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**THE CURRENT STATE  
OF THE SALMON INDUSTRY,  
RISKS AND OPPORTUNITIES**

**IN CHILE**

**FLANDERS INVESTMENT & TRADE MARKET SURVEY**



# THE CURRENT STATE OF THE CHILEAN SALMON INDUSTRY

Risks and Opportunities  
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## 1. INTRODUCTION

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Chile holds the title of the world’s longest country, boasting a coastline stretching 6,435 kilometers and framed by the Andes Mountain range that spans its entire length. Renowned for its extraordinary natural diversity, the nation showcases various ecosystems. The northern region features the driest desert globally, characterized by unique geological formations. Moving towards the central area, including the capital Santiago, a Mediterranean climate prevails, contributing to the production of acclaimed wines. Further south, the Valdivian rainforest, with its numerous lakes and forests, gradually gives way to Chile’s Patagonia, often referred to as the eighth wonder of the world.

This natural wealth translates into substantial reserves of vital metals, including copper, gold, and silver, forming a significant portion of Chilean exports. Notably, Chile boasts the world’s third-largest lithium reserves, often termed “white gold” due to its critical role in the energy transition.

Following years of dictatorship, Chile transitioned to democracy on March 11, 1990. Since then, the country has witnessed robust economic growth fueled by political stability and a commitment to international commerce. This environment facilitated the development of key export industries, such as mining, the food sector, and fish farming, positioning Chile as a noteworthy example for other Latin American nations.

The focus of this thesis lies specifically on the salmon industry, aiming to present a comprehensive overview of the sector and identify market opportunities for Belgian companies. Additionally, the study will delve into the conditions governing the import of salmon from Chile to Belgium.

## 2. RESEARCH AIM AND OBJECTIVES

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The goal of the thesis is to answer to the question “What are the current growth prospects and market trends within the Chilean Salmon industry?” Additionally, the following questions were raised to give Belgian companies useful insights on the industry:

- How do these trends impact Belgian companies willing to enter this market?
- What trade agreements and tariffs are present between the European Union and Chile?
- What risks and opportunities should Belgian companies consider?

## 3. THE GLOBAL SALMON AND TROUT INDUSTRY

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The aquaculture industry is predominantly concentrated in Asia, commanding a market share of 70% (European Commission 2019). However, none of these countries engage in salmon production due to lacking the necessary natural conditions, namely cold-water temperatures and sheltered



coastlines (fjords). Consequently, the leading salmon producers are Norway, Chile, the UK (Scotland), Canada and the Faroe Islands.

The total supply of Atlantic salmon in 2022 reached 2,863,700 tons. Norway emerged as the largest exporter of salmonids, contributing 1,255,851 tons in 2022 (FAO 2023). "Salmonid" is a term encompassing both salmon and trout species, a concept recurring throughout this market research.

Chile, on the other hand, accounted for 751,000 tons in salmon and trout exports in 2022, with Atlantic Salmon alone constituting 692,800 tons (FAO 2023). In addition, it is worth mentioning that in 2023 Norway was the world's leading producer with 48% and Chile remained in second place as a world producer with 33% (See below).

World Production of Salmonids Year 2022 and first half of 2023

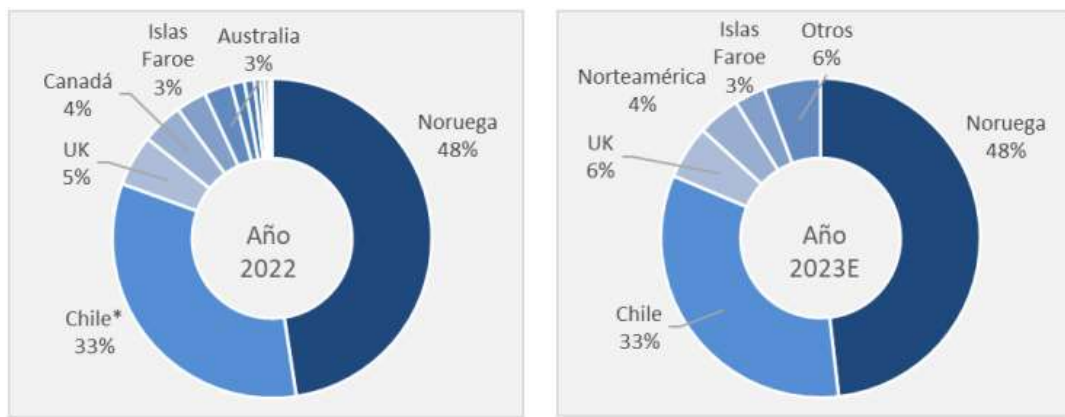


Figure 1. Distribution of world production of salmonids in 2022 and 2023 (Consejo del salmón 2023).

## 4. THE SALMON AND TROUT INDUSTRY IN CHILE

In the following sections an analysis of the Chilean salmonid industry is presented, starting with a detailed description of salmon production to provide a comprehensive understanding of the entire process. Subsequent sections cover the current status of the industry based on recent data, exploring aspects such as the regions of production, the impact of the salmon industry on these regions, yearly production statistics and export trends.

### 4.1 UNDERSTANDING SALMON PRODUCTION

To gain insight into the salmon industry, a comprehensive overview of each stage in the production process is essential. While production processes may vary between different species, the methods employed generally remain consistent. In Chile, three primary species are cultivated: Atlantic salmon, Pacific salmon, and rainbow trout (Salmón Chile 2023).

1. Atlantic or Salar salmon



Picture 1. Atlantic Salmon (Salmón Chile 2023)

2. Pacific or Coho Salmon



Picture 2. Pacific Salmon (Salmón Chile 2023)

3. Salmonidea or Rainbow Trout



Picture 3. Salmonidea Trout (Salmón Chile 2023)

The Atlantic or Salar salmon is the most produced in Chile, making up 75 % of total salmonids production in 2021 (Figure 2). Pacific salmon followed with a share of 19 % and Salmonidae trout constituted 6 % of the output. (Consejo del Salmón 2023.)

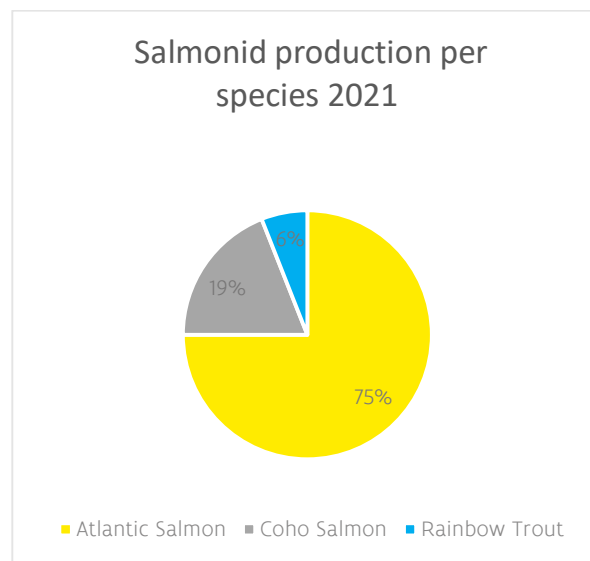


Figure 2. Salmonid production per species 2021 (Consejo del Salmón 2023).

With the identification of the three main species, we can proceed to a simplified overview of the salmon production cycle (Figure 6). It all begins with the artificial fertilization of salmon eggs, conducted under controlled conditions in freshwater incubators. This phase is referred to as the hatchery phase. Once the salmon have reached a sufficient size, they are moved to cultivation tanks in freshwater, and subsequently to saltwater tanks to acclimate to ocean conditions. Finally, they are placed in cages in the open ocean, initiating the farming phase. The salmon remain in these farms until they reach market size, with the time required varying based on the salmon species. For example, Atlantic salmon spend 12 to 22 months in sea pens, also known as sea cages.





Upon reaching maturity, the fish are harvested and transported to processing facilities. The transformation process that salmon undergo depends on the desired product, which can include boneless salmon, smoked salmon, fresh salmon and frozen salmon, among others. Precision in timing and quality control is crucial in this final stage to ensure the quality and safety of the consumed salmon.

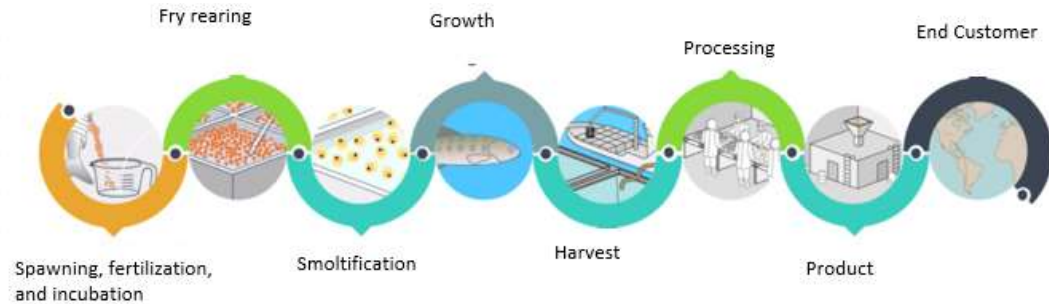
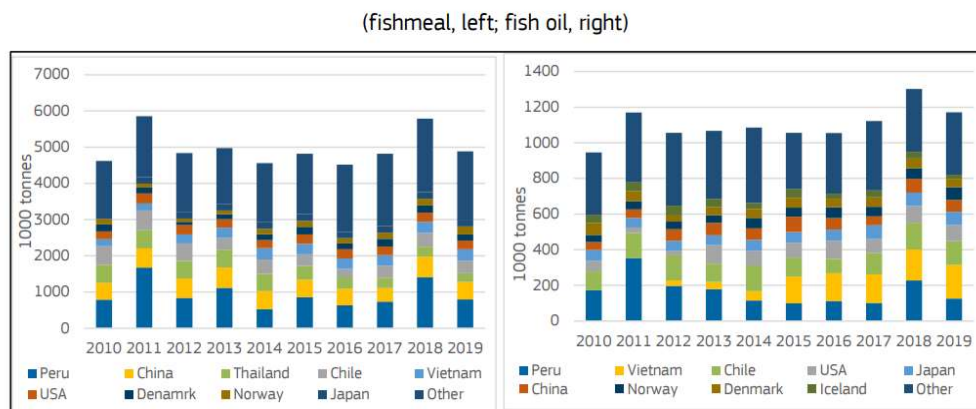


Figure 3. The Salmon cycle (Salmón Chile, 2023).

In the case of Chile, aquaculture related sectors, such as fish feed production and fish oil production were established simultaneously with the development of the salmon industry to meet local demand. However, as the industry grew, they became independent sectors and started to export outside of Chile too. Presently, both sectors rank as some of the largest producers worldwide (Figure 4). In addition, producers of industry equipment emerged, including producers of cultivation tanks and well boats, together with service-related sectors such as maintenance and logistics.

Figure 4. World fishmeal and fish oil production by producing countries (EUFOMA, 2021, 6).



Source: IFFO

## 4.2 PRODUCTION BY REGION IN CHILE

In Chile, there are currently about 3,300 aquaculture concessions, aimed to farm aquatic species including salmonids, mussels, algae and abalones (sea snails) (Subpesca 2023). About 1,353 concessions are intended for salmonid production (Sernapesca 2023).

Most of the salmon concessions are situated in the south of Chile, notably in the provinces of Aysén, Los Lagos and Magallanes (Figure 5). These provinces are often referred to as the Austral region (Figure 6). A very small part of the production (0,3 %) is located in the provinces of Maule, Biobío, La Araucanía and Los Ríos. (Consejo del Salmón 2023.)

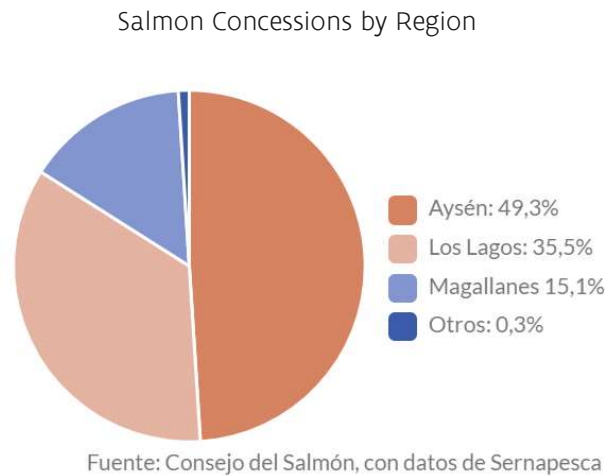


Figure 5. Salmon harvests by region in Chile (Consejo del Salmón 2023).

The Austral region offers environmental conditions that are very favorable to salmonid production, even though salmon is not native to this region. These conditions encompass an optimal water temperature, between 8 and 14 degrees Celsius, the right amount of water movement and high levels of oxygen. Without these conditions, good health of salmon can't be assured. These unique conditions can only be found in archipelagos and fjords. (Mowi 2023, 28.)



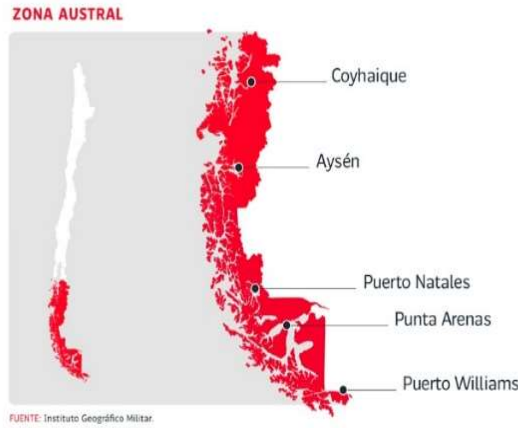


Figure 6. A map of Chile and the Austral region marked in red (Marca Chile 2023).

### 4.3 EXPORTS OF SALMON AND TROUT AND MAIN DESTINATIONS

The exports of salmonids have been growing year over year in Chile. It has become one of the major contributors to Chilean exports. Therefore, it is considered a key sector for the country, alongside other sectors like the mining sector or the emerging energy and hydrogen sector. (Invest Chile 2023.)

Salmon and trout exports reached a total of 751,259 tons in 2022, an increase of 3.8% over 2021 (Figure 7). The value of these exports totaled USD 6,606 million, an increase of 27.3 % over 2021. In 2022, Salmon and trout were the third largest export products behind copper and lithium. When excluding copper from Chilean exports, Salmon and trout exports represented 12.3 % of total exports of Chile. (Consejo del Salmon 2023, 1-3.)

**Annual exports of salmon and trout, in tonnes and millions USD (2015-2022)**

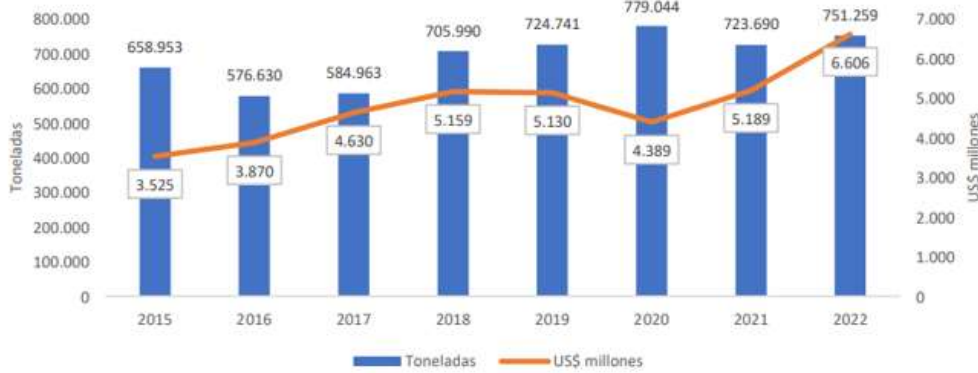


Figure 7. Annual salmon and trout exports, in tons and USD millions (2015-2022) (Consejo del Salmón 2023, 2).

Chile exported salmon and trout to 100 countries in 2022 (Salmón Chile 2023). Its major markets in 2021 were the United States, Japan, Brazil, Russia, China, and Mexico (Figure 8).

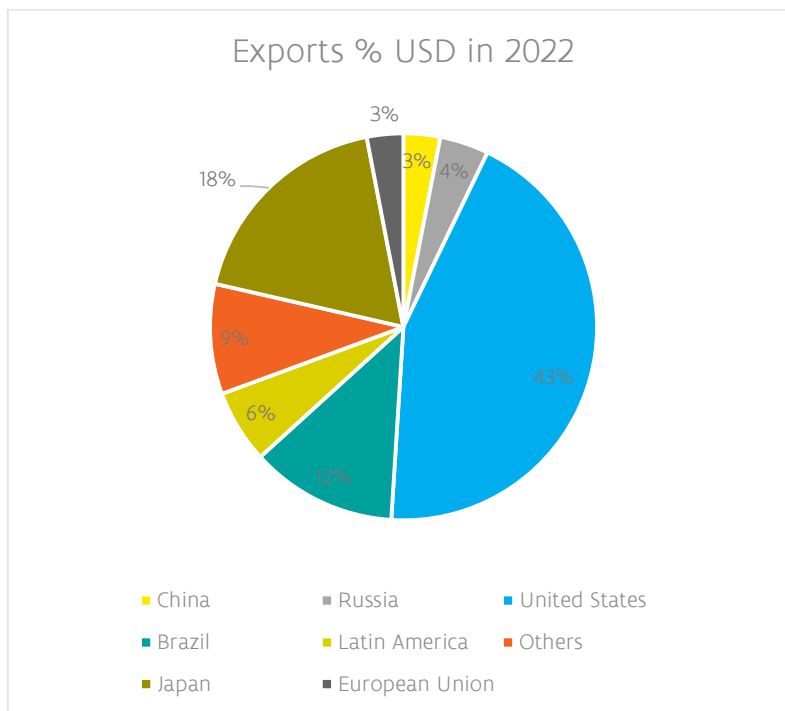


Figure 8. Destination of salmonid exports (% total USD) in 2022 (Consejo del Salmón 2023).

As is common for most commodities, Chile exports salmon in US Dollars, a rational choice given the stability and value of the US Dollar. Consequently, companies are exposed to exchange rate fluctuations between the dollar and the peso. Therefore, a weak dollar would result in a lower export figure in Chilean pesos, while a strong dollar would enhance profitability for Chilean companies.

In 2022, exports saw an increase in the United States, Japan, and China. In the United States, there was a 4.8% growth in tons, propelled by demand in the retail channel (Table 1). Japan experienced a 0.6% increase, while Brazil, despite a 3.7% drop, remained the third-largest destination. Exports to Russia declined by 30.2% due to the war in Ukraine. China witnessed a remarkable 58% increase, securing its position as the fifth most important destination, displacing Mexico, which had a 27% decrease (Consejo del Salmon 2023, 1-3).

Country	Millions USD			Tonnes		
	2021	2022	Annual Change	2021	2022	Annual Change
United States of America	2.281	2.845	24,7%	239.576	251.132	4,8%
Japan	1.032	1.209	17,1%	159.498	160.400	0,6%
Brazil	668	804	20,4%	127.293	122.567	-3,7%
Russia	292	276	-5,3%	50.689	35.386	-30,2%
China	103	188	82,8%	16.090	25.416	58,0%
Mexico	141	195	38,4%	24.438	17.674	-27,7%
Others	673	1.089	61,8%	106.106	138.685	30,7%
<b>Total</b>	<b>5.189</b>	<b>6.606</b>	<b>27,3%</b>	<b>723.690</b>	<b>751.259</b>	<b>3,8%</b>

Table 1. Exports of salmon and trout by market, in tonnes and value in USD in millions (Consejo del Salmón 2023, 3).

For the first semester of 2023, Salmón Chile estimates that the value of Chilean salmon exports has reached USD 3,788 million, accounting for 7% of total Chilean exports. This represents a 3% increase compared to the same period the previous year (Salmón Chile 2023).

Simultaneously, Consejo del Salmón estimates that salmonid exports during the first half of 2023 surpassed 373,734 tons, amounting to USD 3,307 million. This reflects a growth of 2% over the first semester of 2022. While a precise figure is not yet available, these numbers indicate a satisfactory performance in salmon and trout production for the first half of the year. Importantly, the primary export countries have remained consistent (Consejo del Salmón 2023).

The outlook for 2023 and 2024 appears promising for the Chilean salmon industry. Prices are expected to remain high due to strong demand, despite concerns about inflation and economic uncertainty.

## 5. CHILE'S DOMESTIC COMPETITIVENESS AND GLOBAL POSITIONING

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In this chapter, a comprehensive analysis of the competitiveness of the Chilean salmon industry will be undertaken using Porter's Five Forces, coupled with an assessment of Chile's global positioning. This approach enables an evaluation of the industry's attractiveness, offering insights into competition intensity, the influence of buyers and suppliers, and the potential threats from new entrants and substitute products. Furthermore, various challenges confronting the salmon industry in Chile will be explored, encompassing environmental considerations, political risks, and risks associated with climate change.

### 5.1 THE COMPETITIVE LANDSCAPE OF SALMON PRODUCTION IN CHILE

#### Rivalry among existing producers

The salmon industry in Chile is a concentrated sector, with production primarily controlled by a limited number of companies. There are approximately 1353 concessions for salmonid production in Chile (Sernapesca 2023). Mowi, the world's largest salmon producer, estimates that only 385 of these concessions are currently operational, and the top 10 largest firms collectively hold 82% of total concessions in Chile (Mowi, 2023, 49).

Sernapesca annually publishes a list of companies with concessions (see Appendix 1). Despite the existence of 61 different names, most companies are subsidiaries of others. For instance, Aquachile, the largest salmon producer in Chile with 320 concessions, owns Los Fiordos, Salmones Magallanes, Salmones Frisur and Aquachile (Table 2). Other industry giants include Cermaq, Mowi, Salmones Multiexport, Salmones Blumar, and Australis Seafoods (Sernapesca 2023).



Company	Concessions
AQUACHILE (AQUACHILE, SALMONERA LOS FIORDOS, SALMONES MAGALLANES)	320
MITSUBISHI (Cermaq and Salmones Humboldt)	95
MOWI Chile	161
MULTI X	69
AUSTRALIS SEAFOODS	69
TRUSAL S.A.	45
CULTIVOS YADRAN S.A.	44
SALMONES CAMANCHACA S.A.	44
SALMONES BLUMAR S.A.	42
PRODUCTOS DEL MAR VENTISQUEROS S.A.	37

Table 2. Top 10 biggest salmon producers in Chile (Subpesca 2023).

In conclusion, most salmon-producing companies can be considered conglomerates as they own multiple companies. Moreover, these companies often engage in both farming and salmon processing for reasons of economies of scale and productivity growth (Appendix 2). Some companies even have their own fish feed plants (Aquachile 2023). Consequently, companies strive to be as cost-effective and efficient as possible through the creation of fully developed supply chains.

As a result, Chile's salmon production has achieved consolidation. The competition among companies primarily revolves around local efficiency and cost control. On a global scale, these companies compete against producers from other nations. Companies are subject to global supply and demand, and therefore, prices are internationally determined, especially in the case of fresh salmon sales on the spot market. The spot market is a market for currencies or commodities in which they are sold and delivered to the buyer immediately, rather than being sold forward. The main hub in the United States is located in Miami.



**Threat of new entrants**

The threat of new entrants is very low, and this can be attributed to two main reasons. Firstly, the industry faces high entry barriers for salmon production. Substantial investments are required to obtain specialized systems such as salmon pens and boats, as well as to train workers. Additionally, high fixed costs create a hurdle for achieving quick profits. Moreover, the existing companies have established economies of scale that are challenging for new entrants to replicate (Johansen, A 2021).

Secondly, salmon farming necessitates a concession, and these licenses are not easily granted by the Chilean government. Moreover, there are numerous restrictions and requirements for salmon farming, and the locations where salmon can be farmed face increasing constraints due to environmental concerns. Consequently, the establishment of new production sites is currently limited. This will be further discussed in the conclusion of the competitive landscape.

**Threat of substitution of salmon**

In this section, we will explore the likelihood of substitution by similar products, which may be offered by external competitors or other industry players. To be deemed an alternative, a substitute product must satisfy the same customer needs.

In theory, wild-caught salmon is the closest substitute for farmed salmon. However, considering the limited supply of wild-caught salmon and the projected future demand for fish products, it can be argued that wild salmon can only meet a small portion of the demand. Consequently, other types of fish and protein-rich meat sources, including pork, chicken, and beef, emerge as the closest substitutes for farmed salmon.

If the price of salmon experiences a sharp increase, these alternative sources may be considered by consumers in the short term. However, in the long term, meat isn't a proper substitute. Salmon, being rich in Omega-3 fatty acids with various health benefits, is unique in this aspect. High concentrations of Omega-3 fatty acids can only be found in certain fish species, nuts, and plant oils.

Therefore, only other fish products rich in Omega-3 fatty acids can be considered as substitutes for salmon. Nevertheless, insights from an interview with an undisclosed Belgian company that imports salmon from Chile, reveal that consumers are likely to continue choosing salmon even in the face of elevated prices. Specifically, demand for salmon in Belgium remained stable in 2022 despite record-high prices.





## Supplier power

The power a supplier holds is contingent on the significance of the product for the buyer. If the product constitutes a substantial part of the buyer's costs or is critical to the production process, the supplier typically wields higher bargaining power.

In the Chilean scenario, the situation aligns closely with other salmon-producing countries. The cost share of fish feed in salmon production is approximately 50%. Globally, the salmon feed industry is highly concentrated, with four producers, Mowi, Skretting, Ewos, and Biomar who control most of the production. Despite the powerful position of these manufacturers, the bargaining power is only moderate. Fish feed exhibits low differentiation between products from different suppliers.

Moreover, many salmon producers have vertically integrated fish feed plants to establish fully integrated value chains. This holds true for the cases of Mowi, Aquachile, and Blumar, which have recently acquired feed companies to further reduce dependency.

Other suppliers in the industry encompass chemical producers, equipment producers, and electrical power suppliers, among others. Their bargaining power is low as their share in the cost structure is not as decisive as that of fish feed producers.

## Buyer power

Powerful buyers are well positioned to negotiate favorable prices and quantities of products if alternative products or suppliers are easily found. In this section, an analysis of the power of salmon purchasers will be conducted. It is important to note that they serve as intermediaries between the salmon producers and the final consumers.

In the salmon industry, different buyers can be identified, with retailers being the main group, followed by other entities involved in importing and exporting salmon, as well as other food service entities such as restaurants. In recent decades, supermarkets and retailers have experienced an increase in buyer power through acquisitions and mergers. In other words, the industry has reached an extreme level of consolidation, counting only a handful of dominant players.

Salmon can be sold in two different ways. Firstly, on the spot market, salmon is sold in bulk with instantaneous delivery to retailers. In this case, the primary focus is on the sale of fresh salmon, while long-term contracts are more accustomed to selling frozen and smoked salmon, for example.

The bargaining power of retailers can be considered high, given the size of these companies. On the spot market, companies can easily switch from one supplier to another. In the past, this has occurred with Walmart and Costco in response to disease outbreaks and the use of antibiotics. In 2009, Walmart abruptly stopped buying Chilean salmon when the ISA virus was detected in Chilean farms (Diario Financiero), and in 2015, Costco switched to buying Norwegian salmon instead of Chilean salmon due to concerns about the high usage of antibiotics (Esposito 2015).



At present, the Chilean industry has reached maturity and no longer experiences the production shocks that occurred in the past. Additionally, the use of antibiotics nowadays is much lower, given the continuous efforts that are made to further reduce their use. Furthermore, the demand continuously surpasses the available supply and the quality of Chilean salmon has increased a lot in recent years. For these reasons, it can be argued that Chilean companies can sell salmon without any issues and at attractive (high) prices.

**Conclusion of the Porter’s 5 forces analysis of the salmon industry in Chile**

To summarize the competitive analysis in Chile, it can be suggested that there is high competition among companies as they strive for efficiency and low costs to enhance their positioning in the global market. This competitiveness is evident in the vertical integration that companies employ to establish complete value chains. The threat of new entrants is low, given the substantial investments required, and existing competitors already possess significant outputs and economies of scale. The threat of substitution is low, as other meat sources lack the same abundance of omega-3 fatty acids found in salmon. Supplier power is also low, as most suppliers have only a small share in the cost structure of salmon producers. Fish feed suppliers are an exception, with a cost share of 50%. However, the lack of differentiation in fish feed does not significantly impact producers. Additionally, some salmon producers are self-reliant with their own fish feed plants. Lastly, buyer power is moderate, driven by high demand that consistently exceeds supply, allowing salmon to be easily sold at high prices.

**The sustainability concerns in the Chilean salmon industry**

With a deeper understanding of the competitive landscape, the next step is analyzing the significant challenge for Chilean salmonid producers, which isn’t related to industry competitiveness. The primary threat for producers stems from the conflicting interests among the government, salmon companies, and conservationists, particularly concerning fish farming in protected areas. Salmon producers aim to renew and expand concessions in these areas, while the government, overseen by the Ministry of the Environment, seeks to tighten policies and regulations to safeguard national reserves.

Over 400 salmon concessions exist in protected areas, such as the Kawésqar National Reserve in the province of Magallanes, housing about 120 concessions (Greenpeace 2023). These areas include indigenous communities that view these fishing grounds as their ancestral right, making the issue highly sensitive and involving multiple stakeholders.

In May 2023, the Ministry of the Environment proposed a change to the law of fisheries and aquaculture, intending to exclude the cultivation of exotic hydrobiological species, like salmon, indefinitely in all categories of protected areas. However, the law was rejected by the congress due to controversy and potential industry shrinkage estimated at 60% % by the union of salmon workers and leading to thousands of job losses in the Austral region (Garcés 2023).

Recently, the Ministry of Environment introduced a new plan to limit production in protected areas, issuing a directive in late September. This directive aims to curb aquaculture concessions by suspending the granting process for companies without an approved management plan or



environmental impact assessment. The suspension's goal is to assess the compatibility of proposed activities with the protection objectives of the area (Cárdenas 2023).

Within the salmon industry, this directive is perceived as a new interpretation of the law not approved in May, causing discontent in the Austral region. People fear job losses if the directive is implemented, potentially leading to a significant downturn in salmon production and reduced exports from Chile. With the current high demand for salmon, government intervention in Chile could raise salmon prices, benefiting Norway and other salmon producers.

To summarize, the competition in the industry is more between the government and the industry than among individual companies. The differing interests regarding the expansion of concessions in protected areas may lead to stricter policies, reducing Chile's salmon output and market share, with negative economic impacts on the Austral region.

### **Chile's position on the global scale**

Chile attained the status of the second-largest producer of salmon in 1981. Since then, it has consistently maintained this position, showcasing a robust growth trajectory. It is noteworthy, however, that the industry faced disruptions in production due to virus outbreaks. Despite these challenges, the salmon industry has demonstrated resilience with swift recoveries, solidifying its position as Chile's third most important export sector. The subsequent sections will delve into an analysis of Chile's global competitiveness. Similar to the prior examination of Chile's domestic market, a focus will be placed on sustainability and environmental considerations.

### **Chile's cost advantage**

The salmon industry experienced a prolonged phase of enhanced productivity and reduced production costs, attributed to technological advancements and supply chain development. However, recent years have seen an upturn in costs due to stagnant productivity, increased feed prices, and rising risks of disease outbreaks linked to climate change. These factors pose potential short-term impacts on costs and harvests for salmon producers (Iversen et al. 2020, 3-8).

Historically, Chile has maintained the lowest production costs among the top five producing countries, primarily due to lower labor expenses. Nevertheless, periods of heightened production costs occurred during the ISA virus outbreaks (2007-2010) and the algae bloom in 2016 (Figure 9). Tighter regulations and a shift towards more sustainable salmon practices have further elevated production costs. Despite these challenges, Chile has remained competitive compared to countries like Canada and Scotland, which historically incur higher costs.

In summary, discounting external factors like climate change risks and disease outbreaks, Chile is well-positioned to expand its market share due to its relatively lower costs. The improved practices of major producers have also enhanced the quality of salmon. Additionally, Chile holds a comparative advantage through the counter-seasonality of the Southern hemisphere, presenting an opportunity to offer abundant salmon during periods of lower output in the Northern hemisphere. While the relevance of this advantage has diminished with year-round production of Atlantic salmon, it remains a noteworthy factor. Companies are likely to prioritize production and harvest during winter, given better and more predictable conditions compared to the risk of heatwaves and warmer oceans in summer (Institute for European Environmental Policy 2023, 4; Intesal).



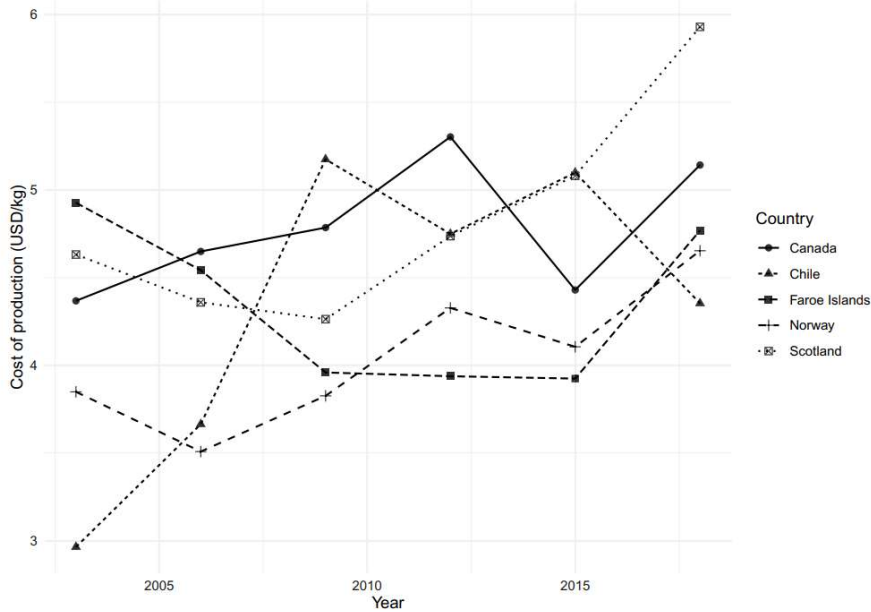


Fig. 3. Real production cost incl. Harvesting and packing costs, USD/kg gutted weight (2018-USD).

Figure 9. Real production cost incl. Harvesting and packing costs, USD/kg gutted weight (2018-USD) (Iversen et al. 2020, 5).

### Chile's International trade agreements and relations

For Chile, creating favorable conditions for free trade has been considered primordial in recent decades to support economic and social development of the country. In 2021, it was estimated that international trade represented 64.4 % of the country's GDP. This can be explained by the numerous trade agreements involving Chile. These agreements have facilitated exports of salmon and the development of the industry through the termination of quotas and tariffs.

### Trade relations between Chile and the European Union

Chile and the European Union finalized a trade agreement in 2002, which took effect in 2003. Since its implementation, bilateral trade has witnessed substantial growth, with a 142% increase between 2003 and 2021 (European Commission 2023). Despite this impressive expansion, salmon exports to the European Union have not been the primary driver. In 2021, salmon exports to the European Union constituted only 2% of Chile's total salmon exports. Most salmon exports to Europe involve frozen salmon, given the considerable distance between Chile and Europe, making the sale of fresh salmon challenging.

Furthermore, the salmon industry did not fully capitalize on the trade agreement, as certain salmon products still faced tariffs. Fresh salmon and frozen salmon enjoyed zero tariffs, while smoked salmon and salted or brined salmon incurred import duties of 9.5% and 11.5%, respectively (European Commission 2002, 85-88). Additionally, Chile encountered significant production shocks due to the ISA outbreak in 2007 and the algae bloom in 2015 (Figure 15). These events encouraged



Chile to focus more on selling fresh salmon on the spot market in the United States and other core markets, as it proved to be more profitable.

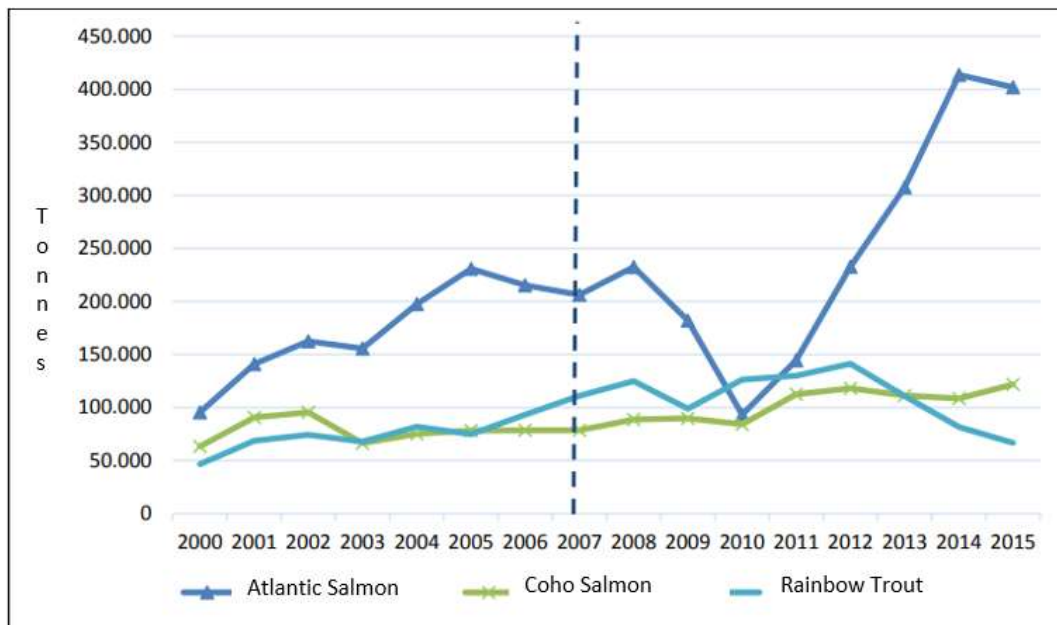


Figure 12. Volume of national exports of salmonids (tons) by species (2000-2015) (Dresdner et al. 2015, 169)

In 2022, the 20-year-old trade agreement between Chile and the European Union was modernized. Important steps were made in support of the salmon industry. More precisely, tariffs for salmon imports have been reduced to 0 for other salmon products too. However, this agreement still has to be ratified and is not yet in use. (Ministerio de Relaciones exteriores Chile 2023.)

This tariff reduction has been successful with the help of stricter policies by the Chilean government to make the industry more sustainable. Between 2015 and 2020, the usage of antibiotics decreased by 44 %. In addition, the industries' goal is to decrease usage 50 % by 2025 to achieve a Seafood Watch Good Alternative rating. (Consejo del Salmón 2023.)

Alongside these reductions, the agency for fisheries and aquaculture Sernapesca introduced a programme called Programa de Optimización del Uso de Antimicrobianos (PROA) which can be translated into English as the Antimicrobial Use Optimization Program. The aim is to issue certificates to salmon farms that have a usage of drugs that meet the PROA requirements. Moreover, these centers are subject to stricter and more frequent inspections. Currently, 138 centers have been recognized by Sernapesca to meet these requirements.

While antibiotics continue to be utilized, the actual usage of antibiotics in Chile has decreased to a very little amount. However, the industry is still haunted by a reputation from the past were salmon producers used excessive amounts of antibiotics.

In an interview with an undisclosed Belgian company, it came to light that that the salmon they buy has never been exposed to antibiotics in its entire life. This statement is likely to hold true, as there are already centers in Chile who don't use any antibiotics and sell their salmon at a premium price (Intesal 2023).

In other cases, the use of antibiotics in Chile is very limited. The rate of antibiotic use in Chile is still slightly higher than in Norway, but the difference has reached a negligible point. The antibiotics are used curatively rather than preventively, and a waiting period is applied before the salmon can be slaughtered so that no traces of antibiotics can be found. The general market also requires the certification ASC, which stands for aquaculture stewardship council. This certification encompasses socially responsible farming, with criteria such as minimizing the use of wild fish in feed, ensuring traceability to responsibly managed sources, maintaining water quality within specified limits to prevent pollution, implementing measures to minimize disease outbreaks, a maximum density in salmon pens, consulting with local communities, and so forth.

In summary, Chile's position in international trade is beneficial for salmon producers, as it holds many trade agreements with different countries, resulting in low to zero import tariffs for Chilean salmon. This facilitates exports of Chilean salmon and solidifies Chile's position as second biggest salmon producer in the world. The recent efforts to reduce drugs and environmental impacts, will help strengthen Chile's position, as it closes the gap with Norway, who barely uses antibiotics. On top of that, the recent changes in the free trade agreement with the European Union offer opportunities to export higher quantities to Europe.

Aside from these positive notes, we should not forget that Chile's position could still be negatively affected by the pressures of the ministry of the environment who looks to put a halt to concessions in protected areas. A significant drop in salmonid output would occur in case this reform takes place. As a result, the future of Chile remains uncertain due to the internal political insecurities.





# 6. WHERE ARE THE MARKET OPPORTUNITIES IN THE INDUSTRY?

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Within the context of market opportunities, a distinction should be made between traditional equipment, including clothing, basins, and machinery, and state-of-the-art technology. Many providers of equipment are located within the country itself, in proximity of the salmon producers. This makes exporting more challenging considering the distance between the countries and the fact that industry is highly self-reliant. An exception to this is fish feed ingredients. While the production of fish feed takes place in Chile, the ingredients are sourced internationally. These ingredients include a variety of ingredients from plant, marine, and terrestrial animal sources. Some of the most well-known ingredients include fish oil, wheat, soy, rapeseed meal, sunflower meal, and peas (Skretting 2023).

The main market opportunities lie in state-of-the-art technology, and innovations for the salmon industry. In the following section, different solutions and needs are discussed. Some of these solutions are already in use or being researched. However, there is a need for improvement and further incorporation of these technologies, both for Chile as for other producing countries.

### **Fish health**

Disease management.: Solutions against diseases like sea lice, ISA virus and Salmonid Rickettsial Septicemia (SRS). There is a need to strengthen salmon resistance through vaccines and improved feeding while proceeding to reduce antibiotics. Companies are also looking for methods to sustainably accelerate the rate at which salmon grow. Therefore, there are still plenty of opportunities to improve salmon feed, through new supplements, probiotics and omega-3s, for healthy growth and disease resistance. In Belgium, many companies could contribute enhancements or insights to the industry as biotechnology and vaccine development is one of the most leading sectors in Belgium. Lastly, LiDAR technology can help detect outbreaks of diseases, changes in water quality and provide information on fish populations and habitat quality.

### **Optimizing production and reducing the environmental impact**

There is a need to pursue technologies and innovations to reduce the environmental impact of salmon production. For instance, the ocean grounds are very polluted due to salmon production. Raw waste from salmon farming infiltrates open waters in significant quantities. As per The Norwegian Pollution Control Authority (SFT), a medium-sized fish farm with open net pens with a production of 3000 tons, generates sewage equivalent to that of a city housing 50,000 people.

The global salmon industry needs solutions for this urgently. Data processing and artificial intelligence are already in use to monitor and optimize production. However, these technologies are still very new. As a result, there are still numerous opportunities to enhance AI solutions that lead to higher energy- efficiency and streamlined production. For instance, technology to detect the amount of available food in salmon sea cages can enhance productivity as it optimizes the timing of feeding and reduces waste. This data should be recorded and analyzed carefully.



As previously mentioned, LiDAR drones, can provide accurate data on fish populations, habitat quality and farm structures. It can also be used for mapping to obtain geographical data, study water flow and determine if a location is suitable for a concession.

Another issue that has to be addressed urgently are the salmon escapes. In theory, the ocean net pens should be strong enough to retain the salmon for months to come. However, on too many occasions, escapes do occur. This has impacts on local fish species as salmon are predatory fish. In addition, these escapes can impact wild salmon populations in areas where salmon are indigenous. To elaborate, contact between wild salmon and farmed salmon can lead to the transmission of diseases or breeding. This reduces the chances of survival of wild salmon as they mature earlier and are less prepared for a life in their natural habitat. This is not a problematic for Chile as salmon is native to the northern hemisphere, but still relevant to mention as resolutions for this are needed imperatively.

**Water reuse and innovations in pisciculture**

Currently, water reuse in the smolt phase is about 35%, whereas water reuse in freshwater piscicultures is about 17 % (Intesal 2023). As a result, there lie many opportunities in creating technologies and strategies for water reuse in smolt and freshwater fish farms to improve water management.

A Swedish company is also experimenting with fully land-based salmon production. This practice completely excludes production in the ocean and has the advantage that the environment can be fully controlled by humans. Hereby, the risk of sea lice and other diseases becomes insignificant. Diversifying production into land-based production would imply heavy investments and the need for new infrastructure related to water flow and mimicking the ocean. Though this technique is currently not in use in Chile, it could offer be an interesting option for companies, considering the threats of stricter policies in Chile regarding concessions in protected areas and risks related to climate change.

**Emissions reduction and electrification**

Most ships are still high emitters of carbon dioxide. The adoption of electric motors on ships would reduce emissions drastically. Furthermore, most salmon farms have pontoons, that act as a place to shelter for the workers and for storing salmon feed. These pontoons are often powered by gasoline. The implementation of batteries would reduce carbon footprint. In addition, these pontoons should change from gasoline as an energy source to gas or even electricity and green hydrogen. Lastly, advances in logistics vehicles, such as electric trucks, can improve efficiency and reduce environmental impact and emissions.

**Salmon Processing**

Robotization and advanced processing techniques can optimize the salmon processing stage and further reduce labor costs. There is a need for better preservation techniques to increase shelf life of fresh salmon to assure that salmon remains fresh throughout the journey to reach the final customer. As in previous examples, AI can be used to optimize processing techniques.



## 7. RISK ANALYSIS (SWOT)

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The key findings of this market research can be summarized in a SWOT analysis. The industry has many strengths and opportunities but counts with important weaknesses related to sustainability and threats related to government regulations. The impact of climate change on the production must not be underestimated as it can cause bad harvests, but Chile's main competitors face this threat too.

Strengths	Opportunities
<p>Counter seasonality with Northern Hemisphere</p> <p>Strong competitive position worldwide</p> <p>High quality salmon</p> <p>Competitive prices</p> <p>Mature industry</p>	<p>Incentives to further reduce antibiotics</p> <p>Modernized trade agreement with Europe</p> <p>Need for technologies to optimize production, limit impacts on environment and increase health of salmon through better salmon feed and vaccines</p>
Weaknesses	Threats
<p>Although to limited extent, antibiotics are still used in salmon farms</p> <p>Pollution of salmon in ocean grounds is a concern, as well as the conflicts with local communities</p>	<p>New regulations by the Chilean government</p> <p>Bad harvests due to disease outbreaks, warmer oceans...</p>

Table 3. SWOT Analysis

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## 8. Answer to research questions

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In this research, the state of the Chilean salmon market was studied to give valuable insights to Belgian companies interested in diversifying into this market. The main questions for this investigation were the following:

- What are the current growth prospects and market trends withing the Chilean Salmon industry?
- How do these trends impact Belgian companies willing to enter this market
- What trade agreements and tariffs are present between the European Union and Chile?
- What risks and opportunities should Belgian companies consider?

Chile has a very robust salmon industry which has experienced an acceptable growth in recent years. Macro-level demographic trends, such as the worldwide population growth, will have positive effects on the aquaculture industry as the need for fish supply will increase substantially, and commercial fishing has reached its limits. Chile can benefit from the higher fish demand by increasing supply of salmon. However, recent events have shown that these growth projects are at risk. The government, leaded by the ministry of the environment wants to put limits on the expansion of salmon producers into unexploited regions that have the statute of protected area. Thus, a renewed legislation of the government could lower future growth of Chile and cause a shrinkage of the industry.

To put the local political aside, it should be said that the market conditions of Chile have become increasingly favorable for importers. The new trade agreement with the European Union has made salmon exports to Belgium more attractive, as tariffs will reach reasonable levels once the agreement is ratified. Furthermore, the efforts of Chilean companies and the government to make the industry more sustainable will further close the gap with Norway. This, together with the excellent competitive position of Chile globally will help maintain Chile's strong position.

In summary, the research has shown that importing salmon from Chile is more alluring than in the past. The sale of equipment to Chile is more complex, considering the consolidation of the companies and the supply that comes primary from local companies. However, disrupting technologies that improve production processes and bolster sustainable efforts have high potential in the Chilean market. These technologies concern making the industry more circular through water recycling, renewable energy sources, reduction of the impact on ocean floors, use less antibiotics, and improve salmon feed and salmon health.



## 9. RELEVANT INSTITUTIONS

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### 9.1 CHILE

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#### Consejo del Salmón

Consejo del salmón is Guild association formed by five well-established salmon-producing companies in salmon farming: AquaChile, Cermaq, Mowi, and Salmones Aysén and Australis Seafoods. <https://www.consejodelsalmon.cl/>

#### Salmon Chile

Salmon Chile is an organization that has been dedicated to uniting major producers and suppliers of salmonids, addressing challenges in health, environment, regulations, social aspects, and the economy within the sector, emphasizing sustainability and community engagement as core driving forces.

Addresses:

Region of La Araucanía:

Address: O'Higgins 125, Office 204, Temuco

Phone: (56 9) 4285 8580

Email: [araucania@salmonchile.cl](mailto:araucania@salmonchile.cl)

Region of Los Lagos:

Address: Independencia nº 50, Office 10, Puerto Varas

Phone: (56 65) 2256 666

Email: [puertomontt@salmonchile.cl](mailto:puertomontt@salmonchile.cl)

Region of Aysén:

Address: Av. Bernardo O'Higgins 605, Office 301, Puerto Aysén

Phone: (56 67) 2336 157

Email: [aysen@salmonchile.cl](mailto:aysen@salmonchile.cl)

Chiloé:

Phone: (56 9) 3370 4649

Email: [chiloe@salmonchile.cl](mailto:chiloe@salmonchile.cl)

<https://www.salmonchile.cl/>

Intesal

Intesal is short for Instituto Tecnico del Salmón, they are part of Salmón Chile and are enrolled in providing technical and scientific information in Chilean salmon farming, facilitating the integration of R&D and innovation, and transferring technologies for the responsible development of the industry. Address: Independencia n° 50, Oficina 8, Puerto Varas T: +56 65 2 256 666 <https://www.intesal.cl/>

Sernapesca

Sernapesca is the National Fisheries and Aquaculture Service Address: Victoria 2832 Valparaíso, V Región Chile T: +56 (32) 281 9176 <http://www.sernapesca.cl>

Servicio de evaluación ambiental

Servicio de Evaluación Ambiental (SEA) This agency's goal is safeguarding the environment responsibly and efficiently, while always protecting the citizens and natural resources. Address: Miraflores 222, piso 7, 19 y 20, Santiago T: (56-2) 616 4000 <http://www.sea.gob.cl/>

InvestChile

InvestChile is a government organisation that represents Chile to foreign investors. It aims to position Chile as an attractive destination for foreign investment. Address: Av Libertador Bernardo O'Higgins N° 1449, Piso 10, Santiago, Región Metropolitana T: (56-2) 698 4254 <https://investchile.gob.cl/>

CORFO

CORFO is the local Chilean investment agency, supporting the economic development of Chile. It does this through an active credit policy and capital injections. They also have programmes such as Startup Chile, where you can win start-up capital. CORFO is mainly focused on stimulating innovation and entrepreneurship, so (foreign) projects that meet these requirements can count on support from this institution. Address: Valuta 921, Santiago T: (56-2) 631 8820 <https://www.corfo.cl/>.

Start-Up Chile

Start-Up Chile is part of CORFO. It offers financial support as well as training, a network, and assistance in starting a business in Chile. Two of the companies consulted in this study, Turbulent and Solcor, used Start-Up Chile and were very satisfied with it <https://startupchile.org/>.





Comisión Nacional de Investigación Científica y Tecnológica (CONICYT)

CONICYT is dedicated to the promotion of science and technology, including renewable energy. It has several programmes whereby (financial) support is given to innovative projects.

Address: Moneda 1375, Santiago <http://www.conicyt.cl/>

Ministry of Finance Minister

Mario Marcel

Address: Teatinos 120, Santiago, Región Metropolitana <https://www.mercadopublico.cl/Home>

Agencia Chilena de Cooperación Internacional para el Desarrollo (AGCID)

The Chilean Agency for International Cooperation and Development (AGCID)

Address: Teatinos 180, Santiago, Región Metropolitana T: +56(2) 2380 0801

## 9.2 BELGIUM – CHILE

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### **Embassy of Belgium in Chile**

Embajado de Bélgica - Edificio Forum Avenida Providencia 2653, Oficina 1103 Providencia - Santiago, Chile T: +56 2 2232 1070 and +56 2 2232 1071 | F: +56 2 2232 1073 E: [santiago@diplobel.fed.be](mailto:santiago@diplobel.fed.be)

### **Embassy of Chile in Belgium**

Aduatokersstraat 106, B - 1040 BRUSSELS T: +32 2 743 36 60 | F: +32 2 736 49 94 E: [echilebelgica@minrel.gov.cl](mailto:echilebelgica@minrel.gov.cl)

### **Belgian-Luxembourg-Chilean Chamber of Commerce**

President : Laurent De Meester Rue Aduatokers 106 1040 Brussels T +32 2 743 36 60 E [contact@chileanchamber.be](mailto:contact@chileanchamber.be) [www.chileanchamber.be](http://www.chileanchamber.be)

### **BELGOLUX - Cámara Chileno-Belgium-Luxembourgesa de Comercio**

Chairman: Alain Kaczorowski Contact Person: Lieslotte de Ly Embajado de Bélgica - Edificio Forum Avenida Providencia 2653, Oficina 1103 Providencia - Santiago, Chile T +56 9 69197663 E [contacto@camarabelgolux.cl](mailto:contacto@camarabelgolux.cl) [www.camarabelgolux.cl](http://www.camarabelgolux.cl)

### **Flanders Investment & Trade Santiago Commissioner**

Piet Morisse Representación Económica de Flandes c/o Embajada de Bélgica Av. Providencia 2653 - Of. 1104 Santiago de Chile Contact person: Piet Morisse, Maria-Elena Duarte T: +56 2 2 334 35 65 E: [santiago@fitagency.com](mailto:santiago@fitagency.com)

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10. SEVERAL INTERESTING FAIRS

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The largest aquaculture trade fair in the southern hemisphere

AquaSur (Chile)

29-30 March 2024

<https://www.aqua-sur.cl/>

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Next edition: 16-17 September 2024

International Conference on Fisheries and Aquaculture (Chile)

ICFA 2023 seeks to foster collaboration and explore innovative solutions to enhance climate resilience of fisheries and aquaculture for sustainable livelihoods. It brings together experts, researchers, and stakeholders to exchange knowledge, explore innovative solutions, and ensure a prosperous future for aquaculture while protecting marine ecosystems.

<https://aquaconference.com/>

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The most important meeting of innovation in aquaculture in the southern hemisphere.

InnAqua Conference (Chile)

Last edition: 26 - 28 of September

<https://www.innaquaconference.cl/>

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A fair with mainly food producers including Salmon producers, but also government institutions like Sernapesca.

Espacio Food Service (Chile)

Last edition: 26 – 28 September 2023

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<https://www.espaciofoodservice.cl/>

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Next edition: August 26 -30

Aqua 2024 (Denmark)

a scientific conference, trade exhibition, industry forums, workshops, student events and receptions. The event will highlight the latest aquaculture research and innovation to underpin continued growth of this exciting food production sector.

<https://aquaeeas.org/>

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Next edition: June 24- 26 2024

World Aquaculture and Fisheries Conference (France)

The congress will be centred on the theme “Panoramic View of Innovations That Impact Life Below Water.

<https://www.worldaquacultureconference.com/>

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The global Seafood marketplace (Spain)

The 2024 conference program will feature more than 20 educational sessions, presented by top seafood industry experts. Attendees will take away informative, engaging and practical information covering the most important and timely issues relevant to today’s seafood business environment.

Next edition: 23-25 April 2024

<https://www.seafoodexpo.com/global/>



**11. APPENDICES**

Appendix 1

List of salmonid aquaculture concessions grouped by concessions in the regions, June 2023 (Subpesca 2023).

COMPANY	NUMBER OF CONCESSIONS
MOWI CHILE S.A. (Marine Harvest Chile)	161
EXPORTADORA LOS FIORDOS LTDA.	133
EMPRESAS AQUACHILE S.A.	85
CERMAQ CHILE S.A.	76
AUSTRALIS MAR S.A.	69
MULTI X S.A.	69
TRUSAL S.A.	45
CULTIVOS YADRAN S.A.	44
SALMONES CAMANCHACA S.A.	44
SALMONES BLUMAR S.A.	42
PRODUCTOS DEL MAR VENTISQUEROS S.A.	37
INVERMAR S.A.	34

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ACUICOLA CORDILLERA LTDA.	10
ACUICOLA PUYUHUAPI S.A.	9
CALETA BAY MAR SPA	9
FRÍO SALMÓN SPA	8
SALMONES AYSEN S.A.	8
SALMONES BLUMAR MAGALLANES SPA.	8
SALMONES ISLAS DEL SUR LTDA.	8
MULTIEXPORT PATAGONIA S.A.	7
AQUAINNOVO SPA	6
FIORDO AZUL S.A.	6
GLACIARES DOS S.A.	6
DELIFISH FARMING SPA	5
PROCESADORA CAILIN SPA	4
SALMONES ALPEN LTDA.	4
ACUICOLA PUNTA VERGARA S.A.	3
AUSTRALIS AGUA DULCE S.A.	3

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GANADERA DEL MAR DECIMA REGION S.A.	3
YADRAN CISNES S.A.	3
INVERSIONES DE DESARROLLO INMOBILIARIO S.A.	2
PACIFIC SEAFOOD S.A.	2
PISCICULTURA PALQUI LTDA	2
PROCESADORA DE ALIMENTOS ASF SPA.	2
SEA SALMON LTDA.	2
BARRIA GUNCKEL, CARLOS MARCELO	1
CAMACHO SANTIBAÑEZ, GONZALO ALEJANDRO	1
CULTIVOS MARINOS LINGUAR SPA	1
INSTITUTO DE FOMENTO PESQUERO	1
PATAGONIA SALMON FARMING S.A.	1
PESQUERA YADRAN S.A.	1
PRIMAR S.A.	1
SALMONES FRIOSUR S.A.	1
SALMONES ICE VAL LTDA.	1
SEAMAG S.A.	1

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SERVICIOS MARITIMOS OXXEAN S.A.	1
SOC. INDUSTRIAL COMERC Y PESQUERA MALOMACUN LTDA.	1
SOCIEDAD COMERCIAL CANAL PEREZ LTDA	1
SOCIEDAD DE INVERSIONES EL MEMBRILLO LIMITADA	1
UNIVERSIDAD DE LOS LAGOS	1
ABARCA CASTELLI, OCTAVIO AGUSTINO	1



Appendix 2

List of Plants Authorized to Slaughter and/or Process Salmonids 2022 (Sernapesca 2022)



Listado de Plantas Autorizadas para Faenar y/o Procesar Salmónidos

09-09-2022

N°	Código	Planta	Zona	Empresas de Cultivo	Realiza Matanza	Tipo	Tipo Desinfección	Lugar de Descarga
1	8271	Pesquera Friosur S.A.	Coronel	Pesquera Friosur S.A.	No	Primaria	Cloración y Decoloración Secundaria; Dióxido de Cloro Terciaria	Mar Fuera ZPL
2	8323	Congelados Pacifico	Talcahuano	Congelados Pacifico	No	Secundaria	Cloración y Decoloración	ESSBÍO
3	8384	Salmones Camanchaca S.A.	Tomé	Camanchaca	No	Secundaria	Cloración y Decoloración / Ozono	ESSBÍO
4	8396	Blumar S.A	San Vicente - Talcahuano		No	Secundaria	Cloración y Decoloración	ESSBÍO
5	8130-8148	Camanchaca Pesca Sur	Talcahuano	Camanchaca Pesca Sur	No	Secundaria-Terciaria	Cloración y Decoloración	ESSBÍO
6	8163/8288	Congelados Blumar S.A	Talcahuano	Blumar S.A.	No	Secundaria	Dióxido de Cloro	ESSBÍO
7	10064	Pesquera del Mar Antártico	Puerto Montt	Mar antartico	No	Secundaria	Cloración y Decoloración	ESSAL
8	10067	Agroindustrial Santa Cruz	Puerto Montt	Agroindustrial Santa Cruz	Si	Primaria-Secundaria	Cloración y Decoloración	Mar Fuera ZPL
9	10156	Planta Fitz Roy	Calbuco	Mainstream Chile	No	Secundaria	Cloración y Decoloración	Mar Fuera ZPL
10	10160	Aguas Claras	Calbuco	Aguas Claras	Si	Primaria-Secundaria-Terciaria	Cloración y Decoloración	Mar Fuera ZPL
11	10231	Invertec	Castro	Invertec	No	Secundaria	Dióxido cloro	Rio La Chacra
12	10256	Salmones Cailín S.A.	Quellón	AquaChile	Si	Primaria-Secundaria	Cloración y Decoloración	Mar Fuera ZPL
13	10636	AquaChile	Puerto Montt	AquaChile	No	Secundaria	Cloración y Decoloración	ESSAL
14	10655	Salmones Aysén	Puerto Montt	Salmones Aysén	No	Secundaria	Cloración y Decoloración	ESSAL
15	10658	Ludrimar Sociedad Jimenez y Gutierrez	Puerto Montt	Pesquera Ludrimar Ltda	No	Secundaria	Ozono	Fosa de Decantación
16	10673	Los Fioridos	Quellón	Pesquera Los Fioridos	Si	Primaria-Secundaria	U.V. Asoc a ESSAL	ESSAL- Quellón
17	10678	Antarfood	Chonchi	Aguas Claras	Si	Primaria-Secundaria	Cloración y Decoloración	Mar Fuera ZPL
18	10681	Salmones Pacific Star	Quellón	Pesquera Pacific Star	Si	Primaria-Secundaria	Cloración y Decoloración	Mar Fuera ZPL
19	10692	Río Dulce	Quellón	Río Dulce	Si	Primaria	Dióxido de Cloro	Mar Fuera ZPL
20	10708/500032	Salmoproceso	Chonchi	Salmoproceso S.A.	Si	Primaria-Secundaria	Dióxido de Cloro	Mar Fuera ZPL
21	10718	Sea Flavors S.A	Puerto Montt	Sea Flavors S.A	No	Secundaria	Cloración y Decoloración	ESSAL
22	10722	Yadrán Quellón	Quellón	Yadrán	Si	Primaria-Secundaria	Cloración y Decoloración	Mar Fuera ZPL
23	10778	San José	Calbuco	Camanchaca	Si	Primaria	Cloración y Decoloración u Ozono	Mar Fuera ZPL

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## Listado de Plantas Autorizadas para Faenar y/o Procesar Salmónidos

09-09-2022

N°	Código	Planta	Zona	Empresas de Cultivo	Realiza Matanza	Tipo	Tipo Desinfección	Lugar de Descarga
24	10788	Surprocesos	Quellón	Surprocesos S.A.	Sí	Primaria	Cloración y Decloración / Ozono	Mar Fuera ZPL
25	10810	Alimentos Bahía Chincul	Puerto Montt	Productos del Mar Ventisqueros S.A.	Si	Primaria-Secundaria	Dióxido de Cloro	Mar Fuera ZPL
26	10695	Roxana	Puerto Montt	Roxana	No	Primaria/Secundaria/Terciaria	Dióxido de Cloro	Pozo infiltración
27	10735	Salmones Antártica	Chonchi	Salmones Antártica	Si	Primaria	Cloración y Decloración	Mar fuera ZPL
28	10748	Procesadora Hueñocoihue	Chonchi	AquaChile	No	Secundaria	Cloración y Decloración	Mar fuera ZPL
29	10751	Granja Marina Tornagaleones	Quellón	Granja Marina Tornagaleones	No	Secundaria	Dióxido de Cloro	ESSAL
30	10862	Caleta Bay	Puerto Montt	Caleta Bay	No	Secundaria	Cloración	ESSAL
31	10823	Salmones Multiexport	Puerto Montt	Salmones Multiexport	No	Primaria-Secundaria	Cloración y Decloración	ESSAL
32	10863	Caicaen	Calbuco	Marine Harvest Chile	Sí	Primaria	Ozono / Cloración y Decloración	Mar Fuera ZPL
33	10884	Chamiza	Puerto Montt	Trusal	No	Secundaria	Cloración y Decloración	Río Chamiza
34	10933	Planta Trapen	Puerto Montt	Operada por ACME Chile SPA	No	Secundaria	Dioxido cloro	ESSAL
35	10954	Planta Abick	Dalcahue	Abick S.A.	Si	Primaria	Cloración	Mar Fuera ZPL
36	500052	Abick	Puerto Montt	Abick	Si	Primaria	Cloración y Decloración	Mar Fuera ZPL
37	500095	Compu	Quellón	Invermar	Si	Primaria	Cloración y Decloración	Sanitaria
38	500142	Marine Harvest Chile S.A	Puerto Chacabuco	Marine Harvest Chile S.A	Si	Primaria	Cloración y Decloración	ZPL
39	11012	Marine Harvest Chile S.A.	Pto. Chacabuco	Marine Harvest Chile S.A.	No	Secundaria	Cloración y Decloración	ZPL
40	12030	Planta Pesquera Torres del Paine S.A	Punta Arenas	Cermaq Chile - Australis Mar	No	Secundaria	Cloración y decloración	Aguas Magallanes S.A.
41	12054	Pesquera Edén Ltda.	Puerto Natales	Acuimag	No	Secundaria	Ozono -Cloración y Decloración	Aguas Magallanes S.A.
42	12079	Nova Austral S.A.	Porvenir	Nova Austral	No	Secundaria	Cloración y Decloración	Aguas Magallanes S.A.
43	12084	Bakkovar Chile S.A	Porvenir		No	Secundaria	Cloración y Decloración	Aguas Magallanes S.A.
44	12109	ELDAP	Porvenir	Australis Mar	No	Secundaria	Cloración y Decloración	Aguas Magallanes S.A.
45	12103	Pesquera Alvarez & Alvarez Ltda	Puerto Natales	Australis Mar	No	Secundaria	Cloración y Decloración	Aguas Magallanes S.A.
46	12141	Chile Seafoods Comercial SpA	Punta Arenas	Australis Mar	No	Secundaria	Cloración y Decloración	Aguas Magallanes S.A.
47	N/A	Frigorífico Simunovic S.A.	Punta Arenas	Presta servicios a terceros	No	Sólo desinfección de riles (no proceso salmónidos)	Dióxido de cloro	Emisario submarino descargando fuera de la ZPL
48	10664	Quemchi	Quemchi	Cermaq Chile S.A.	Si	Primaria - Secundaria	Cloración y Decloración	Mar Fuera ZPL
49	10086	Ilque	Puerto Montt	Abick	Si	Primaria	Cloración	Mar fuera ZPL

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## 12. SOURCES

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