NEW MARINE COMMONS ALONG THE CHILEAN COAST – THE MANAGEMENT AREAS (MAS) OF PEÑUELAS AND CHIGUALOCO

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ABSTRACT

In order to halt resource degradation of the high value sea snail 'loco' (*Concholepas concholepas*), the Chilean state in the late 1990s institutionalised commons – Territorial Use Rights for Fisheries (TURFs), which since then have had varying results, especially in economic terms. Theories on the commons advocate that the economic returns of TURFs should 1) be higher than the costs and efforts of engaging in them and 2) that the economic benefits of the territory should be more attractive than those fishers would obtain from outside of the TURFs. If a TURF does not bring satisfactory economic returns then how does this relate to the social and ecological sustainability of the Chilean TURFs? And how are the economic returns of the TURFs connected to the global market's unequal exchange?

This paper deals with two TURF examples, the management areas (MAs) of Peñuelas and Chigualoco, both in the Coquimbo region. We aim at analyzing what determines the sustainability of these two management areas, one of which seems to be a 'success' in economic terms. In order to study these cases, we mainly used a series of Participatory Rural Appraisal (PRA) tools to assess the fishers' perspectives. These are combined with observations and discussions as well as open and semi-structured interviews – the latter also being applied to assess the perspectives of other actors. Our analysis shows a big difference between the two MAs: on the one hand, confirming that Peñuelas is successful both economically and also socially (with well-functioning organisation, generous internal solidarity etc.), while, on the other hand, Chigualoco is economically much worse off, which seems to interfere with the possibility of organisation in a mutually trusting way. Our results also show that there seems to be a relationship between the economic returns of an MA and its institutional and organisational aspects. Furthermore, low economic returns might also have impacts on the sustainability of the ecological system. However, neither the fishers in an economically well-functioning MA, such as Peñuelas, nor the fishers in the less economically beneficial Chigualoco, are in control of the driving forces of the global market. Irrespective of economic performance, both fisher organisations have been empowered and gained increased control of resources with the implementation of the TURFs, at the same time as they cannot influence either the larger ecological context nor the global market conditions. These factors too affect the possibilities for ecological sustainability.

Key words

TURFs, commons, unequal exchange, economic returns, organisation, social and ecological sustainability

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THE ARRIVAL OF THE TURFS

To halt resource degradation of the high value snail specie loco (*Concholepas concholepas*), the Chilean state in the late 1990s institutionalised commons – Territorial Use Rights for Fisheries (TURFs), with varying results. From the mid 1970s, with the introduction of a new neoliberal economic policy in Chile, loco started to be exported mainly to Asian countries. Landings increased to unprecedented numbers, only to drop abruptly in the 1988.[2] In 1991, a new Fishing Law[3] opened for the introduction of TURFs, after a period of trial and error on the governments' side, trying to control the crisis through a series of regulations.[4] From 1989 to 1992 there was a national ban, leaving fishers who depended on the resource at odds (See Stotz 1997; Meltzof *et al.* 2002; Gonzales *et al.* 2006; Orezans, *et al.* 2005 Castilla *et al.* 2007; Gallardo 2008; San Martin *et al.* 2010). Speculation and 'illegal' fishing became the result, worsening resource degradation, although this degradation was never proved (Castilla 1995; Oresanz *et al.* 2005). Fishers and their boats were transported by somewhat unscrupulous intermediaries along the coast, searching for the best fishing grounds, and often buying locos harvested using unaccepted methods. TURFs were thus established *de novo* by legislation (San Martin *et al*. 2010), once traditional practices had been distorted by the introduction of the above mentioned regulations (Gallardo *et al*. 2010) and marked driven speculations around fisheries.

TURFs,designated in the form of management areas, give exclusive, non-transferable fishing privileges of access to specific benthic resources within an allocated sea-bed to a fisher organisation upon their request. In the formal process of MA allotment, each area is negotiated individually. TURFs are renewed every four years given compliance with a series of regulations and demands (Stotz 1997; Meltzof *et al.* 2002; Gonzales *et al.* 2006; Orezans *et al.* 2005; Castilla *et al.* 2007; Gallardo 2008; San Martin *et al*. 2010).

The TURF system foremost emphasised ecological conservation – something known from other part of the words (Goldman 1998; Ekblom and Tonelid 2010), where resource users have been sacrificed for the sake of conservation. When implementing TURFs, authorities focused on the most acute problem: controlling harvest rates (San Martin *et al.* 2010; Gallardo *et al.* in prep.). The first objective of the TURF system is to contribute to conservation of benthic resources (Servicio Nacional de Pesca (Sernapesca 2005). Thereafter follow four other objectives: to contribute to the sustainability of artisan economic activity, to maintain or increase biological productivity of benthic resources, to increase knowledge of the functioning of benthic ecosystem, generating useful information for management, and, finally, to promote participative management (Sernapesca) 2005). Although the law was dictated in 1991, the specific regulations did not come in to force until 1997, when the expansion of MAs accelerated.[5] Since then, it is not only the number of TURFs that

[2] From 4-5 thousand tonnes in 1975 to 24 thousand tonnes in 1980, falling to 18 thousand in 1988 (Oresanz *et al.* 2005).

[3] Ley General de Pesca y Acuacultura, LGPA.

[4] These were in chronological order: seasonal closures (reproductive seasons or seasonal closing (1981-1984), global or total national quota (1985-1989), and as the tendency could not be reverted, ending with complete bans (from 1989 on, up to present days). See Castilla *et al.* 2007.

[5] The expansion the of the TURFs started in central Chile, where they were fist initiated, continued later to the north, and after that to the south, finally covering all of Chile's 15 administrative parts and about 38 degrees of latitude, embracing 115.901,77 ha.

has increased consistently,[6] but also their sea-bed area. Although the total number of hectares is not impressive (see footnote below), and individual TURFs are relatively small (most of them between 250 and 600 ha), they are to be found in "the prime fishing grounds, with the exception of the extended region of fjords in the south of Chile" (San Martin *et al.* 2010:329). Chilean benthic fisheries are ecologically rich, encompassing more than 50 species of benthic invertebrates and seaweed (Gonzáles *et al.* 2005). Artisanal fishers have exclusive access to fish within the first 5 nautical miles of the coastal zone. In terms of food provision, it is the artisanal fisheries that supply almost all landings of edible fish (Gallardo 2008).Thus food security is closely related to artisanal fisheries and many high value species go directly to export. This shows the intimate relationship between artisanal fisheries production and the global markets.

For their operation fishers have coves (*caletas*), mostly in rural areas.[7] Caletas "and their adjacent fishing grounds constitute the social-geographical-ecological template of the artisanal fishery," as Gonzáles *et al.* (2005:500) and San Martin *et al.* (2010) suggest. In some rural areas, caletas are equivalent to fishing villages, although in other cases, fishers have only some small shanty rooms or shacks at the caleta, living some distance away.[8] As Gallardo (2008), Gallardo and Friman (2010) and Gallardo *et al.* (in prep) state, many caletas in Region IV are embedded within private property, where neither construction nor infrastructure is allowed by the landowners.[9] Following Berkes *et al.* (2001), the TURFs with these conditions are virtual communities, i.e., labour communities; being dislocated from urban centres and families, in a situation that increases their operational costs (transport and vigilance). In urban areas, the coves are part of the urban landscape, which also has its difficulties, although these might be of another character (Gallardo *et al.* in prep.).

ECONOMIC RETURNS OF THE TURFS

The constant and variable costs of MAs vary to a large extent depending on a series of factors, including size (patent cost or territorial tax), location, distance from urban centres, distance to fishing grounds within the MA, and resource availability.[10] Paid certified consultants perform the baseline studies, management plans, and follow-up reports (every year); all requested from the fishing authorities (Subpesca and Sernapesca). In the initial phase of the TURFs implementation, these studies were highly subsidised by government agencies. In particular the territorial tax, which is

[6] MAs with established decrees reached a number of 747 in 2009, Sernapesca 2009.
[7] There are now about 436 permanent caletas in Chile, see Gallardo 2008.
[8] I.e., in Chile a "caleta" is a small scale fishing port, mostly associated to a protected coastal site (the caleta), which allows to land and/or anchor securely the fishing boats or haul them up to the beach. It therefore involves the entire setting, including the caleta, the pier (when there is one), the boatyard, the huts or sheds in which fisher camp or the associated houses or community in which the fisher live." (Gallardo *et al.*, in prep.).
[9] Important to understand the situation of some caletas with MAs, is that in Chile, and especially in Region IV, in those land properties that limit to the sea, the area that is public extends only eight meters from the highest tide, which means that the fishing caletas that are inserted within private properties need an agreement with the landowner for any purpose that take place above these 8 meters. The same is valid to access the sea, passing through the property to and from the caleta. Access to the sea, according to the law, cannot be denied for purposes of productive activities, but the situation is different if fishers need to install any infrastructure or build any shelter for themselves.
[10] Some MAs have as target species seaweed or clams. In a typical caleta in central Chile, the same fishers have licences for diverse types of fishing (shellfish divers, weed collectors, fisher (long-lining finfish).

related to the size of the area (and not production), has been in the centre of the controversy and fisher organisations have (successfully) been pushing for a lower rate and it is now at 0.18% of one UTM,[11] while since 2004 it was 0.25, and previously even higher. There was a tax moratorium (Oresanz *et al*. 2005) during the first four years of the TURF system that, after it finished, became a burden for the organisations. Non-compliance with the management plan or tax payments are in theory causes for losing an MA, although the system has been indulgent with many MAs failing to pay tax.[12]

The incomes in different MAs also vary remarkably (Montoya 2007). A few MAs are very productive, while others are not. Many fishers had high expectations when the loco prices were high. Today almost no MAs – and especially those with locos as the target specie – are meeting fishers' expectation in region IV, as analysed by Zuñiga *et al.* (2008).[13] The MAs extracting locos have a lower result than MAs exploiting other species. Accordingly, the loco as a target species seems not to be relevant for the socioeconomic performance of the MAs – something of a paradox given the importance attached to locos in the implementation of the TURFs (Zuñiga *et al*. 2008:76). San Martin *et al.* (2010), state that the recent decrease in loco price has strongly affected the net income of the less productive MAs, thus jeopardising their economic viability.

According to Zuñiga *et al.* (2008), per member income is highly related to three variables in MAs: success, antiquity and nearness to an urban location. Measured with a global synthetic indicator,[14] the socioeconomic performance of 30 studied MAs in region IV, show a regular result. Of the three synthetic indicators (institutional, economic and social aspects per se), best performance is in the institutional, followed by the social. The economic aspects - increase of MA income, income stability and fisher's per capita patrimony - scored the lowest result with 0.30 or between regular and poor (Zuñiga et al., 2008).[15] These results show that the economic characteristics of MAs affect the rests of the variables. Per capita income is highly related to 'success'. Zuñiga's et al. (2008:74) conclude that MAs do not represent an economic solution for artisanal fishers, instead complementing traditional fishing, and other occupational activities (Gelcich *et al.* 2005; Gallardo 2008). The authors also state that since sustainability does not imply maximising of economic benefits from the MAs, in the short term, the economic results might indicate an advance towards sustainability in the long run. Furthermore, they argue, a reduction of harvests is a standard result following the transition from open access to a system with owners (or user rights, as in the case of the MAs) in comparison to the previous overexploitation (Zuñiga *et al.* 2008), see Figure 1. This also corresponds to official export statistics, see Table 1.

[11] Modifications were promulgated on April 8, 2010. E-mail comm. with N. Valenzuela, 2010-07-27/29. One UTM, Monthly Tax Unit (*Unidad Tributaria Mensual*) is a currency unit used for payment of taxes, fines, or customs duty.

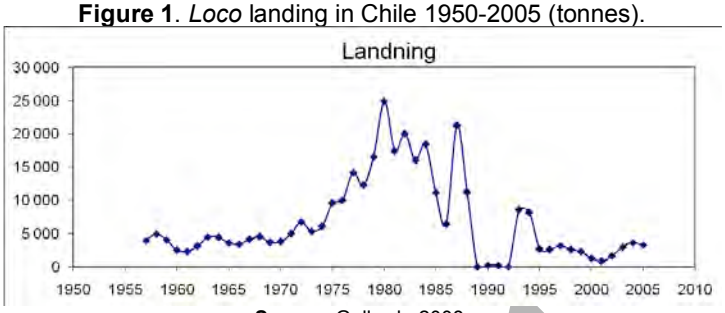
[12] Interview with several Subpesca representants (A. Pinto; A. Gonzáles; J. Riveras; M. Montoya (2008-11-11).

[13] According to Zuñiga *et al.* 2008, of 30 studied MAs in Region IV, only five did well economically, while the rest performed regularly or bad.

[14] Based on the Hierarchical schedule of Lammerts and Bloom 1997, in Zuniga *et al*. 2008.

[15] On a scale from 0 to 1: Socioeconomic performance (0.43); Institutional and social aspects (0.54 and 0.49 respectively); Economic aspect (0.30).

Figure 1. *Loco* landing in Chile 1950-2005 (tonnes).



Source: Gallardo 2008.

Table 1. Chilean loco export 1999-2009

Year	Quantity, net tonnes	Price US$/net tonnes	Total value US$ (million)
1999	663.6	22,503.5	14 933 300
2000	386.4	24,044.0	9 290 600
2001	287.8	18,803.1	5 411500
2002	372.2	20,776.8	7 733 100
2003	845.8	14,787.0	12 506 800
2004	1,124.3	14,145.4	15 903 600
2005	916.7	15,600.3	14 300 700
2006	975.0	16,220.0	15 814 000
2007	1,010.4	15,995.9	16 161 600
2008	1 072.1	16 481.3	15 373 600
2009	1 021.5	11 948.1	11 696 100
Average		**14 214.7**	**27 247,7**

Source: IFOP 2009, courtesy of Ortego, M.I., at IFOP, Pers. comm., e-mail 2006-09-13 and 2010-08-23.

Another economic diagnostic of the loco fishery in the MAs, covering the years 2002 to 2005 and realised within Subpesca by Max Montoya, examines the outcomes looking at market supply. Montoya asks, in 2007, whether the future status of MAs will present a biological or economic problems, leaving no doubt that the problem is economic (Montoya 2007). He argues that, as the fishers' organisations began working under the regime of TURFs, authorised quotas, and consequently the market supply, grew rapidly. Montoya's argument builds on the supply-demand relationship. However, according to our observations based on the long TURFs period 1999-2009, this relationship is not that obvious, although there is a tendency towards lower prices since 2002 (see Table 1). Loco resource extraction could be profitable even if prices decrease, says Montoya, but not under the TURF system that forces fishers' organisations to engage in patent payment, annual follow-up studies and especially the surveillance against poaching in the MAs.

The fact that fishers in the MAs take care of the targeted species to be harvested in specific and planned times and when economically convenient, means that the system, almost by definition, occupies fishers only part time, thus leavings time for other occupations (Gallardo 2008). To our knowledge, very few MAs occupy their fishers' full time (see also on MAs income, Gelcich *et al.* 2005). This might imply that some MAs could function well, even if economic returns are very low. The fishers could perhaps appreciate the entitlement itself with their present economic

trade-off (for instance, the exclusivity to weed extraction within the MAs, although in many cases weeds are not MA target species) or their future potential implications (Gallardo *et al.* 2010), as well as the empowerment that collective action brings, rather than the economic ones.

EMPOWERMENT AND CONTROL: FROM 'INDIVIDUAL' TO COLLECTIVE ACTION

The TURF system has resulted in fisher organisations being empowered in several arenas, such as in relation to authorities and the political system as well as in relation to the commercial sector (intermediaries, restaurant and companies).The resource users themselves are represented by more than 600 fishers organisations, grouped in regional federations, and two national confederations (Gallardo 2008), part of which are within the TURFs. The nomenclature of Chilean co-management artisanal fisheries includes various types of stakeholders.[16] The TURF system combines top-down government regulations with a system of self-imposed rules at organisational level, in accordance with the group idiosyncrasy.[17] Every MA decides on written statutes, including sanctions for non-compliance and exit rules, as well as rules on income distribution, including what is set aside to cover the cost of the MA, for social benefits, and costs for joining the MA. All self-imposed rules and regulations are subjected to change by the majority of members, the assembly. Informal or formal agreements between organisations also exist, as illustrated by one of our case study: Peñuelas. The TURF system has brought radical changes to Chilean artisanal fisheries. The artisanal fishers in the MAs take care of the resources as collectives, deciding together when to harvest and negotiating the price of the harvest collectively,[18] instead of competing for resources as the fishers previously did in groups of three or four (Gallardo 2008). Also, instead of shifting fishing grounds across regions, they are fishing permanently in one place, not being allowed to move along the coast, as they used to, when they are officially registered in one region. This is not necessarily viewed as something positive (Pers. comm. with Stotz 2008-11-26). Others scholars, like Gelcich *et al.* (2005:386), state that the TURF system and its new way of harvesting leads to fishers losing their traditional fishing skills, echoing Ostrom's (2002) ideas that conservation solutions might adventure traditional institutions. The TURF system has meant a radical move from a traditional fisheries frame to a modern system, implying changes in access (from open access to user rights), in management (from a mono-specific approach to one with management plans and an ecosystem approach), and in fishers agency (from individualism with high competition to organised and participative collectivism).

[16] Fisheries authorities are represented by the Undersecretary of Fisheries (Subpesca) with a nationwide responsibility for fisheries management, followed by the National Fisheries Service (Sernapesca), responsible for control, enforcement and landings statistics. Both have zonal or regional delegations. Scientific and technical specialists supporting fishers constitute another stakeholder group. These are agencies, universities and consultants. Stakeholders are also various organisations, such as the semi-governmental IFOP (Institute for Fisheries Development that monitors some benthic fisheries under contract to Subpesca; FIP (Fishing Research Fund), FFPA and Sercotec, all promoting development.

[17] Although the situation from MA to MA varies a lot, many MAs have a centralised management in charge. Others have more delegated responsibility in commissions taking care of administration, discipline, vigilance and commercialisation.

[18] According to the First National Fishing Census (INE 2008-2009), 32.51% of the fishing organisations sell their landings as a common.

Montoya (2007) at Subpesca argues that these are mainly favourable changes, and assesses the benefits of the MAs as follows: increased organisational management, increased partnership, greater presence of resources, better planning and improved extraction system. Furthermore, several MAs have also expanded their activities to other economic spheres such as tourism and restaurants (Pers. comm. Aviles 2008-11-24; Gallardo 2008).

For fishers, to apply for a MA is a challenge in itself. Fishers need to formally organise, recruit members, choose leadership and then jointly administrate and manage the MA. They must also formulate and agree on statutes and rules, fees, etc (Oresanz *et al.* 2005; Gonzalez *et al.* 2006; Gelcich *et al.* 2006; Castilla *et al.* 2007; Gallardo 2008; San Martin *et al.* 2010; Gallardo *et al.* in prep.), i. e., all the requirements normally attached to become a 'successful' institution on the commons. It is thus expected that in managing their MAs, fishers become internally cohesive, learn to discuss and find consensus on harvest, division of income, social security, economic administration of common funds and material facilitations – all in accordance with collective action and user attributes (Schlager and Ostrom 1992; Ostrom 2002). However, there is a relationship between economic efficiency and social equity within an MA. In a few very productive MAs, benefits are distributed among organisation members, while others do not produce enough to bear, for example, the tax costs. It is unknown how many MA has been abandoned due to economic motivations. In a list from IFOP (2009), from a total of 1275 MAs with different situations, 20 organisations have resigned from their MAs.[19]

Though the MAs are set aside for a sustainable extraction of the respective target specie(s), the right to exclude also leads to an exclusive right for the MA members to extract other species within the MA, something which is done individually (given no bans). In one of our cases, as will be shown below, it is non-target species that make the MA worthwhile for the fishers, from an economic perspective. The sea around the MAs consists of historical areas (*áreas históricas*), open to all fishers registered in the region, and subjected to resource-specific regulations only. The access system is, as suggested by Gonzáles *et al.* (2006), dual as MAs coexist with a *de facto* 'open access' system in the background, and with fishers on both sides trying to mutually exceed both systems. Since locos from 2002 and onwards can be extracted only within the MAs, 'illegal' fishing occurs in these historical areas. Both fishers of the MA, who practice illegal fishing outside the MA, and fishers outside the TURF system attempt to fish illegally within the TURFs due to the higher concentration of the resource in this area as a means to improve their incomes. Does this portray the 'tragedy of the commons' which the introduction of TURFs was meant to solve?

TURFS AND ECOLOGICAL SUSTAINABILITY

TURFs' poor economic entries is a central failure and perhaps one of the main dilemmas and challenges for sustainable development as this might be the main reason behind the continuation of 'illegal' fishing outside and within TURFs. Unregulated fishing in open access areas is related to the dilemma of common pool resources (Schlager and Ostrom 1992; Ostrom 2002), both due to non-excludability and difficult monitoring. Although small-scale fisheries have increased in economic importance over the years, fishers still adopt diversified livelihood strategies to

[19] E-mail contact with C. Techeira, IFOP, 2009-04-28.

secure the necessary means to survive, including 'illegal' fishing (Hauck and Gallardo, in prep). An interesting question is whether these failed economic results are due to market mechanisms (supply and demand), or to other ecological 'natural' conditions. Fishers express concern in relation to El Niño, complaining several times that the locos are tiny (*flacos*). Is the latter related to the MA as a system? Apparently in the short term, as analyzed by Montoya, supply and demand plays a role in price decreases, but if we consider the loco harvest and export, the MAs have meant a diminishing of the harvest (and export) to the pre export levels so historically in term of supply, this has shrink since the export 'boom'. Still the intriguing question is why, in spite of not giving the expected economic results, fishers still keep their MAs, even when this means several associated costs.

If a MA does not function economically and therefore perhaps not institutionally/organisationally, the ecological pressure on the MA and on 'open' access increases, endangering the ecosystem. And even if it does function economically and organisationally, the ecological pressure also depends on what is happening in the historical areas and on the levels of illegal fishing or theft within the MA.

According to several studies and from official reports, ecological conservation has been achieved with the introduction of the TURFs, and the resource status within the MAs is good, while the contrary holds for historical areas (San Martin *et al.* 2010). González *et al.* (2006) estimate that as much as 50% of fishers' incomes (including MA members) is derived from illegal fishing in the historical areas. Depletion might be affecting productivity in the MAs and in their longterm sustainability. Here lies a sustainability challenge, as the TURFs are not biologically disconnected from the historical areas, action in one area, affects the outcomes and resources in the other. Incentives for conserving resources within a MA may, for example, decrease if a lot of the resource is extracted from the historical area, increasing the supply of the resource (Orensanz *et al.* 2005). Again this relate to two of the TURFs conditions; that economic returns should be higher than the costs and efforts of engaging in them, and that the benefits of the territory should be more attractive than those outside of the TURFs.

Nonetheless, Gelcich *et al.* (2008b: 35), suggest that fishers' environmental awareness tends to increase with the length of time of engagement, and through the co-management processes themselves, where sustainable behaviours may well increase with time. Policy makers and managers should be encouraged by this fact, the authors claim; such a relationship between perception and time establishes a greater potential for sustainable co-management. The recipe for a successful policy is, the authors state, the following: time + learning-by-doing + a participatory implementation process.

THE TURF SYSTEM WITHIN GLOBAL UNEQUAL EXCHANGE

Current global market exchange is unequal. Global unequal exchange – where the global North depends upon and appropriates time (cheap labour supply) and space (natural resources) from the global South, further generate ecological deterioration and create severe inequalities within and between nations (see for example Heyen *et al*. 2007; Hornborg 2009; Friman and Gallardo 2010). Part of the production of capital goods may have moved to the global South, but the global North has retained most

of the control over financial institutions, communication and advanced technology.[20] In many cases, the natural resource base of the Global South is devastated, mainly for the benefit of the global North.

The unequal local, as well as global, trade cannot be visualised in monetary flows, where one dollar equals one dollar. But, when these flows are also made tangible by their corresponding real material properties and consequences, another perspective of social inequality emerges (Hornborg & Crumley 2007); time- and space appropriation of the global South by the global North. To understand the possibilities for sustainable development of TURFs, we also discuss the integration of artisanal fisheries into the global market and its unequal exchange. Making the connection to the global economy would contribute to a broader understanding of TURFs and the commons in general.

PURPOSE, CASES AND METHODOLOGY

This paper aims to analyse how economic returns relate to social (institutional/ organisational) and ecological aspects of Chilean TURFs. To make our case, we present results from studies of two artisanal fisheries cases, the MA Peñuelas and the MA Chigualoco. Peñuelas and Chigualoco were chosen because they present different features. The first is urban, numerous in terms of members and has as machas as their target specie. The second is rural, having a smaller number of members and extracts locos. Later we learn that Peñuelas no longer produces for export, but for the national market.

To assess the fishers' perspectives, we mainly use Participatory Rural Approach (PRA) tools triangulated with observations, discussions, open and semi-structured interviews, e-mail and telephone interviews; all the latter with the purpose of adding to the former.[21] Most tools were validated by the bigger group of fishers participating at the meetings. PRA tools were considered appropriate to obtain fishers' perception on their MAs given the lack of formal education among fishers, who prefer to avoid writing. Since PRA is a collective approach, it fits particularly well when studying and analyzing the collectives that TURFs constitute (Gallardo *et al.*, in prep.). Tools highlighted in italic in the table 2 were carried out through other methods.

Fishers participating in the meetings and exercises varied in number between MAs and from day to day, depending on audience size and motivation to participate.[22] As researchers we accepted the sampling units that were conveniently available at that moment, i. e. our sampling coincided with a convenience non-probability sampling approach (Nachmias & Nachmias 1996). In Chigualoco, it was the directive and a few other fishers that participated most. In addition, we spent time in the caleta during the day, allowing us to approach other fishers – individually or in small groups – for interviews. In Peñuelas a group of ten fishers, above the directive (five persons), participated in PRA exercises and interviews, while others observed

[20] The uneven relationships in power and use of resources that the concepts 'North' and 'South' usually evoke are displayed within countries – hence the 'Global North' and the 'Global South,' Friman and Gallardo 2010.

[21] Semi-structured interviews with key informants were also applied to assess the perspectives of other actors; fishing authorities, fishers' leadership and consults/scientist. Results from these interviews are only partially used in this paper.

[22] Fishers were assigned different exercises depending on their position and knowledge or skills (for example in writing, drawing and painting).

from a distance. The research in Peñuelas worked very efficiently and in a few days we had a rich material, while several of the PRA exercises done in Chigualoco gave poorer information. The field study was performed during November and December 2008.

Table 2. Main PRA tools and methods used in field		
Peñuelas	**Chigualoco**	**Purpose: to get/understand fishers'**
Brainstorming & problem prioritisation	Brainstorming & problem prioritisation	Own agenda/concerns to be analyzed in regard to their MA
Caleta Map	Caleta Map	Perception of the context in which the fishers are embedded, including distribution of significant places and of the city or village structure. Distribution of resources of both the MA and ALA.
Venn Diagram	Venn Diagram	To reflects the degree of importance, performance and closeness of the institutions and actors with which the fishers interact for the development of the MA.
Organisation Diagram	Organisation Diagram	To obtain an image of the organisation, its committees, and their roles to the MA.
Problem-tree & Solution	Problem-tree & Solution	To analyze how fishers perceive major problems associated with the MA, identifying what the problem or the difficulty is, what its causes and effects are, and whom it affects.
Seasonal Calendar – (Observation/primary source)	Seasonal Calendar	To obtain an assessment of the availability of resources, the distribution of labour force and an economic evaluation of production, income and costs both within and outside of the MA.
Systems Flow Analysis		To represent in a diagram the MAs extraction and marketing process, i e all the sequences from extraction to market.
Source: Based on Pretty *et al*. 1995.		

THE MA OF PEÑUELAS

Peñuelas guild association[23] got their MA in 1997 (Sernapesca, 2008). The MA consists of 288 hectares,[24] is 7.5 km long and has an average width of 300 meters. The maximum depth is 8 meters,[25] and at that depth they extract the MA's main target specie: the macha (*Mesodesma donacium*).[26] Although the fishing activities in Peñuelas are more than 100 years old, harvesting machas is a relatively new development. It started around 1975, when salesmen brought divers from central Chile to the cove. Several of them stayed and brought their families.[27]

There is different information regarding the number of MA members.[28] According to the Organisational Diagram PRA exercise there are 187 members,

[23] The organisation of the MA Peñuelas is called the *Asociación Gremial de Pescadores y Buzos de Peñuelas* (Guild association of fishers and divers of Peñuelas). Sernapesca 2008.
[24] UCN, Seguimiento Peñuelas I Dic. 2002, pp. 20.
[25] ESBA Peñuelas 2000-2001.
[26] They have as second target specie, the *taca* (*Mulinia sp*), but it has not been extracted yet.
[27] The fisher S. Muñoz and his family is one example. S. Muñoz has several brothers in Peñuelas as well as a large extended family. Phone interview with S. Muñoz, 2010-06-04.
[28] According to UCN, there are 207 members, 116 of whom are divers (mariscadores), 83 fishers and 13 algae collector (Seguimiento VII, January 2009:3). According to Sernapesca (Coquimbo 2008, 37), the association has 197 members. In the caleta Peñuelas, there are 227 registered fishers; except for a woman, all male, which should correspond to the GA secretary that is employed by the association.

including the 10 elderly fishers that are no longer active members, but who are considered when the income is divided.[29] Those working by June 2010 are ca 143.[30] For seven years Peñuelas have not accepted new members.[31]

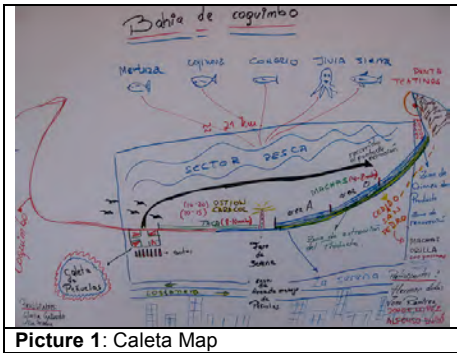
Peñuelas guild association is headed by a board consisting of five managers: a president, a vice president, a treasurer, a secretary and a first director. At the bottom is the general assembly, which takes the decisions. The directive is chosen biannually.[32] To assess its performance, the organisation had six commissions during our visit.[33] While the board is the body responsible for all aspects of the guild and the MA, the commissions take care of specific aspects related to the operation of the MA. The division of labour in commissions is seemingly not a fixed structure.[34] They are one or two-man commissions, which means a delegated responsibility of tasks to certain chosen individuals who, due to their capacities, are best for the roles. For demand and sales, MA Peñuelas pays a salesman who knows all those who buy.[35] The daily money from the sales is taken care of by the secretary of the directive and a paid secretary; a fishers' daughter – the only woman in the whole caleta.

MA Peñuelas has an extended internal social welfare system. The solidarity commission supports the members of the organisation and their families not only in case of necessity, but also offering other kinds of economic support. The elders as well as widows (five) and fatherless children, get about 75% of a man's income for the rest of their life, the children until they can subsist on their own.[36] If somebody dies – the fisher or his wife – the surviving part gets economic support for the funeral. The solidarity commission also supports the local school when they have social activities. Finally, they support the Union Peñuelas (a sport club for children) and women's football (the women are very successful, the men say). Regarding medical issues for its members, they get support in cases of operations (US$287) above the income of their own full fishing quota; when they are sick (US$57 with a doctor's certificate), above to their monthly MA income until they healthy. Absenteeism from job without doctor's certificate is punished and fined (US$19), on top of losing daily income. Non-attendance to meetings also implies fines (US$10), and after being absent three times, a fisher may be excluded from the MA. MA Peñuelas has expulsed five fishers during the last years.[37] Finally, the guild association gives systematic support to every member three times per year during important festivities.[38]

[29] Open interview with P. Guzman, 2008-11-24.
[30] E-mail interview with J-F. Dubó, 2010-06-12.
[31] In 2003 the latest member joined at a cost of 150.000 pesos (US$ 249). Phone interview with J. Esteva Dubo, president of the AG Peñuelas, 2010-06-28.
[32] Phone interview with S. Muñoz, 2010-06-04. The directive that we interviewed in 2008, was replaced with a new one in 2010.
[33] Commissions: 1) MA, 2) Discipline, 3) Account revision, 4) Welfare. 5) Fishing and 6) Administration.
[34] Phone interwiew with J. Esteva Dubo, president of the AG Peñuelas, 2010-06-08.
[35] Phone interview with S. Muñoz, 2010-06-04.
[36] E-mail interview with J-F. Dubo Dubo, 2010-06-12.
[37] Phone interwiew with J. Esteva Dubo, president of the AG Peñuelas, 2010-06-28.
[38] For children's school equipment in March (US$ 96); in September for celebrating Independence Day (US$ 230 in 2007 and US$ 383 in 2008). Finally for Christmas (US$ 7-96 per person) Interview with the leadership, 2008-11-25.

Peñuelas' socio-geographical location

The caleta map drawn by fishers shows the insertion of the cove along the coast of La Serena City (ca 471 km from the capital city of Santiago).[39] La Serena is a popular upper- and middle-class summer resort of ca 200 000 inhabitants.[40]



Picture 1: Caleta Map

Picture 2: The Caleta Building

The parcel of water of the MA runs parallel to the coastline. On land, the beach and the *Avenida del Mar* (Sea Avenue) extends. Due to tourism, the well-off have expanded their territory here at the expense of former agricultural land.[41] The cove itself is situated in the southern part of the bay, towards Coquimbo city, where the port is situated. Machas are extracted in the northern part of the MA at *Punta Teatinos*, which they reach by boat. Along the beach line at the cove there are about 40 small wooden artisanal boats. These are privately owned by some of the Peñuelas' fishers. Peñuelas is located on a beach. The seabed is dominated by sand and there are no sea cliffs, i. e. the physical conditions normally associated to a caleta are absent. The place lacks a pier and crane for fishers to lift and lower their boats. Fishers have to push the boats into the sea (and then push back up again) every time they are to work with extraction of macha or fish, causing heath problems such as injured knees, hernia, and back injuries. Several fishers (6-7) have been in surgery for their backs. This was the main problem that the fishers brought up for analysis in the Problem-tree. As causes to this problem the fishers identified not having financial resources, lacking knowledge (in relation to authorities), and that fishers are not being heard by authorities. The lack of a pier makes Peñuelas organisation dependent on the Coquimbo port. When they have a lot of fish, they have to anchor as well as load and sell the fish there. As a solution, fishers propose the construction of a pier. An even simpler solution would be an electric dragger (*huinche*), which would at least draw the boats out of the sea. An electric dragger is not very expensive – around 20 million pesos (US$38 314) – but the fishers would probably need several huinches to pull that many boats, as they all depart and return at the same time when extracting for the MA.

The caleta building – an impressive and costly building on the beach (see picture 2) – was constructed by Obras Portuarias without any costs to the association. The urban environment of the caleta, and this particular beach setting is favourable to the fishers, due to a constant demand on their product, especially

[39] Lat. S 30º 10´; Long. W. 71º 25'[39] within the bigger context of the Bay of Coquimbo.
[40] INE, Censo Poblacional, 2002.
[41] Such as summer apartments, restaurants, discotheques and casino.

during summer, when tourism flourishes. Another side of the urban coin is, however, contamination of the bay. Peñuelas is, according to the fishers, categorised as a B-caleta, meaning that they can export only boiled products, although Sernapesca[42] says that though Peñuelas was categorised as a B-caleta earlier, there is no categorisation of the caleta at present (2008).[43] During our visit, the association had just been assigned funds to build a cleaning factory so they can start exporting again, though there presently are no macha export firms in the region.

Being an urban caleta, Peñuelas also has electricity, piped water and a sewage system. As the property is municipally owned there are no access problems for the fishers. Another urban advantage (and also due to housing programs of the past)[44] is that the vast majority of fishers live conveniently behind the caleta on the other side of the beach road (in humble houses, though, compared to the fancy summer resorts surrounding them). As a result of living close by, the fishers are assisted by their families when necessary.

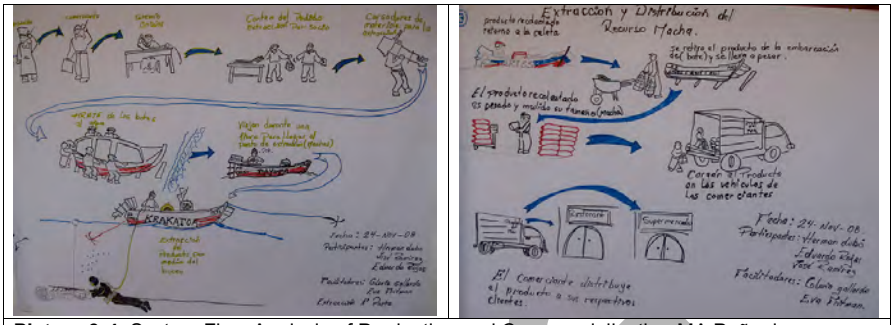
It is common that fishers build several houses on their private yard, not seldom one or two houses for their grown up children, even though it is not allowed, A. Dubó tells us.[45] The fishers can earn 15 000-25 000 pesos (US$29-48) a day by renting their beach front house during the tourist season (which lasts 2-3 months per year). Several fishers have constructed small restaurants in their front houses for the same purpose. These activities bring extra incomes to the fishers and their families.[46]

Production, commercialisation and division of labour in MA Peñuelas

In 1994 IFOP recommended a maximum harvest of 175 kilos machas per boat for Peñuelas, but fisher themselves decided a quota of 320 kilos per boat, soon leading to a diminishing of the specie.[47] This is to compare to the ca 17 kg per diver, according to the present system. The 'death touch' to the macha came due to a heavy and sustained rainy period in 1997, causing the river to deposit a lot of sediment, trees and stones into the sea, thus collapsing the macha banks years 1997-1998. The macha crisis was the reason many fishers migrated to southern Chile to continue fishing machas, even taking their boats with them (ESBA 2000). Presently, MA Peñuelas' divers collect machas only three days a week – the maximum limit that they have set for the resource to be able to recuperate. "We are

[42] Semi-structured interview with Chávez & Cerda, Sernapesca, 2008-11-24.
[43] Based in various sanitary aspects, there are three categories of caletas: A-caletas can export their species raw; B-caletas can only export boiled products; and C-caletas are too contaminated for their catch to be eatable. The value limit is decided by the importing country. But A, B and C are fixed categories decided for by Sernapesca, who controls the process, and the individual firm does a categorisation and a follow-up. It corresponds to the firms pay to a certification company. It is however, Sernapesca that then judge whether or not a caleta is A, B or C, based on many variables. All together Sernapesca certifies that the exporting firms follow what the importing country demands
[44] The first government housing program is from 1950, when 31 houses were built. Peñuelas was then a place in the outskirts of the city. During Allende's government (1970-1973) another 30 houses were built, through giving the fishers material to build the houses themselves. In the opinion of the President of the association, Allende's government was the best for fishers. They had a lot of support and a social voice. Thanks to the implementation of the MAs, that voice is now slowly won back. While they during the coup, and after, were not allowed to have unions, and governmental support stopped. Open interview with the leadership, 2008-11-25.
[45] Open interview with A. Dubó, 2008-11-24.
[46] Open interview with A. Dubó, 2008-11-24.
[47] Peñuelas 2000 ESBA study.

the ones responsible for the resource", Guzman states.[48] Fishers represented the MA's production and commercialisation flow in a diagram (the pictures below).



Picture 3-4: System Flow Analysis of Production and Commercialisation MA Peñuelas

The chain of macha extraction for sale and transport to restaurant begins when merchants or buyers call the caleta office to place an order of machas. Then the day's quota for extraction is distributed among fishers, according to a system where quotas, in relation to labour demand, have been calculated in a mathematical table. Just outside of the office three fishers organise the departure. If all fishers are needed, all go fishing; if demand is low, just some go. Those going out get their quota for the day. The sea mayor (*alcalde de mar*) – a diver assistant, in this case – controls that the fishers have their licenses updated; if not, they cannot go. He also authorises departure after being informed from corresponding authority on weather conditions. Sea mayors are formally assigned by the navy. Another person prescribes the amount allocated to each boat and a third distributes plastic net bags where divers put the machas. Fishers themselves decide with their own crew if they go out or if they ask another boat to take their part, or crew of two boats gather in one and go out taking the day's demand. Next day, they change roles, saving both work efforts and fuel. In the summer, when demand is high, there are sometimes orders of up to 10 000 kilos (10 tonnes) per day.

Once the divers are given their quotas and bags, they put on their wet suits. Meanwhile other fishers prepare the boats, dragging them into the water in groups. Throughout this movement, both union and non-union members are involved. Among the latter are the non-MA four to five motor carriers. They carry the heavy (50-70 kilo) boat engines from the storage room to the boats (and, once the fishers and divers return) back again. Beside these people, there is also another non-MA group of eight people is working in the caleta: the so-called 'pumas' who help carrying the machas when the boats return.[49] During summer, fishers might get help from their own children when they arrive, and if so they get paid too. The elderly members, who do no longer fish, guard the caleta during the day, through a rotation of two members/day. A paid vigilant watches the caleta during the night.[50] Not paid to watch the MA, the fishers from San Pedro (another fisher organisation) have an eye on the part of the MA most distant from the caleta building since Peñuelas share their MA

[48] Interview with the then president P. Guzman, 2008-11-24.
[49] They get paid 6 000-8 000 (US$11-15) day, depending on how much they have to carry. Phone interview with S. Muñoz, 2010-06-04.
[50] He gets paid 180 000 monthly (US$ 344).

with San Pedro fishers.[51] Compared to a rural Chigualoco, this saves MA Peñuelas a great deal in vigilance and labour efforts.

Very rapidly from 8 a.m., in the middle square of the caleta, the building is filled with feverish and synchronised activity where everyone seems to know their roles. There is no loss of time. Even the dogs are happily barking and jumping in excitement, and some of them actually help pulling the boats out into the sea – with their teeth! After less than an hour, almost all boats have departed for their destination: Punta Teatinos, at the other end of the bay. It takes less than hour to get there by boat. Once there, all the boats take a position following the coastline, leaving a safe distance between boats.

Macha extraction is hand-made and divers are submerged about 6 to 8 meters. The bags are attached to brightly coloured buoys, which indicate where the diver is. Each diver is taken care of by one fisher in the boat. When the divers have extracted the relevant quota for the boat, the boat returns to the Caleta with the load. The boats will arrive in succession to the caleta, where there is already a group waiting to help unload the bags. The bags are placed on handcarts and moved to where they are weighed under a shelter. A fisher notes the number of bags and weight of harvest. The bags are being put neatly into piles. Near is also a desk with a smaller weight, where the remnants are sold in smaller quantities to the public. The income from the public goes to the *caja chica* (the small cash), and the money is accumulated to cover part of the MA's cost.

Once the boats deliver their cargo, fishers help each other to drag the boats up the beach where they are parked. The buyers are waiting in their vehicles and they pay at the office, where a fisher receives the payment and accounts for the sales. The secretary organises the money coming in, which is paid to the fishers later the same day. The workday is over by 2 pm. The last in the chain (picture 4) portrays the sale to wholesalers who distribute the resource to consumers. These include, in the first instance, local consumers such as supermarkets, general public, restaurants and finally the national market.

It is easy to observe at first sight that the Peñuelas caleta – with its impressive caleta building and the neuralgic point of the caleta – denote well being and order, an impression that soon becomes even stronger seeing the highly efficient organisation of labour during the fishing day, the distribution of jobs and the quick departure to the sea of almost all the boats at the same time. But the fishers from Peñuelas are not alone extracting machas in their MA. Fishers from the Coquimbo guild association[52] work together with them through an agreement of 'delivery service'.[53] To the shallow part of the sea towards the beach, access is given to another fisher organisation, the San Pedro guild association.[54] To add to the complexity, above the Coquimbo and San Pedro fishers, also the *Sindicato Trabajadores Independientes (STI) Macheros*[55] actively participate in sectors A and B of MA Peñuelas, appropriating part of the macha quota.[56] Peñuelas allows San Pedro and STI Macheros to take machas only

[51] E-mail interview with J-F Dubo Dubo, 2010-06-12.
[52] *A.G. de Buzos y Asistentes de Buzos de caleta Coquimbo*.
[53] This association have 10 boats and 30 members. Interview with A. Dubó, 2008-11-24 and e-mail interview with J-F. Dubó Dubó, 2010-06-12.
[54] *A.G. de Pescadores y Buzos Mariscadores de caleta San Pedro*, which according to Sernapesca has 181 members, some of them women. Informe Pesquero Artesanal, Coquimbo 2008; pp. 35.
[55] With 43 members.
[56] Informe Pesquero Artesanal, Sernapesca Coquimbo 2008, pp.35.

by using their feet and hands – they are not allowed to use boats or dive in the deeper sector.[57]

In total the number of people fishing in the area reaches around 453. The total number of boats reaches 50, counting the 10 extra coming from Coquimbo. Doubtless it is Peñuelas that is in power in this trio, but the existing agreement with both Coquimbo on one hand, and with San Pedro and STI Macheros on the other, seems to be based on good will. This good disposition of Peñuelas is most probably based on the abundance of machas in their MA and thus a good income. There seems to be no fear of getting short of machas, and no worries that the resource might be threatened by the activities of all these fishers. A new threat could be another heavy rain period.

THE MA OF CHIGUALOCO

The fishers' union of Chigualoco[58] acquired their MA[59] in 2002 (Sernapesca 2008). The union consists of 49 members (ESBA 2007). The Chigualoco union board is composed of a chairman, a treasurer and a secretary. The organisation has a union house in Los Vilos, which is cause for pride among the Chigualoco fishers as such houses generally have to be purchased. The union is affiliated to the National Confederation of Fishers of Chile, the CONFEPACH. To operate the MA, the union also has four commissions.[60] These commissions are not one-man-commissions, as in Peñuelas, but consist of about five members each. The fishers who took part in our PRA practices and in interviews all seemed to have good knowledge of their organisation.

Two PRA Venn diagrams were made,[61] one by the President and one by a group of fishers.[62] All together the President describes nine different important internal and external functions that his presidency includes. The president was proud to show his importance. The president together with the *alcalde del mar*, who also took part in the PRA exercises, are the two main formal and informal leaders in MA Chigualoco. The Venn diagram drawn by fishers hightlighted the Banco del Estado to which the MA and the fishers are indebted – a debt that has increased since the price of locos started to decline.[63] The MA was granted the loans as a MA, but the

[57] Peñuelas' agreement with San Pedro fishers who lack their own MA was from the beginning an oral one made by the leadership of Peñuelas. Interview with leadership, 2008-11-25. The Exploitation and Management Project for San Pedro's Cove Guild Association (A.G.) of Fishers and Seafood Divers was approved by means of the N° 2319 Resolution of August the 2nd, 2007 (Sernapesca, Coquimbo, 2008, pp. 35). San Pedro got its own MA in the Punta Teatinos in 2008, but the organisation has not yet delivered its ESBA study, which is a mandatory for caducity. Informe Pesquero Sernapesca 2008, pp. 35; personal comm. by e-mail with G. Cerda, Sernapesca, 2009-11-09.

[58] The Sindicato Trabajadores Independientes (S.T.I.) de Pescadores Artesanales y Buzos Mariscadores Extractores de Productos Marinos Caleta Chiagualoco.

[59] These are three: Boca del Barco, Chepiquilla, and Chigualoco. Lat. S. 31 o 56'; Long. 71 o 31'. (ESBA 2007).

[60] The MA Committee with 5 members, the Disciplinary Committee, also with 5 members. There is also a Welfare Committee, which is responsible for supporting the needy. Finally there is the Sports Committee that within the national culture usually means football.

[61] The Sea mayor is responsible for order and security in the cove and he receives information about weather conditions and gives the authorisation to navigate.

[62] The diagram should reflect also the degree of closeness or remoteness of the institutions or actors with whom the MA interact. An assessment of the union's commissions should also be considered. However, in these two diagrams the aims were not fully met.

[63] Several neighboring caletas were enumerated in the Venn diagram. With most of these, MA

responsibility to pay back is individual.[64] As of June 2010, Chigualoco had two loans at Banco de Estado: one loan of 22 million pesos (US$40 000) that was taken in 1993 (half a million pesos (US$900) per member). In 2006 that loan had increased to 34 million and the union renegotiated so that they would be allowed to pay 11 million pesos (US$20 000) per year, of which 9 million pesos is due in December 2010. According to the president, the union took a loan in advance to be paid with the loco harvest but were cheated by an exporting company, which bought locos with an empty check (the union has sued the company). When that happened the union was unable to pay back the first loan. That is why they took the second loan, to pay back the first one (the above mentioned). In March 2011 and March 2012 the union has to pay 9 million pesos on the second loan.[65] During the loco extraction in 2009/2010, every member (45 members) should have participated, but 10 did not. Their part of the loans to the banks will therefore not be paid.

When the union got its entitlements, it comprised of 80 members, and none of these had to pay to belong to the MA, but this changed as years passed. Later, to become a member demanded payment.[66] Since the beginning, 38 members have been excluded due to not participating. In June 2010 MA Chigualoco had 45 members in total, and the President states that with time, they might need to take new members on, not least due to a high age among present members.[67] The union regulations do not state that it is not impossible to have another job full time while being a member of the union, but the assembly can change the rules. What the rules do state is that if a member is away for three meetings in a row, he gets suspended for a time.[68] Partial engagement is an issue of concern, and the union is (in 2010) discussing this issue.

Chigualoco's socio-geographical location

Chigualoco's caleta (ca. 250 km north of the capital Santiago) is inserted within what we could describe as a half bay (see fishers' map). The rural context is made of two big landed properties with a beach in the middle. To the north is the Santa Ana land property and to the south, the property belongs to the Matte Larraín family, who gave the fishers the commodatum[69] over the caleta (temporary free loan or easement).[70] To the north, the coast line is abrupt and dangerous. The three MAs embrace a total of 600 hectares.[71] At the southern part of the beach, a long land arm extends in a chain of low hills into the ocean, protecting the beach.

Chigualoco has no contact, but with Caleta de Huente – the caleta closest to the Chigualoco cove – they communicate before any modifications or changes concerning the MA are done.

[64] Telephone interview with President J. R. Masbernat, 2010-06-29.

[65] Telephone interview with President J.R. Masbernat, 2010-06-29.

[66] For example, four people have paid 50 000 pesos each, and two have paid 150 000 pesos (100 000 for material and 50 000 for the membership (Telephone interview with J. R. Masbernat, 2010-06-29).

[67] Telephone interview with J. R. Masbernat, 2010-06-29.

[68] Telephone interview with J. R. Masbernat, 2010-06-29.

[69] The TURFs are in themselves considered by the Artisanal Fishers National Confederation (CONAPACH) as a use agreement (*a comodato precario*, commodatum precarious (unsecure/unsave) which are subjected to caducity under the guardianship of Subpesca. "Informe de la Comisión de Pesca, Acuicultura e Intereses Marítimos recaído en el proyecto que de Ley que modifica la Ley General de Pesca y Acuicultura en materia de Áreas de Manejo y Registro Pesquero Artesanal". Boletín, no.º6391-21-1(2009-11-10).

[70] Open interview with Sra. Maria, 2008-11-19.

[71] Subpesca 2006, Informe Técnico Amebr No 232/2006 Evaluación Chigualoco.

		
Picture 5: Caleta Map Chigualoco	**Picture 6:** Chigualoco caleta against the little hill with the building and the wave protection wall that they got from Government.[72]	**Picture 7:** "Prohibited to dive and collect shellfish in the MA". Behind the placard, the backyard of the caleta can be seen, where some families live in provisional housings

At the caleta, in a part outside of the commodatum, a few poor families live, like William's, a young paid helper or auxiliaries assisting fishers in the caleta, who helped to draw the map.

In the caleta nucleus, other fishers live too, including Sra. Maria and her partner. They live there with the consent of the owner of the Santa Ana property.[73] Inside this, and other properties of the same family that follows to the North, she says, there are at least 16 summer residences. A part of the beach owned by the Matte Larraín family, was given in concession to a private person who has built a modest summer camping. According to fishers Martínez and Rojo, the summer camping was installed in 2004. With it, the number of summer guests diminished, and in turn part of the incomes for the fishers. Those that spend vacations on the camping now pay for it, leaving no money left to buy fish from the caleta.[74]

To access the caleta, one takes a small dirt road from the Pan-American Highway, which runs parallel to the MA. This portion of the highway is administered by a private concessionary company. According to various fishers, the union has a lawsuit with the company.[75] The background to this lawsuit is that the union undertook a repopulation sea urchin (numbering 100 000) in the southern part of the beach, that disappeared. According to the fishers, the 100 000 sea urchin seeds died when the concessionary company broadened the highway and threw excessive soil into the sea.[76]

The open character of the northern part of the area makes the caleta, much like the Peñuelas caleta, not a natural one. The Dirección de Obras Portuarias (DOP; Board of Harbour Works) have built a *molo*, a long arm (ca 20 meters) of stones and cement into the sea to protect the caleta from the open sea, allowing a safer drawing

[72] Depto. Obras Portuarias del Ministerio de Obras Públicas. The union did not have to pay anything.
[73] According to her, also this part still belongs to the Santa Ana property, although it rather seems to be part of the cove and easement given by Matte Larraín.
[74] Notes from Cove Map, 2008-11-21.
[75] Notes from Cove Map, 2008-11-21.
[76] The State passed a fine to the concessionary firm and the union put a demand against this company three year back (ca. 2005) for the loss of the urchin repopulation. The union has several lawyers helping them with the lawsuit, which up to the year 2008 have cost them around one million pesos. Open interview with J. R. Masbernat, 2008-11-14, and with M. Godoy, 2008-11-19. This version — that the sea urchin died due to the company's activities — is questioned by a consultant we interviewed, and whose name we maintain anonymous. Interview with consultant, November 2009.

of boats into and out of the sea.[77] Chigualoco also have what Peñuelas lack – an electric dragger with a winch, which they use to draw the boats out of the sea, while still manually pulling the boats into the sea. Since DOP also built a ramp sloped towards the sea (see picture 6), this job in not as physically demanding as in the Peñuelas case, where the boats are dragged through the sand.

For DOP to be able to build any infrastructure, an agreement must exist that gives the easement to the fishers, something confirmed by Sra. María's information. According to Martínez and Rojo, the Matte Larraín donated 5 000 square meters for the caleta.[78] We conclude that the fishers have had a positive relationship with the Matte Larraín family; not all landowners are generous concerning land with access to a beach. The situation is different with the owners towards the North, more specifically with the owner of the Santa Ana property, who do not allow Chigualoco fishers to access the sea through their property's entry, which is situated beside the Pan-American Highway. Therefore, the fishers have to pass through the less accessible places, edging the sea through the hills and cliffs when they go fishing on the coast line inside the Santa Ana and return overloaded with algae – a dangerous endeavour. Due to his age, fisher Martínez cannot do this anymore, something that diminishes his incomes. There are around 12 fishers that go to harvest weeds at the other side.[79] Only two of the summer-house owners allow the fishers to take weeds, the rest of the chalets make trouble if they do. The caretakers of the summer houses inside Santa Ana also take weeds and 'steal' locos from the Chigualoco MA; they have access to the MA from the summer cottages, fishers say. One of the heirs of the landed property had plans (in 2005) to build a Yacht club within the MA (Punta la Mostaza). The union protested and the plans were apparently stopped, fishers say.[80]

Sra. Maria considers the MAs to be a problem because they restrict the access to the sea for those who are not MA members. To sustain herself, Sra. Maria sells eggs and chickens. She used to have a kiosk selling some essential food before the summer camping was installed on the beach. "Although we are poor, we lack nothing", she says.[81]

The majority of the Chigualoco MA members live in the town of Los Vilos, around 15 km south of the caleta, in lower middle-class *poblaciones*. William – the helper – lives and works at the caleta where, among other chores, he helps by putting meat onto hooks in crab cages (*haza* or *jaula*). For this job, the fishers pay him 200 pesos (US$0.38) per cage. During the summer he denudes/strips the fish, prepares the locos and sells fish for the members at the camping, getting to keep half of the income. He earns around 120 000 pesos (US$230) per month in 2008 (compare with 159 000 pesos (US$304 of the minimum salary). During the winter he works as a day-worker, for example planting olive trees. He says that he cannot afford to become a member of the union as it costs around 200 000 pesos (US$383) to join. However, he doesn't like the sea, or fishing, so, he argues, "it wouldn't make much sense for me to belong to the union or MA anyway".[82] Those living at the caleta are poorer than the fishers living in Los Vilos. The fishers and the caleta

[77] A more expensive solution in these cases would be a construction of a pier with a crane so that fishers could lift and sink their boats, but due to the limited landings of the cove, it is improbable that the state would invest in such an infrastructure.
[78] Notes from Cove Map, 2008-11-21.
[79] Notes from Cove Map, 2008-11-21.
[80] Interview with M. Godoy, 2008-11-19.
[81] Open interview with Sra. Maria, 2008-11-19.
[82] Open interview with W. Rojo, 2008-11-19.

residents partly share work, as William's agreed and paid services to the fishers, and partly compete for work, as in the case of collecting weeds.

A problem that fishers took up to be analyzed in the Problem-tree exercise was analphabetism. This problem primarily affects the fishers and their families. Fishers defined four causes for this problem; all dealing with lack of education. Fishers get engaged in work at a young age. Only 50% of the fishers have gone all the way through 8th base. And as low as 10% of them go through the whole secondary education level. Only a few, among them the president, are what could be considered as well educated. The president (not originally a fisher) came to Los Vilos as political dissident relegated (forced settlement) during Pinochet's rule, and married a fisher's daughter. He is educated and also experienced politically, and he enjoys the advantages of connecting to the outside world, socialising with and having a voice in important assemblies, which is an advantage to the union as a whole, but which is also sometimes viewed with scepticism.

As the fishers engage in fishing very young, as high as 40% of them are not schooled. The effects of this lack of formal education on the fishers' families are many. Low schooling seems to lead to a lack of motivation to follow the opportunities that are given for capacity building, which diminishes the chances to progress. We imagine that being partially analphabetic is a serious difficult to follow training courses. The fishers continue as fishers even though they might want to do other things, however lacking the capacity for better options. If noting changes and things continue the same way, resistance to change become cemented. The children of the fishers have no role models doing anything else than fishing. So, even when they have opportunities to exceed that and go beyond, they tend to fail. This is a classical case of cultural heritage among various groups in society, evident also in many other contexts. A fisher working at the caleta says: "Therefore our concern is that our children don't end up like us, we try to give them opportunities. But unfortunately they don't have them because they finish their degree, and hand-out resumes, and there they are."[83]

Production, commercialisation and division of labour in the MA Chigualoco

The Chigualoco fishers have a total of 22 boats, which are individually owned by some of them. The *loco* is the main target specie of the MA, and extracted for a few days around December-January. *Lapas* is the other target specie, extracted throughout the year. During most of the year, when locos are not extracted, the fishers are dedicated to fishing or catching crabs within the 5 nautical miles provided for artisanal fishers, gathering or harvesting weeds or work in other places.[84] Out of the 45 members, about 30 work actively within the MA, extracting the target species. These 30 members also work with crabs and weeds in and outside of the MA – six boats and 15 fishers go out to sea and about 15 stay to pick what the sea throws ashore. In 2010, the Chigualoco fishers sell their extracted and collected weeds for export via three *intermediarios* or middlemen. Weed extraction is done both from six boats with divers harvesting the weeds, and from the shore, and half of the labour force – a total of 30 fishers are engaged in this – work in each manner.

There is the problem of commercialisation the fish and benthic resources, analysed by fishers in the Problem-tree PRA exercise, in which were defined several

[83] Interview with fisher Enrique, 2008-11-19.

[84] One MA member was collecting weeds outside of the MA when we meet him, but that is according to himself just one of his occupations. He also works as a fireman at a gas station. Interview with fisher belonging to MA Chigualoco, 2008-11-16.

causes such as lack of resources and infrastructure to process fish, that the fishers themselves lack contacts for export while companies have monopoly concerning export, internal commercialisation and bureaucracy, and that middlemen (*intermediarios*) have too much power in relation to the fishers. The middlemen have direct contact with export companies, controlling export channels. They pay the MA fishers a low price while still demanding high quality. And the companies, sometimes buy and sometimes not.

Locos extraction no longer bears its costs for MA Chigualoco. But there has been, for some years, a boom in the demand for weeds and, with time, perhaps other resources from the MA will be in greater demand. In any case, the most important target specie of the MA is no longer the milk cow, nevertheless the fishers still hold on to their MA and the exclusive rights to extract from it.

ECONOMIC RETURNS WITHIN AND OUTSIDE OF THE MA PEÑUELAS

The net annual income[85] from machas for a fisher in MA Peñuelas in 2007/2008[86] was 3 390 247 pesos (US$6.495), which equals a monthly income of 282 520 pesos (US$541), which is compared with the figure of 165 000 pesos (US$295), the minimum Chilean salary for 2009. Fishers also have incomes from the ALA ("open" access areas), and from fishing within but not for the MA, in most cases from other jobs than fishing.

The income is somewhat higher if we consider a longer time period based on official statistics. For the years 2002-2008, we get an average net income per member per month of 320 888 pesos (US$532), see 3.

Table 3: Peñuelas macha quotas, extraction and incomes, according to official statistics from Sernapesca – medium values, 2002-2007/8

Year	Quota, kg	Extraction, kg	Total value pesos	Price/kg Pesos	Total value US$*
2002	1 562 000	1 520 000	1070 000 000	725	1 553 201
2003	12 000 000	1 113 000	779 100 000	700	1 126 844
2004	5 050 000	429 000	364 000 000	775	597 211
2006	2 500 000	974 000	779 200 000	800	1 469 440
2007/08	2 500 000	898 764	821 648 900	914	1 572 835
In total		**4 934 764**	**3813 948 900**	**3 914**	**6 319 531**
Medium values for 2002-2008 below					
extraction		986 953			
annual gross income			762 789 780		1 263 906
price per unit				783	
costs (P medium 5.6%)			42 716 228		70 779
annual net income			720 073 552		1 193 127
annual net income/member			3 850 661		6 380

[85] Gross incomes minus constant MA costs of ca 15 000 0000 pesos (US$ 28,736) consisting of: tax, vigilance, consultants, secretary, fuel, car rental, electricity, water, office telephones, cell phones (for the directive), coffee, and other costs. The variable costs are carried by the boat owners, who in return get two shares – one for himself and one 'boat share'.

[86] Based on gathered material from the administrative personnel at the Peñuelas office and the sea mayor, compiled by us (making our own seasonal calender as well as a calculation of labour distribution and quotas, instead of using PRA exercises).

monthly net income/member	320 888	532

*Conversion to US$ with the medium rate for each year. **Source**: Elaboration based on Informe Pesquero Artesanal, Sernapesca, Region de Coquimbo, 2008. The 2007/2008 figures are based on information gathered at the first field trip, Base: 187 members. No info for the year 2005.

According to Muñoz, macha sales have diminished since the February 2010 earthquake, and due to this, there are now 18 fishers from MA Peñuelas in non-fishing occupations, Before the earthquake they used to sell around 8-10 tonnes of machas a day. Today they sell around 5 tonnes.[87] This tells us how dependent MA and its members are on market fluctuations, and it is common for many fishers to work directly or indirectly in mining activities that are spread in northern Chile. Engagement in other labour activities to complement household economy is a problem for the MAs due to the absenteesm of the fishers as it is the Chiagualoco case.

When fishers do not extract machas within the MA, some fishers fish in the ALA ('open' access areas).[88] Fishing in the ALA is done in small groups of three or four fishers. The fishers keep record of their fishing in a ship's logbook (*bitácora) to* report landing monthly to Sernapesca. The income is traditionally shared equally between the participating fishers, with one extra share to the boat owner, 'the share of the boat.'[89] Incomes vary according to many factors such as weather, specie and fish availability.

About 30 fishers fish *corvina* 3 or 4 days a week (10 boats and 3 persons per boat) in the ALA. Every boat has 12-15 boxes, 33 kilos per box. If we count with 12 boxes a day it would give us 396 kilos corvina or 1 188 kilos for 3 working days. If the price for 33 kilos is 5 000 pesos (US$9.6), three days would give 180 000 pesos (US$345), which means 45 000 pesos per fisher and about 180 000 pesos (US$345) a month. Other fishers fish *cojinova*, also about 3 days a week taking between 5 and 25 boxes on a fishing tour. If we count with 15 boxes at 10 000 pesos (US$19) a box, we get a total of 150 000 pesos (US$287), which divided by 3 fishers and 1 boat share is 37 500 pesos (US$72) on each fishing tour, or 450 000 pesos (US$862) a month.[90] A third source of income for the Peñuelas fishers is from fishing within, but not for, the MA. The monthly income from this is about 120 000 pesos (US$230).[91]

According to fisher Alfonso Dubo, the Peñuelas fishers have continuously become better of economically, and in 2007, every fisher owning a boat had an income of about 1 000 000 pesos (US$1 915) per person and month. Now (in 2008) all fishers have had three years of good incomes. "Some spend, some invest their money – as always", A. Dubó says. He himself has three children, two for whom he has paid university education and one car each.[92]

ECONOMIC RETURNS WITHIN AND OUTSIDE OF THE MA CHIGUALOCO

During our first visit in 2008, Chigualoco was still selling locos – their main target specie – for export. The number of fishers working with locos, lapas and weeds is 30,

[87] Phone interview with S. Muñoz, 2010-06-04.
[88] For example: Corvina, Jurel, Cojinova, Merluza, Congrio, Pescado de Peña, Lenguado, Toyo and Pejegallo.
[89] The boat owner then carries the costs (only variable ones).
[90] We got different information regarding the incomes from the ALA, the lowest being 160 000 pesos (US$306).
[91] Based on information from collected material and interviews on first field trip, De. 2008.
[92] Interview with A. Dubó, 2008-11-24.

although the MA members in Chigualoco are 45. 10 boats are used for loco extaction. Fishers are selling the locos to Chilean restaurants through intermediaries. For several years, companies that buy locos discuss the deals with the MAs and, when the price is set, count what will be left of the locos after removing the shell and intestines and drying them out.[93] In 2010 however, the income if selling locos for export was as low as about 200 pesos per unit (compared to when the export income was at its peak at 1700-1800 pesos per unit in 2002/2003),[94] which is why MA Chigualoco now sell for national consumption at about 500 pesos per unit,[95] thus getting a better price.

Loco extraction is performed mainly from December to February. The biggest harvest of locos in Chigualoco was during 2004, landing 85 623 units, and the highest price per unit, and the highest income for Chigualoco was in 2002 with a total income of 83 510 000 pesos (US$121,381), see Table 4. Our calculations concern the year 2009/2010, when the allowed quota was 25 000 units, but the harvest only reached 10 000 units. The costs (for this year (7 938 800 pesos, or US$14,176) exceeded the incomes (5 000 000 pesos, or US$8,928), i.e. the MA lost money from loco extraction, if we based ourselves in the information given by fishers. The net annual income/member was minus 83 966 pesos (or minus US$150). Without the extra incomes from lapa extraction (where we so far have no info) and weed extraction, the union would be very bad off, as would all fishers individually concerning incomes from engaging in MA fishing.

If looking at Chigualoco's incomes over a ten-year period, the result is better, though still low. However, the incomes from locos have decreased (see price/unit in 4) and costs in this MA is considerably higher in relation to income than in MA Peñuelas, see further below. Monthly net income per member over the ten-year period is still only 7 083 pesos or US$12 (!). And what is worse, it goes to pay the fishers' debt to the bank.

This means that the income for those individual active fishers in the caleta comes from weeds, and some other small incomes from fishing and catching crabs within the ALA. Weeds are extracted mainly from December to April, when it can be dried on the beach. During the year 2009/2010, the 15 members working with weed extraction by boat (six boats), extracted a total of 1 000 000 kilos to the (medium) price of 85 pesos per kilo. The total income from weeds was thus 85 000 000 pesos (US$151,786), which makes a net monthly income 337 302 pesos (US$602).[96] Compare with 165 000 pesos (US316) of the minimum Chilean salary for 2009. Weeds are thus what sustain the fishers for which they use the MA and the caleta.

[93] Only about 10% of the loco weight remains in dried locos, according to an expert from IFOP. E-mail contact with C. Techeira, 2010-08-27.
[94] This is the President's information. Official statistics state that the fishers of Chigualoco were paid the highest price per unit of 1250 pesos in the year 2002. Sernapesca, Coquimbo, 2008.
[95] Telephone interview with R. Masbernat, 2010-06-29.
[96] Elaboration by based on telephone interview with J. R. Masbernat, 2010-06-29.

Table 4: Chigualoco loco quotas, extraction and incomes, according to official statistics from Sernapesca – medium values

Year	Quota	Extraction	Total value pesos	Price/unit pesos	Total value US$
1999	56 700	51 456	48 883 000	950	96 079
2000	53 500	53 375	53 375 000	1 000	98 936
2001	55 000	55 000	66 000 000	1 200	103 948
2002	67 200	67 200	83 510 000	1 225	121 381
2003	71 628	71 291	35 645 000	500	51 556
2004	86 673	85 623	58 223 000	680	95 526
2005	78 283	74 113	48 173 000	650	86 060
2006	24 500	7 917	5 146 000	650	9 704
2007	56 147	32 351	21 028 000	650	40 253
2009/10	25 000	10 000	5 000 000	500	8 935
In total	**507 431**	**441 126**	**424 983 000**	**8 005**	**712 378**
Medium values below					
extraction		44 113			
gross income			42 498 300		71 238
price per unit				801	
costs (medium C 91%)[97]			38 673 453		64 826
net income			3 824 847		6 411
annual net income/member			84 997		142
monthly net income/member			7 083		12

* Conversion to US$ with the medium rate for each year. **Source**: Elaboration based on Informe Pesquero Artesanal, Servicio Nacional de Pesca, Region de Coquimbo, 2008. The 2009/2010 figures based on telephone interview with Ricardo Masbernat, 2010-06-29 Base: 45 members.

RELATION BETWEEN ECONOMIC RETURNS AND SUSTAINABILITY IN MA CHIGUALOCO AND MA PEÑUELAS

The result of our cases studies confirm that TURF system varies economically, much depending on the particular case and that there seems to exists a relationship between the economic returns of a MA and its institutional and organisational aspects. These two factors in turn, seem to have implications for the sustainability of the ecological system.

While MA Peñuelas is doing well economically and also institutionally/organisationally, MA Chigualoco is economically much worse off, which seem to interfere with the possibility of keeping their members at the caleta and of organising in a mutually trusting way. While economic returns from the MA in Chigualoco seem to be very low, about half of the incomes of fishers in MA Peñuelas come from machas. However, fishers in both MAs complement their income by extracting other resources: weeds in Chigualoco and fish in Peñuelas. If we also consider non-MA production, fishers in MA Chigualoco have a monthly income of 337 302 pesos (US$602), while fishers in MA Peñuelas have almost the double: a monthly income of 562 520 pesos (US$1005). This is to be compared with results of the First National

[97] Including costs for tax, interest, vigilance, transport, cell phones, car rental, milage, gas etc.

Fishing and Aquaculture Census (2008-2009) where for region IV, fishers had an average of 331 545 pesos for June 2007-May 2008.

In regard to their target specie (loco), it seems that in Chigualoco the benefits of the MA territory are not attractive enough compared to those outside of the TURF, leading them to 'illegal' fishing (seemingly also from within the MA). Nonetheless, regarding non-target species, the contrary holds as the MA give them the exclusive rights to the caleta and to extract other resources within the MA. Also here they seem to extract weeds outside the MA, using boats and diving, apparently not in accordance to the regulations for weeds extraction, on which there is ban, being allowed under special circumstances such as experimental extraction.[98] So, despite their economic returns from the loco not being higher than the costs and efforts of engaging in the MA, they continue with it. In this sense, the unsatisfactory economic returns in Chigualoco seems to influence fishers institutionally, and when trying to complement their economy, formal regulations and internal rules are overruled, and therefore also the ecosystem. Thus loco extraction in MA Chigualoco is an uncertain endeavour that also raised questions about its sustainability.

Chigualoco fishers are not alone in it trespassing the rules. González *et al*., in 2006, estimate that as much as 50% of fishers' incomes (including MA members) are derived from illegal fishing in the historical areas. Depletion in the latter might be affecting productivity in the MAs and in their long term sustainability. Here lies a sustainability challenge, as the TURFs are not biologically disconnected from the historical areas, but action in one area affects the outcomes and resources in the other. Incentives for conserving resources within an MA may for example decrease if a lot of the resource is extracted from the historical area, increasing the supply of the resource (Orensanz *et al.* 2005).

Also decreasing world market prices of locos is a general problem affecting fishers, but also the calibre of the specie. Fishers say that the individual loco itself is not fat enough. A fisher says: "… studies must be made on the water; I have no idea why, because now it's bad… and the same is happening in all the other caletas."[99] And with low economic results, rent dissipation is fact.

'Illegal' fishing in Peñuelas within and outside the MA seems not to be an issue. Poaching apparently comes from people not being fishers and Peñuelas even shares its MA with several fisher organisations. Here the economic returns of TURFs are apparently higher than the costs and efforts of engaging in it. And this in spite of them being quite numerous and despite that they do fish together with another fisher organisation; also sharing the area with at least two other fisher organisations. Regarding the TURFs condition that the benefits of the territory should be more attractive than those outside of the TURF, both spheres are separate, not interfering with each other in terms of what they get from each (machas from the beach and fish beyond).

In this sense, the satisfactory economic returns in Peñuelas seem to influence fishers institutionally, positively benefiting both them and also the ecosystem. The MA Peñuelas is not only innovative, but also a socially well-functioning organisation, with a well developed and generous system towards other fisher organisations. Internally against its own members and solidaric with fisher's families and the near context.

Our result for Peñuelas are validated by Zuñiga's *et al.* (2008:74) who, in their

[99] Interview with fisher belonging to the Chigualoco MA, 2008-11-16.

study of 30 MAs in Region IV, shows that that the economic characteristics of MAs affect the rests of the variables, per capita income being highly related to the 'success' of the MA. As suggested by these authors only five MA did well economically, while the rest performed regularly or bad. Peñuelas has the leading place among the best performing MAs with a global indicator scoring 0.698 (ranging from 0 to 1). Of the synthetic indicator, the economic criteria – increase of MAs income, income stability and of fisher's per capita patrimony – scores highest with 0.89. This is followed by the institutional aspects – increase of fishers participation in decision making, proportion of autonomous decision for the administration of the MAs, organisations self management and a diminishing of the dependency of extern support for the consultancy – with 0.64 and the social – increase of job security and social prevision, among others – with 0.53.

However, irrespective of economic performance, both fisher organisations have been empowered and gained increased control of resources with the implementation of the TURFs; the MAs' economy is not everything. Also the social consideration could include much more than having a well functioning organisation. There are intangible values, which are difficult to value, capture and measure in connection with the TURFs as a common institution, and how fishers perceive their endeavour while struggling as a collective to make their living.

Due to many circumstances the role of both MAs seems to be changing. While Peñuelas is trying to start exporting again, Chigualoco is instead selling its MA production internally, adapting their strategy in accordance to resource availability, quality, both market prices and their own economic and institutional management. As San Martin *et al.* (2010) suggest on the TURF system, one size doesn't fit all. Therefore a differentiated policy support could be more suitable for the large variety of existing TURFs and the particular challenges. Also, TURFs can be considered to serve society at large by contributing to keeping ecosystem services viable. Perhaps this is what the president of MA Chigualoco means when he says that MAs also serve society much more than what society and the state serves the MAs, and in a very different way. He calls this social profitability (*rentabilidad social*), "We", he states, "take care of the fishers, and nature – and this is bonus benefits society".[100]

Not only locos are exported but also weeds, part of which stay in the country, destined for domestic abalone aquaculture, a high value commodity that also goes to Asian market. Thus both TURF and non-TURFs production and therefore also the economic result are closely connected to the global market and yet fishers cannot influence either the larger ecological context or the global market conditions. In terms of food provision, that which goes to export cannot obviously be consumed in the country, and export success of native species, increases prices at a national level, making these products un-accessible for low income people in the country.

SUMMARY DISCUSSION – TURFS WITHIN GLOBAL UNEQUAL EXCHANGE

Environmental degradation, trade and socio-economic development are globally linked processes. The unequality at the global market thus constitutes a great risk for sustainable development in the global South among vulnerable social groups. In the case of artisanal fisheries in Chile, neither fishers in economically well-functioning MAs, nor fishers in less economically beneficial MAs can have much control over the driving forces or prices on the global market. Irrespective of economic performance,

[100] Telephone interview with J. R.Masbernat, 2010-06-29.

they must adjust to changing world market prices.[101] For example, when the price of the loco decreases, fishers might engage in extraction of other species (for example weeds), or in illegal (that is over quota) extraction or fishing in open access areas. If extracting weeds at a rate that is ecologically too high, or over-extracting locos, the sustainability of the resource is threatened. Finally, there is an issue of equity concerning resources that are highly valued by the global North (for example the loco). While the price is dictated by the international market, Chileans who are poor do not even see it. This too might affect ecological sustainability negatively – if the price is too high for Chileans and people still want to eat it, there is a high likelihood that a parallel market develops, based in illegal or over quota fishing.

We are not all in the same boat (Hornborg 2009) – the power of the artisanal fisher is different to that of a TNC. Powerful private corporations gain from current global accumulation, while also shaping the very rules of global economic development from which they benefit (Friman & Gallardo 2010). This is a reality that artisanal fishers cannot do much about, having to adjust to the changing rules of the game of global exchange, which first and foremost benefits the global North.

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[101] The dependence, and thus the sustainability-uncertainty concerns not only artisanal fisheries, but the agricultural sector in Chile in general, which from being marginal has become increasingly important for export, see Gallardo 2008.

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ACKNOWLEDGEMENTS

This paper is a result of an interdisciplinary Swedish Research Council (VR) financed project (2008-2011) called 'Sustainable Global Patterns of Production and Consumption.' We thank VR for granting our application. We warmly thank the fishers and leadership of MA Chigualoco and MA Peñuelas, for willingly engaging in interviews and exercises, as well as Chilean experts and officials within the artisanal fisheries sector, agreeing to be interviewed and engaging in e-mail and phone communication. For swift and helpful language editing, we kindly thank William Guest.