

Chile's Export Fueled Development: Low wages, open access and environmental degradation in the fishing industry

Leigh R. Wedenoja

University of Michigan
Latin American and Caribbean Studies
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Abstract

This thesis traces the development of the Chilean fishing industry from the 1931 Fishing Code that established open access to marine natural resources to the current trials facing the industry. It argues that the rapid growth of the industry was largely the result of the opening of the economy, deregulation and flexibility of the labor market that resulted from the economic reforms of the Pinochet dictatorship but that previous development policies also played a role. It additionally discusses the current struggles within the coastal fishing and salmon farming industries including degradation of natural resources, labor conditions and economic sustainability and their historic influences. Finally, it presents many of the strategies that are being implemented to try and address these problems and evaluates their scope and feasibility within the Chilean context and suggests additional regulatory steps that could be taken

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TABLE OF CONTENTS

<u>INTRODUCTION.....</u>	<u>5</u>
<u>CHAPTER 1: THE INITIAL DEVELOPMENT OF THE FISHING INDUSTRY</u>	<u>9</u>
<u>CHAPTER 2: ECONOMIC CHANGE AND RAPID GROWTH.....</u>	<u>23</u>
<u>CHAPTER 3: THE MODERN COSTAL INDUSTRY.....</u>	<u>41</u>
<u>CHAPTER 4: SALMON FARMING.....</u>	<u>63</u>
<u>CHAPTER 5: OUTLOOK FOR THE FUTURE.....</u>	<u>81</u>
<u>APPENDIX 1: GRAPHS AND TABLES</u>	<u>103</u>
<u>APPENDIX 2: IMAGES</u>	<u>107</u>
<u>SOURCES.....</u>	<u>109</u>



Introduction

Chile, like most countries in Latin America and the global economic periphery, has seen most of its economic growth since World War II as a result of the export of primary materials. Chile initially became important to the global economy because of its large mineral reserves and has maintained that importance through expanding into other natural resource intensive industries like fishing, forestry and fruit. These non traditional exports have been credited with much of the 14 years of sustained growth in the late 1980s and 1990s and a dramatic reduction in poverty and unemployment. Despite the macroeconomic benefits of the industries and the dominant narrative that they have been unequivocally good for the average Chilean, there are many issues to dissect in order to determine the real economic, social and political implications of non-traditional export sectors. The industries are known for having low levels of pay and working standards and have had a devastating impact on the Chilean environment. The reliance on exports has also put Chile at the mercy of markets in other countries and has in recent years opened Chile to fierce competition with Africa, where wages are even lower than in Chile and other parts of South America.

The fishing industry, both traditional coastal fishing and salmon farming, is emblematic of Chilean non-traditional export led growth. The industry has been shaped by the shifting economic climate of Chile. Its rapid development has been dependent on open access to marine natural resources, a flexible and low cost source of labor, and favorable government regulations and macroeconomic policies. The changes in these factors have determined both the growth and the sustainability of the industry through Chile's different development strategies. The evolution of the Chilean fishing industry can be broken into four distinct periods characterized by the

government's macroeconomic strategies. Each of these periods was marked by different motivations for and methods of encouraging fishing. The first, import substitution industrialization from 1931 – 1973 was characterized by a heavy government hand. The government took an important role in advertising and investing in the industry as well as maintaining fish stocks when they were in danger. The industry did not grow substantially during this period but important groundwork was laid for the future.

The most important period in the progress of the industry was the Pinochet dictatorship in which the country experienced a radical economic restructuring and deregulation. The opening of the economy was perfect for the fishing industry because it reduced the cost of inputs including foreign machinery and capital, labor and marine natural resources. The legacy of the dictatorship in fishing has proven difficult to confront in the modern industry. The idea of open access and a flexible labor market have become so important that trying to instigate new environmental regulations and labor standards has been an uphill battle and fisheries have been brought to near collapse repeatedly before any government action was taken. Changes need to be made to the industry to assure that it will be sustainable in the future. Many of the necessary changes and regulations have begun since the return to democracy but efforts still suffer from the entrenchment of Pinochet's economic culture.

My goal is to dissect the fishing industry's development by examining the changing context of macroeconomic strategy, regulation and labor and discussing how the industry's development and functioning has been determined by these factors. It is also to examine modern conflicts within the industry and explore how those conflicts represent both continuity and change with the past. Many of the issues that have been brought to light since Chile's return to democracy have pertained to the sustainability of the industry, its environmental impact and the

quality of life of the people who depend on it. There are many strategies for the future viability of the industry that have been proposed by industry groups, environmentalists, academics, and the government which are discussed both in terms of how they would positively impact the industry and their practicality in context of the historical development of the industry.

The Chilean Context

Chile has the ideal geography for a robust fishing industry. It has over 4000 miles of coastline and with the 200 mile exclusive economic zone granted to Chile under the UN Law of the Seas treaty of 1982, twice as much sea as land. The coast spans from the Atacama desert in the north to Antarctica in the south which means that Chilean waters are home to a wide variety of different fish stocks and types of shellfish. There are a variety of fisheries that have become important. The pelagic fishery, both in the north and south produces fish meal, the southern demersal fishery produces high unit value fish for human consumption and the southern benthic fishery consists of shellfish that must be dove for. The most important modern fishery is in the south of the country centered around the capital of the tenth region, Puerto Montt and the island of Chiloe which is also the center for aquaculture.

Given the extremely high endowment of marine natural resources it is important to note that Chile does not consider itself a coastal nation. Most of the population lives away from the coast with 40% living in the Santiago Metropolitan area. The country is extremely centralized with Santiago completely dominating the provinces. Partially as a result of this centralization and the influence of the Spanish, the traditional culture of Chile is not based on the sea but rather on agriculture. The most important non-religious holiday in Chile are the Fiestas Patrias in October, which celebrate Chilean independence. The main feature of this holiday are Ramadas which are similar to state fairs in the US. They consist of traditional food such as empanadas and barbeque

as well as competitions in the traditional national dance, Cueca, and amusement park rides. Other activities seen as quintessentially Chilean are also derived from agriculture. The Huaso, or Chilean cowboy, competes in traditional rodeo and is one of the most recognizable figures for both Chileans and foreigners. Given the context of Chilean culture it is not surprising that the fishing industry did not really take off until the 1970s and that the vast majority of production is for the external market.

The only place where fishing has been historically important enough to shape culture is in the tenth region including the island of Chiloe. This region is south of the agricultural center of the country. Fishing in the tenth region, also known as the lakes region, is not solely based on the marine fisheries but also on the freshwater fisheries of the many lakes the region is named for. Outside of fishing, there is very little industry in the south other than small amounts of ranching and tourism. The culture is also different, especially in Chiloe. Chilote culture embraces many myths about the sea including mermaids and other sea creatures. Additionally, the traditional food of the region is seafood including bottom feeders like conger eel and shellfish. This is in contrast to the beef dishes that are more common in the Central Valley and Santiago. The most recognizable dish of Chiloe is curanto, a dish consisting of various types of seafood, sausage, other meats and potatoes. It is traditionally a communal dish cooked covered in a ditch for hours. When industrial fishing moved into the south the conflict between the traditional fishing and diving way of life and the new industrial fleet was far more divisive than it had been in the north due to the importance of the sea to Chilote culture.

Chapter 1: The initial development of the fishing industry

Introduction

The growth of the Chilean fishing industry and other non-traditional export industries such as fruit and forestry has fueled much of the total growth in the Chilean economy in recent years has been credited almost exclusively to the economic liberalization policies of the Pinochet dictatorship. Similarly, the environmental degradation and un-sustainability of the industry has been blamed on those same neo-liberal economic policies. Much of the success that the fishing industry, in particular, has had is a direct result of earlier economic policies. Even the idea of open access to marine natural resources that is seen as the backbone to the rapid development of the fisheries, was not a new invention of the Pinochet regime and was first put into law in 1931. Three periods of economic policy emerge as important in the development of Chilean fisheries before the Pinochet government: the early period of Import Substitution Industrialization, the Frei Presidency and the Allende Presidency. The thread that tied this period as a whole together was the strong planning role the government played in the economy and the importance placed on high quality jobs and job security for Chileans.

The economic and political situation confronting an emerging industry

Prior to the global economic crisis of the 1930s, Chile's, like most economies in Latin America Countries was completely dependent on foreign capital investment and exportation of raw materials. For Chile, economic growth was driven by the exportation of copper and nitrates. The copper and nitrate industries were controlled by the ruling oligarchy who wielded enormous political and economic power. The time period is often called "parliamentary" because despite the presidential constitution, parties of the ruling oligarchy shared power in a mock

parliamentary system that functioned to greatly limit the power of the executive. The global economic crisis of the 1930s forced a reorganization of the economic system of Chile and began what many have termed the “Chilean path to socialism.” (Collins and Lear 1995). At the time of the crisis, Chile was dependent on a foreign market in which prices for minerals had dropped dramatically. The time period was marked by rapid social change within Chile as a response to the growing economic uncertainty. The government of Carlos Ibáñez was unable to maintain control of the country and in its inflexibility in the face of the changing economy resulted in the repeated devaluation of the currency causing massive economic strife. The nitrate offices, las oficinas salitreras, were closed, which caused migration of workers to Santiago and the development of rings of poverty around the city. The middle and lower classes in the country began to challenge the oligarchical political and economic system and demand an increase in equality.

This was not the first economic crisis in Chilean history but it was the worst. The country had always been sensitive to changes in the global market price of copper due to a lack of diversification in exports and very little production of consumer goods for in country consumption that would have allowed them to better weather global changes. In response to the crisis Chile became a “developmentalist” nation by instituting a plan of Import Substitution Industrialization (ISI). The Chilean model of ISI had three important characteristics: an increased role of the state, the closure of the external market through a government increase in tariffs and duties and the introduction of industries with the ability to satisfy the domestic market. ISI made large changes to the nature of the Chilean economy by increasing production for the domestic market. It also increased the amount of well paid skilled manufacturing jobs.

It was the creation of CORFO (Corporación de Fomento de la Producción de Chile) in 1939 that did the most to facilitate the economic development and diversification of Chile during the ISI period. CORFO was financed by a royalty on copper as well as capital from North American interests and the Chilean Central Bank. Its initial charge was to found basic national industries intended to decrease the country's reliance on foreign imports of consumer goods and exports of raw materials. The lost national income from exports of raw materials would be replaced with the income from that local production. Some of the initial industries that were created include: ENDESA, ENAP, LAN and IANSA created for electrification, oil, flight and sugar respectively. These and similar state run industries were responsible for the rapid economic growth and infrastructure modernization that Chile experienced during the period. The government also facilitated the expansion of social services in the areas of education, health, housing and social security much like in the US did during the New Deal. The programs were developed in a piecemeal way without the tax base needed to support them nor the organizational structure within the government bureaucracy to aim the programs at the sectors of society that were most in need. It was the emerging middle class that benefited the most from the programs because they were the class that had the intersection of need and political power to fill that need. The sectors of the population that were most disadvantaged had very little access to political power and many were located in the provinces far away from the administrative center of Santiago.

The rapid economic development was characterized by the emergence of new sectors of sectors of the population who would change the political face of Chile. For the first time Chile was developing a strong middle class and a diversified economy. Workers in the industrial sector saw much higher wages than they had experienced before and were able to increase their

purchase of consumer goods and services. The industrialization also brought labor unions into more power than they had previously known and they became an important political and economic actor. The competition for these emerging sectors among the traditional and non-traditional parties of Chile led to an overly politicized populace with shifting alliances among left, center and right wing coalitions. The divided political state of the country was made worse with the economic slowdown of the 1960s. The country confronted slowing growth with a bloated public payroll and politicians who were unable to meet many of the promises it had made to citizens for social services. The 1964 election brought the backroom debate over the trajectory of the Chilean economic system into the foreground of national politics. The country had been trending towards collectivism through ISI but had also been increasing and diversifying exports to the rest of the world and receiving a high level of foreign capital investment. Drastically different economic theories were coming out of the country's two top public universities, La Universidad de Chile and Pontificia Universidad Catolica de Chile. La Chile was supportive of ISI and La Catolica of opening the market.¹

The Frei government was seen by many as a return to capitalism and divergence from the socialist track that the country had been embarking upon through the ISI government policies. However, Frei distinguished between the oligarchic export led capitalism of the past and his brand of capitalism which included streamlining the bloated public sector and limiting intervention in the market. Frei defeated Salvador Allende of the socialist party in the election of 1964 with a center-right coalition. Much of the extreme right that would ordinarily not support a moderate like Frei, did so to avoid the risk of splitting the right wing vote and allowing a

¹ Economists at La Catolica influenced heavily by the writings of Milton Friedman and advocated for expansion of the free market and sent many of their students and faculty to study under Friedman and his associates at the University of Chicago in the US. Despite the fact that La Chile had traditionally had the superior economics program, La Catolica had been able to compete for students and faculty by carving out a specialized niche.

socialist president to be elected.² There is also evidence that the CIA and US companies helped to fund the Frei campaign in order to assure that a stable industrial country not become socialist (Klein 2007). Frei called for limited governmental intervention into the market, agrarian reform and a modernization of the system of social services that had developed ad hoc since the economic crisis of 1929. Frei was forced to walk a thin line between the members of both the left and right wing parties that made up his coalition. Despite his efforts, Frei was unable to turn the tide of polarization in the country. There was growing concern over his reforms in social programs from both sides. The left believed that the reforms were dangerously shrinking public services that needed to be expanded to help the many suffering under the economic slowdown and the right saw Frei's programs as bloated government spending that needed to be curtailed

The capitalism of Frei was by no means the laissez-faire economic system most often associated with Chile and the reforms of the Pinochet regime. It was far closer to a mixed model economy reminiscent of the US or Europe where the government still played an important role in the development of the economy but without the high level of central planning characteristic of the ISI period. Frei's administration believed in the power of markets rather than central planning but it did not believe in complete deregulation and privatization. Under his leadership the Chileanization of copper began when Chile purchased a 51% stake in the industry. This purchase was made possible by US capital investment and required favorable tax breaks for US companies in the copper industry. Despite Chile's majority share in copper, so much of the supply chain was under foreign control that the purchase became more of a symbolic gesture of Chilean control rather than actual Chilean control. Frei's policies also contributed to a shift in power within the voting populace. In 1964 Frei increased the power of rural organizing by declaring that agricultural workers had the legal right to form unions, collectively bargain,

² Frei was not the initial choice of the Friedmanites at La Catolica because he was seen as too much of a moderate.

participate in strikes and pursue other avenues common to organized labor. This shifted power to workers in the country side for the first time and created a political opening to push for agrarian reform. Members of the right wing segments of the coalition rejected the growing power of rural organizations and labor unions as unhealthy for the Chilean economy. The right wing believed that unions were already too powerful a political force within Chile during the Frei administration because they had been instrumental in gaining legal protections for agricultural associations.

Diversifying exports through fisheries

The fishing industry in Chile has only become important since the 1970s. Although there was a lot of discussion about the potential of the Chilean fishing fleet and other marine industries, fisheries were never considered plausible as an important source of income in Chile during the first push for ISI. Fish harvesting and processing was a low value added industry geared mainly for export and this structure was not congruent with the goals and culture of ISI development. ISI sought to decrease the reliance on natural resource intensive exports. Despite the export nature of the fisheries industry, CORFO did attempt to strengthen it in the 1940s by informally encouraging fishing and then again in the 1950s by making credit available to the emerging fish meal industry. The fisheries that were in existence previous to the 1970s tended to be small and of two types: fisheries to produce processed products such as fish meal or fish oil for the international market or artisan fishers who produced fresh fish for their local communities. There was some effort to develop some of these fisheries, especially the small traditional fisheries in the southern regions, for consumption in Santiago. By the time that fisheries began to become a viable industry, the economic context had shifted and the focus was no longer on direct control of the development stages of the industry through CORFO. The focus

of the late 1960s was put on creating a favorable climate for the industry to develop through studies of marine resources, favorable credit and tax breaks for the industry and reductions of trade barriers for products needed by the fishing industry (Collins and Lear 1995). The command control nature of ISI development was starting to be phased out by Frei's administration.

Chile's introduction to the type of commercial fishing that would drive its growth was a result of its shared land and sea border with Peru. Peru has been important internationally as a fish producing and exporting nation since the 1960s and fish still plays an important role in their economy and culture. The focus of the Peruvian industry was the market for fish processed into fish meal or fish oil rather than the export of fresh or frozen fish. These are still extremely important export products for Peru as well as for Chile. Fish meal was the backbone of the growth of the industry. It is still manufactured by the same process that removes fish oil from fresh fish. It can be made both directly from whole fish or from the leftovers (bones, offal) from fish processed for human consumption. Fish meal is used primarily as a high protein supplement for the alimentation of both sea and land animals and fish oil is mostly used in the feeding of farmed fish (Fish meal Information Network 2009).

In the 1960s the northern fishery, which consisted primarily of the anchovy, was the most important fishery within Chile and the catch was used almost exclusively in the production of fish oil and fish meal. It appeared to be a productive and prosperous fishery with consistently increasing catch before the El Niño phenomenon of 1964-65. The changes in weather brought on by El Niño³ shattered the perception of sustainable growth. These environmental changes revealed the over exploitation of the fishery. El Niño always changes the composition and size of

³ El Niño is an environmental phenomenon with multi-year cycles. The phenomenon acts on the Humboldt current, which runs along the coast of Chile, bringing cold water up from the Antarctic. Changes in the Humboldt change the water temperature of fisheries which impacts life cycle of fish through affecting where, when, and how much they spawn.

fish stocks but this time led the total catch of the northern anchovy stock to fall dramatically. The productivity of the fishery had been falling before El Niño. Total catch seemed to be stably rising through the period because the effort to achieve that level of catch had been increasing as fishers found fewer fish in their traditional fishing grounds and were forced to fish longer and farther from shore. The added climactic stress put the fishery over the edge into collapse. In its short history as a fish producing nation, Chile had not focused on conservation within fisheries partially because there had appeared to be no need prior to the anchovy collapse and also because the country had a tradition of open access to the seas. One of the only laws concerning the regulation of fisheries that existed at the time of the anchovy collapse was the 1931 Fishing Code (Decreto Ley No. 34). This code declared free unlimited access to marine natural resources and the basic idea of open access behind this code would remain largely unchallenged until 1991.

The crisis of the anchovy fishery led president Frei to nationalize the industry in order to avoid the complete collapse of the fishery. In one year the total catch had fallen by half which profoundly impacted the 37 processing plants and the fleet of 251 ships that were operating in the northern fishery. This takeover by Frei's administration reflects the greater economic culture of the regime. The takeover was not intended to protect the economic interests of the fishing firms, nor was it to protect the environment. The takeover was done in order to maintain the jobs in both the fishing fleet and the processing plants. The promotion of fisheries during Frei's presidency had been centered around the creation of employment and fostering cooperatives. With those goals in mind, the nationalization of the industry rather than the imposition of a catch quota was a more politically acceptable way to maintain the fishery because of the recent successful Chileanization of copper. The intervention of Frei was successful in the short term and between 1959 and 1970 the annual total production of fish meal increased from 300,000 tons

to 1,400,000 tons (Camus and Hajek 1998). However, nationalization and direct control was only a temporary solution in an economic system that recognized open access to marine natural resources and would eventually demand the return of those rights.

Allende's impact on the industry

The election of Salvador Allende in 1970 caused a shift in the economic and political backdrop to the development of the fishing industry. In many ways the election of Allende's Popular Unity coalition was the culmination of a long process moving the country towards socialism. Since the development of ISI the state had continued to expand its role in the economy, both directly through investment and development of industries and indirectly through the provision of social services. The Allende administration was also diverged from those that had come before it and embraced policies far more radical than Frei's administration. Allende was a member of the socialist party and within the international context of the cold war, the election of a socialist in an economically powerful Latin American country was seen as a threat to national security by many western democracies. Most importantly, the election of Allende can be viewed in the context of the over polarization of Chilean political culture. A showdown between the extreme right and left had only been narrowly avoided in 1964 when members of the right wing decided to support Frei as a moderate alternative to Allende. In the years of the Frei administration the polarization between left and right increased over social programs and agrarian reforms. In 1970 Allende ran on a socialist platform and was elected by a small margin with support from a center-left coalition Unidad Popular. Despite this small margin, many of his supporters took the election as a mandate to suddenly turn the country towards radical socialism rather than to continue with the collectivist trend that was already in motion. Workers took over factories and mines and forced Allende to then transfer those assets to the state. There was a

great fear among the upper classes in Chile that Allende could usher in radical Marxism: “by the early 1970s this [agricultural worker] mobilization – demonstrations, strikes, and land seizures – had become significantly widespread to threaten the very viability of agrarian private property as an institution” (Kurtz 2001). Allende was in part forced to live up to the worst expectations of the US and the right. Immediately upon taking office, Allende instituted radical wage and price controls in order to manage unemployment within the country. Initially these seemed to be successful as the economy grew by 9% and unemployment was cut in half within a year. The complete nationalization of copper and the success of the agricultural workers presented a possible opening for workers within the fish processing industry that had traditionally had similar work patterns to those in agriculture processing due to low levels of job security, seasonal employment, dangerous conditions and low wages.

Unions had an important role in the Chilean economy during the Allende years. The Chilean government traditionally had a very different relationship with their labor unions than other Latin American countries. Unions were political organizations with high levels of organizing power but the direct ties between the unions and government were very weak. Unions had a low level of bureaucracy and were respected institutions similar to the unions in Europe. Unions were active participants in the growth of the Chilean economy and participated in national debates over development strategy and macro economic policy. They also guaranteed an educated and disciplined work force mainly within the manufacturing industry (Collins and Lear 1995). The main national union, the CUT played an important role in the election of Allende but did not subordinate itself to the socialist party or the Unidad Popular coalition.

The nationalizations of the Allende years were different from those of Frei because under Allende, the government did not purchase controlling interest in the companies or temporarily

intervene in their management but rather expropriated directly. July 1971 marked the complete nationalization of copper and the formation of the Chilean copper company: CODELCO. The copper expropriation was the culmination of the process begun under Frei and was expected by Chilean politicians. Other expropriations diverged from tradition and were nearly spontaneous. Workers seized and occupied factories and forced the Allende government to recognize their takeovers as legitimate in order to maintain the support of organized labor. Allende also intervened in the banking system and broke the private monopoly that controlled the financial sector by purchasing the three largest banks in order to make credit more widely available.

The collapse of the anchovy fishery in 1964 brought the necessity of fishery regulation into national discourse and was met with nationalization by Frei. The method of nationalization remained the favored mode of regulation for the Allende government but became far more threatening in the eyes of capital because the political context had changed. Many fears were confirmed when the anchovy fishery collapsed again in 1972 and Allende chose to nationalize the entire fish meal industry of the northern fisheries in order to maintain employment.

Nationalization was seen as the only way to maintain employment in an industry that was beginning to fail. The nationalization of the fishing fleet was far from unique. By the end of the three years of Allende's presidency 461 different firms were seized or intervened in and the government controlled 39% of GNP up from 14% in 1965 (Mesa-Lago 2000).

The growth of the economy and decrease in unemployment that had marked the initial phase of the Allende government was turning out to be unsustainable. Industry owners had begun to refuse to produce at the price levels that had been set and chose to either not produce or produce for the black market instead. The constant threat of state takeover had made capital investment unlikely because there was very little assurance that private ventures would not end

up in the hands of the state. This economic crisis that met Chilean citizens in 1973 was not simply the result of the policies of the Allende administration but was facilitated by economic actions of the US aimed at destabilizing the Allende regime and pushing the socialists out of Chile. US president Richard Nixon famously stated following Allende's election: "Make the economy scream." (Klein 2007). By mid 1973 inflation was at 150% mostly due to wage and price controls, and there had been a 6% drop in production (Mesa-Lago 2000). The economy was screaming and the political sphere in Chile was on the brink of chaos. There were almost daily demonstrations in the streets of Santiago. Middle and upper class women who had never participated in politics were taking to the streets of the wealthy districts of Las Condes and Providencia to protest food shortages while pro-socialist marches were common in the Center and poorer neighborhoods.

Conclusion

Chile has always been considered an economic powerhouse within Latin America. It has a large endowment of natural resources including copper which was the main export that fueled Chilean growth through most of its history including the ISI period which though it tried, was never able to shake the importance of copper. The Frei and Allende regimes and their differing economic strategies were both attempts to make sense of this Chilean history of state sponsored but export led development and the ad-hoc conglomeration of social programs that had resulted from the political pressure of different social groups that gained prominence through development. For Frei, this meant maintaining the basic ideals of the Chilean development process with a slightly opened market. He called for diversification of production both for the home market and abroad, streamlined social programs so they could be supported by the tax base and created a monetary system that facilitated growth. It is important to note that Frei was the

last compromise candidate in the growing polarization between left and right and that the election of Allende marked a determined shift away from compromise. Allende's policies were based on a different interpretation of the success of the ISI model. It was almost a magnification of the state led development that had been part of Chile since the 1930s, this time with a stronger focus on economic equality among Chileans that could only be achieved through government programs and industries and increasing the power of unions.

The fish industry had been peripheral to the Chilean development through most of Chilean history and it was Frei and Allende who were able to recognize the possibilities for the industry's growth and they used the power of the state to facilitate that growth. Yet it was already apparent in 1973 that the Chilean method of fishing was environmentally and economically unsustainable for the country. There was in fact very little growth of total catch during the Allende years, In 1971 the fish harvest was 1.5 million tons and remained relatively constant during Allende's presidency. Despite this low level of growth, many of the economic conditions that would allow for the development of the industry were put into place.

Chapter 2: Economic Change and Rapid Growth

Introduction

At the time of the coup of September 11, 1973 intervention by the military was not new to Chilean political culture. The military had intervened in the past in times of great political and social polarization to restore equilibrium and institute reforms when it appeared that the civilian government would be unable to do so. The military served almost as a caretaker for democracy by destroying it temporarily in an effort to protect it. Previous to the 1973 coup, the government had only been under the control of the military for a little over a year total. The 1973 coup initially followed this traditional pattern. The military junta, containing the five chiefs of the branches of the military, was responding to rampant inflation, a degradation of the rights of private property, shortages of consumer goods and rioting in the streets and stepped in to restore order. Despite the original appearance of continuity with the past, the military would not serve as a caretaker for democracy. The military maintained their power until 1989 and has had a lasting impact on both the political and economic systems of Chile by forcing a new economic system and new constitution on the country.

The 1973 coup differed from previous interventions not only because of its longevity but also because of the leadership. Augusto Pinochet, the army general from the original junta of five, took unprecedented control of the government. It was largely his personal leadership that maintained the military government as long as it was in power. Pinochet's personal magnetism and might were tied to the economic strategy that he introduced the country to. Neo-liberal economics had yet to gain much of a foothold in development strategies in Latin America because of the context of ISI. It is now a theory that has an important place in academic debate and development plans, but in 1973 much of the theory was virtually untested.

The military junta did not begin convinced that the new neo-liberal experiment was right for the country. They were divided into two camps: one that listened to the economists from the outlawed Christian Democrat and Nationalist parties that called for changes in the economy only to correct the excesses of the Allende government. These economists had seen the growth in the Chilean economy under ISI and accepted the state as an important actor in the economy. They wanted the right to maintain tariffs and subsidies for the development of local industry. The plan that won out was called “the brick.” It was a 500 page document that was basically a guide to restructuring the economy based on the neo-liberal model supported by the University of Chicago trained economists at Pontificia Universidad Catolica de Chile and conservative think tanks. The new structure of the economy was oriented outwards. State industries were rapidly auctioned off and taxes and tariffs were lowered, dramatically opening the economy. Export orientation and the new economic plan did not begin in earnest until 1975 after Pinochet was able to consolidate power and brutally repress the opposition.

Violence was one of the main tools used by Pinochet to seize and maintain power and to push through his new economic plan. Violence was targeted at the groups that the military saw as responsible for the current economic situation of the country or who were likely to resist the military’s authority. Anyone with ties to the political left including, the communist and socialist parties, many students and intellectuals, unions and the emerging rural organizations were targets of the DINA (secret police) and the military. This violence and the fear that it inspired allowed the military to experimentally reorganize the economy with limited resistance from the populace. The dictatorship irreversibly changed the culture of Chile: 3,200 people disappeared, 80,000 were imprisoned and 200,000 fled the country for political reasons (Klein 2007). The memory of the dictatorship has become divisive within itself. Many wealthy Chileans, even young university

students deny the violence of the dictatorship and claim that many of the people who “disappeared” are really hiding in Europe while Allende supporters are still brought to tears talking about his death and demand that the surviving members of Pinochet’s government be prosecuted and punished.

It was not until the military coup that installed General Pinochet as the head of the Chilean government that the slowly developing fishing industry began the rapid growth that it is famous for. The political, economic and social conditions created by the policies of the military government were ideal for the development of an export based industry dependent on low environmental and safety regulations, open access to renewable resources, low cost of labor and easy availability of other inputs such as machinery from abroad. The coup brought these new conditions to the country through unprecedented brutality. The radical opening of the economy changed the situation in which the industry operated by lowering tariff barriers and making the influx of foreign capital and export of Chilean fish far easier. The role of the government in the industry also changed. Agencies were founded to support development and the possibility of nationalization was eliminated. The dictatorship also had an impact on the labor force the industry depended on, by making the market more “flexible” through lowering firing protections and wages, repressing unions, and changing the scope of temporary contracts.

Favorable conditions for an emerging industry

A new macroeconomic strategy

The immediate goal of the military junta who seized power was to contain the hyperinflation that had been inherited from Allende’s government which had reached 508% at its peak. Tight fiscal and monetary policy combined with currency devaluations and decreases in social programs were able to bring inflation under control. This stabilization effort also had the

intent of correcting imbalances in the market that Pinochet and his advisors believed had been caused solely by government intervention during the Allende years and before (French-Davis 2005). The price controls were immediately lifted when the military junta came into power in 1973 and were followed by further deregulation. All of the companies that had been seized by Allende and placed under state control were re-privatized and many of the companies that had always been public were also privatized in an attempt to increase efficiency through the market. These privatizations included the public utilities. However, not all of these privatizations actually increased efficiency and many of them were carried out too quickly to stabilize the economy: “privatization of state owned industries often spawned corruption and in many instances led to the replacement of state monopolies with private ones” (Smith 2005). Privatization was touted as the magic cure to the economic woes of the country, Pinochet even privatized the banking and pension systems. In 1975 domestic capital markets were deregulated without any kind of safeguards and by 1979 almost complete trade liberalization had occurred with a single import tariff of 10% (French-Davis 2002) down from an average of 94% in 1973 (Mesa-Lago 2000). Pinochet also downsized the government (with the exception of the armed forces) and regulatory agencies found it impossible with the cuts in their budgets to enforce the few regulations that still existed.

The lack of government regulation in the economy during the dictatorship caused significant and arguably economically inefficient damage to the Chilean environment. The heavy focus on extractive activities in everything from copper mining to forestry depleted both renewable and non-renewable natural resources. Pinochet actively worked to shift the focus of the Chilean economy away from ISI manufacturing to an import export economy based on the neo-liberal doctrine of comparative advantage. For Chile, this meant reliance on industries that

were highly damaging to the environment: “The impact of rapid, unregulated development, based on intensive agriculture and extraction of natural resources, contributed to the depletion of fisheries, destruction of natural forests, soil erosion and desertification, as well as pollution of water sources” (Silva 1996).

The economic liberalization of the Pinochet government and its US trained economists was ideal for the rapid growth of the fishing industry. Open access had long been the backbone of fishing and it was seen by Pinochet and his advisors as the ideal industry to help grow the Chilean economy and diversify Chile’s export income to make the country less vulnerable to fluctuations in the price of copper. However by the standards of the new neo-liberal economic advisors Chile’s open access was not complete. The northern fishery had been subject to a rather lax permit system and during the re-privatization of the fleet, the companies involved successfully lobbied to remove the permits for complete open access. Additionally the reforms of the economy during this period facilitated the growth of the fishing industry. Pinochet also opened Chilean fisheries to foreign companies. For the first time the government permitted large foreign owned factory trawlers to fish Chilean waters as Chilean boats. The only regulation was that they had to have a Chilean captain. This led to a massive influx of these trawlers which employed very few Chileans and produced almost exclusively for the export market ignoring the few taxes they were subject to.

The role of the government

The macroeconomic changes towards liberalization of the economy played an important role in the development of the fishing industry but there was also direct governmental pressure to encourage the development of the fishing industry independent of the opening of the economy. In 1974 a quasi-governmental agency was founded to help develop a new market for the

products of Chilean fisheries called PRO-CHILE. This agency differed from the government intervention during ISI in the sense that there was no direct control or capital investment by the state, rather the goal of the organization was market encouragement and the creation of a brand identity for the Chilean product abroad. This national pressure was seen as necessary following the return of El Niño in 1973. This time the crisis was far worse and production was cut to a fifth of its original level. The anchovy fishery was finally in complete collapse and fishers were forced to switch to other species (Camus and Hajek 1998).

Two regulatory agencies were also created, the most important of which was the Subsecretaria de Pesca (SUBPESCA) which was founded in 1978 by decreto supremo No 2.442. A second national organization was formed by the same law, El Servicio Nacional de la Pesca or SERNAPESCA. All previous fishing regulations, ad hoc as they were, were deregulated to these two agencies. SUBPESCA as an agency of the government was responsible for all fishing policy and SERNAPESCA which was charged with the implementation of policy from the agency of development. SUBPESCA continued the system of open access from 1931. The organizations are still important within Chilean fishing policy and continue to institute regulations within the industry and to collect data on the fleet.

The economic reforms and deregulation of the Pinochet government were not only unable to avoid the collapse of the anchovy fishery but instead helped to cause the collapse. By returning the fleet to private operation and allowing the introduction of large factory trawlers to Chilean waters, El Niño was able to completely destroy the fishery when it appeared again in 1973. Within the two organizations that were founded there was no power to avoid this kind of collapse as the traditional fisheries management tools were considered inappropriate under the

new regime. Quotas would limit the open access to the seas and nationalization would lead to socialism.

Changes in the labor market

The labor market was one of the main targets of Pinochet era economic reform. Starting in the 1960s laws were created that supported the ability of workers to organize and create job security. The rising importance of industrial workers in ISI allowed them to demand more rights. One of the most important of the laws governing labor were the firing protections begun during ISI and greatly expanded under Allende. Employers were not permitted to fire workers without due cause and a high level of severance was required when workers were fired. These controls help explain the extremely low levels of unemployment under Allende; workers who could not be fired without due cause were not fired at all even when their employment was no longer economically viable for the firm. Firing protections also help to explain why export oriented industries grew so slowly under Allende and Frei. The fish processing industry is dependent on processing all catch for the year in a short amount of time due to the competitive nature of open access. Fishers saw it as necessary to quickly fish as much as possible before the stocks were depleted so catch tended to arrive at processing facilities during a brief window and in large amounts. This necessitates high levels of employment for parts of the year and no employment for others. High firing costs increased the cost of labor to the fish processing industry beyond the mere cost of wages because temporary employment contracts were nearly impossible.

The reforms to Chilean labor law made by the Pinochet regime were intended to increase the flexibility of the labor market and reduce costs to employers. The architect of the labor reforms, Jose Piñera, believed that politically privileged labor leaders needed to be removed from the Chilean economy so that the value of labor would be accurately reflected in wages. The

initial strategy to achieve this change was through brutal repression of labor unions. From 1976 to 1981 membership in unions decreased from 934,000 to 374,000 which substantially weakened workers in relation to their employers (Pietrobelli 2006). This came in direct contrast to the position of organized labor within the Allende regime: 33.7% of those working were unionized in 1973 that was up from 17.7% in 1965-1970. The government did more than repress unions to keep workers out of them and their political power down, they also changed the labor codes. In 1978 Decreto Ley 2.200 was passed which allowed employers to fire workers at will without cause or procedure and increased the term which qualified for a temporary work contract from six months to two years. This was followed by Ley 18.018 in 1981 which greatly reduced requirements of severance pay.

Rural poverty skyrocketed. A large amount of workers lost their jobs when unions and cooperatives were dissolved following the reforms. There was a substantial decrease in employment and production within rural areas: from 1965-1976 the amount of permanent paid agricultural workers decreased by 20% (Pietrobelli 2006). These structural changes within the economy necessitated changes in the way rural societies functioned. Families were forced to look for additional income sources such as seasonal employment in the new fish and fruit processing plants. Many also migrated to urban and suburban areas forming “aldeas rurales” or rural townships. This marginalization of rural workers created a class of desperate people willing to work long hours in poor working conditions and without job security to support their families. These people became a low cost input into the fishing industry. The threat of unemployment also kept workers from open conflict with management. Unemployment levels during the dictatorship averaged over 20% and workers were terrified of losing their job because it was almost impossible to find another. Workers were willing to make repeated concessions to management

to keep the jobs they had or undercut other workers in order to gain employment since there was no social safety net.

As fisheries were rapidly expanding due to capital investments, the workers in the industry were suffering. Workers in the new export sectors developed under Pinochet (fish, forestry, and fruit) earned about half of what workers in manufacturing earned and two thirds of the earnings of workers in the service⁴ sector. In the 1970s and 1980s fishers⁴ did earn more than the minimum wage but the minimum wage had been slashed by the Pinochet government. The combination of inflation and the end of wage controls caused real wages to fall below 1965 levels . In 1987 an “unskilled” worker in a seafood harvesting or processing plant earned \$85 per month including overtime. The income received was not enough to support a household nor was income in any of the other industries open to people in rural areas (Schurman 2001). This led to a change in the work habits of the rural poor to a system in which they relied on multiple sources of temporary employment. During the seasonal period of employment people tended to work 12-14 hour days in dangerous conditions in processing plants. The extreme job instability led to most of the people employed in seafood processing to be women who only had access to less desirable jobs. In the logic of the Pinochet regime, the conditions in the fishing and fish processing industries were necessary for its rapid growth. By deregulating the labor market, Pinochet was able to substantially reduce costs in the fishing industry which made it a more profitable investment to domestic and foreign capital but did not increase quality employment among Chileans.

⁴ Fishers refers to people who worked on fishing vessels, usually owners of the boats who were able to extract some of the natural resource rents, not people working in processing plants.

The Consolidation of the Industry

The Collapse of the Northern Fishery

In the 1980s the most important fishery was the Northern Pelagic fishery. The characteristics of this fishery made it ideal for the production of fish oil and fish meal. The main fish stocks harvested were the anchovy and spanish sardine, despite the repeated near collapse of the anchovy from overfishing. These oily fish were not commonly used for human consumption and were ideal for use in the fish meal and fish oil industries. The fishery is considered pelagic because the fish harvested are found in the Pelagic zone of the ocean⁵. The northern pelagic fishery is also considered an open ocean fishery because fishing is not conducted near the shoreline but rather in the open ocean. This fishery had been in full exploitation since the development of the industry in the 1960s and had already had two near collapses of the anchovy stock. The collapses led to a shift to fishing sardines which required the same technology for both harvesting and processing as anchovies. The international demand for sardines for use in fish meal also facilitated the shift in production. This new international market for sardines had potential for Chilean producers because the sardine fishery had previously not been exploited. The resulting products are also nearly identical to those of anchovies. This species shift was one of many in the Chilean fishing sector. In the short term this type of species shift sustained the growth of the fishing sector but in the long term resulted in repeated depletions of fish stocks.

The 1980s had seen a dramatic increase in the value of Chilean fisheries. The increase was almost exclusively caused by an increase in catch volume rather than an increase in the value added of the catch. This is often the case in exportation of primary goods. This growth in

⁵ The pelagic zone is one of the zones that is not close to the sea floor and is often contrasted with demersal fisheries which contain the fish known as bottom feeders and are important elsewhere in Chile. The distinction is important because pelagic and demersal fisheries require different harvesting and processing technologies. Demersal stocks are not normally used in fish oil or fish meal because they have higher unit value and do not have as high of an oil content.

tonnage caught was starting to have an impact on the fish stocks themselves, which were becoming scarcer and scarcer. The northern fishery was finally on the verge of complete collapse and it was becoming apparent that the complete absence of regulation may have temporarily increased the value of the fisheries but in the long term was destroying that value by making it nearly impossible for fish stocks to regenerate. The imminent collapse reveals that the sustained increase in the value of the fishing industry since the 1970s could not possibly merely be the result of the macroeconomic changes to the country and the influence of the government agencies created by Pinochet. The policies of the Frei and Allende regimes of nationalizing the northern fleet during the previous collapses of the 1960s and 1972 were responsible for keeping the fishery functioning through to the 1980s and allowing the industry to expand under Pinochet. The government initiatives to gather information and nurture the industry had also helped maintain the industry as viable.

The initial wave of privatization by the Pinochet government was imperfect at best. The period from 1973-1981 saw deregulation with virtually no restrictions which led many of the public monopolies to be replaced by private ones. State industries were auctioned off and unlimited sales were allowed to a single buyer which led many of the industries to be controlled by giant conglomerates. Specifically in the fishing industry, the privatization was unregulated and allowed two companies, Anacleto Angelini and the Coloso Group to basically control the entire northern fleet (Ibarra 2000). The lack of financial guarantees of the first wave of privatization led to high levels of debt and an economic crisis. The crisis encouraged the government to temporarily abandon parts of the economic plan and re-nationalize many of the industries that had been sold off directly following the coup in order to prevent them from failing.

The fishing industry was beginning to fail in the 1980s. Official concern over the depletion of fish stocks began to develop for the first time since the Allende nationalizations. In some ways this crisis mirrored the fishery crisis that had confronted Frei and Allende but the government's motivation for intervention had changed dramatically. The concern was no longer for protecting the jobs of workers rather, it was to preserve one of Chile's flagship industries for export led growth and the success of the new market model. For the first time regulations were undertaken by the Pinochet government that challenged the idea of open access to the seas. SUBPESCA introduced the first catch restrictions since the reprivitization of the fleet by Pinochet in 1973, but these were completely ineffective. They simply added to the large amount of piecemeal reforms to the industry. The new regulations included rules about landing immature fish, closing fisheries during certain seasons and instituting total allowable catches on collapsed fisheries. The measures were largely ignored by the powerful conglomerates that owned the fishing industry and this widespread non-compliance was not challenged by the fishery agencies. As the crisis in the northern fishery became more grave, Decreto Ley 436 was passed in 1986 which limited catch levels to 1985 levels. This restriction was ineffective because the fishery had already been over exploited in 1985 and maintaining that same level of overexploitation would still inevitably lead the fishery to destruction.

By 1977 the anchovy fishery had permanently collapsed and the anchovy would not play an important role in the growth of the 1980s. The industry continued to grow rapidly but grew almost exclusively through the harvesting of the spanish sardine. The El Niño phenomenon of 1971-1972 that was partially responsible for the anchovy collapse also brought with it certain benefits to the Chilean fisheries endowment. By changing the physical characteristics of the Chilean ocean there was a shift in where certain fish resided. This caused mackerel and pilchard

to begin to spawn further south, moving them into Chilean waters in large amounts for the first time. The success fishers found in harvesting these new species was short lived. The pilchard harvest too collapsed to 1970s levels in 1986 due to overfishing. The Spanish sardine that had replaced the anchovy reached its peak in 1985 of 2.6 million tons and then collapsed in 1989 to 1.4 million tons and then further in recent years to only 123 thousand tons. By the end of the 1980s the northern fishery could not support the fishers and processing plants that had invested in the industry.

A cycle of overcapitalization, overfishing and fishery collapse

In the economic climate of a laissez-faire ownership society created by Pinochet it would have been politically difficult for the collapse of the northern fisheries to be met with a nationalization of the industry. Much of the investment capital in the industry was from foreign investors and government intervention would have negatively impacted investment in Chile. Yet nationalizations were still not out completely of the question. Following the 1982 debt crisis the government saw fit to nationalize many of the industries that had been struggling from debt. Many of these were the same industries that had been privatized just a few years before. The second attempt at privatization that followed recovery from the debt crisis was very different than the first. More safeguards were added to the auction to assure that the industries would not become concentrated in monopolist hands or gigantic conglomerates again. The fishing industry did not necessitate direct nationalization and reorganization when it went into crisis because owners were already planning to expand into the previously unexploited southern fishery to maintain their high levels of catch.

This trend away from nationalization as a management tactic and the removal of the few catch quotas that had existed intensified the cycle of overcapitalization and overfishing. The

cycle worked in a predictable pattern. Initially a large amount of firms entered into a profitable fishery such as the anchovy. Companies who entered the fishery already owned harvesting and processing machinery so new investment was minimal. There were no restrictions to entry and negligible fixed costs so the catch capacity of the fleet became much larger than the sustainable level of catch for the fishery⁶. In the culture of open access, the only way to claim ownership of resources was to harvest them, so there was an incentive to fish indiscriminately as fast as possible. Additionally there were no safeguards to make sure that boats were not harvesting more fish than were sustainable.

When the spanish sardine and anchovy fisheries collapsed many fishers found that they were unable to harvest enough fish to stay economically viable. The conclusion that these fishers reached was to enter into a different fishery rather than to exit the industry. The neo-liberal ideology used to explain these choices was that an equilibrium would be reached in which all fishing fleets would have just enough hold capacity to maintain sustainable catch levels in their respective fisheries. However, the reality of fishery development in Chile was very different. Boats would rush to harvest as much as possible in fisheries leading to overfishing and catch collapse. These boats would then move to new fisheries which would initially sustain them until more firms would enter into the fishery drawn by the high catch and profit until a point of saturation and fishery collapse was reached again. This cycle has been repeated for multiple species of fish in a variety of geographic areas within Chile and it does not appear that it is going to reach an equilibrium at any time soon.

⁶ The sustainable level of catch is the amount of fish that can be harvested from a fishery each year to assure the same level of catch in perpetuity. If too many fish are harvested there will not be enough left over to spawn and regenerate the fish stocks possibly permanently decreasing carrying capacity of the ecosystem.

Moving south

One of the most important changes in the fishing industry that characterized the end of the Pinochet era was the cessation of the northern fishery's prominence. Since both the Spanish sardine and anchovy stocks had collapsed to fractions of their original catch levels, it became necessary for fishers to seek new fisheries to harvest or exit the industry. For many, exiting was not a viable solution because wages in similarly skilled occupations were much lower. It was in this period that they first began to look towards the fisheries in southern Chile (regions V through XII). This area is the span of the Chilean coast from Valparaiso, the main international port, south to the Magellan straits and Antarctic waters at tip of the country. The southern fishery had many of the same attributes as the northern one. It too was a pelagic fishery that primarily supported the production of fish meal. In the south the most important fish stock became jack-mackerel. This is also an oily fish not often used for human consumption that can be processed using the same machinery as sardines or anchovies for fish meal and fish oil. The southern fishery also had stocks of non-traditional fish in the demersal fishery which would become important in the 1990s. Northern fishers were adept at making sure that there would be no economic or regulatory obstacles to their entrance into the southern fishery.

The southern fishery grew rapidly in the wake of the north's collapse. Between 1989 and 1995 the storage capacity of the fleet in the south increased by 134% and reached a peak of 4 million tons in 1995. This expansion was only possible because of the precedent set by Pinochet's management, or rather lack of management, of the northern fishery. The idea of open access had to be maintained. One of the most important impacts of the shift to the southern fishery was that for the first time industrial fishers and factory trawlers were brought into direct competition with traditional small fishers. These fishers had been an important part of the

southern economy and had managed to maintain fish stocks because of the small volume of catch. Small fishers in the south were predominantly centered around the port city of Puerto Montt and the island of Chiloe. The fjords of the south served as protective barriers for ocean floor ecosystems and fisheries based on shellfish and bottom feeders. These fisheries were not important in the north because of different geographic characteristics. Fishers who owned their own boats were an important power in the South. They were one of the most economically advantaged rural groups and brought in wages that were higher than minimum wage due to their ability to capture the value of the natural resources, something that processing plant workers and wage fishers in the North were unable to do. Additionally, the south provided the same type of cheap labor that was available in the north. The agricultural south had seen a rapid increase in poverty during the dictatorship and workers were willing to work for the low wages that had dominated the processing industry.

Conclusions

Pinochet's legacy can still be felt in almost all aspects of Chilean society. Chile experienced a managed transition to democracy rather than the strong and sometimes violent social movements that many of its neighbors experienced⁷. Chile's managed transition was a result of the economic success of many of Pinochet's strategies and the cult of personality he was able to create. Pinochet voluntarily adopted the constitution of 1980 which provided for a referendum in 1989 in which voters chose whether or not to keep Pinochet as president for ten more years or to hold democratic elections. A well coordinated campaign by very different parts of society opposed to the dictatorship called the "campaign for the no," ended up successfully

⁷ For example, opinion in Argentina turned strongly against the dictatorship when they repressed the marching of the Madres de la Plaza de Mayo, a group of non violent older women who were demanding information about their missing children and grandchildren.

ousting Pinochet through the referendum. The result was the coalition Concertación government who despite its democratic roots was still shackled by the legacies of the dictatorship, including military senators for life, specified in the 1980 constitution.

The fishing industry saw few initial changes. Open access and deregulation remained important parts of Chilean economic culture especially in relation to fisheries. Labor was also slow to recover and wages remained low in export oriented industries like fish processing. The economic reforms of Pinochet permanently changed the country and the economic culture. It was a radical departure from the trend of increasing collectivism that had begun with ISI and although it was able to diversify exports, the country remained dependent on the global commodities market and fluctuations in prices.

Chapter 3: The Modern Costal Industry

Introduction

There have been few structural changes to the costal fishing industry since the return to democracy. The industry still depends on the availability of cheap labor and unrestricted access to marine natural resources but the availability of those inputs is starting to be challenged. There has also been a transition to new types of fish stocks such as those that have high unit value. These fish stocks tend to be for human consumption rather than animal feed and were not traditionally industrially fished in Chile. The shift to their production is in fact the result of many of the regulations that limited catch for traditional fish stocks used in fish meal and fish oil. There are now far more regulatory measures to protect the sustainability of the industry. This regulation has been hard to achieve due to the resistance of powerful interests within the fishing industry as well as the legacy of deregulation in the country. Part of the reason it is now possible is that for many sectors of the population, support for open access is decreasing especially following the economic crisis of the 1990s. Chileans are beginning to reevaluate the advantages of their radically free market and export led development. From 1998 to 2003 the amount of people who believed that the privatization of state industries was good for the Chilean state decreased from 51% to 29% and only 23% of people were satisfied with the functioning of the market economy (Hagopian 2005). While attitudes may have shifted, there is still a small concentration of power within the fishing lobby when it comes to regulation on fisheries. The transition to and consolidation of democracy facilitated the ability of the government and environmentalists to induce the fishing industry to accept regulations.

The 1991 fisheries law marks the beginning of the modern fishing industry. It is the first permanent regulation of fishing since the 1931 fisheries code and was only possible due to the

return to democracy. The 1991 fishing law, weak as it was, was only possible due to the new political and economic climate. This fishing law marked the first challenge to the doctrine of open access to the sea and introduced new types of regulatory structures that would become the backbone of fishery preservation. There were also dramatic changes to labor laws. The unions that had been outlawed under Pinochet returned to the political foreground and the President began to institute more protections for workers, higher safety standards and a higher minimum wage. The modern industry still suffers from the historical cycle of overcapitalization and fishery collapse. However, there has been a significant trend towards regulation, specifically towards systems of individual transferable quotas (ITQs). These quotas have been touted as a market solution to the problem of overfishing which would make them more acceptable in Chilean society. The catch limits in the permits would prevent overfishing by setting defined limits and tradability allows them to flow to where they are of highest value to create an industry of the appropriate size for Chile's fishery endowment..

Economic and Political Conditions

In 1980 Pinochet adopted a constitution in an attempt to legitimate his power. There had been growing international pressure for a return to democracy in the wake of the international outrage that the economic experiment and human rights abuses in Chile had elicited. The constitution which was adopted through a suspect referendum declared Pinochet to be president of the republic with a term lasting until 1989 at which point there would be another referendum, this time on whether to continue Pinochet's government or hold democratic elections. The constitution established a number of safeguards for the military in case the second referendum was not successful. These included an autonomous national security council, a privileged position in the government for the branches of the military and senator for life positions

appointed by Pinochet. Additionally the legislature was stacked in favor of the right. The constitution also created two member districts. For both seats to go to the same party that party would have to receive twice as many votes as the opposition at least 66% which was nearly impossible even as popular opinion shifted away from the dictatorship. This allowed the radical right wing to maintain a vibrant position in the legislature both through the split votes in districts and the senate which was appointed rather than elected. Pinochet also reserved the right to run for president in 1989 if he lost the referendum. Many of these restrictions on Chilean democracy were not removed from the constitution until the constitutional reforms of 2005 after 15 years of democratic center-left government.

By the return to democracy, the structural changes made to the Chilean economy had become so institutionalized in the attitudes of Chileans that they were even more difficult to change than the 1989 constitution. The nature of deregulation and the sale of national industries made the reforms of Pinochet difficult to undo. It is very easy for an unchallenged dictator who has placed a country into a state of fear through repressive violence to sell off national industries to the highest bidder. It is far more difficult for a democratically elected government to renationalize. For the most part, the industries were not for sale and the elite which the fledgling democratic government depended on for support, would not have approved of purchasing them even if they were. The type of spontaneous expropriation that happened under the Allende government was similarly out of the question especially since the fear of joining labor unions was still present among those who had lived through the repression.

There was also the direct threat of a return to military dictatorship during the first few years of the return to democracy that made reforms difficult. The right had a virtual monopoly of the press which made it nearly impossible of the more controversial policies of the new

government to gain broad support. Pinochet used the structural instruments at his disposal to continue to influence policy. He was the commander of the armed forces, which were still not under civilian control, and exercised power when he felt it was needed to protect his legacy. He maintained a shadow cabinet and threatened to lead a second coup if he felt it were warranted. These were not idle threats; in 1993 when his son was being investigated for illegal arms dealings, Pinochet ordered combat ready troops and tanks to march into the streets of Santiago as an “exercise.” This backdrop of fear made real change within the government, economy and culture difficult. The first president following the dictatorship, Aylwin, was unable to challenge the footprint of Pinochet through constitutional reforms and was only able to make small changes such as increasing social spending for the poor. Pinochet did not completely exit the political sphere until 2002 when he accepted immunity from prosecution for the human rights and embezzlement cases that were being brought against him, in exchange for leaving his position as appointed senator for life. It was this exit that made the 2005 constitutional reforms that fully returned democracy to the country possible. Despite the economic legacy and the high level of approval that the Pinochet reforms enjoyed in the initial stages of the return to democracy, a significant political opening has been made. This opening allowed an increase participation in politics for voices that had not been heard during the dictatorship including those of low wage labor and environmentalists. There were new rules to who would be able to participate which would eventually lead to the end of open access in Chilean fisheries.

Regulatory framework

The General Fishing and Aquaculture Law of 1991

The Fisheries law of 1991 was a turning point in the development of the Chilean fishing industry. It came as a direct response to shrinking fish stocks and was characteristic of the

changing political climate following the reestablishment of democracy. The northern fisheries had collapsed and the shift to the South was in progress. The law was important because it was the first strong regulatory instrument to be implemented by the government and because it marked the first government recognition that open access to the seas could lead to economically undesirable circumstances. Although the law did mark a shift in attitude, it was still dependent on the history of the Chilean fisheries and the tradition of open access. The law recognized the legality of open access and drew a distinction between fisheries subject to open access and those in “full exploitation.” The law provided for a number of regulations that had not been possible before. Previous regulation was disconnected and consisted of temporarily closing a fishery after it had collapsed in order to allow it to regenerate. Despite improvements, the law was still very weak because the industrial fishing lobby had worked to limit its scope. Fishing had become a highly competitive and profitable business: as fish stocks fell, the rush to harvest quickly in the season before the stocks were depleted became more and more important. The law came at a time of uncertainty about where the Chilean fishing industry was heading. Unlike the north, the southern fishery already had a fleet of artisan fishers who fished for high unit value fish as well as dove for shellfish. The regulations of the fisheries law oversaw both artisan and industrial fleets and the interests of those fishers clashed⁸.

The most interesting introduction of the fisheries law was the possibility of using individual transferable quotas (ITQs) in fisheries management. ITQ systems were seen as ideal for the Chilean economic culture because they are a market solution to the problem of fishery collapse and would preserve the relative levels of investments that companies had made in the fisheries. Fishers who already had a stake in the industry would be less likely to oppose an ITQ

⁸ Industrial fishers were those that were large and vertically integrated, controlling all parts of the production process whereas artisan fishers tended to be independent boat owners who sold their catch at the dock. (Cerdeña 2000).

system than a simple total allowable catch (TAC) quota. The basic mechanics of ITQ systems vary in the form of the initial allocation of the permits, the total level of catch, and how permits can be traded. Initial allocation is usually through historical catch records as a way of protecting the investments that current players have already made in the industry or an auction which would theoretically allow permits to flow to where they have the most value and often allow new companies with high levels of liquid capital to enter the industry and force others out. These ITQs, once initially allocated, can then be traded along certain rules designed by the regulatory body. The system is seen as self correcting. In a competitive tradable permit system, permits will tend to flow to where they can be used to gain the highest value (Tietenberg 2002). Fishers who receive lower value from their permits, because of higher costs or other reasons, would sell them to other fishers who have more to gain from the permits. The initial allocation of permits in a tradable system is almost unimportant for achieving an efficient allocation because eventually no matter what that initial allocation is (within reason) permits will always be traded to where they have the highest benefit. However, the initial allocation becomes important in discussions of fairness and is an key political factor in the decisions of fishers to support an ITQ system. Fishing lobbies are unwilling to support ITQ systems that do not preserve their historic rights to access.

It was the form of allocation, in this case through local catch history, that caused the law to be met with resistance from various sectors of the fishing and non fishing community. The traditional cycle of fishing in Chile where fleets would move from one species and geographic area to the next when fish stocks collapsed would become impossible under an ITQ system. The law bestowed permanent rights on ships as a proportion of total allowable catch for a certain species in a certain geographic area. Entrepreneurs who wanted to enter the industry or fishers

who believed that they might need to move to a different fishery resisted the idea of permanent rights based on historical catch. At the time some of the most important resistance came from fishers in the north who recognized that the fishery was near collapse again and wanted to move to the developing southern pelagic fishery. This move south would have been made extremely costly by ITQs because they would have been forced to pay to enter the fishery. There were also theoretical arguments about the content of the law. The ability of the government to grant permanent rights as a regulatory mechanism rather than limiting the catch when necessary with seasonal and geographic bans amounted to the privatization of the seas in the eyes of many, an idea not only inconsistent with Chilean culture post Pinochet but also with the 1989 constitution that was in effect in 1991. The version of the law that was eventually finalized had limitations on how permanent these rights could be in response to critics.

As a result of this pressure from the fishing industry ITQs were only implemented in four fisheries in Chile. These four fisheries were: the squat lobster since 1992, Chilean Sea Bass (also known as Black Cod) since 1992, Orange Roughly since 1998 and Yellow Prawn since 1997. None of these fisheries were particularly important to the fishing industry at the time ITQs were established which is why they were able to be applied to them without resistance from the industry. None of these fisheries have a high share of employment or value added and have not had an impact on the overall health of the fishing industry. They are all high unit value species that are sold for export having not been processed into fish meal or fish oil which is still the most important sector of the fishing industry. The fisheries were also targeted for regulation because they were either in development so there wasn't a strong lobby around them or they had already collapsed and were in recovery so the value of the fishery was low. One of the interesting characteristics of the ITQ systems in these fisheries is that permits were auctioned off rather than

awarded based on history. This was only possible due to the low concentration of vessels in the fisheries who could claim historical rights to catch and the low value of those permits.

Despite the potential of ITQs as a new regulatory tool to manage fisheries, the government continued to use them in the same way that it had used nationalization during the Frei and Allende administrations and temporary closures during the Pinochet years. ITQs were only applied when fisheries were already in crisis and had begun to see their catch drop dramatically. Many Chilean fisheries were in crisis again in the late 1990s. 1997 through 1998 brought the return of El Niño, this time with a damaging impact on the southern fishery. El Niño reduced adult biomass considerably, so authorities decided to close the southern pelagic fishery in December 1997 to try and protect the juvenile fish population from exploitation so it would be allowed to regenerate. Total catch in 1998 was down 40% from 1997 levels only to dramatically increase in 1999. ITQs were temporarily instituted in the horse-mackerel fishery due to its near collapse and importance in the production of fish meal. This intervention both marked a continuity with the historical method of last minute crisis intervention of the Chilean government but, at the same time it was an innovation to apply ITQs to a fishery used in fish meal production and would set a precedent for future intervention.

The 2001 Transitory Fisheries Law

The Transitory Fisheries Reform was a direct result of the crisis in the jack-mackerel fishery and the failure of the existing regulatory framework to prevent it. The ITQ system that was temporarily applied to the fishery was removed due to successful pressure from both industrial and artisan fishing groups (Peña-Torres 2002). In many ways this new law was simply an extension of the 1991 statute with enhanced enforcement measures. As a transitory document it was only approved to be valid from 2001-2002 and was applicable to all fisheries considered

by SUBPESCA to be in “full exploitation” or “recovery” which were the fisheries for which a total allowable catch (TAC) had already been established. In this way it was a continuation of the regulatory standards that already existed because it was a reaction to an already collapsed fishery.

The law also created a number of changes in the regulatory framework. ITQs became the main management tool for fisheries due to their success in regulating the four fisheries that they had previously been applied to. It allowed for the TAC of a fishery to be divided into semi-transferable permits. These permits were awarded to boat owners and defined as an exact catch tonnage rather than a percentage of the TAC. These catch restrictions were designed to be legal for two years and to not be used as a precedent in any future ITQ system as a way to test this new regulatory mechanism. Not framing the temporary ITQ system as a precedent silenced many of the critics of the ITQ system who worried about limiting open access permanently. All ITQs were not applied in the same way. In the demersal or “deep ocean” fishery quotas were awarded by boat and directly related to the 1999 and 2000 catch histories. However, the pelagic fishery to which the jack-mackerel and most fish used in fish meal production belong, had a different system of allocation because it had already been substantially depleted. The recent decrease in fish stocks had made using catch history as a way of awarding permits problematic since boats that caught for human consumption were given privilege in fishing rights. Hold capacity was used as a proxy for catch history. In awarding ITQs, 50% weight was given to the catch history of a boat and 50% weight to storage capacity.

Despite improvements, this was not a fully functioning ITQ system because direct transferability was still excluded. Fishers were permitted to coordinate each year before the opening of the season in order to consolidate their ITQs and choose a subset of ships to harvest.

This was seen as a viable way to end the cycle of overcapitalization in Chilean fisheries and arrive at financially reasonable scales of production while maintaining historic fishing rights (Peña-Torres 2002). Fishers who owned multiple ships were also able to permanently take a ship out of production and transfer the history of that ship to another. Very few fishers chose to do this because as a temporary law, it was uncertain what future government restrictions would look like and whether they would suffer in the long term by losing fishing rights from taking boats out of production in the short term.

The changes made by the 2001 law that would be the most effective in changing the Chilean economic culture as it relates to fisheries was not the extension of ITQs but the increase in the monitoring power of the government through SERNAPESCA . SERNAPESCA saw its power as a regulatory agency increase dramatically as did private firms who were placed in charge of monitoring the ITQ system. These firms were guaranteed rights to be on board monitors in the industrial fleet. These firms reported to SUBPESCA and were responsible for compiling information on catch and monitoring processing plants. For the first time explicit sanctions were introduced as enforcement measures. One of the main problems with the previous regulatory framework was that it was almost impossible to enforce. The new law detailed four specific violations that were punishable by fines and possible confiscation of quotas: overfishing a ship's quota level, not reporting or certifying a catch correctly, discarding at sea species caught (this was to prevent fishers from only keeping the largest fish caught in light of a quota) and fishing without authorization in areas zoned only for artisanal fishing.

Industry Dynamics

The impact of factory trawlers

The Chilean fisheries have been impacted by various development strategies in their history which has effected everything from the species of fish caught, to the method of fishing to the final destination of the product. In some ways there appears to be only small changes in dynamics, for instance although the species used in fish meal have changed, fish meal production still accounts for 90% of the total volume of catch and is still produced in much the same way. Fish are landed and then they are processed in large processing plants by cheap seasonal labor. One of the largest changes has been the development of other fish products for human consumption. These products are also processed but they are made into canned, fresh or frozen fish products to be shipped abroad mostly to grocery store chains. These products have much higher unit value than fish meal and because of that they accounted for 43% of the value of production in 1987 even though they only made up 10% of catch weight (Collins and Lear 1995).

Much of the production of these high unit value stocks is done by factory trawlers. Factory trawlers are vertically integrated harvest ships and processing plants in one. The ships land in Chilean harbors about once every two months and directly transfer their cargo to transport ships destined for the export market. The ships were initially invited into Chilean fisheries during the 1970s deregulation and are almost exclusively foreign owned by Japanese, Korean and Spanish companies (Camus and Hajek 1998). The initial argument for their presence in Chilean waters was that they would bring jobs for Chileans and allow them opportunities to learn the technology. These goals were never realized and the ships employ virtually no Chileans in skilled positions nor are they beholden to Chilean law. The factory trawlers have a history of

bribing the inspectors they were required to keep on board and then lobbying to have the inspector regulation removed all together.

Factory trawlers have exacerbated rural poverty. The entire fleet of factory trawlers employed about 800 people in 1987 a number that is unlikely to have increased much due to the steady number of trawlers in Chilean waters. In comparison in the same year land based processing plants employed over 10,000 people. Also, many of the employees on the factory trawlers are foreign nationals. Trawlers further add to rural poverty (especially near the coast) because they compete with small fishers by fishing the same stocks of fish which decreases the amount available for small fishers and pushes down the market price they can demand for their catch. The fish stock that is most endangered by factory trawlers is hake, locally known as merluza, which is fished by 35 trawlers and 1500 small boat fishers (Collins and Lear 1995). Factory trawlers have little incentive to maintain fish stocks because they can easily move their entire production to another location whereas the small fishers face a catastrophe from fishery collapse. Currently factory trawlers have been purchasing fishing rights from impoverished African countries and therefore have little incentive to maintain Chilean fish stocks when they can move into African fisheries after those in Chile have been depleted. The Chilean government sees very little revenue from these factory trawlers and yet makes virtually no effort to regulate them. Two percent of the commercial value produced on the ships is supposed to be paid to the Chilean government in taxes but the reality is that most of the value of the harvest is unreported. There is speculation that factory trawlers pay little or no tax.

The method of fishing of factory trawlers, commonly called bottom trawling, drag-net fishing, or benthic trawling is also unique and especially harmful. Bottom trawling is a practice where heavy nets are dragged across the sea floor and is extremely effective in catching large

quantities of fish. However it also catches everything else in its path regardless of whether it is useful to fishers. In Chile, bottom trawlers operate on the continental shelf which is where they are able to do the most damage. The nets irreversibly destroy ocean floor ecosystems including slow regenerating coral reefs and cold water sponge beds. Independent of the impacts on overall biodiversity, bottom trawling has huge economic impacts: the destruction of coral reefs further decreases the ability of fish stocks to regenerate because they provide protection and food for fish spawn. Bottom trawling also destroys shellfish beds which are an important source of income on the southern coast. In the past, regulation of factory trawlers has focused on restricting when and where fishing could take place, however these regulations have actually led to the development of bottom trawling. Fishers who have a limited amount of time in which to harvest fish have turned to bottom trawling as a way to harvest as much as possible in a short amount of time regardless of the future impact on fish stocks. Small fishers in the same fishery as factory trawlers would not have the same environmental impact on fishing even if their catch level were identical to that of bottom trawlers because their fishing methods do not have the same negative externalities.

Demersal (deep ocean) fisheries

Another unique source of fishery depletion is deep ocean fishing, which is a very recent trend related to the increase in importance of high unit value stocks. Deep water fishing occurs in waters 600 feet or deeper and relies on stocks of different fish than traditional coastal fishing (Schmid 2007). Some of the more commonly fished deep water fish stocks are the Chilean Sea Bass and Orange Roughy most of the production of which is destined for the US market. The fish species that are caught in deep water fishing are especially sensitive to exploitation. Deep water fishing is dangerous because it targets fish species, such as orange roughy, that have longer

lifespans and take more time to reproduce than traditional coastal fish stocks⁹. Depletion of coastal fish stocks and regulations have caused fishers to turn to deep water fishing, even renaming species to make them more attractive in the consumer market. The resulting increase in market value of these fish stocks led to marketing campaigns intended to encourage sales by renaming the slimehead fish, orange roughy, and the toothfish, Chilean sea bass, which in turn has caused more deep water fishing as consumers begin to demand these new species (Schmid 2007). Many of the deep ocean fish have lifespans of over 100 years and do not reach maturity until 40 which makes their regeneration very difficult when they are being caught before they reach the age of maturity. Ironically, even though they are some of the most easy species to overfish and deplete they are among the least protected in the ocean because their commercial appeal has been very recent and there has not been much of a push to investigate the environmental impact of their depletion. In Canada overfishing of deep water species has led 40% of those species to become endangered. Estimates of how long it would take to regenerate those stocks range are over 100 years (Schmid 2007). Given the Chilean history of only instituting regulations after fishery collapse, it is likely that a depletion of deep ocean fish stocks would be economically devastating and take a very long time to recover from. Many of these fish stocks were traditional staples in southern Chilean culture and had been harvested without collapse for decades prior to the introduction of an industrial fishing fleet to the region. The exception to the rule is Chilean Sea Bass which was subject to an ITQ system and has gained an international reputation as an environmentally sustainable foodstuff.

⁹ Orange Roughy spawns once every two years in comparison to jack-mackerel which spawns every day in the summer.

Artisan Fishing

Artisan fishers were disadvantaged in the initial development and consolidation of the fishing industry. Because of the concept of open access, and the near complete lack of regulations, it was basically impossible for small fishers to compete with the large vertically integrated industrial fleet and their processing plants. The conflict between artisan fishing and industrial fishing did not really develop until the collapse of the northern fish stocks and the shift to southern production where artisan fisheries had traditionally been located. This conflict was exacerbated by the introduction of factory trawlers to the southern fishery because they relied on the continental shelf just like traditional artisan fishers. Artisan fishing in Chiloe and Puerto Montt in particular is more than a career, it is a way of life. Fishers in the south had traditionally been independent business people who owned their boats and sold their catch to processing plants or markets upon landing rather than through the preexisting contracts with processing plants common within the industrial fleet. Fishing has always been one of the higher paid jobs in rural areas with fishers making well above minimum wage when fish stocks were abundant. Fishers focused on shellfish and bottom feeders such as conger eel and Chilean sea bass which would become common targets of the factory trawlers.

The 2001 transitory fishing law recognized this conflict between traditional fishers and the large industrial fleets that were moving to the southern fisheries by establishing boundaries to protect small fishers and creating systems to give them more power within regulatory and industry groups. The law streamlined the process for informal fishing associations to become formalized. This reform was crucial because it helped to fight the fear of labor unions and rural associations that persisted from the dictatorship and allow an open space for existing groups to bargain with governmental agencies and other industry groups. It also established an artisan

fishing zone for the first five miles of the coast from the fifth region south to the twelfth. This area was already the primary location for artisan fishers. The new law also facilitated passing fishing rights through a family for those who die while fishing which helps artisan fishers maintain their fishing culture. It also gave traditional fishers more of a voice in national fishing policy. The number of artisan representatives in both the National Fisheries Council and Zonal Fisheries Councils was increased. On the national council seven of the representatives are artisan fishers, seven are from labor, four are from the business fishing sector, four are institutional positions and seven are nominated by the president. In the Zonal Fishery Councils the ratio is similar with six representatives from artisan fishers, six from labor, four from business interests, six institutional members two of which are from universities.

Despite the modifications in the fishing law in favor of small fishers, their way of life is greatly in danger. Many of the children of fishers are being drawn away from the industry because they see the decline in income and security of their parents. The jobs of small fishers and divers are becoming more and more dangerous as fisheries close to the shore are depleted. Since fish stocks have been exhausted, artisan fishers have seen lower levels of catch and smaller fish. This decrease in catch has not been met by higher prices as would be expected because the fishing industry has been globalized and increased catch in Africa of similar fish species since the 1990s has kept prices down, threatening the livelihoods of Chilean fishers. The recession in Spain also hit small fishers hard because Spain was one of the primary importers of shellfish harvested mostly by small fishers and divers. In order to maintain their income small fishers were forced to take on greater personal risks. Fishers are obligated to fish further out to sea which is more costly in terms of fuel and crew hours worked as well as more dangerous because shelter from storms is more difficult to reach further out to sea. Longer hours also keep fishers

away from their families and additional sources of income such as agriculture. Divers as well face far more dangerous conditions as easily accessible shellfish beds are depleted. Divers put themselves at risk diving deeper because there is a tendency to surface too quickly in order to save time. According to observations by Rachel Schurman, it is not uncommon to see divers passed out on the docks after surfacing too quickly. The problem has become so grave that the hospital in Ancud (the main city of Chiloe) invested in a decompression tank for divers. These problems continue to plague the small fishers who do not have the resources to move to other fisheries or retrain. Surviving spouses of fishers who have been killed working in unsafe conditions have few choices of employment other than taking in laundry or opening their houses to tourists as *hospedajes*.

Labor

Reforms instituted by the government and regulatory agencies since the fall of the dictatorship have been responses to many of the environmental problems and sustainability issues associated with Chilean fisheries but the effort to improve the conditions of workers has been minimal. Researchers believe that rural poverty is actually higher now than it was in the 1960s due to Pinochet's legacy and the importance of keeping labor cheap in maintaining the rapid growth of non traditional export sectors (Pietrobelli 2006). By most macroeconomic indicators including: the level and value of catch, new investment, increasing productivity, and job growth it appears that the industry has done very well since the return to democracy. However, workers have seen none of those gains. The amount of work has increased but the quality has not. The Free Trade Agreements (FTAs) that Chile has with its trading partners are supposed to require a certain standard for workers in the export industries, but the reality is that

the parts of those agreements governing labor are largely ignored.¹⁰ Workers in export industries are paid minimum wage at best and are hired on temporary contracts. They have virtually no control over their own employment and are forced to work 60 hour weeks during the season and are fired if they take days off (Oxfam 2008). Rather than improving working conditions these FTAs have actually increased job instability for those working in the export sector because they demand cheap production. These jobs often have short term contract or informal contractual relationships which makes it nearly impossible for workers to access pension or health services. The high turnover rate within the industry helps to drive wages down because there is a constant influx of migrants from other parts of Chile who are willing to work for very low wages in the hopes of advancement.

There is a division of labor within the industry that places women at a disadvantage because they are usually assigned the lower paying more temporary jobs whereas men receive better employment. Women in the export sector make up between 50% and 80% of workers and face low wages due to cultural factors in addition the low wages simply being an attribute of export industries (Bee and Vogel 1997). The primary occupation of many women who work as temporary labor in processing plants is seen as being housewives. Their income is not viewed as vital to the family but rather as “extra money” to help with school fees and similar expenses. This identity as housewives also makes it more difficult for women to engage in political activities through their workplaces because their main loyalty supposed to be home and family. It is difficult for rural women to become politically active unless it is directly regarding domestic issues. These women are referred to as “temporeras” which distinguishes them from other workers. This designation places them in a disadvantaged position when it comes to attempts to

¹⁰ This is a common feature of FTAs between countries at different stages of development, worker rights stipulations are built into the agreement in order to get it signed in the more developed country and then routinely ignored and are nearly impossible to enforce.

bargain for higher wages because they are not viewed as an important part of the production process. Additionally, these cultural assumptions give employers an excuse to pay women less because they are not seen to “need” the money. There is also competition between rural women who live near the processing plants and other poor women who temporarily migrate from urban areas to work in the plants during the season. Managers are able to pit these classes of women against each other in order to keep wages down and unions from gaining strength. It is in processing plants that workers face the worst conditions. In order to keep the fish fresh the plants are kept at very low temperatures and are wet. Workers work standing up in a semi-automated processing line that forces them to work very quickly and doesn't allow them to take breaks. The lay out of the plants is also organized to allow managers to constantly monitor all workers and punish them for any mistakes.

Despite these problems, there have been real improvements made since the return to democracy for workers within the fishing industry. Between 1988 and 1992 real wages in processing plants increased by 55% and also saw an improvement in working conditions. The political climate had changed enough that employers were less willing to flagrantly violate labor laws and intimidation of workers decreased dramatically. Workers also saw their bargaining power increase both from improvements in the labor law as well as a tightening of the labor market. Workers were able to demand better conditions because there were fewer of them, a condition that was true throughout the country which limited the possibilities for migration to bring down wages in the southern fisheries. Workers saw more protections against firings and improvements in the ability to organize but the balance of power shifted only slightly. In 1991 only 14 of well over 400 processing plants had unions and those unions were unable to collectively bargain because they represented large amounts of temporary workers. Wages at

plants with unions were on average 12% higher than in non-union plants. (Schurman 2001)

Unions were not able to regain the power they had had in the 1960s and early 1970s. Most of the workforce is younger and have no experience with unions and are unwilling to get involved. The other side is that many saw the willingness of union leaders to subordinated their goals to politicians in the bargaining of the concertación government as a reason not to join.

Conclusion

The modern costal fishing industry in Chile is marked by the legacy of the Pinochet regime. The idea of open access as the basis of fisheries is still healthy but increasingly strict regulations have been applied to the industry as a way to keep it economically and environmentally sustainable. The two most important regulatory laws were the Fishing code of 1991 and the transitory code of 2001. Both of these laws were responsible for the extension of ITQs as a method of regulating Chilean fisheries. ITQs have become more acceptable in the Chilean political climate over the years. One reason is because there has been growing disillusionment with the laissez-faire policies of Pinochet and the impact that deregulation had on the economy and also because ITQs are seen as the best possible regulation for business interests in the face of endangered fish stocks. ITQs are a market solution and would cost fishers already operating far less than either a non transferable system or a system where prohibitive taxes were used to keep catch levels down. ITQs hold some promise but there is also evidence of cheating within some of the Chilean fisheries that have ITQs (Chavez et. al 2008).

There has also been a shift in the type of production within the fisheries away from low quality fish stocks that are processed into fish meal and fish oil to high unit value stocks that are processed into fresh, frozen or canned products for human consumption. These new fish stocks provide possibilities for further expansion of the Chilean market but they also present new

regulatory challenges to SUBPESCA and SERNAPESCA. The tradition of beginning regulations when fisheries are in or near collapse no longer seems viable with the deep ocean species because of how long it takes stocks to regenerate and how destructive the fishing methods are to the environment.

The attempt of regulatory agencies to change the relationship between industrial and artisan fishers has only been possible due to the return to democracy and changing political climate of the country. Although rights of artisan fishers are being institutionalized for the first time, the revenue from fishing and the safety of fishers has dramatically decreased. The return of unions and agricultural associations to legality has allowed artisan fisher associations a lot more power in negotiations with regulatory agencies and with industrial fleets. This change is exemplified in the increase in representation that artisan associations have been given in both the regional and national fishing councils. Labor in fish processing plants has also seen gains in working conditions and the right to organize. However, these gains have been small and there are still many problems within the processing industry.

Chapter 4: Salmon Farming

Introduction

In most of the literature the development of the salmon farming industry and the costal fishing industry are treated separately. Authors who focus on the costal fishing industry (Collins and Lear 1995, Pena-Torres 2002, Schurman 2001) focus on how the rapid growth of the Chilean economy was dependent on new export sectors including fish, forestry and fruit production whereas discussions of the salmon farming industry focus on its rapid growth following the dictatorship and the nature of the industry as a “cluster.” (Montero 2004, Maggi Campos 2006). Despite the differences in their timelines, the industries have developed due to similarities in some key factors. Both industries originally grew due to research into the viability of production done by the government as well as the inability of governmental regulations to keep up with the growth in production. The industries both take advantage of the natural resources of Chile as well as the low cost of labor that resulted from the dictatorship’s destruction of labor unions and agricultural associations. In addition, they are both export industries that produce very little for the domestic market. The industries are further linked by the common technology in processing and the fact that one of the main uses for the fish meal that is produced in the costal fisheries is salmon farming. Despite these similarities there are substantial differences in how the industries developed and the controversies associated with them. The Chilean salmon industry has become the country’s third most important export. In 2006 Chile exported some US\$2.2 billion worth of salmon a number that is expected to rise (Witte 2009). Salmon currently account for 50% of Chilean fish exports (Salmon Chile 2004)

Development: Why Chile and why Chiloe in particular?

The salmon farming industry in Chile is in some ways drastically different from the costal fisheries. Salmon farming is not directly dependent on natural stocks of fish. Rather salmon are introduced to an area where they are a non-native species but has the appropriate ecological characteristics for their growth. The greatest environmental threat to the costal fisheries, overfishing and subsequent fishery collapse, does not exist for salmon faming because the goal is to remove all salmon from the enclosures that they are introduced to. The salmon stock is directly managed in much the same way the cattle ranchers manage the size of their herds with certain fish left alive to spawn for the next year's harvest. Salmon farming does not require a fleet and is conducted in fresh water when the salmon are young (smolts) and they are then moved to salt water on the coast by truck where they are kept in pens and then harvested. Salmon are also processed in a different way. Salmon are kept either fresh or frozen with most fresh fish destined for the US market and most frozen fish destined for the Japanese market.

The convergence of these two industries, costal fishing and aquaculture, is more than just the fact that their final product is fish. They are both the result of Chile's economic development strategies: the opening of the Chilean market and state sponsored development. Like the costal fishing industry salmon farming is dependent on low labor costs for seasonal labor in the processing plants, many of which are located in the poor communities of Chiloe, unrestricted access to the Chilean market by foreign capital and a lack of environmental restrictions that allow for open access to marine natural resources. Additionally, locating salmon faming in Chile makes sense because one of the key inputs into salmon farming is the feed which is made of fish meal and fish oil products that are produced by the Chilean costal fishing industry.

The largest difference in the development of the salmon farming industry from the costal industry is the timeline. While costal fishing had always existed in some form in Chile and expanded under the positive economic conditions of the Pinochet administration beginning in 1974, salmon farming came much later to the game. Salmon farming did not become important in Chile until 1997 well after Pinochet had left office and the country had returned to democracy. However, it was the legacy of the Pinochet economic policy and the opening of the economy that had allowed the initial research and investment into salmon farming which would nurture the industry to prominence. From 1981 to 2000 farmed salmon increased by a factor of 70.

The Chilean salmon farming industry has a distinct advantage over its northern hemisphere counterparts. In the northern hemisphere the zone in which salmon farming takes place is between 40 and 70 degrees latitude in Europe and 40 and 60 degrees latitude in North America (Montero 2004). Due to being in the southern hemisphere Chile is able to produce on the opposite schedule of Northern producers and take advantage of higher prices when their supplies are low. Because of the Humbolt current, Chilean waters are on average colder than those in the northern hemisphere for a given distance from the equator. This allows for the salmon farms in Chile to benefit from more hours of daylight longer in the year than the northern farms.

Much like the costal fishing industry, the rapid development of salmon farming was the result of the opening of the economy under the Pinochet government. It was in the very early years of the regime that the possibility of aquiculture in the tenth region began to be studied. In 1974 the first attempt at salmon farming was made and reflected the foreign orientation of the Chilean economy. The test cultivation was funded by Union Carbide, an American company, through their subsidiary Domesa Farms Chile (Montero 2004). This was the same company that

first introduced salmon farming to the US. The initial type of aquaculture that was tested is known as open ocean ranching in which salmon are kept in pens within the ocean itself as compared to pool aquaculture in which salmon are kept in tanks away from the ocean. The second and more successful investigation into salmon farming in Chile was also sponsored by North American capital, this time through the multi-national ITT and capital from the fish meal industry. ITT was one of the companies that had worked with the CIA to destabilize the Chilean economy during the Allende years (Klein 2007). The coastal industry was developing at such a rate that there was an advantage to create more of a market for fish meal through aquaculture. This attempt relied on Norwegian technology. At the time, the Norwegians were the leaders in aquaculture and their technology would become the mainstay of Chilean aquaculture as well. The lakes in Chiloe and other parts of the Tenth Region have the ideal water chemistry for the production of salmon. These lakes maintain stable temperatures, have the correct pH level, and have an appropriate balance of dissolved gasses and minerals which help to determine the well being of the salmon. In addition, because Chiloe is an island, the distance from the fresh water aquaculture and salt water aquaculture centers is very small which cuts down on production costs. There are also many sheltered inlets along the coast ideal for salmon pens.

Initially, salmon farming grew too fast for market demand and drove down prices. The farms shipped whole salmon to the US which was something that gourmet restaurants dealt with on a regular basis, but was difficult for supermarkets and midrange restaurants who had neither the staff nor time to de-scale and fillet the fish. The solution was the pin-bone-out fillet. This was a basic processing procedure in which salmon was filleted quickly with the skin left on and only the large bone at the center rapidly removed. This made salmon importation far more viable for supermarkets as well as small restaurants without the resources to process their own fish.

Current Structure

Industrial Characteristics

Salmon farming has developed along a parallel path to factory farming of livestock. Livestock are fed mostly corn and soy neither of which is a natural part of their diet. Similarly farmed salmon are fed pellets of fish meal and oil rather than the krill and other small crustaceans that they feed on in the wild. Feeding salmon fish meal actually leads their flesh to be gray and unattractive to consumers so farmers do feed red so that the salmon will have the pink color expected by consumers. One of the results of this process is that consumers think that there is something wrong with wild salmon because it is not as pink as farmed salmon and will select farmed salmon from a store counter based off of its appearance. Salmon farms resemble land factory farming in other ways as well. Salmon farms are densely packed and the salmon have a very small area to move around in. Due to the potential of close quarters to spread infection and other diseases, salmon are fed high concentrations of antibiotics preventatively to keep them healthy. There is also use of anti-fungal agents that many scientists believe are unsafe for use in the production of food.

The majority of aquaculture centers for the production of salmon and trout as well as processing facilities are located in Region X in the south of Chile. The vast majority of these centers are located on the small island of Chiloe. The region is ideal for salmon farming due to the geographic qualities of the area including the high level of oxygen and the ideal temperature in the lakes and canals. The salmon farms are not evenly distributed through the region or through the island of Chiloe. Rather, they are grouped together in physical clusters in order to take advantage of lower costs of infrastructure. Although most of the actual farms and processing

plants are located on the island of Chiloe, the administration is done in the capital of the region, Puerto Montt, which is also the largest population center in the region.

The salmon farming industry has tended towards concentration both geographically and economically. In 1992 when salmon farming was just beginning to take off there were 63 companies in the tenth and twelfth regions. The remnants of deregulation of the Pinochet government made it fairly easy for those with capital to start up salmon farms because environmental regulations and other protections were practically nonexistent. The concentration happened rapidly as large companies were able to buy up smaller ones or force them out of business by producing at a lower price. By 2000 there were only 28 salmon farming companies and 5 controlled 25% of production (Phyne and Mansilla 2003). This was in direct contrast to the Norwegian model which is geographically dispersed.

One of the main differences between the costal fishing industry and the salmon farming industry, other than the different mechanics of fish harvesting, is the relationship that the industry has with its trading partners. A significant amount of Chile's success as an exporting nation has not only been the result of a diversification in exports but also a diversification in trading partners. Costal fishing is subject to this diversification of trading partners because fish meal and fish oil produced in any country and from most fish stocks is almost exactly the same (the exception is fish oil for human consumption). Since 80% of salmon produced in Chile is destined for either the Japanese or US markets those two countries have a lot of control over salmon production in Chile. Salmon is a luxury good in many ways and because of that there are fewer consumers and those consumers are willing to pay high prices only for the quality that they desire. Before the 1990s salmon was a rarity in the diet of the US consumer and could cost over \$20 per pound.

One of the benefits of salmon farming as an export industry is that the lower Chilean production costs make it highly competitive on the international market, it is even projected that Chilean salmon production will surpass Norway's by 2010. However, the complete export orientation makes the industry dependent on the companies that it exports to because there is almost no national market. Salmon farming in Chile is often referred to as a "consumer driven industry" (Phyne and Mansilla 2003). A Consumer driven industry is one in which quality and production standards are set by the consumers rather than the producers. Most of the fresh salmon that is exported from Chile is destined for the US market and the US companies that import the salmon have direct control over the quality and production standards within Chile. Many of the large supermarket chains that buy the salmon send representatives to inspect the production measures within Chile. The larger Chilean companies and export groups all have offices in Miami where they can better communicate with buyers. The Japanese buyers do the same thing for the production of frozen salmon. Japan has traditionally been both a large purchaser of fish products from Chile as well as an investor and owner of factory trawlers in the coastal fishing industry.

The largest single purchaser of Chilean farmed salmon is Wal-Mart which purchases about 12% of the annual harvest in Chile (Fishman 2006). Wal-Mart has a reputation for brutal control of their suppliers: so strong that they are able to dictate exactly how suppliers must load their trucks for delivery to Wal-Mart stores. The same is true for the Chilean companies that they purchase salmon from. Wal-Mart is able to extract extremely low prices from producers, low enough that they could sell salmon for \$4.84/lb which is at least \$2 less than other sellers in the US. Wal-Mart and similar suppliers are unconcerned about the status of workers in the salmon farming industry or the environmental costs of the product. What they do care about is the safety

of the product for the US consumer. Processing plants are routinely inspected and have high levels of safety standards for the fish, if not for the workers in the plants. The ties between the US consumer and Chilean salmon farmer are so strong that salmon routinely go from swimming in the Pacific ocean to fish counter in the US in under 48 hours (Fishman 2006).

Labor in the Salmon Industry

Puerto Montt and Chiloe became the center of aquaculture in part because they were already the center of coastal fishing for the region. There already existed a workforce that was familiar with fishing and fish processing. By the end of the dictatorship the region only had one other strong industry, tourism, and with the destruction of labor unions and rural associations there was very little prospect for stable employment outside seasonal agricultural wage labor, fishing, and seasonal tourism. The result was a labor force willing to work for low wages. This was the case in the primarily agricultural island of Chiloe which before the introduction of salmon farming had difficulty getting basic supplies from the mainland. Chiloe was almost a forgotten corner of Chile before the introduction of salmon farming. Most of the residents worked in traditional fishing, mollusk harvesting, traditional agriculture and summer tourism. Job security and wages were low. The region now contains 85% of national salmon production and 98% if the directly neighboring region is included (Maggi Campos 2006). The salmon industry started to take off right after wild fisheries went into crisis so there was an excess of workers with experience in fish processing. There was also substantial migration from other parts of Chile to work in the salmon industry fueled by a few success stories. Between 1992 and 2002 population growth in “salmon districts” has averaged 11% (Salmón Chile 2004).

In many ways salmon farming has had a positive impact on employment in the Tenth Region which has traditionally struggled with poverty. The workforce in the salmon farming

industry for the cluster located in Chiloe is estimated at 24,800 direct employees and at least 12,000 additional indirect employees who work in either support industries or transportation (Maggi Campos 2006). Some estimates for total employees in salmon farming in Chile are as high as 230,000 direct and indirect employees (Phyne and Mansilla 2003). These figures do not include the many people who work in grocery stores, restaurants, or other service fields who are dependent on the patronage of people employed in aquaculture. The level of poverty in the region decreased 16 percentage points from 40.1% in 1990 to 24.1% in 2000. In addition there has been an improvement in the quality of education in the region with many new universities and secondary schools opening in Puerto Montt with career paths focused on the salmon industry. This development of local leadership is in direct contradiction to the original managers of the industry who were young professionals imported from Santiago.

Despite the gains made by many Chilotes from the salmon farming industry it is still plagued with problems. Workers in the Chilean industry make as little as an eighth of workers in the same positions in Norway. The average wage is US\$400 a month and that is only during periods of employment (Estrada 2008). This wage puts workers close to the poverty line. Workers in Norwegian salmon farms make US\$22 per hour or about US\$3700 per month in comparison, almost ten times more than Chileans. Many companies in Chile pay a base wage that is below the minimum wage and make up the difference with performance based bonuses (Witte 2009). These bonuses have been endangered by the lower production of salmon due to the lice and anemia epidemics in the salmon populations. The motivation of this type of pay is that workers will put in more effort but the reality is that managers are able to force workers to absorb the uncertainty of the fish market. Additionally, performance based pay avoids certain requirements in the labor code. By only raising wages through performance there is no salary

indexation so companies are not required to pay into pension, unemployment and health plans at the actual level of wages but at the lower base wage level. Chile became a salmon farming center not only because it had the necessary natural resources but also because it had the necessary human resources for the industry. It is important to recognize that the salmon farming industry has brought both good and bad to the tenth region of Chile. It has been responsible for rapid job growth in the area but the quality of many of those jobs are suspect. Of the direct jobs in salmon farming 33% work in fattening farms and 15% in hatcheries (Salmón Chile 2004). The majority of these jobs are relatively unskilled and low paid. Working conditions are bad. Workers are subject to the same deplorable conditions as in other sectors of the seafood processing industry. Labor costs are kept so low that they represent only 10-15% of total cost.

The salmon farming industry has also had a profound impact on the culture of Chile. The island was a bastion for traditional farming and fishing through most of its history. It has an international reputation for its natural features including its coastline, forests, and penguin sanctuary as well as *platafios*¹¹ houses and old wooden churches. The traditional Chilote way of life is one of the few in Chile that was always dependent on and shaped by marine natural resources. The 1997 movie *Historias de Fútbol* by Chilean director Andrés Wood won a number of film festival awards for its portrayal of three different aspects of Chilean culture and their relationship to soccer. One of the vignettes deals with the culture clash between a pair of older traditional Chilote sisters and a young man from Santiago who is visiting his brother who works on a salmon farm. The movie is just one of the ways in which the impact of salmon farming on Chilote culture has been discussed in the Chilean media. Salmon farming has permanently

¹¹ Platafios houses are a traditional style of chilote architecture where houses built on the banks of rivers and canals are built on pilons to avoid flooding. They tend to be colorfully painted and an important tourist attraction.

changed the way of life for many Chilotes but it has also brought Chilote culture to many Chileans who were unaware of the way of life on the island which has increased tourism.

Despite the return of the right to unionize and engage in collective bargaining the selection of a rural location where much of the workforce was subject to Pinochet's repression of unions and agricultural associations has created a situation in which many workers are afraid to try to improve their own conditions. Following the reforms of the labor code and the return to democracy, temporary workers have gained the right to join unions but they do not have the right to engage in collective bargaining. Most of the workers in the salmon farming industry are contracted on a temporary basis as a strategy to keep them out of unions. The salmon farming industry is almost entirely export based so it depends heavily on the processing industry in order to be able to ship the salmon abroad. Over 50% of workers in the industry are in the processing plants. These plants consist of mostly seasonal labor for the salmon harvest and function in much the same way as the processing plants for the coastal fishing and fruit processing industries. The same concentration of land into the hands of large companies for factory farming that had forced rural workers to find work in the fish and fruit industries is also responsible for the large numbers of low wage workers willing to work in the salmon farming industry. A contentious attitude between workers and management exists in many of these plants because the management tends to be imported from Santiago and the low wage workers within the plants are hired from within Chiloe. Chilotes have a culture and history that is independent in many ways of the larger arc of Chilean history. For many, the managers of the Salmoneras (as the salmon farms are known) are seen as an intrusion to the unique culture of Chiloe.

The situation is amplified by the bad working conditions in the plants. One of the main concerns for safety of workers in the salmon farming industry is their exposure to high levels of

antibiotics and antibiotic resistant microbes. Salmon farming has the highest level of antibiotics use of any form of livestock. There is a high risk for workers who are exposed to these microbes on a regular basis to contract diseases and then transmit them to other people. Antibiotic resistance in some bacteria can also lead to antibiotic resistance in unrelated bacteria which can increase the possibility of animal to human disease transmission. (Union of Concerned Scientists 2003). Additionally, the salmon industry is one of the most dangerous in Chile. The accident rate is only slightly lower than that in construction which is the most dangerous industry in Chile. In 2005 and 2006, 17 people died on the job. The high rate of accidents, given the type of work, is not a surprise. Plants are kept cold and wet to preserve the fish and workers move very quickly with sharp instruments; mistakes are easy to make. The indirect jobs are little better than direct employment in the industry and are in the supply business much of which is the production of feed, equipment and transportation which suffers from many of the same problems of processing plants.

There is a concentration of women in low wage positions within the salmon processing industry. This is a common attribute of low wage food processing industries including the processing of coastal fish and fruit. Women are seen as easier to control by the management that hires them. There are a number of documented cases of managers ignoring worker rights. One of which, presented in a recent documentary, is “a woman who worked on a salmon farm for 11 years, and was fired for refusing to work at night for certified medical reasons. The woman's severance pay was the derisory sum of 6,000 pesos - about 12 dollars.” (Estrada 2008). In Chiloe, US\$12 will buy one or two nights at a boarding house. The concentration of women makes it difficult to advocate for better working conditions because families often view the employment of women as supplemental rather than as a career to be followed so women are

unlikely to go out on a limb in order to work with union organizers because the costs of losing employment are seen as higher than the benefits of an improved workplace or higher wages especially given the recent history of anti-union sentiment.

Impact on the Environment

One of the initial advantages the salmon farming industry enjoyed was as a source of export diversification. Compared to traditional fishing it was viewed as inherently more sustainable because it did not deplete the marine natural resources of fisheries. It was seen as a way to maintain the biodiversity of coastal fisheries and allow those in danger to recover by shifting exports to salmon which was more renewable. Also, salmon has a much higher unit value than fish meal or fish oil. However, the ideal of creating a renewable resource has resulted in many of its own environmental problems due to the complete lack of governmental regulation. The parallel with coastal fishing is clear, the lack of regulations in the coastal fisheries resulted in their collapse because the government was more concerned with immediately increasing exports rather than creating sustainable growth.

One of the principle impacts on the environment is from the way that fish are fed. The diet of a farmed salmon consists mostly of fish oil and fish meal although soy and other vegetable feed is sometimes used. Farmed salmon are often overfed in order to generate larger fish and a more valuable product for the market. This overfeeding results in excess waste produced from the salmon and emissions of phosphorus, nitrogen, and other organic materials that change the composition of the sediment in the lakes in which salmon are kept. The overfeeding likewise increases the quantity of feces from the salmon. This can cause the water to become polluted and unsuitable for both native species and the imported salmon. When lakes become polluted, salmon are then moved to new pens in other lakes in order to preserve the value

of the aquaculture. The emissions from the salmon furthermore serve to deoxygenate the water which leads it to be unsuitable for salmon production. The Public Problems Registry of Chile (Registro de Problemas Publicos, RPP) has reported that this excess feeding has a disastrous impact on the environment. This problem of pollution is further exasperated by the lack of regulation in how salmon waste can be disposed of. The same report of the RPP states that only 12% of the aquaculture centers in the country have their own waste water treatment centers (Agueros). Without treatment the negative impacts of pollution on the salmon and other species happens much faster than it would with treatment.

There are other characteristics of salmon farming that make it dangerous to the environment and also make it an economically unsustainable practice in its current form. Because salmon, both Pacific and Atlantic, cultivated in Chile are non-native species, there is a large risk is that the salmon will escape from their pens into the wild fish population. The main threat from the invasive species comes from the potential for transmission of illnesses to native fish stocks. The RPP estimates that approximately four million salmon have escaped from their enclosures in cultivation centers and now inhabit the ocean in southern Chile. These escaped salmon directly compete with other fish species for habitat and resources. The most dangerous threat is that the salmon will also transmit illnesses to the native fish in much the same way that the global cattle trade led to the transmission of BSE. The current crisis over lice and infectious salmon anemia in Chilean salmon and the possibility of infecting other salmon is not a new worry but one that has plagued the industry from its inception. Many of the salmon would not even display the symptoms of illnesses that they do have because antibiotics and other medications are over used on the salmon population.

Regulatory framework

According to the industry lobbying group, Salmón Chile, salmon farming is the industry that has the most environmental regulations in all of Chile. The reality of the situation is that salmon farming developed very quickly in Chile and government regulations were not able to keep up with the rapid expansion of the industry. From 1981 to 2000 the Chilean salmon industry grew by 900% making substantial regulation nearly impossible. The initial push for aquaculture by the Chilean government quickly gave way to a system in which the industry was forced to self regulate. In 1986 the first industry lobby group was founded as The Chilean Association of Salmon and Trout Producers which has become the Chilean Salmon Industry Association or simply Salmón Chile. This group represents 70% of the salmon production in Chile and is a powerful lobbying block. In 1990 Salmoexport was formed by 13 of the national salmon companies in Chile as a way to promote Chilean salmon abroad. This was an important move for the salmon industry because over 95% of production is destined for the external market. The salmon industry has engaged in voluntary initiatives and restrictions. However, the problem has been that the industry only adopts the measures that are beneficial to them, not ones that would mitigate the impact that salmon farming has on other industries that use the same physical space such as traditional fishing and tourism.

One of the most important voluntary regulations within the salmon farming industry is the 2005 Collective Agreement on Clean production (Acuerdo de producción limpia APL). This was an agreement that 371 cultivation centers, processing plants, entered into with Salmón Chile, CONAMA (the government regulatory agency) and CORFO. The goal of the APL was to increase environmental standards for the salmon farming industry. There were 46 actions laid out in the document including a \$US 20 million investment in new infrastructure, equipment, and

human capital, a decrease of 14% in the amount of inorganic waste in lakes and the clean up of over 500 beaches that had been polluted by salmon farming. There was also a plan included for the recycle and reuse of residue from cultivation. The agreement was successfully implemented in 93% of processing plants and 75% of cultivation centers within the first two years.

The attitude of voluntary regulation and the high level of compliance within the industry to these agreements could be the result of companies seeing the writing on the wall. The new fisheries law passed in 2001 marked a radical change in the way that coastal fisheries were regulated and replaced the 1991 General Law for Fisheries and Aquaculture that had previously governed the aquaculture industry as well as the coastal industry. As the tide of public opinion began to turn against the complete deregulation of the economy it was only a matter of time before the salmon industry became subject to stricter regulations than the industry would find acceptable. Members of the industry group Salmón Chile saw an opportunity to improve the public image of salmon farming and prevent unfriendly regulations. The industry was often displayed in the media as an environmental disaster interfering with the summer vacations of Santiago residents.

Conclusion

The salmon farming industry developed due to the legacy of the Pinochet years despite the fact that it did not become an important export until 1997. Like the coastal fishing industry, it relied on the export orientation of the Chilean market. Both industries were made possible by positive government initiatives that engaged in research into the viability of the industry and gave positive tax and regulatory incentives to investment. Foreign interests are particularly important to the salmon industry. It is an industry that has been imported from abroad both in species and technology. The fish stocks were imported by American interests and the technology

from Norway. The industry maintains this external orientation because controls for the quality of production and salmon price is entirely in the hands of the foreign consumers who purchase the fish stocks.

The industry presents many of the same structural regulatory challenges as the costal fishing industry. The industry has grown far faster than the ability of the government to regulate it which has led to unforeseen negative environmental consequences. These environmental concerns are different than those in the costal industry, but the relationship of their regulations to the industries are the same. Additionally many of the same concerns over labor standards exist because the industries rely on low wage seasonal labor in processing.

Chapter 5: Outlook for the future

Introduction

Despite the long tradition of open access, exploitation of labor and environmental degradation within the fishing and aquaculture industries, there is capacity for change. Efforts within Chile and the international community to transform the fishing and aquaculture industry into something sustainable have already begun, but there are far more reforms necessary. Coastal fishing and aquaculture have unique environmental impacts and economic sustainability problems and reformists have treated them separately. Coastal fishing suffers from being an extractive industry that relies on high rates of catch and fishing technologies that are destructive to the environment and by catch species. Aquaculture does not rely as directly on coastal fish stocks and its problems result from its intensive nature and the introduction of foreign species and substances to the environment. Both industries suffer from health and safety concerns over the product but they have been far more documented in the salmon farming industry and more alternatives have been suggested.

Both industries suffer from many of the same labor issues. One of the reasons that salmon farming was established in the tenth region is because there was already a competent labor force for fish processing in the area. Many of the conditions at the processing plants are the same for both industries and they are confronted with the same change in the political viability of unions under the return to democracy. The changes that need to be made to improve the status of workers in both industries are the same. The difference in strategy relates to how well these industries are monitored and what the potential for change is. While the salmon farming industry had gotten a lot of international press and important NGOs like Oxfam have taken an interest in the working conditions and human rights within the industry, the coastal fishing industry has been

largely ignored. Salmon farming industry workers have found powerful allies abroad and a political opening through the anti-sweatshop and anti-Wal Mart movements that is unavailable for workers in other types of fish processing.

Costal Fishing

Bottom Trawling

Factory trawlers and their method of bottom trawling are one of the greatest threats to the environmental sustainability of the Chilean fishing industry. A complete ban on bottom trawling would be the most effective way to regenerate fish stocks destroyed by factory trawlers operating on the continental shelf and might be the only way to reverse the high level of damage that has already been done in Chile. A complete ban has the advantage of protecting ecosystems that have unknown benefits, or that may support species that are not currently harvested but could become useful in the future. Orange roughy, for example, has only recently become a commercial fish. A ban would be more equitable to fishers than restrictions and regulations. Current regulations establish a double standard where large corporate fishers are privileged over smaller ones because they have the lobbying power to shape regulations (Evans 2007). This is a trend that would only increase with new regulations. Large corporations would be able to afford the necessary environmental impact surveys that have been proposed in order to trawl which would push smaller fishers out of the industry due to the increase in fixed costs either from the studies or from shifting to different fishing equipment. A ban would affect all fishers in the same way.

Attempts to ban bottom trawling in the past have failed due to pressure from the fishing industry. However, there are policies that the Chilean Government can enact in combination with a ban on bottom trawling in order to decrease the opposition of fishers. The Chilean Government could limit opposition by introducing incentives to fishers to help transition away from bottom

trawling equipment to other forms of harvesting. Tax credits for the purchase of environmentally friendly fishing equipment and a gradual phase out of bottom trawling instead of an immediate prohibition are more appealing to fishers than a sudden change. The extension of ITQs would also make a ban on bottom trawling more acceptable to fishers because the main reason that bottom trawling became popular was to fish as quickly as possible before other fishers could get to the stock. With ITQs there is no commons to exploit and the incentive to bottom trawl rather than fish by conventional means is lower, because each fisher has individual property rights to a portion of the catch. ITQs might even affect trawlers negatively because permits could be established in such a way that by-catch would be included in quotas. Indiscriminate fishing would lead to catch with lower value than selective fishing. There is also evidence that a ban on bottom trawling would have a negligible, or even positive, impact on employment and government revenue. Most of the large factory trawlers that operate in Chilean waters are not Chilean vessels. The fleets have been expert in shirking Chilean taxes and maintaining autonomy on board. Factory trawlers do not support the local fish processing industry which is where the vast majority of jobs related to fishing are. Additionally banning trawling would increase employment for fishers because there would be more fish to be harvested by small fishers.

Even with policies that make a ban more acceptable to fishers, it is still possible that opposition would require a compromise solution. Chile recently signed an agreement with 19 other nations to limit bottom trawling in international waters. The agreement covers about 25% of the high seas and relies on individual countries to enforce restrictions on their fishing fleets (Schmid 2007). The agreement aims to make bottom-trawling so expensive that it is virtually banned. Companies can not fish in a fragile ecosystem until they have undergone an impact assessment and then on each voyage an independent observer must be present (WWF 2007). The

costs of the observer and research are high enough to discourage bottom trawling completely. Yet the agreement does not go far enough. As a compromise, the restrictions on bottom trawling from the agreement of the South Pacific Regional Fisheries Management Organization should be extended to the Chilean Exclusive Economic Zone which extends 200 miles out from Chile's 4000 mile coastline. When the agreement became enforced on September 30 of 2007, there was not a matching change to EEZ regulations. This created an incentive for all companies currently bottom trawling outside the EEZ to shift their operations into the EEZ. The most destructive bottom trawling is located closest to the shoreline because that is where prone ecosystems like coral reefs are located. Because of the different laws inside and outside of the EEZ for Chilean licensed boats which include foreign owned factory trawlers with Chilean captains, the agreement faces a vacuum of enforcement. The Chilean coast guard is forced to monitor boats as they trawl and make sure they are doing so in the correct area instead of just banning boats with bottom trawling equipment from leaving the harbor which would be easier and less expensive to enforce.

There have recently been failed efforts to lobby the Chilean government to restrict bottom trawling within Chilean waters. This effort comes in response to the double standard of banning bottom trawling in international but not domestic waters. The Chilean Chamber of Deputies rejected a ban on trawling in January 2009 that was supported by environmentalists and artisan fishers who say that the coastal ecosystems they depend on are being destroyed by factory trawlers. Much of the debate over the bill has been centered around the relative environmental and economic impacts of trawling. Industry spokespeople claim that the areas in which factory trawling occurs are not at risk ecosystems and that banning trawling would eliminate 5800 jobs in harvesting and processing. Supporters of the bill believe that banning trawling is necessary for

the survival and long term economic viability of Chilean fisheries and the protection of complex ecosystems. They believe that banning trawling would permit fish stocks to regenerate faster and allow for higher catch levels in the long term. They also argue that a ban would protect the income of small fishers. Despite the failure of the bill in the chamber of deputies, the Fishing Committee is taking steps to investigate the impact of factory trawlers on Chilean ecosystems. The strategy of activists has become an attempt to ban trawling in certain areas by focusing on the most at risk ecosystems first. It seems unlikely that the environmental impact assessments commissioned by the government can be done in such a way that they would take into account all the long term impacts of bottom trawling on the regeneration of fish stocks and it seems more likely that significant degradation would have to occur before regulations would be implemented. This attitude of crisis management regulation is consistent with the greater history of fishery regulation in Chile.

PCB Contamination in Farmed Fish and Fish Meal

Chilean aquaculture has been plagued by health and safety concerns over their exports in recent years. This has caused problems for marketing the Chilean product abroad. One of the concerns leveled at fish industries is the level of PCBs and DLCs found in farmed fish. These chemical compounds are harmful and potentially cancer causing to humans and have been banned by the EPA since 1976. Fish normally absorb PCBs and DLCs from the environment but in the case of Chilean farmed salmon they do not come from the natural environment of the fish but are transmitted through the fish meal and fish oil that they are fed. For Chile, this is potentially damaging to the sustainability of the industry because health concerns would keep their products out of the US and Japanese grocery store chains that the industry depends on. The

trend may already be starting: the National Academy of Sciences has advocated that people change their eating patterns to avoid these substances because even low levels of environmental toxins can lead to high levels of toxicity within the fatty tissue of farmed fish because of the large amounts of fish meal and fish oil they are fed.

There is potential for Chile to capitalize on the farmed fish health scare and turn it into gains for both the Chilean salmon farming and fish meal industries. The same report that revealed the PCB contamination in farmed fish and fish meal also tested supplies of fish meal from different countries and found that the highest concentrations of the toxins were in fish meal produced from catch in the Gulf of Mexico or the Atlantic Ocean. The Chilean sample did not make the Academy's list of the top polluted stocks most likely because their fish are from the southern Pacific Ocean which has much lower levels of contamination than the Atlantic. Chile could exploit this natural advantage in a couple of different ways. First, SUBPESCA or Salmón Chile could conduct studies to verify that the Chilean fish meal stocks have low levels of pollution and then institute a marketing campaign to promote their product abroad based on those results. Additionally SUBPESCA, CONAMA and Salmón Chile, could create either regulations or positive tax incentives for Chilean aquaculture to use exclusively Chilean fish meal. The presence of multinationals within the Chilean salmon farming and supply industry makes it difficult for local producers of fish meal to have direct access to the companies. Most feed for salmon farms around the world is produced by a few companies from fish meal shipped from numerous countries. For example, the US imported 51 million kilograms of fish meal and exported 108 million kilograms in 2001. The imported supplies came from 16 countries and the exports went to 40. The mixing of fish meals in the production of salmon feed undermines the advantage that Chile gains from their relatively unpolluted waters. The benefits to the salmon

farming industry would be immense with an appropriate marketing strategy. The industry would also benefit from the positive publicity over health because it would counteract a lot of the negative publicity it has been recently.

Labor and Employment

The high paying, stable jobs in the manufacturing sector that supported the growth of the Chilean economy during the ISI period and consolidated the middle class are a thing of the past. It would be virtually impossible to return to this developmentalist strategy with the free trade agreements that Chile has entered into, the overall changes in global economic climate and the prominent place that neo-liberal economic theory holds in academia. Labor has paid the price of much of the export led development but as the memories of union repression under Pinochet fade, and a younger generation of both workers and managers enter the industry, there have been efforts both nationally and internationally to improve the status and conditions of workers within the fishing industry.

One of the benefits of the fishing industry and other non traditional export industries is that they created highly specialized and well paid management positions. There has also been a dramatic increase in the level of university education in the region to prepare students for these and other management careers. The dark side of this rapid expansion of universities is that there was no accreditation process during the Pinochet years and many of the private universities founded currently have no accreditation and the students who have graduated from them face an uncertain future. Families spend large amounts of money on private institutions and degrees that may end up meaning nothing. In addition, there are very few of the management positions students are being educated for, and the bulk are in Santiago. Students from the regions do not

have access to the social networks that would place them in these careers unless they have the means to move to Santiago to study and look for work. Educational reform has become one of the most contentious issues in Chilean politics and current battles were sparked over the failure of many universities to meet the accreditation standards recently established by the Bachelet government. In 2008 attempts to reform public education were met with massive student strikes in two of the most prominent public universities in Santiago, La Universidad de Chile and La Universidad de Santiago as well as a few public universities in the regions. The battles over quality and affordability of education will greatly influence who has access to management positions in the export sectors and the potential for advancement of other workers in the industry.

For labor, the future looks even more bleak than that of management. Most Chileans who work in the export sector, especially fishing are dependent on many different sources of income in order to support their households. In addition to temporary agricultural work, many also work within the informal sector. The informal sector includes illegally manufacturing cheap goods in terrible conditions and informal sales on street corners of everything from fruit to souvenirs to soft drinks. There does not appear to be much potential for change during the current economic crisis without some kind of drastic initiative because unemployment is increasing and people are unwilling to lose their jobs no matter how low they pay. Additionally, real wages have stagnated within the processing industry. In the period from 1993 to 1995 productivity in fish processing increased by 38% but real wages only increased by 4% and have remained fairly steady at that level. Processors have taken advantage of economies of scale and decreased the total amount of workers in order to become more competitive. This was necessary due to saturation in the global fish market. Firms are trying to cut costs to stay competitive and workers are usually the ones to suffer. There is also not a lot of space for advancement as low skilled workers do not have the

opportunity for additional education and university training. There appears to be no trend of increasing skill within fish processors. Chilean culture also demands high levels of work which limits other avenues for pressuring employers. The official work week is 6 days, 48 hours and the country is rated highest in the world for average hours worked (Berg 2006). Within that type of a climate there is very little potential for workers to make gains.

Women still make up the bulk of low skill employment in the fishing industry and remain an exploited class. Despite this oppressed position, there is potential for these women to gain power from their employment. Before the fish processing industry and other export sectors came to the rural areas of Chile, female labor's importance had been greatly underestimated (Bee and Vogel 1997). In traditional agriculture, both small family farms and large plantations, women's labor was seen as support to the male head of household and their role as market women was not viewed as having the same value as men's more obviously productive labor. Women have found power from having their own money to spend without the consent of their husbands. This creates potential for an increase in education level for children because women traditionally place more importance on the education of children, especially girls, than men. There is also potential for gains due to international pressure. The International Labour Organization (ILO) has taken an interest in the working conditions within the global fishing industry in the past five years. Their focus has been on both costal fishing and aquaculture and began as a reaction to the low level of safety faced by fishers. The ILO has estimated that fishing is one of the world's most dangerous occupations and states that in many countries it has casualty rates equivalent to those of police or fire fighters. The support of international organizations will be an important tool in increasing labor standards in an industry that produces for the global market.

Salmon Farming

Pool Aquaculture

The salmon farming industry was brought to almost a complete halt in 2007 when a lethal virus known as infectious salmon anemia (ISA) was discovered in Chilean salmon farms. This virus has also plagued Norwegian farms and has led authorities there to chemically treat entire rivers to kill organic matter to stop the spread of the virus. In Chile ISA was confirmed in 25 farms, 16 more were suspected to have ISA and a further 81 were quarantined because the cluster nature of the industry meant that they were close enough to the infected farms that they could also be affected by the highly contagious virus. The ISA scare has endangered the salmon industry's export power. Millions of fish have had to be destroyed and the disease assures that the fish that were destroyed could not be used for food.

The current controversy over the Chilean salmon farming industry and its impact on the environment has led to a number of recommendations to improve both the economic and environmental functioning of the industry. The World Wildlife Foundation (WWF) has proposed a new system of aquaculture to replace the current system in the tenth region and elsewhere in Chile. The plan calls for a change from the current practice of lake aquaculture where smolts are raised in porous pens in fresh water lakes and then moved to oceans as they get older to a system of pool aquaculture where lake water is re-routed into isolated pools where smolts are kept. The water is recirculated and filtered to keep it at the appropriate dissolved mineral and gas levels. This would keep lake water from becoming contaminated by the overfeeding of salmon, their waste and the medicines used on them. The water in the pools would be filtered before it is allowed back into the lakes to eliminate pollution. This system has the added benefit of preventing the escape of the smolt because they would no longer be directly raised in the lakes.

All of the environmental problems in the lakes associated with salmon farming could be avoided by successfully implementing this system.

Additionally, there is substantial evidence from aquaculture in Norway that it would not be a particularly expensive transition. The salmon farming practiced in Norway has much more stringent environmental controls which has led many of the producers to voluntarily adopt pool systems because in many cases they are the cheapest way to abide by the regulations. There were also economic factors that made the shift to pool aquaculture viable in Norway. The contamination from smolt production had a negative impact on the chemistry and temperature of the water in the lakes that had made them so attractive to the industry originally. However, there are some problems with making direct comparisons between policies that are effective in Norway and Chile. The first is that Chile does not have as strong of environmental regulations as Norway so there is very little incentive for companies to voluntarily adopt new forms of production in order to be compliant with the regulations that do not exist. This means that the government would have to play an active role in the transition to a pool culture system. Government policy could take a number of forms including tax incentives for or direct investment in pool culture systems, environmental regulations that would make pool cultures more cost effective or restrictions to where salmon farms can be located. Currently there is very little regulation in Chile about the location of salmon farms with the result that firms do not internalize the externalities of their pollution in the same way the Norwegian firms do. Chilean firms do not feel the impact of the change in lake chemistry from salmon farming because they have the opportunity to move to another lake if their current location is no longer ideal.

It is important to note that Chile's advantage in the international salmon market is not entirely due to lax environmental regulation. Most of that advantage comes from the availability

of low cost labor (Maggi Campos 2006). Because of this advantage, Chile has not invested as much in developing better salmon farming technology or creating as skilled a workforce as Norway or Scotland. This lack of capital spent on research means that there are probably large gains to be made from more advanced technology, especially technology that focuses on the long term sustainability of the industry because it is still very young and succeeding due to cheap labor and previously unexploited resources rather than investment in research. In the long term a switch to a more sustainable farming strategy would lower costs of salmon farming because there would be no need to move to new locations and build new infrastructure it would also ensure that the quality of the water remained ideal for the salmon farms. Using data from pool systems that have already been implemented in Chile the WWF predicts that the total cost of investment in the industry to completely change over to a pool system is US\$43 million or 2% of the total value of exports.

The change has an additional economic advantage because it would protect the other resources of the lakes in the tenth region and surrounding areas. This includes maintaining the value of fish stocks for artisan and sport fishers as well as preserving the aesthetic value that is necessary for tourism. The prevention of escaped salmon would protect the stocks of wild fish that many communities in Chiloe still depend upon for food and income. Escaped salmon compete for food with local fish stocks which causes significant problems. The employment provided by salmon farming is not the type of employment that most residents of the tenth region want for themselves and their children. People in the region have begun to turn against salmon farming as the industrial powerhouse of the region because of its negative impact on the tourist value of the landscape. In a recent survey 50% of the inhabitants of Puerto Montt, the capital of the region, stated that they believed that tourism was the most important industry for the

development of the region and only 32% believed it to be salmon farming. It is true that poverty has been reduced dramatically since salmon farming became institutionalized in the tenth region, but the economy as a whole was also growing and with the end of the dictatorship people had a lot more leeway in moving around and vacationing which increased tourism in the tenth region also adding to the reduction of poverty. Many of the residents of the region do not see salmon farming and tourism as industries that can coexist because they compete for physical space in the region's majestic lakes.

Salmon Feed

The way that salmon are fed is also economically and environmentally unsustainable. One of the benefits of aquaculture for Chile is that although it is a natural resource intensive export industry, it does not rely on extraction of a non renewable resource. However, the feed used for salmon farming is becoming a non-renewable natural resource. Salmon are fed on fish oil and fish meal much of which is produced from overfished Chilean coastal species. Estimates made from 2004 data state that a Chilean salmon farm requires 8.5 kilograms of pelagic fish to produce 1 kilogram of salmon (Pinto and Giuliana 2006). Fish meal and fish oil each make up about 35% of the feed of salmon and estimates for 2005 show a steady increase in the amount of coastal fish required to produce a kilogram of salmon to 9.9 kilograms. Salmon farming is in effect adding to the sustainability problems of the coastal fishing industry. Although the Fish Meal Information Network, an industry lobby group, claims that the production of fish meal and fish oil does not impact stocks of fish that are suitable for human consumption, the reality of the situation is that the fish used to produce fish meal are also used for human consumption. They are also part of the food chain that maintains the stocks of other fish more commonly used for human consumption. The use of so much fish meal in salmon farming is potentially dangerous

for the world food supply. There are alternatives to feeding salmon fish oil and fish meal. Some aquaculture systems use soy and other vegetable products as the main source of feed for salmon. When the vegetable products used are ones that could not be used for human consumption there is a net caloric value created for the global food supply. Using fish meal to produce salmon is currently economically viable because salmon are worth more on the market than the fish meal they eat. The problem is that when fish meal prices begin to rise due to the regulations being implemented in Chilean coastal fisheries and other fisheries around the world to limit catch it will become less viable to feed salmon fish meal without an increase in the price of salmon.

The salmon feed situation will be difficult to change. Chile is not a large producer of soy which is the most common alternative to fish meal and fish oil as feed but it is a large producer of fish meal and fish oil. One of the other problems with a transition is that the salmon feed industry has a lot of lobbying power over the Chilean government and regulatory agencies. Salmon feed production is concentrated internationally in very few companies including: Nutreco, Salmofood, Ecofeed and Ewos (Phyne and Mansilla 2003). There are added advantages to shifting to either an all vegetarian diet or higher proportion vegetarian diet for salmon. A soy diet would basically eliminate the presence of cancer causing PCBs within salmon and make it more likely to be consumed. Currently in the US the EPA can not make recommendations about consumption of farmed salmon because it is not caught and therefore is not within the jurisdiction of the EPA. However, given the substantial pressure to keep PCBs out of food it is only a matter of time before stricter regulations and recommendations are made and consumption of farmed salmon within the US begins to drop. Farmed salmon has 10 times the PCB content of wild salmon which will make it an easy target on the regulatory chopping block as a way to increase consumer safety.

Labor and Employment

There have been recent attempts to bully the salmon industry into changing their labor practices through international publicity and public shaming very similar to the strategy used against companies who purchase from sweatshops. The largest campaign is a co-venture between Oxfam international and Fundación Terram a Santiago based environmental policy advocacy group. This campaign called “Not Afraid to Go Against the Current” is an attempt to influence the state regulatory agencies, industry groups and workers. The desire is to create an open dialogue between workers and management which has traditionally been very difficult due to the cultural and class differences between the Santiago managers and the Chilote workers. The campaign is also calling for more oversight by regulatory agencies to make sure that basic health and safety standards are met in the workplace. This campaign has enormous potential for change in Chile. A new generation of workers is entering the industry and they have had a very different background. Many of the workers entering the industry have benefited from higher quality schools and university programs aimed at the salmon industry. Also they were not alive for the dictatorship’s period of brutal repression of labor unions. Growing up in this new Chilean culture, many of these young workers have seen the possibilities of job security and consumer goods that their parents never would have considered attainable.

Labor organizing in the Chilean industry is still deeply problematic. Even though these young workers did not experience repression, they also did not experience the gains made by the unionists under Allende and before. The culture of spontaneous expropriation and highly respected unions has become foreign in a country that was once shaped by those ideals. Additionally, the recent sea lice and ISA crisis have lowered harvest levels and resulted in massive layoffs. Industries with high unemployment are harder to unionize because there are

many people that are willing to work for lower than the collective bargained wage. Two of the larger salmon farming companies owned by Norwegian interests, Marine Harvest and Mainstream which have higher rates of pay than many of the other companies recently laid off 90 workers and are projected to lay off 300 to 400 more in the near future (Witte 2009) this has become extremely common in the industry.

Foreign owned fish farms, like Marine Harvest, tend to have higher wages than their Chilean counterparts especially the Norwegian firms. However, they still pay wages well below what would be acceptable in their own countries. The Norwegian National Workers Confederation (LO) recently investigated the working conditions at Norwegian owned salmon farms in Chile and made recommendations for the improvement of working conditions in Norwegian owned farms. Those recommendations call for realistic necessary changes and should be applied to all salmon firms in Chile. The report calls for a “dignified wage” for workers in the industry and states that simply following Chilean law is not enough to achieve that wage. Specific changes that are presented include raising the base pay so that it is above the minimum wage so that performance bonuses would not be necessary to earn a minimum wage. The report also calls for companies to address the issues of wage disparity. Managers currently earn on average seven times more than the workers directly beneath them¹². These changes would be effective in increasing the level of safety and security for jobs in the salmon industry. The example of Norwegian firms both in Chile and Norway that pay much higher wages than the average Chilean firms are proof that there is potential for increasing the income of workers and maintaining competitiveness in the international market. Norway and Chile are the largest

¹² This is not the disparity between the CEO and a factory worker, it is the disparity between the woman who cuts open the fish and the manager who watches her do so.

producers of Salmon and Chile could learn a lot from the labor relations and environmental standards within the Norwegian system.

Salmón Chile has worked desperately to counter the criticism that the industry has been subjected to over its labor conditions. There has been a publicity campaign to paint the industry as the ideal base for Chilean development. The industry is quick to point out that Region X has a low level of unemployment at 4.5% which is lower than the national average of 7.8% (Salmón Chile 2004). What these statistics ignore is the quality of the work, advancement opportunities and the relationship between the labor force and management. The focus on number of jobs and amount of unions is misleading. The industry claims that a majority of firms have unions, but the vast majority do not have the right to reach collective bargaining agreements because they represent too high of a concentration of temporary workers. Furthermore, the labor code makes it difficult to unionize across firms and maintain collective bargaining rights. Workers at individual processing plants and fattening facilities do not have enough power relative to management to demand collective bargaining agreements that benefit them.

The situation is not completely bleak; there is capacity for labor advancement through consumer pressure in countries that purchase salmon. The salmon farming industry receives substantially more media attention around the globe than the costal fishing industry and that is something that workers are able to use to their advantage. There have already been somewhat successful efforts in the US to try and improve conditions of salmon workers in Chile. One of the most notable of these efforts was that of Bill Herzig of Darden Restaurants. Darden Restaurants owns Olive Garden and Red Lobster among other chains. As the senior vice president for protein purchasing he has instigated tougher standards for how workers within the plants that process salmon for his company can be treated and has monitored them through internal audits. Most

likely this oversight is not as successful as the company claims but it does demonstrate that the power US consumers have exerted to monitor safety standards in Chilean fish processing could also be used to monitor labor standards as well. This is one of the few examples of large buyers using their supply chain power to benefit workers rather than simply assure that the products are safe for consumers and provides potential for future efforts.

Health and Safety Concerns

Concerns over the safety of Chilean salmon due to the use of antibiotics, unapproved chemicals, and the presence of disease in the fish, have proven to be limiting factors in the possibility for Salmon manufacturers to expand their consumer base in salmon importing countries. The FDA recently found that a number of substances not approved for use in salmon production are being used specifically the antibiotics flumequine and oxolinic acid and the pesticide emamectin benzoate. They also found residue from other chemicals that were banned for food production in salmon that was destined for the US market. In a statement made to Underwater Times, the director of the National Environmental Trust, a division of Pew Charitable Trusts, stated that “if U.S. consumers knew about common environmental and labor practices at Chile's salmon farms, the North American market would shrink fast and deeply.” (Underwater Times 2006).

Increased levels of information about the safety of salmon stocks for US consumers could have a devastating impact on the Chilean salmon farming industry. If US grocery store chains become concerned about the safety of Chilean salmon they would shift to purchasing supplies from other countries like Norway, Scotland and Canada. The discovery of a poisoned Chilean grape in Philadelphia in 1989 had a devastating impact on the fruit industry which could easily be repeated in the salmon industry if concerns were raised about the safety of Chilean salmon.

Additionally in 2007 the FDA implemented restrictions on the importation of Chinese aquaculture production when banned substances were found in seafood. It is reasonable to assume that the same type of restrictions could be made for Chilean products if banned substances continue to be found in Chilean seafood. The FDA requires not only that there be no detectable residue from these antibiotics and pesticides but also that they not be used during any stage of the production process. The consumer driven nature of the industry serves to reveal problems within the industry but it also provides potential for improving health and safety standards in Chilean salmon production. Since the US companies that purchase salmon have traditionally had a large deal of control over production standards an alternative path is possible. US buyers could insist on changes in the processing of salmon that would make it safer for consumers and Chilean manufacturers would have to follow those standards in order to maintain their export relationship. Inspectors from US and Japanese grocery chains already routinely inspect processing and farming facilities.

Conclusions

Natural resource intensive export industries have been the backbone of Chilean growth since 1973 and the fishing and aquaculture industry has been one of the most important sources of that growth. Natural resource intensive industries account for 90% of all exports and 10% of all export earnings come from the fishing and aquaculture industry alone. Fish has become the most important non-mineral export. The industry is also responsible for large amounts of employment and security for thousands if not millions of Chileans. It is estimated that 10% of all jobs in Chile come directly from export industries. The importance of the fishing industry necessitates that it be preserved for future generations because the collapse of the industry would result in massive unemployment and economic strife. The industry is its own greatest threat to

sustainability. The same economic reforms instituted during the Pinochet government that allowed it to grow as fast as it did are also responsible for its current precarious position.

The government, industry groups and environmentalists have begun to recognize the damage done by the coastal industry from years of open access and fishery depletion. This has led the government to employ new types of restrictions that are acceptable to both the industry and environmentalists to assure that fish stocks are available into the future. The two most important new regulatory mechanisms are ITQs and the increased power of monitoring groups. ITQs assign individual property rights to fishers which in essence ends the system of open access. They have potential for improving conditions in the industry because they would limit overfishing, decrease the incentives to bottom trawl and they would smooth out production over the year because there would be less incentive to fish as quickly as possible. Smoothing out production would have a positive impact on labor because it would lead to more full time positions in processing plants increasing the power of unions to organize and bargain for better wages and conditions. ITQs have so far been successful in increasing carrying capacity and fish stocks in the fisheries they have been applied to, but they still need to be expanded and introduced into other fisheries to prevent overfishing before it even starts. Other sustainability issues have not been adequately dealt with. Bottom trawling remains one of the most pressing concerns to Chilean ecosystems. The impact of trawlers and their foreign ownership is an important political issue but one that has not translated into protection of Chilean coastal waters. Bottom trawling remains the most destructive aspect of Chilean fishing and if not dealt with may permanently reduce the carrying capacity of Chilean fisheries.

The salmon farming industry has also seen improvements but still has an uphill road to become sustainable and remain internationally competitive. Like the solutions to the problems of

the coastal fishing industry, the solutions to the problems of the salmon farming industry are readily available but it is industry unwillingness, and a tradition of no government intervention that has prevented change. Norway has also suffered from the ISA epidemic and controversy over DHA contamination in fish meal, but it has managed to avoid the international scandal that has plagued Chile. Although the Chilean salmon industry was founded with Norwegian technology it has rapidly fallen behind. Norway has much lower use of antibiotics than Chile and has begun to employ almost exclusively pool aquaculture systems as a way of preventing lake contamination, salmon escape, and ISA spread. The improvements in technology and productivity in Norway has countered the fact that Chile has much lower labor costs. Norway also lost far less revenue from ISA outbreaks because they were better able to contain them.

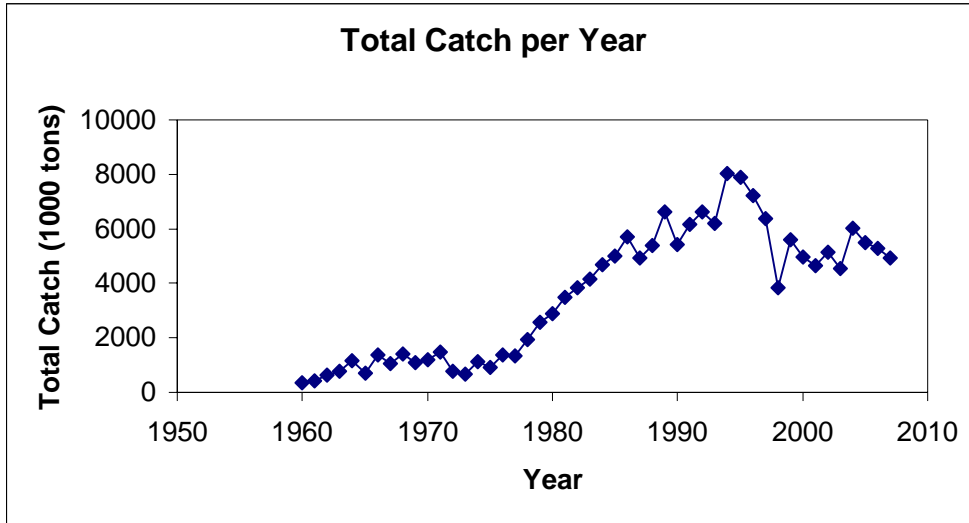
While the government has recognized and begun to address many of the environmental and sustainability issues of the fishing and aquaculture industry that were results of the Pinochet economic restructuring, labor has been left behind. That is not to say that gains have not been made by workers. Poverty has been reduced dramatically since the return to democracy, unemployment is at much lower levels and there is access to education that did not seem possible twenty years ago. Yet those gains have not been experienced by the people, mostly women, who actually work within the industry. For these workers, conditions remain much the same as they were during the 1970s and the future seems bleak with the recent global economic crisis and safety scares in Chilean fish. There are avenues of change that look promising, especially for workers in the salmon farming industry. The outward orientation of the industry that kept wages low for so long may actually help to increase them. Campaigns for worker rights within the industry have taken international scope and buyers have unprecedented control over how the products they consume are produced and how the workers who produce them are treated. It is

true that there has not been much pressure on labor conditions within the coastal fishing industry but because processing is so similar to that of the salmon farming industry it is likely that upward pressure on salmon processing wages would also put upward pressure on other seafood processing wages as well.

The development of the industry has been substantially influenced by the radical economic deregulation of the Pinochet regime. It thrived under macroeconomic policies supportive of export industries: open access to marine natural resources and flexibility of the labor market. Furthermore, the legacy of the dictatorship has extended far beyond Pinochet's exit from politics, the return to democracy and the election of Socialist president Michelle Bachelet. The characteristics that have made the fishing industry strong have proven resilient to efforts of reform but that does not mean that they are unchangeable. The recent trend of regulation and social movements has proven that there is potential to transform the modern fishing and aquaculture industries into sustainable sectors of the Chilean economy that respect worker rights and that there are people dedicated to achieving that result.

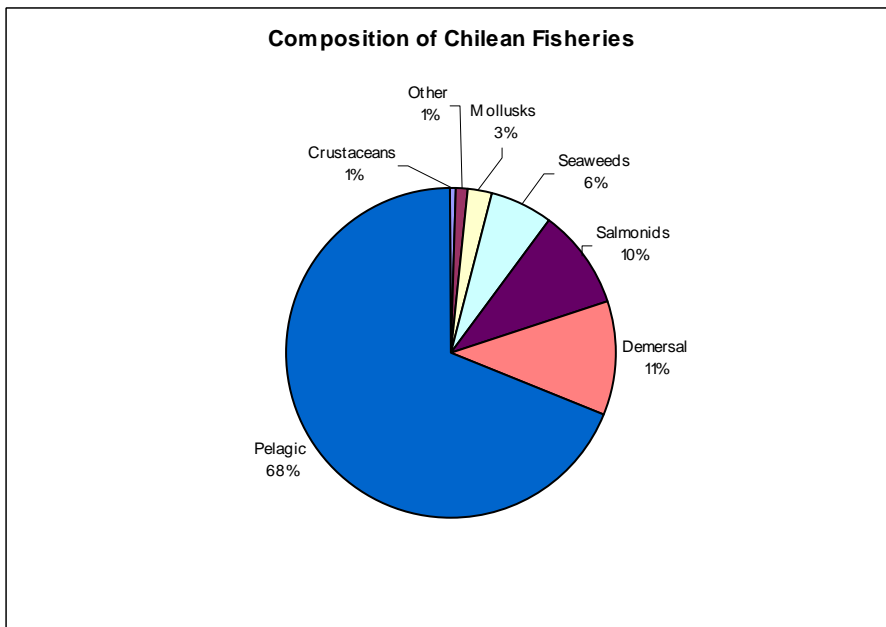
Appendix 1: Graphs and tables

Figure No 1:



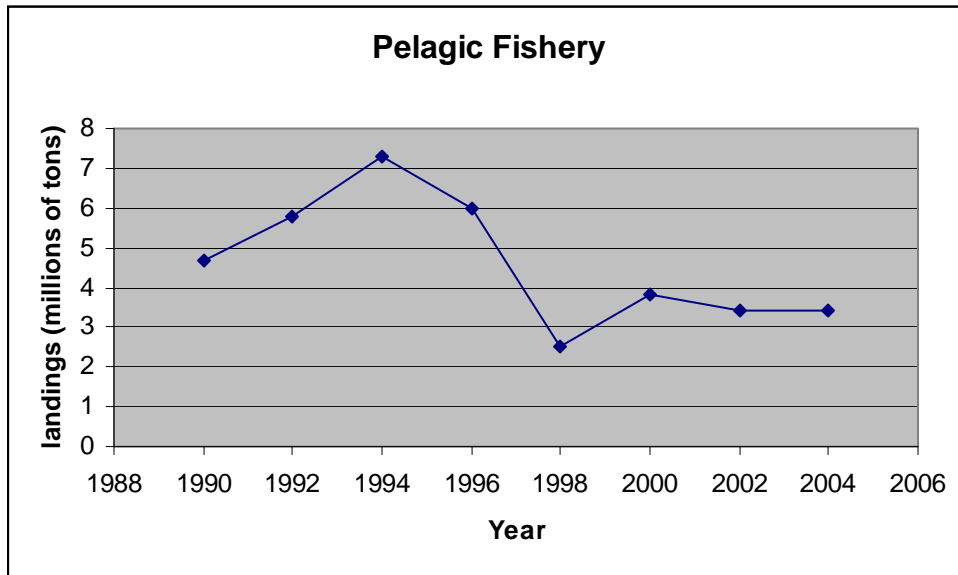
source: SERNAPESCA

Figure No 2:



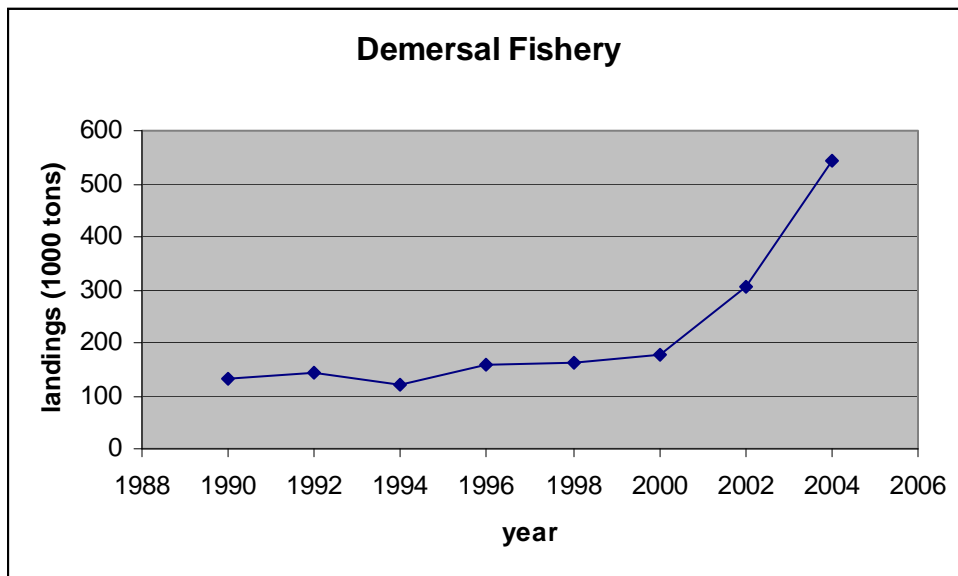
Source: SUBPESCA

Figure No 3:



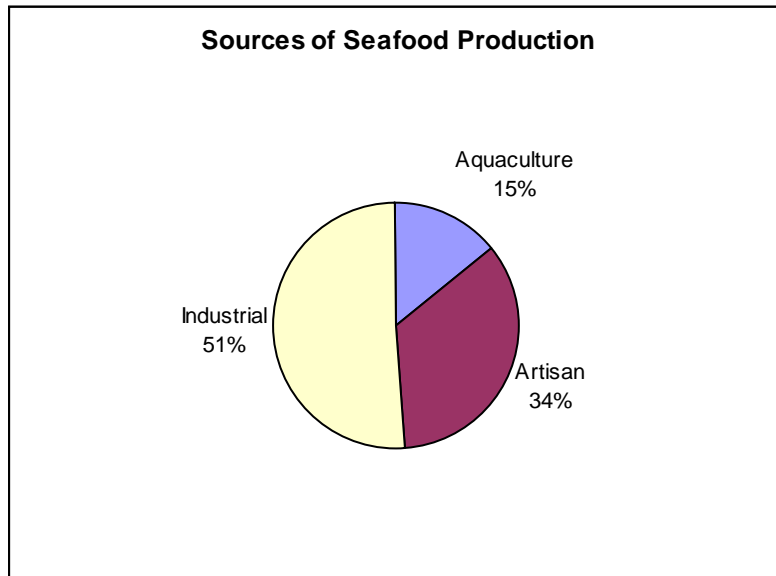
source: SUBPESCA 2004

Figure No 4:



source: SUBPESCA 2004

Figure No 5:



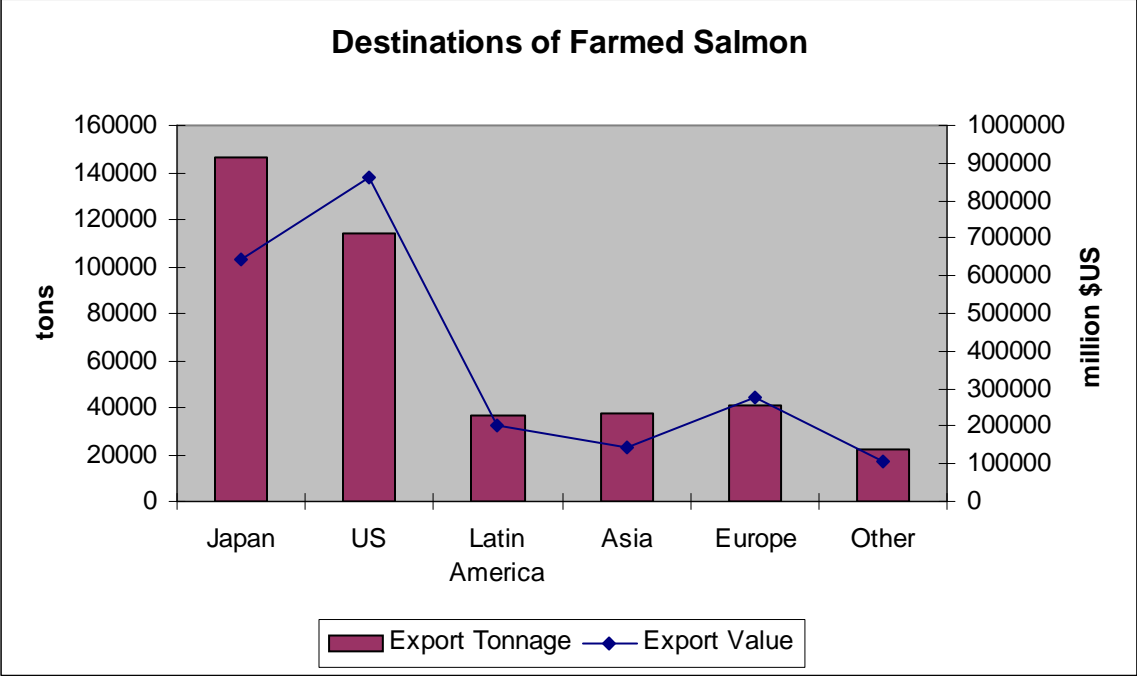
source: Chile Medio Ambiente Informe Anual 2005

Table No 1:

Catch Type	2001	2002	2003	2004	2005
Total	4.597.989	5.004.609	3.935.547	5.536.220	5.077.223
Aquaculture	631.634	617.303	607.214	696.258	739.368
Artisan	1.014.790	1.195.347	1.232.049	1.684.068	1.729.145
Industrial	2.951.565	3.191.959	2.096.284	3.155.894	2.608.710

Source: SERNAPESCA 2004

Figure No 6:



source: Salmon Chile

Appendix 2: Images



Salmon farm near the town of Quellón on the island of Chiloe



Artisan fishing boats in the harbor of Puerto Montt



The Puerto Montt Fish Market



Employment Alternatives: Agriculture in Quillota

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