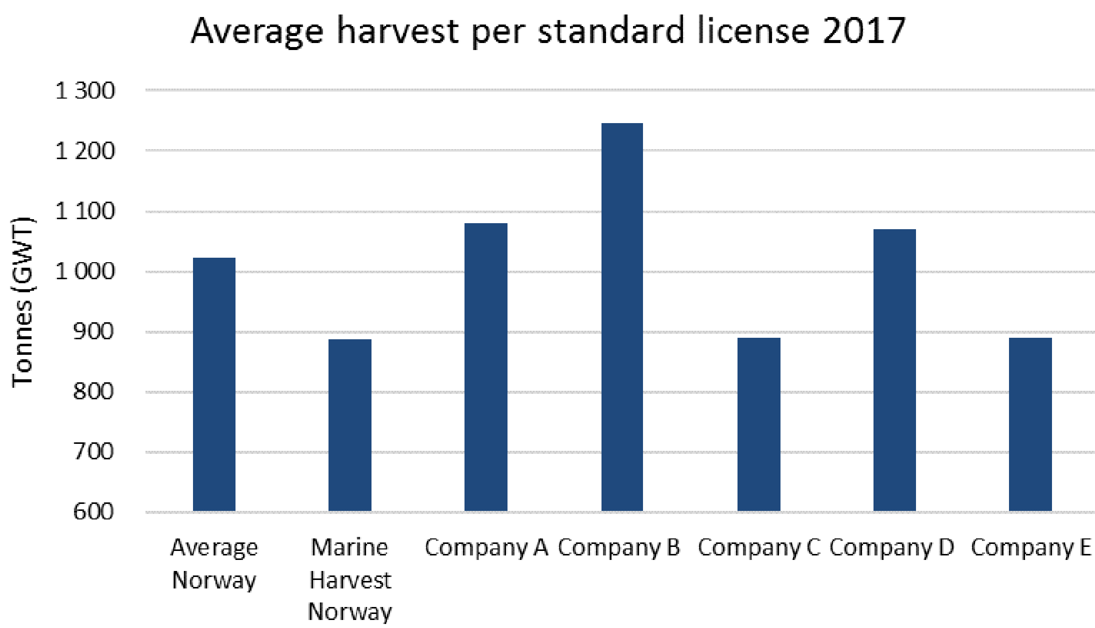
Barriers to Entry – Licenses

10.1 Regulations of fish farming in Norway



The graph above shows the harvest per license in 2017 for the Norwegian industry as a whole and for the largest listed companies. The graph is organized by highest harvest quantity.

Because of the regulation of standing biomass (maximum allowed biomass - MAB) per licence (780 tonnes LW), the production capacity per licence is limited. Annual harvest quantity per license in Norway is currently at about 1 025 tonnes gwt. Larger companies typically have better flexibility to maximise output per license which means that the average harvest figure for the industry as a whole is normally lower than the figure for the largest companies.

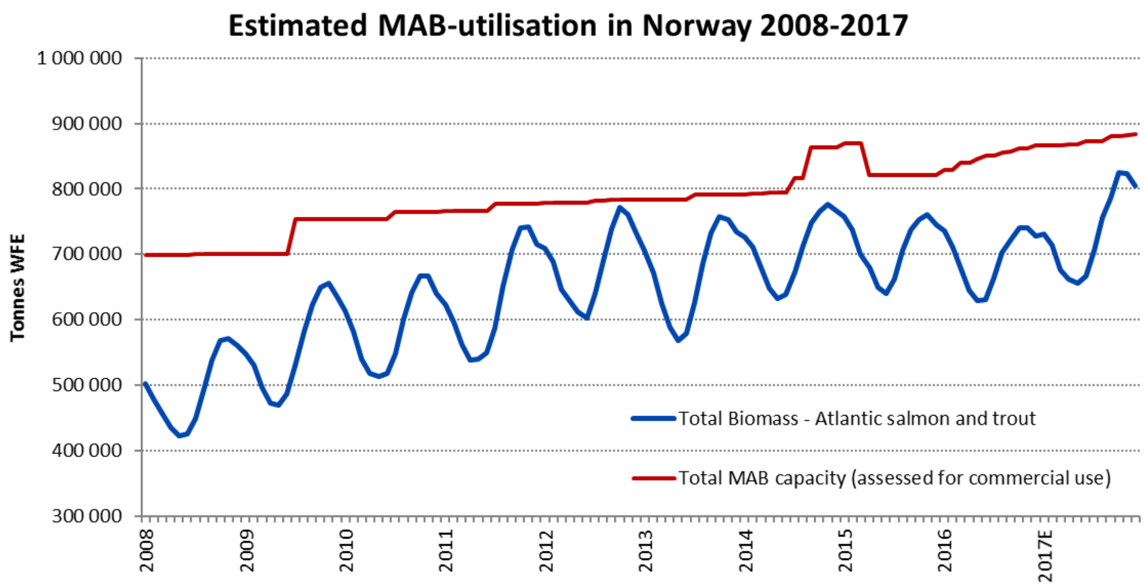
Number of grow-out sea water licenses for salmon and trout in Norway:

- 2007: 929
- 2008: 916
- 2009: 988
- 2010: 991
- 2011: 990
- 2012: 963
- 2013: 959
- 2014: 973
- 2015: 974
- 2016: 990
- 2017: 1015

Source: Marine Harvest, Quarterly reports Q4-17, Directorate of Fisheries

Barriers to Entry – Licenses

10.1 Regulations of fish farming in Norway



The maximum production of each industry player is set by the company's total MAB. However, the production varies due to productivity, fish health, sea temperature and other conditions. The total production of salmon and trout in Norway has increased over recent years.

December 22nd 2017 the Norwegian Government announced the conditions for growth on existing licenses. Marine Harvest purchased 2 % growth on every license in "green" areas of production. This growth represent 1404 extra tonnes. In total, the different players in the "green" areas purchased 7897 tonnes.

Sites that complied with very strict environmental standards were offered additional growth. The conditions for this growth are A) below 0,1 lice every counting for 2016 and 2017 in the period April 1th – September 30th and B) a maximum of one treatment during the last cycle of production. For sites meeting this standard a maximum of 6 % growth was offered, regardless of the general situation in the different production areas. Out of the total 887 tonnes applied by the industry, Marine Harvest purchased 135 tonnes.

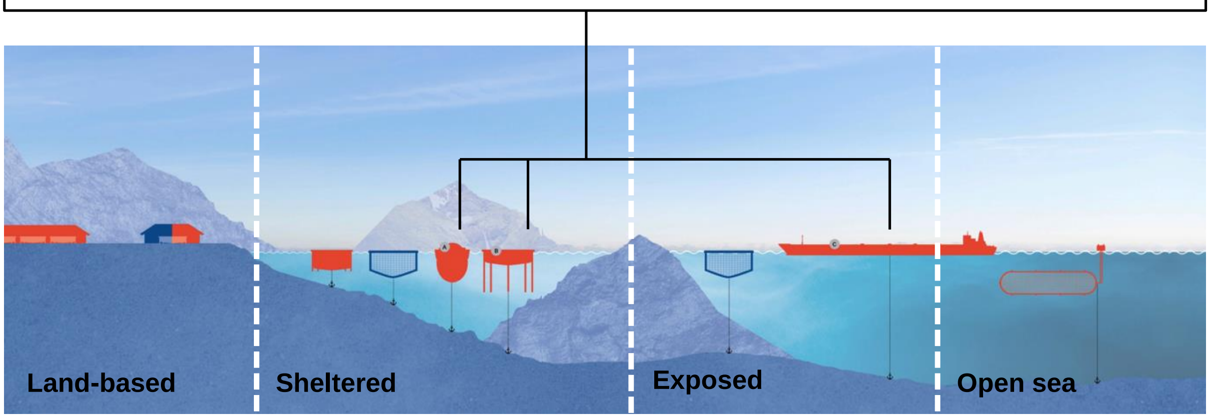
Source: Kontali Analyse

10 Barriers to Entry – Licenses

10.1 Regulations of fish farming in Norway

Closed production in sea

Marine Harvest has applied for licenses for three different systems for closed production in the sea. The Egg (A) is 44 meters high and 33 meters wide, and 90% of the structure will be underwater. The Marine Donut (B) is 22,000 m3 with high circulation. Salmon farming in rebuilt bulkships (C) with 70 000 m3 fish tank volume, is designed for more open waters.



In November 2015 the Norwegian Government announced a new category of licence. Development licenses are intended to motivate investment into new farming technologies. Development licences allocated are free of charge for up to 15 years. After that, if the project is carried out in line with the set criteria, the licences could be converted into commercial licences at a cost of NOK 10 million.

By the deadline for applications, 105 concept applications had been submitted, out of which 13 have been approved and 30 denied. The concepts mainly vary in their exposure to the sea, open vs. closed structure, and between submerged and unsubmerged solutions.

Marine Harvest has applied for five different projects with a total of 70 licences. So far The Norwegian Directorate of Fisheries has decided that “The Egg” and “Marine Donut” concepts qualify for the development license scheme. “The Egg” was awarded 6 licenses in March 2018. It is still not decided how many licenses “Marine Donut” will be awarded.

Source: Directorate of Fisheries

10 Barriers to Entry – Licenses

10.2 Regulations of fish farming in Scotland

License and location

In Scotland, instead of a formal license, permission is required from three institutions before setting up a fish farming site; Planning Permission from local regional Council, a Marine Licence from Marine Scotland and a discharge license from the Scottish Environment Protection Agency (SEPA). Maximum Allowed Biomass (MAB) for individual sites is determined based on the environmental concerns, namely the capacity of the local marine environment to accommodate the fish farm. As a consequence, MAB for salmon farms is not uniform and varies at present between 100 tonnes to 2,500 tonnes depending on site characteristics and its geographic location. Improved environmental modelling tools may now allow licenses to be issued for MAB > 2,500 tonnes.

Access to licenses

In Scotland it is legal to trade licenses and although no restriction on number is given, there is a limit on production quantity ascribed to any one company. This limit is determined by the Competition Commission Authorities. Licensing aquaculture operations in the UK is currently in a transitory state; all new applications require planning application for permission to operate, as long as SEPA and Marine Scotland consent. The granting of the planning permission is aligned to the Crown Estate lease for a 25 year period. All existing fish farm leases without planning permission in Scotland are currently undergoing a review process which will transfer them from the Crown Estate to local regional councils who will automatically grant a 25 year lease. Sites with Planning Permission are not required to go through this review process.

The environmental license can be revoked in cases of significant and long-term non-compliance.

Most existing licenses are automatically renewed at the end of their lease period.

New license applications take around 6-12 months for the planning permission and around 4-6 months for the environmental discharge license. Expansion of existing facilities is the most efficient route in terms of cost and time, whilst brand new sites will take longer and have to go through an Environmental Impact Assessment (EIA) process. The environmental license is charged annually at around GBP 9 000, whilst the standing rent is levied to the Crown Estate on the basis of production levels as follows: GBP 22.50 per tonne harvested for Mainland sites; GBP 20.50 per tonne for Western Isles sites; GBP 1 000 annual charge if no harvesting; GBP 2 000 annual charge if dormant. However a year on year increase to the dormancy charge is being introduced to encourage the use of dormant sites. The planning permission applications are also charged at GBP 183 per 0.1 hectare of farm surface area and GBP 63 per 0.1 hectare of sea bed while the SEPA environmental license costs GBP 4 202 for a new site.

10 Barriers to Entry – Licenses

10.3 Regulations of fish farming in Ireland

Aquaculture in Ireland is licensed by The Minister for Agriculture, Food and the Marine, (MAFM) under the Fisheries (Amendment) Act, 1997 and its associated Regulations which have been amended to give effect to various EU environment protection Directives. The licensing process is complex.

The Aquaculture and Foreshore Management Division, (AFMD) of the Department manages the processing of aquaculture licences on behalf of the Minister. The Marine Engineering Division (MED) of the Department undertakes site mapping and provides certain technical advice on applications as well as undertaking certain post-licensing inspection duties. The Marine Institute (MI) provides scientific advice on a range of marine environment and aquaculture matters and in the case of applications which require Appropriate Assessment (AA) under EU Birds and Habitats Directives, the MI prepares scientific reports. Advice is also provided by Bord Iascaigh Mhara (BIM) and the Sea Fisheries Protection Authority (SFPA). The National Parks and Wildlife Services (NPWS) are consulted in relation to habitat protection. Inland Fisheries Ireland (IFI), An Taisce and the Commissioners of Irish Lights (CIL) are also consulted. Where relevant, the Local Authority and/or Harbour Authority are consulted. Land based fin fish units also require planning consent from the local authority. All applications are released for public consultation and comment.

An Environmental Impact Assessment (EIA) is mandatory for marine finfish applications and applicants are required to submit an EIS with their initial applications. The obligation to carry out an Appropriate Assessment (AA) applies if the application is within a Natura 2000 site or likely to impact on a Natura 2000 site. Decisions of the Minister in respect of aquaculture licence applications, including licence conditions where applicable, may be appealed to the Aquaculture Licences Appeals Board (ALAB). ALAB can confirm, refuse or vary a decision made by the Minister or issue licences itself under its own authority.

Licences are typically issued for 10 years. The 1997 Act provides for licence duration of up to 20 years. Foreshore (seabed) licences are companion consents to Aquaculture Licences. Foreshore legislation allow for leases and licences to be granted for terms not exceeding 99 years, respectively. Terms of current licences vary between harvest output (tonnes) per annum, smolt number input, maximum number of fish on site or a combination of these. Prior to expiry of a licence, an application for renewal of the licence must be made. Currently the processing of a marine fin fish licence takes between 87 and 216 months. Most licences will be appealed to ALAB which can take at least a further 162 months to determine. The process of renewing expired fin fish licences takes as long as a new application.

In 2017, the Minister for Agriculture, Food and Marine initiated an independent review of the Aquaculture licencing system in Ireland. The report of this review was published in May 2017 with the overarching conclusion, that a root-and-branch reform of the aquaculture licence application processes is necessary which encompasses a further 30 recommendations.

Annual fin fish culture licence fees for a marine based finfish site are €6.35 per tonne for the first 100 tonnes plus €6.35 for each additional tonne. Foreshore rental fees are charged at €63.49 for up to and including 5 hectares of foreshore with each additional hectare up to 10 ha at €31.74 and each additional hectare >10 and up to 20 at €63.49. Annual culture license fee for a land based site is €127.97 per annum.

10 Barriers to Entry – Licenses

10.4 Regulations of fish farming in Chile

Chile

License and location

In Chile the licensing is based on two authorisations. The first authorisation is required to operate an aquaculture facility and specifies certain technical requirements. It is issued by the Fishery Sub Secretary (Economy Ministry) and is granted for an unlimited time and can be traded. From August 2016 a time limit has been set and licenses must be used or they will expire. The second authorisation relates to the physical area which may be operated (or permission to use national sea areas for aquaculture production). This is issued by the Sub Secretary of the Navy (Defence Ministry). The use of the license is restricted to a specific geographic area, to defined species, and to a specified limit of production or stocking density. The production and stocking density limit is specified in a Environmental and Sanitary Resolution for the issued license and according to new regulations issued during 2016, density may depend on production, sanitary and environmental conditions. For Atlantic salmon, density ranges from 8 to 17 kg/m3

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Access to licenses

The trading of licenses in Chile is regulated by the General Law on Fisheries and Aquaculture (LGPA), in charge of Ministry of Economy and Defense. Aquaculture activities are subject to different governmental authorizations depending on whether they are developed in private fresh water inland facilities (i.e. hatcheries) or in facilities built on public assets such as lakes or rivers (freshwater licenses) or at sea (sea water licenses).

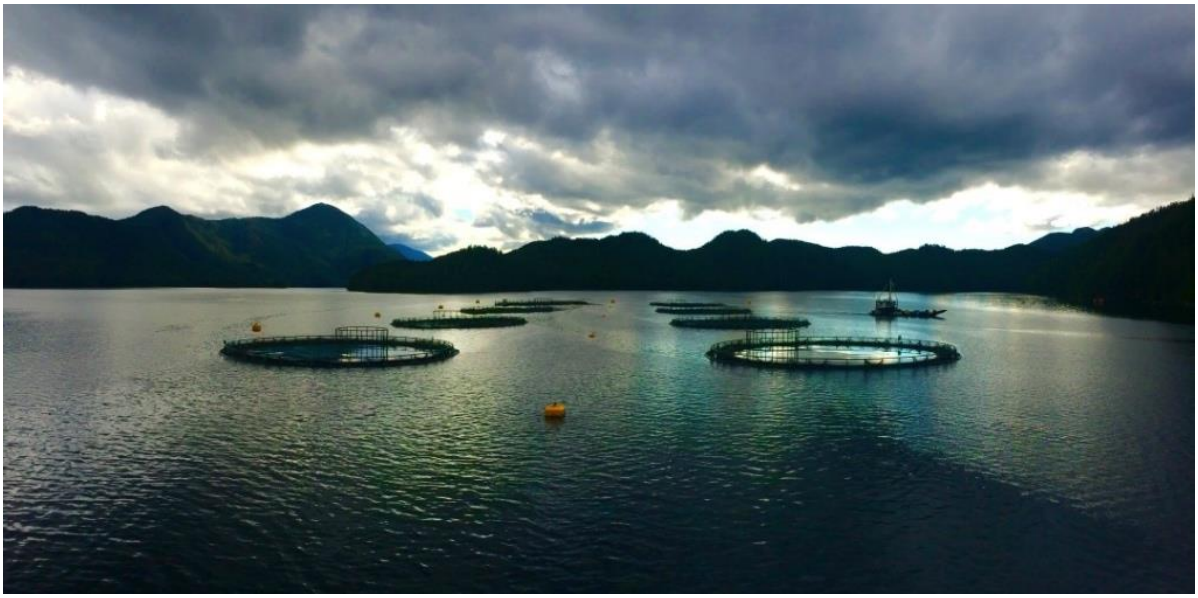
To operate a private freshwater aquaculture facility requires ownership of the water use rights and holding of environmental permits. Environmental permits are issued when operators demonstrate that their facilities comply with the applicable environmental regulations.

Licenses for aquaculture activities in lakes, rivers and seawater are granted based on an application, which must contain a description of the proposed operations, including a plan for complying with environmental and other applicable regulations. Licenses granted after April 2010 are granted for 25 years and are renewable for additional 25-year terms. Licenses granted before April 2010 were granted for indefinite periods. License holders must begin operation within one year of receiving a license and once the operation has started, the license holder cannot stop or suspend production for a period exceeding two consecutive years. Subject to certain exceptions, license holders must maintain minimum operational levels of not less than 5% of the yearly production specified in the RCA (Environmental Qualification Resolution). Until August 2016, all licenses not used could be kept by the holder if they prepared an official Sanitary Management Plan. Now however operations must begin within a time frame of 3-4 years or the license will expire.

License holders must pay annual license fees to the Chilean government and may sell or rent their license. At the moment, no new licenses will be granted in the most concentrated regions, Regions X, XI, and XII (Chile is made up of 15 administrative regions).

10 Barriers to Entry – Licenses

10.5 Regulations of fish farming in Canada



License and location

Fish farming companies in Canada are subject to different regulations depending on the geographical area they operate in. The Federal Fisheries Act, Navigation Protection Act, Health of Animals Act and the National Aquaculture Activities Regulation (AAR) are some of them. The three geographical areas with fish farming are British Columbia, Newfoundland, and New Brunswick.

To operate a marine fish farm site, provincial and/or federal authorizations are required. In Newfoundland and New Brunswick, the Provincial government is the primary regulator and leasing authority. The Province regulates the activity and operations of aquaculture, and issues the Aquaculture License and Crown Land lease where fish farms are located. In British Columbia both Federal and Provincial authorizations are required. The Federal Government regulates the activity and operations of aquaculture while the Provincial Government administers the Crown lands where fish farms are located. Individual site tenures have a specific timeline, varying between the different geographical areas and the provincial policy. In British Columbia, the timeline typically ranges between five to twenty years. In Newfoundland, the Crown Land Lease for the site is issued for 50 years, but the site aquaculture license is issued for one year. Discussions are under way to this may change to a multiyear license. In New Brunswick, individual sites are typically granted for 20 years. All Commercial Aquaculture Licenses are renewable but may be lost or suspended for non-compliance issues and non-payment of fees.

The production limitations in Canada are regulated as either a “Maximum Allowable Biomass” or a fixed number of smolt per cycle. “MAB” is specific to each Aquaculture licensed facility in British Columbia. Smaller farms are typically licensed for 2,200mt. with larger capacity facilities licensed to produce 5,000 mt. per cycle. In Newfoundland and New Brunswick, a maximum number of smolt per cycle is given to a farm. Farms are typically licensed for 600,000 to 1,000,000 smolt per cycle in Newfoundland, and 270,000 to 350,000 smolt per cycle in New Brunswick.

Barriers to Entry – Licenses

10.5 Regulations of fish farming in Canada

Access to licenses

In British Columbia, all permits and licenses require consultation with First Nations and local stakeholders. The time taken to acquire licenses for a new farm can vary from one to several years. Recently the Provincial government instituted a moratorium on new site applications. However, they have allowed existing sites to amend their tenure size and infrastructure if specific conditions apply. Companies can still obtain new tenures by relocating existing tenures to locations "more suitable for safety or matters of public interest."

In Newfoundland, proponents must submit a sea cage license application to the Newfoundland Department of Fisheries and Land Resources for each new or acquired marine site. In New Brunswick, companies must submit an Aquaculture License Application for Marine Sites to the Department of Agriculture, Aquaculture and Fisheries (New Brunswick). It takes about nine months to transition an existing site to a new owner, and approximately one year for a new application in both places. This includes obtaining all necessary approvals and licenses, and a review from The Department of Fisheries and Oceans (Federal). Consultation with residents, towns, development groups and commercial/recreational fishermen is required. In Newfoundland, all new sites of the same company must be 1 km apart, 5 km if sites are operated by different companies.

Provincial approvals can be assigned to a different operator through a government assignment process. A company may transfer licenses to another company providing the rationales for the assignment are supported by the government processes.

10 Barriers to Entry – Licenses

10.6 Regulations of fish farming in the Faroe Islands

License and location

Fish farming companies in the Faroe Islands are subject to at a large number of regulations. The most important legislatitive instruments are the Aquaculture Act (Act No. 83 from 25 May 2009 with latest amendments from 2018), the Environmental Act (Act No. 134 from 29 October 1988 with latest amendments from 2008) and the Food Safety Act (Act No. 58 from 26 May 2010 with latest amendments from 2017).

In addition to the above mentioned acts, several Excecutive Orders with more detailed provisions covering fish farming have been issued under the provisions of the acts.

The right according to a specific license is provided for a specific geographic area and with a limit of production specified in the individual license. The production and stocking density limit is specified in a Environmental and Sanitary Resolution issued for each specific license. The density limit may depend on conditions with regard to production as well as sanitary and environmental conditions.

The size of the area and density limits etc. for each of the 22 sea licenses vary greatly. The production limitations in the Faroes are not regulated through limits on ”maximum allowed biomass”, MAB. As a consequence, MAB for salmon farms varies between 1200 tonnes and 5.800 tonnes a year pr. license, depending on site characteristics and the geographic location of the individual farm.

In 2012 and 2018 the Government of the Faroe Islands announced revised aquaculture regulations with the aim of securing sustainable growth in the industy and in order to implement anti-trust regulations.

Marine Harvest Faroes is first and foremost affected by the regulations regarding anti-trust in the Aquaculture Act. These rules sets a cap of 20% for either direct or indirect foreign ownership in Faroese fish farming companies. If the limit is exceeded with regard to a fish farming company, the company must adjust the ownership to be within the limit within a short deadline set by the authorities or face possible loss of the right to conduct fish farming activities.

Marine Harvest Faroes is 100% owned by Marine Harvest ASA (NO). This ownership is protected by transitional provisions in the Aquaculture Act, securing that the company can remain owned by a foreign company and nontheless keep its licenses. The consequence for Marine Harvest Faroes of the Anti-trust regulations is that the company can not expand its business with additional commercial licenses to farm fish in the sea. Marine Harvest Faroes can however apply for development licenses and licenses on land.

Barriers to Entry – Licenses

10.6 Regulations of fish farming in the Faroe Islands

It is stipulated in the Aquaculture Act that a fish farming company can not hold more than 50% of the total sea licenses. The new restictions do not apply to licenses held by each individual company today, but the new regulations specify that Marine Harvest Faroes can keep its 3 sea water and 1 smolt licenses, even though the company does not fulfill the new requirements regarding the cap on foreignly held capital.

Access to licenses

In order to conduct fish farming activities in the Faroe Islands, the fish farming company must obtain an authorisation from Heilsufrøðiliga Starvsstovan (The Faroese Food and Veterinary Authority) to operate an aquaculture facility. The authorisation specifies certain technical requirements with regard to conducting fish farming activities.

Fish farming companies with the above mentioned authorisation can apply for licenses to conduct fish farming activities from the Ministry of Foreign Affairs and Trade. New sea licenses sea can be awarded by the Ministry of Foreign Affairs and Trade. There is today a limit of 22 commercial sea water licenses and no limit for licenses on land. If new licenses are to be awarded, they may be awarded through auction.

An application for a seawater license must contain a description of the proposed operations, including a plan for complying with environmental and other applicable regulations.

The Government of the Faroe Islands in April 2018 announced a new category of licenses, i.e. development licenses. Development licenses are intended to motivate investment in new fish farming technologies. Marine Harvest Faroes can due to the rules regarding anti-trust only obtain development licenses, as the limits regarding foreign ownership do not apply to such licenses.

Licenses are granted for 12 years and are renewable for additional 12 years term. License holders must pay an annual fee of DKK 12.000 for each individual license. Fish farming companies must also pay a harvesting fee based on the harvesting of farmed fish. The basis for the fee is based on the monthly quantity in weight of harvested and gutted fish, multiplied by the average international market price in the same month.

Licenses can be sold and pledged and legal security is perfected by registration with the Land Registry. Licenses may be withdrawn in cases of material breach of conditions set out in the individual license or in the aquaculture or environmental legislation.

11

Risk Factors

11 Risk Factors

11.1 Salmon disease prevention and treatment

Maximising survival and maintaining healthy fish stocks are primarily achieved through good husbandry and health management practices and policies. Such practices, in addition, reduce exposure to pathogens and the risk of health challenges. The success of good health management practices has been demonstrated on many occasions and has contributed to an overall improvement in the survival of farmed salmonids.

Fish health management plans, veterinary health plans, biosecurity plans, risk mitigation plans, contingency plans, disinfection procedures, surveillance schemes as well as coordinated and synchronised zone/area management approaches, all support healthy stocks with emphasis on disease prevention.

Prevention of many diseases is achieved through vaccination at an early stage and while the salmon are in freshwater. Vaccines are widely used commercially to reduce the risk of health challenges. With the introduction of vaccines a considerable number of bacterial and viral health issues have been effectively controlled, with the additional benefit that the quantity of medicine prescribed in the industry has been reduced.

In some instances however medicinal treatment is required to maximize survival rates and for the well-being and welfare of the fish. Even the best managed farms may have to use medicines from time to time. For several viral diseases, no effective vaccines are currently available.

Risk Factors

11.2 Most important health risks to salmon

Sea lice: There are several species of sea lice, which are naturally occurring seawater parasites. They can infect the salmon skin and if not controlled they can cause lesions and secondary infection. Sea lice are controlled through good husbandry and management practices, the use of lice prevention barriers (eg. skirts), cleaner fish (different wrasse species and lumpsuckers, which eat the lice off the salmon), mechanical removal systems and when necessary licensed medicines.

Pancreas Disease (PD): PD is caused by the Salmonid Alphavirus and is present in Europe. It is a contagious virus that can cause reduced appetite, muscle and pancreas lesions, lethargy, and if not appropriately managed, elevated mortality. PD affects Atlantic salmon and rainbow trout in seawater and control is achieved mainly by management and mitigation practices. Combined with these measures, vaccination is also used where PD represents a risk and which provides some additional level of protection.

Salmonid Rickettsial Septicaemia (SRS):SRS is caused by an intracellular bacteria. It occurs mainly in Chile but has also been observed, but to a much lesser extent, in Norway, Ireland and the UK. It causes lethargy, appetite loss and can result in elevated mortality. SRS is to some extent controlled by vaccination, but medicinal intervention (licensed antibiotics) may also be required.

Infectious Pancreatic Necrosis (IPN):IPN is caused by the IPN virus and is widely reported. It is a contagious virus that can cause mortality if not managed appropriately. IPN can affect Atlantic salmon fry, smolts and larger fish post-transfer. Available vaccines can protect against IPN and good results are obtained by optimizing husbandry and biosecurity measures. In addition, using IPN resistant fish (QTL-based fish selection) has contributed significantly to reducing the incidence of IPN.

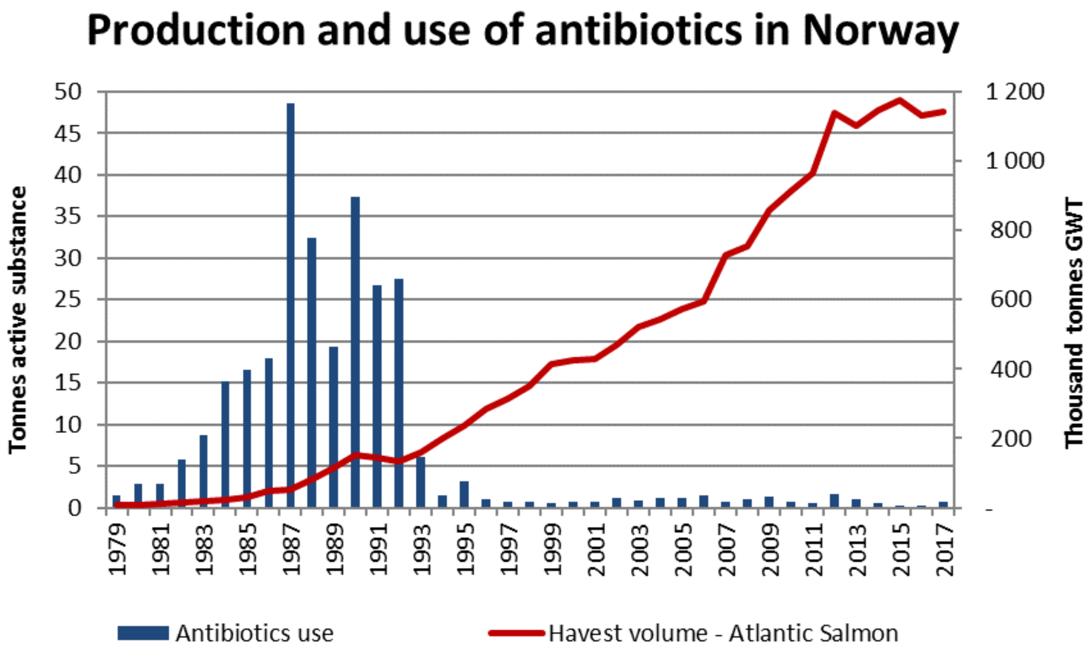
Heart and Skeletal Muscle Inflammation (HSMI): HSMI is currently reported in Norway and to a lesser extent Scotland. Symptoms of HSMI are reduced appetite, abnormal behaviour and in most cases low mortality. HSMI generally affects fish in their first year in seawater and control is achieved mainly by good husbandry and management practices.

Infectious Salmon Anaemia (ISA): ISA is caused by the ISA virus and is widely reported. It is a contagious disease that causes lethargy, anaemia and may lead to significant mortality in seawater if not appropriately managed. Control of an ISA outbreak is achieved through culling or harvesting of affected fish in addition to other biosecurity and mitigation measures. Vaccines are available and in use in areas where ISA is considered to represent a risk.

Gill Disease (GD): GD is a general term used to describe gill conditions occurring in seawater. The changes may be caused by different infectious agents; amoeba, virus or bacteria, as well as environmental factors including algae or jelly-fish blooms. Little is known about the cause of many of the gill conditions and to what extent infectious or environmental factors are primary or secondary causes of disease.

Risk Factors

11.3 Fish health and vaccination (Norway)



The increase in production of Atlantic salmon in Norway in the 1980s resulted in an increase of disease outbreaks. In the absence of effective vaccines, the use of antibiotics reached a maximum of almost 50 tonnes in 1987. With the introduction of effective vaccines against the main health challenges at that time, the quantities of antibiotics used in the industry declined significantly to less than 1.4 tonnes by 1994 and has since then continued to be very low. These developments, along with the introduction of more strict biosecurity and health management strategies, allowed for further expansion of the industry and an increase in production.

During the last two decades there has been a general stabilisation of mortality in Norway, Scotland and Canada, which has been achieved principally through good husbandry, management practices and vaccination. The trend in Chile in recent years stems from infection pressure from SRS in the industry and limited protection offered by today's vaccines against SRS.

Source: Kontali Analyse, Norsk medisinaldepot, Norwegian Institute of Public Health

Risk Factors

11.4 Research and development focus

Fish Welfare and Robustness

- Development of better solutions for prevention and control of infectious diseases
- Minimization of production-related disorders
- Optimisation of smolt quality

Product Quality and Safety

- Continuously develop better technological solutions for optimised processing, packaging and storage of products, while maintaining a consistent high quality.

New Growth

- Development of methods to reduce production time at sea
- Production in exposed areas
- Production in closed sea-going units

Production Efficiency

- Development of cost effective, sustainable and healthy salmon diets which ensure production of robust fish
- Identify the best harvesting methods, fillet yield optimisation and the most efficient transport and packaging solutions
- Net solutions and antifouling strategies
- Development of AI-based tools for value chain optimization and boosting seawater-phase production efficiency

Footprint

- Develop, validate and implement novel methods for sea lice control
- Reduce dependency on medicines and limit the discharge of medicinal residues
- Escape management and control
- ASC implementation; undertake R&D projects that will facilitate and make ASC implementation more effective

According to Zacco (Norwegian patenting office), the rate of patenting in the salmon farming industry has grown rapidly in the last two decades. Considerable R&D is undertaken in several areas and the most important developments have been seen in the feed, sea lice control and vaccine sectors, carried out by large global players. In this industry the majority of producers are small and do not have the capital to undertake and supervise major R&D activities. This is expected to change as consolidation of the industry continues.

Smolt, on-growing production and processing

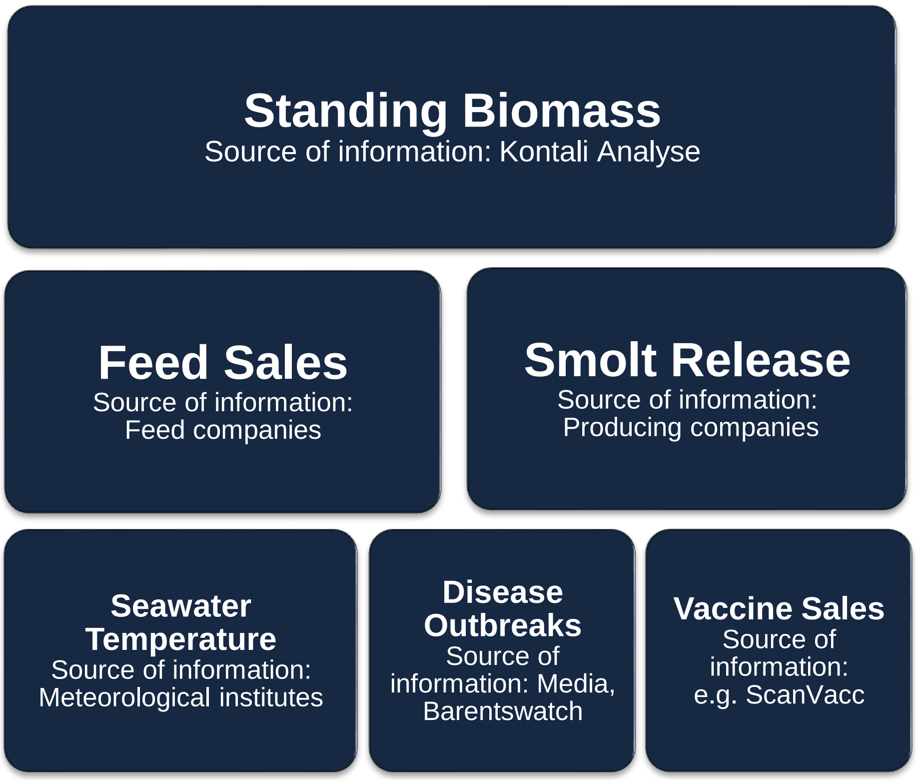
The technology used in these phases can be bought ”off the shelf” and very few patents are granted. Technology and producers are becoming increasingly more advanced and skilled.

12

Indicators Determining Harvest Volumes

12 Indicators Determining Harvest Volumes

12.1 Projecting future harvest quantities



The three most important indicators for future harvest quantities are standing biomass, feed sales and smolt release. These three are good indicators for medium term and long term harvest, while the best short term indicator is standing biomass categorized by size. As harvested size is normally above 4 kg, the available quantity of this size class is therefore the best estimate of short term supply.

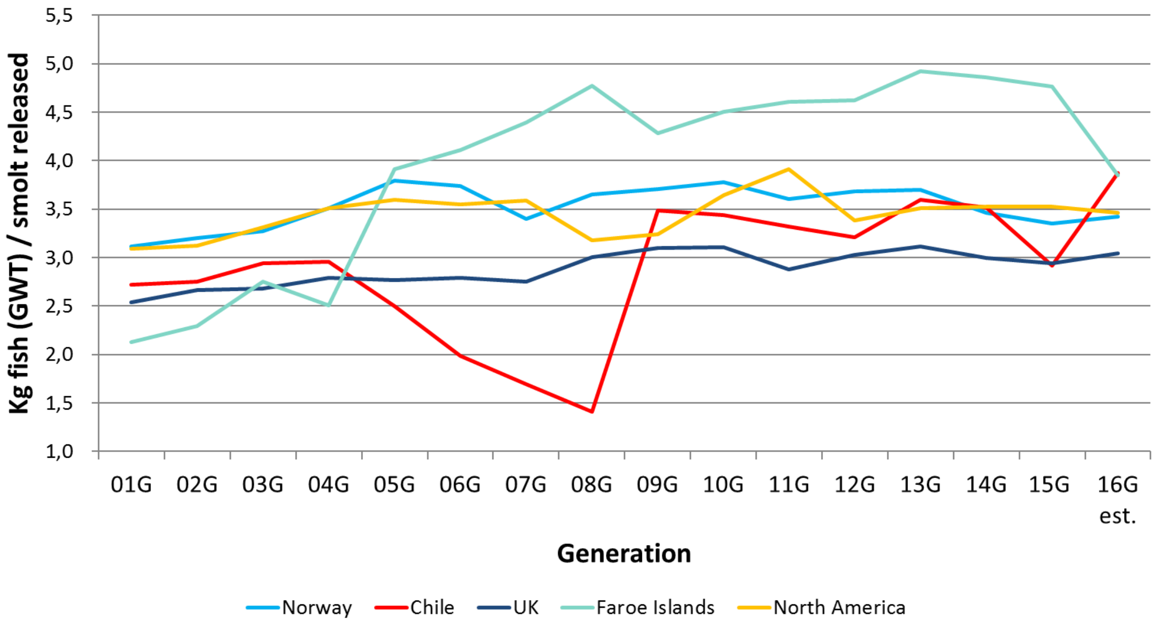
If no actual numbers on smolt releases are available, vaccine sales could be a good indicator of number of smolt releases and when the smolt is put to sea. This is a good indicator on long term harvest as it takes up to 2 years before the fish is harvested after smolt release.

Variation in seawater temperature can materially impact the length of the production cycle. A warmer winter can for example increase harvest quantities for the relevant year, partly at the expense of the subsequent year.

Disease outbreaks can also impact the harvest quantity due to mortality and slowdown of growth.

Indicators Determining Harvest Volumes

12.2 Yield per smolt



Yield per smolt is an important indicator of production efficiency. Due to the falling cost curve and the discounted price of small fish, the economic optimal harvest weight is in the area of 4-5 kg (gwt). The number of harvested kilograms yielded from each smolt is impacted by diseases, mortality, temperatures, growth attributes and commercial decisions.

The average yield per smolt in Norway is estimated at 3.42 kg (gwt) for the 16 Generation.

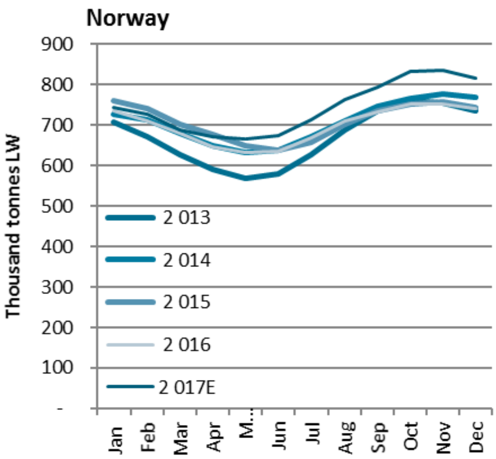
Since 2010, the Chilean salmon industry has been rebuilding its biomass after the depletion caused by the ISA crisis which began in 2007. In 2010/11, the Chilean salmon industry showed a very good performance on fish harvested due to the low density of production (improved yield per smolt). In line with the increased density, biological indicators deteriorated. In 2016, an algae bloom caused high mortality, and the Chilean salmon industry started again to rebuild its biomass. Recently, the yield per smolt has improved in Chile, and the average for 16G is estimated at 3.88 kg (gwt).

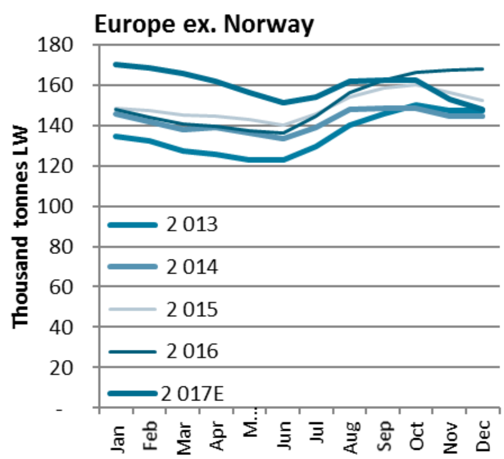
Average yield in the UK, North America and Faroe Islands for 16G is estimated at 3.04kg, 3,85kg and 3.47kg, respectively.

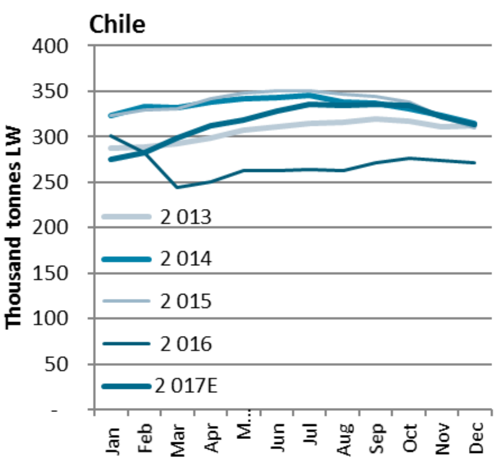
Source: Kontali Analyse, Marine Harvest

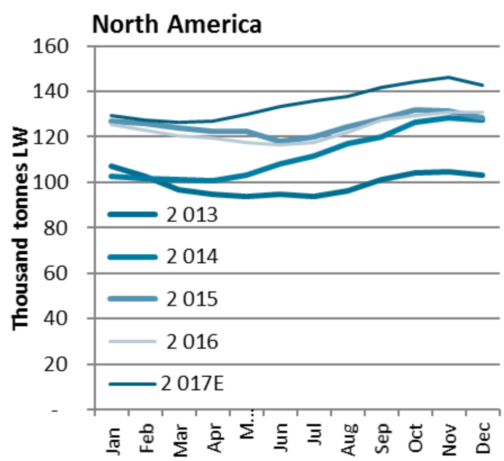
Indicators Determining Harvest Volumes

12.3 Development in biomass during the year









Due to variations in sea water temperature during the year, the total standing biomass in Europe has a S-curve, which is at its lowest in May and at its peak in October. The Norwegian industry is focused on minimising the natural fluctuations as license constraints put a limit to how much biomass can be in sea at the peak of the year.

In Chile the situation is different due to more stable seawater temperatures and opposite seasons (being in the Southern hemisphere). A more steady water temperature allows the possibility of releasing smolts during the whole year and gives a more uniform utilisation of the facilities. The relatively low standing biomass in Chile from March 2016 is due to the impact of an algae bloom.

Source: Kontali Analyse

13

Secondary Processing (VAP)

13 Secondary Processing (VAP)

In processing we distinguish between primary and secondary processing.

Primary processing is slaughtering and gutting. This is the point in the value chain at which standard price indexes for farmed salmon are set.

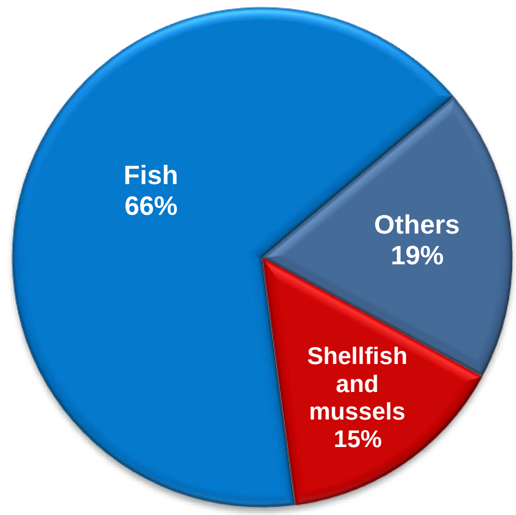
Secondary processing is filleting, fillet trimming, portioning, producing different cuts like cutlets, smoking, making ready meals or Packing with Modified Atmosphere (MAP).

Products that have been secondary processed are called value-added products (VAP).

13 Secondary Processing (VAP)

13.1 European value-added processing (VAP) industry

- A total value of > EUR 25 billion
- Employees > 135,000
- Extremely fragmented – more than 4,000 companies
- About 50% of all companies have less than 20 employees
- Traditionally the EBIT-margins have been between 2% and 5%
- The average company employs 33 people and has a turnover of EUR 4.2 million



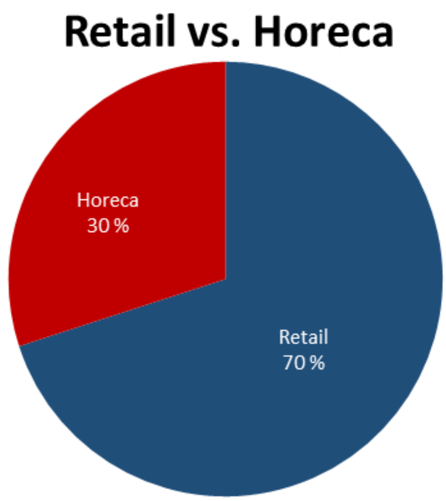
The seafood industry in Europe is fragmented with more than 4,000 players. Most of the companies are fairly small, but there are also several companies of significant size involved in the secondary processing industry: Marine Harvest, Icelandic Group, Deutsche See, Caladero, Royal Greenland, Labeyrie, and Lerøy Seafood.

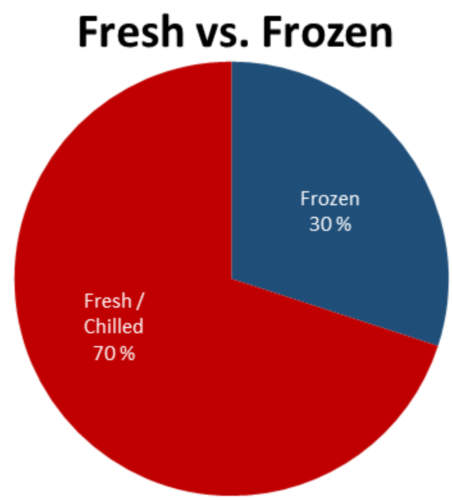
Most of the largest players are basing their processing on Atlantic salmon, producing smoked salmon, portions or ready meals with different packing techniques such as vacuum or modified atmosphere (MAP).

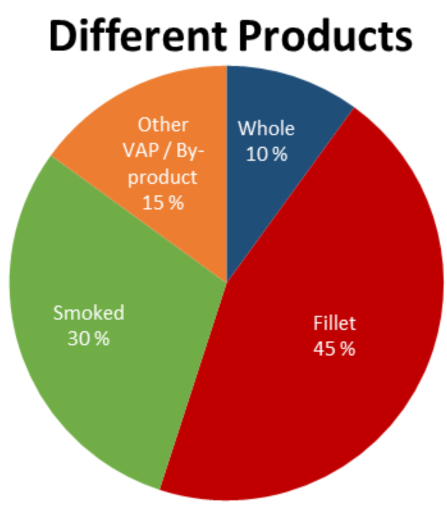
Consumers are willing to pay for quality and value added. This means that we are expecting to see an increase in demand for convenience products such as ready-to-cook fish, together with a packing trend towards MAP as this maintains the freshness of the product longer for than fish sold in bulk.

13 Secondary Processing (VAP)

13.2 Market segment in the EU (2017)







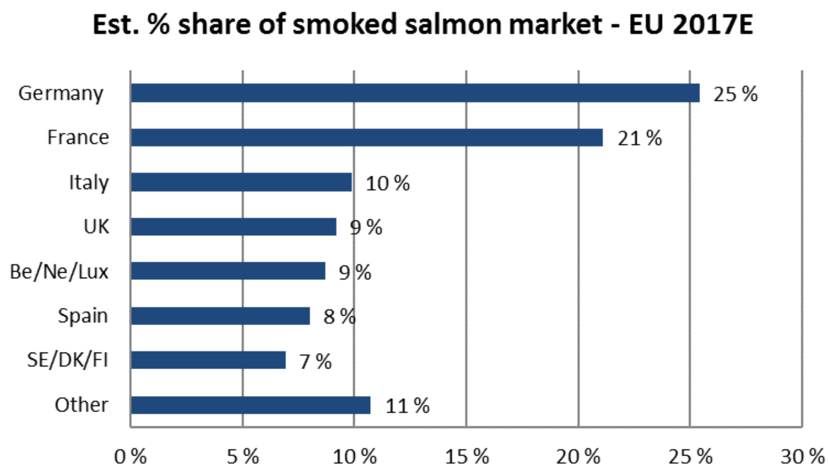
In the EU, around 70% of the Atlantic salmon supply went to retailers and approximately the same share was sold fresh. Of the different products, fillets have the largest market share of 45% followed by smoked. Other VAP consists of all value added processed products, except smoked salmon.

Source: Kontali Analyse

Note: Horeca = Hotel, restaurants and café (or establishments which prepare and serve food and beverages)

13 Secondary Processing (VAP)

13.3 The European market for smoked salmon



Smoked salmon is the most common secondary processed product based on Atlantic salmon. The European market for smoked salmon was estimated to be 185,000 tonnes product weight in 2017, with Germany and France the largest markets. The amount of raw material needed for this level of production was around 299,100 tonnes gwt.

European smoked salmon producers (2017E)

The ten largest producers of smoked salmon in Europe are estimated to have a joint market share of more than 60%. The production is mainly carried out in Poland, France, the UK, the Baltic states and the Netherlands.

Marine Harvest has its smoked salmon production in Poland (Morpol), UK (Rosyth), France (Kritsen) and Belgium (Oostende), and its main markets are Germany, France, Italy and Belgium. After the acquisition of Morpol in 2013, Marine Harvest became the largest producer of smoked salmon. Labeyrie is the second largest and sells most of its products to France, and has also significant sales to the UK, Spain, Italy and Belgium.

Estimated Annual Raw Material - Tonnes GWT			
70 - 90 000	20 - 40 000	10 - 20 000	5 - 10 000
MH Consumer Products (PL-FR-UK)	Labeyrie (FR-UK) Lerøy (NL-SE-NO)	Norvelita (LT) Mer Alliance (FR) Suempol (PL) Delpeyrat (FR) Young's Seafood (UK)	Martiko (ES) Friedrichs (DE) Neptune Intnl. (DE) Intermarché (FR) Foppen (NL) Ubago (ES)

Source: Kontali Analyse

Appendix

In this appendix you can find explanation of key words, as well as information about the Marine Harvest group such as key financial numbers and the company's history together with information about our upstream and downstream operations.

Appendix

Weight conversion ratios and key words

	Atlantic salmon
Live fish	100 %
Loss of blood/starving	7 %
Harvest weight / Round bled fish (wfe)	93 %
Offal	9 %
Gutted fish, approx. (gwt)	84 %
Head, approx.	7 %
Head off, gutted	77 %
Fillet (skin on)	56 - 64 %
C-trim (skin on)	60 %
Fillet (skin off)	47 - 56 %

Net weight: Weight of a product at any stage (gwt, fillet, portions). Only the weight of the fish part of the product (excl. ice or packaging), but including other ingredients in VAP

Primary processing: Gutted Weight Equivalent (gwt) / Head on Gutted (HOG)

Secondary processing: Any value added processing beyond gwt

Biomass: The total weight of live fish, where number of fish is multiplied by an average weight

Ensilage: Salmon waste from processing with added acid

BFCR:
IB feed stock + feed purchase – UB feed stock
Kg produced – weight on smolt release

EFCR:
IB feed stock + feed purchase – UB feed stock
Kg produced – mortality in Kg – weight on smolt release

Price Notifications:
Nasdaq **(**FCA Oslo) - Head on gutted from Norway (4-5 kg)
FOB Miami - fillets from Chile (2-3 lb)
FOB Seattle - whole fish from Canada (8-10 lb)

Source: Kontali Analyse

Appendix

Price indices vs. FOB packing plant

Norwegian NASDAQ-Index - Selling price for superior gutted, fresh salmon iced and packed in boxes - FCA Oslo

NASDAQ Index
- General sales and administration expences ~ 0,75 NOK
= Former NOS/FHL-index
- Freight to Oslo
- Terminal Cost } ~ 0,70 NOK
= Selling price farmers FOB packing plant

Norwegian SSB custom statistics - all sizes, all qualities and included contract sales

SSB
- Freight to border
- Duty and taxes
- Adjusted to sizes and quality
- Freight to Oslo
- Terminal cost } ~ 1,50 NOK*
= Selling price farmers FOB packing plant

Urner Barry FOB Miami - Chilean atlantic salmon fillets, PBO, d-trim delivered FOB Miami

UB
- See text below
= Selling price farmers FOB packing plant

Urner Barry FOB Seattle - West Coast atlantic salmon - whole - fresh delivered FOB Seattle

FOB Seattle
- Freight (~6 cent/lb)
= Selling price farmers FOB packing plant

Several price indices for salmon are publicly available. The two most important providers of such statistics for Norwegian salmon are Nasdaq/Fish Pool and Statistics Norway (SSB). Urner Barry in the US provides a reference price for Chilean salmon in Miami and Canadian salmon in Seattle.

In Norway the price is found by deducting freight costs from the farm to Oslo and the terminal cost from the Nasdaq price (~0.70 NOK). If using the SSB custom statistics, you need to adjust for freight to border, duty and taxes, and for quality and contract sales to get the achieved spot price back to producer. The average difference between SSB price and FCA Oslo is ~1 NOK, which gives the average difference between SSB price and back to plant at NOK 2.00 (historically this difference fluctuates from week to week and will normally fall in the range of -2 to +4).

Calculating Urner Barry – Chilean fillets, back to gwt plant is more extensive. It is necessary to use UB prices for both 2/3lb and 3/4lb and adjust for quantity share, market handling (4 cent), and market commission (4.5%). In addition there are some adjustments which vary over time; premium fish share (~92%), reduced price on downgraded fish (~30%), airfreight (~USD 1.50/kg) and gwt to fillet yield (~70%).

*10 year Average difference between SSB and return to packing plant

Source: Fishpool, Nasdaq, SSB, Norwegian Seafood Council, Urner Barry, Kontali Analyse

Appendix

Some historic acquisitions and divestments

In Norway there have been ’countless’ mergers between companies over the last decade. The list below only shows some of the larger ones in transaction value. In Scotland consolidation has also been very frequent. In Chile there has been limited activity over the last two years. However, several companies have been listed on the Santiago Stock Exchange. Canada’s industry has been extensively consolidated with a few large players and some small companies.

See table on the next page.

Year	Norway	Year	Norway
1999	Hydro Seafoods - Sold from Norsk Hydro to Nutreco Aquaculture	2007	UFO Laks - Sold to Haugland Group
2001	Gjølaks - Sold to PanFish	2007	Anton Misund - Sold to Rauma Gruppen
2001	Vest Laks - Sold to Austevoll Havfiske	2007	Mico Fiskeoppdrett - Sold to Rauma Gruppen
2001	Torris Products - Sold from Torris to Seafarm Invest	2008	Hamneidet - Sold to Eidsfjord Sjøfarm
2001	Gjølanger Havbruk - Sold to Aqua Farms	2008	Misundfisk - Sold to Lerøy Seafood Group
2001	Alf Lone - Sold to Sjøtroll	2008	Henden Fiskeoppdrett - Sold to Salmar ASA
2001	Sandvoll Havbruk - Sold to Nutreco Aquaculture	2008	AS Tri - Sold to Norway Royal Salmon (NRS)
2001	Fosen Edelfisk - Sold to Salmar	2008	Feøy Fiskeoppdrett - Sold to Norway Royal Salmon
2001	Langsteinfisk - Sold to Salmar	2008	Salmo Arctica - Sold to Norway Royal Salmon
2001	Tveit Gård - Sold to Alsaker Fjordbruk	2008	Åmøy Fiskeoppdrett - Sold to Norway Royal Salmon
2001	Petter Laks - Sold to Senja Sjøfarm	2008	Nor Seafood - Sold to Norway Royal Salmon
2001	Kråkøyfisk - Sold to Salmar	2008	Altafjord Laks - Sold to Norway Royal Salmon
2002	Amulaks - Sold to Follalaks	2008	Lerøy Seafood Group - Purchased by Austevoll Seafood
2002	Kvamsdal Fiskeoppdrett - Sold to Rong Laks	2009	Skjærgårdsfisk - Sold to Lingalaks
2002	Matland Fisk - Sold to Bolaks	2009	Brilliant Fiskeoppdrett - Sold to Norway Royal Salmon
2002	Sanden Fiskeoppdrett - Sold to Aqua Farms	2009	Polarlaks II - Sold to Nova Sea
2002	Ørsnes Fiskeoppdrett - Sold to Aqua Farms	2009	Fjordfarm - Sold to Blom Fiskeoppdrett
2002	Toftøysund Laks - Sold to Alsaker Fjordbruk	2009	Fyllingsnes Fisk - Sold to Eide Fjordbruk
2003	Nye Midnor - Sold from Sparebank1 MidtNorge to Lerøy Seafood Group	2009	Salaks merged with Rølaks
2003	Ishavslaks - Sold to Aurora to Volden Group	2009	65 new licenses granted
2003	Loden Laks - Sold to Grieg Seafood	2010	Espevær Fiskeoppdrett - Sold to Bremnes Fryseri
2003	Finnmark Seafood - Sold to Follalaks	2010	AL Nordsjø - Sold to Alsaker Fjordbruk
2003	Ullsfjord Fisk - Sold to Nordlaks	2010	Nord Senja Fiskeindustri - Sold to Norway Royal Salmon
2003	Henningsværfisk - Sold to Nordlaks	2010	Marøy Salmon - Sold to Blom Fiskeoppdrett
2004	Flatanger Akva - Sold to Salmar	2010	Fjord Drift - Sold to Tombre Fiskeanlegg
2004	Naustdal Fiskefarm/Bremanger Fiskefarm - Sold to Firda Sjøfarm	2010	Hennco Laks - Sold to Haugland Group
2004	Fjordfisk - Sold to Firda Sjøfarm	2010	Raumagruppen - Sold to Salmar
2004	Snekvik Salmon - Sold to Lerøy Seafood Group	2010	Stettefisk / Marius Eikremsvik - Sold to Salmar
2004	Aure Havbruk / M. Ulfsnes - Sold from Sjøfor to Salmar	2010	Lund Fiskeoppdrett - Sold to Vikna Sjøfarm (Salmonor)
2005	Follalaks - Sold to Cermaq	2011	R. Lernes - Sold to Måsøval Fiskeoppdrett
2005	Aqua Farms - Sold to PanFish	2011	Erfjord Stamfisk - Sold to Grieg Seafood
2005	Aurora Salmon (Part of company) - Sold from DNB Nor to Lerøy Seafood Group	2011	Jøkelfjord Laks - Sold to Morpol
2005	Marine Harvest Bolga - Sold to Seafarm Invest	2011	Krifo Havbruk - Sold to Salmar
2005	Aurora Salmon (Part of company) - Sold from DNB Nor to Polarlaks	2011	Straume Fiskeoppdrett - Sold to Marine Harvest Norway
2005	Sjølaks - Sold from Marine Farms to Northern Lights Salmon	2011	Bringsvor Laks - Sold to Salmar
2005	Bolstad Fjordbruk - Sold to Haugland Group	2011	Nordfjord Havbruk - Changed name to Nordfjord Laks
2005	Skjervøyfisk - Sold to Nordlaks	2011	Villa Miljølaks - Sold to Salmar
2006	Fossen AS - Sold to Lerøy Seafood Group	2011	Karma Havbruk - Sold to E. Karstensen Fiskeoppdrett (50%) and Marø Havbruk (50 %)
2006	Marine Harvest N.V. - Acquired by Pan Fish ASA	2012	Skottneslaks - Sold to Eidsfjord Laks
2006	Fjord Seafood ASA. - Acquired by Pan Fish ASA	2012	Villa Arctic - 10 licenses, etc. sold to Salmar
2006	Marine Harvest Finnmark - Sold from Marine Harvest to Volden Group	2012	Pundslett Laks - Sold to Nordlaks Holding
2006	Troika Seafarms/North Salmon - Sold to Villa Gruppen	2012	Strømsnes Akvakultur – Sold to Blom Fiskeoppdrett
2006	Aakvik - Sold to Hydrotech	2012	Ilsvåg Matfisk – Sold to Bremnes Seashore
2006	Hydrotech - Sold to Lerøy Seafood Group	2013	Morpol – sold to Marine Harvest
2006	Senja Sjøfarm - Sold to Salmar ASA	2013	Villa Organic – 47,8% of shares sold to Lerøy Seafood Group
2006	Halsa Fiskeoppdrett - Sold to Salmar ASA	2013	Villa Organic – 50,4% of shares sold to SalMar
2006	Langfjordlaks - Sold to Mainstream	2013	Salmus Akva - Sold to Nova Sea
2006	Polarlaks - Sold to Mainstream	2014	Skarven (Sømna Fiskeoppdrett and Vik Fiskeoppdrett) - Sold to Nova Sea
2007	Veststar - Sold to Lerøy Seafood Group	2014	Cermaq – sold to Mitsubishi
2007	Volden Group - Sold to Grieg Seafood	2015	EWOS - 2 licenses, sold to Bolaks
2007	Artic Seafood Troms - Sold to Salmar ASA	2015	Senja Akvakultursenter - Sold to Lerøy Aurora
2007	Arctic Seafood - Sold to Mainstream	2016	Fjordlaks Aqua - Sold to Hofseth International and Yokohama Reito
2007	Fiskekultur - Sold to Haugland Group	2017	NTS acquired Midt Norsk Havbruk

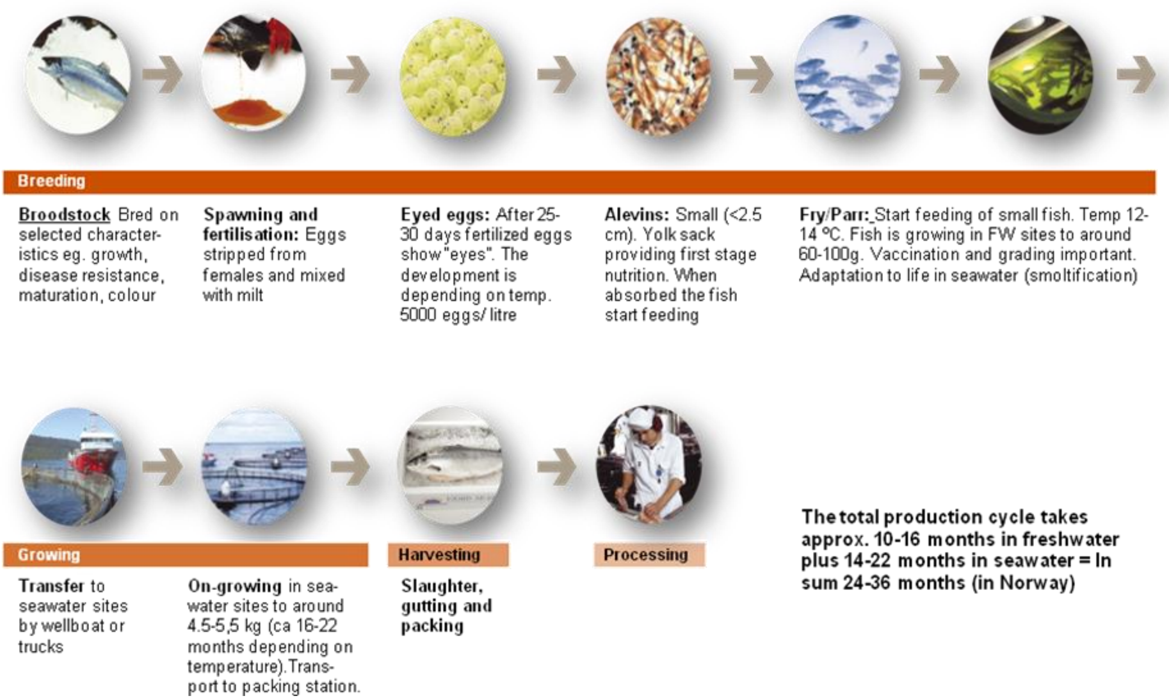
Source: Kontali Analyse

Year	UK	Year	Chile	Year	North America
1996	Shetland Salmon products - Sold to HSF GSP	1999	Chisal - Sold to Salmones Multiexport	1989	Cale Bay Hatchery - Sold to Kelly Cove Salmon
1996	Straithaird Salmon to MH	2000	Salmo America - Sold to Fjord Seafood	1994	Anchor Seafarms Ltd., Saga Seafarms Ltd., 387106 British Columbia Ltd., and United hatcheries merged into Omega Salmon Group (PanFish)
1996	Gigha, Mainland, Tayinlaoan, Mull Salmon - All sold to Aquascot	2000	Salmones Tecmar - Sold to Fjord Seafood	1997	ScanAm / NorAm - Sold to Pan Fish
1997	Summer Isles Salmon - Sold to HSF GSP	2000	Salmones Mainstream - Sold to Cermaq	2001	Scandic - Sold to Grieg Seafoods
1997	Atlantic West - Sold to West Minch	2001	Pesquera Eicosal - Sold to Stolt Nielsen	2004	Stolt Sea Farm - merged with Marine Harvest
1998	Marine Harvest Scotland - Sold from BP Nutrition to Nutreco	2003	Marine Farms - Sold to Salmones Mainstream	2004	Atlantic salmon of Maine (Fjord Seafood)- Sold to Cooke Aquaculture
1998	Gaelic Seafood UK - Sold to Stolt Seafarms	2004	Salmones Andes - Sold to Salmones Mainstream	2004	Golden Sea Products (Pan Fish) - Sold to Smokey Foods
1998	Mainland Salmon - Sold to Aquascot	2004	Stolt Seafarm - Merged with Marine Harvest	2005	Heritage (East) - Sold to Cooke Aqua
1999	Hydro Seafood GSP - Initially sold to Nutreco as part of Hydro Seafood deal	2004	Pesquera Chillehue - Sold to GM Tornegaleones	2005	Heritage (West) - Sold to EWOS/Mainstream
199	Joseph Johnston & Sons - Sold to Loch Duart	2005	Aguas Claras - Sold to Acua Chile	2006	Marine Harvest - Sold to Pan Fish
2000	Aquascot Farming - Sold from Aquascot to Cermaq	2005	Salmones Chiloè - Sold to Aqua Chile	2007	Target Marine - Sold to Grieg Seafoods
2000	Shetland Norse - Sold to EWOS	2005	Robinson Crusoe - Sold to Aqua Chile	2007	Shur-Gain (feed plant in Truro)- Sold to Cooke Aquaculture
2000	Hydro Seafood GSP - Sold to Norskott Havbruk (Salmar & Lerøy Seafood Group) from Nutreco	2006	GM Tornegaleones - change name to Marine Farm GMT	2008	Smokey Foods - Sold to Icicle Seafoods
2001	Laschinger UK - Sold to Hjaltland	2006	Merger Pan Fish - Marine Harvest - Fjord Seafood	2011	Vernon Watkins' Salmon Farming (NFL - Canada East) - Sold to Cooke Aquaculture
2001	Wisco - Sold to Fjord Seafood	2007	Pacific Star - Sold to Andrè Navarro	2012	Ocean Legacy/Atlantic Sea Smolt (NS - Canada East) - Sold to Loch Duart
2002	Wester Sound / Hoganess - Sold to Lakeland Marine	2007	Salmones Cupquelan - Sold to Cooke Aqua	2014	Cermaq – sold to Mitsubishi
2004	Ardvar Salmon - Sold to Loch Duart	2009	Patagonia Salmon Farm - Sold to Marine Farm GMT	2016	Icicle Seafoods sold to Cooke Aquaculture
2004	Hennover Salmon - Sold to Johnson Seafarms Ltd.	2010	Camanchaca (salmon division) - Sold to Luksic Group	2017	Gray Aqua sold to Marine Harvest
2004	Bressay Salmon - Sold to Foraness Fish (from adm. Receivership)	2011	Salmones Humboldt - Sold to Mitsubishi		
2004	Johnson Seafarms sold to city investors	2011	Pesquera Itata+Pesquero El Golfo – merged into Blumar		
2005	Unst Salmon Company - Sold from Biomar to Marine Farms	2011	Landcatch Chile - Sold to Australis Mar		
2005	Kinloch Damph - Sold to Scottish Seafarms	2012	Salmones Frioaysen & Pesquera Landes' freshwater fish cultivation sold to Salmones Friosur		
2005	Murray Seafood Ltd. - Sold from Austevoll Havfiske to PanFish	2012	Cultivos Marinos Chilé – Sold to Cermaq		
2005	Corrie Mohr - Sold to PanFish	2013	Pacific Seafood Aquaculture – Prod rights&permits for 20 licenses sold to Salmone Friosur		
2006	Wester Ross Salmon – MBO	2013	Salmones Multiexport divest parts of coho and trout prod. Into joint venture with Mitsui		
2006	Hjaltland Seafarm - Sold to Grieg Seafood ASA	2013	Trusal sold to/merged with Salmones Pacific Star, with new name Salmones Austral		
2006	Orkney Seafarms - Sold to Scottish Seafarms	2013	Congelados Pacifico sold to Ventisqueros		
2007	Lighthouse Caledonia - Spin-off from Marine Harvest	2014	Nova Austral sold to EWOS		
2010	Northern Aquaculture Ltd - Sold to Grieg Seafood	2014	Acuinova sold to Marine Harvest Chile		
2010	Lighthouse Caledonia - changed name to Scottish Salmon Company	2014	Cermaq – sold to Mitsubishi		
2010	Meridian Salmon Group - Sold to Morpol	2014	Comercial Mirasol – sold to Salmones Humboldt (Mitsubishi)		
2011	Skelda Salmon Farms Limited - Sold to Grieg Seafood	2015	Landcatch Chile - Sold from Australis Mar to AquaGen		
2011	Duncan Salmon Limited - Sold to Grieg Seafood				
2012	Uyesound Salmon Comp – Sold to Lakeland Unst (Morpol)				
2013	Lewis Salmon – Sold to Marine Harvest Scotland				
2013	Morpol sold to Marine Harvest				
2014	Part of Morpol/Meridian sold to Cooke Aquaculture				
2015	Thompson Bros Salmon - Sold to Cooke Aquaculture				
2016	Balta Island Seafare - Sold to Cooke Aquaculture				

Source: Kontali Analyse

Appendix

Atlantic salmon production cycle



Appendix

Sustainability of fish feed

Over the last two decades, there has been a global trend of growing awareness about the economic, social and environmental aspects of optimal use of fishery by-products, and of the importance of reducing discards. Nowadays, more and more by-products are being used in feed, and a growing percentage of fishmeal is being obtained from trimmings and other residues from the preparation of fish fillets.

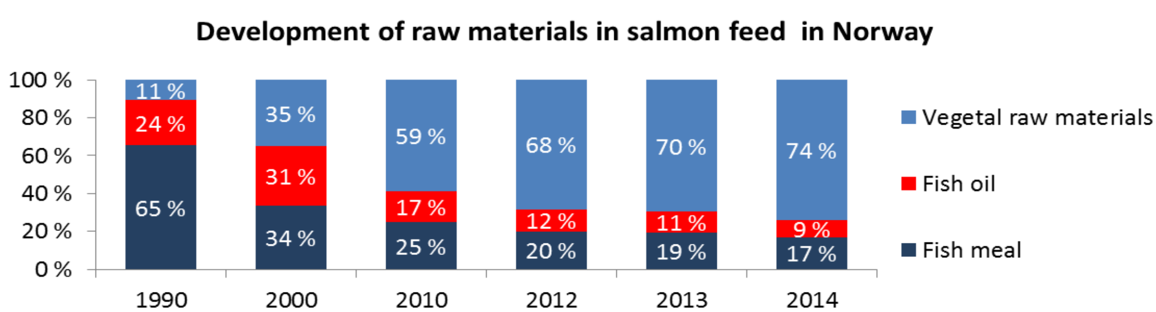
According to the UN, 7 million tonnes of wild catch are destroyed or discarded as non-commercial harvest annually by commercial fisheries. This figure could have been converted into an annual fish oil quantity of 0.5 million tonnes, i.e. close to 80% of the tonnage used in salmon and trout farming (UN, 2010).

In FAO's State of World Fisheries and Aquaculture report (2014) it states that in 2012, more than 86% of world fish production was utilised for direct human consumption. The remaining 14% was destined for non-food uses, of which 75% was reduced to fishmeal and fish oil. Although the FAO encourages using more fish directly for human consumption, they are of the opinion that it is more efficient, in a protein-hungry world, to harvest the unmarketable species for animal feed, subsequently consumed by man, than to not harvest the fish at all.

Nonetheless, we have seen a significant decline in the use of fish meal and fish oil in salmon feed due to changes in recipes. While fish meal and fish oil have traditionally been the main ingredients, with reduced availability and increased prices, it is now common practice to substitute these with cheaper and more readily available non-marine raw materials. Fish meal protein is being substituted with plant proteins, such as soya concentrates and sunflower meal or with poultry by-products, such as feather meal (not used in Europe).

A report from Nofima (Ytrestøyl et. al., 2014) shows that the average Norwegian salmon diet in 1990 contained 65% fish meal and 24% fish oil and that this had reduced to 19% and 11% respectively in 2013. Holtermann has estimated the same numbers to be 17% and 9% in 2014. At these low levels, salmon farming is a net producer of marine protein, in others words more fish protein is produced than what is used to make the feed.

Substitution of marine raw materials has not been found to have any negative effect on growth, susceptibility to disease, or quality of the fish as long as the fish's own nutrient requirements are being covered. The downward trend in the use of marine ingredients continues and with the ability of Atlantic salmon to utilise alternative feed ingredients, lack of feed raw materials should not be a threat to the growth of the industry. However, there will be increased competition for the best quality raw materials and feed prices may therefore be affected.



Source: *Ytrestøyl T., Aas T.S., Åsgård T. (2014) Resource utilisation of Norwegian salmon farming in 2012 and 2013. Nofima report 36/2014 pp. 35, NOFIMA, FAO (2012) World Fisheries and Aquaculture, UN (2010), FAO (2014) World Fisheries and Aquaculture, Holtermann*

Appendix

The Global Salmon Initiative & the ASC

The Global Salmon Initiative (GSI) is a leadership initiative by global farmed salmon producers, focused on making significant progress towards fully realising a shared goal of providing a healthy and sustainable source of protein to feed a growing population, whilst minimising our environmental footprint, and continuing to improve our social contribution.

GSI's focus areas are biosecurity (priority is sea lice), standards (ASC), feed and nutrition (fish meal and oil), and improving industry transparency.

The Aquaculture Stewardship Council (ASC), founded in 2010 by WWF and IDH (Dutch Sustainable Trade Initiative), is an independent non-profit organisation with global influence. ASC aims to be the world's leading certification and labelling programme for sustainably farmed seafood. The ASC's primary role is to manage the global standards for responsible aquaculture.

ASC works with aquaculture producers, seafood processors, retail and foodservice companies, scientists, conservation groups and consumers. The ASC logo sends a strong message to consumers about the environmental and social integrity of the product they are purchasing. The chart below shows the areas of focus for the ASC.

Source: Marine Harvest, www.asc-aqua.org, www.globalsalmoninitiative.org, ASC Salmon Standard - version 1.1 April 2017

Appendix

Marine Harvest History

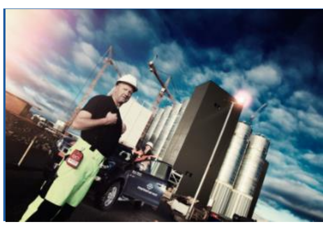
From Mowi to Marine Harvest

2017	Marine Harvest acquires Gray Aqua Group and establish Marine Harvest Atlantic Canada
2016	Marine Harvest enters into joint venture with Deep Sea Supply to build, own and operate aquaculture vessels
2013	Marine Harvest acquires Morpol
2012	Feed division established
2007	Company name is changed to Marine Harvest
2006	PanFish acquires Marine Harvest
2005	Marine Harvest and Stolt Sea Farm merge PanFish acquires Fjord Seafood John Fredriksen acquires PanFish
2000	Nutreco acquires Hydro Seafood. New company name: Marine Harvest
1999	Nutreco acquires the Scottish farming operations started by Unilever
1998	Mowi is discontinued as a company name Hydro Seafood has sites in Norway, Scotland and Ireland
1996	Hydro Seafood acquires Frøya holding
1990	Hydro Seafood registered 25 June Restructuring and consolidation of the industry starts
1985	Hydro increases its holding to 100%
1983	Mowi buys GSP in Scotland and Fanad in Ireland
1975	Mowi becomes a recognised brand
1969	Hydro increases its holding to 50%
1965	Mowi starts working with salmon in Norway Unilever starts working with salmon in Scotland under the name Marine Harvest

Appendix

MHG has a leading position across the value chain

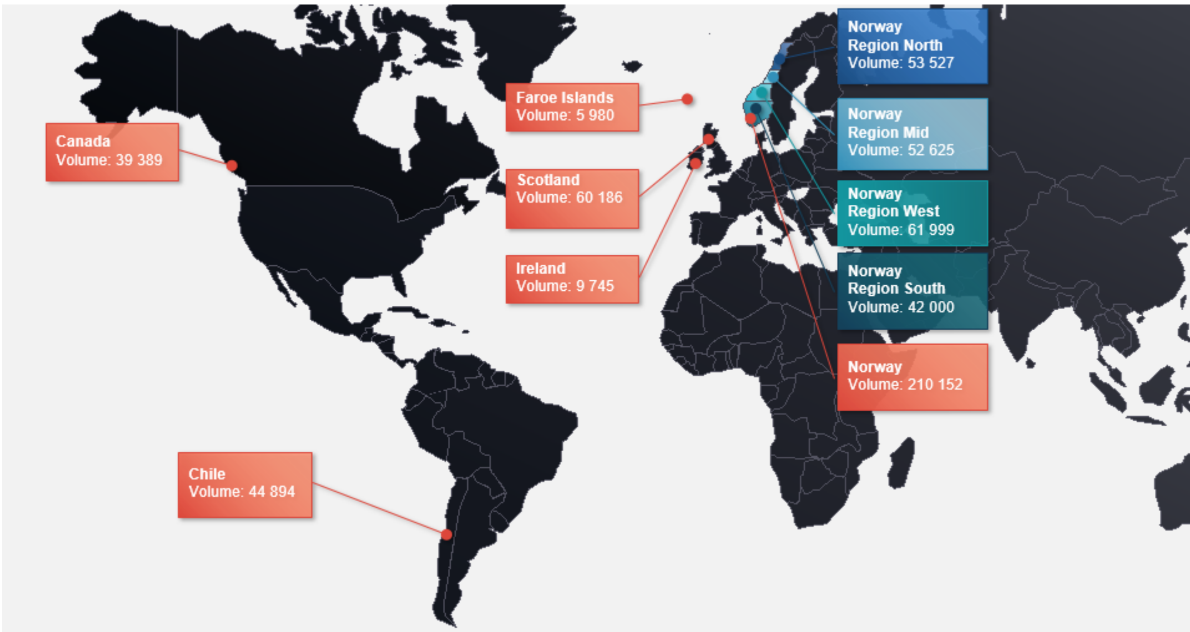
Marine Harvest business areas



#4	#1	#1
Position:		
305,174 tonnes vs. global salmonid feed production of ~4 m tonnes	370,346 tonnes vs. global production of ~2.07m tonnes (18%)	Global sales network Leading position in Consumer Products
Focus areas:		
Efficiency of operations and Organic growth in Scotland	Acquisitive growth in Norway and Chile	Organic growth in Consumer Products

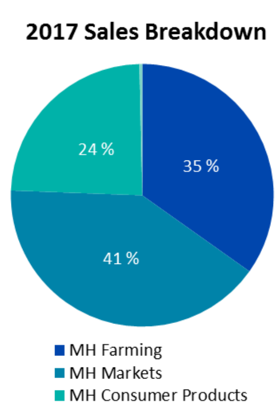
Appendix

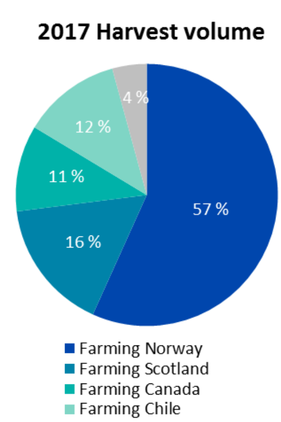
Marine Harvest farming



Marine Harvest farms salmon in six countries; Norway, Scotland, Canada, Chile, Ireland and the Faroe Islands. In total, the company is present in 24 countries and sells to approximately 70 countries worldwide. Marine Harvest is listed on the Oslo Stock Exchange (MHG) and has 20,280 shareholders (Dec 31. 2017). The head office is located in Bergen, Norway. At the end of 2017, the group had 13,233 employees worldwide, including temporary employees.

Total revenue for Marine Harvest in 2017 was MEUR 3,649.4 and the harvest quantity of Atlantic salmon was 370,346 tonnes (gwt), which was 18% of the total industry output.





Source: Marine Harvest

Appendix

Marine Harvest sales network

Marine Harvest has an extensive global sales network and sells to approximately 70 countries around the world. Finished products are sold to retail, food service, industry and distributors.

America, Sales & Marketing:

- Operational EBIT EUR 15.6 million
- Sales – 81,000 tonnes product weight
- VAP Processing: USA & Chile
- 596 FTE

Europe, Sales & Marketing:

- Operational EBIT EUR 41.4 million
- Sales - 405,000 tonnes product weight
- VAP Processing: France, Belgium, Holland, UK, Poland, Germany, Czech Rep, Spain.
- 7,078 FTE

Asia, Sales & Marketing:

- Operational EBIT EUR 12.9 million
- Sales – 34,000 tonnes product weight
- VAP Processing: Japan, South Korea, Taiwan, China and Vietnam.
- 1,134 FTE

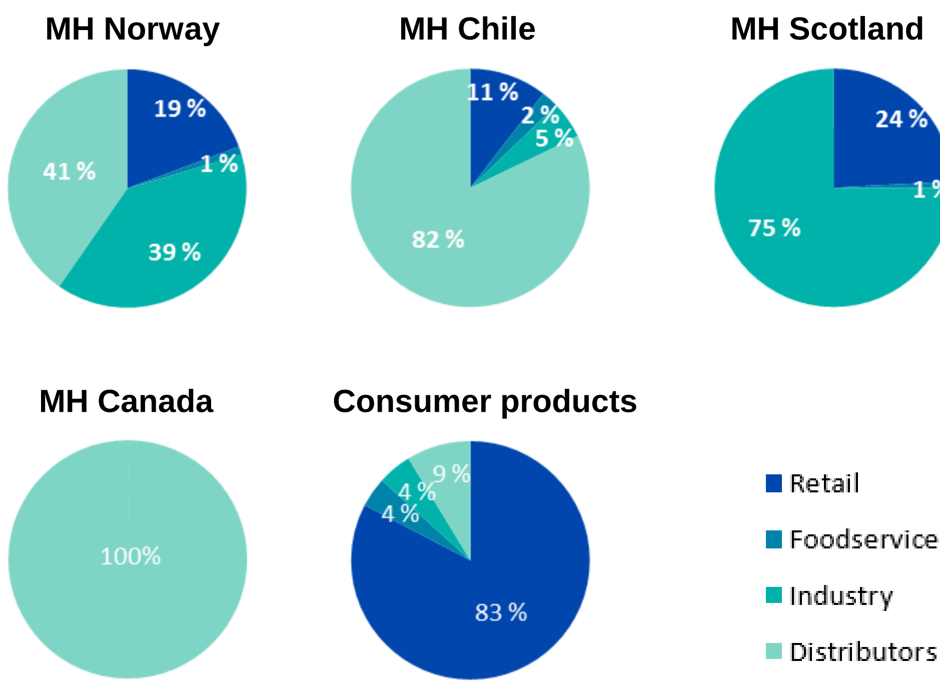
Appendix

Marine Harvest processing facilities

Marine Harvest's main secondary processed product is smoked salmon, and the largest factory is found in Poland. We also process several other species such as whitefish and flatfish into ready meals or packed in modified atmosphere products (MAP).

Appendix

Marine Harvest sales channels (2017)



Marine Harvest sells its products to several categories of purchasers. We divide them into: Retail, Food Service (Horeca[(1)]), Industry, Distributors and others. Each business unit has their own sales profile. MH Canada sells all the salmon they produce to distributors, and MH Chile sells most of their salmon to distributors. In Norway and Scotland, most of the salmon produced is head-on-gutted (HOG, equivalent to gwt) and is therefore sold to industrial customers, who further process the salmon into other products such as fillets, portions, smoked salmon or ready-meal products.

MH Consumer Products processes fish from raw material to value-added products and sells 87% of their products to final sales points met by end consumer (retail + food service).

Note: 1) Horeca = Hotel, restaurants and café (or establishments which prepare and serve food and beverages)
Source: Marine Harvest

Appendix

Historical average foreign exchange rate

Year	EURO/NOK
2017	9,3271
2016	9.2899
2015	8.9530
2014	8.3534
2013	7.8087
2012	7.4744
2011	7.7926
2010	8.0068
2009	8.7285
2008	8.2194

In chapter 9, cost and investments in NOK have in some places been converted to Euro. The same is true for NOK prices in chapter 5.6.

The reason for this conversion is the international nature of the salmon industry. As the European Union is the biggest market for Atlantic salmon, it is often more appropriate to use Euro as the quoted currency.

The table to the left show the EURO/NOK rate used for this purpose.

Source: Norges Bank

Appendix

Sources of industry and market information

Marine Harvest:	www.marineharvest.com
Other	
Kontali Analyse:	www.kontali.no
Intrafish:	www.intrafish.no
Norwegian Directorate of Fisheries:	www.fiskeridirektoratet.no
Norwegian Ministry of Trade, Industry and Fisheries:	www.fkd.dep.no
Norwegian Seafood Council:	www.seafood.no
Norwegian Seafood Federation:	www.norsksjomat.no
Chilean Fish Directorate:	www.sernapersca.cl
FAO:	www.fao.org
International fishmeal and fish oil org.:	www.iffo.net
Laks er viktig for Norge:	www.laks.no
Price statistics	
Fish Pool Index:	www.fishpool.eu
Kontali Analyse (subscription based):	www.kontali.no
Urner Barry (subscription based):	www.urnerbarry.com
Statistics Norway (SSB):	www.ssb.no/laks_en/
NASDAQ:	www.salmonprice.nasdaqomxtrader.com