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Sustainable development? Salmon aquaculture and late modernity in the archipelago of Chiloé, Chile

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ABSTRACT: Chiloé is an archipelago that has, since the 1980s, become one of the motors of the Chilean economy. Salmon aquaculture swiftly transformed the tradition of isolation and poverty that had defined the local identity and livelihoods. This is now changing due to the rapid experience of modernity. This modernity is driven by transnational capital and large-scale state intervention in the promotion of salmon aquaculture and its current central role in defining development in the islands. While this sector has generated private and public employment and infrastructure, there has also been an important shift in the expectations and aspirations of the local population, towards increased hybridization and also a mercantilization of island culture. The success of salmon production reveals that the conditions of isolation can be transformed, and even benefits reaped from integration into the modern world –globalised, capitalist and rational, rather than traditional– however it also entails risks for the sustainability of fragile socio-ecological systems, including the existence of traditional and alternative livelihoods.

Keywords: aquaculture, Chiloé, globalization, identity, modernity, sustainable development.

Introduction: an archipelago in transformation

In May 2016, artisanal fishers on Chiloé blockaded roads and demanded negotiations with the national government. This situation became national and international news as petrol and food supplies were run down, people were unable to move on or off the island, and the Bishop of Chiloé was called upon to mediate between the community and government. This explosion of popular protest, which extended beyond the fishers to the wider population of the islands, was initially a reaction to problems relating to algal blooms in the sea that affected the ability of fishers to sell their fish and shellfish; the fishers blamed the disposal of tens of tonnes of dead salmon by fish farm companies as the principal cause. However, more than a simple issue of cause and effect, this particular factor led to the emergence of a number of long-held concerns by islanders in relation not only to the salmon aquaculture industry and its benefits and

negative externalities, but also to the roles of central government and regional government. A longer-term view of the rapid changes in the archipelago reveals that this popular mobilization was not altogether surprising (Román et al., 2015; Román, 2016); however, its timing and intensity could not have been precisely anticipated. In many ways, this article attempts to explain this explosion of popular sentiment and antagonism towards corporate actors and the central state administration.

Figure 1: The archipelago of Chiloé.

Source: Román et al. (2015, p. 19).

The archipelago of Chiloé (see Figure 1), is located off the southern coast of Chile between latitudes 41 and 43º S. It consists of more than thirty islands, with 155,000 inhabitants living in a province of ten municipalities. For the most part, these islanders are characterised by their high level of rurality (see Table 1). For most of the twentieth century, the islands were characterised by their isolation from the mainland. While the principal island, where most of the provincial population resides in eight municipal areas, is close to the continent,

communications with the rest of the country were poor. Additionally, economic activity was limited due to the lack of accessible productive land and the seasonality of the artisanal fisheries activities (Arenas et al., 2001; Barrett et al., 2002; Grenier, 1984); to date, the livelihoods of *chilotes* are still constrained by a disengagement from markets and a strong dependence on intermediaries, especially in rural areas located in the smaller islands of the archipelago (Hidalgo et al., 2015). A further characteristic of Chiloé was that until the 1970s it lost population, mainly men, due to the seasonal demand for labour on the farms of Patagonia, in the extreme south of Chile and Argentina (Gobantes & Frías, 2015; Montiel, 2010), more than 1,000 km away. However, from 1974 a radical change in this situation of isolation, seasonal migration and poverty emerged due to the neoliberal orientation of the military dictatorship (1973-90) and a new relationship between the state and the private sector which shifted towards new economic activities oriented towards exports.

Table 1: Chiloé rurality in comparative context, 2002.[1]

	Total	**Rural (%)**
Province of Chiloé	**154,766**	**44**
Castro	39,366	26
Ancud	39,946	32
Quemchi	8,689	81
Dalcahue	10,693	54
Curaco de Vélez	3,403	100
Quinchao	8,976	62
Puqueldón	4,160	100
Chonchi	12,572	64
Queilén	5.138	63
Quellón	21,823	37
Region of Los Lagos	**1,073,135**	**32**
Chile	**15,116,435**	**13**

Source: Authors, based on INE (2003).

This phase of economic liberalization has been defined as the Chilean *economic miracle*, since the traditional mining economy was complemented by new products for export, while domestic-oriented farming was also switched increasingly towards products for consumption overseas. Salmon aquaculture was one of these so-called *non-traditional export sectors* (NTAX), and it would lead to the emergence of a new class of entrepreneurs more open to risk and innovation in comparison with their more traditional agrarian elite counterparts (Barham et al., 1992; Barton et al., 2008; Carter et al., 1996; Murray et al., 2009; Schurman, 1996a).

At the beginning of the 1980s, aquaculture was already being consolidated as one of these new export sectors, given the earlier support of the Japanese International Cooperation

[1] Chilean demographic data is provided by the national census undertaken every ten years. However, the census performed in 2012 was declared null and void due to implementation errors. Consequently, the only official figures are still those of 2002. See http://www.censo.cl for more information.

Agency (JICA) for the construction of fish farming sites, and Fundación Chile, a public-private technology transfer agency that created firms to support the production and export of salmon (UNCTAD, 2006). By 1994, Chilean production was already second only to Norway at the global level (FAO, 2012) and this sector would be the third most relevant in Chile, behind copper and forestry. Chiloé was the main protagonist of this *blue revolution* (Barton, 1997) since it was in this province that the hatcheries, cages and processing plants became concentrated (Sernapesca, 2012). The archipelago, given this rapid shift in economic composition, presents an interesting case of changes in livelihoods, from traditional activities of subsistence agriculture and artisanal fisheries and shellfish collection, to modern industrial practices.

Historically, the harsh living conditions, combined with a harmonious coexistence of indigenous groups and European colonisers, gave rise to highly characteristic community support practices, almost without money transfers. However, the first decades of the twentieth century witnessed the first strong steps towards modernity with the emergence of the state apparatus based on the developmental logic of the Latin American governments of the period, mainly involving access to public health and education, infrastructures for connectivity, and the creation of state employment and services, although with little development of industrial capacity (Sunkel, 1991). However, regardless of these developments, the co-existence of traditional and modern livelihoods persisted.

It was only with the rapid changes due to the salmon aquaculture boom that the islands experienced more profound transformations. In the short-term, it was necessary to contract labour with different levels of specialization, leading to migration into the province and also from rural areas into the towns. This was a dramatic change for people and places accustomed to the loss of population over several decades. On the other hand, there was an increasing monetization of transactions, leading to more individualism in contrast with the traditional collective practices (Fløysand & Román, 2008). Finally, with the arrival of professionals with higher educational and technical skills linked to the sector, a gap between them and the local population started to emerge more clearly (Gobantes & Frías, 2015; Román, 2015). Being a farmer or fisher was no longer the only employment alternative, and not even the most desirable since employment with a monthly wage was presented as an attractive option, working alongside the new professionals in the same consumption chains.

From 2007, following almost thirty years of uninterrupted growth, during which Chiloé experienced extraordinarily high (in national terms) employability and productivity, a sanitary crisis deeply affected the foundations of the activity (SalmonChile, 2008). Abruptly, the security of a monthly wage and the confidence in future income were undermined (Carreño, 2010), and a new period of reflection was generated based on the costs of modernization for the environment, also in terms of cultural change and local identity (Fløysand et al., 2010a). This questioning of the development model was profound: Is modernity able to provide the necessary tools for moving towards more sustainable development? And in broader terms, is modernity *good*? These debates emerged in the archipelago in terms of an evaluation of the impacts of the intensive production of marine ecosystems, the opportunities for workers to find alternative employment, in the possibilities for local governments to capture benefits from the activities and to manage the negative externalities, and the will of firms to form part of the local development process beyond their accumulation strategies.

This article takes a critical stance in terms of the sustainability of the development trajectory followed in Chiloé with regards to modernity, its connection with global society

principally through economic relations, and the diffusion of risk as a concept that guides concerns and decisions in the face of the current ecological and economic crises. If modernity is the key feature of these processes, it is important to reflect on the hybrid results that emerge from the engagement with tradition - following the trajectory of modernity defined by Giddens (1990) - also the reflexivity based on shared responsibilities for past and future decisions that have shaped development in the archipelago.

The following analysis is based on a review of the literature relating to the archipelago that is heavily influenced by the work of anthropologists, sociologists and critical geographers; these publications emerged in line with the evolution of the salmon industry and has been specifically interested in the challenges of contemporary rurality and traditions in the face of globalizing tendencies. This literature includes work by the authors of this paper, that has involved interviews with key informants (and analysis of their discourse) on the islands that date back to fieldwork in 1994, with a more intensive period of work between 2008-2014 in the context of projects financed by the Chilean and Norwegian research councils. The paper reviews the main trends in this literature and accounts of the experiences on the archipelago from the 1990s. It does this by framing the discussion around the principal shared element, in our opinion, which is the debate around modernity. This debate, in the context of Chiloé, provides the principal contribution of the paper and links it to wider discussions concerning island studies.

Chiloé: from isolation to globalization

Although salmon aquaculture is the activity that has determined the development options of these islands over the past thirty years, it is not the only activity linked to modernization. During the 1970s, salaried employment was generated in shellfish processing plants, taking advantage of the local supply and the low, un-unionised labour costs. There was also a large stimulus for artisanal fisheries associated with new national fisheries policy orientations (Schurman, 1996b; Arenas et al., 2001). Also important was the indiscriminate felling of native forests for raw material exports to Asia (Sepúlveda & Geisse, 1995). All of these processes revealed a shift to the commodification of nature on the islands as part of a wider national modern project based on traditional (e.g. mining, fish meal) and non-traditional (e.g. higher value fish products, wine, fruit, cellulose) resources. Often the practices were similar to more traditional methods, since they were based on small-scale extraction activities, however the intensity of these activities increased over time, and the expectations for monetary returns became more important than the carrying capacities of the terrestrial and marine ecosystems and the sustainability of these economic activities. This intensive use of island ecosystems can be justified in the name of global food security or the dynamic recovery of a decaying traditional economy; however, there is a central issue of distribution and well-being that has to be addressed (Outeiro & Villasante, 2013), principally in terms of the incompatibilities of different activities and the persistence of high levels of vulnerability.

Chiloé provides an interesting case for the island research community since its current economic condition is not based on the intensification of production or services (e.g. tourism) on land, but rather through an intensification of its inshore marine resource potential. This fits well with McCall`s (1994) appeal to avoid geographical determinism in island studies, in spite of the physical and administrative boundaries of islands which appear similar to ‘continental’ studies in general, and to explore precisely these other territorial dimensions that transcend the

land mass itself. The role of aquaculture in transforming Chiloé and its spatiality (linking landscapes and seascapes), is relevant to this discussion in the context of new economic and cultural geographies of globalization. It has also transformed the positionality of the archipelago in the context of national development, placing it as one of the hubs of the export ´miracle' that has typified the Chilean neoliberal argument since the late 1980s (Schurman, 1996a; Montero, 2004). This implies a 'recentering' of islands in the national psyche and the national economy, as opposed to their construction as isolated, marginal and 'underdeveloped' localities (Baldacchino, 2008).

Salmon aquaculture is not a pioneer in terms of *chilota* modernity, however the scale and velocity of its insertion into the archipelago was significantly different. Although the islands were destined to be absorbed into national and global pressures for modernization, given longer-term processes of connectivity, migration and commerce, it was this particular sector that would become the principal articulator of this transformation.

The shift to modernity was not only related to salmon. Another principal activity that would emerge later in the period in the aquaculture sector was the cultivation of blue mussels. This activity would contribute to the diverse challenges generated by aquaculture as a whole over the period in question, including different locations in the process with extensive networks of lines and flotation equipment, often leading to beach waste and including precarious employment. Tourism has also played a role. While this activity has provided income for local people for more decades than aquaculture, it also threatens a mercantilization of local culture since traditional practices are transformed into exhibition products (Mansilla, 2009), and in turn these elements of archipelago identity become more homogenised with globalised, capitalist society. Given these activities, Chiloé can no longer be considered an isolated space. This resonates with the warning of Depraetere (2008) that insularity is a global condition of specificities, rather than a specificity in a global context. Consequently, the specificities that one can draw from a case may eventually anticipate global consequences of ecosystem threshold limits from social, cultural, economic and environmental points of view. For this reason, McCall´s (1996) idea of insularity as metaphor, which was questioned by Hay (2006), requires an important revision. This revision should highlight that the lessons to be learned are not linear, or one-dimensional, or elements for correction at a planetary scale. The specific nature of adaptation and mutual influences relating to islands suggests that inferences should not be limited to a critical revision based on continental problems or urgencies.

The incorporation of islands into the wider world via increasingly embedded links leads to the adoption of modern practices and, more importantly, to an interdependence with other locations around the world. This is an advantage for the archipelago since its siginificance in global salmon production allows it to be not merely a receiver of globalization, but also an active player in influencing, more or less directly, the hybridization of modern practices (Amin, 2002; García, 1999). Evidence of this situation is provided by the 2007 propagation of the ISA virus (infectious salmon anaemia) that affects farmed fish in a stressed environment, which, along with the risk of curtailing salmon aquaculture, has given rise to an interesting change in how to manage production in Chile (SalmonChile, 2008), since it reflected the problems of commodification and global integration. Although the outbreak did not affect humans, the markets reacted negatively to the disease since the appearance of the fish was affected. This phytosanitary problem rapidly escalated into a financial crisis that heavily affected the economic dynamism that had been generated within the region.

The crisis should not have come as a surprise. Many authors and interest groups had commented on the environmental impacts generated by the industry, such as the depredation of native species by salmon escapees, the poorly controlled use of antibiotics and eutrophication (Barton, 1997; Claude & Oporto, 2000; León-Muñoz et al., 2007; Quiroga, 2003), combined with the loss of cultural diversity and alternative subsistence activities beyond salmon sector wages (Amtmann & Blanco, 2001; Mansilla, 2006). These impacts led to an overall questioning of the socioeconomic and environmental sustainability of the sector due to the intensity of its operations. The practical effect is that interdependencies within which Chiloé develops are not only linked to the global economy, but are also linked to the weakening of a model of isolation in which economic development was understood differently (Gallopín, 2003). It is important to emphasize that it is not necessarily modernity that has affected the sustainability of the archipelago, but rather a specific form of capital accumulation through global networks. The modern experience reveals that the ending of isolation itself generates risks at the local level, which in turn implicates diverse responsibilities that relate to the sustainability of these networks.

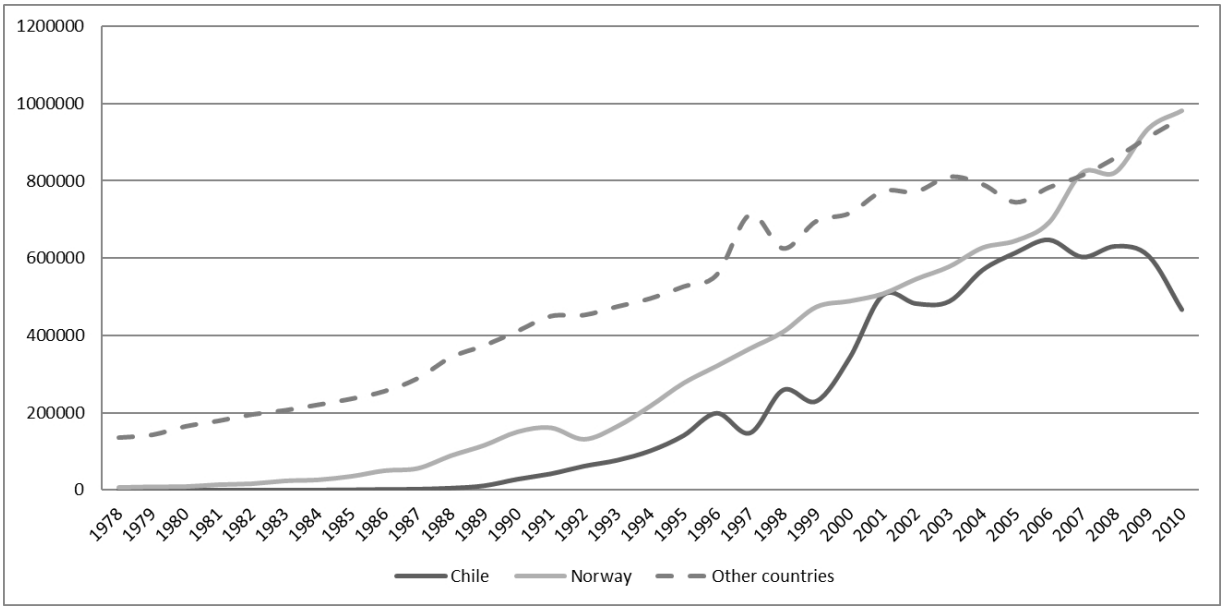
The salmon boom

An important element of the salmon industry has been the active role of the state that, under dictatorship, implemented economic liberalization policies.[2] It was the state agency CORFO (Production Development Corporation) that was the first to export salmon in 1978. Three years later, Fundación Chile bought a salmon firm to test different productive processes, at freshwater and seawater sites, and in processing and export capabilities (UNCTAD, 2006). From this point, technology transfer was initiated and the development of the sector began in earnest, changing the marine environment with the localization of production cages. Within a few years the number of producers had grown rapidly, mostly with Chilean capital, and a Salmon and Trout Producers Association was created in 1985 with 17 members. The production context is important to highlight here: the economic crisis of 1982-83 had undermined the national financial system and there was considerable uncertainty surrounding new investment in the country (Schurman, 1996a), particularly for the agricultural export sector. This sector would soon become a beneficiary of rural industrialization initiatives from central government in what would be become known as the development of the NTAX (non-traditional agricultural export) sectors (Barham et al., 1992; Phyne, 2010).

The outcome was positive in terms of the steady rise in production in these sectors that came to include aquaculture (see Figure 2). The rise of salmon aquaculture would maintain a solid increase, barely affected by the Asian crisis of 1998, and would only be halted briefly by the ISA virus; the virus affects the salmon species *Salmo salar*, which is most dominant in Chilean production. Godoy et al. (2013) note that this disease is one of the most lethal within salmon aquaculture due to contagion, leading to mortality rates of up to 90% in some production cages, with associated socio-economic costs (Bustos, 2012). The crisis emerged in 2007 and continued until 2010 when the disease had been contained and production increased once again (see Figure 3).

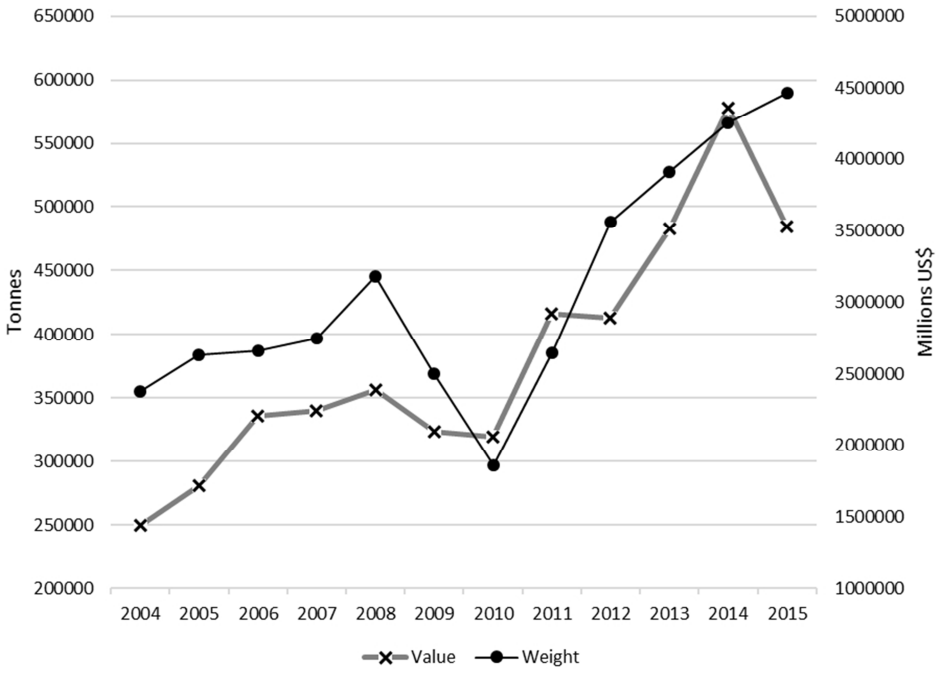
[2] The reasons that explain the choice of Chiloé as an ideal location for salmon production include: water quality; connectivity infrastructure; state support; economic liberalization; available and cheap labour with maritime and fishing skills; and access to investment (Barton, 1998; Montero, 2004).

Figure 2: Salmonid production in Chile, Norway and other countries (tonnes), 1978-2010.



Source: Authors, based on FAO (2012).

Figure 3: Volume and value of Chilean salmonid exports, 2004-2015.



Source: Authors, based on FAO (2016).

The first firms that operated in Chiloé, with Chilean investment, had little experience of salmon production and transnational capital flows (Phyne & Mansilla, 2003). Consequently, the ability of these firms to anticipate the growth rates and possible conflicts emerging in the production and trading cycles was insufficient. One of the key stumbling blocks was the slow incorporation of new technologies (Iizuka, 2004), which in turn gave rise to accusations of labour and environmental dumping due to the low production costs (Knapp et al., 2007). At the same, these low costs made these firms attractive to international investors and ownership began to shift away from Chilean capital to multinationals.

The Chilean state was also slow to react to the rapid increase in the sector and its effective domination of the regional economy (Bustos, 2014a, 2012). This weakness placed considerable power in the hands of the larger firms operating in the archipelago since they were able to define much of the nature of production and regulation, were themselves the key research entities, and had considerable power of lobby among parliamentarians and the national chambers of commerce (Fløysand et al., 2010b; Fløysand & Román, 2008). Land use and use of the sea and freshwater sites became driven by these private actors, with the state having few counter-proposals given the private investment and direct and indirect employment levels generated by the sector and evidence of improving socio-economic standards in the archipelago.

At the time that the sector began its activities, the poverty in Chiloé was evident (Arenas et al., 2001; Barrett et al., 2002; Grenier, 1984). This could be seen in the quality of the housing, problems of access to health services, sanitation and education, and the strong dependence on the local environment for subsistence. The historical emigration from the province, to Patagonia for seasonal work on the sheep farms or to the cities further north (Montiel, 2010), contributed little to the sustainable development of Chiloé, hence the option to remain and work was increasingly attractive and slowed decades of out-migration; during the 1990s, the province would reverse this trend and become a zone of net in-migration. Some of this work was also in rural communities given the location of the cages, therefore these new salaried workers have maintained local culture to some extent in dispersed communities where they are able to maintain some traditional practices and contribute to community development.

Against this more positive position regarding employment opportunities, there are authors who argue that the contribution of salmon aquaculture to the Chilean *economic miracle* has been based on low wages, which in turn has led to large profits for the firms involved (Aravena, 2009; Díaz, 2004; Oseland et al., 2012; Schurman, 2001; Winn, 2004). The early reports on the sector noted the insecure and unhealthy work conditions, with no union representation apart from one small collective (Barton, 1998; Barrett et al., 2002; Claude & Oporto, 2000; Díaz, 2004). During the decade of the 2000s, social standards were improved and state inspection was more intense due to increased pressures from NGOs and also improved connectivity that facilitated site visits. Another key aspect was the rise in unionization, which was triggered by two processes: the large number of formal workers based in the processing sites in particular (Ramírez et al., 2010); and the activities of the NGO established on Chiloé in 2004 – El Canelo de Nos – which encouraged unionization and led to over 50% of sector workers being unionised by the end of the decade (Oseland et al., 2012).

One of the most relevant impacts generated in traditional communities in Chiloé has been the incorporation of women into the labour market since this changes gender relations in the domestic space and the paid work space. Many women who became factory labourers were also heads of household, revealing a particular dimension of vulnerability and precariousness

experienced by many *chilote* households (Barrett et al., 2002; Díaz, 2004). Most direct employment in this sector is in the processing plants, and it is principally women who hold these posts. These plants are now part and parcel of the *chilote* landscape, and are most often located on the peripheries of the island settlements. It is precisely this contrast of industrial employment and large processing plants, the face of late modernity, against a backdrop of traditional community lifestyles and small towns that provides the principal juxtaposition of the Chiloé development process over the past three decades.

The role of women factory workers has also been important in the unionization process. While men most often led the early unions, the agendas reflected the needs of the women workers, such as repetitive strain injuries, poor treatment by male foremen, and cold and damp work spaces. Due to Chilean legislation, union leaders risked being fired, making further work opportunities also unlikely and this gave rise to different unions developing forms of trades union careers for some workers. While this gave them some protection from indiscriminate firing, it also led to a certain fragmentation of the collective bargaining processes (Pinto & Kremerman, 2005). In spite of this, Rebolledo (2012) highlights the fact that it is the women workers that have adapted better to this work regime since it has allowed them, to some extent, to maintain traditional roles while improving their position within the social structure; Ramírez and Ruben (2015) note that 43% of employment in 'modern' economic sectors in Chiloé is in aquaculture.

The salmon boom has also shaped urban development on the archipelago. In 1982, only 40% of the islands` populations were classified as urban –against 80% at the national scale– but by 2002 the figure for Chiloé had risen to 60%. While the absolute numbers in the following table may appear modest, they are highly significant for the size of settlements in question, which are often relatively isolated and highly dependent on one economic activity. Quemchi, Dalcahue, Quinchao and Quellón are good examples of this rapid transition, doubling their populations in a short space of time (see Table 2). This urban development was also characterized by a lack of planning, deregulated processes and a certain commodification of land uses and environmental services such as water (Fløysand et al., 2010b). In the towns, evidence of the precariousness of urban dynamism could be seen among the lower income inhabitants who increasingly occupied risk zones (of mudslides, or extreme high tides or tsunami for example) with limited access to basic urban services; the state response was a series of unarticulated, high cost measures coordinated between regional and municipal institutions (Barton et al., 2013). In this process, there were also overlaps between salmon production zones, and residential and social infrastructure uses, giving rise to incompatible land uses and conflicts that have not been resolved as the towns have sprawled to the sites where the processing installations were originally located.

Table 2: Total population and urban population on the Chiloé archipelago, 1982-2002.*

	1982		1992		2002	
	Total	**Urban**	**Total**	**Urban**	**Total**	**Urban**
National	11,275,440	9.132,912	13,348,401	11,140,405	15,116,435	13,090,113
Region of Los Lagos **	843,430	479,277	948,809	579,885	1,073,135	734,379
Province of Chiloé	112,456	44,635	130,389	61,708	154,766	86,653
Castro	26,906	16,854	29,931	20,634	39,366	29,147
Ancud	29,324	17,009	37,516	23,148	39,946	27,291
Quemchi	9,380	998	8,188	1,398	8,689	1,665
Dalcahue	5,837	934	7,763	2,272	10,693	4,933
Curaco de Vélez ***	3,059	298	3,021	0	3,403	0
Quinchao	9,041	1,840	9,088	2,484	8,976	3,452
Puqueldón ***	4,380	181	4,248	0	4,160	0
Chonchi	9,575	2,134	10,627	2,898	12,572	4,588
Queilén	4,759	885	4,952	1,329	5,138	1,912
Quellón	10,195	3,502	15,055	7,545	21,823	13,657

* The 2012 Census was declared null and void, hence it is not possible to update this demographic data.
** Region of Los Lagos: one of the provinces in this region became an autonomous region (Region of Los Ríos) in March 2007.
*** Since the 1992 Census, the principal definition of 'urban' includes settlements with over 5.000 inhabitants.

Source: Authors, based on INE (1982, 1993, 2003).

The ISA virus significantly affected all the transformations that had been generated by the *success* of the salmon boom. The fall in production gave rise to large-scale layoffs, which in turn led to many workers migrating back to their regions of origin. In the cases of the more urbanised municipalities of Quemchi, Chonchi or Quellón, a consequence of the salmon industry (Barton et al., 2013), unemployment figures in 2009 were very high compared to previous years (although not exceeding regional and national figures: see Table 3). In municipalities with high levels of rurality yet linked to the marine cage sites, such as Puqueldón, Curaco de Vélez, Quinchao and Queilén, there was also a rise in unemployment, which in turn can be attributed not only to the crisis but also to the technification of the production processes that could be foreseen as the industry became more consolidated (Barton, 1997).

Table 3: Unemployment rate (%) in Chiloé municipalities, 2003-2009.

Administrative unit	Unemployment rate		
	2003	2006	2009
National	9.7	7.32	10.22
Region of los Lagos	8.39	5.03	10.53
Ancud	4.91	2.12	9
Quemchi	2	0	12
Dalcahue	2.74	2.54	5.08
Curaco de Vélez	2	3.32	10.05
Quinchao	1.51	3.56	8.05
Castro	2.7	3.06	7.5
Chonchi	2.55	5.12	8.94
Puqueldón	2.38	5.33	7.87
Queilén	0	2.9	10.56
Quellón	1.89	2.96	14.66

Source: Biblioteca del Congreso Nacional (2012).

The arrival of the virus, which had affected other major production zones around the world previously, was not unexpected (Barton, 1997), especially given the erratic approach to environmental and economic decision-making in relation to regulatory frameworks and environmental conservation in particular (Bustos, 2012; Román, 2015). Despite new regulations following the outbreak and initial control, including new marine *production neighborhoods*, there are still sporadic returns of the virus (Godoy et al., 2014). For the industry, the most relevant datum is that production in 2012 had already recovered to 2007 levels (see Figure 3). This is the point of inflection with regards to Chiloé's development process. Given this recovery, from a productive perspective, there is a renewed vigour to intensify production, in spite of the implied risks for the other two factors of production: labour and nature, hence the sustainable development challenge to be resolved by local actors (Barton & Fløysand, 2010). From a global perspective, the participation of Chile in international markets justifies the negative externalities of salmon production in the archipelago –although basic needs are being met– however the sanitary crisis generated by the ISA virus exposed the lack of local decision-making in the evolution of the sector and its responses to specific problems. Consequently, it can be noted that *chilota* dependence on this sector has reduced the capacity of islanders to adapt to changing socio-economic and cultural influences (Barton et al., 2012).

Modernity and modernization

The concept of late modernity evolved during the late twentieth century to define a new phase of modernization and its accompanying social and culture mores. Where the early phase of modernization and its associated concept of progress dominated thinking on socio-economic transformations relatively uncritically and in generally universal terms, late modernity put into place an important degree of reflexivity in relation to institutional references such as

government, business and civil society. Giddens (1990) and Beck (1992) are perhaps the foremost exponents in this debate. Within this new phase of late modernity - otherwise referred to as second modernity, risk society or liquid modernity – new constellations of associativity and identification are in construction, also new political configurations that transcend traditional class lines and conventional economic categories. A central element of these transformations is the role of agency and a certain freedom to challenge established notions of roles and identities (Beck et al., 1994; Dawson, 2010). It is precisely this interest in changing roles and identities associated with late modernity that is relevant for the discussion of the rapid transformations in Chiloé culture. This discussion involves increased reflexivity in terms of actors and their discourses in relation to different development options, as opposed to a purely traditional wealth-based notion of progress. While this traditional construction was part and parcel of the process during which the sector became integrated in the province, there is evidence of serious questioning of what is to be expected from aquaculture investment and employment in terms of wider local development (Barton and Fløysand, 2010).

The salmon boom may be better understood as a core element of a process of modernity rather than an isolated phenomenon. This is particularly relevant since the political and economic elites rationalized the modernist development project and enabled it through economic liberalization and deregulation under dictatorship, including an extended process of export processing and state restructuring. The role of the state has been indispensable for the insertion of the country into global production and consumption networks (Bustos, 2014b). It is for these same reasons that public decisions relating to local development most often are generated at the national level rather than the regional and local levels. In contrast, economic deconcentration has been rife in terms of spatial dispersion across the national landscape (Boisier, 2000), with the example of Chiloé, given its history of poverty and isolation, regarded as evidence of the positive results of this experience.

Apeldoorn et al. (2012) argue that capitalist states are those that organise themselves to ensure the continuity of capital accumulation processes. Regulations are minimised in order to guarantee competition rules and to encourage new market opportunities and technological innovations without generating excessive risks. The tools include representation of national interests in international fora, mitigation of negative impacts that are generated, technology transfer, and in extreme cases, direct intervention. This last resort reveals a hangover from earlier decades of state dominance yet it also reveals that there is a doubt regarding the market as the principal mechanism for resolving conflicts and for establishing local development priorities. In the case of Chilean aquaculture, one can affirm that the state is weak relative to the productive sector, however it is not non-existent. Furthermore, its weakness is principally based on its ability to articulate interest groups within a framework for promoting accumulation for economic activities. Consequently, the indicators of *success* are generally national level and economic, relegating the concerns of local welfare criteria within the so-called *sacrifice zones* of concentrated extractivism (Boisier, 2005; Barton et al., 2016). The Chilean economic model applied from the coup, although inspired by the *Chicago Boys* of Milton Friedman, combines a heavy dose of administrative conservatism within the economic liberalization framework. It is within this framework – of neo-structuralism rather than neo-liberalism (Sunkel, 1991) – that the industrial modernization of Chiloé took place. Experimentation by state organizations in the early stages of aquaculture reveals this highly relevant role of the state. The platform for the subsequent stages was created and consolidated through state leadership, making the sector later attractive for multinational capital. Although

regulation was weak, the state played a lead role in economic diversification (Barton et al., 2008; Barton & Murray, 2009).

In geographical terms, the consolidation of the aquaculture sector in the archipelago created a new configuration for a region, previously considered discontinuous, with the purpose of opening it up for international exports (Allen & Cochrane, 2007). The principal decision-makers in relation to the sector are not based on Chiloé however, but in Puerto Montt, where the regional government agencies are located and where the principal firms have their regional offices. In Chiloé, one finds the cages and processing plants with the operational management, however these are not strategic decision-makers. Further to the south, in the regions of Aysén and Magallanes, there has also been important growth of the sector over the past decade, spurred by ISA that was particularly virulent in the Chiloé province. Nevertheless, there are also important connections in terms of sites and firms across the regions. The principal decision-making hub for the sector is based in Santiago. The ministries of Fisheries (based in Valparaiso), Internal Affairs and Economy, also Labour and Environment, have all been protagonists in the development of the sector, and part of what can be defined as a 'double hierarchy' of often contradictory state interests (Fløysand et al., 2010b). Given the influence of these centralised ministries and agencies in national development strategies, and the lack of administrative decentralization and deconcentration, the locally-elected municipal actors (mayors and councillors) are most often marginalised or merely passed over in terms of development priorities and investment decisions.

The result of the neostructural project in Chiloé is difficult to evaluate given its hybrid nature, with considerable public and private activity, for example in infrastructure (Avilés, 2015). However, it is clearly closest to what Harvey (2001) identifies as the turn towards *entrepreneurialism*, with little interest in strategic planning and considerable flexibility with regards to market actors and specific pressures. One of the consequences has been a focus on specific nodes and enclaves of production and distribution rather than a strategic approach to the archipelago as a whole. It is for this reason that the bridge that has been approved to create a fixed link to the mainland from the largest island has been so polemical, following on from a specific portfolio of exceptional investments for the island – Plan Chiloé – administered by the Ministry of Public Works.

The hybridization of the political and economic landscape has also to be linked to the hybrid identities in the islands. From the Incan Empire to the Spanish conquest and the independence struggle – during which Chiloé took a position in support of the Spanish against the Chilean elites in the early nineteenth century – there has been a specifically autonomous identity formation compared with the rest of Chile, in terms of how the Europeans have related to the indigenous groups that inhabit the islands and established a specific *chilota* identity.

This hybridization was previous to the salmon boom, however the current phase of modernity that the salmon industry represents has provided elements for its continuing process of adaptation, since there has been widespread assimilation into new corporate practices of formal employment (Larraín, 2001; Sklair, 2003). This adaptation has been slow however, with a lack of skilled manual labour for processing, and with significant problems of absenteeism during the first decades of production since most workers also managed their agricultural smallholdings, and were involved in artisanal fisheries, shellfish collection and shared community work activities.

Giddens (1991) refers to the phenomenon of construction of self-identity based on a pragmatic approach to daily life. It involves changes in attitude that makes it easier to face the

challenges of modernity in terms of *difference*, understood as the notion that traditional structures are not able to explain nor facilitate decision-making processes in changing contexts. This is a rational way of creating identity; hence, what is posed by those who are meant to be rational – specifically, those whose experience and success lies in modern practices – becomes a desirable paradigm (Giddens, 1990). It is possible to link different steps in terms of modernity with collective reactions to salmon farming in Chiloé, and with the rational practices that predominate in each step (see Table 4). If sustainability is a relevant issue, what Barton and Fløysand (2010) describe is that the rationality of salmon farming is enough to silence criticism, even if it is clear that certain productive techniques damage potentially or empirically the socio-ecological system. The steps before reflexivity –at this point it should be made clear that these are not chronological steps but a trajectory in terms of the factors that are considered in each reference framework– denote that there is a significant gap between difference and risk: if the first implies attraction in terms of novelty, the latter is accompanied by a rational decision to dismiss what is undesired in order to take advantage of what modernity offers.

Table 4: Moments of modernity in salmon aquaculture in Chiloé.

Modernity	Trajectory	Reference frameworks
Difference	Socioecological silence	Capitalist livelihoods
Risk	Economic imperative	Commercialized local culture
Reflexivity	Sustainable globalization perspective	Mutual influence

Source: Adapted from Román (2015).

After thirty years of integration, the *chilote* workforce is now principally industrial but, unlike other industrial processes, it is closely tied to the particular geographic conditions that permit salmon aquaculture (comparing only with specific locations in Norway, Canada, Scotland, Ireland and Chile) (Knapp et al., 2007). However, with little local participation in the decisions affecting the development of the archipelago, there is clearly not only a cultural issue at stake but also a risk to sustainable development since this development implies active participation in planning, given the local knowledges that are involved.

There is clear evidence of adaptation by *chilotes*. This adaptation includes, for example, cooperative relations between artisanal fishers and employees within the salmon industry, since artisanal fisheries is also an important activity in Chiloé, despite quota restrictions and temporal prohibitions on the fishing of specific species. Despite significant reductions in artisanal fisheries in other parts of the country, the activity has been maintained in the archipelago (Vallejos, 2009; Pavez, 2015). This is due in part to the specialised marine labour force that can move in and out of the salmon industry as demand requires. As employment alternatives, the sector provides a degree of stability to the artisanal fisheries activity that is characterised by its instability in terms of capture, collection and income. However, there is potential conflict since artisanal fishers are critical of the livelihood effects generated by the assimilation of salmon aquaculture since the state has not guaranteed the continuity of their own activities (Saavedra, 2015). This was the principal motivating factor behind the civil protests in Ancud during May 2016.

A further example exists within the firms themselves where an incentive to combat absenteeism has led to shifts of commitment from voluntary community activities to formal employment obligations. This bonus was made available to those who complied with their basic contract. The bonus implied a recognition of cultural practices that are at odds with formal industrial labour, however the negative aspect was that it effectively put a price (opportunity cost) on traditional voluntary community activities and obliged the workers to choose between one or the other (Fløysand & Román, 2008), rather than combine activities which is the traditional livelihood model (Grenier, 1984; Montiel, 2010). In other terms, the bonus increased production costs but it meant that local cultural practices did not have to be incorporated into the production process. The outcome is that modernity has brought with it the modernization of social and productive relations within a framework that has, simultaneously, reduced the outmigration and precarious living conditions of the 1970s, but at the cost of rapid cultural change and increased vulnerability associated with the fortunes of one dominant economic activity.

Embracing change, defending identity

The changes experienced on Chiloé have been swift and profound. Despite the fact that the archipelago has passed through several key transformations in its history, the current phase of capitalist accumulation and insertion into global production and consumption circuits has generated perhaps the most widespread productive and cultural changes that have given rise to new livelihoods shaped by salaried employment and monetary exchange. Over a short period of time, the isolation of previous decades has been reduced and welfare levels now compare more favourably with national averages. Female formal labour has also emerged strongly as a feature of this development process, revealing in turn the importance of many in their roles as heads of household. Although this has always been important in *chilote* tradition, it is economic independence that has been the principal change in the social structure. This situation has also led to family breakdown and problems with the conduct and academic performance of children whose parents work in the sector (Cid, 2012; Rebolledo, 2012). Also, income is now directed towards family maintenance and consequently voluntary community roles have been affected (Fløysand & Román, 2008). These changes are part and parcel of modern economic processes and their social outcomes as modernity has been transported between the islands, displacing certain traditions and adapting others in the process.

Given current trends, it is not unusual that Chiloé should reflect a series of tensions between tradition and modernity. In different parts of the islands, there still remains a strong presence of the culture that distinguishes *chilote* livelihoods from others on the Chilean continent, and there are multiples traditions, practices (including festivals and mythology), that persist. Economic activities beyond the dominance of aquaculture also reflect this degree of hybridization, such as emphasis on agrotourism and ethnotourism, reconversion of artisanal fishers as marine tour guides, and a focus on native species for agriculture. These in turn provide alternative employment opportunities and less dependency. However, most of these activities are based on commercialization of nature, practices and culture as much as community development.

Chiloé is no longer isolated, and should not be once the development transformations since the 1980s have been taken into account. The notion that the archipelago should remain as an open museum and a window onto preindustrial society represents an idealization that

does not consider the deficiencies and vulnerabilities of that earlier condition. Effectively, this position reflects a continental, centralizing gaze – which is typical of the nature of the Chilean state – with regards to the islands within the national territory (Baldacchino, 2008). In the context of Chiloé, it also fails to take into account the hybridization of previous periods in history, prior to aquaculture, when its ports were key, secure destinations for trade between the Pacific American coast and the Strait of Magellan. The situation of Chiloé to the 1970s had little in the way of sustainable development, given the high levels of poverty, emigration and extensive resource use, however the current development model also fails based on other criteria and given the dependency risks that have been generated, and exposed by the ISA virus for example.

Salaried employment and production relations based on capital accumulation have had a major impact on local identities immersed in globalization processes. The presence of women, many in single-headed households, would suggest more equality in terms of participation within civil society organizations. However, there is also the risk that the *chilotes* adopt forms of work and, consequently, understand development from a neostructural position, in which local benefits are traded off against national level benefits. The case of Chiloé offers us the opportunity to witness how, in a short space of time, the experience of modernity via industrialization, multiplier economic activities, salaried employment and changing cultural mores, struggles to establish a new equilibrium with traditional identities and practices, effectively reducing their role and their presence in island livelihoods. Chiloé is currently at a juncture, where the likelihood of identity assimilation in global networks of cultural consumption is high, and in which *chilota* identity is considered as an antonym of modernity. Nevertheless, whether as a modern development process or a complex hybrid one that is able to bridge global production networks with local identities, the challenges of sustainable development remain, given the lack of local decision-making relating to priorities and investment, and the rapidity of the changes being experienced.

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