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Emerging commons within artisanal fisheries. The Chilean territorial use rights in fisheries (TURFs) within a broader coastal landscape

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Abstract: Territorial User Rights in Fisheries (TURFs) have spread in Chile, since the late 1990s, in the form of commons institutions. TURFs are presented by some scholars as a social-ecological success; by others as showing economic and compliance problems. Studies looking at the material conditions in which fishers produce and reproduce their livelihoods, and in which TURFs emerge, are scarcer. Ostrom's theory on the commons claims that certain collective action conditions have to be met to become thriving commons institutions. Our hypothesis is that while institutions are moulded by local material conditions, such as geographical location and social embeddedness, these impose challenges and constraints

upon fishers influencing TURFs' long-term viability. How are collective action conditions influenced when the new TURFs commons do not emerge in *tabula rasa* contexts but in occupied spaces? Do material conditions influence TURFs' sustainability? This paper set out to explore these conditions. Huentelauquén's and Guayacán's TURFs (central-northern Chile) were chosen, as they represent two extremes (rural-urban; on private property-on State/municipal property; mainly diver – mainly fisher) contexts in which TURFs have emerged. We mainly used Participatory Rural Approach (PRA) tools triangulated with other qualitative methods. This study shows that both social embeddedness (private/State lands), and geographical location (rural/urban) matter, resulting in different access to the coast for different TURFs, thus determining some important differences between our cases in at least three relevant areas: entrance, social relations between the fishers' organization (entitled the TURFs) and the landowner (private or municipal/State) and the existence or absence of fishing and general infrastructure. Competition for space among key actors seems to affect the process of acquiring a TURF as well as the conditions conductive to collective action. TURFs' assessments should therefore consider both, the local particularities of specific fishing communities and the larger structural context in which they emerge, that if not paid attention to, can weakens TURFs' viability for sustainable fisheries.

Keywords: Artisanal fishers, Chile, material conditions and land tenure structures, MEABRs/TURFs, organization, rural/urban location, social embeddedness

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1. Introduction

The adoption of Territorial User Rights in Fisheries (TURFs) within small-scale fisheries in Chile are shown worldwide as an example of success (Castilla et al. 2007), apparently improving the social-ecological system's sustainability (Gelcich et al. 2010). Nevertheless, also problems regarding economic results and compliance are mentioned for the Chilean system (Meltzoff et al. 2002; Orensanz et al. 2005; González et al. 2006; Zuñiga et al. 2008; San Martín et al. 2010). But empirical cases, and therefore also their success or problems, differ in their

social embeddedness, geographical location, infrastructure and general material conditions. To this not much attention has been paid, although the conditions in which fishers produce and reproduce their livelihoods, and in which TURFs emerge, may greatly influence outcomes.

TURFs imply the right to limit or control access to the fishery resources within a limited sea territory; to determine amount and kind of use of resources; to extract benefits from the use of the resources and to future returns from the use of those resources (Christy 1992); or what Schlager and Ostrom's (1992) call bundle of rights. Right-based systems tend to be also connected to co-management practices, as happens in Chile, where efforts are made to replace top-down regulation with decentralized forms of governance, delegating management decisions to communities or fisher organizations (Berkes et al. 2001). The Chilean TURFs, run under a co-management approach, represent a clear example of a new commons institutions (Gallardo 2008).[1] Under the TURFs, artisanal fishers manage the resources in common, harvest in common and negotiate the price of the harvest in common; designed to manage a common pool resource, i.e. characterized by non-excludability and substractability (Ostrom 2002).

Alternative approaches (compared to open access, gear or capture restrictions) often appear on the political agenda when resources are already in crisis (Christy 1992; Schlager and Ostrom 1992; Berkes et al. 2001; Ostrom 2002). When tackling these crises – usually associated to the 'tragedy of the commons' – governments proposing solutions pursue resource conservation and maintenance of ecological biodiversity at the expense of institutional diversity (Ostrom 2002). This also echoes partially what has happened in Chile, although little systematized knowledge on fishers' former traditions exists, prior to the series of disruptions that ended with the introduction of the TURFs. The reality in which this major changes have been applied are unwritten chapters in Chilean fishers' history.

Various studies list the ideal conditions for TURFs (Christy 1992), co-management (Berkes et al. 2001), for 'successful' (institutionally, socially and economically) institutions of commons and effective governance systems to sustain them (Ostrom 2002; Schlager and Ostrom 1992). Consideration is mostly paid to institutional conditions conducive to collective action such as resource attributes and user attributes, design principles to common property resource (CPR) institutions (Ostrom 1990) as well as to governance institutions which support them.

The material 'local' conditions surrounding fishers' activities such as the geographical and social embeddedness of fishers' *caletas* (see below) are not

[1] Institutions are defined as rules and habits that govern our behaviour and thinking, supplying individuals with conventions, norms and etiquette, but also with motives, preferences and goals. To institutions belong also ideology, i.e. values and ideas about how reality is and should be. Institutions not only standardize our behaviour but also our thinking and perceptions of the world. When institutions become systematized and formalized in law, they become organizations (Brante and Norman 1995).

given the same attention when dealing with TURFs. Here counts e.g. the power structures based on property rights and the reigning land tenure structure as well as the unequal access to material and even immaterial resources. TURFs do not emerge in *tabula rasa* contexts, but in spaces that are occupied, owned, shared and sometimes even contested. Around and beyond TURFs there is a structural context that itself builds upon other institutions such as an agrarian structure, market, the State, etc. Therefore, 'local' conditions are rooted in and reflect the broader historical, political, ecological and economic context. The hypothesis is that while local institutions such as the TURFs are moulded by these local conditions, these also impose challenges and constraints upon fishers and their activities. Thus, anchoring the analysis on empirical cases may help to understand relevant processes occurring at a smaller, local scale, which are important to understand in order to acquire a long lasting sustainability. Case studies, as the presented here, may contribute to a better picture.

1.1. The Chilean TURFs

The crisis which led to TURFs in Chile originated when the traditional migrations of shellfish-divers along the coast became an 'organized' migration in connection to the *loco* (the gastropod *Concholepas concholepas* or 'Chilean abalone') export boom. Independent, self-employed divers and fishers were informally hired by middlemen and/or impresarios and transported with their boats on trucks across the country, chasing the resource (*loco*) along the coast. This resulted in a steep increase of landings, followed by great decreases and fluctuations, which were perceived as overexploitation. Several restrictions tried to stop overexploitation, ending with a total ban. Extensive poaching during the ban motivated diverse groups of fishers' organizations, with the aid of scientists, to experiment self-imposed bans in parts of their fishing areas, in order to recover the resource. As a result, the *loco* populations increased (Stotz 1997; Meltzoff et al. 2002; Castilla et al. 2007; Moreno et al. 2007), becoming an incentive for the TURF's idea. Additionally, high export prices during the period, thus the harvests of the protected areas generating high income to fishers, led to a general euphoria of all stakeholders around the TURFs.

The TURFs in Chile, popularly known as Management Areas (MA) and officially named *Áreas de Manejo y Explotación de Recursos Bentónicos* (AMERBs) (Management and Exploitation Areas for Benthic Resources or MEABRs), are not based on any former tradition, i.e. were implemented *de novo* (San Martín et al. 2010).[2] Fishers, which used to work individually, migrating

[2] The objectives of MAs are to: contribute to conservation of benthic resources; contribute to sustainability of artisan economic activity; maintain or increase biological productivity of benthic resources; increase knowledge of the functioning of benthic ecosystem, generating useful information for management, and promote a participative management (Subpesca 1995).

along the coast, had to organize and stay at one place in order to protect their resources. MAs are granted only to organizations, provided they applied for them; and are only allowable for the management of benthic resources (see MAs official objectives below). Thus, with MAs, fishers' organizations get exclusive common use rights for the exploitation of benthic resources on given coastal stretches – part of a common good: the ocean. The way fishing is organized depends on the resource particular MAs have as target species (Table 1 and description of our cases).

TURFs were launched in 1995 (Subpesca 1995), under the umbrella of a new fishing act from 1991. Since then they expanded along the Chilean coast, including several hundreds of MAs, involving over 30,000 fishers (Sernapesca 2009). Approximately 50% of the officially registered artisanal fishers belong to the MA system and almost all shellfish-divers should already be subsumed under the MA system (Focus group interview, Subpesca, J. Rivera).

Fishers use as operational base for their MAs coastal places named '*caletas'*. A *caleta* is a small scale fishing port, mostly located on a protected coastal site (the cove), involving the pier (when there is one), the boatyard, the huts or sheds in which fishers camp or the associated houses or community in which

Table 1: Main characteristics of the study cases

Characteristic	Caleta Huentelauquén	Caleta Guayacán
Setting	Rural	Urban
Land ownership in which the *caleta* is embedded	Private land	Municipal land; waiting for a formal *commodatum*
Fishers' living place	Distant to the *caleta*	Close to the *caleta*
Organization and year fishers acquired the MA	Union got the MA in 1998	Guild association got the MA in 2004
Number of organization members	33 members: majority divers, but also fishers and algae collectors	24 members: 22 fishers and 4 divers
Target species of MA	*Loco* (Chilean abalone), *lapas* (key-hole limpet), Since ≈2006 also algae (kelps)	Algae *(Gracilaria* spp. or *pelillo*) Since ≈2006 informally also sea-squirt
Production of MA obtained through	Fishing and collection of algae cast ashore	Bottom (algae) and suspended (sea-squirt) aquaculture
Production period of MA	*Loco*: few days each year Algae collection: dry seasons (spring-summer-autumn)	*Pelillo*: all year, but mainly spring and summer Sea-squirt: all year according to demand and availability
Destination of production of MA	*Loco*: formerly for export to Asia, now most for domestic market Algae: mainly export and a part for domestic market	*Pelillo*: export and domestic market Sea-squirt: domestic market

the fishers live. Access or entrance to the coast for artisanal fishers varies depending on whether the land where the *caletas* are situated is municipal/state or private owned (Gallardo 2008; Gallardo and Friman 2010). Private property rights dominate in Chile and most of the land along the coast, in rural areas, is private (Caballol et al. 2006; Gallardo 2008). Thus, most rural *caletas* and their associated TURFs, often emerge in already occupied spaces; a situation which creates access problems for fishers and also other difficulties. Seventy-six percent of the permanent *caletas* in Chile are rural (Gallardo 2008). Although beaches are defined by law, as a public good, access to the coast has to occur through private properties, entailing often latent or manifest seeds of dispute between different users. In urban settings, *caletas* located on municipal or state property are surrounded by other strong stakeholders, creating space constraints and additional problems such as contamination caused by the productive activities of neighbours.

What the Servicio Nacional de Pesca (Sernapesca) pays attention to in their annual report on MAs (Tirado and Cano 2009) is whether fishers have access problems, but this is only part of a bigger and more complex scenario. Access problems to the *caletas* are not necessarily related to fishers' legally recognized access (right of passage or *paso de servidumbre*) to the coast, but there are cases of open hostility. The right of passage does not predicate a good relationship between fishers and landowners. Furthermore, the right of use granted by law does not refer to the development of fishing related infrastructure (such as piers, shelters, etc.). This omission excludes the possibility for fishers to settle in the *caletas*, near their workplaces. Fishers can construct on those places only if the owner of the land allows it. In those rural *caletas*, fishers camp during the week, or more permanently in summer. Fishers' houses are in towns nearby, where the family mostly stay.

Coastal land in Chile has been increasingly acquiring value for productive and non-productive activities. This involves partly a process of redefinition of appropriation and occupation of the coast – in which the TURFs expansion, in our view, enter. This process involves economics, ecology, politics and history. In the sea, the expansion of the TURFs adds to a long list of viable uses, including large capital intensive salmon and abalone aquaculture, claims by indigenous people, etc., all these putting pressure on the coast, changing the coastal landscape. Within this scenario, fishing activities associated to TURFs are necessarily competing with other social agents for the rights over the control of physical space on land and on sea. Struggles for access to and control of natural resources on/and around the coast are not absent (Gallardo and Friman 2010). This led us to ask the following questions: How are collective action conditions influenced when the new commons, in the form of TURFs, do not emerge in a *vacuum,* but in already occupied spaces? What are the main differences between MAs located in rural *caletas* and those embedded in urban centres? Does the setting and material conditions surrounding the MAs influence their possibilities to become sustainable? This paper explores these conditions.

2. Cases, methodology and fieldwork

Our cases – *caletas* Guayacán and Huentelauquén, both in central-northern Chile (Figure 1) – were chosen because of their different contexts, allowing portraying a rich variation of features characterizing particular contexts in which MAs emerge. While Caleta Guayacán is urban and placed on municipal land, Caleta Huentelauquén is rural, has a remote location and is embedded within a private property (Table 1).

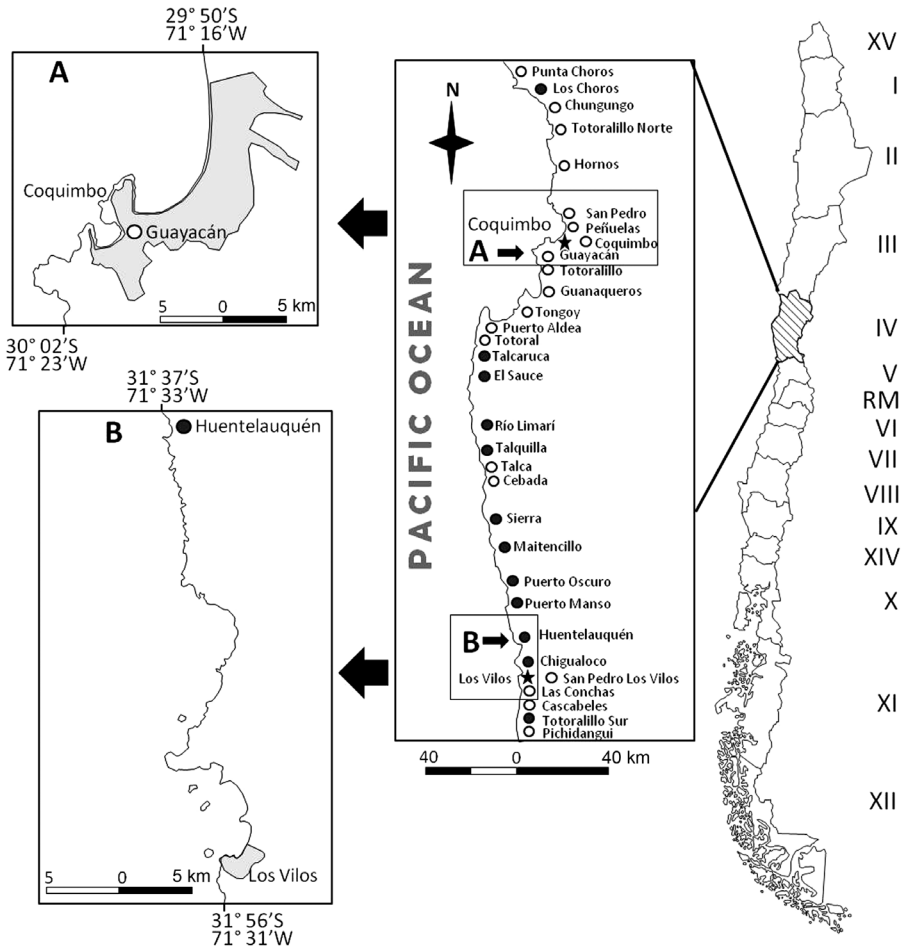

Figure 1: Map showing the details and location of study sites Guayacán (A) and Huentelauquén (B) within Chile, Region IV and their relation to urban centres on the coast. The map of Region IV shows the location of all the caletas in the region. The black circles show caletas embedded within private properties and those with open circles embedded within municipal/ state property.

Participatory Rural Approach (PRA) tools, triangulated mainly with other qualitative methods (semi-structured and focus group interviews, interview with key informants, e-mail letters and telephone interviews) were used to gather data in the field. Additionally, the study includes official statistics and reports.

PRA is "an approach and method for learning about rural life and conditions [by, with and from] rural people" (Chambers 1997, 104), but has been also extended to urban settings. Considering reluctance among fishers to read and write, often lacking formal education, as experienced by us in other field works, PRA tools were judged to be the best in obtaining fishers' perception for us, and for fishers to study and analyze their own situation with a collective approach.

The PRA sessions in Huentelauquén were held on December 2008 (9–12) and complemented with additional sessions held on December 2009 (27–30). In Guayacán we worked on November 2008 (3–5 and 12). Additional work was done on December 2009 (10, 14, 16 and 21). This does not necessarily include the interviews nor the preparing and finalizing visits to fishers done only by the research leader (main author who spent two months each year in the field). Research results were summarized in coloured posters, which were handed to fishers during the last visit in 2010.

In almost all the PRA sessions the 5 authors participated as facilitators. In both cases, eighteen exercises were performed (several of them unfolded in three or four); only part (Table 2) of which are used in the present article. Fishers, divided in small groups, were assigned different exercises depending on their position, knowledge or skills. Also notes were taken systematically while fishers were working with the exercises. In Guayacán participation, excepting the first day, was lower than in Huentelauquén, where fishers showed a bigger and sustained engagement.

In both cases, a group of 9–15 fishers participated most systematically (out of 33 in Huentelauquén; out of 24 in Guayacán); others participated indirectly observing and commenting what the smaller groups did. All the results were presented by the fishers and/or the facilitators to the rest, who validated the results, this way removing eventual bias introduced by the direct participants of each exercise. When necessary, the flipcharts were complemented or re-drawn. No female members are part of any of the MAs, although in Huentelauquén several women work as seaweed collectors (Table 2). Our sampling coincides with a convenience non-probability sampling approach (Frankfort-Nachmias and Nachmias 1996), meaning that we as researchers accept the sampling units that were conveniently available in each *caleta* when we worked there. PRA results were compared with official statistics, reports as well as with data from interviews.

3. Results

3.1. Historical overview *Caleta* Huentelauquén

The Caleta Huentelauquén, located in the Canela County (region IV, Figure 1), is embedded within the private property Santa Ana, part of the former *hacienda*

Table 2: List of main tools and methods used in the field

PRA tools, 2008		**Purpose: to get/to understand fishers'**
Brainstorm & problem prioritization		Own agenda/concerns to be analyzed in regard to their MA
Landmarks or Stepping Stones MA		Application reasons for MA
Historical line		History of the organization, *caleta* and fishing
Cove map		Spatial distribution of the cove and its surroundings
Organizational diagram		Union organization, historical antecedents, committees and their roles within the MA
Institutional or Venn diagram		To obtain a picture of the organization, the committees within the MA and their roles.
Sea transects		Spatial distribution of the species in the sea, harvesting and techniques
Flow diagram		Production and trade systems, complexities and relationships
Impacts		Perception on MA impacts
Problem-tree & Solution-tree		Perception about the major problems in regards to their MA
Seasonal calendar		Availability of resources, labour distribution and economic assessment of both production spheres, i.e., inside and outside the MAs
Based on Pretty et al. (1995)		
Other qualitative methods		
Huentelauquén, semi-structured questionnaire, 2009		Fishers' origin, place of residence and fishing experience
Huentelauquén, focus group interview 1, 2008 Huentelauquén, focus group interview 2, 2008		Huentelauquén fishers on history of the *caleta*, organization, fishing, migration, the initiation of the MA, politics, pollution problems, seaweed extraction, consultants, etc. All these issues served as base for, among others, the PRA exercise Historical line. On the union to complement Organizational Diagram
Huentelauquén, focus group interview 3, 2009		Family ties among fishers
Huentelauquén, focus group interviews 4, with four women, 2008		On their experiences. The issue of security, windowless, lack of pension, seaweed collection, access problems
Guayacán, focus group interview 1, 2009		Guayacán fishers on environmental problems
Guayacán, focus group interview 2, 2009		Fishers' origin, place of residence, age
Focus group interviews, 2008		Rivera, J. Subpesca, Valparaíso
Interviews with key-informants		
L. Rodriguez, Huentelauquén, 2008-2009 Two fishers, Guayacán, anonymous, 2009		

or *latifundium* Huentelauquén. The *caleta* is located ca 30 km north to Los Vilos, the city where all fishers live (Figure 1). The fishers of this *caleta* started as fishers, but early in history became benthic resource divers. At first they dove for sea-urchins (1940s), later (as from the 1960s) and during most of their history for *loco* and since 2000 for algae, most of which are collected

from those cast ashore. For the period prior to the first *loco* ban in 1989, fishers' memories in the Historical line are related to resources, fishing and migrations. They used to look for and exploit the richer fishing grounds along the coast between Arica and Chiloe (ca. 3000 km of coast). Migration was part of their cultural baggage, "following the resources", as the majority said (Semi-structured questionnaire). From the time around the onset of TURFs, the events they remember about their past involved two main subjects: environmental changes, due to natural phenomena, like the El Niño, or pollution; and accomplishments related to diverse funding and projects they got to improve their equipment or infrastructure (such as the union house they bought with own means, an electric winch; urchin re-settlement project, including training; wetsuits, seven outboard engines, etc.). Another subject of concern is the access to the *caleta* (Problem-tree 1) and lack of understanding with the landowner.

Both migrations and salient resource events are identified by Huentelauquén fishers as 'booms' and sometimes these events are closely connected to each other. If a boom of certain species occurred in a different place, fishers migrate after the resource. 'Boom', an economic term, typical from neo-liberalism, has been incorporated by fishers in their narrative: the *congrio* boom, the *loco* boom, the algae boom.

3.2. Infrastructure and access to *Caleta* Huentelauquén

The map of the *caleta*, drawn by a fisher, shows few elements: some sheds, their winch and their boats, the latter being the most marked (Figure 2). Most part

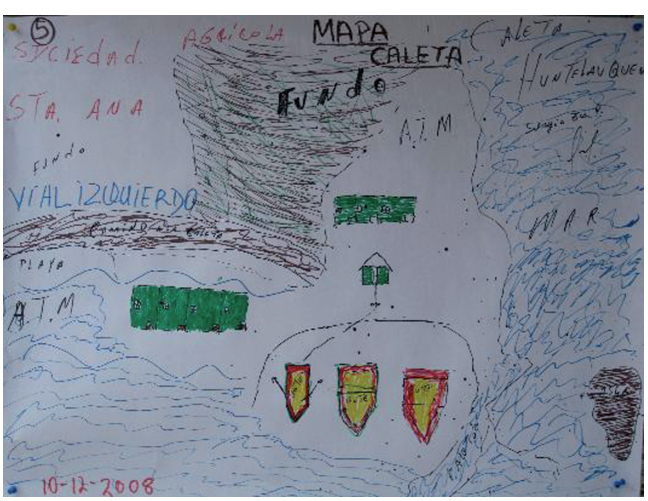

Figure 2: Map of caleta Huentelauquén.

of the painting area is nevertheless occupied by the property Santa Ana, which besides by its surface, also is identified in the painting with diverse names: Fundo, Sociedad Agrícola, Santa Ana and Vial-Izquierdo which is the owner's name.

As the *caleta* is inserted within a private property, the State cannot construct any infrastructure, fishers lacking possibilities to change this situation. Access problems to the *caleta* are mentioned in several exercises. This situation has also implications for their MA and general fishing activities, as the access of researchers, officials, tourists and merchants, is restricted by the landowner. Fishers have to notify the administrator in advance if somebody else, than fishers other want to enter the *caleta.* This also affects women, who join the fishers only during the summer, many of which collect algae (Focus group interviews with women, 2008). This makes the *caleta* an isolated place. Huentelauquén fishers are not alone in this. Twelve of the thirty-three *caletas* (Tirado and Cano 2009) in the region are embedded within privately owned land (Gallardo and Friman 2010), a situation shown in Figure 1.

As reported by fishers, while doing the problem-tree and solution-tree (Figure 3 A,B), the owner is willing to make some improvements in the *caleta*, having as condition that fishers move their sheds away from the beach, something the fishers do not accept. Analyzing the causes of access problem through this property, the fishers made reference to a political issue, the power of the landowners, pointing out that political, economic and social power are the same thing, "it's the same group". They also claimed, as causes of the problem: government's mismanagement, the lack of interest they show for fishers' causes, and finally, that the laws in place are not favourable to them.

Besides being embedded within a private property, fishers experience also another difficulty, portrayed in a local newspaper (Diario El Día, October 12, 2009). Fishers declared that they do not get help from the government since the *caleta* is within the limits of the Canela County, and they all live in Los Vilos, which is another county. Both counties claim that the *caleta* Huentelauquén fishers' problems are not within their jurisdiction. Enumerating their problems fishers said:

> Our *caleta* has limited access, not everyone can pass, even direct families can't, we lack water, electricity and where to put the garbage; as toilettes we have a shed put over a hole in the ground (pozo negro); our three sheds of 3×9 m get wet every winter when it rains, things get wet since the floor is of earth, we cannot build shelters nor a place where to gather the seaweeds (Gallardo and Friman 2010, 55).

3.3. Organizational structure of Huentelauquén fishers

In 1990 Huentelauquén fishers formed a Guild association (*Asociación gremial*), with 80 members, coinciding with the end of the military regime in the country and the return to democracy. It coincided also with the time of the first *loco* ban,

A	B
No somos 'dueños' de terreno We are not the 'owners' of the [caleta] land	*Que nos den comodato de la caleta Huentelauquén* Let us get the *commodatum* of the caleta Huentelauquén

Figure 3: Problem (A)-and solution (B)-tree caleta Huentelauquén.

most fishers nevertheless illegally fishing the resource. An important reason for many fishers in the *caletas* to become organized was to have a voice to discuss the ban with authorities and stop illegal fishing (W. Stotz, personal comm. 2009). The type of organization was chosen because, as one fisher said "We organized as a guild only because of the military regime". In 1995, after a series of problems, the organization changes its legal form, becoming a union: "an entity of struggle", as a fisher said (E. Alfaro, focus group interview 1).[3] The union formed with 42 members, of which presently remain 33.[4] Thus, the group is not numerous, allowing face-to-face communication. Several members of the organization are relatives with each other (Focus group interview 3).

The union has been quite successful in getting aids from the State and diverse private companies, although the same cannot be said about incomes derived from the MA. Among the obtained achievement highlights in the year 2007,

[3] Unions, politically more associated to a working class ideology, were common before Pinochet, and again in democracy, while guilds associations more associated to professions/patrons, became common under Pinochet's time (1973–1989), who outlawed unions (Orensanz et al. 2005; Gallardo 2008).

[4] We did not inquire about this issue, but the decrease of members might be due to a political division among members in changing from guild association to union.

an agreement with the Mining Co. Los Pelambres (today, running the world's fifth-largest copper mine) to get wetsuits and outboard engines, all for about US$51,000. Counting the 2000–2008 period and up to 2009, fishers have been awarded around nine different projects, with a total value close to US$111,000. Production during the same time summed 138,592 US$ (Seasonal calendar and Tirado and Cano 2009). For their union and social activities, fishers have bought a house in Los Vilos, which is a motive of pride for them. The house was paid for with money from selling *locos* from the MA (Figure 4. *Loco* extraction).

3.4. Huentelauquén: becoming an MA

The organization of Huentelauquén was one of the first to agree to protecting the *loco* in an area in front of the *caleta* (September 1990), assisted by the Universidad Católica del Norte (UCN). Therefore they identify themselves as 'pioneers'. Algae have been incorporated officially as target specie of the MA only from 2006.

In their informal MA, the *loco* population decreased due to the 1997's rainstorm, which caused large amounts of sediment to come out of the Choapa river, close to the *caleta*. In 1998 when they could finally legalize their area, they did it in a different place from which they had originally protected. Even with a new area the resources declined, which the fishers now attribute mainly to pollution and the already mentioned phenomenon of El Niño; they say that Huentelauquén has pollution problems, "the water is changing; it's dirty. Before, it was colder", but they say that "in general the planet is polluted." (M. Godoy, focus group interview 1). In this context they mention the installation of the Mining Co. Los Pelambres (same company that has given material support to the fishers) and the polluting waste waters of a nearby dairy farm, which they think ends up in the Choapa river, and thus in the sea. Concurrent to this event was the construction of the

Figure 4: Loco extraction in caleta Huentelauquén.

Pan-American highway and, according to fishers the leftovers of the construction were thrown also into the river and the sea, an opinion shared with the neighbouring *caleta* Chigualoco, whose fisher mentioned the same in another study (Gallardo and Friman 2010). They even mention climate change as an influence. They also declare "We have our share in the resource depletion problem". A key-informant says "I have always said ... that the fishers have to make a *mea culpa* of the system … they helped that resource disappear" (L. Rodriguez, focus group interview 1).

3.5. MA impacts in Huentelauquén

Thirteen fishers identified MA impacts. There were nine critical opinions against four positive ones. Six of the former can be reduced to the economic issue and its impact on the morale of the fishers (Table 3). The ninth viewpoint highlights a different theme that also comes out in other exercises: the MA system locked them geographically to a defined area, expressed as a lack of freedom to move.

In relation to the lack of movement, three fishers said (semi-structured questionnaire), that "It was open before, and then we could move along the coast. With the regionalization one cannot move out of Region IV" (fishers are allowed to register only in one region). Another fisher stated "I liked the former system, where we could move more. Now we are very restricted by the regionalization and the MAs." A third fisher said "I do not like the MA system because it forces us to be in one place and there is no place to work on the open coast". The positive views in MA impacts show a richer range of issues, being all of different kinds. The first positive point stresses the security that the MA gives by excluding other fishers from the collection of algae cast ashore in the sector. The second view emphasizes something not directly related to resources, but of great concern, related to their fear to be removed from the *caleta* by the landowner. Essential is the fourth positive item; the unity of members around a common good, caring for the MA in a collective form. Among the views expressed regarding the MA may be mentioned what one fisher said "we began as divers and became artisanal fishers" (see discussion below).

3.6. Historical overview *Caleta* Guayacán

Caleta Guayacán, located in Coquimbo, is embedded within a municipal property (Figure 1). The Coquimbo municipality bought this land in 1988 for the exclusive use of Guayacán fishers, passing it to their association in 2007, waiting since then to get the formal *commodatum* or use agreement from authorities.

The first fisher activity, according to the memories (Historical line) of present fishers, appeared around 1900. The *caleta* developed and remain as a landing place for pelagic fish. In the 1960s some divers from outside worked in the *caleta*, but as fishers remember, had as a consequence that the former wealth of benthic resources diminished. At present only pelagic fishers are part of the MA, who outside the MA, continue to work in pelagic fisheries. Migration seems not to be a tradition among Guayacán fishers. Two of the MA's divers said that they migrate,

Table 3: MA impacts in caleta Huentelauquén

Items	Evaluation (+ or –)	MA impacts in Huentelauquén: fishers' perceptions
1	–	The economic problems: compared to before, it was thought that it would be much better [with the MA]
2	–	Socially got worse because it was supposed that it would generate more money [no desire to work in the MA].
3	–	It was not known that our payment [tax] for the MA would be so high.
4	–	It was supposed that what we did was for taking care of the resource but is not longer like that [there is nothing to sell referring to *loco*, they are too tiny]
5	–	Too many costs to take care (car, transport, food, cellular phones)
6	–	Little security that the resource harvest will be positive (*locos*, *lapas*) or economically [worthy]/Low security on the quantity of resources in the MA
7	–	Poor profit in the MA
8	–	The vigilance of the MA zone is difficult, due to the topography (cliffs in the southern part, bushes and others)
9	–	Unable to move to other regions
10	+	Security [meaning exclusivity] to work [algae]
11	+	Security from being dislodged from the *caleta* [by the owner of the private land]
12	+	Conservation of their benthic species [*locos*, *lapas*, *erizos*]
13	+	Unity among members to take care for a common good
[ ] brackets and clarifications are ours and based on fishers' complementing information		

e.g. to work as divers in the industrial salmon aquaculture in the south of Chile (anonymous interview).

3.7. Infrastructure and socio-geographical setting of *Caleta* Guayacán

The *caletas*' map drawn by fishers highlights its most salient characteristics: a basic but complete infrastructure, with several buildings, pier, etc. occupying the entire space (Figure 5). As part of its infrastructure, the *caleta* counts with storerooms for equipment, a roofed yard with individually owned store boxes and tables equipped with fresh water, where fishers or sellers fillet the fishes they sell. They also have a winch, which allows them to haul their boats from the water up a ramp. This was bought by the association, as stated by the members. Within the *caleta* area three restaurants exist which pay the association a rent for the right to be inside the *caleta;* the urban character allowing the establishment of business activities brings economic benefits for the association.

The map shows as well that the *caleta* space with its small MA is surrounded by other stakeholders. At the right side, there is the port of an Iron Mining Company (CMP). Behind the *caleta,* is a yard owned by the State Mining Company (Empresa Nacional de Minería, ENAMI), and to the left side is the campus of the UCN.

Fishers have the perception to have contamination problems from some of the neighbouring companies. This because of big ships coming into the port, and oil spills from those, as well as from their own artisanal vessels. Activities on land of the mining companies also produce dust (Focus group interview 1, 2009–12–14). Most of the members of the MA live in Guayacán, just above the *caleta,* having their families close by, saving them time and transportation costs (Focus group interview 2).

3.8. Organizational structure of Guayacán fishers

Guayacán's fishers were early in organizing themselves, forming, in 1950, a union of about 40 people. This organization allowed the fisher access to diverse types of benefits, as houses and infrastructure for the *caleta*. In 1967 fishers got governmental support for the construction of 50 houses. However, only 30 houses were built (close to the *caleta*) and the rest of the material had to be returned, since not all fishers wanted to participate in the project due to an atmosphere of distrust, as one fisher said (Historical line). According to the fisher's narration, political pressure (under Pinochet's regime)

Figure 5: Map of caleta Guayacán.

changed their traditional organization from a union into a guild association. The union's house could not be transferred to the guild association. Therefore they now had to reorganize the union in order to maintain the property of the house.

3.9. Guayacán: becoming an MA and it impacts

Guayacán fishers began the application for their MA in 2001 and got it granted in 2004. Formally the MA was granted to the guild association, but as most of its members had no interest in it, just a small group formed an MA commission and got in charge of the area. Within this group, there are only four divers being able to extract the production (Figure 6). The rest of the members help with complementary work. As MA's products can be easily stolen, there is a vigilance committee; all members participate in the vigilances, mostly necessary only on weekends. Each vigilance turn is performed by two persons. Twenty-four percent (7) of the members are retired (over 65 years old) (Focus group interview 2).

According to the Guayacán fishers (Landmarks MA), the first two reasons for them to apply for an MA was related to the decrease of resources: "as time passes, there is less product in the sea". Another reason was linked to a precaution aspect "security for their future and seniorhood". Both answers were ranked at the same level of importance, followed by an economic criterion, to gain "extra incomes". The fourth reason was "we were the only ones without an established MA"; and last, because they wanted to improve their organization.

The MA lasted only one year, due to bad initial administration. Resources (scallops, *pelillo*, *piure* or sea squirt) and work material were lost, leading to the paralysis of the MA during 2005 and part of 2006 (MA Impacts: Table 4). In 2006 a group of just 30 members reorganized to work with their MA. This small organization, using the money they started earning from the MA, have already

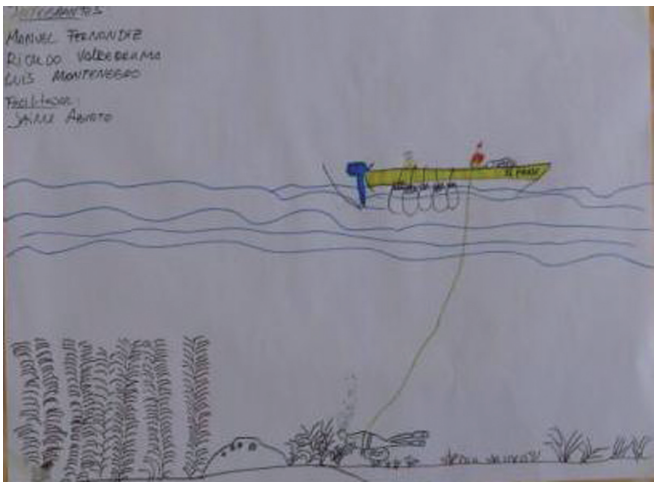

Figure 6: Pelillo harvest in caleta Guayacán.

Table 4: Events in the history of the MA of caleta Guayacán

Year	Events
2004	Bad administration • Resources losses (*Algae*, scallop, *Pyura*) • Working material losses
2005–2006	MA abandoned, remains inactive Economic losses
2006	New MA commission
2006>	Improvements: • Good administration (order/discipline) • Extra income • Future income (from repopulation of) • Acquisition of diving material (3 dive suits, 2 hoses, 3 compressors, 2 regulators, 2 masks, 2 lead belts, 2 pair of fins, 200 bags to collect algae, 200 buoys, etc.) • Social benefits (help for family)

created some social benefit/support for families as a small pension and/or food baskets, principally when a fisher dies or cannot continue to work due to illness.

The original MA application was done in order to manage scallops, clams, crabs, *pelillo* (an algae, *Gracilaria chilensis*) and *chicoria* (*Chondracanthus chamissoi*). Despite the small existing population of scallops and *pelillo,* these became the target of the new management plan. In contrast to other fishers' organizations, when the Guayacán association obtained the MA, they did not get financial support from the government to make the required studies. They asked for a loan of 1,200,000 pesos (US$1969) from its own association to buy seed and equipment to install a scallop culture, which failed. Later they started with a sea squirt culture, which gave them some income, but not jet formalized according to the new regulation. The main products of their MA finally became the algae (*pelillo*) and the sea squirt (*piure*). The income they get from the *pelillo* harvests, which fluctuates greatly yearly, is kept by the MA and distributed once a year, on a pre-arranged date. In this distribution, the boat owner gets an extra 0.5 part for the harvests. Fishers also want to diversify the production of their MA. For this reason they are trying to incorporate more species through aquaculture activities in the MA, as done with the sea squirt culture (Caleta *Guayacán* map: Figure 6).

3.10. Fisher's own agenda Guayacán

The items suggested by the fishers during the 'brainstorming' (Table 5), in regard to problems in their MAs, depicts one central economic problem related to their dependence on few products, and an organizational problem (both analyzed in a second step in problem-tree 1 and problem-tree 2, respectively) that have badly affected them in the early stages of their MAs.

The organizational problem was characterized by a lack of order, training, thefts, job security, lack of funding, supervision and operation of both *pelillo* and

Table 5: Fisher's own agenda, Caleta Guayacán

Labour	Production	Organization
Labour security	Diversify production: achieve a MA with several species	Lack of order
Professional training	Improve commercialization; export	Thievery and poaching
	A boat for the MA to prevent robberies (surveillance boat) and to work on *Piure* and algae (*Pelillo*) harvesting	
	Budget to hire a security guard	

piure fishing and export prospects. The reasons behind the lack of order were laziness, shyness, a lack of responsibility and insufficient will or motivation said the fishers. Lack of order causes division and fighting within the group, which limits their productivity and fulfilment. These effects are consistent with the causes, analyzed in solution-tree 2. They recognize that there is among them a free-rider problem, not easy to get rid of. This is a "human problem and the same people who do not cooperate quickly claim that they are poor and have children to support", they say.

3.11. General analysis of Huentelauquén and Guayacán

The geographical setting of the *caleta* Huentelauquén, principally its rurality, involves access problems to the coast, isolation, lack of diversification possibilities beyond fishing and fishers are mostly dislocated from their families. It also increases production and monitoring costs due to increased transportation costs, both for fishers and buyers, deteriorating the fishers' economy as the buyers pay lower prices the longer the distance are to the *caleta*. Furthermore, as the *caleta* is embedded within a private property, fishers have not the right to settle, nor develop any infrastructure if the owner does not allow it. The 'camp' situation of Huentelauquén may have greatly conditioned their former migration behaviour.

Huentelauquén fishers got into the MA system with high expectations regarding the potential production of *locos* and income coming from these. These expectations have not been met, provoking disappointment. Nevertheless, the MA has also positive side-effects. It prevents others from fishing in the area, giving them exclusivity over the algae, which at present sustains them. Being in a private property helps them preventing access to the resources by outsiders, at least regarding algae. Regarding *loco*, they cannot neglect vigilance of their MA, as those stealing *locos* from MAs are divers, moving by sea. The MA entitlement functions also as protection from being evicted by the landowner. The unity of the members for a common good ('to take care of the resources') is probably reinforced by the difficulties they have with the landowner. The fact that the MA is not giving them the expected results seems not to be a reason to give up either the MA or the

caleta; on the contrary, one might think that abandoning the *caleta* would mean to leave the place free to the owner of the land, or to another fisher organization. Changing the organizational form, from association to union when Chile returned to democratic rule, could be political because unions are traditionally associated more with working class (see note 3). If as one fishers said, the union is "an entity of struggle", adopting this form as collective, fishers might have considered it to be a better form to defend their interest against, e.g. the landowner.

When a fisher said "we began as divers and became artisanal fishers", he probably referred to that they are not allowed to dive for *locos* outside the MA, and within the MA they do it only once a year. The rest of the time is dedicated to fishing or other activities. Instead of following resource availability across regions, fishers are now bound to one. With the old system they could move and now this lack of freedom is perceived as a major constraint. In order to survive natural variability or low income from the MA, they now shift between resources and roles: diver, fisher, and since the year 2000 increasingly seaweed collector. And partly also, former efforts to get income from fishing, today may be redirected to obtain development projects for their MA and in some cases to negotiate with powerful stakeholders to obtain economic support for possible/perceived contamination problems in the sea. Thus, management and entrepreneurship instead of fishing have become important, especially for the union's directive.

One of the greatest achievements within this new entrepreneurship resulting from the MA, has been the strong subsidiary support that they were able to obtain from State institutions and private companies. In monetary terms, the value of the nine projects that Huentelauquén fishers have obtained almost equals to 8 years of *loco* production. All these achievements show that the organization is paying off both the social and labour conditions in the *caleta*, and the new production possibilities. Thus, both the union and the MA seem to be well organized, purposive, functional and cohesive. Since the group is small and many are related by family ties, these may play a key role, assisting with common understanding and trust.

Guayacán instead, due to its geographical setting has a relatively privileged position, compared to other *caletas* in rural areas. They can directly sell their products to the public, without middlemen and transport costs. Their problems, such as eventual lack of infrastructure or equipment, poverty, etc., also become more visible to authorities, they also having easier access to the latter. But on the other side the urban location also constrains them, the *caleta* having no space to expand, either on land or on the sea. It also means that the *caleta* shares the space with others public or private stakeholders and that the fisher may experience, among other, pollution problems, such as those described above.

Guayacán applied for their MA for reasons which differ from most other MAs. Its members had the idea from the beginning to use the area for aquaculture, not originally allowed by the regulation. The expectation of future earnings based on aquaculture already had results, they having got modest incomes from their *piure* (sea squirt) culture. They associated the MA also with conservation and envisioned

it as an extra income and a security for the time of retirement from fishing. It is also interesting to note, that they got into the system because of a perception to be otherwise left behind ("we were the only ones without an established MA"). They also used the MA as a way to get better organized as the first start was not easy. They first failed and abandoned the MA, but were then able to revive it under a new leadership. This was a good lesson for them, as they now recognize that the MA needs management, order, discipline and unity, features seemingly poor since the formation of the guild association.

The location on private land for Huentelauquén fishers has as its worst consequence that they are limited to construct or to receive subsidies to improve their infrastructure, as a pier, boatyard, storeroom, etc. In contrast, fishers in Guayacán had all the facilities associated with its urban location and land tenure. Being on municipal property, and having a formal use agreement, has helped them to get support for the construction of a good infrastructure. For Huentelauquén to get such an agreement with the owner seems to be far. But, although at a high price, these difficulties concur in defining or moulding the types of 'soft' collective action conditions, producing a positive influence. The problems fishers are constantly experiencing in the confrontation with the landowner, which also affects their families, seems to have acted positively, pulling the group together. To negotiate and discuss these problems, fishers have to act as a collective. This has also favoured their unity and early adoption of an MA, first informally, but later going through the intricate process of its formalization. This process demanded to agree on statutes, rules for the vigilance and management of the MA, sanctions for eventual transgression of rules, division of labour, income distribution, etc. In contrast, Guayacán lacks these kind of 'incentives' for collective action. Despite this, Guayacán fishers were able, although with diverse problems, to organize, get and run an MA. Despite the small size and limited productive possibilities of their MA, they are taking advantage of it. Guayacán is an example of something which might have happened in many *caletas*, being confronted to two alternatives regarding MAs: to jump into the process or be left behind. This happened independently of whether the fishers understood the system or not, convinced or not, and were prepared or not to administer an MA.

4. Discussion

As our study shows, the material 'local' conditions surrounding fishers' activities have a great influence in at least three relevant areas for the fishers: access to the coast, social relations between the fishers' organization (entitled the MA) and the landowner (private or municipal/State) and the existence or absence of fishing and general infrastructure. These conditions influence the history of each *caleta*, fishers' relation to resources, how the organization appears, its functioning and finally how this organization adopts and develops the MA. In this context, the PRA exercises allowed to get a good picture of both cases, even when not all the members of each *caleta* participated. Being a qualitative study, in which the

richness of information, more than its representativeness is of interest, to have had all members participating on the exercises, would probably not have changed much the general conclusions of the study. And this was in fact corroborated indirectly, by synthesizing the results in a series of posters, which are in exhibition in each *caleta*, for the information and internal discussion of all members, and no disagreement or new detail has been mentioned by the group until now.

In the contexts shown for both cases, which are representative of extremes within the diversity of *caletas* (urban-rural, state/municipal-private property, more fisher- more diver, etc), the adoption of TURFs as 'one size fits all' solution, as applied in Chile, can have very diverse outcomes. At the policy level, this calls for a fine-tune of this ambitious management policy process; one that considers TURFs' local and structural particularities: an approach which is perfectly suitable if "co-management is a continuous problem-solving process, rather than a fixed state" (Carlsson and Berkes 2005). In other words, if sustainability wants to be achieved, a potential reconfiguration of the system should also address issues such as the *caletas'* material conditions (in which the MA are embedded), including tenure rights on land, access to the coast and infrastructure problems. It is by looking beyond the TURFs (not as isolated phenomenon) that can help to understand the diverse outcomes the TURFS system has for different fisher groups, giving account of some structural factors limiting their endeavour. Not considering or not understanding the existent institutional and structural diversity on which the new management approach was built, eventually destroying local traditions (Ostrom 2002), may explain such outcomes. That the 'one size fits all', solution could be inappropriate is a view that, among others, San Martín et al. (2010) share for the Chilean case. Often, when resolving a fisheries problem, as it happened with the MAs in Chile, the solution tends to be indistinctly applied afterwards as a 'whole-sale solution' (Degnbol et al. 2006). As we observed in our study cases, there are significant differences among different *caletas,* fisher organizations and fisheries traditions, thus applying the same administrative tool to so different realities would necessarily result in disparate outcomes. These experiences call the attention to be careful to copy this type of management approach (the TURF as applied in Chile) to other countries or other small-scale fisheries in the world, as perhaps publications, as the one from Gelcich et al. (2010) may be incentive for. Our position finds also echo in Elinor Ostrom's, closing keynote address at a meeting in 2004 of the International Association for the Study of Common Property (IASCP) at Oaxaca (México), asking a large and diverse audience to repeat with her thrice: "There are no recipes" (Orensanz and Parma 2010, 15), referring to using examples of successful commons institutions as a blueprint to use everywhere.

The former tradition of migrations along the wider coast, following resource availability (Aburto et al. 2009), trying to secure subsistence and/or responding to market demands, which were parts of artisanal fishers' regular behaviour, were replaced (for good or worse), by bounding fishers to one spot, in order to guard their sea tenure rights. As a consequence, MAs are perceived by some fishers as

an enclosure, compared to their former migratory behaviour. Despite this and the meagre economic outcomes of MAs (Zuñiga et al. 2008), fishers will not give them up. This 'not giving up' may be connected or being part of the ongoing processes of re-appropriation and re-occupation of the costal border. Fishers seem to foresee future economic interest associated to MAs. Having or keeping control over TURFs, despite its low productivity, opens other possibilities such as small-scale aquaculture, or constitutes a security against the expansion of capital intensive aquaculture prospects. It can be used to get loans, diverse projects and financial aids. The reasons to apply and be satisfied with an MA are very diverse; many MAs are being supported for other reasons than those intended when the policy was created (San Martín et al. 2010). Through their use of the MAs, fishers are defining new objectives for them. Is this a not intended result of TURFs policy, while supporting a sense of ownership among fishers?

Although adopting the TURF system may have occurred at the expense of fishers' local traditions, they are socio-politically an achievement without precedents (Meltzoff et al. 2002; Orensanz et al. 2005; González et al. 2006; Castilla et al. 2007; Montoya 2007; Moreno et al. 2007; Gallardo 2008; Zuñiga et al. 2008; Gelcich et al. 2008, 2010). TURFs are imposing great challenges for fishers, traditionally seen as a vulnerable social group. Nevertheless, the long-term ecological consequences of the TURFs, considering the 'resilience' of the former traditional rich fishing grounds, which resulted from the former migratory behaviour that allowed each area long periods without being exploited, is an aspect which remains to be seen.

5. Conclusions

This study shows that both social embeddedness and the geographical location shapes important conditions that if not paid attention to, can weaken TURFs' importance and viability for sustainable fisheries, determining some important differences that can either hinder or promote fishers' socio-economic development.

Security of coastal land tenure, especially in rural areas seems crucial for the development of many TURFs, if they continue to be promoted. While TURFs grant exclusive fishing rights within a given territory, land tenure is not paid the same attention when in fact the division line between the parcel of water (the TURFS) and the adjacent *caleta* is difficult to hold for fishers when they have the *caletas* as fishing base.

Assessments of TURFs' adoption should therefore consider both the local particularities of specific fishing communities, and the larger structural context in which they emerge; both which can vary extensively between cultures and countries. Ostrom's theory on the commons (2002), strongly based on consensus and reciprocity, would enrich its analysis if it recognizes and addresses the structural factors existing beyond and above resource users whose individual decision-making count very little when dealing with internal power structures, market,

globalization and managerial structures. As Nadasdy says (2007) regarding the proponents of adaptive management, these scholars "take for granted the broader political/economic context of capitalism/colonialism that gave rise to the notion of and need for resource management in the first place."

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