

**State of Information on Social Impacts of Salmon Farming.**

**A report by the Technical Working Group of the Salmon  
Aquaculture Dialogue.**

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**The goal of the Dialogue is to credibly develop and support the implementation of measurable, performance-based standards that minimize or eliminate the key negative environmental and social impacts of salmon farming, while permitting the industry to remain economically viable.**

**The Salmon Aquaculture Dialogue focuses their research and standard development on seven key areas of impact of salmon production including: social; feed; disease; salmon escapes; chemical inputs; benthic impacts and siting; and nutrient loading and carrying capacity.**

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**More information on the Salmon Aquaculture Dialogue is available at:  
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## Forward

The aim of this report is to provide an overview of the current state of information on the key social issues related to the salmon farming industry, for the purpose of developing recommendations for a framework of criteria for assessing the industry's social impact.

The report examines the industry in the three main countries in which salmon is farmed and produced: Chile, Canada and Norway. In each country, the industry is described in context: geographic location and historical development, the structure of the production process, supply chains, and demographics of the employment. Each case then examines the main social issues related to the industry in each country, structured around two broad thematic areas: 1) the labor issues affecting workers employed in the salmon industry; and 2) the impacts of the industry on the lives of the surrounding communities and those in which the salmon industry is immersed.

Because each of these countries presents its own specificities regarding the development of the industry, as well as the social, economic and cultural context in which it takes place, establishing generalizations regarding the social impacts of the industry as a whole presents a challenge. Chile, Canada and Norway present different levels of economic development, different trajectories and dynamics in the development of the salmon industry, and diverse legislative frameworks and industry practices. Availability, quantity and quality of information and data regarding social issues also vary between the three. Nevertheless, despite these differences, common issues do emerge in terms of challenges to labor compliance and community engagement which can be related to the industry in general.

This report, by examining broad trends and country specific dynamics of labor and community-related issues in the three largest salmon-producing countries will hopefully provide useful information to the Salmon Aquaculture Dialogue (SAD) efforts in its process of developing criteria, indicators and standards by which to assess the social impact of the industry as a whole.

# Chapter 1: Introduction

## Assessing the Social Impact of Aquaculture: Elements from Corporate Social Responsibility

There is an increased awareness worldwide that companies – in addition to the positive role that they can play in terms of economic development and the creation of employment – can also have a significant impact on human rights, labor rights, environmental issues and community relations. Many companies now recognize the need to analyze their impact in these areas. Indeed, the movement calling for companies to assume policies and practices that are “socially responsible” has gained such currency in recent decades that it is often seen as an integral part of the way of doing business.

The concept of “social responsibility” as it relates to the performance and impacts of the activities of companies – particularly multinational corporations - emerged in the 1970s, and grew in the 80s and 90s, mainly in response to the widespread effects and challenges of economic globalization. Among these are:

- An increasingly internationalization of production. One company may have dozens, hundreds, or even thousands, of suppliers and /or subcontractors spread across several countries forming large and complex global supply chains that span continents, nations, economies, legislations and cultures that can vary widely
- The improvement and speeding up of communications, allowing the public to learn about conditions of production of the items it consumes, thus opening companies to more scrutiny
- A global trend (particularly after the creation of the World Trade Organization) towards deregulation and privatization of many government functions, thereby increasing the power and resources of corporations, and a weakening of enforcement of laws and legislation

In this increasingly globalized and interdependent world the responsibility for issues such as development, health, human rights, labor rights, and the environment is now assigned to many stakeholders, rather than just to national governments as it had been in the past. Consumers, buyers, investors, and donors are increasingly expressing demands and expectations on businesses in relation to social responsibility. Non-state actors, such as NGOs and other civil society organizations have also taken up the issue of globalization and its possible adverse consequences. Some of these NGO’s have formed social and environmental coalitions to raise awareness about the effects of the actions on corporations. Trade unions have taken their struggles from the shop floor to the international arena, through cross-border organizing, campaigns and framework agreements with multinationals. Business, in short, is now seen as having key responsibility for contributing to overall sustainable development.

One of the ways in which companies – particularly multinationals with large international supply chains - have responded to the pressure of consumers and other stakeholders to uphold responsibility is through the development of corporate codes of conduct and standards for suppliers and monitoring systems for verifying compliance. The last two decades have seen a proliferation of corporate codes of conduct, as well as many industry-driven and multi stakeholder standards, and a variety of monitoring mechanisms aimed at verifying compliance with these codes and standards. In contrast to national and international labor legislation, norms, and regulations these codes of conduct and standards are voluntary in nature. Some critics have argued that these initiatives could be taking the place of mandatory government enforcement and unions’ role in vigilance of labor rights. Others maintain that voluntary codes and monitoring do not aim to replace the function of government or trade unions, but rather assume a necessary role in the reality of the complex globalized economic structure, together with decreased capacity on the part of developing country governments to enforce the law.

Independent of where one falls on the spectrum of opinions, accountability for the social impacts and consequences of its activities has now become a factor in the evaluation of a company’s overall performance, image and perception, and therefore for its overall competitiveness.

### **The core issues of Corporate Social Responsibility**

Initial conceptions of corporate social responsibility focused on the private sector’s “giving” to the community in which they operated, hence the identification of early CSR initiatives with philanthropic and charitable activities. Over time, other issues were incorporated into the CSR agenda, such as those related to environmental sustainability, human rights and labor rights, anti-corruption, consumer protection, and engagement with community stakeholders in more significant ways. Currently, the “core subjects” of corporate social responsibility<sup>1</sup>, areas on which companies are most generally called on to demonstrate compliance with standards and report, include the following:

- organizational governance
- human rights
- labor practices and working conditions
- environment
- fair operating practices
- consumer issues
- community impact, involvement and development

In terms of social impact for consideration by the Aquaculture Dialogues (and excluding “environment”, as it is covered extensively in other parts of the standard) two of these core subjects could be considered the most relevant in assessing the impact of salmon aquaculture:

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<sup>1</sup> These are based on the draft ISO 26000

**labor practices and community impact, involvement and development**<sup>2</sup>. Outside of environmental impact, these are the two areas in which the social impacts of productive economic activities and business are most commonly assessed. National or international regulatory frameworks, corporate codes of conduct, multi stakeholder codes of conducts and industry standards that address social impacts, include provisions for safeguarding both the labor conditions of the workers involved in the activity and the well-being of the communities surrounding or within which the activities are taking place.

Of these two broad areas of consideration of social impact, labor is the one for which international standards and criteria are more clearly defined and developed. Most labor provisions in regulatory frameworks and voluntary codes or standards include the elements of what the International Labor Organization (ILO) calls the **Fundamental Principles and Rights at Work**, or conditions of Decent Work. These in turn include elements that refer to the prohibition of child labor, the prohibition of forced or bonded labor, anti-discrimination, freedom of association and collective bargaining, fair remuneration, appropriate working hours, safe and healthy working conditions and fair disciplinary practices.<sup>3</sup> This report includes the available information on these issues in each of the three main salmon producing countries and extrapolates some general trends about the labor compliance and its challenges in the industry as a whole.

The other broad area considered when assessing social impact is community relations. Unlike labor, this area is less well defined in terms of elements or aspects to be taken into account. Additionally, much less actual criteria, standards and measurable indicators of impact have been established in this area. The country chapters in this report describe the main issues that emerge as a result of the establishment, development, and on-going salmon-producing activities, and their interaction with the surrounding communities. In addition to the benefits of job creation and economic opportunities in regions that are often marginal and under-industrialized, the interaction between salmon producing activities and communities has opened up areas of conflict. The potential for such conflict exists in several contexts. Some of these areas of potential and actual conflict have been related to:

- access to natural resources (land and water)
- health and safety effects of the salmon-producing activities on the surrounding community
- presence of aboriginal and other communities with claims to land and water resources
- displacement of communities and their activities (including subsistence agriculture and/or traditional fishing activities) by the salmon producing activities
- lack of sufficient job opportunities for local residents

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<sup>2</sup> Other aquaculture dialogues, namely Tilapia Aquaculture Dialogue (TAD) and the Pangasius Aquaculture Dialogue (PAD), also consider these two broad areas in the social sections of their standards.

<sup>3</sup> The SA8000 Standard, considered to be one of the most complete and rigorous on labor, includes these eight elements, plus a requirement for management systems for sustainable compliance.

- absence of communication and engagement mechanisms for ongoing consultation with surrounding communities

### **Labor and Community Issues in Salmon Production**

Salmon aquaculture is generally an activity that can be characterized by a globalized supply chain and therefore can also be assessed within the two areas of framework of CSR described above. The effects of the salmon industry on workers and on surrounding communities in the three main countries considered in this report are related not only to the nature of the salmon industry itself, but also to a constellation of broader contextual factors. The production process itself, in its various stages, entails certain conditions of work and risks (particularly related to health and safety of workers). But both the labor and community issues are largely the result of the intersection between salmon farming and the broader social, political, economic and cultural (including legislative) factors in which it is immersed.

### **Main Labor Issues in the Salmon Industry**

Several of the labor problems that emerge in the salmon industry may be associated with the fact that production has developed in geographically marginal areas. Although Chile, Canada and Norway have all ratified the main ILO conventions guaranteeing fundamental labor rights, and have strong provisions in their national labor legislations, weak enforcement in marginal areas can often lead to non-compliance. When the industry is developed as an enclave in areas where there are very few employment alternatives, the bargaining power of employees to seek higher wages and improved working conditions can be undermined.

An industry that depends on exports to the international market also can be vulnerable to risks for labor rights: it adds more factors in making it more susceptible to boom and bust cycles. Together with other vulnerabilities such as the impact of Infectious Salmon Anemia (ISA), these can be contributing factors that undermine job security. While individual companies cannot assume full responsibility for job security, this fluctuation gives rise to practices such as irregular contracting, arbitrary termination, termination without legal benefits, suppression of the right to organize, as well as other unfair practices. The seasonal nature of activities, the dependence on climate, and a dependence on a wide range of suppliers are all factors that could lead to labor risks such as: excessive working hours, compulsory overtime, and overtime not paid at the premium stipulated by law.

Taking into account the areas related to labor as defined by ILO principles, below is a synopsis of the main issues associated to salmon production<sup>4</sup>.

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<sup>4</sup> The Chile and the Canada studies include farms and processing facilities in their scope. Given that most salmon production consists of vertically integrated operations, and that farm and processing plants exist in close proximity to form a continuous process, the SAD social standards could consider a scope that includes the two aspects: farm and processing facilities

- 1) **Child labor:** This does not appear to constitute a problem in the industry, according to the three case studies. The percentage of “young” workers (between the ages of 15 and 18) does not appear to be significant either, so problems related to the protection of young workers do not constitute a risk.
- 2) **Forced labor:** there is no mention of this aspect constituting a problem in the sector. However, it will be important to ascertain the mobility of and social protections available for certain vulnerable groups, such as the large contingents of foreigners working in the industry in Norway.<sup>5</sup>
- 3) **Discrimination:** There is a general gender imbalance in favor of male employment in the farming activities. In the processing plants, there is greater gender balance. This is the case reflected in both the Chile and the Canada studies. The Chile study reports a pronounced gender segmentation of jobs, as well as a persistent salary gap between those jobs that are considered “male” and “female”. Some age discrimination (preference for hiring younger people may be present in Chile. Also there may be problems with discriminatory hiring against people with union backgrounds. In Norway, the sector employs a significant number of workers from Eastern Europe. These workers are usually employed in low-skill jobs, and are remunerated at rates that are significantly lower than their Norwegian counterparts. This may constitute an area to investigate possible discriminatory practices in terms that may violate the principle of equal pay for equal work.
- 4) **Remuneration:** While sub-minimum wages do not appear to be problem in the industry in the countries included on the study (all workers receive wages that are above the legal minimum and industry average), the forms of payment typical of the industry (a combination of hourly wages plus piece rate, or a base salary plus production bonuses) could lead to problems. It is important to make sure that the legal minimum wage can always be attained within regular working hours, and at a piece rate that is reasonable. In other words, production bonuses and piece rate cannot be utilized so that the workers depend on these to reach minimum wage. In Norway, wages are set through collective bargaining. But in the case of foreign workers, wages are significantly lower.
- 5) **Working hours:** This area does present problems. In fact, as the Chile study points out, after health and safety, this area constitutes the most problematic in terms of compliance with legal standards. Among the main infractions in this area are: exceeding the maximum of two hours of overtime a day; failure to give two Sundays off per month; compulsory overtime. In Canada, on-site workers are permitted to “bank” overtime hours and then take equivalent time off. While this practice can often lead to the loss of premiums paid for overtime, in this case this loss does not appear to occur.

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<sup>5</sup> Retention of passports or other identity papers can be one of the mechanisms by which companies can force workers to stay on the job.

- 6) **Health and Safety:** All three country studies signal this area as the most problematic, and where the highest risk for compliance with fundamental rights at work lies. Among the most prevalent occupational health and safety problems in the sector are lumbago and tendinitis, muscle cramping and inflammation. One of the most dangerous aspects of salmon production is diving in the cages. The Chilean study points out that divers can sometimes work under inadequate conditions with a high potential for accidents, including injury and death. The Norway study also mentions fatalities among divers. Significant causes of this are inadequate emergency plans and the absence of a proper medical network in the case of an emergency. In general, problems in the area of worker health and safety constitute the most frequent violations in the sector, among these the failure to provide personal protective equipment (PPE) free of charge; absence of adequate washroom facilities, absence of adequate drinking water, absence of joint health and safety committees, inadequate risk assessment and failure to inform workers of occupational risks effectively.
- 7) **Freedom of Association and Collective Bargaining:** This area presents some problems, specifically reflected in the Canada and Chile studies. In Chile, fragmentation of labor unions makes the negotiation of collective bargaining agreements difficult. The Chile study reports a significant growth in anti-union practices, related to transgressions of the right to organize and bargain collectively. The Canada study also reports anti union activity, such as threats of closures or dismissals.
- 8) **Disciplinary Practices:** There is not much information in the studies on disciplinary practices, but this is an area that can present problems for compliance with labor rights, particularly when demotion and termination policies are not clear and transparent.
- 9) **Management Systems issues:** The Canada and Chile studies note the importance of a large number of suppliers (between 500 and 1200 in Chile) in the salmon industry, including suppliers of feed, equipment (net, cage, mooring systems); vaccines, processing equipment, and others. Salmon operations with solid systems to evaluate and control their suppliers would avoid and minimize risks to labor rights. Some of the contracted work involves the highest risks in terms of health and safety (e.g, divers). More in Chile than in Canada, contracted workers could be an area of greater risk of labor rights violations.
- 10) **Conflict resolution:** The studies do not specify whether there are effective mechanisms for workers to file grievances, but this is an important issue to consider when assessing labor practices, worker communication with management, and good industrial relations.

### **Main Community Impact Issues in the Salmon Industry**

The evidence from the Chilean and Canadian cases, in contrast to that from the Norwegian case, suggests that the impact of salmon farming and processing on the community in which it is immersed can be more conflictive when the industry develops in an enclave context. In the Norwegian case, the development of the industry is closely tied with government-directed local

development of coastal communities; and in this context the connection to government programs ameliorates some of the conflicts that have emerged in the other two cases.

In general, the kinds of conflicts that emerge between the industry and the surrounding community are

- Conflicts in competing for local resources (water, land)
- Health consequences of industrial waste and salmon escapes
- Segregation and isolation from the community
- Displacement of local communities – including aboriginal communities - as a consequence of the presence and activities of salmon production
- Dependency on a single employer; dependency on a foreign employer; the modification of local patterns of consumption

The Chile study mentions the decline of small-scale agriculture is correlated with the increase in salmon production. It cites a study that refers to a “crisis” in local agriculture (dairy, meat, forestry and commodity crops, such as wheat, potatoes, oats and sugar beet, mainly for the domestic market), which has become less profitable with the establishment of salmon farming. Although this is not mentioned in the study, there are most likely implications for food security as a consequence of that shift. The Norwegian study, in turn, notes some conflict with traditional fishing communities.

The Canada study cites surveys in which the perception of the salmon industry on the part of local communities is consistently negative in all aspects except job creation. There are NGOs that have been quite vocal in expressing their opposition to the industry. Some aboriginal communities have also expressed opposition to the industry. Overall, more information is needed on the extent to which the industry has developed programs – or plans to develop them – to engage communities (including aboriginal communities) in a meaningful dialogue. Such plans would include ongoing mechanisms for communications and consultations, as well as procedures for receiving, addressing and resolving complaints from stakeholders

## CHAPTER 2: Country Overview- Chile

### INTRODUCTION

While this diagnostic report about the salmon farming industry was being prepared, the production of Atlantic salmon (a species that accounts for more than 50% of total exported net tons and contributes about 60% of returns in thousands of US\$ FOB)<sup>6</sup> was undergoing the impacts of Infectious Salmon Anemia (ISA). This disease is caused by a virus and results in major salmon mortality during grow-out stages. This new outbreak, which began in June-July 2007, significantly impacted many Chilean salmon farming operations<sup>7</sup> and boosted unemployment in the country.

According to media sources, SalmonChile estimated that more than 20,000 jobs had been lost in the Los Lagos Region alone as of July 2009<sup>8</sup>. This was reflected in the region's unemployment rate; the data provided by the Chilean Statistics Bureau (INE for its initials in Spanish) show an increase of three percentage points between August-October 2008 and August-October 2009, from 4.5% to 7.5%<sup>9</sup>. The unemployment rate in the Aysén Region also increased by 1.2 percentage points over the same period, from 3.7% to 4.9% (INE, 2009).

It should be noted that unemployment had an impact both on direct and indirect employment, since it is estimated that hundreds of small and medium sized enterprises (SMEs) supply this industry.

If all the measures put forth by the authorities to reorganize the industry are implemented and all required investments made<sup>10</sup>, "the situation is expected to return to normal in at least in two to three years"<sup>11</sup>. However, the potential impact of the global financial crisis on the country and the industry must also be taken into account.

This is an ongoing process of change and adjustment that has not yielded all its production and labor-related outcomes. The background information provided in this report thus refers mostly to the pre-crisis context and, to a lesser extent, to its unfolding. Different statistical, institutional,

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<sup>6</sup> In 2008, these percentages correspond to 227,000 net tons and US\$1.456 billion FOB (SalmonChile, 2009).

<sup>7</sup> The Indicator of Regional Economic Activity (INACER) for Los Lagos, prepared by INE, shrank by 19.4% as of September 2009.

<sup>8</sup> Aqua. News. 01.07.2009. Prior to that (between January and April 2007), 14 farms had been closed due to a tsunami in Aysén. This also resulted in unemployment, although at a lesser extent.

<sup>9</sup> Provisional figures. The national rate, however, was still higher; it grew from 7.5% to 9.7% in the same period.

<sup>10</sup> The Government of Chile committed credits for the industry for US\$450 million so as to promote the required improvements in health standards (Ecoceanos News. 27.11.07).

<sup>11</sup> Aqua. News. 04.11.2008. In the opinion of Felipe Sandoval, who chairs the Salmon Round Table. Capital magazine, in a story written by journalist Lorena Rubio.

media, in-house and third-party sources were reviewed for this report, in addition to specific consultations with qualified experts as needed.

The Los Lagos Region accounts for the largest share of salmon production in Chile and it has also been the subject of most studies<sup>12</sup>. For this reason, more information is available on this region, as is reflected in the report.

## **The Salmon Farming Industry in Chile: Economic and Productive Background**

### **Relevance of the Industry to the Domestic Economy**

The salmon and trout farming industry was long considered to be one of the most dynamic industries in Chile—owing to its great economic potential. The Chilean salmon farming sector (pre-ISA) aimed to double its production by 2015. Over the past decade, the industry’s average annual growth was a remarkable 22% (Infante, 2007), a significant contribution to the national economic activities. In 1998, salmon-related exports reached US\$714 million FOB<sup>13</sup>, while in 2008 the figure almost tripled to US\$2.392 billion FOB<sup>14</sup>. Accumulated salmon and trout exports during the 1998-2008 period exceeded US\$15.5 billion.

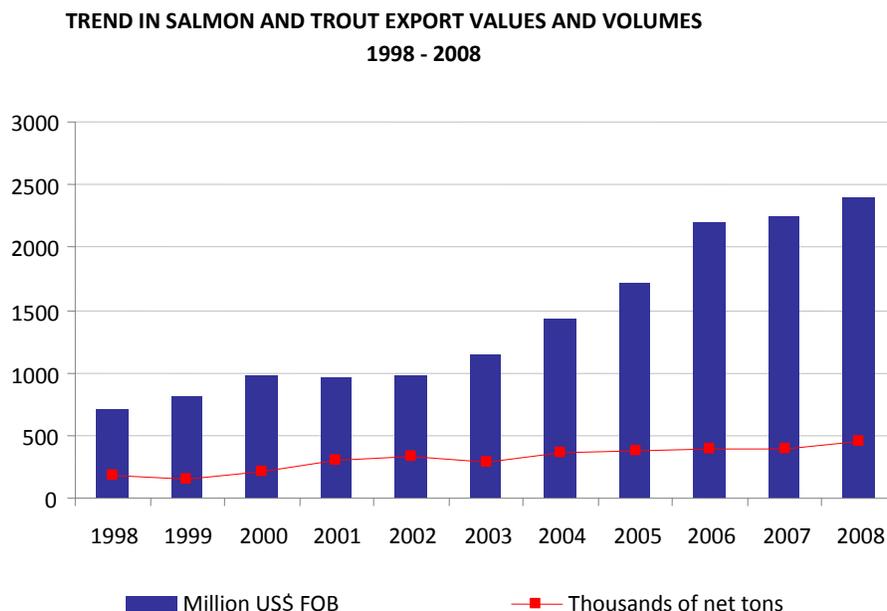
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<sup>12</sup> Compared with Aysén, for instance.

<sup>13</sup> Approximately 182,000 net tons (SalmonChile, 2009).

<sup>14</sup> Approximately 445,000 net tons. However, a downturn began in 2006, when export values showed the greatest percentage of growth (28%) as compared to 2005. Growth in the value of shipments in 2007 only reached 2% compared to 2006, and 7% in 2008 compared to 2007 (SalmonChile, 2009).

Chart 2.1



Source: SalmonChile Statistics, 2009

In 2006, salmon and trout exports accounted for 56% of fishing exports (SalmonChile, 2007). In terms of its direct contribution to national income, the same source estimates that the industry's gross aggregate value –exports less feed costs– is around US\$1.581 billion, accounting for a little more than one point of the Gross Domestic Product (GDP).

In spite of the current crisis, salmon farming is the country's fourth largest export industry. Chile is the world's second largest producer of farmed salmon - surpassed only by Norway. And, Chile is the largest producer of trout (Infante, 2007). The industry has become a major starting point for domestic economic diversification and a key foundation of the public-private strategy aimed at transforming Chile into a food-producing power.

In relative terms, the salmon aquaculture industry has outperformed other Chilean export industries that have played a leading role in the country's performance as an exporter during the past decade, such as agriculture, non-copper mining and pulp production. Salmon export growth exceeds that of non-copper and forest exports by 57% and 73%, respectively (SalmonChile, 2007).

#### **Production Chain and Vertical Integration of Salmon Farming**

The production chain of salmon farming consists of the following three main stages:

**Hatcheries:** This technology-intensive stage is the productive unit where salmonids in grow-out or smolt phase are obtained. It takes place in natural freshwater sources or tanks with controlled environments. This is where artificial breeding of fish is carried out to obtain eggs, which must be

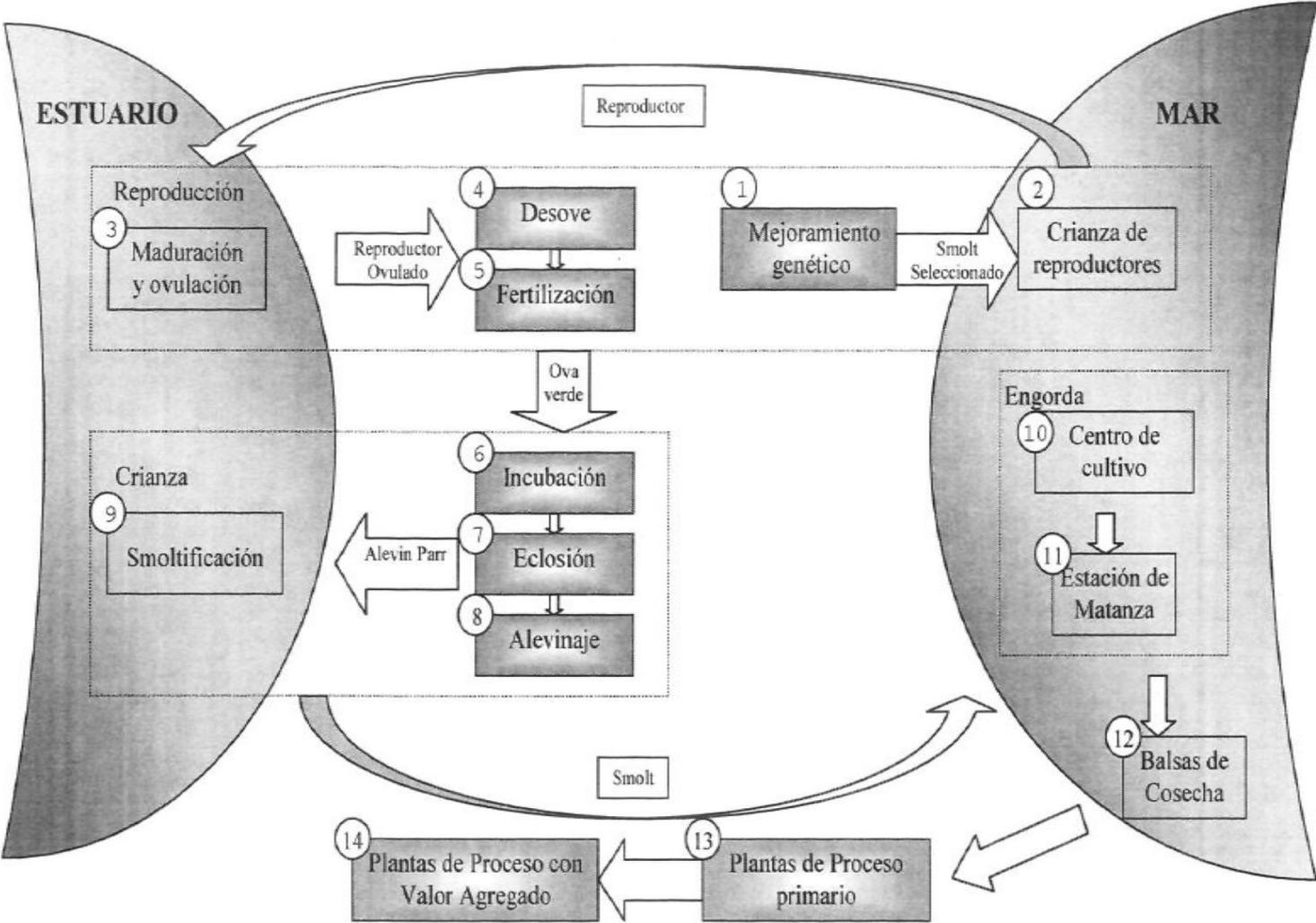
incubated in order to hatch. After this, alevins are obtained and kept in fresh water until smoltification.

**Grow-out and Harvest Farms:** This is the production hub and is located in marine sites, where net cages are installed to confine fish from the smolt to adult stages. The following activities take place on farms: feeding, health procedures, monitoring of fish growth, facility maintenance and harvest. Some companies have post-harvest stockyards and slaughtering facilities.

**Processing Plants:** This is where value is added to the product, including primary and secondary processing units. **Primary processing units** consist of industrial facilities where harvested fish are cleaned and processed, including gill and head removal and gutting. When fish are harvested live using well boats, slaughtering also takes place here. The product obtained from this unit is whole or headless fish (HG), which may be chilled or frozen. **Secondary process units** involve salmon cutting operations. This is a labor-intensive stage since most cutting is done manually. Products include fillets, pieces, steaks, and smoked salmon, among others.

The following chart shows the 14 productive processes included in salmon farming, from genetic improvement and broodstock development to secondary processing (Durán and Kremerman, 2008).

PRODUCTION CHAIN OF SALMON FARMING



The production processes involved in salmon farming shown above are an accurate description of the steps followed by companies that participate in the entire production chain. Some companies are vertically integrated; they include hatcheries, grow-out and harvest farms, processing plants and distribution. Some even manufacture their own feed, ensuring better process planning, coordination and efficiency. Other companies focus only on a single link in the chain.

In Chile, approximately 30 to 40 companies<sup>15</sup> take part in the salmon farming and processing industry, and about 40% of them are foreign capital enterprises. Eleven companies produce for almost 57% of the total tons exported by Chile, and together they account for more than 68% of the exported value in thousands of US\$ FOB<sup>16</sup> (Aqua, 2009).

**Table 2.1. Main Salmon Company Exports. 2008**

Exporter	Total Net Tons	Value in TH US\$ FOB
Empresa AquaChile S.A. (AquaChile S.A. + Salmones Chiloé S.A. + Salmones Maullín Ltda. + Aguas Claras S.A.)	64,841.9	350,914.4
Marine Harvest Chile S.A. + Delifish Ltda	49,565.8	280,033.0
Cía. Pesquera Camanchaca S.A.	27,520.8	202,311.1
Salmones Multiexport S.A. (Belongs to Multiexport Foods S.A.)	26,366.8	167,349.9
Mainstream Chile S.A.	30,626.0	141,323.9
Pesquera Los Fiordos Ltda.	25,805.6	122,189.5
Cultivos Marinos Chiloé S.A.	16,505.2	113,129.7
Salmones Antártica S.A.	18,339.6	100,298.6
Cultivos Yadrán S.A.	13,797.5	75,402.1
Invertec Pesquera Mar de Chiloé Ltda.	12,423.1	74,867.1
Trusal S.A.	15,469.2	72,925.1
Ventisqueros S.A.	8,664.0	51,017.5

<sup>15</sup> According to CEPAL, 40 companies were devoted to salmon and trout farming and processing in 2004. As a result of mergers, there are currently less than 30 (Labor Bureau. Inspection Department. Official and Scheduled Inspection Unit, June 2006).

<sup>16</sup> Each one produces over 10,000 tons.

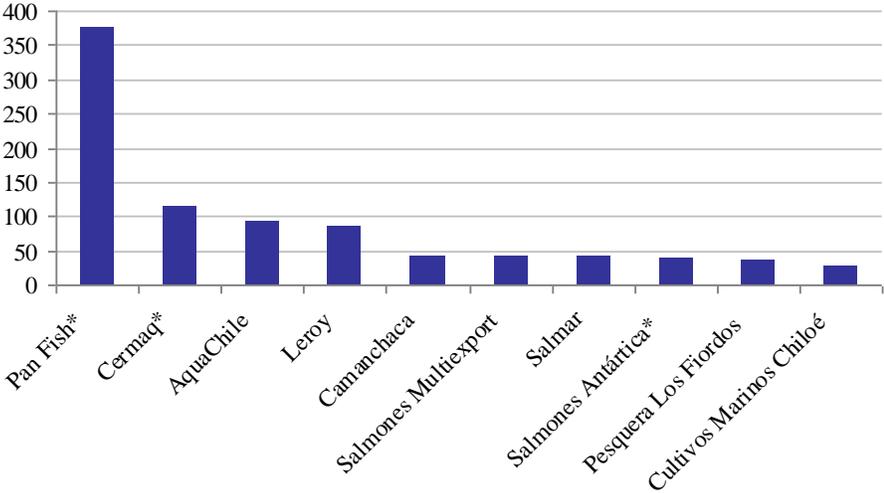
Others	219,586.7	722,811.0
<b>Total</b>	<b>529,512.2</b>	<b>2,474,572.9</b>

Source: Aqua. Aquaculture and Fisheries Board. 2009

At the global level, five Chilean companies are among the top ten salmon producers. Three of the remaining five foreign companies in the ranking have operations in Chile.

Chart 2.2

PRINCIPALES COMPAÑÍAS PRODUCTORAS DE SALMÓN A NIVEL MUNDIAL  
(MILES DE TONELADAS 2006)



\*Foreign companies operating in Chile. Their subsidiaries are: Pan Fish’s: Marine Harvest Chile S.A.; Cermaq’s: Salmones Mainstream S.A.; and Salmones Antártica is a subsidiary of Nippon Suissan Kaisha.

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Source: Kontali Analyse AS, from Durán and Kremerman, December 2007- January 2008.

In addition, a wide range of goods<sup>17</sup> and services<sup>18</sup> suppliers are also an integral part of the salmon industry. Most of them specialize in different links of the production chain and are fully integrated into the processes of the larger companies<sup>19</sup>.

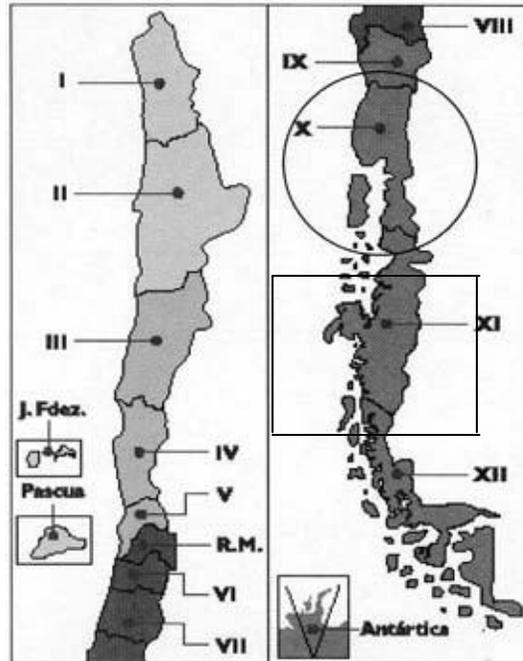
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<sup>17</sup> Feed; egg producers; alevin and smolt producers; cage manufacturers; distributors of automatic feeders; manufacturers of deboning tools, skinning devices, fish head removers and scale removers; knives and gauges; manufacturers of packaging materials, labels, boxes and wrapping, among others.

<sup>18</sup> Manufacture of raw materials; scuba diving; maritime watchmen; acquisition of aquaculture concessions; washing, repairing and maintenance of nets; change of nets; transportation of nets, smolts, broodstock, harvested

## Geographic Location

Salmon farming has been more or less concentrated in the Los Lagos Region, and thus the area has become known as the “salmon capital”. Based on data from the Chilean Fishery Service (Sernapesca, for its acronym in Spanish), 78% of salmon production took place in this region in 2006. Aysén<sup>20</sup> is the second most important area in terms of production and, together with Magallanes, makes up the industry’s zone of expansion.



The industry’s rapid growth can be explained by a combination of comparative advantages in the regions mentioned above (ecosystem, hydrography, availability of labor and inputs) and acquired competitive capacities (favorable legal and institutional framework, networking, technological know-how, etc.).

The natural conditions of the Los Lagos Region are excellent for fish farming. They include protected bays and inlets with the proper water depth and temperatures to ensure good fish growth throughout the year, as well as adequate tidal flushing. Additionally, Chile has a solid fishing tradition and experience in the processing of marine resources, including the fish meal and oil, the basic inputs for fish feed. The country also has a stable and skilled labor force. Another factor that favored domestic and

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salmon; extraction of dead fish and clean-up of industrial inorganic waste from marine sites; plant cleaning; anchoring and net mounting, among others.

<sup>19</sup> There are different estimates. Aqua indicates that there are 1,200 industry suppliers (Aqua. News. 18.07.2007); Infante mentions 500 key suppliers of capital goods, productive inputs and services (Infante, 2007).

<sup>20</sup> According to Sernapesca, it accounted for 20.4% of salmon and trout production in 2005; 44% of the region’s exports were related to the salmon industry, totaling US\$155 million (SalmonChile, 2006).

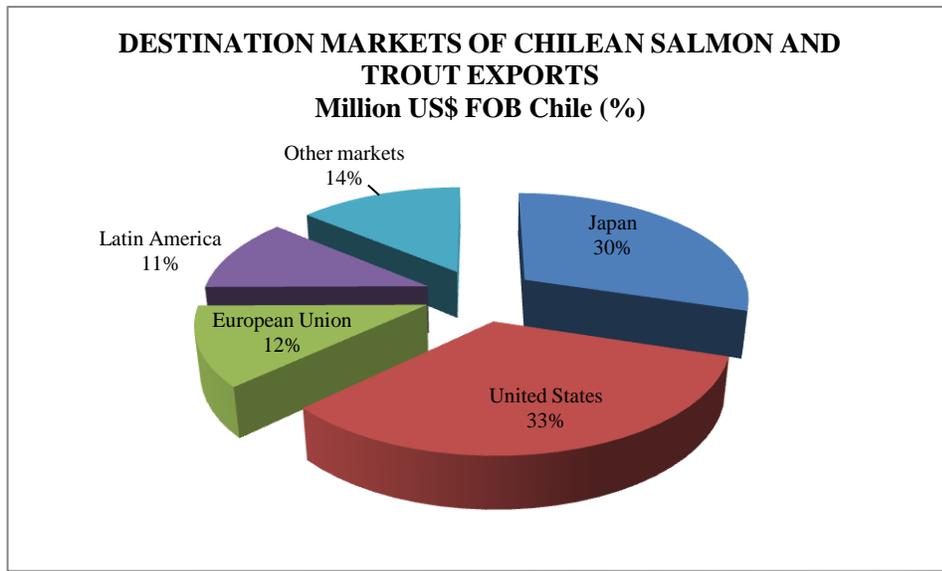
foreign investments in the industry was the convenient average prices for salmon-derived products in global markets<sup>21</sup>.

Numerous studies have found that the Chilean salmon industry meets many of the criteria to be considered a cluster. The existence of significant networks<sup>22</sup> is one of its most relevant traits, resulting from collective actions around the standardization of process quality.

### Exports and Access to Foreign Markets

Main export destinations in 2008 were the United States, Japan and the European Union, with approximately 33%, 30% and 12% of value shipped, respectively<sup>23</sup>. Together, the three markets account for 75% of exports by value. The remaining destinations (Latin America and others) represent 11% and 14% of value shipped, respectively<sup>24</sup>.

**Chart 2.3**



Source: SalmonChile. 2009

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<sup>21</sup> According to SalmonChile, between 2002 and 2005 the value of the product increased from US\$3.08 per kg to US\$4.48 per kg.

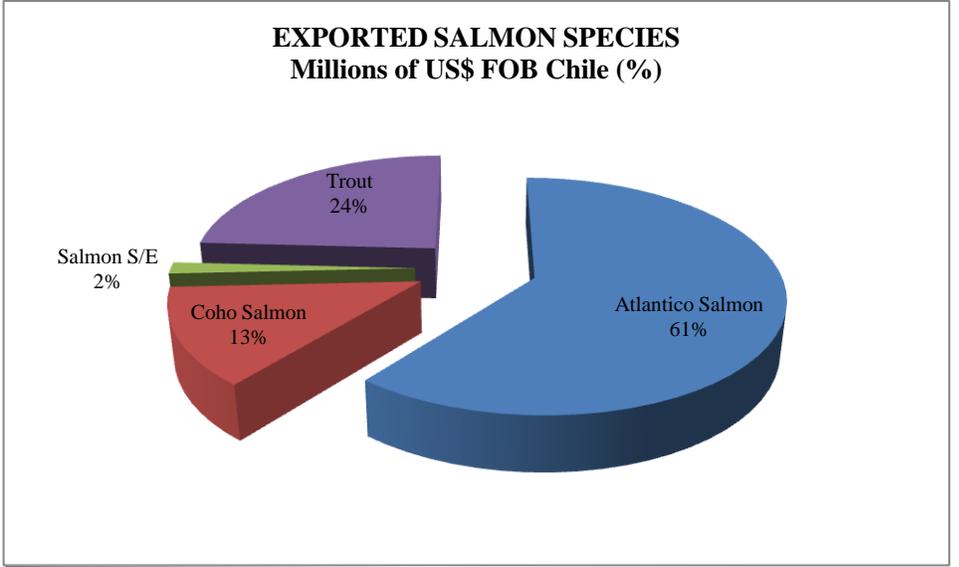
<sup>22</sup> Salmon Industry Association A.G. (SalmonChile), which groups together 72 producers and suppliers; Association of Shipowners (ARASEMAR); Association of Net Workshops (ATARED); Association of Scuba Diving Companies (ADEB); Association of Veterinary Laboratories (ALAVET).

<sup>23</sup> Corresponds to 108,000, 163,000 and 43,000 net tons, respectively (SalmonChile, 2009).

<sup>24</sup> Corresponds to 53,000 and 78,000 net tons, respectively (SalmonChile, 2009).

In 2008, Chile exported mainly Atlantic salmon, Coho salmon and trout, accounting for approximately 61%, 13% and 24% of shipments, respectively<sup>25</sup>.

**Chart 2.4**



**Source: SalmonChile. 2009**

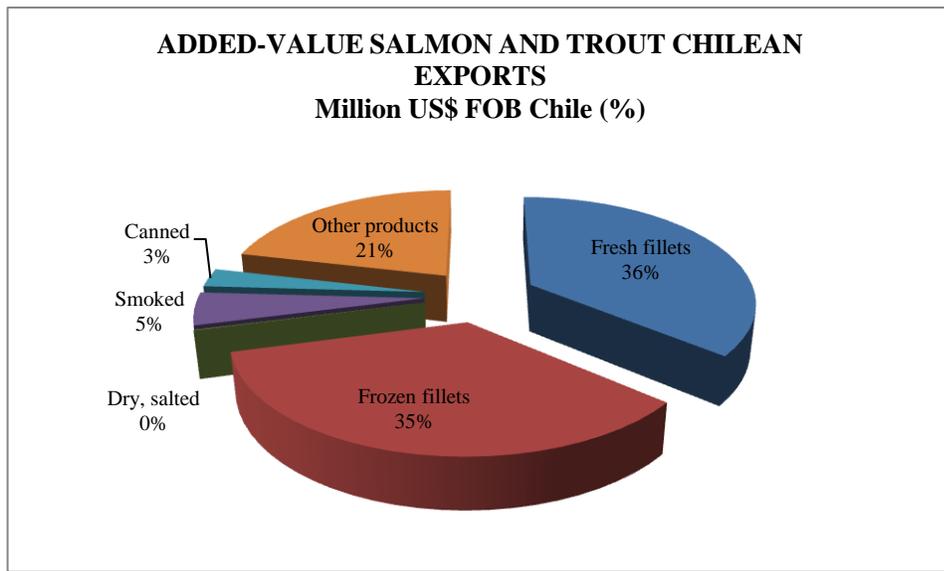
The outstanding growth of Chilean salmon exports in the past decade has centered increasingly on products with greater added value. These products increased their relative share of total salmon exports from 52% in 1998 to 63% in 2008<sup>26</sup>.

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<sup>25</sup> Corresponds to 227,000, 90,000 and 123,000 net tons, respectively (SalmonChile, 2009).

<sup>26</sup> In thousands of net tons, the percentage went from 39% in 1998 to 47% in 2008 (SalmonChile, 2009).

**Chart 2.5**



Source: SalmonChile. 2009

## EMPLOYMENT, WORKING CONDITIONS AND LABOR RELATIONS IN THE SALMON FARMING INDUSTRY

### Employment

Since salmon farming is not an economic activity category on its own, but a subset within the fishing and food industry<sup>27</sup>, it is impossible to estimate the number of workers based only on census information or employment surveys. Instead, secondary information must be used. For this reason, figures may vary depending on the source.

Data made available for 2007 by the Regional Labor and Social Security Ministerial Departments of the Los Lagos and Aysén regions reveal that before the ISA crisis, the activity provided approximately 45,000 direct and indirect jobs<sup>28</sup> in Los Lagos and 5,500 direct<sup>29</sup> and indirect jobs in Aysén. The aggregate figure for both regions thus totals about 50,500 workers<sup>30</sup>.

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<sup>27</sup> Chilean Classification of Economic Activity, CIU. CL Technical Standard SD No. 86 of the Ministry of Economy, Development and Reconstruction, dated August 10, 2005. On one hand, it is an estimated subset including fisheries, fish hatcheries and farms (division 05), and on the other, it is also an estimated subset of the food and beverage manufacturing industry (division 15).

<sup>28</sup> Direct employment refers to employment directly generated by the company. Indirect employment refers to outsourcing of services associated with the salmon farming industry, including cleaning, transportation, consulting, vaccinations, scuba diving, harvesting, waste removal, engineering, etc., which are performed by third-party companies.

<sup>29</sup> Amounts to about 3,000 direct jobs, approximately 7% of the regional total (SalmonChile, 2006).

<sup>30</sup> For that same period, Infante suggests 53,000 direct and indirect jobs (Infante, 2007).

Estimates from the Chilean Export Promotion Agency (ProChile) indicate that in 2005 the salmon farming industry generated 28,368 direct<sup>31</sup> and 7,631 indirect jobs (Bravo-Ortega, López and Gamé, no date). These figures make salmon farming the export activity which generates the largest number of direct jobs and the second-largest number of indirect jobs, surpassed only by pulp. Most jobs in the industry are permanent (90%) while only 10% are temporary.

According to these estimates, salmon farming generated 11% of total employment in the Los Lagos Region (direct and indirect jobs) and 0.7% of the country's total up until the crisis. Additionally, the region accounted for 90% of jobs in the salmon industry. Hence, during 2006, the regional unemployment rate stood at only 5.5%, considerably lower than the national rate of 7.7% (SalmonChile, 2007)<sup>32</sup>.

Increasingly, salmon production tends to take place in a more balanced fashion throughout the year, since most of the companies are farm concessionaries. This allows for self-regulation and the planning of harvests, observing biological and fish maturity cycles. This means that the demand for labor tends to spread evenly throughout the year without the need to adjust to extremely flexible production peaks or drops.

The multiple production phases require a large amount of permanent staff. They can be hired directly but also on a temporary basis and as subcontractors (employees hired by third-parties). The evidence shows that few temporary workers are hired directly by the producer companies. Only a small amount of companies follow such practice at certain times, for short periods and to carry out specific tasks. For instance, to process a salmon species with marked seasonal behavior; to deliver specific customer orders, etc. A case study conducted in process plants revealed that temporary workers hired directly accounted for only 1% of the total amount of permanent labor (Díaz, López and Riquelme, 2007).

The workers hired by third-parties are more relevant in terms of their numbers. However, outsourcing is not such an extended practice in the salmon industry. There are two major approaches: outsourcing of works or services; and *maquila*<sup>33</sup>. Outsourcing works or services is used to conduct several support or complementary activities, namely wastewater treatment, waste removal, yard and industrial cleaning, laundry, civil works, maintenance of equipment and machinery, transportation of raw material, products and inputs, transportation of staff, surveillance and security, staff catering, diving tasks, etc. In a strict sense, outsourcing means the commissioning by a user company of a specific task or service to a contractor. The contractor is obliged to conduct such works or render such services at his own liabilities and risks, working with own capital, technology and staff. The work conducted or services rendered are,

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<sup>31</sup> The estimate was based on information provided by surveys sent to salmon farming companies. First, the ratio of number of workers to exported tons was calculated for each company in the sample. This ratio was then used as an expansion factor to estimate the number of workers in the other companies belonging to each strata.

<sup>32</sup> Citing INE.

<sup>33</sup> *Maquila* refers to that part in the processing chain where the processing of fish products takes place (TN).

then, a separate unit from the activity carried out by the main company and not a step in the productive process of such main company.

These works and services are performed in the facilities of the commissioning company and they could be permanent or occasional. In general, those who perform them have no greater links with the commissioning company nor with their staff. They are instructed about what to do and how from their own contractor, who has previously agreed on the terms of the task with the commissioning company. The same study quoted above suggested that approximately 4% of all those working in the companies reviewed were subcontracted.

The *maquila* is carried out by external companies not dependent from the commissioning firm. It is used in processing plants and mainly at peak production and/or demand periods or to face special requirements (for instance a specific added value and/or the processing of a different salmon species, etc.). Overall, the *maquila* is an outsourcing-type of production system where intermediate inputs and raw materials owned by the main company are transformed; there is no change in ownership but rather major or lesser actions on the products, which are then returned to their original facility. The *maquila* is defined as any activity concerning the production process of a company which is performed by a third-party. Both units, in general, have no ownership relationship. Resulting products are usually exported; they could be shipped right after the *maquila* or an additional process may be added. Another study reports that *maquila* workers would account for approximately 14% of the total amount of workers of processing plants (Díaz, 2009).

There are several reasons why companies decide to use external staff. First, there are productive requirements, i.e. to timely and adequately meet customer demands. Then there is a need to increase the budget efficiency: certain costs that used to be considered fixed (for instance, large wage bills), become variable; reducing management liabilities (formal agreements, payments, attendance register, etc.); having more time to perform the tasks related with their own business line; taking advantage of external expertise which cannot be absorbed due to economies of scale reasons (this is the case of the *maquila*); reducing legal liabilities by transferring the very risks of contractual relations and potential labor conflicts to a third-party (accidents, labor cases, unions, etc.).

Based on Chilean labor laws, workers hired by any company (in this case, by the salmon farm, the *maquila* or the company rendering the services or work), can be dismissed under certain criteria. Workers hired on a fixed-term basis or by work or task, are no longer part of the unit once the term elapses or once the work or task for which they were hired is over. In the case of workers hired on an indefinite basis, two events can take place: the company can terminate the working contract due to: a) corporate needs, such as those arising from the streamlining of services or facilities; productivity drops; changes in the market conditions or in the economy that warrant such termination; and b) reasons imputable to the worker, namely, severe improper behavior (lack of probity; sexual harassment; hitting the employer or a fellow worker; insults, immoral behavior); negotiations within the business line; neglecting his/her duties for unjustified reasons during a certain period; abandoning his/her duties; acts, omissions or imprudent behavior that can put safety at risk; material damage to facilities, equipment

and products; severe breach of contract. In every case, both parties can resort to a set of defense or contesting arguments.

### **Demographic Features of Workers**

Not many studies report the demographic features of the industry's workers. The Department of Industrial Engineering of the University of Chile (Universidad de Chile, 2005), carried out a diagnostic in 2005<sup>34</sup>, commissioned by SalmonChile. The study consisted of a survey of 16 companies<sup>35</sup> registered under the latter organization, involving a total of 15,207 workers.

According to the diagnostic, 28% of workers in the industry are women and 72% are men. ProChile (Bravo-Ortega, López and Gamé, no date) shows similar figures, with 70% male and 30% female workers in the industry.

Apparently, both studies included several areas of the production chain— not only processing plants, where women account for much more than 30% of employees. ProChile mentions that plants employ 63% of all the workers in the industry, while 24% work on farms and 12% work in hatcheries.

To supplement the information on gender distribution across industry workers, a case study commissioned by the Labor Bureau in 2006 including 15 processing facilities<sup>36</sup> belonging to leading companies in the Los Lagos Region that exported products to the United States (Díaz, López and Riquelme, 2007) was also examined. According to the figures, 5,239 of 9,568 workers were males (55%) and 4,329 were females (45%). An additional draft report (Díaz, 2006-2007) complementing the one cited above conducted a case study of seven *maquiladora* operations that render production services to leading firms. Of the 1,200 individuals employed, 50.4% were men and 49.6% were women. Finally, another recent Labor Bureau study (2008) dealing with wages in processing plants (main companies and *maquila* operations) found that within a universe of 5,556 workers, 48.4% were women and 51.6% were men. In conclusion, gender distribution is quite equitable in processing plants.

While the University of Chile study (2005) commits an error in the definition of the age categories, as they are not considered exclusively, it does provide a rough idea of the age distribution of industry workers. It suggests that 0.1% of workers are younger than 18 years old; 19% are between 18 and 25 years old; 23% are between 25 and 30 years old; 36% are between 30 and 40 years old; 17% are between 40 and 50 years old; 4% are between 50 and 60 years old, and only 1% is older than 60. In other words, about 60% of workers are between 25 and 40 years old.

The above-mentioned study on wages conducted by the Labor Bureau (Díaz, 2009) reveals the following regarding the workers' age distribution: 2% is younger than 20 years old; 36% is between 20 and 29 years old; 33% is between 30 and 39 years old; 22% is between 40 and 49 years old; 6% is between 50

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<sup>34</sup> The information refers to April 2005.

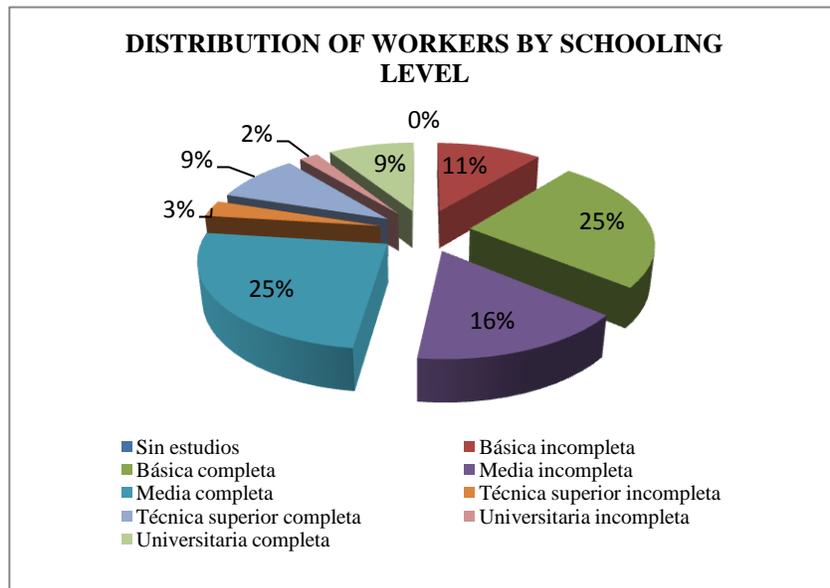
<sup>35</sup> In the first half of 2005, selected companies accounted for 58% of salmon exports and 59% of sales.

<sup>36</sup> Does not include other links in the chain (hatcheries, farms).

and 59 years old and 1% is older than 60. In other words, 69% of workers are young, with mean ages between 20 and 39 years.

According to the University of Chile study (2005), the level of formal education of salmon industry workers is as follows: 0.1% lacks education; 11% has incomplete primary education; 25% completed primary school; 16% has incomplete secondary education; 25% completed secondary school; 3% has incomplete technical studies; 9% completed technical education; 2% has incomplete college studies; and 9% completed college.

**Chart 2.6**



Translation:

- |                               |                                 |
|-------------------------------|---------------------------------|
| No studies                    | Incomplete primary              |
| Complete primary              | Incomplete secondary            |
| Complete secondary            | Incomplete technical-vocational |
| Complete technical-vocational | Incomplete college              |
| Complete college              |                                 |

In relation to schooling, the study confirms that the industry is labor-intensive in operational tasks. Approximately 81% of workers are operators<sup>37</sup>, 8% perform administrative tasks<sup>38</sup> and 11% are leaders or carry out supervisory duties<sup>39</sup> (this excludes managers).

<sup>37</sup> Workers directly related to the production activities of the main business.

<sup>38</sup> Workers who support production management in general service areas.

<sup>39</sup> Workers who carry out tasks related to directing, coordination, planning and/or control, excluding management.

Other interesting demographic information is revealed by Amtmann and Blanco<sup>40</sup> (2005). According to their study, salmon industry workers in the Los Lagos Region mainly come from a rural background (see Table 2 for rates of rural “salmon farming communes” as identified by SalmonChile (SalmonChile, 2007)<sup>41</sup>). The territorial distribution of this activity and the personal seeking complementary non-rural income seem to favor intra-regional migration to nearby cities and towns (where farms and processing facilities are located), thereby facilitating a strong link with the countryside and non-migrating family members.

Hence, rural families see this as a positive employment opportunity, instead of having to migrate outside the region. During the period of 1987-1992, the Los Lagos Region had a negative migratory balance, i.e. the region was losing population. The 2002 census subsequently revealed that the region was attracting individuals, and the 2006 Casen survey verified positive migratory flows. Between 2001 and 2006, the so-called “salmon farming communes” attracted 20,164 people, while 17,559 people left. In 2006, the net migration in these communes reached 11,605 people (SalmonChile, 2007).

The Amtmann and Blanco report (2005) also draws a link between migration and the demographic conditions of age and gender. It reveals that the development of salmon farming has had major impacts in the region’s rural economy, notably the employment of not only men but all family members on fish farms and in processing plants, especially youth and women. The decline of small-scale regional agricultural practices<sup>42</sup> is thus likely related to the expansion of salmon farming.

Table 2 depicts the rural nature of the so-called “salmon farming communes”. In the Los Lagos Region, 10 of 18 communes included in that category have mostly rural populations. In the Aysén Region the corresponding figure is one out of three.

**Table 2.2 “Salmon farming communes”: Rural Population Rates**

<b>Communes in the Los Lagos Region</b>	<b>Rural Population (%)</b>
Puerto Montt	12.38
Calbuco	64.05

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<sup>40</sup> Citing studies by R.González and F. Umaña (1996).

<sup>41</sup> Thus named because salmon farming activities take place there. In the Los Lagos Region there are 18: Calbuco, Castro, Chonchi, Llanquihue, Puqueldón, Cochamó, Curaco de Vélez, Dalcahue, Frutillar, Puerto Montt, Puerto Varas, Puerto Octay, Purranque, Queilén, Quellón, Quemchi, Quinchao and Hualaihué. In the Aysén Region there are three: Aysén, Cisnes and Guaitecas.

<sup>42</sup> The study provides copious information about the crisis of local agriculture –mainly based on dairy and meat production, forestry and commodity crops (wheat, potatoes, oats, sugar beet and rapeseed) for the domestic market– which has become less profitable and faces difficulties in reconverting to sectors and products with export potential.

Cochamó	100.0
Frutillar	32.60
Llanquihue	19.97
Puerto Varas	27.29
Puerto Octay	67.30
Purranque	38.31
Castro	27.79
Chonchi	62.36
Curaco de Vélez	100.0
Dalcahue	45.14
Puqueldón	100.0
Queilén	60.03
Quemchi	70.03
Quellón	35.09
Quinchao	57.96
Hualaihué	54.17
<b>Communes in the Aysén Region</b>	<b>Rural Population (%)</b>
Aysén	9.82
Cisnes	50.09
Guaitecas	3.60

**Source: INE Projections. 2007**

According to SalmonChile, in the Aysen region artisanal fishery takes place in close contact and interplay with the aquaculture industry and commercial fisheries, since they share the region's coastal border. Naturally, the aquaculture industry has become a major source of employment for artisanal fishermen and their descendents (SalmonChile, 2006).

In the case of Aysén, artisanal fishermen and their descendents account for a considerable share of the salmon farming labor force (SalmonChile, 2006).

## Wages

The University of Chile study (2005) cited above suggests that average gross industry wages in April 2005<sup>43</sup>, broken down by position, were as follows: Ch\$905,781 for directors and supervisors; Ch\$466,928 for administrative staff; and Ch\$260,676 for operators<sup>44</sup>. The items included in the wage and the percentages involved for each category mentioned above were the following: a) for directors and supervisors, 85.1% of the wage was the base salary; 3% corresponded to production bonus; 1% to overtime; 5% to benefits and 6% to other bonuses; b) for administrative staff, 81% was the base salary; 2% corresponded to production bonus; 5% to overtime; 8% to benefits and 4% to other bonuses; c) for operators, 53% corresponded to the base salary; 19% to production bonuses; 7% to overtime; 12% to benefits and 9% to other bonuses.

The study of the wages of salmon farm workers conducted by the Labor Bureau in 2008 (Díaz, 2009) reviewed wage records and identified salaries paid to processing plants employees in the Los Lagos Region. It included 12 production units, seven of them belonging to leading export companies and five belonging to *maquila* operations that sell production services to larger companies. The group involved a total of 2,868 workers who had worked every day<sup>45</sup> during the sample month (May 2008).

The study revealed that workers were almost evenly distributed among three taxable salary categories: 30.4% earned between Ch\$200,000 and Ch\$300,000; 31.4% earned between Ch\$300,000 and Ch\$400,000; and 38.1% earned wages above Ch\$400,000<sup>46</sup>.

The salmon companies in the Los Lagos Region follow a wage scheme that is quite homogeneous and is based on four key components: base salary, production bonus or incentive, overtime and benefits. However, the actual values given to these components vary from one company to another, ultimately leading to a heterogeneous situation regarding wages.

These four key items are often supplemented by other bonuses or earnings (taxable or not), which make up the final wage paid to workers. Likewise, all the companies apply the relevant pension and health insurance deductions, as well as unemployment insurance as applicable.

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<sup>43</sup> On April 30, the US\$ exchange rate was = Ch\$582.87.

<sup>44</sup> Salmon farming companies (and others) that operate in Aysén, Magallanes, Chiloé and Palena benefit from a subsidy through which the Chilean State returns 17% of taxable income for each worker hired, with a ceiling. (Law No. 19,853, which provides subsidies and customs and tax franchises to promote productive activities in remote areas).

<sup>45</sup> For methodological reasons, a total of 1,861 workers that showed absenteeism in the month of the study were excluded.

<sup>46</sup> On May 30, the US\$ exchange rate was = Ch\$479.66.

Overall, the base salary accounts for a large share of wages, however there are differences among firms. In some plants, the base salary is lower than the legal monthly minimum wage<sup>47</sup>. Notwithstanding, in all cases the final taxable income exceeds this threshold, and in many it is far surpassed.

A major component of wages, frequently used by many plants for different positions in the production line, is the production bonus or incentive. It is mainly related to the volumes of raw materials processed, but also to processing quality and incorporated added value. As with other important components that make up the wage, the calculation method and amounts vary among companies; but it does account for a large percentage of the total wage. Notwithstanding, companies that rely on collective bargaining define that the amount of the bonus shall match the production actually achieved and not a mandatory production target which, if not met, can actually translate into some sort of wage punishment or even a cause for dismissal.

The process plants use the so called common legal working shift, which covers up to 45 hours a week, distributed in five or six days. Although overtime appears to be prevalent in most plants, it does not account for a high number of labor hours in the total work performed by workers during a month, nor is it an excessive load beyond what is legal in the specific shift of each worker. It actually accounts for a relatively low percentage of the final taxable average income. According to the Labor Code, to deal with a company's temporary needs or events, overtime can be agreed in writing up to a maximum of two hours per day, which shall be paid with a surcharge.

However, we should note that this provides no evidence about the intensity of the shifts. While they may not extend much more than what is legal, the arrival of raw materials, its perishable nature and the requirements in terms of volume, features and quality set by external clients, can influence and even condition the arrangements of working hours.

The benefits component refers to additional bonuses provided by employers to employees. Although most plants paid these benefits in May 2008<sup>48</sup>, there are some exceptional cases where no record was made of such payment.

Also, in most of the plants studied different allowances are provided to supplement wages, with a variety of combinations (attendance bonus, seniority allowance, compensation bonus, other benefits, etc.). Although in some cases attendance (and, less frequently, seniority) does not necessarily translate into a bonus, its basic spirit is present in the calculation basis of base salaries<sup>49</sup>, of production bonuses and even other bonuses. This has an impact on final wages, since the key criterion to determine its value

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<sup>47</sup> As of May 2008, it amounted to Ch\$144,000 (approximately US\$300). This situation became unlawful after the passing of Law No. 20,281, published on July 21, 2008 and effective as of January 21, 2009.

<sup>48</sup> Overall, wages are paid on a monthly basis, as set out in Article 50 of the Labor Code (4.75 minimum monthly wages).

<sup>49</sup> Usually, base salary scales take seniority into account.

is the weighting of the days actually worked. In this way, there is a clear premium for attendance<sup>50</sup> and a penalty for absenteeism. One of the arguments to explain this is that –to timely achieve the production levels committed with the clients– the company needs to rely on a determined and previously calculated amount of staff. If the base salary and allowances are considered as a fixed component of wages, and production bonus and overtime as a variable component, the conclusion is that the fixed component has greater weight in the set of companies studied.

There are only a few sources of information on wages in Chile and they use different conceptual frameworks and methodological designs. This makes it difficult to make comparisons and analysis that may shed light on actual wage differences among economic sectors, industry size, age groups, gender, etc. Taking this caveat into account, average wage information of processing plant workers with those of workers in similar economic sectors were analyzed in general terms. Without going too deeply into the calculation criteria, it was observed that the average taxable wages in the salmon industry were lower. For instance, the Chilean Security Association publishes a monthly report on employment and wage behavior of member companies, based on their own samples<sup>51</sup>. Taxable wages in the two sectors whose features and conditions could be compared to the salmon farming industry –namely fishing and industry– were (in May 2008) Ch\$436,573 and Ch\$429,831, respectively. However, a caveat should be made that this information includes workers from all occupational segments: professionals, managers, administrative staff, production staff, etc. (ACHS, 2008).

The same report provides information about the Los Lagos and Aysén regions. For a sample of 1,409 member companies, the average taxable wage in Los Lagos amounted to Ch\$401.231; in Aysén, considering a sample of 166 member companies, the average wage was Ch\$460.765. Additionally, a report on employment and wages issued by the General Bureau of International Economic Affairs reveals that in 2007, 76% of workers employed in exporting companies earned an average monthly wage of Ch\$434,556. The sample included a total of 7,916 companies and the monthly average wage was estimated based on reports by the employers to the Internal Revenue Service (SII, for its acronym in Spanish), considering the total wages and fees paid during the year, divided by the amount of workers and by the 12 months of the year (DIRECON, 2009).

Finally, the 2006 Casen Survey suggests that the average per capita income from all sources<sup>52</sup> in the Los Lagos Region amounts to Ch\$524,282, less than the national figure (Ch\$613,206). From the information provided by this survey, it is worth noting that 14 of the 18 so-called “salmon farming communes” are below the regional average (between Ch\$324,685 and Ch\$506,420); one is below the national average; and only three exceed the national average (between Ch\$616,887 and Ch\$646,549). In the Aysén

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<sup>50</sup> Overall, it is expressed as attendance. In two other cases, an additional condition is set regarding length of service or uninterrupted employment over a twelve-month period.

<sup>51</sup> In May 2008, membership amounted to 1,832,971 workers belonging to 36,266 companies throughout the country. The sample includes 29,423 companies with a total of 1,480,049 employees.

<sup>52</sup> All income from work activities, both in cash and in kind.

Region, the average per capita income from all sources amounts to Ch\$541,811, which is also lower than the national average. The survey data also reveal that in the two “salmon farming communes” for which information is available<sup>53</sup>, one is below the regional average (Cisnes, with Ch\$533,956) and the other is above this figure (Aysén, with Ch\$559,802) (Mideplan, 2006).

### **Health and Safety**

Health and safety are extraordinarily sensitive topics, since they touch directly on the wellbeing and life of workers. Nonetheless, the infringement of labor standards regulating these matters can be very common in the salmon farming sector in Chile, as illustrated in this section. The previously cited study of salmon processing plants (Díaz, López and Riquelme, 2007) reported inadequate prevention, poor quality of protective equipment, poorly evaluated and understood risk factors, weak contingency plans in the case of accidents, and high accident rates. Some of these aspects will be analyzed in more detail below.

The majority of the plants have work plans or prevention programs in coordination with Mutual Insurance Companies (*Mutualidades*)<sup>54</sup>. In some cases, they appear to be quite effective; in others, there are apparent weaknesses, mainly in terms of a lack of monitoring and follow-up. The preventive instruments required by law are generally in place in the plants, however they often exist only in form. These preventative instruments are: Internal Rules of Order, Health and Safety Regulations; Joint Health and Safety Committee; Department of Occupational Risk Prevention. Workers’ legal right to know about the occupational risks to which they will be exposed, preventive measures and proper work methods is put into practice in the facilities through information provided by the company in one of the following ways: the distribution of pamphlets, posters and signs; bulletin boards; guidance and training; team work; staff meetings; videos; suggestions boxes; technical demonstrations of proper work techniques; circulation of evacuation plans; risk prevention fairs; etc.

In general, the plants provide their staff with the personal protective equipment (PPE) required for the job: work gloves (steel, cut-resistant or rubber); safety boots or shoes (as appropriate); masks; protective goggles; work aprons; thermal underwear; overalls; ear protection; etc. As noted below, this is an area of frequent infringement due to noncompliance. One explanation could be that the quality of the material is often inadequate and/or that elements are not replaced or changed on time. Internal regulations provide that workers must wear PPEs, otherwise they are subject to reprimand. There is a general opinion that workers accept PPEs and have developed a proactive behavior on its use.

Processing plant workers are exposed to a number of occupational risks, and the salmon companies, in conjunction with the mutual insurance companies, take preventive measures and conduct specific studies to minimize them. Some of the more common risks addressed include noise, wet conditions, low

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<sup>53</sup> No information was provided on Guaitecas.

<sup>54</sup> Organizations administering Law No. 16,744 on work-related accidents and occupational diseases, with which companies must be affiliated.

temperatures and the static or dynamic physical load or muscular force that workers must exert while performing their jobs.

The aforementioned study requested information about the effects of performing work in a standing position (static exertion), common in processing plants where workers are on their feet for all or most of the workday. In addition workers perform their work in a hunched position with extended arms, which has a greater impact and risk for the worker. The main consequences of prolonged standing are congestion, swelling, and the formation of varicose veins in the legs. In addition, a hunched standing position can result in spinal deviation and even herniated disks.

The study also addressed dynamic exertion, and requested specific information regarding the exposure of workers to tasks involving the manual handling of loads. The manual handling of loads does not appear to be a significant risk factor in salmon processing plants. While some jobs require lifting, lowering or carrying loads –mainly in the form of trays loaded with raw materials or packaged products– the weight is less than or equal to the limit established in the so-called “sack law”<sup>55</sup>, which regulates the maximum load that a worker may transport<sup>56</sup>. Heavier loads are transported using mechanical means such as stackers, pallet trucks, forklifts, etc. One of the injuries that can result from the manual handling of loads is lumbago. This is a musculoskeletal problem related to improper postures that workers must assume in order to carry out a task, the content of the task and the way the work is organized.

Dynamic exertion also includes other types of muscular exertion resulting from work that requires repetitive, non-random, rapid movements. These tasks can cause muscle cramping and inflammation when the inflection point is reached. Salmon processing plant workers, especially women, are particularly prone to this risk factor, and some of the jobs where they are most likely to be affected include head and tail removal, washing and cleaning, gutting, trimming, filleting, deboning, molding, and packaging.

Repetitive tasks can be associated with tendinitis<sup>57</sup>, an inflammation of the tendons and tendon sheathes accompanied by pain along the length of the tendon that is exacerbated by movement. Two factors that influence the development of this condition are the way work is organized and efficiency pay (production bonuses). The occurrence of tendinitis is one of the main causes for concern in the plants.

An ergonomic study carried out by the Puerto Montt branch of the Occupational Safety Institute (IST, for its acronym in Spanish) between 1999 and 2004 found that the majority of occupational diseases and

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<sup>55</sup> The matter was addressed in the ILO Maximum Weight Convention No. 127, 1967, ratified by Chile in 1972. In 2005, Law No. 20,001 was passed regulating maximum human load weight.

<sup>56</sup>Adult men may handle a maximum of 50 kg. Women and minors under the age of 18 may handle a maximum of 20 kg.

<sup>57</sup> This term is used generically to refer to conditions arising from excessive use of the upper extremities (SUEDES): tendinitis, tendosynovitis, carpal tunnel syndrome, etc.

90% of sick leaves taken by salmon industry workers were related to tendinitis. Eleven of the 15 plants included in the study reported that this condition was by far the most serious. The measures used to prevent it include breaks for stretching exercises and the rotation of tasks.

In terms of the safety and technology risk factors (safe movement of machine operators; lockout of machinery before maintenance, repairs and cleaning; protection of operating points and moving parts), preventive measures were in place in the different facilities.

While the most common accidents are minor (cuts, falls on slippery floors, blows, and wounds from fish bones), one source reports a total of 8 worker fatalities due to processing plant accidents between February 2005 and April 2007 (Igor and Díaz, 2007). With respect to occupational injuries, tendinitis and lumbago are the most prevalent, followed by herniated lumbar disks and arthritis. Unfortunately, official statistics on labor accidents and occupational illnesses have major biases: a) they are collected by different agencies with diverse methodological criteria; b) results are inconsistent; c) data are not always updated or accurate. According to figures from the Superintendence of Social Security (SUSESO, for its acronym in Spanish) the average accident rate<sup>58</sup> for all productive activities in 2004 was 7.1%, rising to 7.96%<sup>59</sup> in 2005. In the fisheries and/or manufacturing industries –where processing plants are classified– the rates in 2004 were 9.2% and 9.7%, respectively. Nonetheless, accident rates in the majority of the 15 plants included in the previously cited study (Díaz, López and Riquelme, 2007) were higher than the national average and the average of the two reference sectors (SUSESO, 2004-2005).

Data from the two mutual insurance companies with which the majority of the salmon establishments are affiliated confirms this finding. According to figures from the Chilean Safety Association (ACHS, for its acronym in Spanish) affiliated salmon industries showed an accident rate of 10.77% in 2004 and 10.62% in 2005<sup>60</sup> (ACHS, 2006); while the Occupational Safety Institute reported a rate of 11.4% in 2004, falling to 6.95% in 2005.

Since salmon companies are vertically integrated, it is important to take note of accidents in another link of the production chain: farms. The Chilean Safety Association reported that the accident rate at member salmon company farms was 9.05% in 2004 and 8.77% in 2005. For its part, the Occupational Safety Institute reported rates of 5.56% in 2004 and 5.77% in 2005. These rates are relatively low in comparison with national, sector and processing plant averages. The statistics may not reflect the true scale of the problem, however, since many of the main companies in the sector are known to employ contracted labor at their farms. For example, a 2008 study by the Labor Bureau of scuba diver wages showed that of 546 divers working in the salmon industry, 263 (48.2%) were company staff and 283 (51.8%) were contractors (Díaz, 2009).

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<sup>58</sup> Includes workplace accidents and those occurring on the way to or from work.

<sup>59</sup> The data do not include accidents on the way to or from work.

<sup>60</sup> Surpassed only by construction, with a rate of 10.83%.

One of the most risky occupational activities at farms can be scuba diving. According to estimates from the Association of Diving Companies (ADEB, for its acronym in Spanish), the total number of divers was around 1,200 in 2003. These workers perform their job in net pens, floating cages used to grow-out and these divers harvest salmon in a confined environment. Divers can be exposed to a variety of risks arising from the marine and underwater environments. Some of these include the use of heterogeneous technology; lack of certification of air and equipment quality; insufficient skills; lack of training; net pens of more than 20 meters deep; and a practice known as yo-yo diving (where work during one session in the net pen requires multiple decompressions and exits from the water). Divers working under inadequate conditions may have a high potential for occupational accidents, which in many cases can cause serious injury or death (Labor Bureau, June 2006).

Among the most significant causes of serious diving-related occupational accidents are inadequate emergency plans and the absence of a proper medical network. There is often almost no means of emergency transport or communication, making it difficult to respond to life-threatening emergencies in time. A rapid, efficient response should include the existence of a hyperbaric chamber in the towns closest to groups of farms. At present, the installations in three communes (Quellón, Ancud and Puerto Montt) present operational problems, and this is one of the greatest weaknesses in the protection of these workers since the use of a hyperbaric chamber as soon as possible after an accident is necessary to prevent permanent injuries such as paraplegia, hemiplegia, tetraplegia, neurogenic bladder, etc. (Labor Bureau, June 2006).

The statistics on occupational diving accidents are also incomplete and out of date. Ecoceanos<sup>61</sup> made an effort to compile information from different sources, reporting a total of 13 diver deaths in occupational accidents related to salmon farming between February 2005 and April 2008 (Ecoceanos, 2009).

### **Labor Infractions**

As explained above, there is no single branch of activity of the Labor Bureau devoted exclusively to salmon production and processing. For this reason, the Labor Bureau, the competent agency in the supervision of labor standards, can only estimate infractions in this sector by isolating relevant information from its database<sup>62</sup>. The results correspond to the period between January 2006 and March 2008. A total of 1,643 inspections were carried out in the sector, 70% (1,149) in the Los Lagos Region and 30% (494) in the Aysén Region. This included a total of 99,093 workers (85.6% from Los Lagos and 14.4% from Aysén). It should be taken into account that the inspections did not cover 100% of work sites and establishments, mainly due to the geographic dispersion of farms, climatic conditions and the complexity of the production chain involved. Thirty-five percent of the inspections resulted in the application of fines for the infraction of one or more labor standards. The most common infractions

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<sup>61</sup> Figures based on information from the Labor Bureau, Directemar, Mariscope, Regional District Attorney's Office.

<sup>62</sup> See footnote 22.

were in the area of health and safety (47.6%) and working hours (28.6%), involving 22,496 and 13,262 workers, respectively.

**Table 2.3. Infractions of labor standards. Los Lagos and Aysén Regions. In order of precedence**

Area of infraction	Number of sanctions	Percentage
Health and safety	552	47.6
Working hours	332	28.6
DFL 2 <sup>63</sup>	88	7.6
Work contract	63	5.4
Wages	54	4.7
Collective bargaining	16	1.4
Worker protection	11	0.9
Social security	10	0.8
Maternal protection	8	0.7
Discrimination	6	0.5
Trade unions	4	0.3
Other matters	16	1.4
<b>Total</b>	<b>1,160</b>	<b>100.0</b>

**Source: In-house figures based on Labor Bureau data. Inspection Department. Management Unit. 2006-2008.**

The most common infractions of health and safety standards were: failure to provide personal protective equipment free of charge to workers; absence of washroom facilities; absence of drinking water for human consumption; absence of joint health and safety committee; failure to maintain personal protective equipment in perfect working conditions; and failure to inform workers of occupational risks.

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<sup>63</sup> Refers to administrative action or lack of action on the part of employers that makes it difficult for the Labor Bureau to fulfill their supervisory role, i.e. failure to appear on a summons, failure to submit required documentation, etc.

The most common infractions of working hour standards were: failure to keep records of attendance and hours worked; exceeding the maximum two hours of overtime work per day; failure to give two Sundays off per month; distribution of the ordinary work week of 45 hours over more than six days or less than five days; and failure to agree to overtime hours in writing.

Another source that inspects farms and salmon-related diving activities in particular (General Bureau of Maritime Territory), reveals that scuba diving can be one of the most high-risk activities and the one with the highest major accident rates in the industry. According to this report, diving-related infractions were: divers with expired licenses; diving work not authorized by the maritime authority; scuba diving equipment in poor condition and/or inspections out of date; execution of unsupervised scuba diving work; scuba diving work at depths exceeding the regulations; scuba diving work not recorded in the logbook; and diving without basic, required equipment (Igor and Díaz, 2007).

### **Trade Unions**

According to official Labor Bureau figures, in 2007 (Igor and Díaz, 2007) there were a total of 7,484 unionized workers<sup>64</sup> in companies in this sector, including both the Los Lagos and Aysén Regions. This makes up approximately 14.8% of all workers employed directly and indirectly in the salmon industry. There were 90 grassroots unions affiliated with five union federations<sup>65</sup>, and the majority of union workers were employed in processing plants. According to these figures, the rate of unionization in this sector is very close to the national average of 14.5% in 2006 (Labor Bureau, 2008).

The figures provided by the industry, however, are quite different and are far from the situation at the national level. They only refer to companies members of SalmonChile (they account for a limited universe of companies and workers) and suggest that 82.4% of companies in the sector have unions<sup>66</sup> and that 33% of workers employed in these companies are unionized<sup>67</sup>. Partial data collected by the Labor Bureau study from leading processing plants that export to the United States reveal a different situation (Díaz, López and Riquelme, 2007). In the 14 plants with unions (of the 15 studied) there were a total of 24 organizations. An average of 44.6% of personnel was unionized, but distributions varied widely from plant to plant; some reported 10% to 20% unionization and others reported rates of 60% to 70%.

Seven facilities had more than one union, revealing significant fragmentation. Those with the greatest affiliation had two or three unions, demonstrating that while they manage to gather many workers, it is unlikely that any one organization can effectively represent all of them.

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<sup>64</sup> 90.6% in Los Lagos and 9.4% in Aysén.

<sup>65</sup> Four in Los Lagos and one in Aysén.

<sup>66</sup> The Labor Survey (ENCLA 2008), which uses a sample of domestic companies with five or more employees, reports that only 5.1% of the companies consulted has a union (Labor Bureau, 2009).

<sup>67</sup> This figure is based on a study by University of Chile (2005).

There is a significant rate of unionization among female workers in salmon processing plants. In the facilities included in the aforementioned study, more females (25.2%) than males (21%) were unionized.

### **Compliance with International Labor Standards**

Chile is a member state of the International Labor Organization (ILO) and as such ascribes to the commitments taken on in the ILO Declaration on Fundamental Principles and Rights at Work (June 1998). This declaration contains internationally recognized values that Chile agrees must be protected by its national labor laws. These values are also guaranteed in several ILO conventions ratified by Chile over time: freedom of association, the right to organize, and effective recognition of the right to collective bargaining (Conventions 87 and 98); elimination of all forms of forced or compulsory labor (Conventions 29 and 105); effective abolition of child labor (Conventions 138 and 182); and the right to freedom from discrimination (Conventions 100 and 111).

While other matters regarding acceptable conditions for minimum wages, working hours, and occupational health and safety are not part of the eight conventions making up the Declaration, they are recognized internationally by other ILO conventions.

Using the Labor Bureau's study on labor rights in the Free Trade Agreement between Chile and the United States as a basis for evaluation (Díaz, López and Riquelme, 2007), the information suggests that salmon companies may be deficient in terms of respect for collective rights.

As previously mentioned, while there are numerous unions in processing plants, there are problems of representation due to their fragmentation. In addition, the majority of administrative staff is not unionized. The reason put forward by these executives is that they are "confidential staff" (*personal de confianza*) and therefore owe loyalty to the company. While the category of "confidential staff" is formalized in the labor standards, it is used to such an extent that it suggests possible abuse of the category.

With regard to collective bargaining, almost all of the companies have developed this type of process, but the fragmentation of workers is also apparent here. In a single facility, different unions or even *ad hoc* groups may negotiate contracts or collective agreements. This means that there are different instruments in effect within a single company, weakening the bargaining power of the workers. Several collective arrangements may coexist within the same company, according to the Chilean Labor Law. While a collective contract follows a regulated procedure (rules, terms and safeguards), the collective agreement means an informal procedure, even though once signed, both instruments have the same effects.

On some occasions, anti-union practices have been found in some companies, namely: provision of benefits only to non-unionized workers; failure to pay the proportional union fee for the extension of a collective contract negotiated by a union; warning to new workers to restrain from joining the union to prevent being fired and to get better positions and benefits; groups of workers who continue working after the collective bargaining, prompted by a management unit as a way to replace the union; interference in union issues; harassment to and/or dismissal of union members.

There is also significant growth in the number of reports of anti-union practices related to transgression of the right to organize and bargain collectively. Of a total of 36 formal complaints in the Los Lagos Region in 2005 and 2006, 13 corresponded to salmon farming companies (Igor and Díaz, 2007). It is important to note, however, that not necessarily all of them were verified by the competent monitoring agency and derived to Court for trial and sentence. Notwithstanding, it is a matter of concern for political and labor stakeholders, and has led to the introduction of the issue in the Executive's proposal for the new General Fishing and Aquaculture Bill, currently before Parliament. It stipulates that the concession holder or any person carrying out aquaculture activities who commits a disloyal or anti-union act will be fined 50 to 150 Monthly Tributary Units (UTM for its acronym in Spanish), amounting to between two million and five million Chilean pesos<sup>68</sup>. Similarly, it sets out that concessions will not be renewed for holders who have not paid the fine, or for any person who has accumulated three legally sanctioned penalties on the same grounds over the course of three consecutive production cycles.

The elimination of all forms of forced labor and the effective abolition of child labor are rights that are respected in this industry, with no evidence to the contrary.

In terms of the right to freedom from discrimination, the infringements observed are not so much flagrant abuses on the part of the companies as the replication of phenomena that occur in society at large: a pronounced segmentation of jobs and duties according to sex; minor but persistent salary gaps between "male" and "female" jobs; preference for hiring young people; preference for hiring workers with no history of union participation; and cases of sexual harassment on the part of managers or superiors that, while not numerous, are always directed toward women.

Regarding other internationally recognized rights (decent wages, working hours and occupational health and safety) the level of compliance varies. The topic of wages was addressed in a previous section, with findings that indicate that salaries are higher than the minimum. The final amount, however, may not be considered satisfactory or "fair". With respect to acceptable working hours, it is clear from the infractions section that this is one of the most commonly violated areas in the sector. It has been shown that overtime is used in processing plants as a way of increasing production in order to deal with sporadic, periodic or constant work overloads. Finally, occupational health and safety is the industry's weakest area, in the sense that it leads to risks to the health and life of workers, and is the area in which the greatest number of infractions occurs.

## **THE SALMON INDUSTRY IN CONTEXT**

### **Demographic Features of the Communities with Salmon Farming Activity**

In the next section, reference is made to the two regions in which the bulk of the salmon industry takes place: Los Lagos and Aysén.

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<sup>68</sup> Between approximately US\$4,000 and US\$10,000.

According to 2008 projections based on the most recent Population and Housing Census from 2002, the Los Lagos Region<sup>69</sup> has an estimated 815,395 inhabitants, accounting for 5% of the national total. The population is made up of 50.8% men and 49.2% women. Urban inhabitants account for 69.6% of the total, while rural inhabitants account for 30.4% (Foundation for Poverty Relief, 2008). Males and females are equally represented in urban areas, as are the different age groups. In these areas, the population is concentrated in two main age categories: from 5 to 24 years old and from 30 to 44 years old. INE projections for 2020 show an aging population, with growth in the over 50 category.

In rural areas, the population is concentrated in the 5 to 19 year-old category and the 30 to 44 year-old category. It should be pointed out that the decrease in inhabitants between the ages of 20 and 34 may be due to increased rural to urban migration of individuals in this age group. There is also a balance between male and female inhabitants and among the different age groups. The 2006 Casen Survey reported that 20.1% of the regional population belonged to a particular ethnic category.

Overall poverty in the Los Lagos Region has diminished considerably, as measured by the Basic Needs Basket<sup>70</sup>. It dropped from 39.8% to 14% between 1990 and 2006, placing the region above the national percentage (13.7%)<sup>71</sup>.

This has been a very favorable trend both for urban areas in the region, where extreme poverty<sup>72</sup> fell from 15.9% in 1990 to 3.3% in 2006 and moderate poverty<sup>73</sup> from 30.4% to 11%; and for rural areas, where extreme poverty decreased from 10.1% to 1.7% between 1990 and 2006, and moderate poverty from 19.9% to 4.5% over the same period. Nonetheless, total poverty in the region is heterogeneous since it is unequally distributed among the different communes. Of the 10 communes with the highest poverty levels, five are salmon producers: Purránque at 20.3%, Quellón at 13.7%, Puerto Octay at 12%, Castro at 11.3% and Llanquihue at 10.9% (Mideplan, 2006).

Employment rates by gender in the different communes of the Los Lagos Region reflect the national tendency: more males are employed than females. Puerto Montt and Castro (both salmon producing communes) have the highest rates of female employment (50.1% and 46.2%).

The same 2008 population projections based on the most recent Population and Housing Census from 2002 estimated some 102,632 inhabitants for the Aysén Region, accounting for 0.6% of the national

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<sup>69</sup> As of 2007, the region underwent territorial changes with the creation of the Los Ríos Region, which was formalized with the enactment of Law No. 20,174, published in the Official Gazette on April 5, 2007.

<sup>70</sup> This method analyses consumer capacity based on monthly income. A food basket is worth \$23,549 pesos in urban areas and \$18,146 pesos in rural areas.

<sup>71</sup> The data come from the previous administrative division since there are no long-term comparative data.

<sup>72</sup> They live on less than a basic food basket.

<sup>73</sup> They live on less than a basic needs basket composed of food and other goods and services, whose value is equivalent to two basic food baskets.

total. Analyzed by gender, 52.6% are men and 47.4% are women. Urban and rural inhabitants make up 83.6% and 16.4% of the total regional population, respectively (Foundation for Poverty Relief, 2008).

In urban areas, the population is concentrated in two large age groups: from 5 to 19 years old and from 30 to 44 years old. INE projections for 2020 show a pyramid similar to the current structure, but with a greater concentration of inhabitants in the 30 to 34 year-old range.

The rural population is concentrated in two age groups ranging from 5 to 19 years old and from 30 to 49 years old. It is important to point out that the decrease in inhabitants in the 20 to 29 year-old range may be due to emigration of individuals in this age group from the region to larger urban centers. There is also a balance in the number of inhabitants by sex and within the different age groups, with a predominance of males?\*. The INE projection for 2020 shows a more irregular pyramid, with a clear decrease in the youngest age category and a predominance of male inhabitants. There is a significant number of Mapuche inhabitants in the region. In Guaitecas, one of the salmon farming communes, 23.7% of the population belongs to this ethnic group<sup>74</sup>.

The incidence of poverty in the Aysén Region has diminished considerably, as measured by the Basic Needs Basket. It went from 32.8% to 9.2% between 1990-2006, putting the region below the national average (13.7%).

This has been a very favorable trend for urban areas, where extreme poverty decreased from 10.3% to 4.3% between 1990 and 2006, and poverty from 29.5% to 5.1%. In rural areas, extreme poverty decreased to approximately 3.1% in 2006, and poverty also declined from 8.7% to 4.7%.

Total poverty in the region<sup>75</sup> is lower than the national average. Among the salmon farming communes included in the 2006 Casen Survey<sup>76</sup>, Aysén and Cisnes have a 5% and 8.8% poverty rate, respectively.

Employment rates by gender in the communes of the Aysén region tend to follow the national trend: more males are employed than females.

### **Main conflicts**

**Conflicts with artisanal fishermen:** Increasingly, artisanal fishermen have had to share the coastline – to which they traditionally had exclusive use rights – with the salmon industry. The installation of cages and environmental pollution related to waste, salmon escapes and other factors, has had an impact on the activities of artisanal fishermen.

**Conflicts with tourism:** Several conflicts have arisen between tourist-related activities and salmon farming, especially on the shores of lakes, fiords, channels and estuaries in the Aysén Region. There,

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<sup>74</sup> Meanwhile, in both Aysén and Puerto Cisnes, 7.7% of the population is Mapuche.

<sup>75</sup> Reaching 9.2%, below the national rate of 13.7%.

<sup>76</sup> No data are available for Guaitecas.

salmon farms coexist with tourism aimed mainly at foreign visitors. The conflicts are related to pollution and waste in coastal areas and beaches; landscape pollution; killing of sea lions; and salmon escapes from farms, among others. One example of the negative impact of these factors is on fly fishing, a practice that draws in many foreign tourists.

***Salmon escapes and impacts on human health:*** According to a WWF report, up to 1.7 million salmon escape annually from ocean farms in Chile, resulting in many adverse environmental and social impacts. Escape volumes in Chile exceed the rates in countries with similar production levels by almost 15 times, based on a comparison of Chilean and Norwegian statistics in 2008. Moreover, of the total amount of escaped individuals, only 3% is recaptured, which highlights the importance of focusing on prevention rather than mitigation or recapturing (Sepúlveda, Farías and Soto, 2009).

The main environmental impacts from salmon escapes are: predation of native fauna; competition with species of similar feeding requirements; and modifying the structure, diversity and operation of aquatic systems. This is compounded by the establishment of broodstock in rivers and lakes in southern Chile, and an increased risk of pathogen and disease transmission from the interaction of farmed salmon and wild species.

In addition to the social impacts mentioned regarding conflicts with artisanal fishermen, there are also risks for human health resulting from the consumption of escaped salmon, since their origin, health status and exclusion period (if they have received medications) are unknown. This could eventually result in bacterial resistance to antibiotics used by humans.

***Changes in consumption patterns:*** Salmon farms provide workers with a monthly income, unlike normal land farming or fishing activities (which are characterized by their seasonality and uncertainty due to the prevalence of natural events). Notwithstanding, the transformation of the local population into wage-earners is known to lead to cultural changes that impact the preservation of local traditions and customs. Consumerism and indebtedness are some of the factors known to come along with the employment of salmon industry workers, which can have a severe impact on households in times of crisis.

***Segregation and parallel worlds:*** Industry advocates speak of salmon farming as an economic activity that has helped get a depressed area back on its feet, providing more jobs and thereby increasing consumption and urban growth. They add that in the same period, the industry went from zero to US\$2 billion in exports; the population of Puerto Montt (the capital city of the Los Lagos Region) increased from 70,000 to 175,000 people; and more than 40,000 jobs associated directly or indirectly with salmon farming were created.

The agents of a significant part of these changes were executives who moved to the area to develop this dynamic industry. With them, they brought social and cultural changes to a region formerly dominated by economic activities such as agriculture, livestock and artisanal fishing, with an elite class composed mainly of German settlers who were fully integrated into the local community.

However, criticism has surfaced concerning a lack of involvement with the local culture; allegedly, these executives failed to establish strong relationships with the community. Instead, it is argued, they have developed their own neighborhoods, schools for their children, clubs and leisure centers, in a sort of exclusive ghetto. Critics say they lack sufficient commitment to the social context and to the rest of the activities that take place in the region (Capital Magazine, 2009).

### **How the Industry Supports the Community**

Several companies develop outreach activities and provide community support. However and although most of such aid is useful, their coverage is limited and they are often not part of an integrated and extensive corporate social responsibility policy.

SalmonChile's webpage (the industry's trade organization) lists the support provided to the community. Several projects are conducted jointly with governmental or municipal organizations:

- Donation of 20 school libraries (600 titles) for 20 schools in the regions of Los Lagos and Aysén;
- Building and operation of one nursery and day care center, located in a commune in Los Lagos, with a capacity for 120 children under six;
- Children's Orchestra of Aysén which trains 40 children at risk in several musical instruments;
- Cultural Center in a commune in Los Lagos, with a auditorium for 214 people, exhibition hall and stage;
- Construction of 17 bus stops in the area of Aysén, to protect workers and the community from rainy weather;
- Radio program for the Aysén region dealing with diverse topics of general interest.

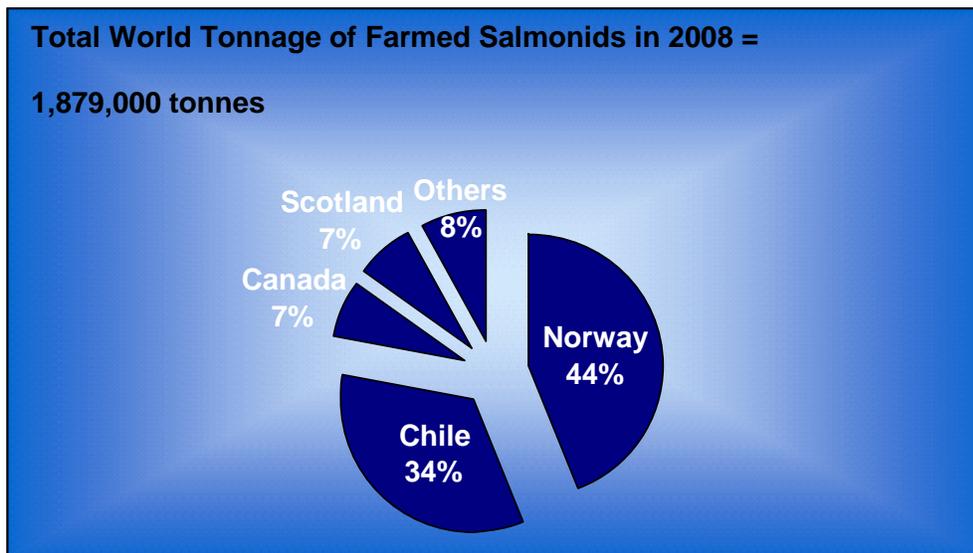
### CHAPTER 3: Country Overview- Canada

#### Introduction: The Salmon Aquaculture Industry in Canada

In Canada the principal aquaculture species is Atlantic salmon (*Salmo salar*). It is one of about fourteen countries including Australia, Norway, and Chile that produces Atlantic salmon, which has become a global commodity traded world-wide. The 2007 global output of farmed Atlantic salmon at 1,433,708 tonnes has grown at an average annual growth rate of 11.0% since 1990. This rate of growth compares to 16% for Canada. The global value of farmed Atlantic salmon increased from US\$ 2.8 billion in 2000 to US\$ 7.6 billion in 2007. Globally, it is the second most valuable farmed species after Whiteleg shrimp (*Penaeus vannamei*) [FAO, 2010].

With expansion there has been concentration geographically. Two countries, Norway and Chile, dominate production of farmed Atlantic salmon, as can be seen in Table 1. Canada produces about 7% of the world total.

Figure 3.1: Distribution of Countries Producing Farmed Salmonids in 2008



Source: SalmonChile, 2009

Canada's aquaculture output has increasingly specialized on Atlantic salmon. In 1990 Atlantic salmon accounted for only 23% of total tonnage, but had increased to 70% of tonnage and 84% of value by 2007. In the two major producing provinces, Atlantic salmon accounted for 89% of total provincial tonnage in British Columbia (BC) and 82% in New Brunswick (NB). Respective shares of provincial aquaculture values were 96% and 97%. The specialization on Atlantic salmon in Canada is shown below in Table 1

Table 3.1: Output of Farmed Salmonids in Canada 1990-2007 (tonnes)

	1990	2000	2007
Atlantic salmon	9,625	61,495	117,306
BC; Pacific Ocean	1,790	39,300	71,370
NB; Atlantic Ocean	7,835	33,195	45,936
Chinook	11,977	8,000	-
Coho	1,509	2,100	-
Trout	7,487	12,037	4,899
Total	30,598	94,632	122,205

Source: FAO, Fishstats. 2010

Salmon farming is becoming increasingly concentrated industrially, as well as geographically. In 1996 about 114 companies produced 80% of the world supply of farmed salmonids, but by 2006 this had fallen to 46 companies (Marine Harvest, 2008). Mergers occurred because of bankruptcies, and lack of economies of scale of smaller companies. This oligopolistic power is illustrated by two transnational companies, both based in Norway. One company alone, Marine Harvest of Norway produced about 380,000 tonnes of salmonids in 2006 of which 358,800 were Atlantic salmon (more than one-quarter of world output). It has operations in Norway, Chile, Scotland, Canada, Ireland and Denmark (the Faroe Islands); in all these countries it is the single largest producer. It is also a major fish processor with European plants in Belgium, Spain, France and the Netherlands. The second major transnational is Mainstream, whose holding company is Cermaq. The principal shareholder is the Norwegian government with 43.5% of the capital. It is the third largest producer in Chile and the second largest in BC. The Cermaq group includes the world's largest feed manufacturer.

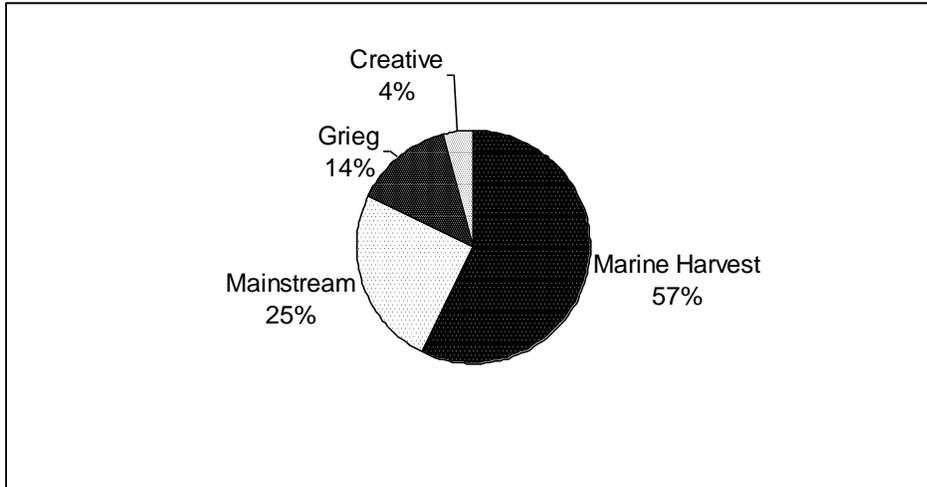
Diversifying geographically to different countries, as Marine Harvest and Mainstream have done is a rational strategy for farms, because it reduces disease risk, and economic risks due to exchange rate volatility (Ridler, et.al. 2007). They can also obtain economies of scale and of scope. There are, however, risks to communities reliant on a single employer. Because of size, aquaculture companies may enjoy monopsony power over the labour force as the dominant employer in isolated rural coastal communities. This could depress wages and oblige communities to make concessions over employment protection legislation (EPL).

### **Salmon aquaculture in Canada**

In Canada three firms dominate production on the Pacific west coast in BC, with one alone accounting for more than half the production. Bankruptcies and mergers have reduced the number from about 100 in the late 1980s. All run hatcheries, grow-out farms and processing. The largest is Marine Harvest with

75 sites and 55% of provincial output. The second is Mainstream with 33 sites and 24% of output. Grieg is the third with 17 sites and 13% of production. These three Norwegian companies produce exclusively Atlantic salmon. Creative is the fourth company; it is the only Canadian company and the only one to produce Chinook salmon. It has 6 sites and 4% of output. Foreign (Norwegian) ownership of salmonid production in BC therefore equals 96% of the total. This is shown below in Figure 2 below.

Figure 3.2: British Columbia (BC), Canada: Concentration of Salmonid Companies in 2008



On the Atlantic east coast in NB, there has also been industrial concentration of salmon farms, although unlike the west coast, with operations owned by local families and without foreign companies. The number of processing plants in NB has halved since 2000, and the number of grow-out companies had decreased from 41 to 8. Seven of the eleven remaining salmon hatcheries in NB are owned by one company, Cooke Aquaculture. It also owns one and leases one of the remaining five active processing plants, and has one of the remaining seven marketing organizations. Cooke Aquaculture is fully vertically integrated, and controls its own hatcheries, grow-out, and processing, marketing, and transportation companies in NB. It recently bought a major feed supplier's Nova Scotia operation, and also owns GMG Fish Services which provides cages, nets, boats and motors, and a range of supplies used by aquaculture. Other remaining companies are also in various stages of vertical integration. Admiral Fish Farms operate hatchery, grow-out, processing and marketing organizations in NB. Ocean Horizons and Ocean Legacy both operate grow-out, processing and marketing organizations in NB, and Aqua Fish Farms operates hatchery, grow-out and marketing organizations in NB, but contracts out its processing. All grow-out companies operate multiple sites. Today, there are only two independent salmon hatcheries, Gray's Aquaculture and Arctic Rose supplying industry members. All other salmon hatcheries supplying smolt for grow-out are owned and/or operated by companies with grow-out facilities.

Table 3.2: New Brunswick (NB), Canada: Concentration of Salmonid Companies in 2000 and 2007

	2000	2007
Hatcheries	19	11

Farm Companies	41	8
Processing Plants	10	5
Marketing Organizations	10	7
Marine Site Leases	96	90

Source: Cormier, 2009

Once received in the plant, the fish are processed. Primary processing involves gutting and cleaning the fish. The finished product is Dressed Head On (DHON) whole fish. These are typically packed in ice in 50-pound Styrofoam containers to keep the fish cold during transport to market. Salmon harvested in NB can reach the US and Canadian markets in less than 48 hours from cage to customer.

Initially, the industry was processing Dressed Head On (DHON) product. Since the mid 1990's, the industry has evolved towards increasingly significant amounts of secondary or value added processing in the form of deboned fillets, portions and steaks. Today in NB, secondary (value added) processing represents 40% of the processed product sold.

Fresh processed products are sold to fish brokers, wholesale food distributors and retail chain customers throughout North America. However, in Canada, the great majority of product sold is in Ontario and east, and in the US, from the mid-west east and down the eastern coast as far as the Carolinas. About 70% of BC salmon is exported, of which 90% is to the US, and about 60% of NB salmon is exported (also 90% of which is to the US). NB salmon is primarily sold as fresh product and transported in refrigerated trailer/tractor combinations.

The salmon aquaculture industry is supported by a wide range of suppliers. Major suppliers to the industry provide specialized feed for hatcheries and grow-out operations; net, cage and mooring systems; insurance; therapeutants and vaccines; processing equipment; packaging; trucking; and financing. Other suppliers provide a wide range of goods and services ranging from rope, gloves, boats and motors to specialized consulting and environmental services. About 90 suppliers to the NB salmon aquaculture industry are located in NB, but only about 45 of these employ people as a result of their sales to aquaculture. These indirect activities have an additional impact on NB of about 60% the direct effects, whether measured by employment or GDP (Statistics Canada, 2005). In addition, there are numerous suppliers located throughout North America that sell to the salmon aquaculture industry.

### **Demographic Characteristics of Employees.**

Data

Data were obtained by surveys of the salmon producers. In BC the producers were asked to complete the survey by the BC Salmon Growers' Association. The two largest firms complied, so 82% of provincial production is covered. A similar survey in NB was undertaken on behalf of the New Brunswick Salmon Growers Association by Skip Cormier (Cormier, 2009). All but the very smallest producer completed the

survey conducted by so results account for more than 95% of provincial output. Appreciation is due to the two Associations which were so helpful. It should be noted that there is sometimes a discrepancy between the totals because not all firms were willing to give certain information.

Results:

**Gender**

Survey data in both BC and NB demonstrate that most employees in salmon farming are male. In BC, about 85% of farm employees are men, although when processing, which includes a higher proportion of women, is added the proportion falls to about 70%. This is the same proportion for all salmon activities in NB (71%). Table 3 below indicates the gender distribution. Overall the salmon farming industry in Canada employs about 3 men for every woman. A major reason for the dominance of men in farm operations is the shift schedule, which in BC at least, requires workers to spend up to eight consecutive days on site. This shift schedule is usually not convenient for women with children.

Table 3.3: Salmon Aquaculture Employees by Gender

	Men		Women		TOTAL	
	Number	Percent	Number	Percent	Number	Percent
BC	616	85.4	105	14.6	721	100
NB	851	71.5	340	28.5	1,191	100
Canada; BC +NB	1,467	76.7	445	23.3	1,912	100

<sup>1</sup> The BC figures do not include processing, which has a higher proportion of women than farming.

There is a difference in activities within aquaculture. In NB men comprise 91% of grow-out employees, 62% of hatchery employees and 55% of processing employees. Conversely, women comprise 9% of grow-out employees, 38% of hatchery employees and 45% of processing employees.

**Occupations by Gender**

While about 77% of aquaculture employees are men, they are particularly predominant in managerial and supervisory positions. The only industry occupation where women predominate is administration, where females outnumber males 2 to 1.

Table 3.4: Canada (both BC and NB); Number of Men and Women in Salmon Aquaculture Employment (permanent and contract) by Job Classification

Job Classification	TOTAL			Men			Women		
	BC	NB	Total	BC	NB	Total	BC	NB	Total
Managers	92	106	198	80	88	168	12	18	30

Heads/Supervisors	105	119	224	99	106	204	6	13	20
Professional/Technicians	216	157	373	184	97	281	32	60	92
Administration	35	61	96	13	19	32	22	42	64
Labourers	242	748	990	219	541	760	23	207	230
Total	690	1,191	1,881	595	851	1,445	95	340	436

Table 3.5: BC; Percentage of Men and Women in Salmon Aquaculture Employment (permanent and contract) by Job Classification (%)

Job Classification	Total	Men	Women	Total
Managers	13.3	87.0	13.0	100.0
Heads/Supervisors	15.2	94.3	5.7	100.0
Professional/Technicians	31.3	85.2	14.8	100.0
Administration	5.1	37.1	62.9	100.0
Labourers	35.1	90.5	9.5	100.0
All Employees	100.0	86.2	13.8	100.0

Table 3.6: NB; Percentage of Men and Women in Salmon Aquaculture Employment (permanent and contract) by Job Classification (%)

Job Classification	Total	Men	Women	Total
Managers	8.9	83.0	17.0	100.0
Heads/Supervisors	10.0	89.1	10.9	100.0
Professional/Technicians	13.2	61.8	38.2	100.0
Administration	5.1	31.1	68.9	100.0

Labourers	62.8	72.3	27.7	100.0
All Employees	100.0	71.5	28.5	100.0

Table 5 and 6 indicate that BC has a higher percentage of employees classified as managers, supervisors and professionals/ technicians than NB. On the other hand it has a much smaller proportion of general labourers. However, supervisor technician and labour positions are not always clearly delineated, and in many instances, supervisors, technicians and labourers may, in fact, do the same types of work.

Tables 5 and 6 also reveal that in all positions of authority, women are in the minority. Women account for only 13% of managers in BC and 17% in NB. An even greater gender discrepancy applies to supervisors. However, in NB there is a high proportion of female professional and technicians compared with BC.

For the two provinces combined, Tables 7 and 8 show that men dominate in managerial, supervisory and professional/ technical positions. Women outnumber men 2 to 1 in administration.

Overall in BC the share of women managers in all sectors has increased steadily and reached 36% by 2001, but there was considerable discrepancy between sectors (BC Stats, 2003). In the public sector women dominated but in construction, transport and some other sectors women accounted for barely 10% of managers.

Table 3.7: Canada (both BC and NB); Percentage of Men and Women in Salmon Aquaculture Employment (permanent and contract) by Job Classification (%)

Job Classification	Total	Men	Women	Total
Managers	10.5	84.8	15.2	100.0
Heads/Supervisors	11.9	91.1	8.9	100.0
Professional/Technicians	19.8	75.3	24.7	100.0
Administration	5.1	33.3	66.7	100.0
Labourers	52.7	76.8	23.2	100.0
All Employees	100.0	76.8	23.2	100.0

Table 3.8: Canada (both BC and NB): Percentage of Men and Women in Salmon Aquaculture Employment (permanent and contract) by Job Classification (%)

Job Classification	TOTAL	Men	Women
Managers	10.5	11.6	6.9
Heads/Supervisors	11.9	14.1	4.6
Professional/Technicians	19.8	19.5	21.1
Administration	5.1	2.2	14.7
Labourers	52.7	52.6	52.7
Total	100.0	100.0	100.0

**Age profile**

Table 3.9: BC and NB; Number and Percentage of Salmon Aquaculture Employees by Age Groups and Gender

	Men				Women				Total			
	Number		Percentage		Number		Percentage		Number		Percentage	
	BC	NB	BC	NB	BC	NB	BC	NB	BC	NB	BC	NB
<20	16	45	2.6	5.3	2	5	1.9	1.5	18	50	2.5	4.2
20-39	356	418	57.8	49.1	50	137	47.6	40.3	406	555	56.3	46.6
40-49	154	241	25.0	28.3	28	116	26.7	34.1	182	357	25.2	30.0
50-59	87	118	14.1	13.9	24	70	22.8	20.6	111	188	15.4	15.7
60+	3	29	0.5	3.4	1	12	1.0	3.5	4	41	0.6	3.5
Total	616	851	100.0	100.0	105	340	100.0	100.0	721	1,191	100.0	100.0

Table 3.10: Canada (both BC and NB); Number and Percentage of Salmon Aquaculture Employees by Age Groups and Gender

	Men		Women		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
<20	61	4.2	7	1.6	68	3.6
20-39	774	52.8	187	42.0	961	50.3
40-49	395	26.9	144	32.4	539	28.2
50-59	205	13.9	94	21.1	299	15.6
60+	32	2.2	13	2.9	45	2.3
Total	1,467	100.0	445	100.0	1,912	100.0

In both provinces the majority of aquaculture employees are aged 40 or younger. In BC almost 60% of employees were in this age range, and in NB just over 50%. In a previous survey of salmon aquaculture in 2000, 75.6% of industry employees were reported as less than 39 years of age, so the age level of employees in the industry has increased during the past 10 years. About 30% were between 40 and 49 years of age for a total of 81% of employees being under 49. There is little difference by gender.

The age distribution is important because of its socio-economic implications. A young labour force requires educational facilities for children. It also increases the economic viability of coastal communities and reduces rural-urban migration. Most aquaculture occurs in isolated areas which usually lack employment opportunities for young people; the sector therefore enables young people to remain reinforcing the viability of coastal communities.

***Educational level***

Farms in BC did not provide data on educational level but Table 11 below shows the level of education of hatchery and processing personnel in NB. Not surprisingly due to the more technical nature of the work, hatchery employees have higher levels of education than processing employees. Approximately 55% of hatchery employees have post secondary certificates or diplomas or bachelor degrees as compared to approximately 14% of processing employees. Almost three-quarters of processing workers have just high school or less, which limits their employment opportunities.

Table 3.11: NB, Canada; Educational levels in the salmon industry

	Hatchery	%	Processing	%

Less than high school	2	2.4	59	10.1
High school graduate	11	13.4	352	60.0
Some post secondary	24	29.3	91	15.5
Post secondary diploma	42	51.2	74	12.6
Bachelor's degree	3	3.7	11	1.8
Above bachelor's degree	---	---	---	---
Total	82	100.0	587	100.0

\*Note: Education information for grow out employees was not available at the time of the study

### **Contract work.**

A significant difference between Canada and Chile is reliance on permanent workers. In Canada on both coasts the bulk of labour is full-time and permanent. In BC the proportion is 97% and in NB 90% for a national total of 90%. About 7% of industry jobs are year round part-time and about 3% are seasonal. This is shown in Table 12.

Table 3.12: BC, NB and Canada; Permanent workers in salmon aquaculture (numbers and percent)

	Permanent		Casual		Seasonal		Total	
	Number	%	Number	%	Number	%	Number	%
BC	676	97	22	3	0	0	685	100
NB	1,076	90	79	7	36	3	1,191	100
Canada	1,752	93	101	5	36	2	1,889	100

Table 3.13 disaggregates by type of activity within aquaculture in NB. As can be seen grow-out has a high proportion of part-time and of seasonal employees. Surprisingly, processing has a high proportion of permanent employees.

Table 3.13: NB: Permanent workers in salmon aquaculture (numbers and percent)

	Hatchery		Grow-out		Processing		Total	
	Number	%	Number	%	Number	%	Number	%
Full-time	74	90	441	84	561	96	1,076	90
Part-time	2	3	51	10	26	4	79	7
Seasonal	6	7	30	6	0	0	36	3
Total	82	100	522	100	587	100	1,191	100

Aquaculture creates employment and employment income and these impacts can be quantified by input-output models. However, some NGOs have expressed concern that labour conditions are unsatisfactory and fail to comply with international standards.

### Labour Code

The origin of labour laws was the British Factory Act, which were enacted in response to labour conditions created by industrialization. Over time labour laws have expanded to cover rights and obligations of workers, union members and employers in the workplace. Generally, they cover: industrial relations – certification of unions, labour-management relations, collective bargaining and unfair labour practices; workplace health and safety and employment standards, including general holidays, annual vacations, working hours, unjust dismissals, minimum wage, layoff procedures and severance pay. Special social issues include women and child labour and migrant labour the crux of which is welfare and protection of these groups. A significant aspect of labor relations is employment protection legislation (EPL). It may restrict the ability of firms to hire and fire. For example provisions about employment of disadvantaged groups, conditions for the use of part-time or contract workers, or training requirements, affect hiring. Redundancy procedures, the length of advance notice, and severance pay affect firing.

Many countries have ratified international protocols of the International Labour Office (ILO). These guidelines are considered the fundamental rights of labour. They are the right of association, the right to organize and to negotiate collectively, the prohibition of any type of forced labour, non-discrimination, a minimum age for the employment of children, and prohibition of child-labour. The guidelines also cover labour codes, such as acceptable working conditions, minimum salaries, hours of work, maternity leave and health and occupational safety. Minimum common standards discourage regulatory arbitrage. Labour rights may also be part of bi-national agreements. An example is the 2004 Free Trade Agreement between Chile and the USA. Chapter 18 of the Agreement specifies the social and labour norms that both countries must meet to comply with the 1998 ILO guidelines.

In Canada, federally regulated companies such as banks, and telecommunications companies, and companies whose business crosses provincial boundaries are regulated under the national *Canada Labour Code*. Otherwise (as for aquaculture), provincial labour codes apply. It should be noted that in BC aboriginal people must be consulted prior to any license approval. All provinces have regulations that oblige employers to pay a minimum wage and to meet certain labour conditions. They have Employment Standards regulating overtime, holidays and other conditions (such as maternity leaves and uniforms).

Regulations such as EPL also affect the ability of firms to adjust employment rapidly to demand and supply shocks, reducing their efficiency and increasing their costs. EPL can differ sufficiently to give those jurisdictions with lower labour standards a competitive advantage compared with enterprises in jurisdictions with higher labour and social standards. Exporter's costs will be artificially lower than their competitors, representing an unfair advantage in (international) trade. This is called *social dumping*. Firms that are footloose may be tempted by "regulatory arbitrage", relocating or threatening to relocate to jurisdictions where rules are more accommodating.

In BC there are special EPL for employers involved in raising finfish rules (BC Ministry of Skills Development and Labour, 2010). A differentiation is made between those who do not live on-site and those who do. Workers who do not live on-site are paid regular wages (at least the minimum wage) after 35 hours, whereas those on-site who work for more than 40 hours a week must be paid at least overtime rates (1 1/2 times). They can bank over-time and take time off with pay (within six months). Overtime is taken out of the "time bank" at the rate at which it was earned; so an hour banked at double time would allow two hours off with pay. For every twenty-four shift, on-site workers must have at least 12 hours scheduled rest. If the scheduled break is interrupted for work the employee must be paid at least overtime rate and for a minimum of two hours (even if the worker does not work for two hours).

### **Compliance with labour standards**

Canada has regulations that oblige employers to pay a minimum wage and to meet certain labor conditions. In Canada the minimum wage is a responsibility of the province or territory and in October 2009 ranged from CAD\$ 10.00 to \$8.00 an hour. The two principal aquaculture provinces (British Columbia and New Brunswick) in 2009 have a minimum wage of \$8.00 an hour and CAD\$8.25 an hour respectively. Assuming a 40 hour week and four weeks a month, the monthly minimum wage approximates CAD\$1,320 or US\$1,200. Both provinces have Employment Standards regulating overtime, holidays and other conditions (such as maternity leaves and uniforms). They meet the 1998 International Labour Organization (ILO) guidelines.

In BC the average salary for Mainstream is CAD\$5,417 a month which is four times the minimum wage. However, this includes managers. The hourly wage for a labourer is about CAD\$15.00 an hour which is somewhat below the average for the salmon region in BC. The lower salary, plus the need to do eight-day shifts, is recognized as a challenge to recruitment in BC. All staff earn higher than minimum wage without overtime and bonuses. Working hours are based on 40 hours per week. Overtime is claimed at increased rate but must be authorized by the manager. All non-union staff are eligible for an annual

bonus paid according to company performance, and union staff at processing plant are eligible for monthly production bonus based on volume processed.

Survey data for NB show that average salaries for those involved in hatchery, grow-out and processing in 2007 were more than double the 2009 minimum wage for NB (ranging from CAD\$2,512 to CAD\$2,617), although below the average salary of the province as a whole in 2009 (CAD\$3,040). However, once administration is included, the average salary increases to about CAD\$3,140, which is higher than the average salary for NB. Aquaculture salaries include bonuses which are performance-based (and in processing plants also based on attendance). Working hours range from 40 to 44 hours, with considerable flexibility in the largest company, Cookes, Ltd which is fully integrated, permitting the company to accommodate the preferences of workers. Temporary foreign workers are hired if no Canadian worker is available. Wages and benefits are identical to domestic workers; and the program is strictly regulated.

In terms of worker health and safety there have been no direct employee fatalities in BC, at least among the two major companies, although a diving contractor working at one site suffered the death of a diver in 2007. This has been the only fatality. In NB there have been no fatalities.

In terms of injury the companies report a dozen or so each year mainly at processing plants where people use sharp knives, or on sea water sites which involve mainly sprain/strain injuries from physical tasks or slip/trip hazards. Reducing the number of injuries is a Key Performance Indicator for Marine Harvest in BC and its Health and Safety program (5 staff) is focused on preventing injury. At Mainstream, also in BC, there are safety representatives from all farms, offices and warehouses and they meet monthly. It is certified for Occupational Health and Safety - OHSAS 18001 and there are comprehensive guidelines and Key Performance Indicators (KPI) developed. According to ISO KPI's, all injuries and absentee data (with other risks) are tracked for trends and risk management.

In NB the Salmon Growers' Association is assisting the smaller farms to upgrade training on worker safety. At the largest company, Cookes Ltd., certification by the Seafood Trust of CQS, requires constant internal and external audits with record-keeping, and targets for improvements. At each salmon operation there are worker health and safety committees; these are required by regulations. Workers on or near the water are required to wear life jackets; failure to do so a second time means dismissal; this is in sharp contrast with commercial fishermen who are federally regulated.

The major issues for EPL at salmon farm in BC are complaints over termination of employment. These complaints have prompted Marine Harvest to improve termination procedures. In NB, the largest salmon farm with about 1,600 employees has a dual procedure. If the company needs to terminate an employee without cause (for example because of an acquisition), a severance package is provided. If, on the other hand, there is not a good fit between the company and an employee, or if there is an issue with the employee, a 3-tier system is followed whereby the company tries to coach the employee through the situation to improve things, offers training or counseling as appropriate, and only goes to termination as a last resort. Employees are rarely surprised by a termination as they would have gone through a few steps with Human Resources before it comes to termination. When someone is

terminated they always get a letter from the company that clearly outlines the reason in a way that can help them find other more appropriate work or qualify for benefits. In some cases the company also pays for retraining to help them transition to another position. This approach is taken regardless of the length of contract. There have been no strikes at the plants and few formal grievances at the processing plants.

Anti-union activities (even perceptions of anti-union behavior) are illegal, and are strictly avoided. Where unions exist in the east of Canada, as in one feed mill in Nova Scotia or a processing plant in Newfoundland, they have been inherited through mergers.

All salmon farms subsidize training and education, although courses are generally technical. In Canada the preference is to up-grade existing staff, but if that is impossible hire externally. On the east coast the largest company is privately-owned, and has demonstrated its commitment to the community by hiring local people. It has also adopted integrated multi-trophic aquaculture (IMTA) in order to mitigate ecological damage from salmon cages without clear evidence of increased profitability. In BC also most hiring is of local people, and IMTA has been introduced there as well. This suggests a potential external benefit on both coasts.

#### **Socio-economic Indicators of Salmon Aquaculture.**

There are five socio-economic indicators of the impact of salmon farming: the revenue generated from sales; industry expenditures in the local economy, employment generated in the local economy, payroll in the local economy and the number and type of linked activities. The five direct indicators can be quantified with input-output data if available. If these do not exist direct impacts can be quantified using proxies.

In addition to these directly quantifiable impacts there are externalities, which are often intangible. They may be negative or positive. The salmon farm may be an “enclave” relying on expatriate technical personnel, who buy imported goods, and that has few linked activities. Indirect and induced impacts will be negligible. If there is ecological damage or the enterprise creates resentment there may be litigation, vandalism and theft (negative externalities). Alternatively the company may be an “engine of growth” training local people, paying community taxes, generating spinoff jobs, and constructing infrastructure (positive externalities) (Stanley, 2003).

Aquaculture’s *direct* contributions to the economy arise from the total output effect of aquaculture, both the growing of salmon and processing. It is measured by the total value of hatcheries and grow-out operations, and, also the processing and transport of salmon. To estimate the direct contribution of aquaculture to Gross Domestic Product (GDP), deductions from total output are necessary. This is the concept of value added and is equal to total output, minus intermediate outputs and minus “imported” inputs. *Indirect* effects of aquaculture are derived from the total output of other sectors which supply aquaculture. They can come from backward linkages (i.e. feed, cages) or forward linkages (i.e. transport). Part of the output, value added, jobs, and incomes in these suppliers are due to aquaculture, and therefore, are part of the contribution of aquaculture to the economy. In addition to direct and indirect effects, there are *induced* effects. Induced effects refer to the additional impacts caused when

households spend their incomes earned from aquaculture. Such incomes may be earned in the core aquaculture activities (salmon production and processing), or in the linked activities. When a portion of the income is spent, the economic activity of the immediate recipients increases causing continuing (if diminishing) repercussions, as with the Keynesian multiplier. The size of the repercussions depends on the amount spent locally. Clearly leakages are fewer (and hence the induced effect larger) nationally than just locally. The sum of direct, indirect and induced effect is called the *total* effect.

Statistics Canada was the principal source for indirect contributions and for multiplier estimates. The input-output tables disaggregate by province and by industries to the six digit level. At the six digit level (112500) salmon farming is classified under “animal aquaculture” which includes the cultivation of shellfish, as well as all finfish. However, in BC and NB, it is plausible to use “animal aquaculture” as a proxy for salmon farming. This is because (Atlantic) salmon is the dominant species farmed in both provinces, accounting for about 93% of total aquaculture value in BC, and 98% in NB. Similarly, the six digit industrial classification for seafood preparation and packaging (311700) does not disaggregate by the source of the seafood (aquaculture, international fish imports or the commercial fisheries) or by species, but was used for the processing of farmed salmon products. Multipliers and ratios are shown in the tables below. As can be seen, the right column has the highest ratio because it combines direct and all spinoff effects.

Table 3.14: (Salmon) Aquaculture: Some Multipliers and Ratios for each CAD\$1 Exogenous Output Shock (Employment effects per million dollars of output)

	Direct		Indirect		Induced		Total	
	BC	NB	BC	NB	BC	NB	BC	NB
GDP: Provincial	0.27	0.22	0.30	0.17	0.19	0.11	0.76	0.50
<b>National</b>	0.30	0.31	0.70 <sup>1</sup>	0.51 <sup>1</sup>			1.0	0.82
Wage Income: Provincial	0.14	0.11	0.17	0.10	0.09	0.05	0.40	0.26
<b>National</b>	0.14	0.14	0.39 <sup>1</sup>	0.31 <sup>1</sup>			0.53	0.45
Employment FTEs :Provincial	3.9	4.6	4.1	2.1	2.5	1.9	10.5	8.6
<b>National</b>	3.9	4.6	10.2 <sup>1</sup>	8.6 <sup>1</sup>			14.1	13.2

<sup>1</sup> All spinoff effects

Source: Statistics Canada Input-Output, 2005, Cormier, 2009

Table 14 indicates that a one dollar increase (decrease) in the value of salmon farming will produce a \$0.27 increase (decrease) directly in BC's provincial GDP and 0.30 in that of NB. After taking into account both indirect and induced effects, the total effect will be \$0.76 and \$0.57 respectively. The following row estimates the impact on Canadian GDP. The total impact on Canada, as a whole, would be \$1.0 for BC and \$0.84 for NB. The impact on Canadian GDP is greater than the impact on provincial GDPs because leakages are fewer.

Every dollar increase (decrease) in the value of salmon farming increases labour income directly by \$0.14 within BC and NB and when indirect and induced impacts are combined by \$0.53 and \$0.43

The row for employment measures Full Time Equivalents (FTEs) reflecting labour productivity. If BC salmon production increases (decreases) by \$1 million 3.9 FTEs are created directly within the province, 4.1 in indirect jobs and 2.5 in induced jobs. Total employment generated within the province is 10.5. For NB indirect and induced impacts are smaller because it is a smaller and less self-sufficient province than BC. Total employment for each million dollar increase in output increases by 9.2 FTEs. Again, because of fewer leakages the impact on national employment is higher for both BC and NB.

Taxes paid as a result of the salmon industry are corporation taxes, income taxes, sales taxes and property taxes. They accrue to different levels of government and are impossible to attribute exclusively to the industry, but an estimate can be made of some tax revenues.

In addition to these direct socio-economic indicators the input output model can quantify externalities, such as taxes, and foreign exchange revenues earned from salmon aquaculture. For every CAD \$100 million of spending in salmon farming, the industry pays \$1 million in indirect taxes to NB on products, and another \$3 million in indirect taxes on production; the respective figures for salmon processing are zero and \$1 million. When Canada is included, the tax payments increase. Thus, with the value of salmon farming in 2007 the indirect tax paid to NB was at about \$7 million. For Canada, the total indirect tax revenues generated just by NB salmon farming were more than CAD\$9 million in 2007.

In addition, there are personal income taxes. If some 2,500 FTE's jobs in direct, indirect and induced activities were generated in NB because of the salmon industry in 2007, and about 80.0 million dollars of labour income NB's tax revenues from personal income tax attributable to salmon farming would exceed \$20 million annually.

A further contribution to Canada's economy is the value of net exports. As mentioned above more than 60% of farmed salmon is exported. However, there are international imports associated with both the cultivation of salmon and its processing; international import coefficients range from 0.21 to 0.30. Thus from the export value international imports must be deducted to give net foreign exchange earnings from farmed salmon exports. For Canada as a whole this exceeds CAD\$300.

## **Socio-economic Impacts on Communities**

### **Socio-economic impacts on BC.**

Salmon aquaculture in BC occurs primarily in the Campbell River / North Vancouver Island Regions. The province in 2007 produced salmon sales worth CAD \$522.6 million (about US\$490.0 million); just over half the total value of Canadian aquaculture output (50.9%). In addition shellfish sales in BC were worth another CAD\$ 37.1 million. Aquaculture contributed CAD\$151 million directly to provincial GDP, which when combined with indirect and induced impacts, totalled CAD\$425 million (Gardner Pinfold, 2009). Total wage income generated within Canada from BC aquaculture was CAD\$ 293.9 million.

In 2007 aquaculture in BC generated 2,200 Full Time Equivalent (FTE) jobs in BC, another 2,300 in indirect activities and 1,400 in induced employment (Gardner Pinfold, 2009). Total FTE employment within the province was therefore 5,900. Within the Campbell River / North Vancouver Island Regions direct employment in salmon aquaculture was 1,200 FTEs, generating CAD\$60 million in direct employment income to the region. The industry supports about 200 companies in the local community.

In spite of these socio-economic benefits, social license towards salmon aquaculture in BC is poor; perceptions are almost uniformly hostile to aquaculture (Department of Fisheries and Oceans, Canada. 2005). There was unanimous agreement in focus groups in two major BC communities on the statement *“While aquaculture provides jobs and millions of dollars of revenues, there are numerous concerns about its impacts on biodiversity: it may cause disease outbreaks in wild fish stocks, result in discharge of untreated waste and antibiotics, and allow alien species to escape. Recently scientists have raised concerns over the amounts of wild fish taken to meet demands for fish feed”*. For the focus groups in BC aquaculture's major perceived drawbacks were: (1) environmental concerns, risks and pollution, (2) escaped fish contaminating wild stocks, especially Atlantic salmon in the Pacific, (3) unnatural genetic contamination, (4) cost, investment and financial risks, (5) competitive impact on traditional fisheries, and (6) food safety and health risks (Department of Fisheries and Oceans, Canada. 2005).

BC has encountered particular difficulty with aquaculture siting; there has been such vociferous opposition that a moratorium on new sites was imposed in 1995 (Galland and McDaniels, 2008). Opposition was, and still is, focused on cage culture of finfish because of escapees, lice and other ecological impacts, and ocean-based closed containment systems were recommended by the BC Special Committee on Sustainable Aquaculture (BC, 2007). In 2002 the moratorium on new cage sites was lifted when the BC government implemented a new policy that required consultation, particularly with aboriginal groups. Not only must First Nations be consulted when considering a site in their waters, but sites must be at least one kilometer away from their communities (Murphy, at. al., 2006, Schreiber, 2006). However, the consultation process has been described as “bureaucratic paternalism” (Schreiber, 2006). Since the 2005 *Blaney* decision of the BC Supreme Court, consultation has been less about “the legal discourse of rights than about the practical details of fish farming” with First Nations expected to co-operate and compromise (Schreiber, 2006, p29).

The First Nations in BC as a whole appear ambivalent about salmon aquaculture. On the one hand there are First Nations, such as the Hamalco and Musgamagw Tsawataineuk Tribal Council (MTTC), who are adamantly opposed to any cage culture in their waters (Schreiber, 2006). This opposition was officially expressed in February 2010 by the President of the Union of BC Indian Chiefs in a News Release (Union of BC Indian Chiefs, 2010a). The President stated that salmon farming damaged wild salmon stocks, and

that he supported the MTTC in their opposition to salmon farming in the Broughton Archipelago. He asked that Norway, as a signatory of the 2007 UN Declaration of Indigenous Peoples, ensure that its companies honour the Declaration wherever they operate. In March of 2010 the Union reiterated its opposition in an Open Letter, having passed a resolution in which one clause stated “First Nations have been negatively impacted by aquaculture in their territories due to the harm the industry has caused to wild fish stocks” (Union of BC Indian Chiefs, 2010b).

On the other hand, the Aboriginal Aquaculture Association with the vision that “***First Nations will play a key role in the development and management of a healthy and sustainable aquaculture sector in B.C. (Canada)***” published a manual on Getting Started in Aquaculture; A Guide for Aboriginal Development in 2006 (Aboriginal Aquaculture Association, 2006). The support is because of jobs and training, on condition that aquaculture is environmentally sustainable. While most aboriginal aquaculture is shellfish, there are some salmon farms. The small aboriginal community of Klemtu, which has about one hundred households, illustrates the socio-economic impact of salmon farming. Klemtu (about 600 kilometres north of Vancouver) is the home of the Kitasoo /Xixias First Nation. In the 1990s the Kitasoo started a salmon farm because of staggering unemployment caused by the collapse of the commercial fisheries. They began with a 100t operation, but this was insufficient to obtain economies of scale. As a result they entered a partnership with Marine Harvest Canada. The Kitasoo kept tenure of the sites which were leased to Marine Harvest. The partnership is based on environmental sustainability and training. As of 2005 55 full time jobs had been created, which were half of all jobs at Klemtu, and direct wage payments from salmon farming amounted to CAD\$1.4 million or about \$14,000 per household. The project has been successful in large part because of community support (Grebe, 2005). The aim is to have at least one full-time salmon farming job for each of the 100 households. In 2009 the Kwakiutl First Nation (650 members) signed a similar salmon farming agreement with Marine Harvest.

Perceptions towards salmon aquaculture are almost the opposite in NB (Department of Fisheries and Oceans, Canada. 2005). The explanation for the different attitudes on the east and west coasts may reflect economic and demographic factors. Focus groups on the west coast focused on adverse environmental impacts of aquaculture, whereas the focus groups on the “poorer” east coast emphasized the employment benefits of aquaculture. The population in BC is generally richer than that of NB with lower unemployment rates; moreover residents of coastal areas in BC are often affluent retirees rather than young people anxious for jobs. Their concern is to maintain pristine coastal conditions.

#### **Socio-economic impacts on NB.**

New Brunswick is a Maritime province located on the Atlantic Ocean. The population of about 750,000 has a low per capita income (relative to the Canadian average), and the labour force of 370,000 has high unemployment (8.4% in August 2009). Farmed salmon are the principal agro-food export, as in BC.

Salmon aquaculture in NB occurs in the Bay of Fundy adjacent to Charlotte County. The population in 2006 of Charlotte County was 27,000. Fisheries and aquaculture are an important part to the Charlotte County lifestyle. With a rich fishing tradition, the area employs approximately 3500 people in the

industry. Blacks Harbour houses the world’s largest sardine industry. Lobster fishing is a traditional life style in Grand Manan. In recent years, Dulse is also a growing industry.

As in BC Statistics Canada input-output data can be used to estimate the impact of salmon aquaculture on different socio-economic indicators. Direct employment in salmon aquaculture in 2007 in NB was 1,190 (Cormier, 2009). In addition there were indirect and induced effects so that total employment generated within the province approximated 2,048 FTEs (Cormier, 2009). As with BC, there are leakages from the province. Hence, total employment attributable to aquaculture is higher in Canada than just the province: national employment generated by NB (salmon) aquaculture in 2007 was 3,180 FTEs. Total wage income in Canada generated by NB aquaculture was CAD\$ 108.8 million.

In Charlotte County direct employment in salmon aquaculture in 2007 was almost 10% of the region’s total employment (Gardner-Pinfold, 2009). Direct employment income from salmon aquaculture was CAD\$ 33.0 million. About 100 local businesses are supported by the industry. They included feed, nets, packaging, diving and transport. Salmon farming is therefore a significant socio-economic engine in Charlotte County.

Two studies of social license confirm the generally positive attitude of the public towards the salmon farming industry, reported by the 2005 study by the Department of Fisheries and Oceans (Department of Fisheries and Oceans, Canada. 2005). One study used random sampling, the other focus groups. The survey was of residents in Charlotte County, New Brunswick, to assess their perceptions towards current aquaculture practices and a possible alternative, Integrated Multi-Trophic Aquaculture (IMTA) (Robinson, et. al., 2004). From a random sample, a total of 165 participants responded from 3 populations. The response rate for the general public group (N=110) was 11.4%, expected in survey research. A total of 53 respondents were from 15 professional organizations and companies. With environmental groups (NGOs) 2 respondents came from the 2 environmental organizations invited to participate. As can be seen from Table 15 and Table 16 the majority of respondents were favourable to aquaculture using the current practices. Employment and the economic benefits were the primary reasons.

**Table 3.15 Question: Please indicate your feelings about the present practices of aquaculture:**

	General Public N =109	Industry N =53	ENGO N =2
Very positive	5	19	---
Positive	33	37	---
Neutral	30	19	---
Negative	18	24	---
Very negative	6	---	100

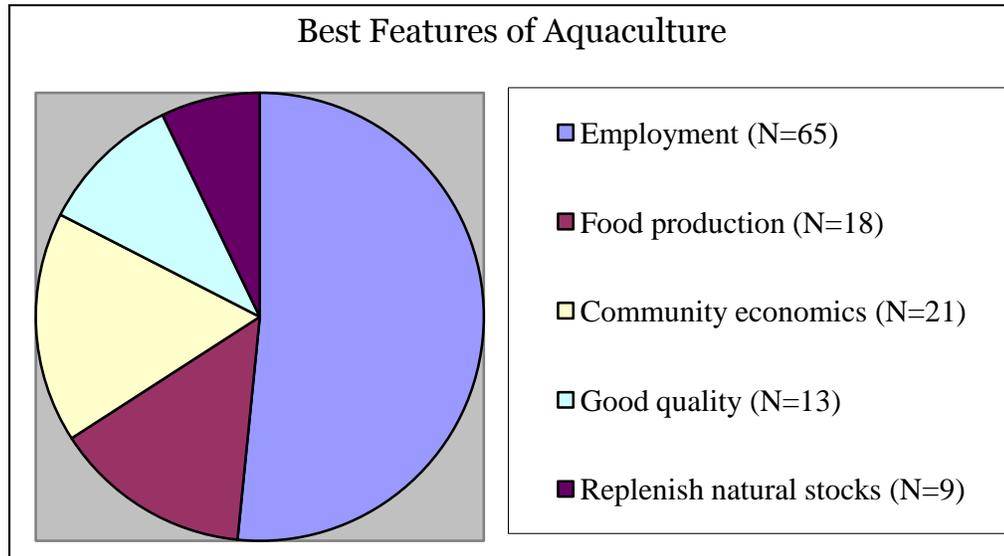
No opinion	7	2	---
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**Table 3.16: Question: What would you consider to be the best feature of the current aquaculture industry?**

	<u>General Public</u> (N=80)	<u>Industry</u> (N=41)	<u>ENGO</u> (N=2)
Employment in local communities	55	49	50
Food production	15	15	---
Economic input into communities	16	20	---
Good quality/quantity	10	12	---
Method of replenishing stocks	9	5	---
Overall ecological impact	1	7	---
Overall positive community impact	3	2	---
Low prices	4	---	---
Technology used	---	7	---
Unsure/need more information	1	---	50
Other	23		
<u>Average response</u>			
Mean words written	7.3		
Range of response length	0 – 65		

Note. Responses are provided in percentages, relative to each sample group

Figure 3.3: Question: What would you consider to be the best feature of the current aquaculture industry?



The second study in 2005 focused on IMTA, a technology that incorporates salmon, mussel and seaweed cultivation on the same site (Barrington, et. al., 2010). In the sessions, groups were informed about IMTA systems and their opinions regarding this aquaculture practice and the food produced were noted. All focus groups were very positive about the potential environmental improvements of IMTA technology.

### Conclusion.

Salmon aquaculture in Canada occurs on both Atlantic and Pacific coasts. The predominant species is Atlantic salmon. Because of bankruptcies and mergers there has been industry consolidation and in BC acquisition by foreign (Norwegian) companies. Salmon aquaculture is a major source of employment in the Campbell River region of BC and in Charlotte County in NB. Jobs are predominantly non-seasonal and permanent. Employing particularly men younger than 40, salmon aquaculture has enabled isolated coastal communities to remain viable. Wages of general labour are at least double the minimum wage of each province and are competitive with other activities of similar skill, although below the average of the area. Wage above equilibrium suggest that salaries reflect labour productivity, and not monopsony power. There is no record (at least known to me) of labour violations that have resulted in fines (unlike Chile).

In BC cage culture of salmon faces vociferous opposition, partly due to NGOs, but also perhaps to poor communication and lack of transparency by the industry (Mazur and Curtis, 2008). Resentment at foreign dominance of the industry may also play a part. In NB, on the other hand, salmon aquaculture has a positive image in the province.

## CHAPTER 4: Country Overview- Norway

## **INTRODUCTION**

The Norwegian salmon industry started out in the late 1960s, although a small production of rainbow trout started much earlier. The breakthrough of the new industry came with the change to salmon, reared in net pens in sea water. This technological innovation was made by former fishers, and gradually a mixed group of fishers, fish processors, farmers and teachers became the entrepreneurs, besides for one large company (Mowi, later to be owned by Norsk Hydro). The story behind the new industry is entirely different from the Chilean case, where a number of large companies were involved right from the start. In the Norwegian case the fisheries authorities managed to control the new industry from 1973, although disease control and food security were the responsibility of the Ministry of Agriculture.

Putting the aquaculture industry under the fisheries umbrella meant that many of the same management measures were applied, such as concessions (licenses), mandatory sales union, and various cooperative arrangements, including state sponsored research and supervision. The first years were largely based on trial and error and it took several years before it could be considered an *organized* industry. Hence the producer organization was established in 1970, while the sales union was established in 1978. Nevertheless, it took 20 years for the total production (salmon and trout) to surpass 100,000 tons.

Salmon (and trout) was from the very beginning meant for the national market, but as soon as volumes increased, export was the main channel, taking into consideration the very limited Norwegian market and the fact that salmon was still considered a luxury product, attracting very high prices. Basing the industry on export markets meant that the fisheries authorities also introduced strong regulations, aimed at avoiding the previous crisis of overproduction. This meant regulations in terms of number (of licenses) and on volume (and hence on production).

Right from the start the new industry was considered as a means to improve the economic and employment situation in the rural and coastal areas. The traditional fisheries decreased considerably in terms of employment in the 1970s and 80s and aquaculture was considered a possible substitute, especially because maintenance of the settlement pattern has always (since 1945) been a strong political goal in Norwegian politics. This implied that after the aquaculture law entered into effect in 1977, potential fish farmers had to apply and that the fisheries authorities, involving also the regional (county) and local (municipality) levels, made the selection of the few lucky ones to be the first to start, provided that they managed to secure finances to establish a farm and buy smolt.

This in turn implied that the industry right from the start was extremely decentralized (see map fig. 5), and with the exception of the far north, we find salmon farms all along the coast. The small clusters we find today in certain regions were developed at a much later stage, although the few municipalities that managed to get many farms registered before the law entered into practice in 1977 got a natural head start.

## **THE SALMON FARMING INDUSTRY IN NORWAY – ECONOMIC AND PRODUCTIVE BACKGROUND**

### **General description of production process and supply chain**

As can be seen from Figure 4.1, Norwegian aquaculture has been an enormous success in terms of production. In less than 40 years, production has increased from almost 0 to nearly 900,000 tons (2009), with a few setbacks, mainly due to disease problems.

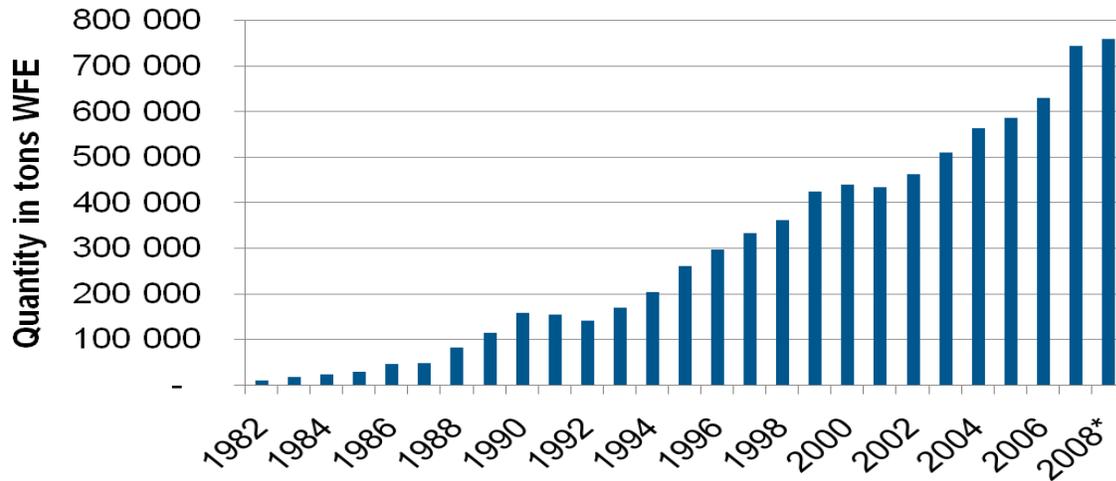


Figure 4.1: Production of salmon and trout 1982-2008 (Norwegian Seafood Export Council 2009).

In 2008 seafood products (based on farmed and wild fish) were the third most important export earner, after oil and gas and metals. This means that aquaculture is now firmly established as an important industry in Norway, both in economic and political terms.

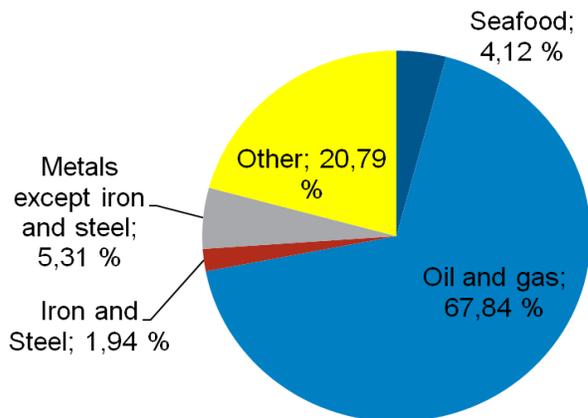


Figure 4.2: Norwegian export sectors according to value 2008 (Norwegian Seafood Export Council 2009).

While the actual employment in the aquaculture industry is modest (see table 1) the multiplier effects are considerable, as can be seen from figure 3.

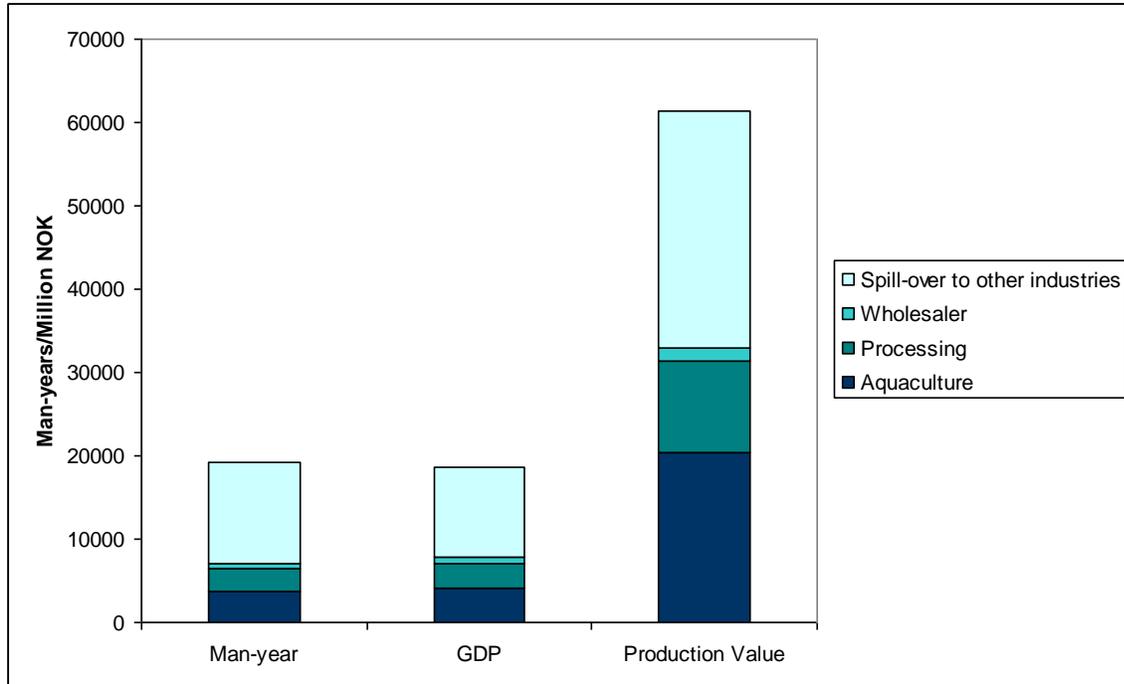
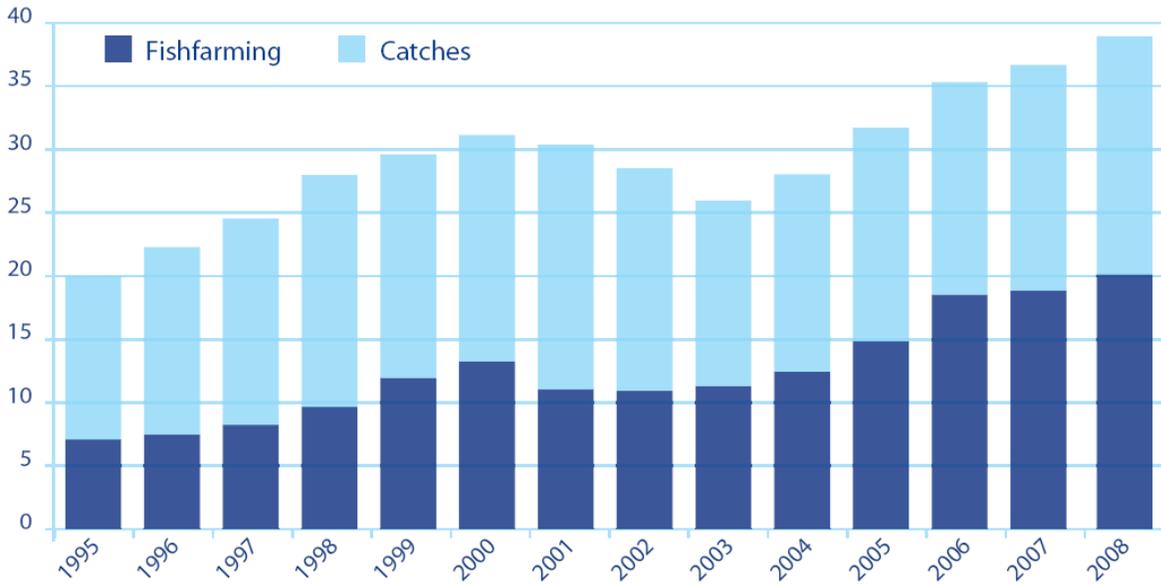


Figure 4.3: Spill over effects from aquaculture (Sandberg et al. 2009).

Every man-year in the aquaculture sector creates 1.7 man-years in other sectors as a spillover effect. As for the GDP, 1 NOK in the core-activity (aquaculture) creates 1.4 NOK in other industries. Regarding the production value, the aquaculture sector (incl. wholesalers, processing and farming) equals 33 billion NOK compared to 28.4 billion NOK generated in other sectors as a spillover effect (Sandberg et al., 2009). This means that the aquaculture industry has become an important employer in a number of related sectors, ranging from transport to banking. This is even more so, as the majority of the working force is still located in rural coastal communities, with relatively few alternatives in terms of employment.



*Statistics Norway, the Norwegian Seafood Export Council*

Figure 4.4: Norwegian seafood exports 1995-2008. Value in 1000 mill NOK (Ministry of Fisheries and Coastal Affairs 2009)

The value of fish farming exceeded the traditional catch fisheries in 2006 and at present aquaculture represents 56 % of total export value, a share that is expected to increase even further in the coming years. This in spite of the fact that Norwegian aquaculture has rather few value added activities, and where further processing activities mainly take place in Denmark, Poland and France, i.e. in countries with lower costs of labour or closer to the main markets.

#### **General geographic distribution of the industry**

As can be seen from table 4.1 below, the number of aquaculture concessions has been fairly stable over the last 12 years. The number of fish hatcheries has been reduced, reflecting the economies of scale in this sector, while the number of grow-out facilities has increased, reflecting a gradual expansion allowed by the fisheries authorities. However, as can also be seen from the table is that the employment has hardly increased, in spite of the fact that production has more than doubled. This is largely due to the increased mechanization of the industry, making each operator able to handle a larger quantity of farmed fish. This in turn means that while the aquaculture industry is able to produce impressive economic results for the nation, the employment contribution needed in the rural coastal areas can not be met by aquaculture alone.

It should also be noted that in terms of number of concessions, the West coast is still dominating with Hordaland County as the largest. This is the region where the aquaculture started in the 1970s, and due to the restrictive license policy of the fisheries authorities, this part of the country still controls a majority of farms. The largest potential is, however, in the north, and especially in Nordland County, which has increased production rapidly over the last 12 years. The areas further north, in the counties Troms and Finnmark, have still not utilized their potential, largely due to more complicated logistics and to slower growth (colder winter temperatures in the water). These areas have fewer problems with diseases and less sea lice and will probably have stronger growth in the near future.

Table 4. 1: Number of concessions and employees  
(Central Bureau of Statistics 2009 and Directorate of Fisheries 2009)

	In Total		Grow-out Facilities		Fish Hatcheries	
	# concessions	# employees	# concessions	# employees	# concessions	# employees
1997.....	1 035	3 719	769	2 670	266	1 049
1998.....	1 025	3 557	768	2 527	257	1 030
1999.....	1 041	3 589	799	2 517	242	1 072
2000.....	1 065	3 631	817	2 565	248	1 066
2001.....	1 065	3 673	822	2 631	243	1 042
2002.....	1 093	3 431	850	2 384	243	1 047
2003.....	1 113	3 293	870	2 317	243	976
2004.....	1 146	3 129	926	2 275	220	854
2005.....	1 137	3 054	917	2 181	220	873
2006.....	1 136	3 445	909	2 480	227	965
2007.....	1 157	3 736	929	2 537	228	1 199
2008.....	1 141	3 958	921	2 699	220	1 259
2008						
Rogaland	88	301	70	208	18	93
Hordaland	213	845	158	507	55	338
Sogn og Fjordane	103	246	83	150	20	96
Møre og Romsdal	145	515	111	305	34	210
Sør-Trøndelag	103	403	83	284	20	119
Nord-Trøndelag	83	269	67	169	16	100
Nordland	182	738	151	555	31	183
Troms	91	343	88	286	3	57
Finnmark	95	209	81	173	11	36
Other counties*	41	92	29	63	12	29

\*Akershus, Aust-Agder, Buskerud, Hedmark, Oppland, Oslo, Telemark, Vest-Agder, Vestfold, Østfold.

### Number of and size of farming units

As can be seen from table 2 and 3, there is now a heavy concentration process going on in the aquaculture industry. While in the 1980s the general rule was that each owner could only have majority ownership in one farm, this provision was suspended after the bankruptcy of the sales union (FOS) in 1991. Since then there has been a steady concentration process, with larger companies buying out the smaller ones. This process is dominated by three groups of players; the large industrial companies, such as Marine Harvest, regionally based companies, such as Salmar and Norwegian Salmon, and finally family based companies that have expanded by buying up neighboring farms.

The industry is now dominated by the large-scale and medium sized companies, but there are still a considerable number of small producers with 1-5 concessions. But as can be seen from table 3, 186 companies now control the entire industry, and especially in Finnmark, the concentration is high, with only five companies controlling the 81 concessions.

Table 4.2: Geographical distribution of grow-out facilities and fish hatcheries, salmon and trout (Central Bureau of Statistics 2009 and Directorate of Fisheries 2009).

County	Grow-Out Facilities		Fish Hatcheries	
	# concessions	# companies	# concessions	# companies
Rogaland	70	19	18	16
Hordaland	158	38	55	31
Sogn og Fjordane	83	17	20	14
Møre og Romsdal	111	18	34	21
Sør-Trøndelag	83	9	20	10
Nord-Trøndelag	67	11	16	10
Nordland	151	32	31	14
Troms	88	20	14 (Finnmark and Troms)	13 (Finnmark and Troms)
Finnmark	81	5		
Other counties*	29	17	12	11
2008.....	921	186	220	140
2007.....	929	201	228	144
2006.....	909	226	227	153
2005.....	917	242	220	149
2004.....	927	262	220	152

\*Akershus, Aust-Agder, Buskerud, Hedmark, Oppland, Oslo, Telemark, Vest-Agder, Vestfold, Østfold.

The size of each licence was previously regulated by the volume of the net pens, originally set to 3000 m<sup>3</sup>, then expanded to 5000 m<sup>3</sup>, 8000 m<sup>3</sup> and finally to 12,000 m<sup>3</sup>. Later on production was regulated through feed quotas, before the present system of maximum allowable biomass (MAB) was introduced in 2004. According to this system farmers are allowed to have 780 tons of fish in each concession, while in the north (the counties of Troms and Finnmark) the limit is 900 tons, mainly due to slower growth. Increasingly we find that several licenses are managed from one site, where the actual production is determined by the pollution authorities (previously *Statens forurensningstilsyn*, now *Klima og forurensningsdirektoratet*). This means that one licence can have production on several sites, or that one site can contain several licenses. The granting of new licenses will therefore not automatically imply extended use of space, as they can often be accommodated on sites with available (pollution) capacity. This is especially the case in the extreme north, where many sites currently use less than 50 % of their capacity (Hersoug et al. 2010).

As can be seen from table 4.3 the production of salmon has increased nearly undisturbed over the last 12 years. In terms of tonnage Nordland County is now the largest producer followed by Hordaland County. In terms of value the development has been less smooth reflecting the boom and bust cycles familiar in the salmon industry (see figure 6).

Table 4.3: Quantity and value (in 1000 NOK) of produced salmon and trout 1997-2009 (Central Bureau of Statistics 2009 and Directorate of Fisheries 2009).

	Salmon		Trout	
	Quantity <sup>1</sup>	Value <sup>2</sup>	Quantity <sup>1</sup>	Value <sup>2</sup>
1997.....	332 581	6 768 841	33 295	628 956
1998.....	360 806	7 606 646	48 431	988 851
1999.....	425 154	9 110 631	48 692	1 263 197
2000.....	440 061	10 907 028	48 778	1 172 049
2001.....	435 119	7 899 536	71 764	1 175 654
2002.....	462 495	7 736 691	83 559	1 394 290
2003.....	509 544	8 257 473	68 931	1 229 415
2004.....	563 914	9 862 190	63 401	1 286 990
2005.....	586 512	12 178 945	58 875	1 256 251
2006.....	629 888	15 575 590	62 703	1 578 776
2007.....	744 220	15 496 270	77 465	1 553 311
2008.....	742 976	15 291 956	75 316	1 456 470
2008				
Rogaland	52 245	935 222	162	3 148
Hordaland	117 582	2 416 630	23 480	480 775
Sogn og Fjordane	55 591	1 117 327	13 274	265 728
Møre og Romsdal	88 158	1 813 639	15 092	289 283
Sør-Trøndelag	96 949	2 015 887	608	9 993
Nord-Trøndelag	65 057	1 352 888	0	0
Nordland	138 651	2 945 651	14 031	247 937
Troms	86 217	1 857 856	5 001	105 878
Finnmark	31 853	683 132	3 592	50 929
Other counties*	10 675	153 732	77	2 799

\*Akershus, Aust-Agder, Buskerud, Hedmark, Oppland, Oslo, Telemark, Vest-Agder, Vestfold, Østfold.

1) Amount stated in round weight after bleeding. Conversion factors: 1.125 from the gutted weight to round weight and 1.12857 from the gutted, head cut weight to round weight.

2) Some of the companies have reported values after subtraction of cost of processing.

While salmon have dominated the Norwegian aquaculture industry since the start of sea farming, trout is for many salmon farmers an important supplement and some farmers have specialized in trout only. While trout is normally harvested at smaller sizes than salmon (and thus require less production time), the price has also been considerably lower, and Japan was until recently the only major market for Norwegian trout production. Now Russia and Ukraine have become major markets, buying larger quantities than Japan.

The production of sea trout (Arctic Charr) has so far been a specialty for a few North Norwegian producers. Regarding other marine fish species (cod, halibut, wolf fish), production is now very limited. For halibut and catfish, the main problem has been on the market side, where farmed fish have to compete with wild catches. For cod there has been a series of production problems, in addition to the price problem: the cost related to farmed cod by far exceeds the selling price, especially in a situation with ample supply of wild cod as during the last few years.

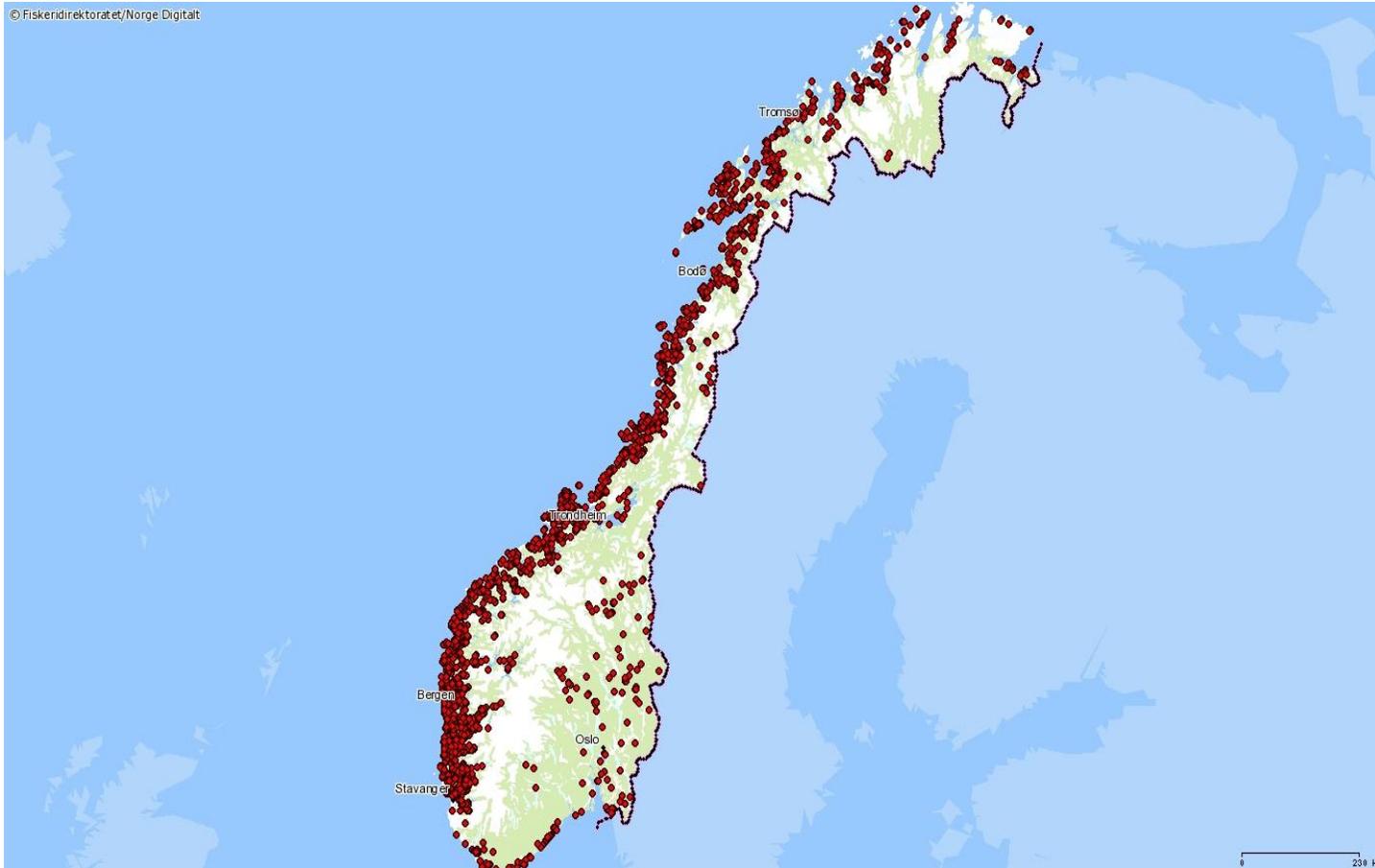


Figure 4.5: Aquaculture concessions in Norway 2010 (Directorate of Fisheries 2010).

With a few exceptions farmed cod obtains the same prices as wild cod, which is at present not sufficient to cover costs. The Norwegian fisheries authorities have over the last ten years invested heavily in cod farming, as an alternative to the traditional catch fisheries, but so far without success. Most of the original producers are at present bankrupt or they have ceased operations, due to low prices. Of the few remaining commercial companies, most have been refinanced in order to survive and some have been bought by salmon farming companies, mainly in order to obtain valuable production sites at a later stage.

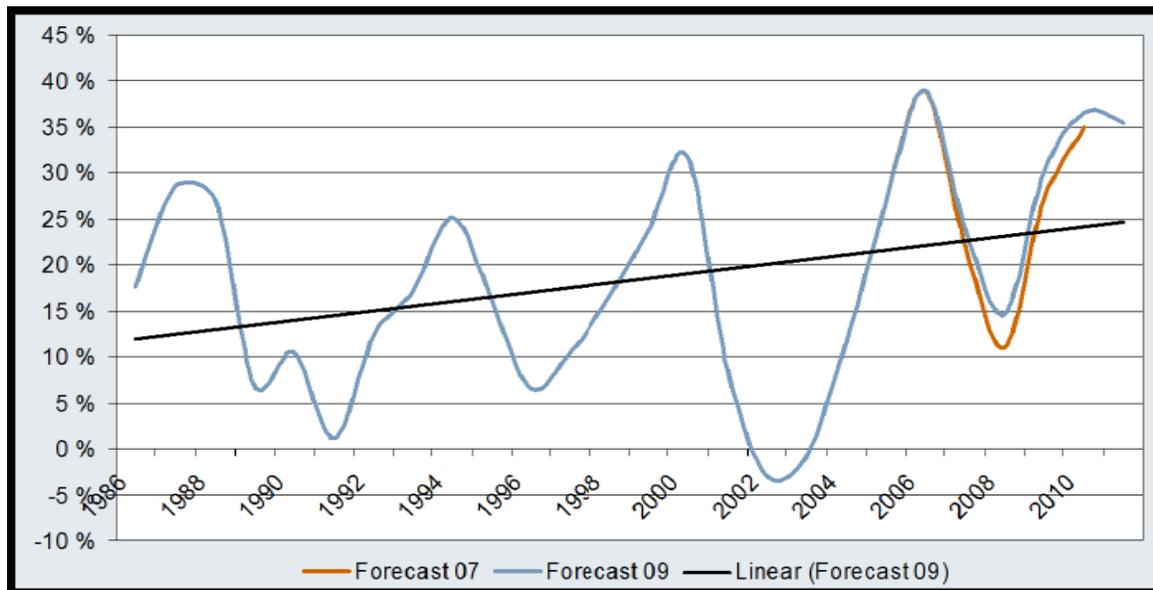


Figure 4.6: Profitability in the Norwegian aquaculture 1986-2010 (Guttormsen 2009).

It should also be added that cod farming has been met by intense resistance by the traditional fisher organizations, such as the Norwegian Fishermen's Association (*Norges Fiskarlag*) and the sales union (*Norges Råfisklag*). With the present dramatic reduction in sales prices for cod (ex vessel) of more than 30 %, the whole idea of producing cod through aquaculture has been seriously questioned by the fishers. Nevertheless, until 2008 the production increased steadily, but in table 4 the more recent price reductions and crisis (in 2009/2010) have not been reflected. In 2004 the production was only 3160 tons, increasing to 18,052 tons in 2008, worth some 372 mill NOK.

Table 4.4: Distribution of concessions and employment Cod farming (Central Bureau of Statistics 2009 and Directorate of Fisheries 2009).

	Concessions <sup>1</sup>	Companies	Men	Women	Total
2004.....	199	136	261	28	289
2005.....	206	133	299	40	339
2006.....	214	104	275	35	310
2007.....	240	97	251	48	299
2008.....	232	79	252	35	287
2008					
Rogaland	12	7	10	1	11
Hordaland	21	11	17	6	23
Sogn og Fjordane	16	10	24	5	29
Møre og Romsdal	49	13	59	6	64
Sør- and Nord-Trøndelag	16	7	10	4	14
Nordland	76	20	98	11	109
Finnmark and Troms	33	9	33	2	35
Other counties*	2	2	2	0	2

\*Akershus, Aust-Agder, Buskerud, Hedmark, Oppland, Oslo, Telemark, Vest-Agder, Vestfold, Østfold.

1) Including hatchery concessions.

### Export markets and countries for farmed salmon and trout

Table 5: Export of salmon and trout 1998-2008, value and quantity (Ministry of Fisheries and Coastal Affairs 2010).

Year	Salmon		Trout	
	Value	Quantity	Value	Quantity
1998	8 763 296	281 915	---	---
1999	10 766 037	337 977	1 257 899	35 116
2000	12 269 775	343 031	973 441	27 568
2001	10 003 588	338 594	1 092 963	45 224
2002	9 538 050	360 618	1 361 981	62 076
2003	10 043 353	414 412	1 260 056	53 389
2004	11 200 585	441 193	1 199 633	47 050
2005	13 570 073	476 470	1 245 568	43 424
2006	17 082 779	496 933	1 314 926	38 304
2007	17 485 419	606 775	1 270 158	49 525
2008	18 047 087	623 236	1 866 830	75 628

Norwegian exports of farmed seafood increased by NOK 1.2 billion to NOK 20.2 billion in 2008. This split into salmon for NOK 18 billion and trout for NOK 1.9 billion. This represents export records for both salmon and trout. Fish from the salmon family are exported from Norway to 98 countries, of which France is the largest market, buying salmon and trout for NOK 3.2 billion. Exports to the EU increased in 2008 by NOK 273 million to NOK 3.2 billion. The most important export markets can be seen from figure 7. Note that in the case of Denmark and Poland most of the salmon for these two markets is destined for further processing and is then distributed to other EU countries.

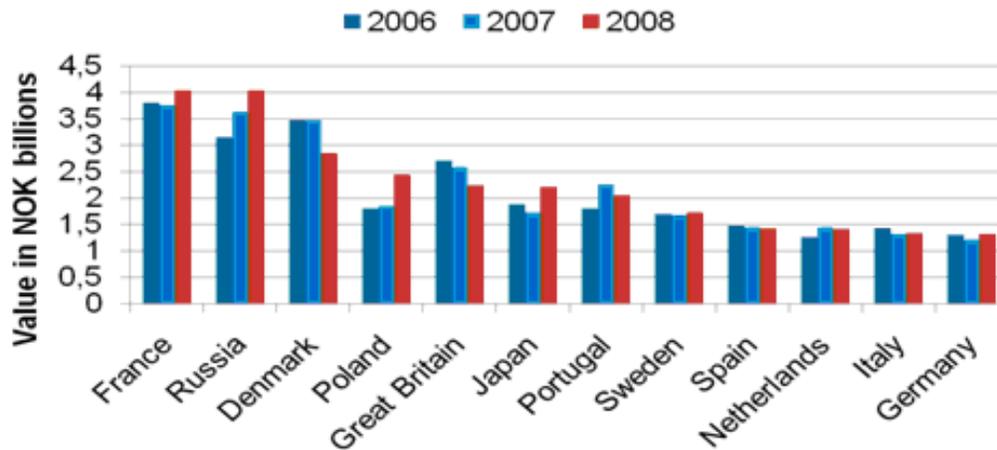


Figure 4.7: Export of salmon and trout to major markets (Norwegian Seafood Export Council 2009).

It should be noted that 2009 was a boom year for most Norwegian salmon producers. In spite of severe problems of sea lice, especially in the south and on the west coast, production increased and the market situation was extremely favourable, largely due to the fact that the production in Chile was dramatically reduced. This opened a window of opportunity for Norwegian exporters on the US market, previously largely closed due to the extra tariffs imposed on Norwegian exports. This situation is expected to continue also for 2010, with extremely small volumes of Atlantic salmon exported from Chile.

## EMPLOYMENT, WORKING CONDITIONS AND LABOR RELATIONS IN THE SALMON FARMING INDUSTRY

### Wages and benefits

As can be noted from previous charts, the number of persons directly employed in the Norwegian salmon industry has not increased over the last 12 years, in spite of the fact that the production has more than doubled. This is largely due to technological improvements, thus increasing the efficiency of each farm worker dramatically. Hence the labour cost in relation to other costs (feed, capital, smolt, etc.) is declining. This means that the main focus for most Norwegian farming companies is to get hold of the best qualified personnel and not necessarily the cheapest. This in turn means that the Norwegian technicians/farm workers are well paid by national standards, well above the national average for industrial workers.

In Norway there is no national minimum wage. The national employer association (*NHO*) is in favour of such a minimum salary, while the labour unions, and in particular the most powerful (*LO*), still prefer specific minimum salaries connected to the type of work and the specific tariff agreements made by the various unions. In one of the largest unions (*Fellesforbundet*) the present rate is NOK 126,00 (US\$ 21.3) per hour, based on 37,5 hours per week. The general principle in Norway is that workers organized in the unions work out the annual or biannual agreements, and that in turn, these agreements will be valid also for *unorganized workers*.

What is now up for discussion is whether workers from other countries should receive Norwegian salaries when working in Norway. At present there are considerable loopholes in the contracting regime, thus

allowing for example Polish workers being hired through Polish companies to work in Norway for a fraction of the going minimum wage. This is strongly resisted by the labour unions, which seem to agree to general tariffs to all workers in a particular branch/sector, no matter their country of origin. This conflict could affect also the aquaculture industry, and in particular the slaughtering companies, which employ an increasing number of foreign workers. (On the actual farms, the number of foreign workers is still limited, not least due to the qualifications required).

There are no specific subsidies attached to labour in the aquaculture industry. As can be seen from figure 8, the subsidy elements in the Norwegian seafood industry was dramatically reduced with the entry into the European Economic Space (EES) agreement in 1990, although most of these subsidies were connected to the fisheries and not to aquaculture. However, there is still favourable tax conditions connected to living in the extreme north (Finnmark County and part of Troms County), similar to what we find in Chile (in the extreme south). But these arrangements apply to *all workers*, not only to the aquaculture industry. Similarly there can be a subsidy element in the loans and guarantees obtained by aquaculture farms, but these arrangements are geographically based and apply to *all sectors* (Innovation Norway 2010).

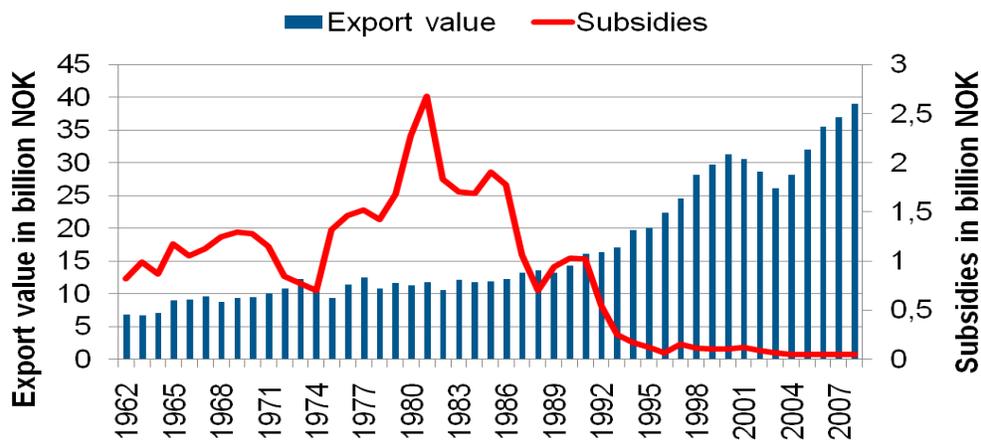


Figure 4.8: Export value and subsidies in the Norwegian seafood industry (Norwegian Seafood Export Council 2009).

#### Status of labor unions and freedom for workers to associate in the salmon industry

Generally we find in Norway that 53 % of the labour force is organized through labour unions. Of the federations, *LO*<sup>77</sup> is the largest, with close to 900,000 members, while independent federations like *YS* and *Unio* have approximately 220,000 and 280,000 members. Within aquaculture, the largest union is *Fellesforbundet*, organizing mainly production workers and technicians, while specialists like veterinarians and engineers are organized in other unions. There is complete freedom regarding the right to be a member of a union in Norway, although some foreign workers now working in Norway have encountered difficulties when organizing as members and claiming Norwegian salaries. On the employers' side the Federation of Fish and Aquaculture Producers (*FHL*) organizes approximately 85 % of all the licensed farms.

<sup>77</sup> Using in this section the Norwegian acronyms, all indicated by *italics*.

Labour unions like *Fellesforbundet*, negotiate every year with the employers' organization, making jointly binding agreements for their members. These agreements deal mainly with salaries, compensation for staying on the farm (platform), working hours and free periods, in addition to more general themes related to pensions, etc. Generally, unorganized workers receive the same salary as organized workers, except in the case of specialists much in demand, who can obtain individual salary agreements. As an illustration we can mention that in one of the largest aquaculture companies (Cermaq ASA) 79 % of all employees (in the aquaculture branch, Mainstream), were organized in 2008. Hence, all farm workers were bound by the collective wage negotiations obtained by the organized workers (Bergan, pers. comm. 18.01.2010)

### Demographic characteristics of employees

The gender distribution can be seen from table 6. While women constitute only 10 % of the workforce in grow out facilities, they make up 30% in the fish hatcheries. While the number of women is increasing, the aquaculture industry is still a male dominated industry. However, if we include the slaughtering facilities and the processing plants the percentage of women is considerably higher, but due to joint processing operations (processing wild and farmed fish at the same plants) it is hard to sort out the gender composition in the aquaculture industry in particular.

Table 4.6: Employees by gender and county (Directorate of Fisheries 2009).

County	Grow Out Facilities			Fish Hatcheries		
	Men	Women	Total	Men	Women	Total
Rogaland	186	22	208	62	31	93
Hordaland	457	50	507	240	98	338
Sogn og Fjordane	133	17	150	69	27	96
Møre og Romsdal	293	12	305	135	75	210
Sør-Trøndelag	262	22	284	67	52	119
Nord-Trøndelag	152	17	169	78	22	100
Nordland	466	89	555	136	47	183
Troms	267	20	286	74 (Finnmark	19 (Finnmark	93 (Finnmark
Finnmark	150	23	173	and Troms)	and Troms)	and Troms)
Other counties*	55	8	63	23	6	29
2008	2419	280	2699	883	376	1259
2007	2332	204	2536	856	343	1199
2006	2264	216	2480	729	236	965
2005	2009	172	2181	660	213	873
2004	2093	182	2275	654	201	855

\*Akershus, Aust-Agder, Buskerud, Hedmark, Oppland, Oslo, Telemark, Vest-Agder, Vestfold, Østfold.

There is no reliable statistics on the age composition of the work force. From interviews with some of the larger companies in the industry, it seems that the work force in general is younger than in other, more established industries (as for example in the catch fisheries and in fish processing). Regarding nationality, most of the workers on the farms (grow out and hatcheries) are ethnic Norwegians, while in the processing industry, the share of foreign workers is considerably higher. Due to the labour regulations within the EU, it is now relatively easy to obtain a work permit in Norway and the aquaculture industry is paying considerably higher wages than can be obtained in their own home countries. That even applies to a neighbouring country like Sweden; where wages generally will be from 20-30 % lower than in Norway. In the north we also find a considerable number of workers from Russia and from former members of the

Soviet Union, having obtained labour permissions for a fixed period. It should be noted, however, that Norway, unlike Chile, has a very limited processing sector for farmed salmon and trout, and hence a limited number of processing workers dedicated exclusively to value added activities for farmed fish.

In the future, the composition of the work force will depend on several factors, but qualifications and payment seem to be the most important. So far work on the farms and in the hatcheries is becoming more demanding in terms of qualifications, thus favouring Norwegians with the right background (including the important qualification of mastering the Norwegian language needed for reporting). In the slaughtering facilities and processing plants the qualifications needed are considerably simpler, thus making these jobs available for labour immigrants and for unqualified labour more in general.

There is a long tradition for immigrant labour in the fish processing industry, especially in the north, dating back to the 1950s. As ethnic Norwegians gradually have found these jobs physically demanding, not particularly well paid and in addition not permanent (long periods based on unemployment benefits), foreign workers have taken over a larger share. However, as pointed out under the section dealing with wages, it is a large difference between the agreed Norwegian salary levels and the ones obtained by workers hired to do contract work in Norway by their own national labour agencies. Hence, in the construction industry we find workers with NOK 150 per hour according to the Norwegian labour union agreements, while contract workers may be found to earn as little as NOK 30 per hour.

The same situation may apply in the fish processing industry, but the extent of such contract labour is unknown. In any case, due to economies of scale the number of slaughtering facilities and processing plants has been dramatically reduced over the last 20 years, thus reducing the employment in this part of the industry. Increasing mechanization also means that these facilities will be able to handle larger volumes in the future without increasing employment to any significant degree. So far, increased value added activities by the aquaculture companies have not been able to offset the reduction in fish processing from the traditional catch fisheries.

### **Health and safety conditions and risks in the operations**

Aquaculture is still considered one of the most dangerous occupations in Norway, next to fisheries and mining. Although the numbers are based on old statistics (the period 1980-2003 it is worth considering that 21 persons lost their lives working in the aquaculture industry during these years (Heide et al. 2004). Most of these accidents happened in connection with the use of boats while three refer to diving accidents. Furthermore, there are on average 75 accidents per year within the sector (ibid). The main cause for casualties is management of heavy loads in combination with bad weather. Regarding accidents, the majority of injuries are due to falls. Typical characteristics are slippery surfaces combined with varying degree of height, e.g. falling from dock down to boat.

Of relevance is also deteriorating health due to wear and heavy physical work. The university hospital in Tromsø, UNN, initiated a project in 2002 with the aim of mapping health effects caused by exposure to factors in the work place which is believed to be dangerous to one's health. The project considers employees in the fishing industry in the northern region of Norway (the counties Nordland, Troms and Finnmark) and was performed using questionnaires distributed to the different branches of the industry. For aquaculture, the results showed significant wear of back or neck due to heavy loads, with cold weather increasing the severity of back/neck pain. Also wrist wear is common in processing plants. Other minor health effects can be skin conditions due to allergies or anaerobic environments (use of

latex gloves), allergies developed due to long exposures to certain substances and freezing because of a cold working environment. However, in general the salmon sector is experiencing better working conditions than in the shrimp and whitefish sectors. Common in the fish processing sector is noise pollution sustained over time and with a higher intensity than what's recommended. The fish processing industry is one of the industrial sectors with worst sound pollution (Aasmoe et al. 2002).

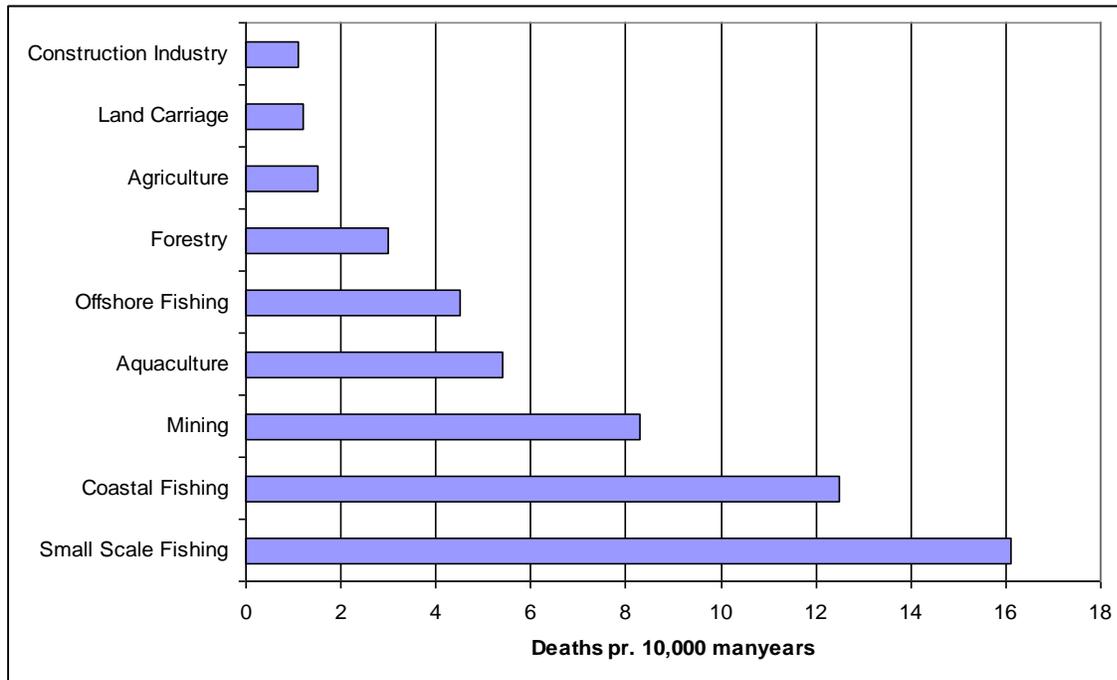


Figure 4.9: Deadly accidents in different Norwegian industries 1980-1999.

(<http://www.handboka.no/Vgs/Veiled/Atva/havbruk.htm> )

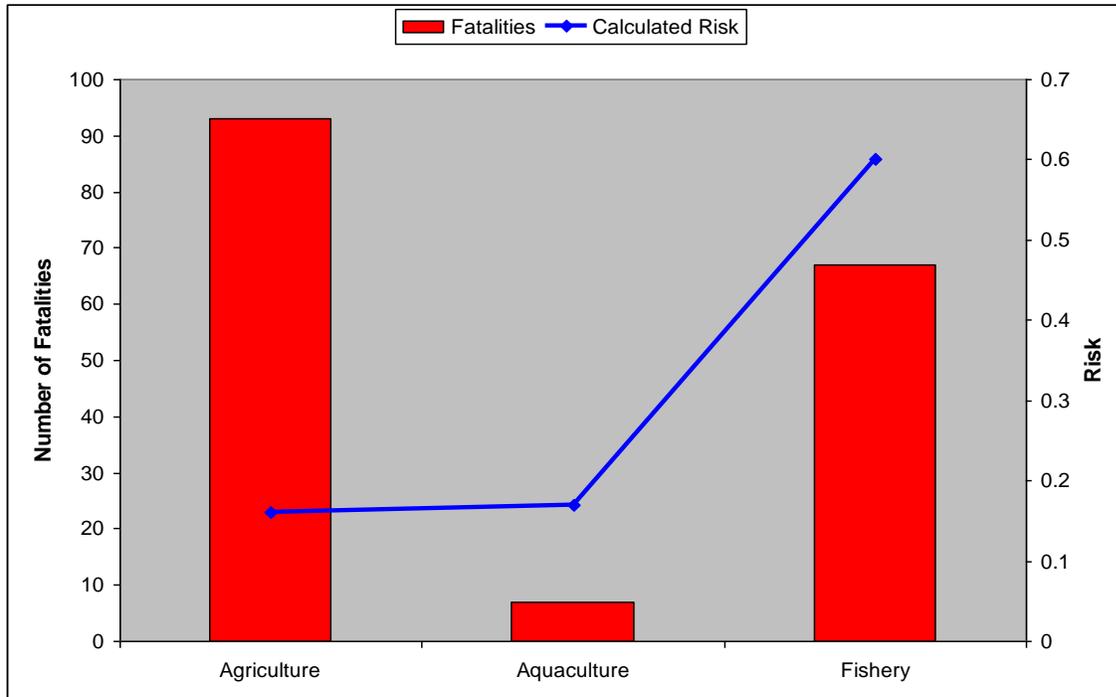


Figure 4.10: Fatalities and risks in comparable industries (Geving et al. 2008).

### Risk management

As can be seen from figures 4.9 and 4.10, the frequency of fatal accidents in the aquaculture industry was fairly high, higher than in offshore fisheries. In the period 2000-2008 the situation has improved and aquaculture now has a calculated risk on par with agriculture and far below fishery.

Dealing with actual risk management, all Norwegian companies are subject to legislations dealing with risk. The Employment Protection Act (*Arbeidsmiljøloven*) is a law regulating the relationship between employer and employee, in addition to ensuring a safe working environment. This law is also meant to ensure physical and psychical/mental wellbeing of employees. (<http://lovdata.no/all/tl-20050617-062-0.html>). In addition are there many regulations relevant for aquaculture which deals with factors prone to risk and instructions on how to perform operations defined as dangerous (Heide et al. 2004).

In general, all firms are required to have *HMS* (health, environment and safety) plans. Normally, an employee is required to follow and have knowledge about these plans dealing with risk and safety internal in the firm. In practice, employees are trained in operating machines and other technical installations. Personal safety equipment is also provided by the company. There is currently no law regarding the operation of boats less than 15 m length (most commonly used on aquaculture farms), but practical training is obligatory for all new operators, a requirement imposed by the industry itself. Generally speaking, it seems that the larger aquaculture companies have implemented safer and stricter routines in their daily operations than smaller companies (Heide, Sintef Fisheries and Aquaculture, pers.comm. 2010).

Concluding, in Norway aquaculture is perceived as a dangerous occupation, especially when working with manual labor in proximity to big loads. Also, the natural environment contributes to risk. Harsh weather conditions increase the danger of accidents, especially during winter time, with snow and ice on the net pens and platforms. Some farms are located far away from ambulance and hospitals, and rescue operations are often very hard to execute. However, due to mechanical feeding systems and more technological devices, the heavy manual labour has been considerably reduced over the last ten years, thus reducing the health risks involved in the salmon industry in Norway.

#### **Brief overview of any known labour-related controversies**

There has been no publicly known labour-related conflict over the last few years, but the largest labour union (*Fellesforbundet*) reports that the most important challenges relate to arrangements regarding working hours, safety regulations and compensation for workers who work for extended periods of time on floating platforms.

In the processing industry the main conflict is about wages, especially around the issue of whether workers from other countries should receive the minimum wages fixed by the collective agreements between the employers association and the labour unions.

#### **Profile/demographic characteristics of surrounding communities**

As can be seen from figure 4.5, aquaculture farms are scattered all along the Norwegian coast. Unlike the situation in Chile, nearly all farms are connected to surrounding communities with good infrastructure (roads, housing, electricity, telephone and internet access, shops, doctors, etc.). Since the allocation of licenses from the very beginning (in 1973) focused on aquaculture as part of a program for general rural development, farms are found all along the coast line, with special preference for decentralized communities/municipalities. When the ownership regulations were abandoned in the early 1990s, farm owners were free to arrange their farming operations within larger regions (not bound to specific municipalities). Nevertheless, it is still the municipalities which regulate the sea space (together with a number of other state authorities). This implies that aquaculture farms and hatcheries are found all along the coast, and it is impossible to give a detailed description of the surrounding communities. Here it suffices to say that the large majority of such communities are former fishing communities (many still active), which means that the farming companies have access to manual labour used to handling fish, boats and nets under rough weather conditions. On the other hand, most of these communities do not have the qualified experts that are increasingly used in the farming operations. The tendency to have more floating platforms with crew onboard for extended periods, also contributes to the decoupling of farms and surrounding communities. More recently there is a tendency towards a dual structure in the aquaculture industry, with *production communities* containing farming units only and *service and processing communities* on the other hand, containing headquarters, service units and slaughterhouses/processing plants. As could be expected, the last group gets more benefits from the farming operations, and they are therefore also more positively inclined to the industry.

#### **Working standards/ conditions in the salmon industry**

There is no available statistics on working conditions in each salmon farming jurisdiction.

From what is publicly known, there seems to be very few complaints regarding the actual farming operations, including the hatcheries. In the processing industry, the picture is different, with frequent complaints regarding monotonous work, low temperatures, and frequent periods of unemployment. However, this seems to be a lesser problem in the processing factories specializing in salmon, probably due to the fact that these factories are newer and contain more up to date technologies, compared to older fish processing factories. In general the aquaculture industry follows the general Norwegian labour regulations, also regarding employment of under-aged persons. Under-aged people may be employed in school breaks, and they are rewarded with current tariff or wage scale for their respective age group. When placing an employee within a wage group, age and experience is considered.

**Known conflicts/ impacts on communities' health and safety/ access to resources, etc.**

In the Norwegian aquaculture industry there are four main challenges:

- Pollution of the seabed and coast line
- Fish diseases and sea lice affecting the wild salmon
- Escapes of farmed salmon, affecting the genetic composition of the wild salmon
- Sea farming affecting the traditional fisheries (in terms of occupying space)

The first challenge is in the process of improving, largely due to stronger regulations by the pollution authorities and by the preferences among salmon farmers for better sites, that is, sites with greater depths and relatively strong currents. Pollution of beaches has been a problem in the past, as farms going into bankruptcy had no obligation to clean up wrecked net pens, ropes and floaters.

The second problem is currently affecting a large number of farms, particularly in the south. All the common diseases are frequently found in Norwegian farming (ISA, PD, etc.), but they are generally under control, largely due to the use of vaccines and strong veterinary regulations, pertaining to distance between farms, maximum density, establishment of veterinary zones, etc. The lice problem is however, not under control, and Norwegian farmers have over the last year been under increased scrutiny by the Food and health inspection service, for surpassing the maximum limit of sea lice per salmon. The massive number of sea lice during the fall of 2009 is largely due to the increased biomass in the sea and the lack of 100 % effective treatment procedures.

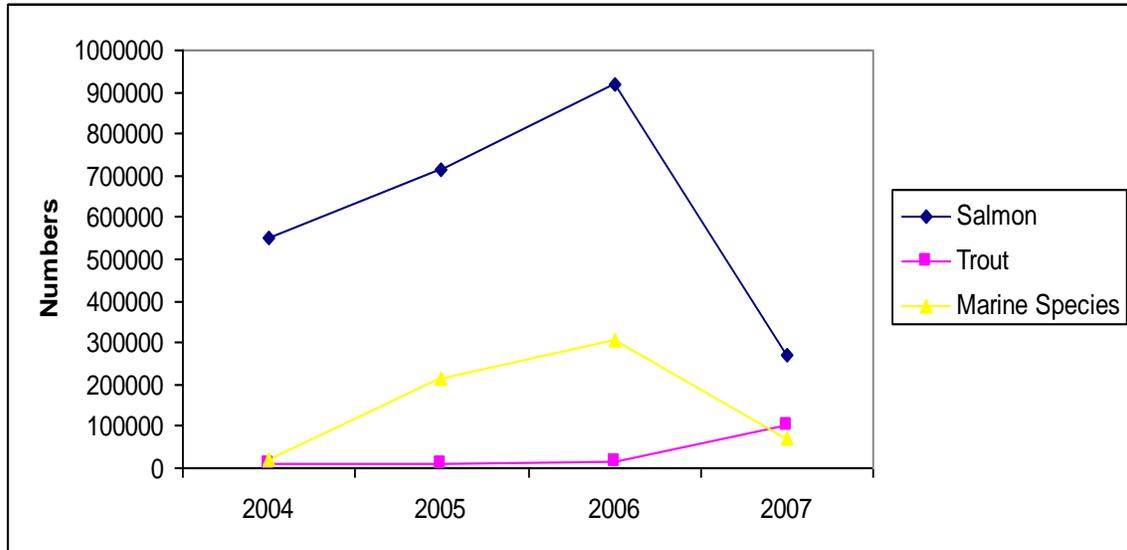


Figure 4.11: Number of escapees in Norwegian aquaculture (RKA 2008).

The third problem refers to escapes, normally caused by bad weather or by accidents in handling fish and net pens. Although the number of escapes has been reduced over the last years, the level is still far beyond what the conservation authorities accept in order to protect the wild salmon stocks. This has caused major public debates over the last years, often affecting also the local communities, where in the north we also find many fishers engaged in the fisheries of wild salmon, either at sea or in the rivers. While this conflict primarily affects the sports fishermen and the sport fishing industry (including tourism), the last conflict regarding the use of space has intensified over the last years.

While the municipality boards (*kommunestyre*) generally are in charge of allocating space for aquaculture purposes, this is in practice often a battle between the traditional fishers and the incoming aquaculture farmers. Especially contested are areas traditionally used for spawning, fishing or storing (of wild fish). In many cases traditional fishers claim that aquaculture operations have implied reduced access to cod and other valuable fish species, while aquaculture farmers generally refute such claims. So far there has not been possible to decide this issue scientifically, and the conflict goes on, especially in the north, where many small-scale fishers depend on the coastal cod in the fjords.

From 2009 a new planning and building act (PBA) has facilitated a more flexible regime for coastal planning, but the results remain to be seen. Spawning migrations and other natural processes affect entire ecosystems, while planning takes place in 286 different coastal municipalities, often with minimal cooperation. In addition planning at sea is optional (not mandatory) and the municipalities are limited to plan the area out to the base lines (connecting the extreme points on the coastline, including islands) plus one nautical mile (1852 m). Competition for space is therefore a major issue in many coastal communities. In the south it is often a competition between the tourist industry and recreational interests versus aquaculture, while in the north the discussion and conflicts are mainly between fishing and aquaculture (increasingly also with oil and gas development and with various wind power projects, planned at sea).

## **Chapter 5: Summary, Synthesis**

In assessing the social dimensions of salmon production in the three main countries in which it is most developed, two broad areas were considered: labor and community impact. In general, for the evaluation of labor issues, international standards, indicators of performance and monitoring methods are much more defined than for community impact. There is a basic set of criteria, based on what the ILO calls “Fundamental Principles and Rights at Work”, and standards against which performance of economic operations (farms, companies, etc) are assessed. In the case of community impact, standards and measurements for assessment are much less developed; rather, they are shaped and determined largely by factors related to the specific history and broader context of the industry’s development.

Chapters 2, 3 and 4 examined the social dimensions of the salmon production and processing in the three main countries in which it takes place: Chile, Canada and Norway. Each chapter included a description of the origins and development of the industry in each context; the principal geographic and demographic features, the main characteristics of the labor force, the legal frameworks governing labor relations, and the actual labor practices and conditions in the industry in each case.

The main area in which challenges to compliance with national and international labor standards were found was in occupational health and safety. This is largely due to the nature of salmon production itself, and the natural environment in which it takes place. The Chile study signaled occupational health and safety one of the most “sensitive” aspects regarding labor conditions. In Norway, salmon aquaculture was described as “a dangerous occupation”, exacerbated by the fact that salmon production occurs in a natural environment with weather conditions that contribute to an increase in the possibility of accidents.

Another area with real and potential compliance problems with labor standards is in working hours and overtime. Overtime hours in excess of what is permitted in the labor legislation appears to be prevalent in the industry. Other labor issues dealt with in the country chapters – such as wages, discrimination and freedom of association and collective bargaining – presented problems in some contexts and situations – notably wage discrepancies between nationals and non-nationals in the case of Norway, and some anti-union practices mentioned in the Chile chapter.

Even though the three countries have ratified ILO conventions regarding these and the other fundamental rights at work, and have robust national labor legislation governing them, the isolated, enclave nature of the industry in Canada and moreso in the case of Chile, could be functioning as a factor in weak enforcement and thus allowing noncompliant practices to persist. Where the industry developed in a more organic relationship with the community (e.g the Norwegian case) these abuses are not as widely detected. Furthermore, because the development of salmon farming in Norway was part of a larger government-led rural development program for coastal communities, conflict with those communities was not a contentious issue. The salmon farms were not perceived as “outsiders”, thus avoiding many of the conflicts that have emerged in the Chilean and Canadian cases.

As mentioned above, community impact issues are tied more to the broader context in which the salmon producing activities take place, than to the salmon farming and production processing

themselves. In all three cases, the fact that the industry has developed in areas where former agricultural or fishing communities - in some cases, communities of aboriginal people - had and continue to have traditional ties to local natural resources, is a factor in setting the stage for potential and real conflict over those resources and access to them (mainly land and water, but also to wild fish species). Competition with other economic activities, such as tourism was also mentioned as an area of conflict; as was the effects on environmental and human health of escaped farmed salmon and of water and air pollution.

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