

Improving governance of aquaculture employment

A global assessment



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Preparation of this document

This document was prepared in the framework of the ongoing efforts of the FAO Fisheries and Aquaculture Department to reduce food insecurity and poverty through promoting sustainable aquaculture. The COFI Sub-Committee on Aquaculture requested FAO to prepare Guidelines for Improving Governance in Aquaculture. As part of that process, background papers were prepared that provided overviews of employment governance in aquaculture. This report summarizes some of the issues facing aquaculture employment governance in a number of countries, current “best practices” and suggestions for improvements. Information reported herein results from field surveys conducted in 2009. It also comes from a literature review that uses data from surveys conducted before 2009. Hence, while many useful lessons can be learned from this information, the situation in countries used as case studies in this report may have changed. The NEPAD-FAO Fish Programme (NFFP) funded the publication of this report.

Abstract

Effective governance of modern aquaculture must reconcile ecological and human well-being so that the industry is sustainable over time. Without effective governance, there will be misallocation of resources, and perhaps stagnation of the industry, irreversible environmental damage, and social unrest. An important component of human well-being is the treatment of the workers in the industry. The aim of this study, which was recommended by FAO Members during the Fourth Session of the FAO COFI Sub-Committee on Aquaculture held in Puerto Varas, Chile, in 2008, is to contribute to the understanding of governance in aquaculture employment so as to suggest potential improvements where necessary.

A dozen farms and jurisdictions in Africa, the Americas, Asia and Europe were reviewed for their employment practices. Information on employment characteristics, such as educational background, gender and remuneration, was obtained from farms by survey. The aim is to evaluate whether workers in aquaculture are treated according to the law, and are paid at a rate equal to those in similar sectors. The creation of employment appears to be a decisive factor in public perceptions of the aquaculture industry, as indicated in attitudinal studies.

The conclusions of this report suggest that aquaculture has benefited the overall socio-economic conditions of the areas in which it operates. The industry has provided jobs, particularly non-seasonal jobs. These have enabled young people to stay in their communities, enhancing the economic viability of isolated areas. Total remuneration levels in all of the enterprises surveyed were at, or above, the minimum wage, and usually above wages in alternative sectors. Farms also provided indirect benefits, such as medical and pension coverage, and in some cases, bonuses. Attitudinal surveys indicate that these benefits are appreciated by the local population. However, there are negative aspects. Wages of unskilled workers in fish processing are low and working conditions often rudimentary. The dominance of large companies in areas of high unemployment can create a dualistic labour market that is reflected in wages; professionals are paid competitive salaries, but unskilled workers less than the value of their revenue product. There is also the danger that labour laws are either poorly enforced or, where violated, result in fines that lack deterrence, perhaps because governments wish to retain a competitive advantage for their internationally traded species. A number of suggestions are made that would improve the governance of labour in aquaculture. Because of the relatively long time that elapsed between the compilation of the information reported in this document and its publication, the situation may have improved here or there. Therefore, these suggestions may not be needed there. However, they remain relevant where such is not the case or for countries thriving to develop aquaculture in a sustainable manner. Note should be taken that this study does not intend to pinpoint any specific country or aquaculture system; its goal is to use them as case studies for the purpose of generating lessons, positive or negative, to learn from.

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Foreword

This report aims at assisting countries to improve employment governance of aquaculture activities within their jurisdictions. Many of the concepts and principles are common to other sectors but have not always been applied to aquaculture because the sector is relatively new. The result of poor employment governance can be exploitation of labour with low wages and unsafe working conditions. There may even be employment of children. To assess how the governance of labour can be improved, a survey was undertaken in four regions of the world: Africa, the Americas, Asia and Europe. Individual farms were asked about their hiring practices, the demographic characteristics of their employees, and the remuneration and other benefits paid to employees. The reader is invited to take account of the relatively long time that elapsed between the compilation of the information reported in this document and its publication, and note that the situation may have improved here or there. The reader is further advised to note that this study does not intend to pinpoint any specific country or aquaculture system. Rather its aim is to use them as case studies for the purpose of generating lessons, positive or negative, to learn from.

Abbreviations and acronyms

CEO	chief executive officer
EPL	employment protection legislation
FEAP	Federation of European Aquaculture Producers
FTE	full-time equivalent
ILO	International Labour Organization
INAQUA	National Institute for Aquaculture
LHA	Lake Harvest Aquaculture Ltd
MPL	marginal product of labour
MR	marginal revenue
MRP	marginal revenue product
NGO	non-governmental organization
OECD	Organisation for Economic Co-operation and Development
P	retail price
S	supply curve of labour
W	nominal wage

1. Introduction

RATIONALE AND OBJECTIVES

In the last three decades, employment in the primary fisheries and aquaculture sector has grown faster than employment in traditional agriculture. In 2006, the estimated number of fish farmers was almost 9 million people, with 94 percent operating in Asia (FAO, 2009). For each person employed in the primary sector, it is estimated that there could be four employed in the support services, including fish processing, marketing and service industries – for example, accountants, divers and researchers. In aquaculture, this indicates an employment of about 36 million. Including household dependents, there would be more than 100 million people dependent on the aquaculture sector for a living.

This employment in a sector that is predominantly in the developing countries increases food security and contributes to the Millennium Development Goals. By providing protein, the availability of food is increased, and through employment in aquaculture, incomes are generated (often to women employed in fish processing and marketing), enhancing accessibility to food. Through multipliers, aquaculture increases economic growth, tax revenues and foreign exchange earnings. On the environment, aquaculture can have positive effects by reducing the pressure on overexploited fish stocks.

However, aquaculture has developed at a time of growing scrutiny from the public, improved communications and vociferous opposition groups. Well-funded groups generate media attention with conclusions that often differ from those of government. Some of these groups claim that, in addition to polluting the environment, aquaculture enterprises, especially large corporations, exploit local labour, be it by employing them in low-paid jobs, or by denying benefits workers are entitled to, or even through employment of child labour.

There is limited research to support or refute these claims, but there are widespread concerns that, on an international level in developing countries, there is the danger of “social dumping”. Labour codes may be jeopardized as countries compete to remain attractive to companies. This is particularly pertinent where the industry has become oligopolistic owing to industry concentration. Large transnational companies farming species such as shrimp, salmon, tilapia and others that are global commodities are generally located in rural coastal communities. These large-scale commercial fish farming companies often enjoy monopsony power over the labour force as the sole or dominant employer. To remain attractive, communities may be prepared to sacrifice good working conditions, reduce wages and salaries, work longer hours without compensation, forgo benefits or accept employment of minors. The problem may become even more acute in the event of a negative shock to the market. How responsible the company feels to its employees depends on its commitment to social responsibility and corporate governance, but the danger of regulatory abandonment exists.

The purpose of this study is to investigate these issues. More specifically, the aim is to contribute to the understanding of governance in aquaculture employment so as to suggest improvement measures where necessary. In the past decade, in spite of persistent gaps, considerable progress has been made in general aquaculture governance with, among other things, the dissemination of “best practices”, but knowledge of aquaculture employment remains sketchy. By using data from several farms in different regions of the world, this paper attempts to fill some gaps in that knowledge. The paper

focuses on: the characteristics of aquaculture employees; remuneration in aquaculture compared with other sectors; existing aquaculture governance in some jurisdictions; and social licence towards aquaculture. By providing this information, the paper could guide future research into this critical issue.

The conclusion of this paper from the evidence of the surveyed farms is that labourers in hatchery and grow-out operations are paid at least the stipulated minimum wage, and often more than workers in equivalent sectors. However, processing workers, who are typically female and low-skilled often suffer from poor working conditions, including remuneration. Child labour is rare if only because farming requires technical skills. There were no reports of labour “exploitation”; in fact, farms where there is a plentiful supply of labour in Africa and Asia are paid above the equilibrium wage. Labour legislation in most countries is guided by the standards of the International Labour Office, and where there have been labour problems; the fault appears to have been poor monitoring and enforcement. In addition, penalties for companies that violate labour regulations are too small to act as deterrents.

DATA

Data on aquaculture production are available from national and international sources, including FAO. However, data on socio-economic variables are almost non-existent in most countries. At the time of this study, in Canada, the national statistics office was undertaking a survey of aquaculture employment for the first time, but no results were yet available. In Chile, a bibliographical search showed that more than 90 percent of research on aquaculture was biological or technical, with only 9 percent devoted to socio-economics (Yanez, Gonzalez and Trujillo, 2009). Other countries also are devoid of socio-economic data. The reason for the paucity of research stems partly from a lack of funding for socio-economic topics. There is also a lack of capacity and of interest. A further constraint is the reluctance of farmers to divulge information because of concern over competitors and tax authorities, or because of the time involved. Even non-governmental organizations (NGOs) focus on environmental challenges; few publish on labour aspects of aquaculture (although the World Wildlife Fund is compiling socio-economic data on aquaculture to guide future policy). The result is a lack of information on employment, and an almost complete absence of research on social licence.

To obtain information on employment in aquaculture, both primary and secondary data were used. In some regions, individual farmers were asked details about their employees and hiring and firing policies. The farms surveyed, in 2009, produced a variety of species, such as crocodiles, milkfish, salmon, shrimp, tilapia, and sea bass, according to the region. Interviews were not based on a random sample but on individual farmers willing to answer survey questions. In the salmon farming industry in the Americas (Canada, and Chile), employment surveys were more widespread, and covered almost all farms. The surveys were undertaken with the support of producer associations. Secondary data came from reports by governments, NGOs and trade unions.

In Africa, two farms in Mozambique and two in Zimbabwe were surveyed. All are foreign-owned. In Mozambique one firm, Aquapesca, was the first commercial shrimp (*P. monodon*) farming operation in the country. The company started construction in the mid-1990s and operated as a joint venture with the Government of Mozambique. Since 2005, the company has been owned by two foreign shareholders, and is no longer a joint venture. The other company in Mozambique, Sol e Mar, also grows shrimp (*P. monodon*). It was created in 2000 and was at first a joint venture with private capital from Mozambique and China, but in 2004 it became an expatriate company operated solely with Chinese capital.

In Zimbabwe, Lake Harvest is a group of companies that includes Bakerton Farming Ltd (a fish farming group), Lake Harvest Aquaculture Ltd (LHA) (a fish processing and marketing group), and Lake Harvest International SA (a fish marketing

group). The Lake Harvest production system combines a breeding and nursery pond system with grow-out of tilapia (*niloticus*) in cages on Lake Kariba. The other company in Zimbabwe, Crocraise Company, is oriented towards crocodile farming and the crocodile skin business. It also operates in the township of Kariba. Some Lake Harvest owners have shares in the Crocraise Company.

In the Americas, the focus was on salmonid enterprises in Canada and Chile. This is because salmonids, particularly Atlantic salmon (*salmo salar*), constitute the bulk of aquaculture value in both countries. The employment survey covered almost all salmonid producers. In Canada, two provinces dominate salmonid production, and the companies that completed the survey account for about 90 percent of national production. On the Pacific coast in British Columbia, the two largest salmon producers that completed the survey account for more than 80 percent of the province's output. On the Atlantic coast of Canada in New Brunswick, the surveys were completed by all the producers. Producer organizations assisted with the survey. Data were validated by the Statistics Canada input–output model, which generates employment and wage incomes for aquaculture producers and also for fish processors, provincially and nationally. Chilean data, also exclusively for salmonid producers, came from studies conducted in 2005 and 2007 by University of Chile and Salmon Chile (an association of salmon producers), respectively (Universidad de Chile, 2005; Chile SalmonChile, 2007). As part of this study, a further survey was conducted on salaries and on employment characteristics. Two other studies were undertaken by Oxfam and Terram, two NGOs (Diaz, 2007; Pinto, 2007). Their data came from secondary sources and from labour organizations.

In Asia, five firms in four countries were surveyed. In India, the firm surveyed processes and exports shrimp products; it sources its raw materials from farmers with whom it has buying arrangements. It has 342 workers. The firm in Thailand is another marine processing company with a founder–owner managing the farm. Its workforce has shrunk to 300 from about 3 000 because of competition and a downturn in the industry. In the Philippines, the aquaculture farm is a fully integrated operation growing milkfish, shrimp, tilapia and pompano with 690 employees. It is located in Mindanao as part of a larger agrobusiness and is family-owned.

Two cases studies of aquaculture operations were conducted in Viet Nam. The first is relatively small with 22 workers including the expatriate co-owner, and whose business is mainly seed production supported by a broodstock farm; its output of mainly grouper seed is sold locally. The firm is a joint venture owned by an expatriate from Taiwan Province of China and a Vietnamese partner. The other is owned by a large parent company in the United States of America. It is a vertically integrated farm with a seed production unit, a nursery unit, a grow-out unit and an export unit. It contracts its processing jobs to a local processing plant and exports all its output to the United States of America for distribution by its parent company. It is a newly established operation and had only one production cycle at the time of the study with an output from this trial run of 80 tonnes. It produces only sea bass (*Lates calcalifer*), filleted, and exported. Its target at full operation is 1 000 tonnes a year. Four farms were surveyed in Turkey. For convenience, results were reported under Asia.

In Europe, aquaculture operations in Norway and Scotland (the United Kingdom of Great Britain and Northern Ireland) were surveyed. There was no random sample of farms but some information was obtained on employment. However, most data related to social licence and attitudes towards aquaculture.

ORGANIZATION OF THE PAPER

The point of departure of this paper is a summary of issues in aquaculture governance and the administration of aquaculture in countries in the survey. It focuses on labour regulations that have been passed to improve working conditions. Some issues are common to all countries, such as health and safety protection, whereas others such as the hiring of contract labour affect only a few countries. The next section presents

demographic data from the many farms surveyed. Characteristics such as the age, education and gender of employees are summarized. The third section provides information on remuneration and working conditions of employees in the surveyed companies. The last section shows examples where labour regulations have been violated in the jurisdictions and provides some suggestions for improved governance of employment in aquaculture.

2. Governance of employment in aquaculture

GENERAL AQUACULTURE GOVERNANCE

The goal of aquaculture governance is to ensure aquaculture prospers over a long period. This requires that both ecological and human well-being are reconciled. Economic viability must be enhanced without jeopardizing environmental integrity and social licence. Governance must balance business-friendly enabling policies, such as security of property rights, enforcement of contracts, and macroeconomic stability that reduce risk and costs to farmers, with regulations that protect environmental and social well-being. Among regulations affecting social well-being are minimum wages, prohibition of child labour, and conditions of work.

Broader and softer than “government”, governance covers not only what a government does but also the process by which collective action is taken. Thus, aquaculture governance includes how decisions are made and how conflicting interests are reconciled. Therefore, it is broader than the traditional concept of “government” (Gray, 2005). Among participants in aquaculture governance are producer groups, NGOs and often local communities, as well as governments. FAO identified the principal issues of aquaculture governance more than a decade ago as: “how to develop institutions and rules that recognize aquaculture as a distinct agricultural sector; integrate aquaculture concerns into resource use and development planning; improve food safety and quality to safeguard consumers and meet the standards of importers; and improve the management of aquaculture, particularly where it has the potential to be socially or environmentally unsustainable” (Cullinan and Van Houtte, 1997).

Evidence from other sectors demonstrates how governance can influence investment and growth (Lio and Liu, 2008). Countries that rank highly in World Bank governance indicators tend to have higher agricultural productivity. Those jurisdictions that have “good governance” provide an enabling environment for the accumulation of capital (both human and physical), which in turn enhances their rate of economic growth compared with those jurisdictions with weak governance. Respect for the rule of law, secure property rights and enforcement of contracts provide guarantees to farmers when marketing products and obtaining inputs from suppliers (World Bank, 2008). Policy implications for the aquaculture sector are clear. Inputs such as seed and technical support are necessary for development of aquaculture but are not sufficient; governance issues must also be addressed. Institutions, the rule of law and the process of policy implementation may matter more than resource endowments or technical inputs in influencing aquaculture development.

While aquaculture governance has shown considerable progress, poor governance of aquaculture still remains. In some jurisdictions, the sector is insignificant and of low priority. In others, there may be no rule of law, jeopardizing investment even when demand and supply factors are favourable. Farmers will then have no incentive to take risks and to invest; rent-seeking rather than efficiency becomes rational behaviour in resource use. In other jurisdictions, regulatory procedures may be so onerous (or opaque) that entrepreneurial initiatives are discouraged. Even when regulations exist, there may be poor enforcement, so that there is ecological damage or the spread of preventable disease. A further indication of poor governance is moratoria on aquaculture expansion because of public opposition. Too often, social licence is ignored until there is litigation or vandalism.

For the governance of aquaculture labour, four general principles are important. They are criteria against which institutional roles and policies of the sector should be judged for their impact on sustainability. The four principles are: accountability; effectiveness and efficiency; equity; and predictability. Accountability implies greater openness so that enterprises and officials are answerable for their actions. Accountability would be reflected in monitoring and enforcement of labour legislation, with appropriate penalties for violations. Effectiveness and efficiency reflect the quality of administration and would require that labour regulations are cost-effective and enforceable. Too often, regulations are imposed without sufficient consideration given to efficiency or capacity to enforce. Equity refers to intergenerational but also intragenerational equity. Intragenerational equity can be included in procedures for hiring, for remuneration, and gender fairness. Predictability refers to the fair and consistent application of laws and regulations. It also requires transparency with an open, clear decision-making process. Implementation of these principles in labour practices enhances public acceptance of aquaculture.

These principles are increasingly being incorporated into aquaculture governance with the spread of “participatory governance”. Self-regulation and comanagement are examples of participatory management with aquaculture producers implementing a detailed code of conduct, under the overall supervision of the State. At the local level, neighbouring (and competing) farmers work together to coordinate environmental and production measures. Compliance is enforced by peer pressure. At the national level, many countries have codes of conduct with a certification of quality. This is replicated at the international level, as with the code of conduct of the Federation of European Aquaculture Producers (FEAP). Certification requires monitoring of animal health, food safety and environmental impacts, and, in addition, socio-economic benefits. These socio-economic benefits of aquaculture include “fair” treatment of employees and positive impacts on local communities.

Regulations covering employment in aquaculture are likely to be housed in a number of agencies, and a lead agency can facilitate cooperation and cost-effective monitoring (FAO, 2008). As a new industry in many countries, and one that impinges on several other sectors, there is a danger of overlap and turf wars in the administration of aquaculture. The potential for administrative overlap is greater where there are different tiers of governments, as with federal states, but it may also occur in unitary states where local authorities have some jurisdiction (Glenn and White, 2007). Departmental competition, whether horizontal (same tier of government) or vertical (different tiers of government), is likely, and one possibility is to agree on responsibilities. A lead agency helps to improve integration of administrative and regulatory initiatives related to employment in aquaculture.

The jurisdictions studied in this report all have a competent authority for aquaculture. For the African case studies, Mozambique has established the National Institute for Aquaculture (INAQUA) as an autonomous institution within the Ministry of Fisheries. While the Ministry of Fisheries has primary responsibility, the Ministry of Environment is responsible for environmental impact assessments and environmental compliance, and another agency is responsible for quality control. In each province, aquaculture enterprises respond also to the provincial fisheries directorates in the event of necessity. In the case of Zimbabwe, the lead agency for aquaculture is the Parks and Wildlife Management Authority.

For the two countries in the Americas, Canada has a federal agency, the Department of Fisheries and Oceans, and there are also provincial departments with their own competence. The two provinces that produce the most fish (about 80 percent of total value) are British Columbia and New Brunswick. In aquaculture, as in some other sectors, decision-making is best served by a combination of high-level and local jurisdictions. In Canada, the central government has delegated responsibility for

site selection to provincial governments. In Chile, the administrative lead agency for aquaculture is the Department of Aquaculture, within the Subsecretaria de Pesca. The Subsecretaria de Pesca is responsible for maintaining information about aquaculture activities including concessions, proposing authorized areas for aquaculture, identifying capacity for managing aquaculture efficiently, and elaborating criteria for siting (Alvarez, 2009). Chile's aquaculture governance model is market-driven, as reflected in its policy statement: "Chile aims to promote the maximum possible economic growth over time from aquaculture, but in an ambience of environmental sustainability and equitable access to the activity" (Alvarez, 2009).

For the Asian case studies, the lead agency for coastal aquaculture in India is the Coastal Aquaculture Authority. Its mandate is to regulate coastal aquaculture so that it does not cause damage to the environment and protects the livelihoods of people living in the coastal areas. In India, there is comanagement between central and state governments. The lead agency for aquaculture in Thailand is the Department of Fisheries, which, as its counterpart in India, falls under the Ministry of Agriculture. In the Philippines, the Bureau of Fisheries and Aquatic Resources (under the Department of Agriculture) is the lead agency. In Viet Nam, the Ministry of Fisheries is the agency responsible for the management and development of aquaculture.

In Europe, Norway administers aquaculture within a context of sustainability, with regulations to ensure that practices are responsible. Environmental and social concerns are not ignored because the underlying framework is sustainability, but its governance is predominantly market-oriented, with profits and competitive advantage as key objectives. This economic orientation is also reflected in its ambition to simplify administrative and regulatory procedures so as not to penalize producers and jeopardize comparative advantage. The lead agency in charge of aquaculture in Norway is the Ministry of Fisheries and Coastal Affairs. In Turkey, aquaculture is mainly based on intensive finfish culture under the authority of the Ministry of Agriculture and Rural Affairs. In the United Kingdom of Great Britain and Northern Ireland, Scotland accounts for about 92 percent of all aquaculture production, and its lead agency at the time of the survey was the Scottish Executive Environment and Rural Affairs Department.

EMPLOYMENT LEGISLATION

One aspect of human well-being is employment that is equitable and non-exploitative. Ideally, principled values would guide aquaculture activities so that farmers with strong corporate social responsibility would induce "beyond compliance" behaviour (Lynch-Wood and Williamson, 2007). This would obviate the need for restrictive regulations; i.e. "the best" regulation is self-regulation. With an ethos of corporate social responsibility, aquaculture companies would assist local communities, employ fair labour practices and demonstrate transparency.

Responsible behaviour is in the self-interest of producers. Consumers increasingly demand that goods be ethically and ecologically produced. For internationally traded products, poor behaviour can lead to negative publicity in importing countries, even to threats of boycotts. Reports of child exploitation or "sweatshops" damages the image of the brand and jeopardizes demand. On the supply side, mistrust may be reflected in opposition to site licences, or moratoria on expansion. Hence, enlightened self-interest would imply non-exploitative treatment of labour.

However, experience has demonstrated that regulations and economic incentives are needed to mitigate behaviour that produces negative externalities (Glenn and White, 2007; FAO, 2010). Self-interest may not be "enlightened" if the company only has a short time-horizon, or the company is a "free rider" benefiting from exemplary behaviour of other producers. As with other resource products, large-scale companies (domestic or transnational) may become the dominant employers, creating salmon

or shrimp “republics”, able to hire labour at low wages and under poor working conditions. The industry might be an enclave with a few (often expatriate) managers, and a large mass of unskilled and poorly trained workers. Such workers with few alternatives may be willing to work but under conditions that threaten their health and safety. Jealousy, competition for resources and resentment over hiring practices may trigger social conflict. This can be particularly acute if small elites, domestic or foreign, dominate the industry.

For these reasons, legislation is needed to protect labour. The origin of labour laws was the British Factory Act, which was enacted in response to labour conditions created by industrialization. Over time, labour laws have expanded to cover: industrial relations (certification of unions, labour–management relations, collective bargaining and unfair labour practices); and workplace health, safety and employment standards (general holidays, annual vacations, working hours, unjust dismissals, minimum wage, layoff procedures and severance pay). Special social issues include women, child labour and migrant labour, whose focus is welfare and protection of these groups. A significant aspect of labour 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. Firing may be affected by required redundancy procedures, the length of advance notice, and severance pay. One unresolved issue for labour legislation, particularly in developing countries, is protection of workers in the informal sector.

Child labour

Estimates of the number of child labourers in the world vary from 158 million to 215 million, which is about one child in six in the world from age 4–15 years (UNICEF, 2011; ILO, 2011b). In sub-Saharan Africa, the proportion is one in three. Child labour occurs when children’s work is dangerous, affects health and interferes with schooling. When work is for pocket-money or part-time in a family business (farm), it is not classified as child labour; it can actually be educational and positive.

In Canada, all provinces have regulations limiting the work that can be done by minors. The primary focus is to ensure that school education does not suffer, thus those provinces that do allow children of 14 years old to work limit their hours. There are also restrictions on the type of work in order to ensure the health and safety of minors.

In India, there is no outright ban on child labour, and the practice is generally permitted in most industries except those deemed “hazardous”. Although a law in October 2006 banned child labour in hotels, restaurants, and as domestic servants, there continues to be high demand for children as hired help in the home. Current estimates as to the number of child labourers in the country range from the Government’s estimate of 12 million children under the age of 13 years to the much higher estimates of children’s rights activists of about 60 million. Little is being done to address the problem as the economy is expanding and the nuclear family is spreading, thereby increasing demand for child labourers.

Contract labour

In some jurisdictions such as Chile, India and the Philippines, aquaculture firms often rely on contract labour. Reliance on contract labour for semi-skilled and unskilled jobs is prevalent also in agricultural and allied operations and to some extent in the services sector. Contract workers are indirect employees; persons who are hired, supervised and remunerated by a contractor who, in turn, is compensated by the aquaculture company. While economic factors such as cost-effectiveness may justify the system of contract labour, considerations of social justice have made some organizations such as

trade unions advocate its abolition or regulation. Inferior labour status, casual nature of employment, lack of job security and poor economic conditions are the major characteristics of contract labour.

Contract work is important and growing in Chile. As part of outsourcing, it is a means of reducing costs and of increasing flexibility (Pinto, 2007). About 60 percent of salmon workers are now in outsourcing activities, compared with 43 percent in 1999 (Pinto, 2007). There are few permanent jobs; in 2005, barely one-quarter of salmon workers had permanent contracts (compared with at least 90 percent on salmon farms in Canada). Hiring on contract gives firms flexibility; however, there is the danger that firms feel less responsibility to maintain labour standards, which increases the precarious nature of aquaculture work. In 2005, 62 percent of work-related accidents in salmon aquaculture in Chile occurred in outsourced companies, and in such companies unionization is difficult (Pinto, 2007). The salaries through outsourcing companies are about 30 percent lower than for permanent workers.

In India, economic liberalization as well as court judgments have prompted proposals to bring about amendments in the Contract Labour Act, thereby prohibiting contract labour. Several studies on the condition of contract labourers in India have found their condition to be appalling and exploitative in nature. The Supreme Court of India has observed that contract labour should not be employed where: (i) the work is perennial and must go on from day to day; (ii) the work is incidental to and necessary for the work of the factory; (iii) the work is sufficient to employ a considerable number of full-time workers; and (iv) the work is being done in most concerns through regular workers. They apply to every establishment in which 20 or more workers are employed or were employed on any day in the preceding 12 months as contract labour and to every contractor who employs or who employed on any day of the preceding 12 months 20 or more workers. It does not apply to establishments where the work performed is of intermittent or seasonal nature. An establishment wherein work is of intermittent and seasonal nature will be covered by the Act if the work performed is more than 120 days and 60 days in a year, respectively. The Act also applies to establishments of the Government and local authorities. The employers associations gave the following, pro-contract-labour opinions:

- The system of contract labour offers tremendous opportunities for employment and allows the employers flexibility to choose what is best for them. This helps improve productivity and service competitiveness.
- Any Act should be made applicable only to the main and core activities of the establishment if contract labour is to be abolished. Supportive or allied activities of an establishment like maintenance, housekeeping should be outsourced and the Act should only provide for regulating working conditions and wages.
- If the contract labour system, which is cost-effective, is not allowed to continue, industries may opt for technological restructuring with fewer workers, leading to a reduction in employment.

On the other hand, the labour unions are opposed to the idea of contracting of perennial services for the following reasons:

- Reduction of regular employment.
- The contract labourers generally come from the weaker sections of the society and will be deprived of the benefits that accrue to regular employees.
- Coordination of activities of a large number of contractors/subcontractors is more time-consuming and costly than in-house activity.
- Outsourcing will only lead to a type of employment founded on discrimination and exploitation of contract labour in regard to wages paid, working conditions, etc.

In the Philippines, the labour directive of 2001 prohibits contracting of labour directly. The directive requires firms to contract jobs from labour cooperatives, which act as labour contractors and take care of all the remunerations and benefits of their

members subject to the labour code of the country. A general criticism of this directive by labour NGOs is that it prevents the formation of labour unions and thus is a way to prevent workers from organizing and negotiating with the employers. It has also been criticized as a way to avoid hiring regular workers and thereby avoid wage upgrades and welfare benefits that would otherwise be provided to workers employed on a regular basis. A large foreign-owned agribusiness corporation operating in Mindanao has been the recipient of criticisms in the Philippines and the United States of America for allegedly using the scheme in an exploitative way.

The immediate problem for some firms is that cooperatives are not well run and, thus, service is unreliable. In this regard, firms have been assisting cooperatives to run more efficiently. By comparison, the case firm has not had a similar problem. It has been assisting the labour cooperative to improve its management capability. Meanwhile, the practice continues to be observed subject to the provisions of the law, while the matter is being studied.

The challenge of social dumping in aquaculture

While labour legislation is necessary to protect workers, compliance with EPL can be expensive for firms. When a good is exported from a jurisdiction with weak or poorly enforced labour standards to another jurisdiction with higher standards, the exporter's costs are artificially lower than its competitors, hence representing an unfair advantage in (international) trade. This is called social dumping.

Low direct and indirect labour costs constitute a significant competitive advantage for enterprises, with possible negative consequences for social and labour standards in other jurisdictions. Enterprises in jurisdictions with high direct wage costs can attempt to compensate by increasing productivity. However, in addition to direct wage costs, there are the indirect costs of compliance with EPL, which can differ sufficiently to give those jurisdictions with lower labour standards a competitive advantage. A possible result is that jurisdictions will be under pressure to reduce their labour and social standards in order to ease the burden of high indirect wage costs on enterprises. The costs of EPL may encourage firms to engage in regulatory arbitrage, and relocate or threaten to relocate, to jurisdictions with more amenable regulations. Fear of losing jobs and foreign exchange may oblige governments to lower standards and ease regulations. This shift in the balance of power is more probable where the industry is oligopolistic and transnational. In aquaculture, this could apply to species such as salmon or shrimp, where a single transnational company may operate in different jurisdictions.

Salmon farming is an example because industrial concentration has occurred both domestically within producing countries and internationally, owing to bankruptcies and mergers. Internationally, the industry is increasingly dominated by a few large corporate enterprises; by 2006, only 46 farms produced 80 percent of the world supply of farmed salmonids, compared with about 114 farms in 1996 (Marine Harvest, 2008). One farm alone, Marine Harvest, produced more than one-quarter of world output of Atlantic salmon in 2006. An aquaculture company may enjoy monopsony power over the labour force as the dominant employer in isolated rural communities. With overwhelming bargaining power, companies have the ability to demand concessions, and in order to remain attractive, communities may be prepared to sacrifice regulations regarding EPL.

Minimum common standards discourage regulatory arbitrage. Many countries have ratified international protocols of the International Labour Organization (ILO). These guidelines are considered the fundamental rights of labour. These 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. The Organisation for Economic Co-operation and Development (OECD) has produced the “OECD Guidelines for Multinational Enterprises”. These preclude foreign companies, such as international salmon companies, from imposing a double standard in labour practices between workers they hire in developed countries and those in developing countries. However, monitoring and enforcement of these guidelines is difficult. Labour rights may also be part of binational agreements to counter social dumping. An example is the 2004 Free Trade Agreement between Chile and the United States of America.

LABOUR LEGISLATION IN SOME CASE JURISDICTIONS

Africa

Both the jurisdictions of these case studies in Africa have labour laws, and with minimum wages that vary by sectors. For agriculture, the minimum wage is US\$70 a month in Mozambique, and from US\$35 to US\$50 a month in Zimbabwe. In general, labour laws in Mozambique and Zimbabwe protect the national work force, although there are no specific regulations regarding aquaculture enterprises; therefore, aquaculture employment is regulated by the national labour acts. Labour acts in both countries allow collective rights and collective employment relations, through associations, syndicates, and other employees organizations. Working hours in both countries are eight hours a day, after which the employee is paid half of the pay day; and if working on the weekends or holidays, workers are entitled to receive double their normal pay. However, all aquaculture companies avoid these situations, and employees work eight-hour shifts, be it during the day or night. Mozambique is a signatory to the International Core Labour Standards.

Americas

In Canada, federally regulated companies such as banks and telecommunications companies, and companies whose business crosses provincial boundaries, such as railways, are regulated under the national Canada Labour Code. Otherwise, provincial labour codes apply, as for aquaculture. All provinces have regulations that oblige employers to pay a minimum wage and to meet certain labour conditions. As a responsibility of the provinces or territories, the minimum wage in October 2009 ranged from CAD10.00–8.00 an hour (about US\$9.35–7.50 an hour). Assuming a 40-hour week and four weeks a month, the monthly minimum wage is about CAD1 300 (US\$1 215) in the two principal aquaculture provinces (British Columbia and New Brunswick). Both provinces have employment standards that regulate overtime, holidays and other conditions (such as maternity leave and uniforms).

In Chile, which is a unitary state, the minimum wage is the same throughout the country. The minimum wage in October 2009 was CLP165 000 (US\$300) a month. To convert to relative purchasing power, this is equivalent to what US\$446 would buy in the United States of America (*Santiago Times*, 2009). The Ministry of Labour stipulates the maximum number of hours that can be worked a day (10, with 2 on overtime) and the number of days per week (6). Therefore, even taking into account purchasing power, the minimum salary in Chile is almost one-third of that in Canada.

In addition to the OECD guidelines for transnational companies operating subsidiaries abroad, Chile has legislated labour codes. As mentioned above, the 2004 Free Trade Agreement between Chile and the United States of America contains Chapter 18, which specifies the social and labour norms that both countries agreed to meet in order to comply with the 1998 ILO guidelines (above). All have been ratified by Chile in its labour code, some ratifications dating back to 1933 (freedom of work), and others more recently, such as the law against sexual harassment in 2005 (Diaz, 2007).

Asia

In Asia, there are also labour laws. Under the Constitution of India, the central and state governments are competent to enact labour legislation. This includes the minimum wage, which is a state responsibility. As a result of robust economic growth nationally, the Andhra Pradesh government has raised the minimum wage threshold for unskilled, semi-skilled and skilled workers. Monthly minimums are INR4 030 per month for unskilled workers, INR5 070 for semi-skilled workers and INR6 110 for skilled workers. The Payment of Wages Act (1936) ensures that wages payable to employed persons are disbursed in a timely manner and that no unauthorized deductions are made from the wages. The wage ceiling for applicability of the Act increased from INR1 600 to INR6 500 per month while empowering the central Government to further increase the ceiling by way of notification. It also enhances the penal provisions for non-compliance and violations.

The Ministry of Labour and Employment is mandated to create a work environment conducive to achieving a high rate of economic growth with due regard to protecting and safeguarding the interests of the working class in general and those of the vulnerable sections of the society in particular. The Ministry has been performing its assigned duties through the aforementioned legislation with the help and cooperation of state governments. A large number of labour laws have been enacted catering to different aspects of labour, namely: occupational health, safety, employment, training of apprentices, fixation, review and revision of minimum wages, mode of payment of wages, payment of compensation to workmen who suffer injuries as a result of accidents or causing death or disablement, bonded labour, contract labour, women labour and child labour, resolution and adjudication of industrial disputes, provision of social security such as provident fund, employees' state insurance, gratuity, provision for payment of bonus, regulating the working conditions of certain specific categories of workmen such as plantation labour, beedi workers. The Factories (Amendment) Bill 2005 has been introduced in the Lok Sabha (Lower House of the Parliament of India). The Bill proposes to amend Section 66 of the Factories Act 1948 so as to provide flexibility in the matter of employment of women during night shift with adequate safeguards for their safety, dignity, honour and transportation from the factory premises to their nearest point of residence.

To ensure the welfare of workers in the unorganised sector, which among others include weavers, handloom workers, fishermen and fisherwomen, farm workers, toddy tappers, leather workers, plantation labour, etc, the Government has proposed to enact comprehensive legislation for these workers. On 2 December 2009, the Government notified parliament that it would bring in an umbrella labour legislation for the unorganized workers in the country during the budget session in early 2010 to take care of the concerns of this segment of the workforce and to "ensure their minimum protection and welfare". The Second National Commission on Labour has made recommendations on various issues, which among others cover according protection. Out of the workforce of 400 million in the country, the organized workforce was only 7 percent. A central fund for skills development was being contemplated as skilled labour force in the country was only 6 percent compared with 70–80 percent of the workforce in countries like Japan. The proposed fund would help raise labour productivity.

In the Philippines, the Department of Labour and Employment is mandated to implement the labour code of the country. The current Labour Code of the Philippines was promulgated as a Presidential Decree in the 1970s. It has subsequently undergone several amendments by the legislature to address several emerging issues such as employment of Filipinos abroad, new occupational opportunities such as the information sector, and the need to improve the competitiveness of Philippine industries. Other relevant laws in the country are special laws such as the Social

Security Law, the Magna Carta for Disabled Persons, Magna Carta of Public Health Workers, Migrant Workers and Overseas Filipino Act of 1995, Paternity Leave Act of 1996, and the Constitution.

From time to time, the Department of Labour and Employment issues labour directives in line with the labour code to address immediately major concerns that need not be acted on by the legislature. A particular directive that the case firm is confronted with, because it affects its efficiency and adds more cost than it needs to bear, is the requirement by the directive to contract jobs from labour cooperatives rather than contracting labour directly from the open market. The directive prohibits labour contracting only but allows job contracting which means outsourcing portions of non-core operation to third-party contractors. There are very stringent regulations on the direct hiring of labour on contract. There is a preference for the use of cooperatives as third-party contractors because cooperatives utilize their members to perform job contracts. As members, they are perceived to be more concerned, which reduces the threat of labour unrest.

In Thailand, the rights and duties of the employer and the employee are generally governed by the Labour Protection Act and the Civil and Commercial Code. The Labour Protection Act provides for a wide range of welfare concerns that include: rest period before overtime; payment for temporary cessation of operation of business; child allowance benefits; leave for sterilization; leave for military service; leave for training and development; prohibition regarding payment of wages; and guarantee to child employee; and entitlement of leave of absence of child employee. However, it does not have a declaration of policy and does not provide for: construction of laws in favour of labour; who may engage in recruitment; mandatory remittance of foreign exchange earnings; disqualifications for engaging in recruitment and placement of workers; transferability of licence or authority; suspension of licence authority; illegal recruitment; apprentice; learner; paid breaks for teachers; service charges; thirteenth-month pay; paternity leave; facilities for women; stipulation against marriage for women employees; and classification of certain women workers. The Ministry of Labour proposes labour laws and amendments to the Parliament, promulgates policies and implements them with ministerial regulations.

The maximum probationary period permissible under Thai employment law is 120 days. All employers are required by labour law to provide at least 13 official public holidays per year, and 6 vacation days after one full year of service. Apart from salary, all benefits arising from employment are regarded as assessable income subject to withholding tax at a progressive rate. Under Thailand's labour law, an employee is entitled to annual sick leave of 30 working days per year, with full pay. In addition to sick leave, a pregnant woman is entitled to 90 days of maternity leave (inclusive of holidays), including 45 work days at full pay. Minimum daily wage rates depend on the cost of living in different provinces. Legislation regulating hours and conditions of labour, workers' compensation, and welfare also exist.

The Labour Code in Viet Nam is comprehensive. It is heavily socially oriented and has provisions that cover some special social issues. It has protective provisions for women workers (retirement is at 55 compared with 60 for men, and full pension provision after full payment of 25 years of social insurance (compared with 30 years for men). It also has provisions to protect and provide due benefit for junior (below 18) and senior (above 60) workers. It requires collective agreement between workers unions and the company, and provides assistance to workers to organize unions. It allows strikes and has local-level conciliation bodies.

In Viet Nam, the national minimum wage is set according to the standard of living. At the time of the survey, it was US\$53 a month. Foreign companies are required to pay at least twice the minimum wage for local companies. This is to provide a competitive advantage to domestic firms. The minimum wage is fixed on the basis of the cost of

living “to ensure that an employee performing the most elementary work in normal working conditions recovers his/her basic work capacity and partly accumulates reserves”. The minimum wage serves as a reference for calculation of the wage rates for other categories of work. The Government decides and promulgates for each period a general minimum wage rate, minimum wage rates for different areas and for various branches of trades, after consultation with the Viet Nam General Confederation of Labour and with representatives of employers. When the cost of living index increases, entailing a reduction in workers’ real wages, the Government is empowered to readjust the minimum wage rates accordingly to safeguard real wages.

3. Characteristics of aquaculture employees

AGE PROFILE

In all the countries surveyed, the majority of aquaculture workers are in the age range of 20–39 years. As Figure 1 illustrates, in Africa about 83 percent of people employed in all four farms are between 20 and 39 years old; in the Americas just over half, and the average for the five surveyed farms in Asia was about 55 percent. In Europe, more than three-quarters of employees in the three countries surveyed were aged less than 40.

Table 1 disaggregates by the farms that were surveyed. In Africa, there were relatively few employees aged more than 40. Only 18.3 percent were more than 40 compared with 46.1 percent in the Americas and 36.6 percent in Asia. This may reflect differences in life expectancy. In the Americas, the proportion of the higher age group is particularly high in New Brunswick, Canada. Those more than 50 years old were 19.2 percent of all employees, with 3.5 percent more than 60. This is higher than for other salmon producers in British Columbia, Canada and Chile, and for other regions. An earlier study of employees in New Brunswick in 2000 showed that 75.6 percent of industry employees were less than 39 years of age, about the same proportion as in Chile at present. Hence, the age level of employees in the industry has increased in the last decade, and this may indicate a trend in other jurisdictions. Within Asia, farms in the Philippines and Thailand had a wider age distribution as shown in Table 1. This wider spread probably reflects the processing orientation of the farms surveyed.

There is little difference in age distribution by aquaculture species in Chile; the proportion of employees less than 40 years old ranged from 73.4 percent (marine aquaculture) to 76.8 percent (plant aquaculture). Table 2 also indicates that in Chile there is little difference in age distribution between the genders. Most men (74.4 percent) were less than 40, as was the case for women (75.7 percent). Some difference is discernible by gender for ages 50 and older, with men more likely to continue working.

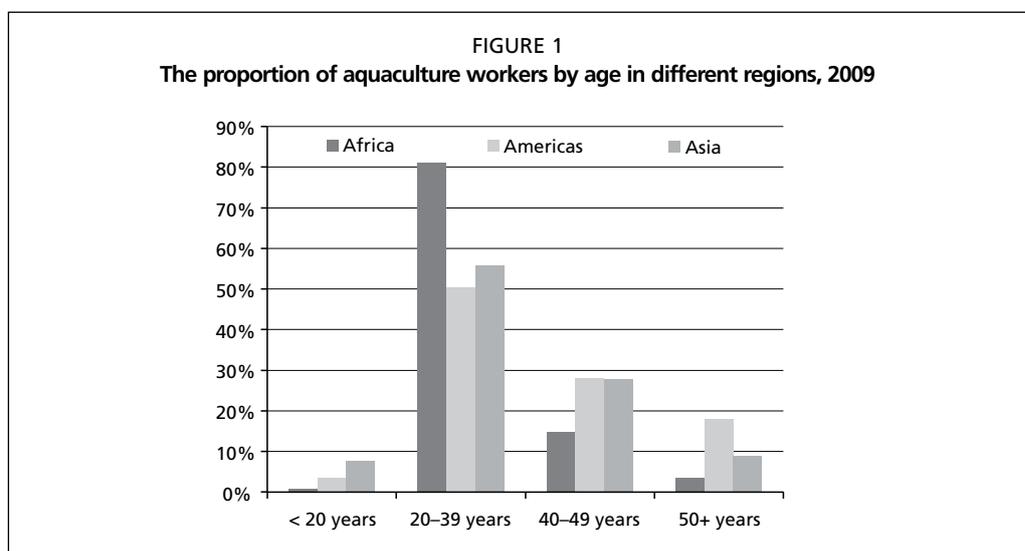


TABLE 1
Age of aquaculture workers (both genders) by farm and jurisdiction, 2009

	Age group (years)					Total	No. FTEs
	< 20	20–39	40–49	50–59	60+		
	(<i>%</i>)						
AFRICA							
Mozambique – Aqua	1.3	77.1	16.9	3.9	0.8	100	480
Mozambique – Sole Mar	0	85.4	11.2	3.4	0	100	89
Zimbabwe – Bakerton	0	87.2	10.4	2.4	0	100	125
Zimbabwe – Lake Harvest	0	71.4	13.6	0	0	85 ¹	126
Zimbabwe – Crocraie	0	84.6	15.4	0	0	100	13
AMERICAS							
Canada – BC	2.9	58.9	24.0	13.7	0.5	100	1 019
Canada – NB	4.2	46.6	30.0	15.7	3.5	100	1 191
Canada – BC+NB	3.5	50.3	28.2	15.6	2.4	100	1 912
Chile	18.7 ¹	56.6	18.6	5.2	0.9	100	NA
ASIA							
India	19.3	73.4	6.4	0.9	0	100	342
Philippines	0	50.7	36.2	13.1	0	100	690
Thailand	11.1	44.1	34.9	8.6	1.3	100	324
Viet Nam – 1	9.1	77.3	13.6	0	0	100	22
Viet Nam – 2	9.4	78.1	9.4	3.1	0	100	32

¹ There is some discrepancy between the classification by age and the employment total.

Note: BC = British Columbia; NB = New Brunswick; FTE = full-time equivalent.

TABLE 2
Age and gender of workers in aquaculture activities in Chile, 2007

Age group	Men	Women	Marine	Fresh	Plants	Administration
	(<i>%</i>)					
Up to 25	18.7	18.7	17.0	20.2	22.3	9.8
25–30	21.2	23.1	20.3	23.6	22.2	21.2
31–40	34.5	33.9	36.1	32.5	32.3	43.6
41–50	18.8	18.0	19.8	17.6	18.0	19.4
51–60	5.8	3.8	6.1	5.2	4.6	5.1
> 60	1.0	0.5	0.7	0.9	0.6	0.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Salmon Chile (2007).

The age distribution according to gender is different in Canada. A higher proportion of men (56.9 percent) are less than 40 compared with women (43.6 percent). Again, unlike Chile, women aged 50 or more are more likely to work – 24.0 percent of women employees are aged 50 and older, higher than the proportion for men at 14.8 percent.

The age distribution of aquaculture employment is important because of its implications for rural communities. Most aquaculture occurs in isolated areas that usually lack employment opportunities for young people; by providing employment, the sector enables young people to remain, thereby reducing rural–urban migration. Therefore, it reinforces the viability of rural (often coastal) communities through taxes and educational facilities for children.

EDUCATION

Not all farms were able or willing to provide data on the educational levels of their employees; in some jurisdictions, this reluctance was due to privacy concerns. Table 3 shows the educational levels of employees of firms willing to divulge the information.

TABLE 3
Educational level of aquaculture workers in certain countries, 2009

	Less than high school	High school studies	Technical studies / diploma	First degree	Higher than first degree	Total
(%)						
AMERICAS						
Canada – NB						
Hatchery	2	13	81	4	0	100
Processing	10	60	28	2	0	100
ASIA						
India	20	71	6	2	1	100
Philippines	25	20	41	14	0	100
Thailand	30	25	33	11	1	100
Viet Nam – 2	47	13	0	40	0	100

Note: NB = New Brunswick.
Source: Cormier (2009).

In New Brunswick, Canada, most employees had at the least high school studies. Owing to the more technical nature of the work, hatchery employees have higher levels of education than processing employees. About 55 percent of hatchery employees have postsecondary certificates or bachelor degrees as compared with about 14 percent of processing employees. Almost three-quarters of processing workers have just high school education or less.

Asian processing operations also reflect the low level of skill needed. At least one-fifth of employees had less than high school education, and in Viet Nam almost half (47 percent) lacked a high school education. In Viet Nam, there was a dual labour force with almost the same number having a first degree (40 percent). This appears to reflect foreign ownership of the company with expatriates as managers. Thailand and Viet Nam were unusual in terms of educational attainments of women (although not unique among the farms). With the Thai firm, the educational attainment of women was the most acute; two-thirds of those with a first degree were women, as were three-quarters of those with at least some high school. In Viet Nam, also most of those with a university degree, and half of those with a high school education or a diploma, were women. However, in India, most of the university graduates were men.

In Turkey, among the farms surveyed, around 69 percent of the men employed have completed an education up to high school level and around 16 percent up to the university level, while around 12 percent and 2 percent of the female population have completed high school and university, respectively.

In Europe, among the farms surveyed, the men are more highly educated. Of the men employed, around 82 percent in Norway and 59 percent in Scotland have completed an education up to high school level and around 2 percent in Norway and 28 percent in Scotland up to university level, whereas in the female population, around 16 percent in Norway and 7 percent in Scotland have completed high school and around 7 percent in Scotland up to the university level (Table 4).

TABLE 4
Educational level of aquaculture workers in selected European countries, 2009

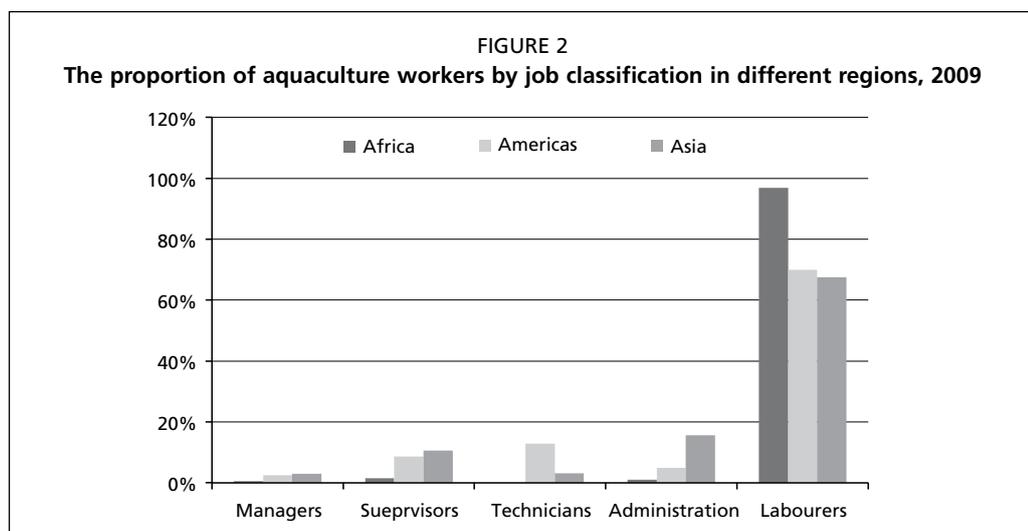
	Norway		Scotland (United Kingdom)	
	Male	Female	Male	Female
High school	82.1	16.1	58.6	6.9
University	1.8	0	27.6	6.9

JOB CLASSIFICATION

Figure 2 indicates the percentage of permanent employees in different job classifications for those farms with data. As can be seen, the bulk in all regions are occupied as labourers; in the only farm to give these data in Africa, more than 90 percent were classified as labourers. The lowest proportion was in Canada, but generally at least half of all employees are classified as general labour.

When disaggregated by farm and jurisdiction, the difference in the proportion of general labour varies from only 35 percent of all employees in British Columbia, Canada, to 97 percent in Mozambique. The proportion in British Columbia is low even for other salmon farming jurisdictions such as New Brunswick, Canada, (62.8 percent) and Chile (75.4 percent). Much of the disparity may be due to labour flexibility and the ability and willingness of workers to accomplish different tasks; in British Columbia, the proportion of technicians is high compared with New Brunswick and Chile, which suggests that there is interchangeability in functions.

Chile has a very low proportion of managers and supervisors compared with Canada as a whole, and the two provinces. In Canada, almost one-quarter of employees are managers and supervisors compared with less than 10 percent in Chile. This may indicate a more top-heavy hierarchy in Canada than in Chile, but, in Canada, supervisor, technician and general labour positions are not always clearly delineated, and, in many instances, supervisors, technicians and labourers may do the same types of work. A further disparity in the proportion of employees assigned as managers and supervisors exists in Thailand compared with Viet Nam. In the latter farms, the apparent top-heavy hierarchy may reflect their foreign ownership. This is shown in Table 5.



GENDER BALANCE

Survey data in all countries demonstrate that most employees in hatchery and grow-out operations are men, while women usually predominate in processing.

Figure 3 illustrates that in all the regions of the case studies, except in Asia, three-quarters of employees were male. There was considerable variation among farms, women made up one-third of employees at one Zimbabwe farm but in another no women were hired. The discrepancy was greatest in Asia, where the gender ratio was reversed in India and Thailand compared with Viet Nam; in the first two countries, the proportion of women among employees averaged 77.3 percent, about the same proportion as men in the two case studies in Viet Nam. The high proportion of women in the enterprises surveyed in India and Thailand reflects their processing orientation.

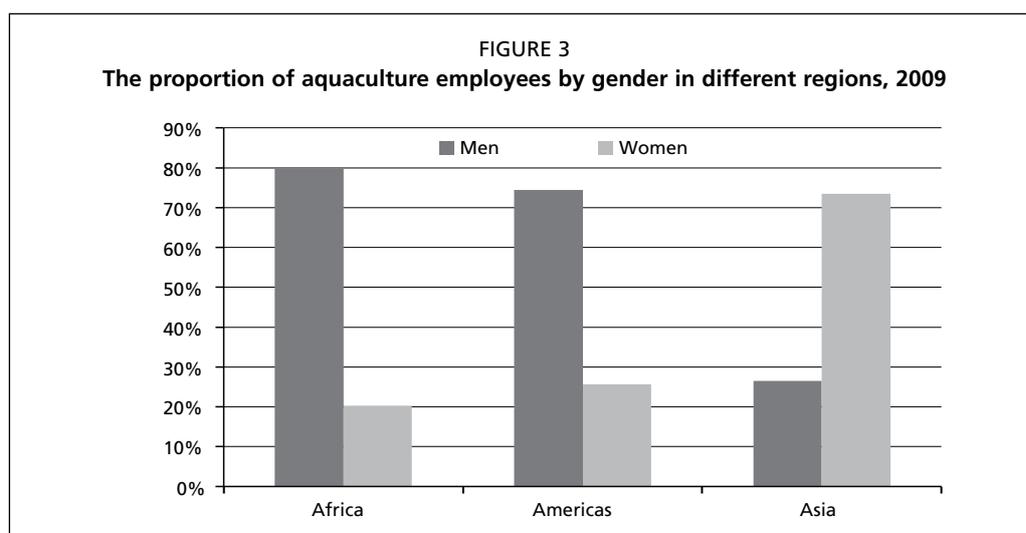
For Asia, Table 6 shows that most employees at three of the farms were women. The proportion of women among total employees in India was 94 percent, in the

TABLE 5
Aquaculture workers by job classification by farm and jurisdiction, 2009

	Managers	Supervisors	Technicians	Administration	Labourers	Total
	(%)					
AFRICA						
Mozambique – Aqua	0.5	1.5	0	1.1	96.9	100
AMERICAS						
Canada – BC	13.3	15.2	31.3	5.1	35.1	100
Canada – NB	8.9	10.0	13.2	5.1	62.8	100
Canada – BC+NB	10.5	11.9	19.8	5.1	52.7	100
Chile	1.2	7.3	10.5	5.6	75.4	100
ASIA						
India	1.5	9.4	1.5	3.1	84.5	100
Philippines	2.9	14.5	–	26.1	56.5 ¹	100
Thailand	3.4	3.7	8.6	9.0	75.3	100
Viet Nam – 1	9.1	4.5	27.3	–	59.1	100
Viet Nam – 2	12.5	9.4	18.6	9.4	50.1	100

¹ If the 1 000 contract workers are included, the share of labourers rises to 82.2 percent.

Note: BC = British Columbia; NB = New Brunswick.



Philippines 80 percent and in Thailand 75 percent. This is different from the other farms surveyed. In both Vietnamese case studies, women were only 39 percent and 21 percent of employees.

In Turkey, among the surveyed farms, men represented the majority in all age groups.

In the selected European countries, the majority in all age groups were male (Table 7). As the workforce ages, so the difference between countries diminishes with either few or no women employees.

The gender balance is determined by at least two variables; the type of grow-out operation, and the type of occupation. The grow-out operation and its impact on gender balance are shown in Table 8. In Chilean aquaculture overall, about three-quarters of employees are men, and this reaches 92 percent for marine (salmonid) aquaculture. However, as Table 8 shows, while the overwhelming majority of employees in marine salmonid farming are male, the proportion is lower in other forms of aquaculture. Freshwater and plant aquaculture have higher proportions of women employees; in fact, women account for almost half the workers in plant aquaculture.

TABLE 6
Aquaculture workers by gender by farm and jurisdiction, 2009

	Men		Women		Total	
	No.	%	No.	%	No. FTEs	%
AFRICA						
Mozambique – Aqua	381	79.4	99	20.6	480	100
Mozambique – Sole Mar	68	76.4	21	23.6	89	100
Zimbabwe – Bakerton	125	100	0	0	125	100
Zimbabwe – Lake Harvest	80	63.5	46	36.5	126	100
Zimbabwe – Crocraise	11	84.6	2	15.4	13	100
AMERICAS						
Canada – BC	616	85.4	105	14.6	721	100
Canada – NB	851	71.5	340	28.5	1 191	100
Canada – BC+NB	1 467	76.7	445	23.3	1 912	
Chile	NA	72%	NA	28%	NA	100
ASIA						
India	69	20.2	273	78.8	342	100
Philippines	NA	NA	NA	NA		
Thailand	82	25.3	242	74.7	324	100
Viet Nam – 1	14	60.9	9	39.1	23	100
Viet Nam – 2	26	81.3	7	18.7	32	100

Note: BC = British Columbia; NB = New Brunswick; FTE = full-time equivalent.

TABLE 7
The proportion of aquaculture workers by gender in Europe, 2009

Age group	Norway			United Kingdom		
	Men	Women	Total	Men	Women	Total
20–39	64.6	35.4	100	76.5	23.5	100
40–49	100	0	100	100	0	100
50–64	75	25	100	100	0	100

TABLE 8
The proportion of aquaculture workers by gender in Chile

	Total	Marine	Fresh	Plants
	(%)			
Men	72	92.2	84.0	53.4
Women	28	7.8	16	46.4
Total	100.0	100.0	100.0	100.0

Source: Salmon Chile (2007).

GENDER AND JOB CLASSIFICATION

Another determinant of gender balance, in addition to the type of aquaculture, is the type of occupation within aquaculture. Administration and sales have a high proportion of women compared with grow-out. Moreover, processing is often a female occupation. The atypical predominance of women in the Indian and Thai case studies in Table 6 can be explained by their type of activity; both are primarily processing operations. In the African case studies, although on average only 20 percent of total employees were women, 98 percent of them worked in packaging and/or processing, and the remaining 2 percent in management or as technicians.

In terms of gender, most responsible positions in aquaculture are the domain of men. Managers, supervisors and technicians tend to be men although in the case studies

there was generally more equality in technical assistance. In one of the African case studies in Mozambique, all managers were men. Over a four-year period, of the seven or nine managers annually employed, none were women. However, there was more gender balance over time with supervisory positions, rising to 18 percent by 2009. Similarly, in Chile, data suggest that almost all managers were men as were two-thirds of all supervisors. In Canada, there was little difference between British Columbia and New Brunswick in job employment for men, with an overall weighted national average of 85 percent of managers and 91 percent of supervisors. The low proportion of women in salmon production in both Canada and Chile (about 28 percent) may reflect discrimination, or a preference by women not to be involved in the sector. In Norway, which has a long tradition of promoting gender equality, only 13 percent of the 3 408 employees in salmon production were women in 2006 (Maroni, 2007). This is half the rate of Canada and Chile, which invalidates charges of gender discrimination in Canada and Chile. The same cannot be said for gender inequality in the senior hierarchy. In management and in supervisory positions, the low proportion of women is striking, particularly in Chile.

Only at the small (foreign-owned) farm in Viet Nam (Viet Nam 1) are women in the majority as managers. At the other farms, the highest proportion of managerial positions held by women is in Thailand with one-third of the total. The same applies to supervisory positions; most positions are held by men except in Thailand where half are held by women. Table 9 shows the proportion held by men and women in each occupation in the farms and jurisdictions where data are available. For technical positions, about one-third of employees were women, but in one Viet Nam case study half of all technical personnel were women (Table 9).

As mentioned above, women tend to predominate in administration. Table 9 indicates that about two-thirds of administrative personnel are women, except at the farm in Mozambique and the processing plant in India. This gender ratio was fairly uniform for all the salmonid jurisdictions in the Americas. The gender balance for general labour depends on the type of activity of the case studies. Where the activity is mainly processing (India and Thailand), women predominate; for grow-operations, men predominate.

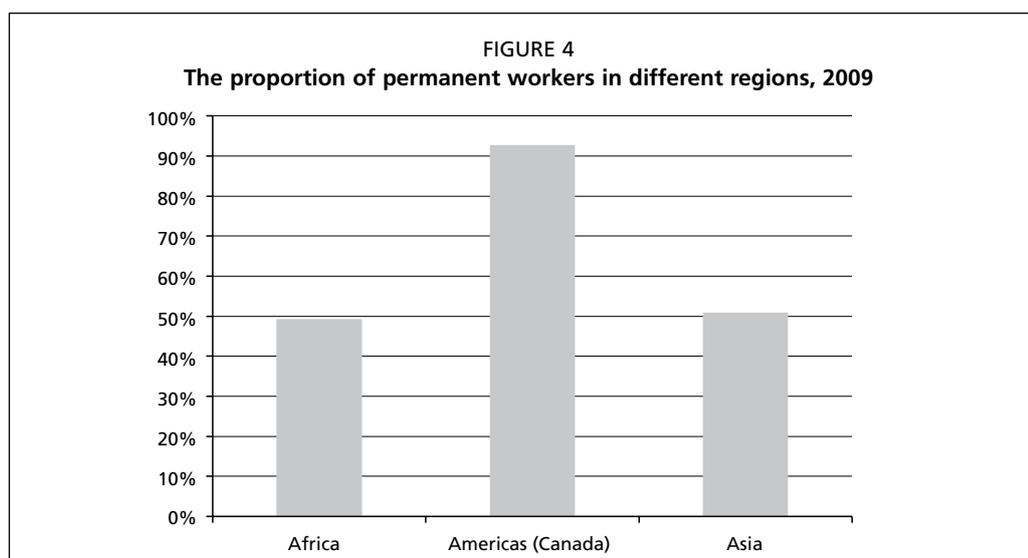
TABLE 9
Aquaculture workers in job classifications by gender in different jurisdictions, 2009

	Managers		Supervisors		Technicians		Administration		General labour	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
(%)										
AFRICA										
Mozambique – Aqua	100	0	82	28	–	–	100	0	79	21
AMERICAS										
Canada – BC	87	13	94	6	89	11	37	63	90	10
Canada – NB	83	17	89	11	62	38	31	69	72	28
Canada	85	15	91	7	77	33	33	67	77	23
Chile	100	0	69	31	63	37	42	58	47	53
ASIA										
India	100	0	91	9	80	20	55	45	9	91
Thailand	64	36	50	50	71	29	34	66	16	84
Viet Nam – 1	33	67	100	0	67	33	-	-	67	33
Viet Nam – 2	75	25	100	0	50	50	0	100	100	0

Note: BC = British Columbia; NB = New Brunswick.

FULL-TIME AND PART-TIME EMPLOYMENT

A significant difference between farms is their reliance on part-time contract workers. When averaged across farms, the Americas as represented by Canada, hired very few part-time or seasonal workers; almost all are permanent workers entitled to full benefits, including pension benefits. At the other extreme, some of the farms studied in Africa and Asia relied primarily on contracted labour, rather than permanent labour. Figure 4 averages across farms to indicate that Canada, representing the Americas, hires an exceptionally high proportion of permanent workers.



When disaggregated by farm and jurisdiction, the Canadian exception is even more evident. On both coasts of Canada, at least 90 percent of salmon employees are permanent. Of salmonid producing jurisdictions, both British Columbia (97 percent) and New Brunswick (90 percent) hired predominantly permanent workers, which is in stark contrast to Chile (25 percent). No disaggregated data are available for salmon farms in Chile but the proportion of permanent workers is lower than in Canada.

There are also significant difference in permanent work among farms in Africa and Asia (Table 10). At one extreme, the enterprises in Thailand and Viet Nam hired

TABLE 10
Number and proportion of permanent workers on farms, 2009

	Permanent		Contract		Casual		Seasonal		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
AFRICA										
Mozambique – Aquapesca	279	59	0	0	0	0	188	41	467	100
Zimbabwe – Lake Harvest ¹	75	30	176	70	0	0	0	0	251	100
AMERICAS										
Canada – BC	676	97	0	0	22	3	0	0	698	100
Canada – NB	1 076	90	0	0	79	7	36	3	1 191	100
Canada	1 752	93	0	0	101	5	36	2	1 889	100
Chile ²	NA	25	NA	75	NA	NA	NA	NA	NA	100
ASIA										
India	191	56	78	23	17	5	56	16	342	100
Philippines	690	40	1 000	58	50	2	0	0	1 740	100
Thailand	324	100	0	0	0	0	0	0	324	100
Viet Nam – 1	22	100	0	0	0	0	0	0	22	100
Viet Nam – 2	27	84	0	0	3	10	2	6	32	100

¹ This is an estimate based on a reported 30 percent permanent and 70 percent contractual employment.

² The Chilean proportion comes from Pinto (2007).

Note: BC = British Columbia; NB = New Brunswick.

only permanent workers with apparently no contract or seasonal employees. At the other extreme, at Lake Harvest in Zimbabwe, only about 30 percent of the workers were permanent, the rest were on contract. On the farm, contract labour expressed appreciation for the work provided but also resentment over the superior benefits, particularly the pensions that permanent employees enjoyed. The rationale of the management for not hiring more permanent workers was the uncertain economic situation of Zimbabwe, and the cost to the company of entitlements if permanent labour had to be released.

EMPLOYING EXPATRIATES

Employing expatriates is often regulated through giving preference in hiring of nationals. In Africa, for example, the Mozambican Labour Law requires that contracting of foreign workers by national or foreign entities is subject to the authorization of the Ministry of Labour. Foreign workers must possess professional qualifications and may only be contracted where there are no Mozambicans with such qualifications or their number is insufficient. All investments must specify in the investment project proposal the number and category of foreign workers to be employed. In the case of Mozambique, the legislation states the allowed percentage of expatriates within one company. Article 31, clause 5, states: “Employers may employ foreign nationals by giving notice of the employment to the Minister of Labour or an entity to whom the Minister has delegated this competency, subject to the following quotas: a) five percent of the total number of employees, in large enterprises (more than 100 employees); b) eight percent of the total number of employees, in medium-sized enterprises (more than 10 but not more than 100 employees); c) ten percent of the total number of employees, in small enterprises (up to 10 employees).” However, the establishment of wages and other forms of compensation to be paid to the employee and recruitment are not subject to strict controls, and this study found some companies, such as Sol e Mar, that do not have a single Mozambican technician working on the grow-out ponds or nursery. The only qualified Mozambican technician was working in the processing and quality control department. At Aquapesca in Mozambique, the situation was quite balanced in terms of qualified people (half nationals, half expatriates) and most qualified national personnel earn higher salaries than expatriates, although both groups have the same benefits such as housing and medical assistance. When asked about such differentiation, Aquapesca management stated that they agree with and try their best to comply with the labour clause that states: “Employers should create conditions for placing qualified Mozambicans in the more highly skilled jobs and in positions of management and administration of enterprises”.

The Zimbabwe Labour Act has no special provisions. At the Lake Harvest Group and Crocraise farms in Zimbabwe, there was only one expatriate on each farm. Zimbabweans are in charge of all operations (nurseries, grow-out cages, processing and marketing as well as administration).

SUMMARY

This study indicates that in general, aquaculture employees of grow-out operations are male, aged from 20 to 40 (Table 11). The majority are in general labour, and while education varies by country, most have some high school education. In processing operations, most employees are female, often with little education. There is a gender imbalance within the farm hierarchy, with a disproportionate number of men in managerial and senior positions. However, there was one farm (in Viet Nam) where women formed the majority. In most of the farms surveyed, workers were primarily permanent but in Chile, the Philippines and Thailand there was considerable reliance on contractual workers provided to the company by a third party.

TABLE 11
Demographic characteristics of aquaculture workers in different jurisdictions, 2009

	Employees who are				Managers who are women
	Women	Aged 20–40	Permanent	Managers	
	(%)				
AFRICA					
Mozambique – Aqua	20.6	77.1	59	0.5	0
Mozambique – Sole Mar	23.6	85.4	NA	NA	NA
Zimbabwe – Bakerton	0	87.2	NA	NA	NA
Zimbabwe – Lake Harvest	36.5	71.4	30	NA	NA
Zimbabwe – Crocraise	15.4	84.6	NA	NA	NA
AMERICAS					
Canada – BC	14.6	58.9	97	13.3	13
Canada – NB	28.5	46.6	90	8.9	17
Canada – BC+NB	23.3	50.3	93	10.5	15
Chile	28.0	56.6	25	1.2	NA
ASIA					
India	78.8	73.4	56	1.5	0
Philippines	NA	50.7	40	2.9	NA
Thailand	74.7	44.1	100	3.4	36
Viet Nam – 1	39.1	77.3	100	9.1	67
Viet Nam – 2	18.7	78.1	84	12.5	25

Note: BC = British Columbia; NB = New Brunswick.

4. Remuneration and benefits of aquaculture workers

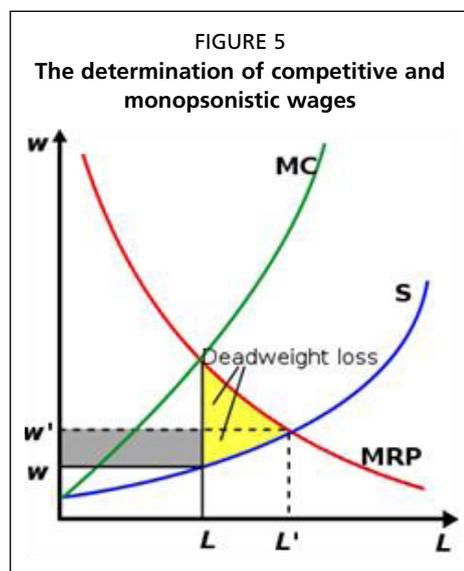
One of the criticisms of aquaculture, particularly where it occurs in developing countries, is that labour in aquaculture is “exploited”. Such exploitation would occur when companies pay less than required by law, or pay less than workers “deserve”. While Marxist theories attribute this to structural disequilibrium in capitalist economies, neoclassical economics argues that any exploitation is organizational and due to market failures. Monopolies and monopsonies have bargaining power that would not exist in perfect competition and, therefore, are able to pay workers less than they contribute to the company. The chapter examines actual remuneration in the case studies to determine whether general labour is paid the legal minimum wage, and whether wages are competitive with alternative sectors. A second section looks at positive social externalities of aquaculture employment. The following chapter summarizes the few studies that exist on public attitudes towards aquaculture, but employment and externalities appear to be decisive factors.

LABOUR ECONOMICS

The demand for labour is not intrinsic, but only derived from the product or service it can produce. Therefore, salaries and wages paid depend in part on the value of the product or service. In neoclassical theory, the wages that workers “deserve” is determined by their contribution to the enterprise. The theory states that workers will be paid a wage equal to their contribution to farm revenues, because it is not efficient for a profit-maximizing farm to pay its workers more than it will earn in revenues from their labour. Therefore, they are paid according to the value of the product or service they produce, and their productivity – this is marginal revenue product (MRP). Nominal wages (W) reflect the marginal revenue (MR) earned from selling additional products, and labour’s additional contribution; the marginal product of labour (MPL). Hence, $W = MRP = MR * MPL$.

In a perfectly competitive industry, marginal revenue and price are identical, so $W = MRP = P * MPL$. This would suggest that when certain farmed species are internationally traded and become substitutable, wages in the industry should converge. For example, farmed Atlantic salmon is internationally traded, and both Canada and Chile compete in the same market (the United States of America) for their primary aquaculture species. Therefore, the retail price of Atlantic salmon, P , is approximately the same for both Canada and Chile. This would suggest that, in the absence of distortions, nominal wages in Canada and Chile would converge, and vary only with differences in productivity (MPL).

Figure 5 shows the determination of wages. Money wages are on the vertical axis, and the quantity of labour on the horizontal axis. The demand curve for labour is shown as MRP reflecting labour’s derived demand. It is downward-sloping because as workers are added so the contribution of the last worker is less than that of earlier workers; this is diminishing marginal product. In Figure 5,



the supply curve of labour (S) is upward-sloping, indicating that as wages increase the quantity of labour also increases. The intersection of the demand and supply curve is the equilibrium wage W^1 , and that will be the remuneration paid unless there are distortions. Distortions refer to deviations from the competitive equilibrium, and can be caused by government policies, business practices or syndication. These distortions result in wages that are no longer at their equilibrium at W^1 .

Distortions resulting in wages lower than the equilibrium

Some distortions would result in workers being paid less than the equilibrium wage. One cause would be an excess supply of unskilled workers who are willing to work for almost any wage that is offered. In Figure 5, this would be represented by a supply curve of labour that is horizontal (perfectly elastic). Enterprises can hire as many unskilled workers as they wish without bidding up wages. The result is a dual labour market with skilled workers paid according to national or even international norms, but unskilled workers paid less than W^1 .

Another possibility is when a single employer (or a number of enterprises colluding together) sets wage rates. Then, wages will be below W^1 . A single buyer of inputs such as labour, called a monopsonist, will maximize profits at a wage lower than W^1 , at W . The producer benefits because profits are higher, but workers lose with lower wages. The transfer from workers to companies is shown by the shaded yellow triangle, and labelled “deadweight loss”. Employment will also be lower, at L rather than L' and society as a whole loses through lost output. The term “deadweight loss” refers to the loss to society from lower employment and wages. The policy solution to monopsonist behaviour is either antitrust legislation, or minimum wages above the monopsonist wage, W .

Distortions resulting in wages higher than the equilibrium W^1

There are other distortions that may raise the wage above W^1 . There are at least three possibilities: a minimum wage that is effective; trade union action; and wages that are “efficient”.

A minimum wage set above the equilibrium is called effective. Many jurisdictions have regulated minimum wages because of concern over equity and poverty alleviation. If they consider that the equilibrium wage at W^1 is not sufficient to guarantee an adequate living standard, a floor can be established below which wages cannot fall. A minimum wage is established for the formal sector, although India has legislative proposals that would impose a minimum wage also on the informal sector. In these case studies, all jurisdictions except Norway impose a minimum wage. In Viet Nam, foreign companies face a higher legal minimum wage than do domestic enterprises. The effect of the minimum wage is to raise wages. However, there may be a cost because those with low productivity (or little seniority) will be released.

A second potential means of increasing wages above the equilibrium W^1 is by unionization and collective bargaining. A union will negotiate on behalf of all employees, thereby increasing its bargaining power. The degree in which union wages exceed non-union member wages is known as union wage premium. Even the threat of unionization can force up wages. Labour laws usually protect workers’ attempt to unionize, but companies may revert to threats such as closure or dismissals. Companies may be prepared to pay wage premiums to workers in return for an agreement not to unionize. Professional associations have aims similar to those of unions – forcing salaries or wages higher than equilibrium. Certain positions need licences from professional organizations, but even where not formally required, tradition may dictate unnecessary qualifications. For example, there is a tradition that a university degree is needed for supervisory positions in Chilean salmon farming.

A third reason for remuneration to exceed equilibrium is because the company pays an “efficient wage”. According to the efficiency wage hypothesis, wages are determined

by more than simply supply and demand. A manager might be rational to pay workers more than the equilibrium wage. Several arguments have been proposed for the payment of efficiency wages. One suggests that it is difficult to measure a worker's productivity, and compensate with appropriate remuneration. In that case, workers have an incentive to "shirk" work, doing less than agreed. By paying more than equilibrium, the cost of being fired increases for the worker, providing employees with an incentive to work rather than shirk. Another argument is that low productivity may be caused by poor nutrition, and efficiency wages may enable workers to avoid illness and to work harder. A further explanation for paying efficiency wages is to reduce staff turnover. Hiring and retraining is expensive, so paying higher wages encourages employees to remain, thereby enhancing productivity and efficiency. One salmon company in the XI Region in Chile reported a staff turnover of 50 percent in 2008, which prompted it to raise salaries for the poorest-paid workers in order to reduce staff turnover.

In addition to these economically rational arguments, there is the argument that efficiency wages may result from cultural traditions. Rather than focus exclusively on their own self-interest, employers may be paternalistic. For example, an owner may feel some obligation to treat long-serving employees well, even when it is not in his (narrowly defined, economic) self-interest to do so. Broader, longer-term economic benefits may result (e.g. through reputation as a benevolent employer), but a major factor would be non-economic.

REMUNERATION IN THE CASE STUDIES

In Africa, there is considerable difference among the case studies in terms of total remuneration. In Mozambique, unskilled labourers on the two aquaculture farms earn less than in alternative sectors. They receive the minimum wage for their sector but do not receive fish that fish companies provide for their workers. Therefore, their total remuneration package is less than one-third that of fish company employees. In Zimbabwe, on the other hand, Lake Harvest employees receive more than twice the minimum wage. Unskilled workers receive more than they would in tourism or the kapenta fisheries. At Lake Harvest, there appears to be a paternalistic approach to labour; which explains why workers receive more than their opportunity cost. Efficient wage theory does not explain the relatively high wages, given that unemployment in the Kariba region exceeds 80 percent. This paternalistic approach is reflected in providing (for a low fee) fish-heads for soup; an important source of protein. Lake Harvest also provides land for agriculture; workers value this opportunity to grow crops on company land because it is protected against wild animals.

There is some resentment at another Zimbabwe farm because workers there are classified as agricultural labour and so are not eligible for the higher minimum wage of Lake Harvest workers, who are classified as industrial. Only 30 percent of Lake Harvest employees are permanent, and so entitled to enrol in a voluntary retirement pension scheme. There is another pension plan available to everyone. The contract workers would like to become permanent, but the managers are concerned that, with the precarious economy, the company might have to retrench and pay heavy compensation to those laid off.

In the African case studies, managers are paid very competitive wages. As can be seen in Table 12, the chief executive officers (CEOs) are paid more than 20 times more than labourers, and managers more than 10 times more. In some cases, this wage gap reflects the expatriate nature of some senior positions, but at Aquapesca in Mozambique the expatriate manager earns less than the national, and in Zimbabwe the CEO is an expatriate and is paid the same as nationals. However, at Aquapesca the average salary of expatriate supervisors is almost twice that of nationals. At Sol e Mar, expatriate supervisors and administrators earn 2.5 times more than nationals.

TABLE 12
Remuneration per month by job classification in the African case studies, 2009

Position	Education	Mozambique			Zimbabwe					
		Aquapesca		Sol	Bakerton		Lake Harvest		Crocodile	
		Men	Women	Men	Men	Women	Men	Women	Men	Women
(US\$)										
CEO ¹	Post-grad.	3 300	0	0	4 200	0	3 500	0	0	3 500
Managers	Graduate	1 750	0	0	2 200	2 200	2 200	2 200	2 200	0
Supervisors	Diploma	1 650	1 100	600	1 300	1 300	1 300	1 300	0	0
Administration	High	600	600	400	230	230	290	270	400	0
Technician	Diploma	1 650	0	0	220	220	360	0	0	0
Labour	Primary	95	95	60	150	150	155	155	60	0

¹ CEO = chief executive officer.

In the Americas, both Canada and Chile have regulations that oblige employers to pay a minimum wage and to meet certain labour conditions. In Canada, the minimum wage is the responsibility of provinces, and in October 2009 it ranged from CAD8.00 to CAD8.25 an hour in British Columbia and New Brunswick. In British Columbia, the hourly wage for a labourer is about CAD15.00 an hour, which is almost double the minimum wage but somewhat below the average for the salmon region in the province. The lower salary, plus the need to do eight-day shifts, is recognized as a challenge to aquaculture recruitment in British Columbia. In New Brunswick (Table 13), average salaries for those involved in hatchery, grow-out and processing in 2007 were more than double the 2009 minimum, although below the average salary of the province as a whole in 2009 (Cormier, 2009). However, once administration is included, the average salary increases to about CAD3 140, which is higher than the average salary for New Brunswick.

TABLE 13
Salmon aquaculture remuneration per month in New Brunswick, Canada

	No. of employees			Total no. of FTEs	Average salary per month
	Male	Female	Total		(CAD)
Direct					
Hatchery	51	31	82	74	2 617 ¹
Grow-out	474	48	552	429	2 617 ¹
Processing	326	261	587	557	2 512 ¹
Direct, total	852	340	1 191	1 060	
Indirect					
Suppliers			554	414	
Total			1 745	1 474	

¹ These figures are approximate. Total wage payments for grow-out and hatcheries were divided by the number of employees. Assuming a 40-hour week and four weeks a month, the monthly minimum wage approximates US\$1 200.

Source: Cormier (2009).

In Chilean aquaculture, the average salary of general labourers in 2008 was more than double the minimum wage. This applied even to the lowest-paid workers – those in freshwater aquaculture (Table 14).

On-site workers receive three meals a day and accommodation, and processing workers receive lunch. The average monthly salary of labourers (CLP354 500) compares favourably with the average salary in Chile, which was about CLP347 000, and with those in agriculture and forestry (INE, 2009). However, there are caveats to this positive figure. First, if the salary is the only source of income in a household of

TABLE 14
Average aquaculture remuneration per month in Chile

	Average	Variation	Marine	Fresh water	Plants	Administration
	(CLP 000)					
Managers	3 491.3	1 534.8	3 680.9	3 347.5	3 408.5	3 528.2
Chiefs / supervisors	1 310.0	509.8	1 314.3	1 228.1	1 105.5	1 592.2
Professional / technical	843.5	309.6	873.1	771.8	680.5	1 048.7
Administration	530.7	136.6	551.8	494.4	528.0	548.4
Labourers	354.6	106.0	375.1	337.6	366.0	339.5

Note: The monthly minimum wage in Chile in 2008 was CLP159 000.

Source: SalmonChile (2007).

four (the average in the X Region), the average family member was close to the poverty line, which was CLP47 100 in 2007 (Pinto, 2007). Second, there was considerable variation in pay – Some workers were earning 30 percent less than the average. Third, workers in processing plants appear to be paid less than those in production. The average salary in processing was about CLP218 000 CHP in 2007 (Pinto, 2007). This is still higher than the minimum wage, but considerably less than production workers. A fourth issue is that of the basic pay. A major portion of the income of processing workers is a bonus. The base wage accounted for less than half the average salary received in 2007; production bonuses, gratuities and overtime payments were the principal source of income. To earn the average salary, therefore, workers in processing plants (mostly women) had to double their basic pay by meeting performance targets. This contributed to industrial accidents (Pinto, 2007).

While remuneration in Chile was higher than the minimum wage and the average for other primary resource sectors, labour theory would suggest that wages in Canada and Chile would equalize. Labourers should be paid the value of their marginal product, which for a global commodity such as salmon is determined by labour productivity. Output of salmonids in Chile in 2007 was about six times that of Canada, and direct employees about seven times higher, which suggests that labour productivity was slightly higher in Canada. In theory, real wages should reflect labour productivity. That real wages in Chile are considerably lower than those in Canada (and also Norway) reflects the existence of surplus labour in Chile, and a distribution towards profits, rather than wage income. It suggests that salmon workers are not receiving salaries that compensate their productivity.

In Asia, all wages paid to permanent employees were above the minimum wage. This was not always the case for contractual workers. Wages for permanent employees also tended to be higher than wages in alternative sectors. The explanation in Thailand was that migrant labour had left the region at the time of the interview and labour was scarce; to keep workers, generous remuneration was obligatory. This is in accordance with the effective wage theory. In other case studies, the reason for higher than equilibrium wages was a paternalistic management style within the companies. Owners and/or managers appear anxious to support their workers, as for example in Viet Nam, where 60–80 percent of wages are sent back to families and the companies adjust paydays to facilitate the transfer. In Viet Nam, one company offered semi-annual wage increases. All the companies subscribed to health and pension plans for their workers as required by law. However, some also provided free access to clinics and annual check-ups, and topped up medical payments if not covered by insurance. One company provided a rice subsidy and interest-free loans to its workers.

However, there is inequality in salary distribution. Table 15 indicates that workers receive a much smaller share of the company payroll than their numbers would warrant. In all the case studies, labourers constitute the majority of employees, yet in three cases

TABLE 15
Share of remuneration among job classifications in the Asian case studies, 2009

	Managers		Supervisors		Technicians		Labour	
	Employed	Salary	Employed	Salary	Employed	Salary	Employed	Salary
	(%)							
India	1	9	9	19	2	6	85	64
Philippines	3	13	5	21	18	12	57	43
Thailand	3	19	4	8	9	10	75	52
Viet Nam – 1	13	33	4	5	26	27	57	35
Viet Nam – 2	9	25	13	22	17	21	52	20

receive less than half the payroll; in Viet Nam they receive only one-third or one-fifth. In fact, the managers there absorb the same or more than all the workers. In India, managers are only 1 percent of the employees compared with labour with 85 percent of the total, yet their share is one-seventh of the total payroll. Similarly, in the Philippines and Thailand, a disproportionate share of the payroll goes to managers.

For selected European countries, Table 16 reveals the salary scales.

TABLE 16
Average monthly aquaculture remuneration in European case studies (US\$/month), 2009

Salary scales	Norway		Scotland (United Kingdom)	
	Male	Female	Male	Female
	(US\$/month)			
Manager	6 150	–	4 650	–
Technician	5 100	–	2 975	–
Secretary	–	3 850	–	–
Cleaner	–	–	–	–
General labour	4 375	–	3 075	–

OTHER BENEFITS

Wages are one of the potential benefits for labour. Others include: aquaculture's contribution to human capital creation by education and training, amenities that the enterprise constructs or persuades governments to construct, and goodwill gestures by the enterprise. These socio-economic impacts are positive externalities that benefit workers and communities. There may also be negative externalities, but evidence from the case studies suggests that there are positive externalities, although there are considerable differences because of management styles and governance models (Barrett, Caniggia and Read, 2002; Barrett *et al.*, 2005).

The positive socio-economic impacts will be greater if there is value-added, if inputs are acquired domestically and if production is labour-intensive. It will also be socially desirable if there is training, and employment is full-time (with benefits), rather than part-time or contracted. Relying on adjacent areas for hired labour whenever possible will maintain the economic viability of isolated communities by increasing property taxes; hiring local people is also critical in obtaining social licence (Katrandis, Nitsi and Vakrou, 2003). Table 17 indicates some factors that influence the contribution aquaculture can make to capacity building and local community development.

On the other hand, farms could be enclaves with few external benefits dispersing to the adjacent countryside. If the operation is capital-intensive and skill-intensive, there will be little direct employment. If inputs and consumer goods are also imported, direct and induced effects will be low, and so will be the employment multiplier. Tax revenues may be jeopardized if farms are offered tax holidays (Stanley, 2003). There could even be negative externalities because of jealousy, resentment and the hiring of non-local workers. This can cause social disruption, poaching and violence. Table 17 indicates some factors that affect the extent of the impacts.

TABLE 17

Factors that determine the impact of aquaculture on human capital and social licence

Linkages	Large positive externalities	Few positive externalities
Production	High employment multipliers – rely on local suppliers	Low employment multipliers – outside suppliers
Human capital	High proportion of labour Training is available/encouraged Skills transferable to other sectors Labour is full-time	High capital labour ratio Highly specialized skills required Labour is contracted
Social licence	Labour hired from local area Ownership is local with concern for local community Infrastructure (roads, schools, health clinics) built either by the companies or by the State	Labour is “imported” Foreign ownership and profits are repatriated No infrastructure built Social disruption Environmental degradation

A major externality of aquaculture is the employment created in indirect and induced activities linked to a large aquaculture enterprise or a cluster of smaller farms. An aquaculture enterprise may stimulate the establishment of feed mills and nurseries. Similarly, there may be forward linkages that include processing, transport and marketing. These indirect activities create jobs because of the aquaculture enterprise. In addition, there will be induced effects caused by spending on goods and services. This spending benefits existing shops and restaurants and may stimulate new entrants. For example, Table 18 indicates that for every CAD1 million increase in New Brunswick salmon production, 4.6 full-time equivalent (FTE) jobs are created directly, plus 2.7 in indirect jobs and 1.9 in induced jobs. Total employment within New Brunswick increases by 9.2 FTEs for each CAD1 million increase in output; hence, every direct job created in salmon farming generates another job within the province in indirect and induced activities. The ratio of indirect and induced jobs to direct jobs is one to one. The size of this employment multiplier is determined by whether the linked activities are local, and whether spending occurs on goods and services produced within the community. A local area will tend to have a smaller employment multiplier than a nation because many linked and induced effects “leak” outside the area to the rest of the country. The same CAD1 million increase generates 13.2 FTEs throughout Canada as a whole – the ratio is 1.9 additional FTEs for each direct job. As can be seen in Table 18, this employment multiplier is reflected in wage income.

In Chile, the salmon sector has created a development pole in southern Chile. The cluster includes more than 1 200 enterprises, 500 of which are based on salmon aquaculture while others are service companies (INE, 2009). Almost 90 percent of salmonid production occurs in the X Region, where in 2007 there were 53 hatcheries (Pinto, 2007). Feed companies are also located in the X Region. More than two-thirds of Chilean output is processed, and there were 60 processing plants (most of which are part of grow-out companies). One estimate of total employment in salmon aquaculture in 2008 was 55 000, of whom 60 percent were women in processing.

All four farms surveyed in Africa are foreign-owned. In one, there are few benefits with no skilled jobs for local people, whereas in another, management positions, infrastructure and food are available to the community. In Mozambique’s Sol e Mar,

TABLE 18

Multipliers for salmon aquaculture in New Brunswick, Canada

	Direct	Indirect	Induced	Total
Wage income: provincial	0.14	0.09	0.06	0.29
Provincial FTE jobs	4.6	2.7	1.9	9.2

Sources: Statistics Canada (2010); Cormier (2009); Gardner Pinfold (2009).

there are no Mozambican technicians in its grow-out or nursery operations. The situation is very different in Zimbabwe where the two foreign-owned companies, Lake Harvest and Crocraise, leave responsibilities exclusively to Zimbabweans. Lake Harvest also provides free food for the local hospital and sells fish-heads for soup. As mentioned above, it also allows employees to farm crops in areas protected against wild animals. Hiring for skilled jobs is done initially through notice boards to encourage local applicants, and for unskilled work through word of mouth among existing employees. These gestures, together with a wage for unskilled workers above opportunity costs, reflect that paternalistic management approach, and create positive externalities for the Kariba region.

Many salmon farms in Canada and Chile subsidize training and education, although courses are generally technical. In Canada, the preference is to upgrade existing personnel, but where that is impossible to hire externally. On the east coast, the largest company is privately-owned, and has demonstrated its commitment to the community by hiring local people. In Chile, the industry is increasingly conscious of the low level of general education in the X Region, as reflected in years of schooling and literacy rates. For the salmon industry, poor education creates a competitive disadvantage compared with other salmon jurisdictions where most employees have at least a high school diploma. The industry has responded by establishing SalmonRed, which tries to find jobs for unemployed salmon workers, retrain others, and also upgrade skills, particularly for divers. By September 2009, it had provided training for 473, found employment for more than 400 unemployed, and given more than 10 educational workshops (SalmonChile, 2009). The industry has supported school fairs and provided computers to schools (SalmonChile, 2009). The motivation may be self-interested in order to soften criticism of the salmon industry and maintain public support, but the region benefits from these externalities.

In Asia, in-house training is provided to workers but not always formal training or education outside the company. The preference is to upgrade existing employees rather than hire externally. In India, no subsidies are given for outside education, unlike in the Philippines, Thailand and at one farm in Viet Nam. Announcements of vacancies for unskilled positions are informal. In India, they are announced through village elders; those interested are interviewed, and hired if they meet age, education and experience requirements; in the Philippines through existing employees, and in Thailand through notices on gates and by bus drivers. In Viet Nam, the company recruits based on recommendations from employees. This is for two reasons: the company trusts its employees and reliance on them has worked out well; and it is more efficient. The owner once advertised 10 positions on local television and 300 applied; and in another company, 1 000 queued for 15 jobs. Because screening is time-consuming, the company prefers recommendations from employees. Family members work together and no one has been fired. The companies have contributed to infrastructure (water tanks, community halls and village temples in India, schools and hospitals in Thailand), cultural events (community festivals in India) and health projects (medical missions and check-ups in the Philippines).

In the Philippines, relations with workers have been seen as mutually beneficial. Family members are hired, spouses and children of working age are given preferences for new openings, and the lack of labour unrest improves economic efficiency. The enterprise has not had a labour dispute of any proportion. The community's growth and the economic development of the province derives impetus from the company for being a large and reliable employer and user of other local commercial services that have sprung up because of its presence. After government, it is the largest employer in the province.

SUMMARY

Results from the surveys suggest that basic wages for labourers in grow-out and hatcheries are higher than legally required; there is no attempt to circumvent the law. Moreover, on most farms, remuneration is above the minimum. A plentiful (even perfectly elastic) supply of labour did not result in wages at the legal minimum; wages and benefits exceed that equilibrium. This indicates that remuneration is determined by an efficiency wage, paternalistic behaviour on the part of enterprises, or a combination of both. A paternalistic attitude appears dominant in the Zimbabwe and Viet Nam case studies, with managers and/or owners offering benefits that improve the quality of life of their employees (Table 19).

TABLE 19

Summary of remuneration and benefits in aquaculture case studies, 2009

	Actual basic wage compared with:		Other major benefits
	Minimum wage	Alternatives	
AFRICA			
Mozambique – Aqua	Equal	3.5 times lower	No fish bonus, unlike with fish companies More than 200 apply a year for labour jobs
Mozambique – Sol	Equal	3.5 times lower	No fish bonus unlike with fish companies More than 200 apply a year for labour jobs
Zimbabwe – Lake Harvest	2.5 times higher	2.5 times higher	Pension scheme: differs for permanent (30%) and contract labour (70%) Employees able to use land for crops 10–15 apply per job
Zimbabwe–Croc	Lower minimum wage than Lake Harvest: classified as agriculture rather than industry		
AMERICAS			
Canada – BC – NB	2 times higher	Lower	Pension scheme available after two years Premiums for dental, health care, life insurance
Chile	Basic wage for processing is below minimum 2.0 times higher for grow-out	Higher	With bonuses, etc., processing workers earn twice minimum wages. Processing workers receive lunch For grow-out, food + shelter provided. Some companies pay from time of boarding boat rather than landing at site
ASIA			
India	Higher	20% higher than agriculture	Health, accident insurance, pension covered by firm Accommodation and transport provided for all Bonus of 8.3% of salary provided annually No child labour
Philippines	> 10 times higher for technicians	Higher than plantation workers	Health, accident insurance, pension covered by firm In-house service with nurses and dentists Uniforms, medical fund, interest-free loan and rice subsidy available to labour Accommodation for some labour
Thailand	40% higher	Same	Health and pension covered by firm Annual check-up provided Accommodation provided for all
Viet Nam – 1	75% higher	Higher than agriculture but not industry	Health, and pension covered by firm. Free accommodation and meals A bonus is given based on sales Semi-annual salary increase Workers able to send 50% of pay to families
Viet Nam – 2	2 times higher	Higher	Health, and pension covered by firm A bonus is given based on sales Free accommodation and meals
Turkey	NA	NA	Medical and pension covered by firm. Some accommodation is available to labour. Transport provided by firm. Free fish is given to local staff
EUROPE			
Norway	NA	NA	Medical and pension covered by firm Some accommodation is available to labour
Scotland (United Kingdom)	NA	NA	Pension provided by the firm

Note: BC = British Columbia; NB = New Brunswick.

There are three caveats to this positive conclusion. First, the basic wage of processing workers is often low; only bonuses based on performance enable remuneration to exceed the legal minimum. This appears to be the case in Chile. Second, there is a dualistic labour market with managers, professional and technicians paid salaries comparable with other regions and sectors, but salaries for production labour below the average for the region. This partly reflects the low education required. It also reflects the existence of surplus labour with that level of skill. Third, low real wages in Chile reflect the existence of surplus labour in Chile, and a distribution towards profits away from wage income. As noted above, labourers should be paid the value of their marginal product, which is labour productivity multiplied by the price of the product. For a global commodity such as salmon that is sold in the same market, price is the same, so wages should be determined by labour productivity. Output of salmonids in Chile was about six times that of Canada in 2007. Employment in salmonid production was about seven times higher than in Canada, which suggests that labour productivity was approximately similar in the two countries. This is not surprising because technology is widely disseminated. In addition, the largest producer in Canada is also the largest producer in Chile (i.e. Marine Harvest). However, real wages in Chilean salmon farming lag behind those of Canada. While the gap between average salaries in the salmon towns in Chile and the nation as a whole has narrowed, it appears that unskilled salmon workers in Chile are not receiving salaries that compensate their productivity.

5. Employment and public perceptions of aquaculture

Evidence suggests that public support, or social licence, for aquaculture is strongest when local communities benefit from aquaculture (Katrandis, Nitsi and Vakrou, 2003). If jobs and economic spin-offs, such as tax revenues, accrue to local communities, aquaculture will be perceived as beneficial. However, hiring outsiders or remitting taxes to other jurisdictions generates rejection and mistrust. Not only must benefits accrue locally, but these employment and spill-over benefits must be communicated. Among the means of correcting misinformation are: informing the public with campaigns about all aspects of aquaculture; ensuring that sound information is available from credible sources; and using the Internet for two-way information sessions (Mazur and Curtis, 2008). The goal is to create trust. An illustration of the importance of employment as a factor in social licence comes from an attitudinal survey in Canada. Relying on focus groups from British Columbia on the Pacific coast and New Brunswick on the Atlantic coast, perceptions about salmon aquaculture were almost uniformly hostile in British Columbia but positive in New Brunswick (Department of Fisheries and Oceans Canada, 2005). Whereas respondents in British Columbia focused on adverse environmental impacts of aquaculture, the focus groups in New Brunswick, which is poorer with higher unemployment rates, emphasized the positive employment benefits of aquaculture.

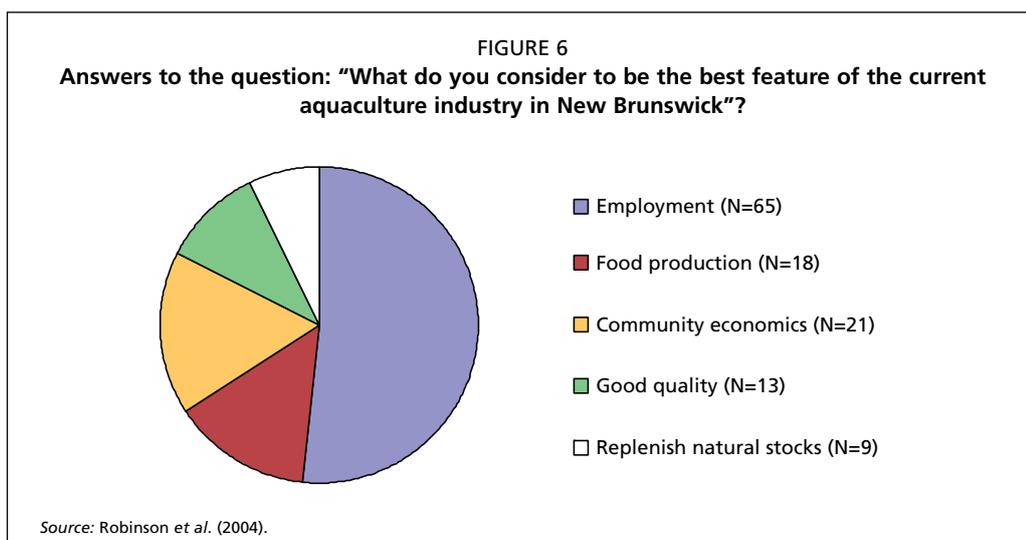
Social licence is likely to become more critical to the success or failure of aquaculture in the future. A global Delphi study on constraints facing aquaculture found that respondents in all regions except Africa and Eastern Europe expect opposition to aquaculture to be a threat to the future development of the industry (Hishamunda, Poulain and Ridler, 2009). In Asia, public mistrust was seen as having a large negative effect over the next 15 years, and such mistrust had a high chance of happening. In the Americas and Western Europe, respondents also expected opposition to aquaculture to have a large or very large negative impact, and was believed likely to happen. The absence of social licence in British Columbia has resulted in boycotts of farmed fish and a government moratorium on new sites. The moratorium was only lifted when the provincial government implemented a new policy that required consultation, particularly with aboriginal groups (Galland and McDaniels, 2008).

NEW BRUNSWICK, CANADA

The impact of employment on perceptions was indicated in an attitudinal survey in New Brunswick using a random sample of the population (Robinson *et al.*, 2004). From a random sample of 165 participants in the salmon-growing area, the majority of respondents (57 percent) were either very positive or positive towards aquaculture. Employment and the economic benefits were the primary reasons (Figure 6). A later study using focus groups has confirmed this support (Barrington *et al.*, 2010). Environmental integrity, employment and profitability were the principal concerns of the groups.

CHILE

Perceptions towards salmon aquaculture in Chile appear to be influenced by employment and community benefits. By 2007, direct employment was estimated at 31 000, having grown from 20 000 in 2002, and total employment (direct, indirect



and induced) was 53 000 (SalmonChile, 2009). According to these estimates, in 2006 aquaculture generated 11 percent of total employment in the X Region (SalmonChile, 2009). Other benefits are reflected in education and reduced illiteracy and poverty. That improvements in the quality of life are attributable to aquaculture is indicated in Table 20, with the “salmon towns”. In these towns, the levels of poverty almost halved between 2003 and 2006; this in contrast with the much smaller decrease in the non-salmon towns. By 2006, the proportion of the population classified as “poor” was 9.9 percent, compared with the national average of 13.7 percent, and 19.6 percent in the non-salmon towns. Average incomes in the salmon towns had not reached the national average by 2006 but the difference had narrowed, whereas with the non-salmon towns the gap had widened. Similarly, the gap in years of schooling and illiteracy rates also narrowed; this was not the case in non-salmon towns.

The link to employment and social benefits is illustrated by surveys in salmon aquaculture. In one survey of 447 people for the Development Corporation of Puerto Montt (the principal -producing town), 64 percent of respondents had a positive attitude towards the salmon industry (Encuesta Adimark- Gfk, 2007). In a second study, there were 1 735 people in the X and XI Regions surveyed (Universidad de Chile, 2005). As can be seen in Figure 7, 91 percent of respondents felt that salmon aquaculture was either very important or important to the region. Only a very small proportion (3 percent) felt it had little role.

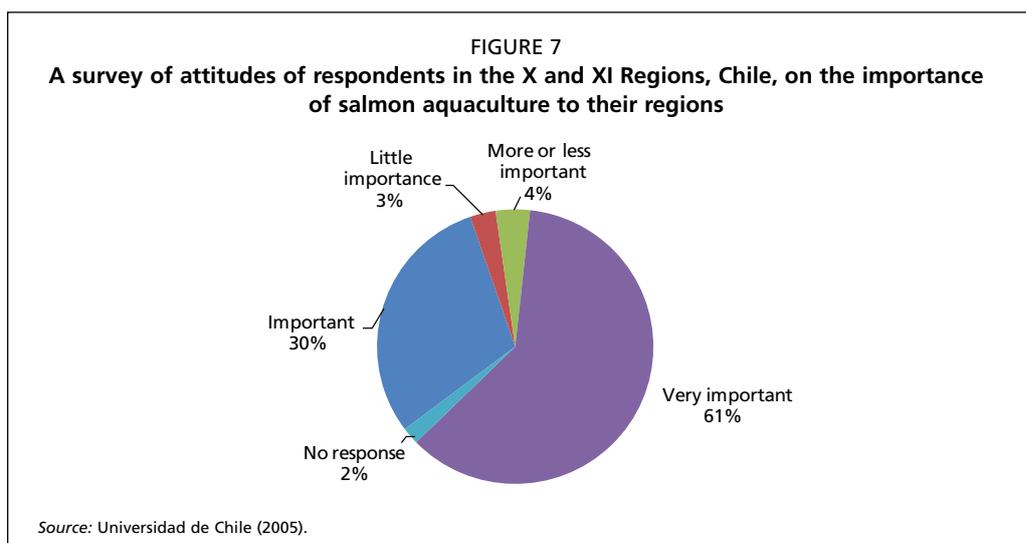
This positive attitude occurred in spite of a poor image of salmon companies in general. The Faculty of Communications of the Catholic University undertook a study ranking 101 private and public companies according to whether they were well

TABLE 20
Quality of life indicators in the X Region of Chile, 2003–06

Indicators	2003			2006		
	Chile	X Region		Chile	X Region	
		Salmon towns ¹	Non-salmon towns		Salmon towns ¹	Non-salmon towns
Poverty	19.0%	17.0%	25.1%	13.7%	9.9%	19.6%
Incomes (CLP)	579 919	478 135	419 591	613 206	560 244	452 012
Years of schooling	10.2	8.9	9.0	10.1	9.0	9.1
Illiteracy rate	4.0%	5.7%	5.3%	3.0%	4.1%	4.6%

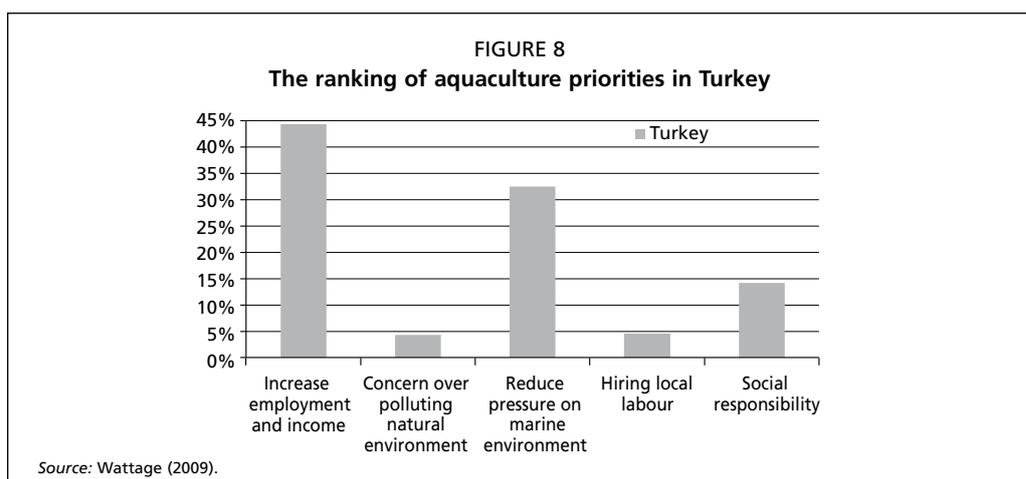
¹ The following are considered “salmon towns” of the X Region: Calbuco, Castro, Chonchi, Llanquihue, Puqueldón, Cochamó, Curaco de Vélez, Dalcahue, Frutillar, Puerto Montt, Puerto Varas, Puerto Octay, Purranque, Queilén, Quellón, Quemchi, Quinchao and Hualaihué.

Source: SalmonChile (2007).



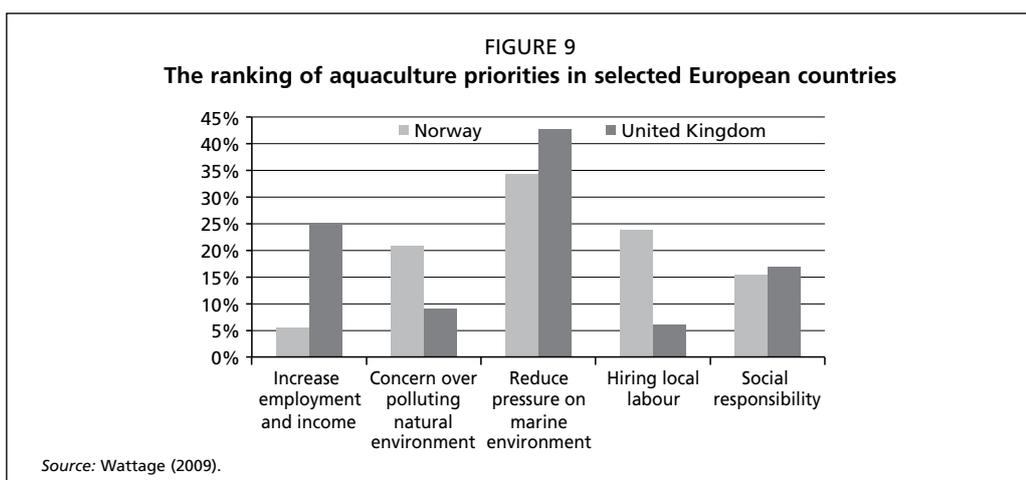
regarded (*Revista Que Pasa*, 2009). In the 66 ranked highest, there were no salmon companies, although there were three wine companies and other food companies. This reflects the poor image of the companies in spite of their success. The image has become even more tarnished with the 17 000 lost jobs owing to disease and the constant attacks by some NGOs alleging socially irresponsible behaviour by the salmonid companies (Alvarez, 2009).

Analytic hierarchy process has been used to measure preferences to aquaculture governance among the farms surveyed in Turkey (Wattage, 2009). The preferred objective for Turkey was an increase in employment and income; it is the highest preference given for any. The preference allocated for this objective was 44.4 percent. Turkey was also appreciative of the impact aquaculture has on reducing pressure on exploited marine resources, which amounted to 32.5 percent. The third preference for Turkish aquaculture, at 14.2 percent, was social responsibility.



EUROPE

In Europe, the role of employment in affecting attitudes was revealed in an analytic hierarchy process survey of a sample of the population (Wattage, 2009). In conformity with an earlier study in Scotland (the United Kingdom of Great Britain and Northern Ireland), environmental concerns are a priority, and respondents ranked the ability to reduce pressure on the marine environment as the first contribution of aquaculture (Whitmarsh and Wattage, 2006).



There were differences in ranking among the surveyed countries, as shown in Figure 9. Norway considered reducing pressure on marine resources as the prime objective (34.4 percent) of aquaculture development. The governance-related objective of exploiting local labour was the second preference at 23.9 percent. This is the highest rank given by a single country of the sample selected for this objective. The third priority was concern over polluting the natural environment (20.9 percent).

The top-ranked objective for the United Kingdom of Great Britain and Northern Ireland is reducing pressure on the marine environment, which accounted for 42.8 percent, the highest figure for this objective by any single country. However, increasing employment and income is ranked second in by an allocated weight of 25.2 percent and social responsibility came third with a preference of 16.9 percent. While the United Kingdom of Great Britain and Northern Ireland (and Norway) placed greatest weight on aquaculture's role in reducing pressure on the marine environment, jobs and social responsibility, which are aspects of aquaculture employment governance, have a joint preference of 42.1 percent, close to the weight given to the top-ranked objective.

TABLE 21

Social licence and perceptions towards aquaculture employment in European case studies, 2009

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
	(%)				
1. Aquaculture provides employment income possibilities for many people	0	0	0	50	50
2. I have little or no interest in aquaculture-related employment	75	0	0	25	0
3. The Government should do more to protect the interests of aquaculture employment and aquaculture communities	0	0	0	75	25
4. Improving governance in aquaculture employment is a social responsibility	0	0	25	25	50
5. Maintaining a gender balance is important in farm employment	0	25	0	50	25
6. Farms should consider well-being of native people of the area	0	0	0	75	25
7. Farms should consider well-being of the surrounding communities	0	0	0	100	0
8. Aquaculture can have positive effects by easing the pressure on overexploited fish stocks	0	0	0	100	0
9. Aquaculture provides protein and energy rich-food to humans	0	0	0	50	50

Source: Adapted from Wattage (2009).

Table 21 disaggregates the data by providing the weights that respondents gave to concerns over aquaculture employment and employment governance. Overall, the respondents gave a high priority to employment, with the sample strongly agreeing that governance of aquaculture employment should be improved. All of the respondents either strongly agreed (50 percent) or agreed (50 percent) with the first statement about the role of aquaculture in generating jobs. This is reinforced in the second statement – only 25 percent have little or no interest in aquaculture-related employment. Governance of employment and poor labour practices are also an issue as shown in the responses to survey statements 3 and 4. All of all respondents agree or strongly agree with the statement that governments should be more active in protecting aquaculture communities, and 75 percent with the obligation to improve employment governance. Responses to the fifth statement on gender balance were more nuanced, with one-quarter of respondents disagreeing with this as an objective. The sample was mainly male-dominated, so the 75 percent, who felt that maintaining gender balance is important in farm employment, is a positive indicator.

Broader social goals of aquaculture were unanimously supported. As mentioned above, pragmatic arguments exist for farms to take into account local inhabitants and communities, because social licence is enhanced. Overwhelming support was given to the goal of farms to consider the well-being of the native people of the area. Similarly, the objective that farms should consider the well-being of the surrounding communities was unanimously supported by the sample.

Statements 8 and 9 were supported, which indicates a very positive perception of aquaculture. The statement that aquaculture provides protein and energy-rich food to human was unanimously supported by the sample.

6. Suggested improvements in governance of aquaculture labour

COMPLIANCE WITH LABOUR LEGISLATION

As mentioned above with respect to social dumping, indirect costs of hiring labour through EPL can diverge enough to permit certain jurisdictions a competitive advantage. In none of the countries studied in this paper are labour laws and policies designed to encourage social dumping. All jurisdictions have regulations to protect workers, compliant with ILO standards. If social dumping is happening, it is due to the inability of regulatory institutions to monitor and enforce the law. This appears to be the case for Chile.

In the African and Asian firms studied, the culture of the firms was generally underpinned by family values, which favoured a paternalistic and hierarchical style of company management. Standards appear to meet international standards, except with the possible case of Thailand. There, children younger than 15 are hired. Apparently, parents go to the company to request that their children be given a job; the company ensures that the children are in good health and assigns them light work. In Europe, the farms comply with national and international labour standards.

In Chile, allegations that workers suffer from working conditions that are unsatisfactory appear to be supported by the evidence (Phyne and Mansilla, 2003). In the period 2003–05 a total of 572 programmed inspections were carried out, 404 resulted in fines, a violation rate of 70 percent (Diaz, 2007). Among the violations were: employment of casual workers (lack of contracts), violation of health and safety rules at the workplace, unsafe underwater working conditions, violation of maternity rules and anti-trade-union practices. The rights most at risk are non-discrimination, acceptable conditions of work and freedom of labour. However, child labour has almost disappeared.

Compliance with, and violations of, labour laws in the salmon industry in Chile varies with firms, with no evidence that foreign companies are less compliant than Chilean companies. One national and one foreign firm had full compliance, and two national firms had less than 50 percent compliance. The two largest foreign companies, Marine Harvest and Mainstream (both Norwegian), have low scores for compliance and high scores for non-compliance; Mainstream has been fined at least 13 times for infringement of the labour code since 2002. It has been guilty of: not providing protective equipment to employees, failure to give employment contracts, requiring seven-day work weeks and illegally suspending Mainstream's first elected union leader. However, in general, foreign firms have high rates of compliance; even the two Norwegian companies have higher compliance rates than some Chilean firms. A summary of several salmon aquaculture firms is given in Table 22.

One source of data on compliance with labour regulations comes from Oxfam, which undertakes biannual surveys. Survey results are given from two plants of Marine Harvest, Chile, in Table 23. There is considerable diversity in adherence to regulations. While both plants demonstrated that conditions of work were acceptable, there was low compliance in terms of freedom of association, freedom of work and non-discrimination. Because no labour under 18 years of age is hired, the regulation against child labour is moot.

TABLE 22
Rate of compliance with labour regulations by aquaculture companies in Chile; 2005–06

Company	Compliance	Non compliance	Partial	Source of capital
	(%)			
Agroindustrial Santa Cruz	77	3	20	Chile
Aguas Claras	78	1	21	Chile
Robinson Crusoe	76	0	24	Chile
Salmones Andes	78	0	22	Chile
Cultivos Marino Chiloe	48	36	16	Chile
Pesquera Transantartic	100	0	0	Chile
Pesquera Los Fiordos	42	28	20	Chile
FOREIGN COMPANIES				
Marine Harvest; Chinquihue	63	33	4	Norway
Marine Harvest; Chamiza	52	39	9	Norway
Fjord Seafood Chile	100	0	0	Norway
Pesquera Eicosal	95	0	5	Norway
Salmones Mainstream	55	18	27	Norway
Safcol Chile	97	1	2	Malaysia
Salmones Antartica	99	0	1	Japan

Source: Diaz (2007).

O’Riordan (2007) reports that there has been a high rate of accidents in Chilean aquaculture. In 2005, accident rates were 11.2 percent in the rearing units and 13.9 percent in processing (against a national average of 7.96 percent for industrial workers). Most (73 percent) accidents occur in processing plants (where 91 percent of workers are women), 19 percent on marine sites and 5 percent in the feed plants. Between February 2005 and April 2007, 42 workers in aquaculture (primarily salmon farming) were killed. Although some of the industrial deaths were in feed plants and fish-processing plants, most occurred during diving. There are 4 000 divers, of whom 100 are commercial. Most are from the artisanal fisheries and less than 10 percent are shellfish divers (allowed to dive to 20 m) with an intermediate licence to 36 m. Shellfish divers report a rate of accidents of 80 percent compared with commercial divers (20 percent) but are one-quarter of the cost. However, the situation may have already changed.

A critical concern is enforcement of regulations. As indicated by Diaz (2007), Chilean regulations already meet ILO standards, but market governance and the desire to maintain cost competitiveness can encourage companies and jurisdictions to minimize the importance of labour standards. There is limited capacity to monitor regulations. The Directorate of Work has capacity to inspect only 12 percent of salmon installations. In the XI Region

TABLE 23
Compliance with labour regulations by Marine Harvest, Chile

	Chinquihue			Chamiza		
	Comply	Non-compliance	Partial	Comply	Non-compliance	Partial
	(%)					
Freedom of association	31	50	19	25	56	19
Freedom to negotiate collectively	57	43	0	0	0	0
Freedom of work	63	37	0	63	37	0
Abolition of child labour	–	–	–	–	–	–
Non-discrimination	62	38	0	37	50	13
Acceptable conditions of work	100	0	0	81	13	6
Overall	63	34	3	52	39	9

Source: Diaz (2007).

of Aysen, there are no boats for inspections of health and safety rules (Diaz, 2007). Penalties are not sufficiently onerous. For example, a clause in the new proposed legislation governing salmon farming in Chile would have withdrawn licences from farms that violate labour law; this clause appears to have been dropped. In addition, salmon companies divest themselves of responsibilities by subcontracting. More than half of the workers in the industry are supplied by subcontractors (Diaz, 2007). However, again, the situation may have changed.

POSSIBLE IMPROVEMENTS TO EMPLOYMENT GOVERNANCE

Improving monitoring and enforcement

Labour regulations in the case countries meet those accepted internationally through the ILO. However, there are problems unique to certain operations such as the salmon industry. First, monitoring and enforcement are difficult and costly because sites are located some distance from shore. Therefore, inspections require boats and time. Challenges of monitoring and enforcement of existing regulations are an issue in all countries. Prior to enacting new regulations, attention should be paid to these challenges, and sufficient funding must be available for enforcement of those regulations already in force. Second, there may be a need for specific regulations for salmon workers. Some companies in Chile pay their workers as soon as they board the boat to go to sites, but others pay only when workers arrive at the site. For six-hour trips in each direction, that is a lost day's pay for the latter group. Ideally, social responsibility would encourage producers to pay workers immediately on boat embarkation; if that does not occur, a specific regulation would be desirable. Third, fines on companies that continue to infringe labour regulations should be increased. There appear to be repeat offenders, and heavier penalties would induce more responsible behaviour.

Licence withdrawal

Penalties for non-compliance with labour regulations need to be severe and to act as a deterrent against irresponsible behaviour. Fines may exist, but may not be onerous for multimillion dollar operations, particularly if they can rely on foreign capital. There has been non-compliance in the salmon industry in Chile, jeopardizing health and safety of contracted employees. Revoking licences of repeat offenders would signal that authorities are serious about labour conditions in aquaculture. The threat itself could improve compliance.

Site leases

Lease costs and lease conditions should reflect the full value of resources being used, and the risks to ecological and human well-being inherent in cage culture. Norway auctions its leases, and the cost can approach EUR1 million. In addition, leases should not be in perpetuity. High lease costs and a need to renew leases would generate resources for governments, and encourage producers to comply with labour and environmental regulations. Renewal on condition of good behaviour would provide the security of property rights needed for investment but also create incentives for responsible behaviour.

Limit ownership size

Norway imposes a limit to the biomass that a single company can produce nationally but also locally. As mentioned above, industrial concentration has occurred because of economies of scale in production and marketing, but while size may be beneficial for international competitiveness there are risks. A producer that is dominant in a local area can act as a monopsonist (as shown in Figure 5) and pay workers below their marginal product, causing a loss not only to workers but society as a whole. Much aquaculture occurs in isolated communities.

Limit foreign ownership of natural resource activities

Among the benefits of direct foreign investment are an increase in capital and the diffusion of technology. For sectors such as aquaculture that are intrinsically risky, the subsidiary of the transnational incurs the risk rather than governments. In Chile's X region, as noted above, farm operations and feed companies that are subsidiaries have contributed to gross domestic product and employment. There have been infractions of the labour code by these subsidiaries, but there has also been non-compliance by domestic companies.

However, for natural-resource activities, there may be strategic reasons to maintain control by domestic companies. This is the case particularly for non-renewable resources such as minerals, the extraction of which is often restricted to domestic operators. There may also be pragmatic reasons. Unless the cost of licences reflects the true value of the ecosystem, foreign (as well as domestic) companies are being subsidized. There may be perverse wealth distribution if the subsidiaries are part of a transnational based in a developed country. Moreover, foreign subsidiaries are more likely to face resentment if they infringe environmental and labour codes. This resentment is often explicit in criticisms of salmon aquaculture in British Columbia, Canada, and in Chile. There is concern that foreign companies (particularly Norwegian but also Japanese) have a dual standard, treating their host country differently from their home country. In Chile, this is illustrated by the frequent (but unproven) allegation that Marine Harvest caused the disease crisis by importing infected eggs.

To alleviate concerns about "exploitation" of natural resources, a limit to foreign ownership is an option. The Philippines and Viet Nam already have restrictions on the proportion of natural resources that foreigners can own. If acquisition of technology is a goal, limiting foreign investment to joint ventures would achieve that objective, while also maintaining domestic control.

7. Conclusions

The aquaculture industry has experienced rapid growth, particularly for certain species such as Atlantic salmon, which is now the second-most-valuable farmed species. This extraordinary expansion has created governance problems for jurisdictions because they have to enhance the competitiveness of their industry while at the same time ensuring that environmental and social standards are maintained. Only if economic viability, environmental neutrality and social well-being are assured, will aquaculture be sustainable. One aspect of social well-being is the treatment of aquaculture labour. In many jurisdictions, there is legislation that protects workers, guarantees a minimum wage and allows labour to organize. Through a number of case studies, this paper has attempted to evaluate whether EPL is enforced. Aquaculture employment also appears to influence social licence; public support of aquaculture is greater where there are positive externalities due to local benefits. The study does not aim to be exhaustive but it is a first step in an assessment of labour governance and social well-being. Demonstrating positive social impacts is increasingly a prerequisite for aquaculture certification.

The conclusions of this paper are generally positive. Evidence from the case studies suggests that the labour force in general has benefited from aquaculture. Wages in production and processing in all jurisdictions were at least equal to the legislated minimum wage, and often higher. In most, they were equivalent to other primary resource industries and the local average. There was no evidence of monopsony wage behaviour; in fact, wages on certain farms in Africa and Asia were higher than seemed necessary according to supply and demand. This was compounded by benefits such as bonuses or the right to use farmland for crops. In most countries, employment was permanent and non-seasonal; exceptions were Chile, the Philippines and Thailand. All farms recruited locally where possible and some provided training.

Local communities also appear to benefit. Aquaculture created not only jobs directly but also jobs in linked activities and through spending. This created clusters and maintained the viability of isolated rural communities. In Chile, there is evidence that the quality of life, as measured by poverty reduction, incomes, illiteracy and years of schooling, has improved thanks to (salmon) aquaculture. The X and XI Regions were traditionally areas of high unemployment, and the salmon industry transformed those regions. By 2003, the X Region, where most salmon is produced, had below-average unemployment, and net in-migration. Some farms provided infrastructure to the communities and educational facilities.

Most of the employees in aquaculture are less than 40 years old. The relative youth of the employees has revitalized coastal communities. Rather than being forced to move to larger urban centres, jobs in aquaculture have enabled young people to remain in their local area. Through their tax revenues and consumer expenditures, these employees have revived the viability of small towns in isolated areas.

The beneficial impacts of aquaculture on employment and communities are reflected in the few surveys of attitudes that are available. Studies in Canada, Chile and Europe demonstrate that employment is important in attitudes towards the sector. In Canada, there is a dichotomy between the Atlantic and Pacific coasts, with the former ranking employment as aquaculture's most positive feature. On the Pacific coast, positive socio-economic impacts were outweighed by environmental concerns. In Chile, 91 percent of respondents to a survey in the salmon farming regions acknowledged that aquaculture played an important or very important role.

Table 24 provides a summary of some remuneration and social licence aspects in case-study countries for the period covered by this review.

TABLE 24
A summary of some characteristics in the case studies

Jurisdictions	Characteristics
Africa Viet Nam	Paternalistic Efficiency wage No participation in decision-making Hiring guided by employees Few labour disputes Portion of wages designated for family Strong social licence Little child labour
Chile	Market-driven Focus on (labour) costs Dual wage structure Considerable contract labour Training provided Industry provides link to community Some social licence High incidence of serious work accidents
Most jurisdictions	Processing Predominantly women Few skills and little training Basic wages low (often just at the legal minimum) Bonuses a high proportion of total remuneration High incidence of minor work accidents High labour–capital ratios and multipliers

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An important component of effective governance of modern aquaculture relates to human well-being. How the industry treats its workers will influence its sustainability. In order to improve the understanding of governance in aquaculture employment so as to suggest potential improvements where necessary, a survey was undertaken in Africa, the Americas, Asia and Europe. Individual farms were asked about their hiring practices, the demographic characteristics of their employees, and the remuneration and other benefits paid to employees.

The conclusions of this paper are generally positive. Evidence from the case studies suggests that the labour force in general has benefited from aquaculture. Attitudinal surveys indicate that these benefits are appreciated by the local population. A number of suggestions are made that would improve the governance of labour in aquaculture, like the compliance with labour legislation.

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