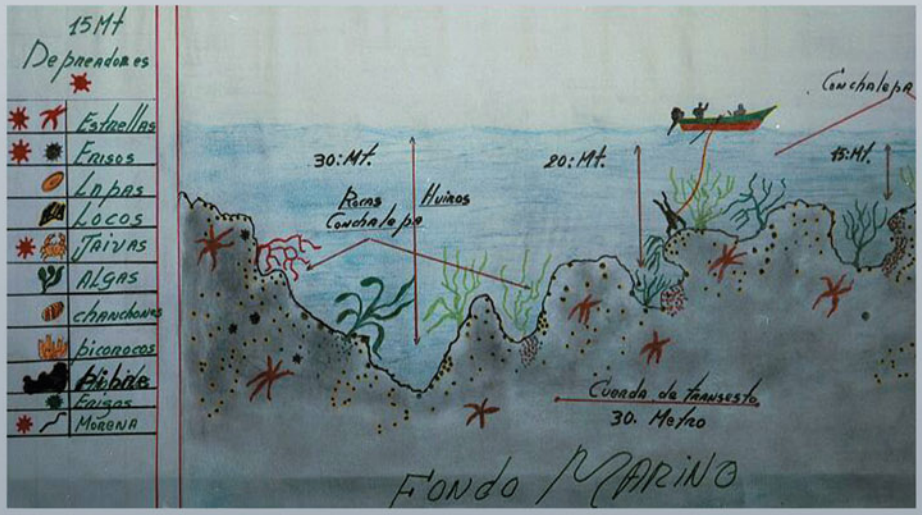
From Seascapes of Extinction to Seascapes of Confidence

Territorial Use Rights in Fisheries in Chile: El Quisco and Puerto Oscuro



Gloria L. Gallardo Fernández

UPPSALA UNIVERSITET
Uppsala Centre for Sustainable Development
SLU
ROUTLEDGE

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I dedicate this study to my beloved son Max Emiliano Tornstam who at the age of seven accompanied me in the field trip to Chile – and to the Chilean fishers who through the management areas are contributing toward preserving precious coastal resources for those coming after us.

Uppsala, Sweden
3rd of June 2008

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Acknowledgements

The inspiration to perform this research came from Paul Landon, Director of the National Television (TVN-Chile) Programme "Tierra Adentro". The objectives of Landon's films were to highlight Chilean rural handicraft which, though produced for the market, is not subsumed wage labour. In one of his films about artisan fishers and the new Management Areas (MAs) in Chile, Landon presented the story of the MA Puerto Viejo in Northern Chile and the problems the fishers had with the local landowner; a situation that concurs with my own experience in Puerto Oscuro. From what I understood from Landon's programme, fishers under the MAs were extracting fish under a kind of institution of the commons. Also this caught my attention as my PhD dissertation covers the historical development of another example of the commons in northern Chile, that of more than two hundred agricultural communities in the semi-arid Norte Chico where the commoners (*comuneros*) have owned the land collectively since the 1700s. Fishers in Chile were now holding sea parcels in common.

During the time I decided to start this study I was employed as a lecturer at the Department of Rural Development Studies at the University of Agricultural Sciences (SLU), Uppsala, where participatory methods had an almost dutiful status among many researchers. I myself was somewhat doubtful given that originally these methods were advanced by cooperation agencies working with development programmes in Third World countries. To improve the result of these programmes, the involvement of the locals was deemed essential and so material incentives for the communities have been part and parcel of these programmes. However, what can we, as researchers, offer the people we include in our research when we come empty handed, with not even the rhetoric of promises of delivering improved prospects? I decided that, before being too critical, I should try it out. My theoretical interests concerning questions of the commons in connection with the new situation of artisanal fishers in Chile and my increasing interest for participatory methodology led to the present study.

It has taken some years to complete my work. Coming back from a field trip I lost my job at SLU, but SULF (Swedish University Teachers Union) secured me almost two years of economic compensation, which gave me not only the financial resources but also the time and thinking space to advance this investigation. For this I am indebted to SULF and especially to Robert Andersson to whom I would like to express my sincere thanks.

After this I was employed by the Centre for Environment and Development Studies (Cemus) at Uppsala university/SLU, presently Uppsala Centre for Sustainable Development (CSD), which provided a supportive and nurturing environment for me to finish this study, not only because of its deep commitment to environmental and development issues but also due to its open and democratic atmosphere. My special thanks go to Cemus/CSD and its Director, Eva Friman.

The experience of working together with all the fishing men and their women in the fishing location El Quisco was truly wonderful and inspiring and I want to express my deep gratitude to all of them for their precious time and commitment during my visit there in July 2001. After this experience I understood that using participatory methods gives a great deal to those working with them and also has the potential to build bonds of understanding and warmth between those involved. I want to extend my thanks to Armando Rosson as well, who assisted me during the field study and enabled contact with the fishers of El Quisco; and to the geographer Javiera Espinoza, for kindly assisting me in Chile to gather source material and interview some key informants.

Particularly, three persons have been central to this study. Special thanks are extended to Maria Hauck, MSc, from Cape Town University, South Africa, who when acting as discussant to the manuscript in May 2007 in Uppsala,

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To finish, all my love and gratitude to my son Max Emiliano for his patience with his mother.

Preface

This book by Gloria L. Gallardo Fernández is a study of the interdisciplinary subject of social and political action aiming to reverse the extinction of edible shellfish along the Chilean coast. The man-made process confronted through this action threatened not only the existence of the fish but also the livelihood of thousands of fishers and the very eco-system of the coastal waters. Accelerated destructive fishing locked nature and society to each other in a vicious circle of self-subversion. Trying to reverse it meant turning non-sustainability into sustainability. Conceptually as well as practically, this was a process linking politics to economics; local to regional to global, and nature to society. Studying and assessing such an attempt calls for an equivalent dialectic.

It is highly appropriate – and very encouraging – that the first monograph to be published within Uppsala Centre for Sustainable Development (CSD Uppsala) moves boldly in such troubling waters and crucial areas for research on sustainable development. Furthermore, CSD is most pleased to publish this book in collaboration with Co-Action Publishing, a Scandinavia based Open Access publisher of scholarly books and journals. In this way the text becomes a global common.

The book is a detailed study of a co-management example, i.e. territorial use rights in fisheries (TURFs), of two local fisheries on the Chilean coast which depend for their survival on benthic resources, and where the shellfish *Loco* plays a central role. The TURFs are aimed at a more sustainable use of threatened coastal resources. The larger context is the critical situation of fisheries in the world. Fish as a resource is globally on decline since the mid-1990s. Several main fish populations have been exhausted or even become extinct since then, not surprisingly since the intensity of ocean fishing increased by a factor of nearly 40 during a period of 100 years (1900–2000). The situation of the fisheries in the world has been perhaps best summarised by the Millennium Ecosystems Assessment reports in 2005. Fishing is one of the key renewable resources under serious decline. This threatens the sustainability of the planet. Mismanagement at any point along this truly global path will have consequences at all the others.

Since ocean fishing is by definition international it is difficult to regulate, it is a global common and its decline is a case of the "tragedy of the commons" or the "tragedy of open access" as Gallardo prefers to call it. But also fishing under national jurisdiction is under threat and has been very difficult to regulate in a way that protects the resource. The regulation of fisheries and the description of success stories, which the *Loco* fishing outside Chile seems to be at least in part, are important to provide and study, and this is exactly what Gloria Gallardo has undertaken to do.

Here we approach a difficult but central issue of the topic of management of common resources: To whom do these resources belong? To whom does the fish in the ocean belong? A reasonable view is that this resource belongs to us all, inhabitants of the planet. An even more radical view would be that it is no one's property- or the property of the planet, and should be protected for its own sake. This is a so-called biocentric ethics, also possible to defend.

In the context of the two case studies presented in detail, it is clear that the emotions stirred by the conflict of ownership are strong. Gloria Gallardo as a sociologist gives these a colourful description by introducing many of the artisanal fishers, using participatory rural appraisal (PRA) to elicit information on values, behaviours and interests. PRA is a methodology that seeks to empower participants whilst enabling researchers to gather information.

The question of resource management has been studied by the well-known political scientist Elinor Ostrom. She has provided many examples showing that the tragedy of the commons does not always apply. In fact traditional societies were often quite good at managing common resources, although examples of the opposite, such as the collapse of the Easter

Island (presently belonging to Chile), do of course also exist. It seems that the larger scale brought by modernity increases the likelihood of tragedy. On the larger scale there is more competition, less well-defined responsibilities, and consequences of mismanagement seem far away. This, however, is not quite so clear any longer. We all suffer from global – and ultimately local – mismanagements. This also applies to fisheries. Thus one key aspect of the present book is how to connect the local to the global. Is it possible to apply the solutions found along the Chilean coast to other societies? What did we learn that may be useful in other places, on other scales? Previous success stories do exist, perhaps lobster fishing outside the coast of Maine, US, is best known, or the Japanese TURF which shows many similaries with the Chilean TURF.

Gloria Gallardo spells out the consequences of changed fishing regulations for the development of local fishers' organizations. She goes into the question of self-regulation which is central here and touches on the issue of how the local level – below and/or beyond the village but below the State – may be the proper level to accomplish what we need, a functioning management of limited resources.

As social, natural and interdisciplinary scientists working at the Uppsala Centre for Sustainable Development we salute our colleague, the author of this work.

Uppsala, June 2008

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List of abbreviations

[]	my parenthesis
AAL	Areas de acceso limitado (areas of limited access)
ADITAL	Agricultural Virtual Community of Latin America and Europe (Comunidad agrícola virtual de América Latina y Europa)
AM	Area de Manejo (Management Areas)
AMERB	Area de Manejo y Explotación de Recursos Bentónicos (Management and Exploitation Areas for Benthic Resources)
BITECMA	Biología y Tecnología en Recursos del Mar (Sea Resources: Biology and Technique)
CAR &	Comité de Asignación Regional (Committee of regional allocation)
CAR-PESCA	Comité de Asignación Regional de Pesca (Fishing committee of regional allocation)
CBCRM	Community-based coastal resource management (Manejo de recursos costeros basados en comunidades)
CCCM	Community-centred co-management (co-manejo basado en comunidades)
CEDOC/INE	Centro de Documentación, Instituto Nacional de Estadística (Documentation Centre, National Statistics Institute)
CEMUS	Centre for the Environment and Development Studies (Centro de estudios del medio ambiente y desarrollo)
CFQs	Community Fisheries Quotas (Quotas comunitarias de pesca)
CIDA	Comité Interamericano de Desarrollo Agrícola (ICAD, Inter-American Committee for Agricultural Development).
CIID	Centro Internacional de Investigaciones y el Desarrollo de Canada (International Research and Development Centre)
COFI	FAO's Committee on Fisheries
CONAF	Corporación Nacional Forestal (National Forestry Corporation)
CONAPACH	Confederación de Pescadores Artesanales de Chile (Chilean National Confederation of Fishers)
CONICYT	Comisión Nacional de Investigación en Ciencia y Tecnología (National Research Commission of Science and Technology)
CoMPeB	Comisión de Manejo de las Pesquerías Bentónicas de las Regiones X y XI (Benthic Fisheries Management Commission of Regions X and XI)
CORA	Corporación de Reforma Agraria (Agrarian Reform Corporation)
CORFO	Corporación de Fomento (Development Corporation)
CPR	Common Property Resources (Propiedad común de recursos)
Cpr	Common Pool Resources (Recursos de Uso Común)
CSD	Centre for Sustainable Development (Centro de Desarrollo Sustentable)
DAS	Department of Atmospheric Sciences, University of Illinois (Departamento de Ciencias Atmosféricas de la Universidad de Illinois)
D.F.L.	Decreto con Fuerza de Ley (Decree with Legal Enforcement)
DS	Decreto Supremo (Supreme decree)
DIRINMAR	Dirección de Julereses Marítimo (Board of Marine affairs)
DIRECTEMAR	Dirección General de Territorio Marítimo y Marina Mercante (General Board of Maritime Territorial and Merchant Marine)
DOP	Dirección de Obras Portuarias (Board of Harbour Works)
ESBA	Estudio de Situación Base (Base Situation Study)
EEZ	Exclusive Economic Zone (Zona Exclusive Económica)
FAO	Organización de las Naciones Unidas para la Agricultura y la Alimentación (United Nations Organization for Agriculture and Alimentation)
FENAPACH	Federación Nacional de Pescadores Artesanales de Chile (National Federation of Artisan Fishers of Chile)
FEPEMACH	Federación de Pescadores Artesanales y Buzos Mariscadores de la Provincia del Choapa, IV Region (Federation of Artisan Fishers and Divers of the Choapa Province, Region IV).
FFPA	Fondo de Fomento para la Pesca Artesanal, Development Fund for Artisanal Fishing
FIP	Fondo de Investigación Pesquero (Fishing Research Fund)
FNDR	Fondo Nacional de Desarrollo Regional (National Fund of Regional Development)
FONDEP	Fondo de Fomento al Desarrollo Científico y Tecnológico (Scientific and Tecnological Development Fund)
FOSIS	Fondo de Solidaridad e Inversión Social (Social Solidarity and Investment Fund)
GDP	Gross Domestic Product (Producto Nacional Bruto)
HRB	Héctarea de Riego Básico (Irrigated Basic Hectare)
ICM	Integrated coastal management (Proyectos de co-manejo y manejo costero integrado)

IDRC	International Development Research Centre (Centro de Investigació de Desarrollo Internacional)
IFOP	Instituto de Fomento Pesquero (Fishing Development Institute)
IGM	Instituto Geográfico Militar (Militar Geographic Institute)
INE	Instituto Nacional de Estadísticas (National Statistics Institute)
INTQs	Individual Non-Transferable Quotas (Quotas individuales no-tranferibles)
IPC	Indice de Precios al Consumidor (Retail Price Index)
LIFDC	Low Income Food Deficit Countries (Países deficitarios de alimento y bajos ingresos)
LPA	Ley de Pesca y Acuicultura (Fishing and Aquaculture Law)
Ltda	Firma de responsabilidad limitada (firm of limited liability)
MA	Management Area (Areas de Manejo)
MEARB	Management and Exploitation Areas for Benthic Resources (Área de Manejo y Explotación de Recursos Bentónicos)
MBN	Ministerio de Bienes Nacionales (Ministry of Real Estate)
NGO	Non-Government Organization (Organización no gubernamental)
OBN	Oficina de Bienes Nacionales (Office of National Real Estate)
PIP	Protocol of Fish Investment (Protocolo de Inversión de Pesca)
PMEA	Management and Exploitation Plan (Plan de Manejo y Explotación)
PPD	Partido por la Democracia (Party for Democracy)
PRA	Participatory Rural Appraisal (Apreciación/Diagnóstico Participativa/vo Rural)
s. a.	*sine anno* (no date)
s. l.	*sine loco* (without place)
SAG	Servicio Agrícola Ganadero (Cattle Service)
SERCOTEC	Servicio de Cooperación Técnica (Cooperation Tecnique Service)
SERNAPESCA	Servicio Nacional de Pesca (National Fishing Service)
SHOA	Servicio Hidrográfico y Oceanográfico de la Armada (Navy's Hydrographic and Oceanographic Service)
SII	Servicio de Impuestos Internos (Internal Tax Service)
SLU	Swedish University of Agricultural Sciences (Universidad Sueca de Ciencias Agrícolas)
SUBDERE	Subsecretaría de Desarrollo Regional y Administrativo (Subsecretary of Regional Development)
SUBPESCA	Subsecretaría de Pesca (Fishing Subsecretary)
TAC	Total Allowable Catch Limit (Límite Máximo de Captura)
TPFR	Territorial Private Fishing Rights (Derechos territoriales privados de pesca)
TURF	Territorial use rights fisheries (Derechos de uso territoriales de pesca)
UF	Unidad de Fomento (Development Unit)
UN	United Nations (Naciones Unidas)
UNCLOS	United Nation Conferences on the Law of the Sea (Conferencias de la Ley del Mar de las Naciones Unidas)
UNESCO	United Nations Educational, Scientific and Cultural Organization (Organización de las Naciones Unidas para la Educación, Ciencia y Cultura)
UTM	Unidad Tributaria (Tributary Unit)
WCC	World Convention Council (Consejo de Convención Mundial)

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PART I

FISHERIES: BETWEEN THE GLOBAL AND THE LOCAL

1 The Study Setting

INTERNATIONAL BACKGROUND

Coastlines and oceans around the world are slowly turning into landscapes of extinction. Diverse studies have detailed the dire worldwide situation of marine resources, which are largely exploited under open access conditions, and heavily affected by land based activities (Hauck, 1998; Sweijd and Hauck, 1998; Gordon and Cook, 2000; Naylor et al., 2000; Garcia et al., 2003; Myers and Worm, 2003).

Due to the current North–South market dynamics, will edible marine resources soon turn into a rare luxurious food to be consumed only by rich consumers? An overwhelmingly significant proportion of the catch of many threatened species, such as sturgeon — the fish from which black caviar is extracted — ends up on a dinner plate in rich countries. Producers in the South get minuscule revenue compared to the prices for which the products are sold abroad.[1] Compared with 1950, there is presently only 10 percent left of the predatory fish communities. The loss seems to be irreversible as species populations that are left will never reach the numbers they once had as they will be fished before reaching maturity (Myers and Worm, 2003).

Since the 1940s, ocean fishing shows three main tendencies: (1) The increasing transition from small-scale fisheries to large-scale industrial exploitation allowing increasingly larger captures in the sea, later also embracing inshore fisheries and aquaculture; (2) The scaling up of fishing management transfer, i.e., from local level, to national, and to supranational levels; (3) An increasing tendency to substitute local production by international production in the globalization of food systems, where local fishers are presently involved in a world wide competition (Garcia et al., 2003; Symes [1996]* in Píriz, 2004, pp. 1, 31–32). As a result, the list of devastated marine species around the world is long. During the 1940s the Indian sardinella fisheries collapsed. This was also the fate of the Japanese sardine in the 1940s and 1950s, the South African pilchard in the mid 1960s, the Atlantic herring, Greenland cod and Georges Bank haddock, all in the late 1960s, the Namibian pilchard and the Peruvian anchoveta in the early 1970s, the Gulf of Guinea sardinella in the mid 1970s, and in the 1990s the Canadian Atlantic cod (Garcia et al., 2003).

The impacts on the ocean eco-system derive from fisheries and non-fisheries activities. The interferences of industrial fishing are large and varied. Over-fishing stresses the eco-system by diminishing the stocks of demanded high level predators, thus modifying the trophic chain. Over-fishing also alters the habitats by destroying and disturbing the bottom topography (Garcia et al., 2003). Physical, mechanical and chemical human activities alter and damage sea habitat: physically, by introducing alien structures such as aquaculture installations, artificial reefs, mechanically through the "ploughing" effect of dredges and trawls, and chemically through a variety of ways including the injection of nutrients, pesticides, heavy metals, drugs and hormones. The chemicals in particular pose high levels of uncertainty with little information known about the damage and duration of effects. Compounding and additional adverse impacts result from destructive fishing techniques, inappropriate fishing practices like trawling in the

[1] In Azerbaidzian, one kilo of caviar costs around US$418 in 2006, while in the West it is sold for US$9,762 (Aale, 2006). Caviar as a delicacy will soon be history as sturgeon is in danger of extinction. Sturgeon can live to a 100 years old, and it has been on earth for 250 million years. UN declared 2006 export prohibition for all the countries around the Caspian Sea except Iran. It is believed that this species has decreased by 90 percent during the last 20 years due principally to dam constructions, pollution, poaching and corruption.

* When a quoted or mentioned author brings up another author, the year of the reference of the latter is given in brackets []. These indirect references are not listed in the reference list at the end of this book (e.g. Symes).

wrong habitat, pollution from fish processing plants, use of ozone-depleting refrigerants, and dumping at sea of plastic debris that can entangle marine animals or be swallowed by turtles.

The lack of selectivity associated with industrial fisheries affects associated and dependent species resulting in wasteful discarding practices, juvenile mortality resulting in additional threats to endangered species. All of these impacts have important and long-lasting effects, despite the prevalence of the 1982 UN Convention on the Law of the Sea, which states that fisheries management must take care also of bycatch species. Concerning consequences of over-fishing in the trophic chain, Garcia et al. (2003, Chap. 3, p. 2), based on Goñi [1998], refers to the following examples:

> The hunting of sea otters (*Enhydra lutris*) in the Northeast Pacific caused a large-scale expansion of sea urchins, the increased grazing of which caused the decline of the important kelp forest (. . .) In the Bering Sea, the expansion of the fisheries on pollock (*Theragra chalcogramma*) during the 1970s has been considered as a probable cause of the decline of several populations of marine mammals, e.g. sea lions (*Eumetopias jubatus*) by 76%, seals (*Callorhinus ursinus*) by 60% and (*Phoca vitulina*) by 85%, as well as the decline of several seabird populations (*Urea algae, U. lomvia, Rissa brevirostris, R. tridactyla*). All these non-fish species compete directly with the pollock fisheries since the target species represent 21–90% of their diet (Garcia et al., 2003, Chap. 3, p. 2).

As Garcia et al. (2003) note, at the beginning of the 1970s, the contamination effects on aquatic eco-systems, both coastal and continental, derived from non-fishing activities on land, were considered to be the main factors responsible for fisheries degradation:

> Land drainage, sewage, river outflow, wind and rainfall, economic activities as agriculture, manufacturing or chemical industries, incineration of toxic wastes, human settlements, etc., released excess nutrients (e.g. nitrates, phosphorus) as well as contaminants (e.g. polychlorinated biphenyls (PCBs), mercury, dioxin), radioactive wastes, oil, antifouling paints (tributyl tin), human pathogens (e.g. cholera, salmonella), plastic and other debris (Garcia et al., 2003, Chap. 4, p. 1).

Today, there is more emphasis on the direct (removal and related impacts) and indirect (eutrophication leading to depletion of oxygen) consequences of over-fishing as the main cause adversely affecting marine eco-systems (Garcia et al., 2003, Chap. 4, p. 1). The following quote from the same source stresses the complexity of eco-systems and the interconnection between human land-based activities and non-human activities:

> At the end of the 1960s, the Black Sea was the most productive area of the Mediterranean, with a high diversity of pelagic and benthic fauna. After 1970, a very strong modification of the chemical and biological habitat occurred as a consequence of industrial development and intensive agriculture. Inputs of phosphorus and nitrate increased threefold and tenfold, respectively while the input of silicate decreased fivefold. This resulted in a significant modification of the structure and functioning of the coastal eco-system, including a change in dominance of the algal communities from diatoms to small-size dinoflagellates (*Dinophysis* spp.). At the beginning these modifications appeared favourable for the eco-system and fisheries. Phytoplankton production and copepod abundance increased and with them the abundance of plankton-feeding fishes. Fishing effort increased, leading initially to an increase in catches from 200 000 tonnes in 1970 to 600 000 tonnes in 1985 but resulting finally in overfishing. The ultimate consequence was an explosion of carnivore jellyfish (*Aurelia aurita* and *Mnemiopsis leidy*) consuming eggs and larvae and occupying the ecological niche formerly occupied by the small pelagic species depleted by overfishing. The biomass of jellyfish increased from one million tonnes in 1970 to 700 million tonnes in 1985 (about 5 kg/m^2). These jellyfish, having no predators, are a trophic "dead end", and their mortality generates an important bacterial activity and a large quantity of anoxic water near the bottom, reducing further the habitat for fishery resources (Bouvier [1998] in Garcia et al., 2003, Chap. 4, p. 2).

The interrelated ecological and productivity damages to the ocean have largely occurred in a few decades, between 1940 and the 1970s (Garcia et al., 2003). From the 1970s, problems started to become manifestly evident that the period of abundance was over (Mackenzie, 1983), yet in the late 1990s FAO estimated that 27 million tonnes of bycatch and discards were dumped each year (Garcia et al., 2003).

Ensuring the continued productivity of marine eco-systems is critical for those millions of people dependent upon it for current and future food security. Almost all catch from small-scale fisheries is used directly for human consumption, while most of the capture from industrial

fisheries is channelled for reduction (animal feed and other products) (FAO, 2005). The relevance of small-scale fisheries for the world fish supply and their contribution to food security both directly in the daily diet, and indirectly through the generation of foreign income, has been underlined by FAO (2005). Export values in this sector rose from US$15 billion in 1980 to US$56 billion in 2001 (FAO, 2005).

Regarding sector distribution of the labour force, worldwide *ca* 90 percent of the 38 million people recorded as fishers and fish-farmers are classified as small-scale. This corresponds to around 34.2 million people. To this we can add an estimate of more than 100 million people employed in other fisheries associated occupations (i.e., processing and trading). This means that directly or indirectly, those employed in small-scale fisheries and aquacultures were in the vicinity of 135 million in 2002. These figures do not consider seasonal or occasional fishers who are not registered as "fishers" in official statistics (FAO, 2005). Industrial fishing would occupy *ca* 10 percent of the total fishing labour force, corresponding to around 3.8 million people.

Studying global fish production during the last five decades makes clear a tendency in the North–South relationship, namely, the transfer of ocean fish production from developed to "developing" countries' waters. Developing countries in the South channel production to export markets as well as leasing their fishing rights to international capital (Hersoug et al., 2004). Taking a global view, fish production (marine, inland and aquaculture) has increased from 40.5 million tonnes[2] in 1961 to 142.1 million in 2001, an increase of 250 percent, while the world population during the same period has increased by 98 percent (Hersoug et al., 2004). De-aggregating these data according to the dichotomy rich–poor countries highlights the fact that it is the developing world that contributes most to the total fish production (marine, inland and aquaculture). While the developed world increased its fish production with 40 percent from 1961 to 2001, the developing world increased it by 540 percent over the same period. Population in the latter increased by 128 percent, which means that production increased far more than population. Within the developing world, the Low Income Food Deficit Countries (LIFDC), to which 80 of the poorest countries belong, increased fish production by 857 percent between 1961 and 2001. Dealing specifically with marine production, while the developed world increased marine fish production by 31.3 percent between 1961 and 2001 (from 21.7 million tonnes to 28.5 million tonnes), the developing world increased it by 318.5 percent during the same period (from 13.5 million tonnes to 56.5 million tonnes). Regarding export and import of fish products, in 2001 the developing countries exported twice as much as they imported (i.e., US$28.03 billion in export versus US$10.66 billion in import). This import usually deals with the cheaper species, while the converse is the case with high value commodities going to export (Hersoug et al., 2004).

PICTURE 1.1 *Loco*

Export "success" of many high value commodity species demanded by consumers from rich countries leads to over-exploitation and commonly to the severe depletion or extinction of the species in the South, as the example of the edible sea shellfish *Concholepas concholepas* (false abalone) in Chile (local name *Loco,* derives from Mapudungun, Mapuche's language), object of this monograph, will show. The Chilean *Loco* fishery is one of the world's most significant gastropod fisheries (Geaghan and Castilla, 1988, p. 58). South Africa experiences a similar situation with another threatened species, the shellfish abalone which, like the *Loco,* is threatened by poaching and hence facing extinction (Pictures 1.1 and 1.2). Both species are demanded by consumers in Asian countries. Developing countries seem to have

[2] Tonnes are metric, i.e., 1 tonne is equivalent to 1,000 kilos.

PICTURE 1.2 *Abalone*

common problems and challenges regarding endangered marine species and those whose livelihoods are dependent on these species. The *Loco* and abalone cases in Chile and South Africa respectively, are both cases in point.

Abalone poaching and stocks exhaustion are a worldwide problem (Cook and Sweijd, 1997). In California two species have become extinct. During 1989–1999, the worldwide catch from wild abalone fisheries declined by about 30 percent (Gordon and Cook, 2000, p. 567). The only country where abalone fisheries have increased over the past 10 years is Australia, but it has decreased considerably in Mexico, the USA, and Japan. The situation with regard to cultured abalone is the opposite. During 1989–1999, the production of cultured abalone increased by over 600 percent.

In the South African case, scholars agree that attempts to restrict abalone poaching through law enforcement have been unsuccessful (Cook and Sweijd, 1997; Hauck, 1998; Sweijd and Hauck, 1998). Poaching is not decreasing due to the decimation of abalone resources, rather the opposite is true. More stakeholders become involved and get better organized. Chinese syndicates have been established in the legal abalone industry in South Africa as a way to obtain control over both legal and illegal markets due to the lucrative nature of the activity and the relative impunity whilst poaching. The price of a special dried abalone can reach US$1,200 per kilo (not sun dried, but processed in a special, often secret and ceremonial form in Asia, which once dried, only keep 10 percent of the "in shell" weight) (Gordon and Cook, 2000, p. 568). Fresh and canned abalone cost US$45 and US$80 per kilo, respectively. In 1980 in South Africa a kilo of perlemoen was sold abroad for ZAR30–80. In 2002 it was locally sold for ZAR300 and, in the Far East for up to ZAR1,400 per kilo (Redpath, 2002). Whole villages, including gangs with links to drug syndicates, have become involved in the illegal trade with wars taking place between poachers and police. People have been killed and children younger than 12 years old are being used as runners because they are immune to prosecution (Redpath, 2002).

As a solution to the extinction of the species in South Africa, Hauck (1998, p. 3) recommends a holistic multi-prolonged approach that considers all the affected stakeholders, among which are abalone divers, quota holders enjoying the exclusive and disputed rights to dive, processors, leisure divers and informal fisherfolk, to count only those more directly involved contesting the right to harvest the resource. Furthermore there is a poaching hierarchy embracing those living near the sea and up to highly organized Chinese triads. Consequently, abalone poaching is a coast-wide phenomenon involving a wide range of stakeholders, having different socio-economic and ethnic background (Sweijd and Hauck, 1998, p. 4). The problem is thus socially complex, as are also suggested solutions. Long-term solutions must recognize the "intricate history and circumstances of the people involved in the industry" (Sweijd and Hauck, 1998, p. 1). For the same reasons, diverse role-players must be targeted with interventions at different levels. A project of co-management, in Hawstone town, where thieving problems have been more severe, and whose goal was to build a sense of ownership among users of the resource and to restore their internal social relations, did not materialize. As the authors emphasize, so long as the conflicts remain, the resource continues to be destroyed and at the end, all will lose as there will be nothing left for anyone. Long-term protection of natural resources requires not only law enforcement, but also effective resource management promoting biodiversity and sustainable resource utilization. It is about vesting in the resource users the concern for the eco-system upon which they depend through encouragement, empowerment and development, instead of loosing valuable

means chasing the violators as Hauck suggests (1998, p. 3).

Although over-exploitation might increase profit in the short-run, large-scale degradation of resources is, in the long-run, also a threat to the reproduction of capital itself. After all, the maintenance of the commons is one of the legs on which commodity productions stand (Goldman, 1998). Globalization is primarily about renewed expansion of capitalism into new formerly uncommodified social arenas (Dickens and Fontana, 1994), not subsuming those relations of productions that are not directly necessary for the reproduction of capital, as for example small-scale artisanal fishing. Capital has varying needs and it can exploit non-capitalist relations of productions, people and markets in different ways; for example as sources of cheap labour, the country's market as springboard from which firms can export their products, as resource pools from which to extract resources to feed the needs of transnational corporations. The outcomes of such development are global, more frequently than not having detrimental ecological and social effects in Southern countries. Often the role of international fisheries companies in the South is disadvantageous to small-scale fisheries, local low-income consumers and the environment. This is exemplified by the presence of salmon fisheries in Chile. Liberal market supporters, government representatives and middle- and upper-class Chileans often highlight with pride the development of the salmon industry for export. Salmon, a carnivorous species that is a non-native of Chile, is a high-value commodity that has been marketed mainly for industrialized countries, driven by commercial farms using primarily intensive and semi-intensive production methods (Naylor et al., 2000).

NATIONAL BACKGROUND

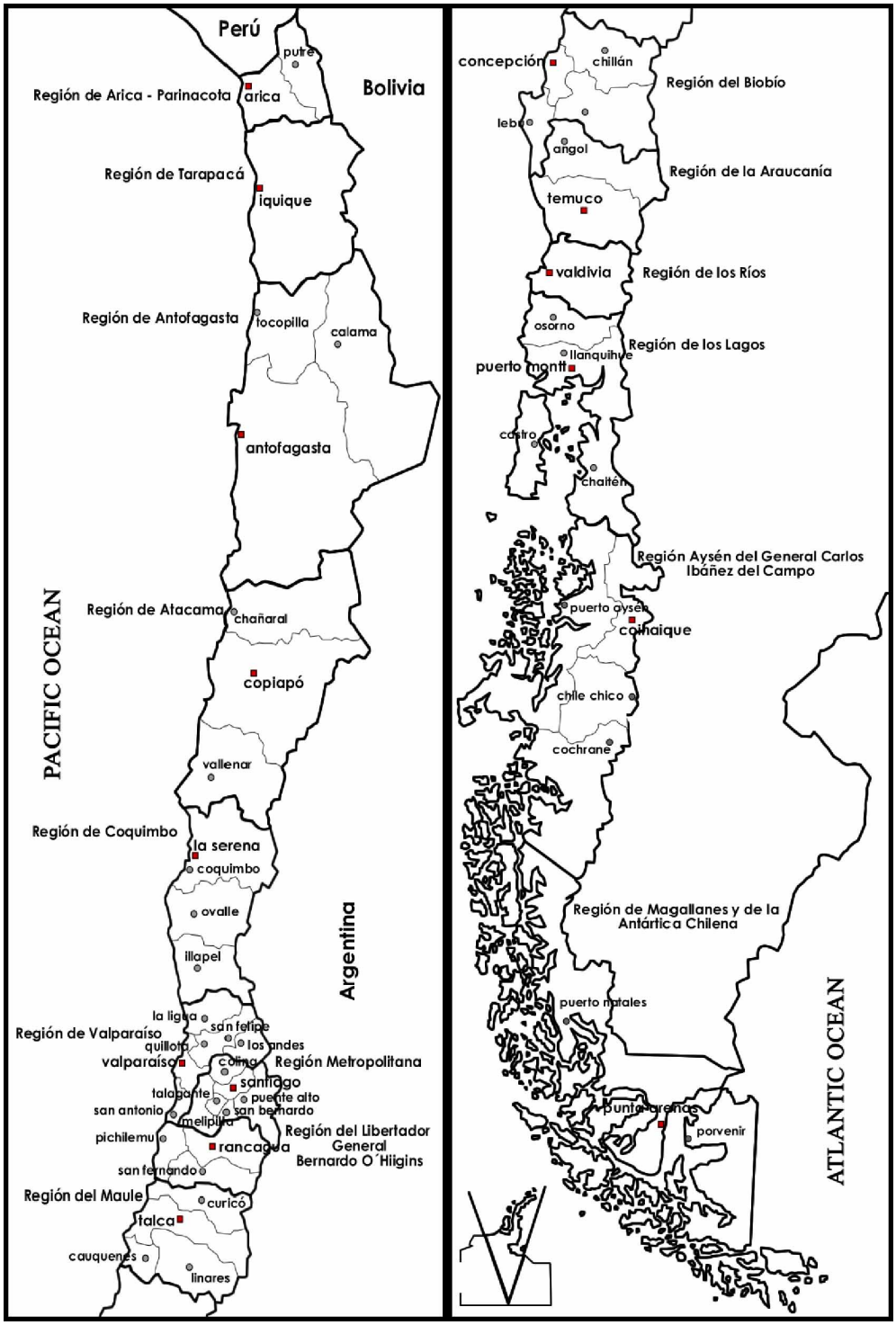
Chile has over 18,000 km of ecologically significant coastline (see Map 1.1) (Caballol et al., 2006). The waters outside Chile holds for example, over 1,000 fish species, more than 80 species of seaweed and 50 shellfish species. Fisheries catch around 150 different commercial species (Svensson, 2003), making Chile highly attractive for international fisheries firms. Unequivocally, Chilean fisheries are directed towards international markets and as early as 1985, 85 percent of the national fish production value was commercialized in foreign markets (Ahumada and Retamal, 1988, p. 648, 651). In contrast to Japan and Russia, Chile captures all fish within its territorial waters.

In 2003 Chile occupied seventh place in world fish landings, but in 1994 it reached its landing peak with around 8 million tonnes of fish, occupying fourth place globally (Subsecretaría de Pesca "Subpesca", 2004). The reasons for the decline after 1994 have not been focus for attention. The export "success" of salmon farming is often touted by the press and very rarely are the ecological and social downsides given any coverage. This is except by those critical to this export-based economic growth, who are mainly environmentalists and neo-liberal system critics, who are seldom represented in the mainstream press.

The negative effects of the process of globalization on natural resources seem to be quite direct in the case of the *Loco*, showing that once integrated into the international trade sphere, artisanal fishing is also involved in depletion of marine resources. Considered a delicacy by the Chileans, the *Loco* – as discussed above – has been near extinction due to indiscriminate extraction.

Critical for the species decline was the opening of export markets in 1975 due to the implementation of neo-liberalism during the Pinochet regime. Until 1975, the extraction of *Locos* for the domestic market was on average 4,300 tonnes/year. During the export period, extraction reached its peak in 1980 with 25,000 tonnes (Castilla, 1995; IFOP, 2000), which is an increase of 481 percent in five years. Industrial fishing shows a similar tendency. From 1976 to 1992 total catch increased by over 400 percent.

The export "success" of the *Loco* attracted the interest of those working in other sectors into fishing, including mining workers. Management and Exploitation Areas for



MAP 1.1 Map of Chile divided by regions

Benthic[3] Resources (MEABR) was the regulation introduced primarily to protect the *Locos* from over-exploitation. From this regulation a localized Management Area (MA) could be established all along the coast. This initiative had also the effect of increasing the number of fishers and therefore also the pressure on all the benthic species. Measures like national bans to extract the species implemented before the introduction of the MAs had a similar effect. The first extraction ban (1989–1992) (IFOP, 2000) which allowed for a moderate recuperation of the species, led simultaneously to illegal extraction and the prices rose 500 percent, giving further incentive to illegal extraction. The situation could be characterized as the "tragedy of open access" (Stevenson, 1991) (usually referred as the "tragedy of the commons"), not due to the lack of regulation, but because different measures aimed to control extraction did not work or worked only partially. This experience has parallels to what has occurred in others part of the world, South Africa being a case in point (Cook and Sweijd, 1997; Hauck, 1998; Sweijd and Hauck, 1998; Gordon and Cook, 2000; Redpath, 2002; Garcia et al., 2003; FAO, 2005).

There are no simple explanations for either the diminution of the *Loco* population or for the failure of conservation plans. The species is sensitive to harvesting and easily over-exploited and increased rivalry in fishing, commercialization and export contributed to the depletion.

PICTURE 1.3 *Jaiba*

PICTURE 1.4 *Lapa*

PICTURE 1.5 *Champa*

PICTURE 1.6 *Piure*

PICTURE 1.7 *Picoroco*

PICTURE 1.8 *Erizo*

[3] "Marine biota can be classified broadly into those organisms living in either the pelagic environment (plankton and nekton) or the benthic environment (benthos [bottom environment]). Some organisms, however, are benthic in one stage of life and pelagic in another. Producers that synthesize organic molecules exist in both environments" (Encyclopædia Britannica, 2008; my emphasis). Benthic (zool): that lives in contact with the sea bottom (Pequeño Larousse Ilustrado, 1989, p. 142). Examples: Jaibas (see Picture 1.3), Loco (*Concholepas concholepas)*, Lapas (*Fissurella spp*), (see Picture 1.4), Algas (like Champa) (see Picture 1.5), Piure (*Pyura chilensis*) (see Picture 1.6), Picoroco (*Austromegabalanus psittacus*) (see Picture 1.7), and Erizo (*Loxechinus*) (see Picture 1.8). (Subpesca, 2005c, Iconografias de peces, Permission from Bolbarán, D., Subpesca, Pers. Comm. via email 2008-04-08).

The scattered habitat distribution of the *Loco* excludes industrial fishing or large commercial operations (Geaghan and Castilla, 1988, p. 58) and artisanal hand extraction are used. The growing period of the *Loco* is long, taking, depending on the region, over 3.5 years to reach the minimum legal longitudal shell size of 10 cm (Geaghan and Castilla, 1988).

The *Loco is* sold internationally as Chilean abalone. It is also called false abalone or South Pacific abalone due to its physical similarity with the abalone. The *Loco* belongs to the Muricidae family being alone as a species within this family. The abalone proper belongs to the Haliotidae family. Chilean exporters, instead of highlighting the exclusivity of the *Loco*, expediently it was associated with the abalone that already occupied a privileged place in Asian markets (Reyes, 1986). The abalones are found in warm oceans almost worldwide. The *Concholepas* is restricted to the coast of Southern Peru (local name Chanque) to the south of Chile (Stuardo, 1979; Gallardo, 1979; Castilla, 1995; Rodriguez and Inostrosa (*s.a.*).

In Chile the depletion of *Concholepas concholepas* and other benthic species threatens not only the eco-system but also the economic survival of the artisanal fishers along the Chilean coasts; a group already living on society's margins. Artisanal fishing activities support, directly and indirectly, *ca* 400,000 people (Subsecretaría de Pesca (Subpesca), 2003). The number of artisanal fishers amounts to *ca* 54,751 (Servicio Nacional de Pesca, (Sernapesca), 2005a).[4]

However, in this rather dark "seascape of extinction", and under the shield of the new 1991 Fishing and Aquaculture Law (Ley de Pesca y Acuicultura, LPA 430/1991, Art. 48), there are also some hopeful emerging scenarios of a more locally-based development that addresses sustainability's environmental and socio-economic aspects starting with the small-scale fishing organizations themselves. This new fishing law, which nestles the referred MEABR, emerged in a new political climate marked by the transition from the military government (1973–1989) to one elected in 1990, bringing in new democratising ideas. It became clear that regulatory measures were quite pointless until the users, the artisanal fishers themselves, realized that they held the primary responsibility for conserving the species they economically depend on. Chilean authorities in recognizing this have partially changed strategies, intentionally or not — an issue that deserves to be studied — very much in accordance with principles dictated by international organizations. Among them we have the 1982 UN Convention on the Law of the Sea for marine resources management, the FAO Committee on Fisheries (COFI) of 1991 which recommended new approaches to fisheries management such as the Code of Conduct of 1995 to foster COFIs policy, and other agreements, declarations and legislative frameworks emphasizing a more participatory approach at grass-root levels (Garcia et al., 2003; FAO, 2005; FAO, 2006).

THE EMERGENCE OF NEW CULTURAL LANDSCAPES

Facing diminishing species, some Chilean fishers' organizations located at El Quisco — my first study case — and Quintay (Region of Valparaíso) have, with the help of university experts, pioneered the development of strategies to reduce the threat of *Loco* depletion, thereby providing space for new cultural landscapes.[5] They protected their traditional fishing areas, which later stimulated and informed a new more localized approach called the Management and Exploitation Areas for Benthic Resources (MEABR), which was subsequently formalized by government. The manifestation of MEABR

[4] Fishing Subsecretary and National Fishing Service, respectively.

[5] The World Heritage Convention acknowledged in 1992, in Article 1 of the Convention that cultural landscapes represent the "combined works of nature and of man (...) They are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal" (Unesco, 2007).

on the ground is commonly known as a Management Area (MA). I henceforth use this term to refer to individually established reserves under the MEABR framework. As a fishing administrative measure, MEABR's main objective is to stop open access and decentralize fisheries management (IFOP, 2000; Gelcich et al., 2005). In short, as I will return later to this central issue, MEABR comprises a kind of paradigm shift in the fishing policy of benthic resources "to halt the scheme of free access (...) that reigned in the exploitation of the said resources, which fomented, on one hand, the over-exploitation of these, and on the other, generated negative socio-economic and technical conditions for the artisanal fishers." (IFOP, 2000, p. 1).

It is precisely these kinds of conditions, characterized by an escalating scarceness in the availability of fish resources, and a major awareness about it, which have raised the economic question of costs and benefits of acquiring territorial rights for fisheries (Christy, 1992). Thus, MEABR came to empower defined users with the right to exploit benthic resources within a publicly owned, limited portion of the sea, not implying ownership, but exclusive access, or put more appropriately, sea tenure (Christy, 1992). Following Schlager and Ostrom's (1992) bundles of rights, these include access, withdrawal, management and exclusion of specific fishing ground for the right holders. In the international literature they are known as collective territorial use rights in fisheries (TURF), and are based on a common property approach (Christy, 1992; Píriz, 2004; Gelcich et al., 2006b) thereby constituting a co-management between the state and the principal stakeholders. This approach is in direct response to years of failed centralized fisheries management.

Certainly, the rights embodied in TURF do not exist in a vacuum but they are part of a defined social context. As resource management, TURF is part of national fisheries management, and here the concept of "co-management" is relevant. Co-management is defined broadly as, "the sharing of power and responsibility between government and local resource users." (Berkes et al., [1991] in Hauck and Sowman, 2003, p. 20). This implies a shift in the perspective from fisheries to the fishers, including also the "non-scientific knowledge of those depending on the environmental quality of coastal waters for their livelihood" (Píriz, 2004, pp. 4–5). This is indeed an important shift from a democratic point of view that places the fishers as subjects in other spheres other than those merely related to their own immediate production.

In Chile the organization and implementation of MAs enabled under MEABR are financed through national and regional authorities and supervised by both universities and consultancy firms. Thus, the concerned action of these actors is central. Therefore, although the users (artisanal fishers) are required to organize themselves in order to obtain use rights over a sea area, it is ultimately the state that defines the legal framework. Once organized collectively, only the local fishers (be it in the legal form of union, associations or cooperatives; more about this in Chapter Four) are allowed to exploit MA resources.

There are different reasons for introducing co-management in a country. In Chile it was introduced after other more centralized resource management approaches failed. Failed in this context means that an economic surplus was not produced or sustainable stocks maintained. Hersoug et al. (2004) stress that in many developing countries fishers are likely to be marginalized in setting the management objectives and more broadly through implementation of co-management projects. This infers that co-management policies are usually government initiated, thus remaining top-down.

The evaluation of extensive experiences in community-based coastal resource management (CBCRM), co-management and integrated coastal management (ICM) projects from Philippines seems to be positive at least in terms of the development of so-called soft assets (e.g., social "capital", social resources and networks). Soft assets support fishers' efforts to undertake steps towards sustainable development. Similar assessments come from other Southeast Asian countries, such as Vietnam and Cambodia where

CBCRM has been applied (Ferrer et al., 2001). Similar to the Chilean experiences under MEABR, the economic outcome of the South-east Asian experiences is not clear from an evaluation of ICM projects. ICM projects are broader in scope and scale than CBCRM projects, which are usually locally oriented, community based initiatives (Pomeroy et al., 2005).

In that the Chilean MAs are allocated and operated by the fisher organizations, they are similar to the Japanese version of TURF, whose co-management is also based on fishers' cooperative associations. TURF is perceived as successful (Píriz, 2004, p. 45), especially for sedentary species. This judgement also seems to be valid in the Chilean case, based on 20 years of experience (Castilla et al., 2007).

It is important to stress that MAs are not automatically attached to local villages or communities in the sense of involving the families or other formal or informal institutional forms usually found in a community.[6] MAs are situated in coves, many of them being rural and geographically isolated, often whose only inhabitants are likely to be fishers. However, coves vary. Some are located in rural and urban settings and some nestle communities, while others do not. The fishers and their families, forming a community, inhabit some rural coves but their legal status in respect to the land they occupy is often ambiguous, resulting in contests over access.

UNATTENDED CONCERNS? STUDY RELEVANCE AND JUSTIFICATION

Through the MEABR reform and the setting up of MAs fishing use rights have been delegated to the fishers in an effort to redress the depletion of benthic marine resources. It can be reasonably concluded then that the perception of these key actors, the "guardians of the coastal eco-systems" (Píriz, 2004, p. 79), towards the MAs will be central to their success or failure. Thus, understanding attitudes and beliefs are important for further policy development and to inform other co-management policies worldwide for threatened marine resources (Gelcich et al., 2005; Gelcich et al., 2006b). As Pomeroy et al. (1997, p. 102) express it:

> If there is an interest in understanding the success and sustainability of Community Based Coastal Resource Management projects, it is essential to understand perceptions of the present and possible future impacts of these projects. Perceptions of impacts may explain some of the variance in long-term, as well as short-term, project success.

However, in spite of their expansion, the implementation of MAs is still at an early stage. As FAO (2005, p. 50) states:

> The transition from open access to effectively managed fisheries can be expected to bring long-term improved benefits for the fisheries and for society as a whole. However, there is a time-lag, usually of some years, between the implementation of management measures and the realization of the stream of benefits resulting from the changes made.

Nonetheless, since 1991 the MAs have expanded all over the Chilean coast, embracing almost every cove and almost half of the 687 artisanal fishing organizations in the country, involving in 2006 *ca* 40 percent of its 42,091 members (Sernapesca, 2005a). These figures could be easily interpreted as an indicator that MAs are viewed by many of the organized fishers as a valid organizational alternative. An initiative

[6] There are at least 94 definitions of the concept "commmunity" (Gallardo, 2002), but there is nonetheless some general consensus about the elements required to talk about a community: the territory, the population, and the feeling of belonging to a particular group. However:

> when physical territory does constitute one of the basic elements of a community, it corresponds to a relatively specific and limited space, known by the community members who share it, whether it is for real or symbolic. The population consists of a group of people who are linked to each other by a network of relationships, sharing some common norms and values. The feeling of belonging to a particular group stems from the existence of linkages between people. These linkages can be such as kinship, ethnicity, friendship, common interests (Gallardo, 2002, p. 125).

Obviously these elements are present among the fishers, except that the families are not part of the population as is the case with many other working or producing activities. The community of the fishers' organizations will be more of the symbolic kind. I return to both of these issues later.

involving such a high mobilization of people, organizations and economic resources would not appear to be the result of only top-down policy enforcement. Top-down policy enforcement seldom succeeds if grass-root organizations are not convinced of its benefits. Nonetheless, approximately 23 percent (12,660) of the registered fishers at Sernapesca are not affiliated to any fisher organization. Furthermore, there are many organizations that have not applied for a MA.

Doubtless, the seriousness of the situation during the last few decades has placed the fishers in a better position to change their non-sustainable practices, validating Ostrom's (1999) idea that when resource users notice changes that threaten the natural resource they depend on, they act collectively in order to solve the problem. In 2001, 90 percent of the MAs had *Locos* as their main target species, and all the collected *Loco* in the country comes from MAs (Gelcich et al., 2006b).

The enhanced self-esteem and self-reliance of the fishers in forming local responses are configuring what I metaphorically call "seascapes of confidence".[7] Nonetheless, new solutions often lead to new problems, threatening the newly won, still embryonic seascapes of confidence. The solution to the problem of overexploitation, giving management rights over a part of the main means of production for the fishers — the ocean — leaves the problem of their settlement and infrastructure on land unresolved, leading to new seascapes of conflicts. This situation arouses old latent power relations, and tenure conflicts re-emerge at the same time as new stakeholders enter the scene. New power constellations crystallize, adding major complexity to the situation. These problems are not only about different stakeholders in the contested places of MAs, but also about the legal framework and different law interpretations. In addition there are complex jurisdictional issues with different law enforcement authorities controlling different natural resources, such as land (police) and sea (Maritime Governance). All of these conditions constitute a potential threat to the enduring viability of MAs.

The spread of MAs is not only changing the physical landscapes but also the cultural landscapes of land and sea tenure, opening an arena for potential tensions and conflicts principally among the fishers and the landowners. This issue has not received much research attention. It deserves a wider and deeper discussion than the one offered in this book. The corollary is that, with some exceptions, social aspects are given little attention by both authorities and scientists, despite the warning signs discussed above and the fact that economic results are still uncertain in terms of improving the fishers' livelihoods.

Gelcich et al. (2005) analyse fishers' perceptions in some MAs finding positive and negative attitudes towards them. The authors warn about conflicts among fishers in regard to claims of rights to the fishing places where no management areas have been implemented (so-called historical areas), and that some areas used by fishers' organizations have been encroached with the introduction of MAs, leaving fewer alternatives for those who have not adopted the official MA alternative. Historical areas are those traditionally lucrative for fishing and where no MA or other concession has been implemented, and where formally open access reigns, except for those resources that are under a ban or subject to other restrictions. Some evidence suggests that the expansion of MAs, seen as a success by government, might hide conflicts among fishers, weakening their social bonds (Gelcich et al., 2005).

The reason why not all fishers' organizations have applied for MAs remains to be studied. There is likely to be diverse explanations for this, such as lack of unification, interest, means, and time amongst others. Or perhaps their

[7] The World Commission for Protected Areas The World conservation Union (IUCN (2008) defines a seascape as an: Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area.

efforts have not yet resulted in an application. Some fishers also hold the idea that diving is a free activity and find it difficult to depend or submit to the collective regulation required for an MA. They turn from free gatherers to cultivators at agreed times, as a fisher from El Quisco expressed (July 2001).

In the rest of the country's fishing places (historical areas) there has been a total ban on *Loco* fishing since 1989. The last ban decree spans from July 2003 to December 2008 (Sernapesca, 2007d; D.S. 1593/05). Most probably after that it will be enlarged in order not to risk the MEABR regime (Paillaman, A., Sernapesca Pers. Comm. via email 2006-08-25). MAs are, in other words, excluded from this ban since they themselves manage the resource, having their own regulations. In another study Gelcich et al. (2006a) warn also about the effects of the MAs upon fishers' traditional institutions (I will return to this issue in Chapter Eight).

Nonetheless, with the new management, fishers are experiencing a transition from "nomadic" fishing to a "sedentary" harvesting of the species in fixed places leading to a transformation of their life-style. The transition from hunting to harvesting also means that traditional diving skills become less important, giving place to new negotiation and management abilities (Gelcich et al., 2005).

However, to manage sea resources in common in this situation does not involve ownership, as the sea is *res publica.* However, regarding land the dominion of the state is quite limited as the land around the coves is mostly in the hands of large private landlords (see Chapter Three). The fishers seldom belong to this social group, so their access to land is problematic. If the MAs and the ban initiative results in sustainable harvests it could be reasonably conjectured that the transition from temporal and nomadic to fixed location fishing would lead to social tensions and legal problems as the fishers become increasingly settled on the coastal lands without entitlements. Alternatively, the fishers do not have the possibility to settle at all, or lack the option of developing required infrastructure to support their fishing livelihood. The fishers of Puerto Oscuro (Region IV of Coquimbo) — my second case study — exemplify the latter situation (own observations during 2000–2003). The same is valid for the fishers of Puerto Viejo in Northern Chile (Region III of Tarapacá), that although mostly under precarious conditions, they already live in the cove and are suffering from the hostility of the landowner; a case that has featured in the media. The insecurity regarding rights to land bordering the sea, coves and beaches discourages the building of infrastructure on the land where the coves are located. For fishers to build houses in the coves if these are within private property, is out of question. However, the rights over natural resources vary from region to region depending on whether land bordering the sea is public or private, urban or rural. I return to this issue both in Chapters Three and Six. A study of use rights allocation of the Puerto Oscuro MA and its effects on the physical and social surroundings hopefully sheds light on sustainability of other rural MAs in Chile.

Eco-systems do not recognize social and political borders and ecologically the sea is indivisible (Píriz, 2004), as is society from nature. Nonetheless, the borders of socially defined space-time scales of artisanal fishing exist and might work provided allocation rights are well-defined, including those on land. This is even more evident in the case of sedentary species for which the model of collective or community territorial use rights in fisheries (TURF) has been tried with positive outcomes (Píriz, 2004). This makes the application of this model promising for the sustainable use of benthic resources in Chilean MAs, provided that land problems are taken into the equation. The Chilean experience might constitute a positive example in the global efforts for a more sustainable social and ecological use of marine resources.

As Pomeroy et al. (1997) state, what is crucial in assessment of projects is their impact on the "well-being" of the coastal eco-system, including non-humans and humans. Therefore, ideally a comprehensive evaluation would be interdisciplinary. However, such assessment of

"well-being" of both nature and humans can be complex and expensive (Pomeroy et al., 1997). Ideally, any evaluation of this type would also compare data gathered before the implementation (baseline data) with data collected after some years of experience. Likewise, the same instruments or operational definitions of variables (or indicators) should be used during both periods. In reality, conditions seldom allow ideal evaluations (Pomeroy et al., 1997).

A review of the literature indicates that to date, a comprehensive evaluation of MAs in Chile has not been completed, perhaps with the exception of Castilla et al. (2007). What has been written so far dealing with threatened species falls predominantly within natural science, more specifically marine biology (Castilla, 1974; Tobella, 1975; Castilla and Cancino, 1979; Gallardo, 1979; Stuardo, 1979; Dubois et al., 1980; Castilla and Duran, 1985; Geaghan and Castilla, 1988; Castilla, 1988; Varela and López, 1989; Cespedes, 1990; Oliva and Castilla, 1990; Rodríguez and Inostrosa *s.a.,* etc). The presence of social sciences in the literature is scarce. However, among the studies, mostly by natural scientists, that consider socio-economic aspects, we find Castilla, 1983; Moreno et al., 1987; Geaghan and Castilla, 1988; Arrizaga et al., 1989; Castilla et al., 1993; Gallardo et al., 1993; Payne and Castilla, 1994; Castilla, 1995; Stotz, 1997; Vildósola and Rossón, 1997; Castilla and Fernández, 1998; Meltzoff et al., 2002; Castilla et al., 2007. In this category we also find Gelcich et al. (2005, 2006a and 2006b) in a study that addresses attitudes, beliefs, and financial risk-taking among fishers in some areas. Among the studies written by social scientists (sociology and psychology) we can count Cereceda and Preiss *s.a.*(a), Cereceda and Preiss *s.a.*(b), Cereceda *s.a.*(c). Also de Laire (2002) touches upon MAs in a study about artisanal fishing in Chile.

Biological models alone are not enough to "understand the socio-ecological interrelations derived from the use and managements of fisheries resources" (Píriz, 2004, p. 40). Social sciences would enrich the discussion regarding the adequacy and sustainable management of forms like the MAs under the *cpr* approach. This is even more important in Chile as awareness about the commons institutions as a management solution is meagre, which the case of agricultural communities in Chile's Norte Chico exemplifies (Gallardo, 2002; Gallardo, 2004).

PURPOSE OF THE STUDY

The purpose of this monograph is to qualitatively study and analyse MAs as a socio-economic reproduction alternative and organization using the common pool resources (*cpr*) theoretical approach evaluating principally the pioneer MA of the Sindicato de Buzos y Pescadores of El Quisco (Fishers and Divers Union of El Quisco), Region V of Valparaíso, from the fishers' perspective. The case of the fishers' guild of Puerto Oscuro cove (Region IV of Coquimbo) is included in this study to portray the landscapes of conflicts as the ownership/claim of the nearest land to the coves is contested.

A key concept that appears when the question of the MAs is discussed in the mass media and scientifically is "sustainable development". My first reflection was how the fishers themselves understood such a concept and how it was related to the MA in El Quisco. The research questions, mainly for El Quisco, then became: How do fishers understand the concept of sustainable development? How do members of the union perceive their experiences with MA and their role? Do they consider it to work? What is the background and reasons for organizing a MA? What problems and constraints do the fishers perceive both in practical and legal terms regarding MAs?

The problem of land disputes was a main issue due to my own experiences from Puerto Oscuro and what I have understood from the mass media regarding the case of Puerto Viejo in Northern Chile. While the evaluation of El Quisco deals more with the performance of MAs, Puerto Oscuro engages more with the "seascape of conflicts". El Quisco is therefore the principal case study and Puerto Oscuro an auxiliary case study. Although the MA at El Quisco started *de facto* to function in 1989, it officially became a MA in 1993. Puerto Oscuro became a MA in 1998 (IFOP, 2000).

I hope, first, through my cases, to illustrate how MAs, as national examples of the territorial use rights in fisheries (TURF) for the exploitation of marine benthic resources, may be a sustainable natural resource management alternative against the overall process of commoditization of rural livelihoods, showing how they, after several years of implementation, are performing economically and socially. I hope, second, to highlight the particular situation of rural coves and the new seascape of conflicts that are emerging with the spreading of MAs along the Chilean coasts, to provide social science input into a national fishing policy to address these problems.

Using a case approach the study aims to identify common features that MAs share with other institutional arrangements of the commons such as those described by Ostrom (1999) and Stevenson (1991). Thus the specific theoretical aim is to contribute to building a common base for an approach that both defines and explains this form within the national context. The more general aim is to contribute with empirical knowledge from the Chilean cases to CPR theory and practice. In ecological and theoretical terms, MAs are relevant as they can show that marine species can be exploited sustainably under the institutions of the commons (Stevenson, 1991; McCay and Acheson, 1996; Ostrom, 1999).

RATIONALE BEHIND THE SELECTION OF THE CASES

The Fishers and Divers Union of El Quisco was the pioneering MA in Chile, forerunners in protecting a sea area from over-exploitation in order to save the *Loco*. The initiative, together with others, led to the promulgation of MEABR and the legal capacity to establish MAs. Landon, who originally inspired me with his TV program on Chilean artisan fishing, directed me to the Union of El Quisco. Landon also gave me the name of the Chilean *Loco* expert Dr. Juan Carlos Castillla, at the Centre for Advanced Studies in Ecology and Biodiversity, Pontificia Universidad Católica de Chile, Santiago. Dr. Castilla then referred me to Armando Rosson, a marine resource technician, a consultant who has worked with the fishers and the MA in El Quisco for several years and who ended up assisting me in the field with this research. Since 1982 Universidad Católica de Chile, Santiago, has an experimental marine protected area (La Cruces) in concession from the state, near El Quisco.

I undertook fieldwork in El Quisco during July 2001 with financial support from the Dept. of Rural Development Studies, Swedish University of Agricultural Sciences (SLU). Puerto Oscuro was not initially in the scope of this study, however having experienced conditions there during several vacations, I thought it would provide valuable insights into seascapes of conflict. Puerto Oscuro is a small natural harbour that also gave its name to the private land estate (*fundo* or *hacienda*)[8] that surrounds the cove or harbour. I am very familiar with the cove and the beach areas of Puerto Oscuro, and it was during my vacations there that I saw the emergence of their MA- related problems with the owners of the land estate, Puerto Oscuro. I am also acquainted with the property and its colonial history as part of my PhD investigation (Gallardo, 2002) about the agricultural communities in the Commune of Canela embraced the Puerto Oscuro property. Canela is the area where I have my cultural roots. I have close associations with the Puerto Oscuro fishers and their families. Furthermore, I personally know the owners of the estate and have been exposed to their arguments in defence of their own interests. In other words, I have seen the fishers' powerlessness, and also unfortunately, the open hostility of the other party, especially against the people that have rather humble summer houses on the beach. The inclusion of Puerto Oscuro thus illustrates many of the problems that the fishers confront in rural coves along the Chilean coasts, forming part of the experience

[8] The concepts of *latifundium*, *hacienda* or *fundo* are commonly used in Chile indistinctly to denote a large landed estate. The concept of *minifundium* refers to small landed estates. Historically the *minifundium* has its roots mainly in the *latifundium*, resulting from the subdivision of the latter (Borde and Góngora, 1956; Gallardo, 2002).

that threatens the enduring viability of the MEABR initiative.

METHODOLOGICAL APPROACH

Participatory Rural Appraisal (PRA) is the approach used in this study. What follows is a discussion of the general characteristics of qualitative methodology. This will reveal how and in which way PRA shares the general characteristics of qualitative research, except that participatory approaches put participation at the forefront of attempts to emancipate disempowered people. Denzin and Lincoln (in Creswell, 1998, pp. 15–16) define qualitative research as being

> multimethod in focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural setting, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them.

Among the characteristics common for qualitative methodology, Creswell (1998, p. 16) highlights (a) the natural setting as source of data; (b) the researcher as key of data collection; (c) the collection of data in the form of words or pictures; (d) seeing the result more as a process than as product; (e) the inductive analysis of data; (f) paying attention to the particular; (g) putting the focus on participants' perspective, and their meaning; (h) the use of expressive language.

PRA is evolving all the time and is therefore not easy to define, but it can be described as "an approach and methods for learning about rural life and conditions [by, with and from] rural people" (Chambers, 1997, p. 104). More recently it has been used in urban settings and extended its focus from learning to analysis, planning, action monitoring and evaluation. For others, PRA has deeper resonance implying "philosophy and a way of life which stress self-critical awareness and commitment to the poor, weak and vulnerable" (Chambers, 1997, p. 104). The three foundations of PRA are: "(i) the behaviour and attitudes of outsiders, who facilitate, not dominate; (ii) the methods which shift the normal balance from close to open, from individual to group, from verbal to visual, from measuring to comparing; and (iii) partnership and sharing information, experience, food and training between insiders and outsiders, and between organizations" (Chambers, 1997, pp. 104–106).

Participatory approaches have been used extensively in sustainable development studies. In this approach, in contrast to extractive research, "methods are being used not just for local people to inform outsiders, but also for people's own analysis of their conditions" (Pretty et al., 1995, p. 56). Using PRA, I also complied with the spirit of global efforts of international fishing organizations and protocols (Garcia et al., 2003; FAO, 2005; FAO, 2006), to anchor the investigation at grass-root-level, in order to fully take account of the fishers' own evaluation of the methodology and process, including the role of the researchers (Pretty et al., 1995).

Using PRA tools, the subjects involved follow their own process, defining and structuring problems and solutions, performing the reflection and the analysis (Pretty et al., 1995). Through this exchange process fishers had the possibility to collectively elaborate and expose their ideas and visions, creating opportunities to create empathy for the position of others (Scoones and Thompson, 1994). This exercise in information exchange and understanding should contribute to the empowerment of the fishers and the Union, strengthening their own role as resource users. Furthermore, PRA is gender sensitive providing tools to explore, for instance, gender differences in power and decision-making in economic activities. It is in this way that women's own experiences and problems are given a meaningful separate focus that more effectively enables pertinent gender issues to be revealed (Jiggins, 1994).

In choosing this methodology, the focus here is squarely on the fishers, the protagonists of MAs, and their perceptions. As Píriz (2004, p. 71) puts it:

> The perceptions of problems and solutions by resource users must be captured and understood, because regardless of whether these could be considered as "real or false", "right or wrong", they will contribute to the understanding of cpr [common pool resources] situation, the search for and implementation of solutions and ultimately the fishers of the future.

Given that this study is principally about one case (El Quisco), it cannot be considered to be representative of MAs in Chile, nor of all the members of the Union. It is, rather, exploratory research significantly based on the chosen cases, thus reflecting specific fishers' perceptions in accordance with the aim of the study.

One of the central issues of external validity is the representativity of the sample. That is, the characteristics of the subjects must reflect the characteristics of the population that is under research. In this view it is essential that the sample is as representative as possible of the population from which is drawn.[9] However, field conditions are never ideal and the researcher often has to adapt to the social context. Due to field conditions, the sample was not statistically representative of either the fisher members of the Union responsible for managing the MA under study, or of their women. Of the three types of non-probability sampling (convenience, purposive and quota sample) (Nachmias and Nachmias, 1996, p. 184), my sample coincides with a convenience sampling approach. This is where the researcher selects the sampling units that are conveniently available. In this,

> there is no way of specifying the probability of each unit's inclusion in the sample, and there is no assurance that every unit has some chance of being included (Nachmias and Nachmias, 1996, p. 183).

However, quantifying statistical patterns based on a representative sample of the population is not an aim of qualitative research. Such studies are more concerned with capturing textured details of social events and the perceptions of respondents about these events. This is not to say that it is impossible to quantify and measure perceptions, or for that matter that the perceptions found among fishers in El Quisco could not be valid for fishers of other MAs. Case study research does not aim to extrapolate its results for the whole population of the studied phenomena, as the results are site specific and therefore also limited in their geographical scope. This approach may lack generalization, but it hopefully gains in depth.

Qualitative research is characterized by paying attention to the particular (characteristic f), and to the kind of data that does not need to be measured in quantitative terms. The present study has two different cases (one primary and one auxiliary). Instead of counting occurrences across a large population and controlling possible contaminating variables, using statistics and replicability to validate generalization from survey and experiment, qualitative studies are

> open-ended and set up research opportunities designed to lead the researcher into unforeseen areas of discovery within the life of the people s/he is investigating. Also, they look deeply into behaviour within specific social settings rather that at broad populations (Holliday, 2005, p. 5).

There is a significant difference in the philosophy underlying qualitative and quantitative research traditions. The key assumption of quantitative research is that through the use of correct technique it is possible to obtain objective facts about the world; in contrast, qualitative research is interpretative offering gradual pictures of reality, pictures that themselves are also interpretations of a socially constructed world.[10]

[9] A sample is considered representative if the analysis made using the researcher's sampling unit produce results similar to those that would be obtained had the researcher analysed the entire population.

[10] This is not to postulate an idealist ontology. The ontology behind this hermeneutic or social constructivist position is not to deny the existence of a material world outside our consciousness or for that matter, its importance in the way it conditions human life, but there is a difference between the physical, material world, and the social world. We cannot explain social reality with objective observation language since knowledge is based on and created through language; reality and language being inseparable (Bergström and Boréus, 2000). There is a helpful distinction between social or institutional facts and so-called "raw" facts (Searle in Bergström and Boréus, 2000) that here helps to avoid social constructivism to fall into an idealist ontology denying the existence of a world outside our minds. Examples of raw facts are that the earth gyres around the sun, and institutional facts such as Chile being ruled by a dictatorship between 1973 and 1989. While the first fact is valid independently of our language (although to sustain this we need a language), the social fact is unthinkable without language.

Given that the researcher is the key to gaining information (characteristic b), s/he is an instrument of data collection, gathering words or pictures, and although the researcher brings their own questions of how and what, s/he is an active learner who can tell the story from the participants view rather than being the "expert". In PRA the researcher is a facilitator of the inquiry process. Regarding the characteristic that collection of data takes the form of words or pictures (characteristic c) and (characteristic h) expressive language, visual representations are especially important as they can fulfil two-folded purposes: First, when the study subjects lack formal education, which was very much the case with the fishers, visual representation avoids the use of written language to express things (see also Chapter Seven). Second, pictures better than words visualize complex situations, and when it is the researcher that lacks knowledge regarding the studied activities, the pictures help to fill their lack of knowledge. Thus, the sea transects and pictures showing diving activities were useful to solve my ignorance in matters of fishing and diving. The process of working with PRA tools seems to have been important in sharing experiences with others discussing the issues targeted by the tools during which fishers also acquired new insights, judgments and knowledge (characteristic d). Thus, the process provides benefit for the participants and the products or results are more important for the researcher as they are the data on which s/he bases the analysis.

This epistemology, which leads to a specific inductive data analysis (characteristic e), means that knowledge is contextual and consists of the material constructed by the participants, in contrast to extractive deductive analysis where the converse is true and the research steps move from theory and hypothesis to reality. Putting focus on participants' perspective, and their meaning (characteristic g), means that researchers show in their work data produced by social subjects, or a re-drawing of them. The interpretation of the researcher comes only after presenting the participants' own drawings, or a re-drawing of them, and as a second step in her analysis. Here the identified information and elements are related to each other, to other similar field experiences/cases and to a theoretical approach. This relates again to the different significance that the process and the products or results have for both the social subjects involved in the inquiry and the researcher, respectively, fulfilling two different functions; a kind of "win–win" social situation and interchange in contrast to extractive research. Thus, while in the process the fishers and the women define and structure both problems and solutions, perform the reflection and the analysis (Pretty et al., 1995), with the results the researcher hopefully gets the answers to the posed questions.

THE METHODS

Since the reasons to include the two study cases are different, so are the methods used to gather data; the overall methodology is characterized as qualitative. The central methodological device used in the field research to collect data in El Quisco was Participatory Rural Appraisal (PRA). PRA tools were used to do a bottom-up evaluation of how the members of the Union perceived their experiences with the MA, illuminating problems and constrains experienced both in practical and legal terms. The specific tools used in El Quisco are exposed in a separate section below.

Beside PRA and interviews with qualified informants, and in order to grasp the multiple sources of evidence and to address the research questions, further data collection consisted of gathering and systematizing national statistics on artisanal and industrial fishing, relevant grey literature, fishing rules and laws, a lawsuit over land ownership and the Union's rules. All these types of data were complemented with national and international scientific articles and reports, as well as with intensive email contact that was maintained with key informants and scholars and institutions on the implementation, results, successes and problems of MAs. The national information technology integration of public institutions, due to demand for transparency, has radically changed the

information conditions for scholars and the public, making it easier for research.

Since Puerto Oscuro was included to integrate social tension over access to land in the cove area, data gathering specifically regarding the MA of Puerto Oscuro differs from that of El Quisco in that it includes more stakeholders than the fishers and their MA. It comprises the history behind the conflict over the cove and the inclusion of other stakeholders is achieved by studying the ongoing law-suit between the landowners and the cove's summer-house owners, as well as through observations and dialogue with those involved. My familiarity with the area, from both a personal and academic perspective, was also helpful in gaining cooperation from and understanding the perspectives of the stakeholders. Puerto Oscuro obtained its MA later than El Quisco, its experience is also shorter and data in this regard different and limited in scope.

The information from the Puerto Oscuro MA is based on semi-structured and open interviews with key informants. Two fishers were especially important (see Chapter Six). The information of the interviews was complemented with IFOP's (2000) study, the Base Line Study (ESBA) and the Proposition of Management Plan and Exploitation of the Management Area Puerto Oscuro, both necessary as prerequisite studies to officially obtain MA status.

For the ongoing lawsuit and demographic data from Puerto Oscuro I received assistance from a university geography student who also helped me collect data in Los Vilos and Canela during 2005. She interviewed several local informants and representatives from municipal, marine and judicial authorities. The historical background of the property, Puerto Oscuro, was derived from Gallardo (2002), where in order to reconstruct the land tenure structure from the 1600s onwards, judicial, notaries and parochial archives, land property registers and sales were used. I undertook the translation from Spanish to English of the different laws, rules, letters, interviews and other documents used in that monograph.

ON THE FIELD CONDITIONS IN EL QUISCO

When I initiated my field-work in El Quisco during the second part of July 2001, I was somewhat "assisted" by the stormy weather conditions that forced the fishers to remain ashore for several days. Thus, many of the fishers were around working with their boats and socializing. Meetings in this situation were relatively easy to arrange. After three days, and after familiarizing with Armando Rosson — the marine resource technician who helped me in the field — and giving him PRA technique orientation, I concentrated on understanding the Union's Junta (Board), the geographical layout and features of the cove, and met some of the individual fishers that were around. Mr. Rosson, who heads BITECMA (Biología y Tecnología en Recursos del Mar, Sea Resources' Biology and Technology), the consultancy firm, which along with the university has been working with the Union in the development of the MA, was of great support during my visit to El Quisco.

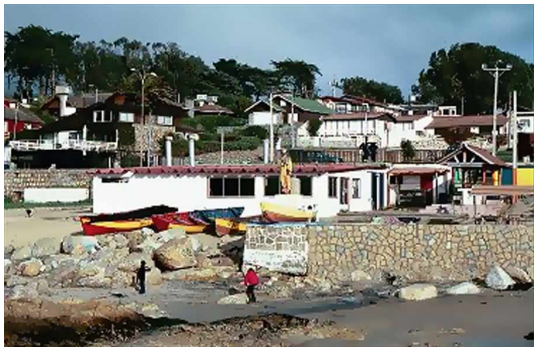
An *ad doc* meeting was then called after the first days in the place, by a member of the union using the megaphone that could reach the cove. A group of 20 fishers came to the meeting, which is about 22 percent of the total of the 92 members. In this first meeting, I presented myself and part of my personal history. I also explained to them the aims of my investigation, why it was a participatory evaluation, as well as about the role of us as facilitators (Rosson, A. and myself).

Of the 20 fishers that came to the first meeting, 12 participated constantly in the exercises (in groups of two, three or four persons, depending on the exercise/tool) during the ensuing days, although their numbers during the initial few days were higher. Over the entire period different fishers participated at different times. After the first few days of PRA exercises several fishers witnessed the ongoing process. Although they were curious, they did not directly take part in the exercises, staying behind those who were sitting and more directly engaged. While some of these standing, upon my encouragement, accepted my invitation to

get involved, others declined, perhaps because they thought it was more difficult to join at this later stage. Standing behind those who worked was an easier way to withdraw at any time if they felt like it. Some may have also felt intimidated because they could not draw or write well enough. However, standing behind those directly active did not hinder the observers from giving their comments, opinions and suggestions. Yet, only the names of those who participated formally were recorded. None of them wanted to be anonymous; the same for the women. Later, I interviewed one fisher individually and he asked to remain anonymous. He was the only one who had a less positive attitude towards the MA. His reasoning was that he found it difficult to accept impositions on when and how to fish *Locos* when he was a diver, i.e, he could no longer exercise his profession in the same way. I decided to leave aside more information about this fisher as more details could threaten anonymity.

The meetings were held in the Union's social centre, just beside the boats and the sheds. The social centre is the gathering place for the fishers and their families. Here they can eat, rest, smoke, socialize and get warm during chilly days. Outsiders can also eat fresh fish or other food here, cheaply. The place is well visited during the weekends by people coming to their summer houses in El Quisco. In front of the social centre there is another, more exclusive restaurant that is owned by the Union and run commercially.

After less than a week the weather calmed down and the fishers went off to sea. Most of the planned exercises were complete but those engaged in the exercises continued to participate until all exercises were complete. The last exercises (men's Problem-Tree and Problem-Solution) were performed in the open while fishers were preparing fishhooks. I was thus able to take pictures of fishers, the cove and of all the flipcharts (26 in total). These were displayed in the social centre, covering all of the walls during the days of my field visit there, which in total embraced less than 20 days. In this way the fishers who had not engaged directly in the exercises could observe what the participants had produced.



PICTURE 1.9 The social centre (behind the boats)

Mr. Rosson's good reputation helped me gain acceptance fast. We worked 10 intensive days together undertaking the group exercises. In the evenings I stayed with the women. This way we could advance quite fast.[11] I integrated women into the study by involving seven participating fishers' wives, including the two responsible for the social centre. We worked during the evenings, when women are traditionally at home to meet their returning husbands. Some women brought their children and some husbands were around waiting, giving companionship in the dark surroundings of the cove (Pictures 1.9 and 1.10) .

PICTURE 1.10 Flipcharts of the exercises hanging in the social centre's wall

[11] To work fast was important to me as I had my then seven-year-old son with me. Furthermore, the economic means were limited to engage Mr. Rosson for extra time.

Working with women was a bit different. They were quite decisive, organized themselves quickly and cooperatively divided up the tasks within the group. They started working quickly as soon they understood the exercise, and the results were promptly displayed on the wall. They also showed considerable confidence, perhaps because I was a woman too. They were also better at drawing and writing. All the women that came worked, and some of the accompanying children emulated them (Picture 1.11). They enjoyed doing their own map of the village.

PICTURE 1.11 Women having refreshment after PRA work

THE PRA TOOLS USED IN EL QUISCO

The PRA tools used for El Quisco were 14 in total. Unlike the Puerto Oscuro case, no other stakeholders were part of the study. As hitherto, fishing is mostly a male activity, there is not a single woman registered as a member of the Union, either as fisher or diver (Lista de Socios Sindicato de Pescadores Caleta El Quisco, 2001). Most tools were aimed at this main relevant production activity. Consequently, all the tools were used with men, but only seven were employed with women in an endeavour to capture a gendered perspective. Although the tools were the same for both genders, the issue to be studied could be the same (e.g., effects of the MA), or different (e.g., MA Problem and Solution Tree for men; Life and Household Problem and Solution Tree for women). The daily calendar tool was used for different categories of respondents, such as divers, fishers and women. Table 1.1 below, describes the tools used and their purpose.

In Table 1.1, the tools are ordered in three parts: background, production and commercialization system, and economy and daily life in order to give a first impression of these three broad categories and the content of the exercises. The treatment of the results and analysis in Chapter Seven will follow a different logic. In Table 1.1, Part One embraces the reasons for the introduction of the management area in El Quisco (Stepping Stones), followed by how the fishers perceive the concept of sustainable development (linked to the introduction of the MA) (Drawing Concept). The Historic Profile deals with the time perspective of the fishing village, and the maps with the spatial distribution of the different areas of the village as perceived by men and women (Village Map). The Venn diagram deals with the institutional linkages between the Union and the other actors/institutions including those both local and remote and public and private. This institutional mapping exercise also included an evaluation of their relationship to the Union. This was complemented with an *ad hoc* extra tool. This produced a diagram that described the Union's internal organization, including the role and responsibilities of committees.

Part Two includes the production and commercialization system, starting with Sea Transect which deals with how the harvest of the *Locos* and *Lapas* (*Chilean limpe, Fissurella Spp.*) is performed by the crew while submerged beneath the sea. Also captured was the distribution of benthic species, as well as what the fishers consider being predators of the *Loco*. This is followed by the System Flow Analysis tool that deals with the linkages between different economic activities both on land and sea, and their interconnection both with the households and the market. The two Impact Analyses undertaken by men and women (separately) convey the effects that the MA has had on their lives, thus being their evaluation of this production initiative. An evaluation is incomplete if it is not followed by an analysis of both the problems that the fishers perceive in

TABLE 1.1 PRA tools used in El Quisco

Tools	Men	Women	Purposes with the tools
Part One: Background			
1. Stepping stones	X		Reasons for introducing the Mas
2. Drawing concepts	X		Understanding the concept of sustainable development
3. Historical profile	X		History of the Union/fishing cove
4. Village Map	X	X	Spatial distribution of the different areas of the village
5. (see below)			
6. Venn diagram	X		Institutional linkages between the Union and the surrounding instances, including their role in relation to the Union. An assessment of the Union's committees is also considered here.
Part Two: Production and Commercialization System			
7. Sea transects	X		Spatial distribution of the species in the sea, harvesting techniques and predators of the *Loco*
8. System flow diagram	X		Production and trade systems, complexities and relationships.
9. Impact analysis	X	X	Effects of the MAs
10. Problem-Tree	X	X	Men: Problems with the MAs. Women: Problems with their lives and the household
11. Solution-Tree	X	X	Solutions to the problems
Part Three: General Economy and Daily Life			
12. Seasonal Calendar	X	X	Men: availability of resources, labour distribution and economic assessment of both production spheres, i.e., inside and outside the MAs. Women: yearly illness and related expenses
13. Daily calendar of a fisher, diver and women	X	X	Daily life during a working day
14. Methodology and process evaluation	X	X	Evaluation of the methodology
Additional tools			
5. Organization diagram of the Union	X		Union organization, committees and their roles
Interview: Most common fished species in El Quisco			Most common species fished outside the MAs

Based on Pretty *et al.*, (1995).

connection with this experience and suggested solutions to solve these difficulties (Problem-Tree and Solution-Tree). Problem-Tree and Solution-Tree with women, instead of dealing with the MA, dealt with the problems of their own lives including household situation and family.

Part Three includes economy and daily life with three tools: the Seasonal Calendar, which I have subdivided into several tables and diagrams comprising the availability of resources, labour distribution and economic assessment of both production spheres, i.e., inside and outside the MA. Also the daily calendar of a fisher, diver and three women are included and illustrate a working day. The empirical analysis also includes the participants' evaluation of the methodology. In this last part I have also included an interview on the most common species fished outside the MA.

The results and analysis of the fieldwork in El Quisco (Chapter Seven) starts with the voice

of the fishers and the women, instead of a more conventional presentation with their voice backing my analysis. I regard this sequence to be more sincere and in accordance with PRA methodology, although this way of approaching it may have analytical implications. Where relevant the results have also been complemented and/or contrasted with information and data from other primary and secondary sources.

EVALUATION OF THE METHODOLOGY USED IN EL QUISCO

This was the first time I used PRA in research and was impressed by the advantages offered by the methodology. Up until then my experience of PRA was theoretical, from teaching, tutoring and from developmental fieldwork with rural communities within an EU-project with Latin America (ADITAL).[12] I also had, as course convenor, the field experience of leading master students from the Department of Development Studies from SLU during their field trip to the Philippines (2002) to practice the same methodology.

Rosson was also new to PRA. Both of us acknowledged the experience as positive recognising that we had learned a lot. As we shall see in Chapter Seven, the opinions expressed by the participants confirm the advantages of the PRA. Both male and female participants provided positive evaluations of the experience of working in groups and discussing common problems in a way that allows everyone to express their opinion. The men found the democratic spirit of the process enriching and also felt they learned about their own work activity. The role of the facilitators was assessed positively by both groups. The most common item underlined as negative by the male participants was the lack of engagement of the rest of the fishers in the exercise; a (..exercises; an) issue that cannot be directly attributed to a fault with the methodology.

The women emphasized the positive experience and dynamic character of the common discussion, which made them discover the collective character of their life problems, preoccupations and reflections. They also learnt to draw collective conclusions and developed confidence individually in their own ideas when discovering that others had had similar reflections. They emerged strengthened from the experience, being able to express ideas freely, and losing part of their insecurity. At the same time they learnt to know each other better. Both men and women agreed that there was nothing in the approach that they saw negatively.

ETHICAL CONSIDERATIONS

I am of the opinion that not only "historically significant" persons have the right to appear with their real names in literature, but also those who through their daily life and actions make a difference in every society; those whom in social science research are easily made anonymous, invisible and faceless, even when it is not ethically motivated. I therefore, with the consent of the respondents, attribute accounts to people using their real names. It is a way of paying tribute to them and it can also provide a moment of pride for their children, so short of paragons from their own social class. After conveying my ideas on this, the participants consented to use of their names, and to reproduce some of the created flipcharts. Furthermore, in error some Daily Calendars, which were done at a fishers' home, lack the name of the fisher and diver who created them.

THE PRA FIELD-MATERIAL

The philosophy of participatory approach implies that the material produced by the participants belongs to them and not to the researcher. Therefore I took careful pictures of all the produced material to take back with me, and with the intention to leave the material in the hands of the Union, but they declined,

[12] Agricultural Virtual Community of Latin American and Europe: this portal gives the opportunity to swap experiences concerns with farmers, ranchers and technicians of the agricultural sector throughout the world and especially the partner countries, Spain, Bolivia, Argentina, Chile, Peru, Denmark and Sweden. The registered users from the partner areas can make use of the distance learning programs with courses adapted to the necessities. They can also have an education with available timetable.

alleging that I would have more use for the material since "it was me who was going to write about them". I respected their opinion, and took the flipcharts. However, as soon as I had returned to Sweden, I sent back several sets of photos of the flipcharts (both of the people and of the exercises) to the Union, Rosson and many other participants. I intend to present this monograph to the Union sometime in 2008, even though it is in English, which will make it hard for people from the area to access it. I lack financing to translate this monograph and produce a popular version in Spanish. PDF files of the monograph will be sent to the different institutions and persons that I collaborated with as well as to the main public university libraries in Chile, and obviously to the Municipality of El Quisco and Canela. The El Quisco Union will get a hard copy of the book.

With one exception (*Loco* harvest), all the pictures of the flipcharts of Chapter Seven and those in the present chapter were taken by me. The pictures from the species have been taken from the Iconografía de Especies en Chile (Subpesca, 2005c). Maps have different sources, mostly websites, and I have required permission to use them. The same is valid for tables, diagrams, specific pictures, figures and all data I got from different authorities.

2 Fishing Management and Property Rights: A Conceptual Framework

INTRODUCTION

Small-scale fisheries have been paid little attention in policy and management theory. Up to the beginning of 2000, none of the mainstream journals had editorial focus around small-scale management (Berkes et al., 2001, Chap. 4, p. 10). Academic Journals usually have their origin in high-income countries in the north, and are therefore dominated by agendas set by these countries (Sachs [1999] in Berkes et al., 2001). Both Symes [1996] and Phillipson [2001] in Píriz (2004, p. 40), in referring to the European context, support the view that research on small-scale coastal fisheries has been especially neglected.

This situation contrasts with the worldwide importance of small-scale fisheries (See Hersoug et al., 2004, chapter one in this study). Berkes et al. (2001) in Table 2.1 compares small-scale and the large-scale fisheries.

This next section will discuss the multi-dimensional importance of small-scale fisheries in terms of the economic, cultural and ecological benefits they provide. The contribution of small-scale fisheries to world fish supply and its impact on fish food security is significant; almost all fish from small-scale fishing is aimed for food (FAO, 2005, p. 15). Small-scale fisheries are, on one hand, regarded as less threatening for the eco-system and, on the other, receptive to eco-system approaches due to their flexibility regarding institutional structures, which often are based on intimate relations among fishers. Additionally, they rely on multiple-species and multiple employments, either from the fishing sector or from other sectors (Garcia et al., 2003, Chap. 9, p. 4). Among the comparative advantages of small-scale fisheries according to FAO (2005, p. 2) are: greater economic efficiency, less environmental impact and greater ability to spread economic and social benefits, due to a less geographic concentration of the activity. Also fishers' cultural and environmental heritage is highlighted.

Berkes et al. (2001) divide fisheries into two main sectors: the harvest and post-harvest sector. The first one includes all types of fishers and respective gears and resources. The second includes buyers, processors, market, consumers, government and the society in general. In order to overview the differences between different fishers, Berkes et al. (2001) group them into three categories and in doing so considers a long list of dimensions involving scale, catch size,

TABLE 2.1 Comparison between large-scale and small-scale fisheries.

Key Features of the Fisheries	Large-scale Fisheries	Small-scale Fisheries
Direct employment in fishing	500,000 people	50,000,000 people
Fishery-related occupations	–	150,000,000 people
Fishing household dependents	–	250,000,000 people
Capital cost per fishing job	US$30,000–$300,000	US$20–$300
Annual catch for food	15–40 million tonnes	20–30 million tonnes
Annual fish bycatch	5–20 million tonnes	<1 million tonnes
Annual fuel oil consumption	14–19 million tonnes	1–2.5 million tonnes
Catch per metric tonnes of oil used	2–5 tonnes	10–20 tonnes

Source: Berkes et al. (2001; Table 1.2). With permission from Bill Carman, IDRC.

boat ownership, extent of marketing, amongst others. The first two categories are commercial large-scale industrial and small-scale industrial fisheries, and the third, subsistence and artisanal fisheries which these authors gather in a single category, despite their differences. Even subsistence fisheries are commercial as very few fishers catch exclusively for household consumption. In many Third World countries most small-scale fisheries would fall into the two last categories (small-scale industrial and subsistence/artisanal), but through globalization some artisanal fisheries are starting to show characteristics of large-scale fisheries. The Chilean *Loco* fisheries are an example of this and in order to illustrate this, I have plotted my estimation of the attributes of the *Locos* fisheries in Chile, via the zig-zagging line in Table 2.2 below, against the fisheries related characteristics identified by Berkes et al. (2001).

The position of the line (left, centered, or right) is an approximation of the nearness to the described features. Where Berkes et al. (2001) have several specifications in a given dimension and one of these is more representative for the *Loco* fisheries, I have emphasized this in italic.

TABLE 2.2 Categories and dimensions of fisheries.

	Categories		
	Industrial		Artisanal
Fisheries-related Characteristics	Large-scale	Small-scale	Subsistence
Fishing unit	Stable, with division of labour and career prospect	Stable, small, specialized with some division of labour	Lone operators, or family or *community group*
Ownership	Concentrated in few hands, often non-operators	Usually owned by senior *operator*, or operators jointly, absentee owner	Owner-operated
Time commitment	Usually full-time	Either full-time or part-time	Most often part-time
Boat	Powered, much equipment	Small; inboard motor (or small outboard)	None, or small, usually non-motorized
Equipment types	Machine-made, assembled by others	Partly or wholly machine-made materials, often operator-assembled	Often hand-made materials, operator-assembled
Gear sophistication	Electronics, automation	Mechanized and manual	Mainly non-mechanized
Investment	High; large proportion other than by operator	Medium to *low, entirely by operator*	Low
Catches (per fishing unit)	Large	Medium to low	Low to very low
Disposal of catch	Sale to organized markets	Organized local sale, significant consumption by operators	Primarily consumed by operator, his family, and friends; exchange by barter; occasional sale
Processing of catch	Much for fishmeal and non-human consumption	Some drying, smoking, salting; *[frozen and canned]* primarily human consumption	Little or none; all for human consumption
Operator's income level	Often high	Middle to lowest brackets	Minimal
Integration into economy	Formal; fully integrated	Partially integrated	Informal; not integrated
Occupationality	Full-time or seasonal	Often multi-occupational	Multi-occupational
Extent of marketing	Products found worldwide *[mainly in Asia]*	Often national and local	Local or district-level only
Management capacity of fisheries authority	Considerable, with many scientists and managers	Minimal to moderate, with few scientists/managers	Often not managed except by the resource users
Management units	One or few large units	Usually many small units	Very many small units
Fisheries data collection	Not too difficult, given the authority's capacity	Difficult due to fisheries and authority's features	Often no data may be collected due to difficulty

Source: Berkes et al. (2001) (Table 2.1.1), permission from Bill Carman, IDRC.

In places I have also added specifications of my own in brackets ([]) in the tables.

As seen with the added line, the most deviant characteristic of the Chilean *Loco* fisheries is the dimension "extent of marketing", which is the main reason for the intensification of the exploitation that these benthic resources have experienced. In other words, it is the integration of high value species into the global economy that is changing small-scale and subsistence fisheries. Through the incentives of profit pursuing export business, the fishing logic and commercialization of small-scale fisheries has become part of the global economy. Even demand for environmental friendly, non-industrial production in rich countries is putting stress on resources as it intensifies the production of selected species that used to be locally or nationally consumed.

In spite of the fact that the harvest of many coastal high value species is performed by artisan hand-collection methods, over-fishing has still been the result, threatening marine resources and fishers' livelihood. Researchers still do not adequately include humans as predators, or the negative associated consequences of short-term market driven fishing profit upon marine resources (Berkes et al., 2001).

The commoditization of high value marine resources for export, and the resulting decline in production has started to make small-scale fisheries less marginal from a policy and stock assessment point of view. Considering the large amount of small-scale fishers basing their livelihoods on fishing, independently of whether they fish high value species or not, it is not difficult to understand international and national concern about the social and ecological costs of stock collapses.

The pressure of international market demand and consumption on coastal resources shows the vulnerability of local fisheries, exposing the interconnected nature of the world (Berkes et al., 2001). Due to the interaction of the parts, the food web relations, predator–prey relations, multiple flows and life cycles in the eco-system, resource exhaustion in the open sea caused by industrial fisheries (Hauck, 1998; Sweijd and Hauck, 1998; Gordon and Cook, 2000; Naylor et al., 2000; Garcia et al., 2003; Myers and Worm, 2003) also affect coastal marine resources.

Fish yields are normally taken as an indicator of ecological soundness and if fish yields decline this is usually a clear message that things are not as they should be. Some examples of this are Chilean C*oncholepas* or C*hanque* in Peru during the 1980s and the abalone worldwide (Cook and Sweijd, 1997; Gordon and Cook, 2000). The incorporation of other high value benthic species to international markets, like the sea urchin in Chile (Moreno et al., 2007), has showed the same declining tendency. Biological extinction (the worse scenario) means the vanishing of the species, while economic extinction means the diminution of the species so that it becomes unviable for commercial fishing (Berkes et al., 2001).

The diminishing of coastal marine resources becomes the economic concern of fishers, the ecological concern of scientists and the social, political and conservational concern of both national and international authorities. It is the threat of stocks collapses in the 1980s that stimulated the movement towards sustainable management approaches. Initiatives like co-management and territorial use rights for fishers (TURFs), which put emphasis on more people centred models for natural resource management, are a clear example of this trend.

Fishery is a complex social activity that has an extensive impact on the eco-system. It includes many dimensions: cultural, economic, commercial, political, biological and technological. Many of these impacts move beyond national boundaries, involving consequently a broad spectrum of fishing resource users and stakeholders at different levels, over broad regions of space and with different economic and political power. The term resource user refers to:

> Individuals or groups whose position (as proprietors, claimants, etc) in relation to fisheries results in them being likely to affect or be affected by the use and management (or non-management) of fisheries (Píriz, 2004, p. 62).

The term stakeholder considers all those social agents that have a relation with, interest in, or affect on all aspects of fisheries management (Berkes et al., 2001). Although in the literature it is not always clear whether government and fishing authorities are included as stakeholders, it is clear that they play an important role: as the overall resource manager and as the ultimate resource "owner" of the coastal realm and beyond. In this regard, stakeholders can be placed in a continuum with fishers at one extreme and government at the other, with the other stakeholders somewhere in between.

It is also difficult to know whether the term stakeholder includes social agents beyond national borders, although the importance of international market and consumers is central in how the resources are used, even though they do not have a direct say in national management. The conception of stakeholders could also be extended to include those international organizations that have sponsored fishing agreements and conventions signed by the Chilean Government. And by extension of all co-signatories of these agreements and conventions.

As social activity, fishery involves rights and property rights. But what is then the resource upon which rights and property rights are exercised? Although the ocean is indivisible, lacking clear eco-systems boundaries, socially constructed divisions and appropriations have been historically imposed on it. Therefore before I examine the question of the resource and related property rights, it is necessary to give a short historical description of the development of marine property rights. In doing so, relevant definitions are also given to the modern subdivision of the ocean. I underline in italic or in quotation marks [" "] the concepts used in order to draw attention to them.

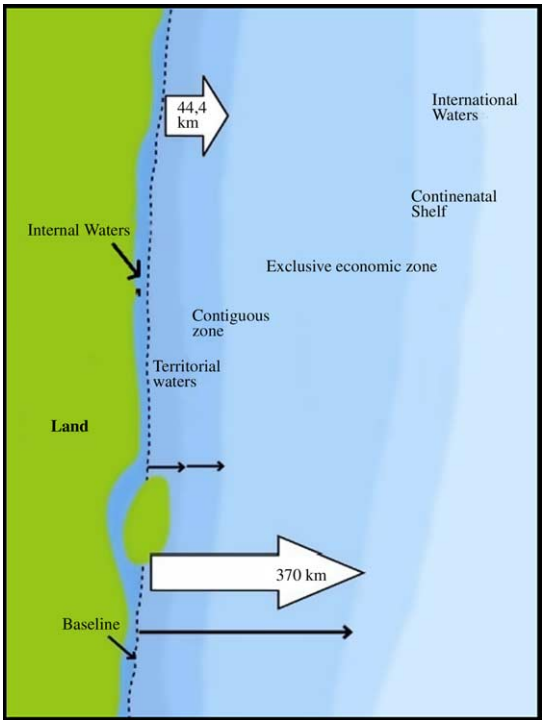
SOCIALLY CONSTRUCTED SUBDIVISIONS OF THE OCEAN

Many of the subdivisions of the ocean that exist now have come into place as a result of long-standing and complex international agreements such as several United Nation Conferences on the Law of the Sea (UNCLOS I (1956), II (1960) and III (1973) and successive Parts), which resulted in the 1982 United Nation Convention on the Law of the Sea. However, it was not until 1994 that this Convention came into force (Kjellén, 2007). In the beginning (in the 1950s), the treaty was signed by 117 countries, and by 2000 the number had increased to 140 countries (Sea, law of the, Encyclopædia Britannica, 2008).

The 1956 UNCLOS, came to replace the doctrine "freedom of the seas" which had originated in the 1700s (UNCLOS, UN, 2007). It eventually became recognized and then formalized among nations during the 17th and 18th centuries (Christy, 1992) that a country could acquire *exclusive jurisdiction* over the sea to the extent that it could defend it from land up to where a cannon shot could reach, the rest being *Mare liberum. Mare liberum* means free to all and belonging to no one; and hence was *exploited* under open access conditions. This is perhaps captured by McCay (1996, p. 195) when she talks about open access common *property* rights. During this period a cannon shot could technically reach up to three nautical mile or 5.5 km.[1] from which the traditional three-miles territorial sea limit developed; substituted later by the 12-miles from the 1960s (UNCLOS, UN, 2007). Map 2.1 portrays the different zones in which "property" rights are assigned internationally today.

Historically, colonial open access to the sea as a doctrine is not related to rights attached to customary communal traditions of nearby villages, but to imperial interests and the struggle to secure rights for countries and overseas companies. Spain and Portugal tried to protect their commercial interests to the sea. After Columbus' first trip to the Americas, Spain and Portugal, through a Papal Bill endorsed by Pope Alexander VI in 1494, divided the ocean among themselves. While Spain claimed the Pacific and the Gulf of Mexico, Portugal was given the South Atlantic and the Indian Ocean (UNCLOS, UN, 2007). This was later challenged by the other colonial powers, such as France, England and Netherlands, that had their

[1] A nautical mile is 1,852 meters, or 1.8 km.



MAP 2.1 Jurisdictional division of the ocean (nautical miles and km)

own interests in ensuring continuing an open access to the sea. Commercial interests secured not only "free" commerce of material/products and humans (slaves) among continents, but also the right to fish indiscriminately and without constraint all over the world. The larger the boats became, the longer they could reach into this open access ocean. Accordingly: "Freedoms of navigation, trade and fishing were essential to capitalist development" (McCay, 1996, p. 196).

Parallel to this, the privatization of fishing rights of coastal fisheries and fishing rights of villages, communities or collectives went, like in England for example, hand in hand with the privatization of common lands. Therefore, the "tragedy of the commons" in reality better corresponds to the "tragedy of the commoners" (Ciriap-Wantrup and Bishop [1975] in McCay, 1996, p. 200), as they lost their commons. Although in USA, immigrants tried to maintain free fishing rights, in the end they were unsuccessful and these rights were eventually privatized (McCay, 1996).

Since the middle of the 1900s fisheries have gone through several phases (Berkes et al., 2001). The 1950s saw the reconstruction of the fishing fleets after World War II. The next decade brought new technology, long-range fleets and new fishing grounds. Expansion continued during the 1970s, which resulted in growing concern about over-fishing. With the incorporation of the 200 nautical miles national jurisdiction and management, the 1980s meant a redistribution of open access. From the late 1990s, environmental concern grew globally, which led to a search for alternative, sustainable fisheries models in order to avoid total depletion of marine species. For example, the 1998 eco-system-based fisheries management approach emanating from the USA put focus on the users, emphasising that what is managed is the economic activity (Garcia et al., 2003). This gave place to the eco-system approach to fisheries 2002 (FAO in Reykjavik), which better corresponded to the FAO Code of Conduct, taking more criteria into consideration such as development, planning, food safety, etc. (Garcia et al., 2003). An eco-system is defined as a system of complex interactions of populations between themselves and with the environment, and populations as "including people, and specially people involved in fisheries, with their technology and institutions" (Garcia et al., 2003, Chap. 2, p. 1).

Before the extension of the Exclusive Economic Zone (EEZ) of territorial waters up to 200 nautical miles was agreed upon, open access benefited those with fleets that could move between distant waters, fishing adjacent to other countries' coastal waters. This led to coastal waste and pollution, increased maritime traffic and, not less important, oil and gas exploration and present and future production expectations in the late 1940 and 1950s led some countries to declare unilaterally their jurisdiction of the sea to the continental shelf of their coasts. First to take this initiative was USA (1945), followed by Argentina (1946), Chile (1946) and Peru (1947). In the case of Chile and Peru, the 200 miles of the EEZ include the rich waters of the Humboldt Current (UNCLOS, UN, 2007).

The EEZ — an example of territorial *use* (*nota bene*; not property) *rights* in fisheries (TURFs) — is defined as a sea zone over which a State has special *rights* over the exploration and *use* of marine resources. The EEZ was given binding international recognition by the Third United Nations Convention on the Law of the Sea in 1982 with the aim of giving better control of maritime affairs outside territorial waters. Article 55 of the Convention on the Law of the Sea states that the

> Exclusive Economic Zone is an area beyond and adjacent to the territorial sea, subject to the specific legal regime established in this Part, under which the *rights* and *jurisdiction* of the coastal State and the rights and freedoms of other States are governed by the relevant provisions of this Convention (Law of the sea, UNCLOS/UN, 2008, Art. 55, p. 43, emphasis added).

Provided that there is a marine physical space in front of coastal countries, the EEZ usually embraces a distance of 200 nautical miles (370 km) out into the sea, perpendicular to the baseline of the country holding an EEZ. When two or more EEZs overlap, it is up to the individual states involved to define the boundary themselves; this being a potential source of dispute.

Extending up to 200 nautical miles, the EEZs overlap both the 12 nautical miles of territorial waters and the 12 nautical miles of the contiguous zone. The states are free to enforce any law, regulate any use and exploit any resource on territorial waters. In the following 12 miles of the "contiguous zone", coastal states have the power to exercise *certain rights,* such as preventing violations and enforcement, including the powers to pursue, arrest and detain suspects as smugglers and illegal immigrants. The territorial water baseline from which it is measured is the low-water tide limit. The waters inside the baseline (see Map 2.1) are consequently the internal waters where coastal states have *complete jurisdiction*. In other words, the nearer the coast the particular zone is, the stronger the jurisdiction of the particular coastal state over it, ranging as seen from "complete" to "certain" rights. In Chile, the high-water mark designates the beginning of the national *good of public use* reaching up to the territorial waters (i.e., 12 nautical miles or 22 km.) over which the State declares sovereign *rights.* National goods of public use are those that belong to the whole nation (see Chapter Three and definitions below).

Beyond the EEZ is the continental shelf of a coastal State, which is defined as

> the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance (Law of the sea, UNCLOS/UN, 2008, Art. 76, p. 47).

In those cases where the continental margin extends beyond the 200 miles, nations may claim jurisdiction up to 350 miles from the baseline or 100 miles from the 2,500 meter depth in which case these States must share the revenue derived from the exploitation of mineral resources beyond the 200 miles. An exception is made for those developing countries that are net importers of that mineral (UNCLOS, UN, 2007). Nonetheless, in 1970, the UN General Assembly declared the resources of the seabed beyond the limits of national jurisdiction to be the "common heritage of mankind" (UNCLOS, UN, 2007).

Oceans and seas outside the national jurisdiction are extraterritorial waters, international waters, high Seas or *Mare liberum*, being under the jurisdiction of international laws. "Freedom of the high seas" is

> open to all States, whether coastal or land-locked. Freedom of the high seas is exercised under the conditions laid down by this Convention and by other rules of international law. It comprises, *inter alia*, both for coastal and land-locked States: (a) freedom of navigation; (b) freedom of overflight; (c) freedom to lay submarine cables and pipelines, subject to Part VI; (d) freedom to construct artificial islands and other installations permitted under international law, subject to Part VI; (e) freedom of fishing, subject to the conditions laid down in section 2; (f) freedom of scientific research, subject to Parts VI and XIII (Law of the Sea,UNCLOS/ UN, 2008, Art. 87, p. 51).

Fisheries regulation became a significant aspect of the EEZ, which presently can be defended more easily thanks to modern vigilance systems. According to UN, 99 percent of

the world fisheries fall under national jurisdiction (UNCLOS, UN, 2007), which does not mean that fisheries are exploited by national interests.

In extraterritorial waters industrial scale vessels still harvest the largest share of the catches. Ships navigating in international waters undertaking fishing in this zone do it commonly under flags belonging to specific states, but any country can exercise jurisdiction if piracy or slave trade is discovered or suspected. Although governmental resource protection based fisheries management was already developed by the North European Fisheries after the First Overfishing Conference in London in 1936, fisheries management in international waters is still in its infancy. Much later, the Rio Conference in 1992 fostered a position of striving for sustainable development, which included specific clauses related to the protection and preservation of the ocean. Agenda 21, Chapters 17 and 18, deals with the protection of all seas, rational use and development of living resources as well as the protection of quality and access to fresh water resources (Kjellén, 2007, pp. 3 and 98).

PROPERTY RIGHTS, COMMON PROPERTY, OPEN ACCESS

As discussed, many concepts are used when referring to states' rights to the ocean. The question of property rights in regard to resources is central, independent of the kind of resources it deals with. But concepts and laws are always loaded with ambiguities and scientific concepts are no exception. The concepts used to analyse and characterize social relationships among individuals in regard to resources are intricate, making interpretation difficult for the scientific community, policy makers and resources users. Social relations of non-private-owned resources, such as common property, common pool resources and resources situated in open access regimes are even more of a challenge to understand. The meanings of concepts also differ in different languages as we shall see regarding the concept of property in Spanish and English. Therefore, before beginning the discussion on rights and property rights in relation to the ocean and its fish resources, it is necessary to examine the meaning of some concepts.

In economic theory the social relations of both physical and non-physical resources are included in the concept of rights and property rights: "Whereas rights are relationships between persons, property rights are specifically relationships between persons regarding *use* of a thing — whether corporal or incorporeal" (Stevenson, 1991, p. 50; emphasis added). Property entails rights and duties, both for property holders and for non-holders. In Schlager and Ostrom's words (1992, p. 250) "all rights have complementary duties. To possess a right implies that someone else has a commensurate duty to observe this right. Thus rules specify both rights and duties". If there are neither rights nor duties, then there is not property either (Stevenson, 1991).

According to Schlager and Ostrom (1992) "rights" refer to particular authorized actions. "A property right is the authority to undertake particular actions related to a specific domain." (Schlager and Ostrom, 1992, p. 250). Rights are therefore not to be confused with rules as rights are the product of rules. Thus "rules" "refer to the prescriptions that create authorizations" or "generally agreed-upon and enforced prescriptions that require, forbid, or permit specific actions for more than a single individual" (Schlager and Ostrom, 1992, p. 250).

If there is no property and therefore neither rights nor duties, there is no owner and therefore open access conditions prevail. I adhere to Stevenson's definition of open access and common property. While common property represents property; open access does not (Stevenson, 1991, p. 49). Consequently, open access is on one hand, defined by Stevenson (1991, p. 49) as

> as depleteable, fugitive resources that are open to extraction by anyone, whose extraction is rival, and whose exploitation leads to negative externalities [effects] for other users of the resource.

Common property, on the other hand, is

> a form of resource management in which a well-delineated group of competing users participate in

> extraction or use of a *jointly held resource* according to explicit or implicit understood rules about who may take how much of the resource (Stevenson, 1991, p. 49; emphasis added).

Property, common or private, entails on one hand (*ex ante*) rights for the rights holders, those who can be multiple or single, and on the other hand, duties for those who are non-property holders (Stevenson, 1991, p. 49). A person's property rights are defined by a combination of rights, duties, liberties, powers, immunities and liabilities defining, at the same time, how others are required, morally or legally, to behave in respect to the object of property. A list that defines the degree of ownership is long and includes: right to possess, right to personal use, right to manage, right to income, powers to alienate, immunity from expropriation, power to bequeath, rights regarding term of ownership; duty not to use the property in ways harmful to others; liability (legal responsibility) to expropriation for unpaid debt, rights and duties regarding their reversion of lapsed ownership rights (Stevenson, 1991, p. 50).

How extensive or limited these rights are depends on the property regime/s of a given society. Different property regimes can coexist in a society. To define rights is to specify the prerogatives that determine the rights and duties of the holder in the use of a natural resource (Bromley [1991] in Píriz, 2004, p. 44). However, one of the most fundamental questions regarding property is the question of exactly who the owner/holder is. Different social actors, individual or collectives, come into play. Hara (2003) summarizes the four main ideal types of property rights regimes, including open access (Table 2.3). One can ask whether open access; i.e., the absence of property rights, can be considered a property regime. Does not open access rather refer to the use, exploitation, administration, management; i.e., the conditions under which a resource is delivered rather than to the appropriation of the resource itself?

I have added a further regime category to Hara's table, which has been derived from the economic theory of government; the regime of global public goods that has been extrapolated from the national to the global level (Koh, 1999) to catagorize those globally shared resources or goods. The definition includes several of the Bruntland Report's (1987, p. 43)

TABLE 2.3 Property rights regimes.

Regimes	Characteristics
Open access *(Res nullius)*	Free-for-all; resource use rights are left unassigned, are neither exclusive nor transferable, individuals have *privilege & rights* with respect to use rates but not responsibility for maintenance of the asset.
Common property *(Res communes)*	Use rights for the resource are controlled by an identifiable management group (''owners'') & non-members have a *duty* to abide by exclusion; individual members of the management group (the co-owners) have both *rights & duties* with respect to use rates and maintenance of the resource. Within the co-owners, rights to the resource are unlikely to be either exclusive or transferable; they are often rights of equal access & use; each person has a private right to the use of a resource once captured or taken but only a communal right to the same resource before is taken.
State property *(Res publicae)*	Ownership and management is held by the nation state and or crown of behalf of its citizens; rights are held exclusively by government that has to determine use/access rules & levels of exploitation. Individuals have a *duty* to observe use/access rules determined by the control agency.
Private property *(Res private)*	An individual (or household) is assigned the *rights* to undertake socially acceptable uses & has a duty to refrain from socially unacceptable uses; others (''non-owners'') have a *duty* to respect exclusion from the resource; usually private property rights are recognized by the state, are exclusive and also transferable.
Global public good	A public good with benefits that are strongly universal in terms of countries (covering more than one group of countries), people (accruing to several, preferably all, population groups) and generations (extending to both current and future generations, or at least meeting the needs of current generations without foreclosing development options for future generations) (Kaul et al., 1999, p. 509).

Source: Hara (2003, p. 16), in Hauck and Sowman, Eds; original emphasis; Kaul et al. (1999, p. 509).

criteria of sustainable development: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

Public goods are defined as those whose main characteristics are that they are non-rival in consumption (two or more people may enjoy the benefits of the good at the same time), and non-excludability (exclusion is difficult or impossible to enforce) (Stevenson, 1991; Kaul et al., 1999). Due to the problems of excludability (e.g., the intricacy to effectively enforce exclusion in thousands of kilometres of coast), public goods are supplied under open access conditions (Stevenson, 1991). Depending on whether a public good shows both characteristics, or just one of them, they are subdivided into "pure" public goods and "impure" public goods. While "pure" public goods are both non-excludable and non-rivalrous, impure public goods are one or the other. One example of a pure public good is the traffic light regime, which we all understand in the same way (shared meaning) and in using it behaves accordingly (Kaul et al., 1999). An example of an impure public good is a common pool resource such as the ocean, which is non-excludable, but rivalrous in consumption. An impure public good which is excludable, but not rivalrous are so called club goods. An example is a film screening in a cinema which is not rivalrous for the viewers who have got access to see the film; all the viewers can enjoy it without infringing on each other's consumption, but excludes those who have not got access (Kaul et al., 1999, pp. 3–5 and 250).

These characteristics of non-excludability and rivalry are referred as the dilemma associated with the use of common pool resources. Ostrom (in Píriz, 2004, p. 47) has categorized them in relation to two near related sets of problems: appropriation or use of resources and the so-called provision or conservation of resources (maintaining production capacity). Resource appropriation deals with the distribution of potential yields such as appropriation externalities resulting in over-fishing, with assignment of fishing grounds, or with technological externalities. Conservation problems result from resource degradation, and the aim is to ensure resource flow and ecological "services".[2] Problems can include: a lack of development investment, ignorance of eco-system interrelations and resource availability and spatial distribution and the "free-rider" problem (Píriz, 2004, p. 47).

How can we situate the ocean and its resources in the discussion on property rights? Before I respond to this question it is helpful to obtain an understanding of what is meant by the ocean and related property rights.

THE GLOBAL OCEAN AND PROPERTY RIGHTS

I adopt the term global ocean due to its ecological and geographical characteristics. While the ocean covers about 71 percent of the Earth's surface, the sea constitutes a part of an ocean or a large body of salt water partially surrounded by land (Ocean, Encyclopædia Britannica, 2008). The global ocean is thus one global, interconnected body of salt water, even though it is commonly split into several "oceans".

If property rights are specific relationships between persons regarding the use of some thing — whether corporal or incorporeal, as Stevenson (1991, p. 50) defines it, then property rights relating to the ocean are the relationships between States and persons regarding its use. Property rights are normally related to tangible

[2] In ecological economics, systems ecology and the Millennium Ecosystem Assessment (World Resource Institute, 2005, Synthesis:V), ecological or environmental "services" is a concept used to describes:

> the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation, and nutrient cycling, and cultural services such as recreational, spiritual, religious and other nonmaterial benefits.

This study showed that 60 percent of the 24 studied eco system services were in the process of being depleted.

resources or objects, "things", which is not the case with the ocean. This difficulty partially explains the shift in the conceptualization of social relations of ocean use from *property* rights to *use* rights.

The ocean is a corporal resource, but the entity itself is not conducive to physical appropriation or clear-cut subdivisions. It is due to the complex three-dimensional nature and the fluidity of its resources that Christy (1992) argues that concepts of property of the sea are less developed, and more difficult to conceive (than in other resource appropriation situations; e.g., forests).

Like MacKenzie (1992), it is therefore useful to distinguish analytically between (1) the resource endowment; i.e., the stocks of fish species; and (2) the supporting natural environment or aquatic habitat, both forming the natural resource base: the global ocean. Ostrom (1999, p. 30) makes a similar distinction between (1) resource units (what users appropriate from the resource system); and (2) the resource system (i.e., the aquatic habitat). The reason for differentiating between resources, and the aquatic habitat in regard to property rights is that while fish resources (i.e., the resource endowment) are fugitive, submerged, and mobile, fluctuated and shared (Píriz, 2004), but still susceptible of physically appropriation, this appropriation in regard to the aquatic habitat is, in the same physical terms, much more complex.

Fish, being fugitive resources, become the fishers' possession or property only after capture. In other words, the condition of open access reigns for fugitive species, and this is valid both in open access and non-open access waters.

In open access waters "open access is better characterized by the liberty/no right correlate" as Stevenson (1991), following Bromley [1991], suggests. A user is at liberty to catch what he/she wants. If ownership for example includes the right to possess, to hold the object and to exclude others from its possession, open access demonstrates neither of these rights, the fishing resource being *res nullius*, an un-owned resource (Stevenson, 1991, p. 51). The fact that a user at one point cannot hinder another one in a different place to catch migratory fish stock has historically constituted the origin of the principle of freedom or open access in fishing since to acquire, enforce and defend exclusive rights over migratory fish is hardly possible.

Fish resources, prior to capture, are common pool resources (cpr) (*nota bene*, not Common Property Resources (CPR). Therefore, open access in relation to this resource entails no *ex ante* rights for the user, be it in open access, private, common property or use rights.

In other words, the condition of open access is also applicable to fugitive species in cases where private use rights to waters exist. The private holder of the body of water can prohibit someone from fishing, but cannot attach rights to mobile species swimming in "his" water, unless, for instance, the species are enclosed in farms. If this is not the case, private individual territorial fishing rights (TPFR),[3] or exclusive territorial (collective) use rights (TURF) over a parcel of water (aquatic habitat) does not secure its holder *ex ante* rights to mobile species.

Use rights imply, according to Christy (1992), that the control is relative rather than absolute as the species (mobile and sedentary) are influenced by the flow of nutrients and pollutants that pass the site, without the use right holder being able to do much. Although to a lesser degree, this can also be extended to sedentary species, the control of which is also limited as they are not completely static and can relocate for any number of reasons, such as if their prey also moves or if the area becomes polluted.

Christy (1992), not talking about ownership of the resource, but instead of "ownership" as a right of use, tries to define the resource and what the definition might include; i.e., "a particular stock, the prey on which the stock feeds, control of the predators, the nutrients which support the stock, the medium in which the stock swims, etc." (Christy, 1992, Chap. 2,

[3] In Sweden, in some cases, people owning land adjoining the coast or a lake have also the fishing rights (Píriz, 2004, p. 44).

p. 4). This shift from property rights to use rights would thus be reasoned by the complex three-dimensional nature of the resource itself—the water body and its constituents. Although Christy (1992) discards the question of ownership or property, he continues to be imprisoned by the use of the term when he refers to "ownership of use right". Also Schlager and Ostrom (1992) as we shall see later, use the term owner and proprietor in relation to use rights holders, which is difficult to disassociate from the common sense of ownership and property.

A problem that still persists is the definition of the resource: what is the ocean?[4] If fish resources are as described before, *res nullius;* i.e., nobody's property, could the same be said about the ocean itself? I suggest that not defining one of the main resources of the planet leaves it open to interpretation that the ocean is nobody's property, entailing the "tragedy of the commons" — more properly of open access — which has led to disastrous resource exhaustion and stock collapses.

THE GLOBAL OCEAN: A COMMON POOL RESOURCE

Is the natural resource base that is the global ocean[5] best understood as being: open access (*res nullius*), common property (*res communis*), public property (*res publica*), common pool resource or a global public good?

Many authors have the opinion that the ocean is common property and use this concept interchangeably with open access. For example, differentiating between common property and the TURFs, Christy (1992, Chap. 2, p. 1) defines common property resources as open access

> those to which access is both free and open to a set of users or potential users ... If the country, province, or community does not control access to a fishery, even though it may have the right to do so, the condition of common property exists.

In Christy's (1992) understanding of the use of common property resources, it is equal to open access, leading therefore to a "tragedy of the commons". Referring to what Schlager and Ostrom (1992) calls the provision problem, Christy (1992, Chap. 2, p. 1) says:

> First, there is a tendency to waste the resource physically. No individual fisherman has an incentive to restrain his catch in the interest of future returns, for anything he leaves in the sea for tomorrow will be taken by others today. Thus, fishery stocks tend to be used at, and frequently beyond, the point of maximum sustainable yield.

A second consequence that results from the condition of common property is economic waste:

> In the absence of controls on capital and labour, there will tend to be too much effort spent on too few fish. In over-utilized fisheries, the same, or even larger, amounts of fish can be taken with fewer fishermen and vessels than are actually employed. This means that the same, or greater, total revenues could be produced with lower total costs (Christy, 1992, Chap. 2, p. 1).

Common property, furthermore, leads to rent dissipation as the profit the fisher obtained from the beginning in open and free access, soon attracts new fishers (i.e., the non-excludability problem) that would increase cost without obtaining the same profit per capita as the resource diminishes. A fourth consequence of common property is that it leads to conflicts among fishers who compete for resources or fishing grounds. With these, in his words "generally damaging consequences of common property", Christy (1992) portrays a "tragedy of the commons" when referring in reality to open access.

Christy (1992, Chap. 2, p. 1) is aware that he diverges from other definitions of common property, and for him common property

> relates specifically to the *conditions governing access* to the resource, not to the nature of the owners or the nature of those who exercise jurisdiction or control over the resource (emphasis added).

The problem with Ciriacy-Wantrup and Bishop's ([1975] in Christy, 1992, Chap.2, p. 1) definition of common property ("distribution of property rights in resources in which a number

[4] Although not for Christy (1992), who in order to avoid this problem, changed to use rights.

[5] That is, both the resource endowment, the stocks of fish species and the supporting natural environment or aquatic habitat.

TABLE 2.4 Common property characteristics.

1. The resource unit has well defined borders by physical, biological, and social parameters, or by a combination of them. This condition answers the question: What is the resource?
2. There is a well-defined group of users—the commoners—distinct from persons excluded from resource use. Simply, ''we'' and ''they'', or user and non-user, are the two groups with a relationship to the resource.
3. The well-delineated group of rights holders may, or may not, coincide with the group of users, as the rights holders may rent their rights
4. Shared ownership: Multiple users participate in resource extraction. This means that the common property is utilised by two or more people, excluding being own by a single person, a characteristic otherwise still associated with private property.
5. Users share joint, non-exclusive entitlement to the *in situ* or uncaptured resource, prior to its capture or use. The resource is uncaptured or fugitive. Neither the resource *in situ* nor the physical unit can be associated to a particular user as its owner, the commoners having expectations to certain amounts of the resource.
6. The commoners compete for the resource and, thereby, impose negative externalities or effects on one another.
7. There are, explicit or implicit, well-understood rules among commoners regarding their rights and duties to one another in respect of resource extraction. Of these rules, the most important is, because it distinguishes common property from open access, the existence of methods to control who may take how much of the resource.

Source: Stevenson (1991, p. 40).

of owners are co-equal in their rights to use the resource'') is, according to Christy, that the definition removes the condition of free and open access.

Christy (1992) uses the concept of common property to characterize the exploitation regime or system, and not the thing or object subjected to ownership. In his view, if nobody controls the access, we have ''common property'' rather than open access. Also MacKenzie (1992) defines common property as open access in regard to the sea when he says that a peculiarity of both the fisheries resources as their aquatic habitat is that they have been common property. As we shall see in Chapter Five, Castilla (1995, p. 157) also refers to the over-exploitation of the Chilean *Loco* as a result of the ''tragedy of the commons''. This is a clear inference to open access conditions.

These examples show the confusion amongst commentators about what constitutes open access and common property. I prefer to adopt the view of Stevenson's (1991) and Ostrom's (1999) that common property does imply property and therefore also owners, control and rules.

According to Stevenson (1991, p. 40) seven necessary and sufficient conditions, are needed to categorize a resource situation as common property (Table 2.4). As seen, these conditions or characteristics largely coincide with Haras' (2003) description of a common property regime (see Table 2.4).

Stevenson's (1991) definition of common property cannot be used for the global ocean as the ocean lacks the central element of the definition ''a well-delineated group of competing users participates in extraction or use of a jointly held resource according to explicit or implicit understood rules about who may take how much of the resource''. Could the international community be that well-delineated group of users? Probably not. There seems to be agreement that the group should not be excessively big (face to face relationships among members of the group are presupposed) (Stevenson, 1991; Ostrom, 1999; Berkes et al., 2001). This element of the definition could perhaps apply for lakes where there might be a well-delineated group of users.[6]

Stevenson's (1991) definition of open access seems to be more appropriate for the ocean taken as an indivisible whole. Using this perspective the ocean could be defined as an exhaustible, fugitive resource that is ''open to

[6] This defining characteristic is not always necessary as there are common property resources situations that are functioning effectively where the number of commoners does not constitute a small group with face to face relationships. This is exemplified by many agricultural communities in Chile. For example an agricultural community may have over 600 commoners furthermore distributed over 30 000 hectares, (Gallardo, 2002).

extraction by anyone, whose extraction is rival and whose exploitation leads to negative externalities for other users of the resource'' (Stevenson, 1991, p. 49).

However, if open access is the absence of property and of owners, does it mean that the global ocean is nobody's property? That the ocean has largely been exploited under open access regime is not the same as saying that it is nobody's property. A way of solving this problem has been to avoid talking about ownership as Christy (1992) did, though in a different way. Ostrom's (1999) definition of common-pool resource as property rights seems more suitable for the ocean. In Ostrom's (1999, p. 30) view a common pool resource

> refers to a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use.

In other words, common pool resources are goods that are mostly non-excludable but rivalrous in consumption, being an example of an impure public good. A common pool resource (*cpr*) differs from Common Property Resource (CPR) as the later involves ownership, which is less appropriate when referring to the ocean and its resources (Píriz, 2004). In other words, the concept of *cpr* helps us to avoid the complex question of ''ownership'' in relation to the ocean and fish resources, regardless of whether we are talking of national or international waters. A difference is that while in the international waters, open access reigns since it is open to all due to its non-excludability, this is not the case within national waters.

A common pool resource is shared or jointly held, and as such the ocean becomes a part of the global public goods (non-excludable but rivalrous in consumption). It is a resource that is not conducive to being socially divided more than symbolically. This is perhaps captured by the term jurisdiction used in international agreements. The etymology of the noun jurisdiction comes from Latin *juris* and *diction. Juris* means law and *dictio,* the act of saying. It has three related meanings: ''(1) the power, right, or authority to interpret and apply the law; (2a) the authority of a sovereign power to govern or legislate; and (2b) the power or right to exercise authority (control); and (3) the limits or territory within which authority may be exercised.'' (Jurisdiction, Merriam-Webster Online Dictionary, 2007).

Accordingly, countries have over the ocean the power, right, authority to legislate, interpret, and apply the law and exercise authority or control within the limits of national waters. The same applies for the international community in regard to international waters. Thus, jurisdiction clearly does not imply ownership, either for the States or its individuals, but rather *tenure* rights. Tenure as a concept seems to be more appropriate than use rights, as tenure involves, more than using, which is more pertinent for states that have a permanent, near perpetual, tenure dependant of course on the maintenance of the geopolitical *status quo*. Furthemore, tenure does not imply ownership (Gallardo, 2002). Therefore instead of ''ownership of use right'' (like in Christy, 1992), a better alternative would perhaps be ''entitlement'' of use or tenure rights. In the same fashion, instead of owners and proprietors in relation to use rights holders (like in Schlager and Ostrom, 1992), a better alternative would be holder, concessionary or tenant.

Jurisdiction, tenure and use imply, just as private or common property, not only rights but also duties in regard to a common pool resource. It is in relation to this that both management issues as user rights come into the social and institutional landscape. Let us first examine the use rights associated with the resource holders in regard to *cpr* followed by a discussion of management, co-management and finally with the TURF.

It is important, however, to distinguish between the concepts of management and property rights regime. That is, management deals with the administration of the resources and not their ownership. Management is about the administration of the property or the resource; i.e., how and under what conditions it is used/exploited. A beach in terms of property rights is usually a public good that can be ''managed'' or left to default to under open access (open to all),

or be given in concession to private interests to be exploited commercially. The right holder of the concession can usually, depending on the respective legislation, sell, lease or inherit the concession. In term of property rights, the beach in a concession scenario is a public good, but managed privately.

Schlager and Ostrom (1992, see Table 2.5), distinguish between five rights associated with fours classes of holders in relation to the resource, which describe the positions and functions that individuals hold within a social system. In Table 2.5 I have added the Spanish translation of right holders (in italic) since the difference between the English concepts of ownership and property is problematic in Spanish as they mean more or less for the same thing (*propiedad* and *posesión*). These words are also synonyms in English, except that property has Latin origin and ownership has English origin. According to The American Heritage ® Dictionary of the English Language, the word property is a "Middle English, from Old French propriete, from Latin proprietās, ownership (translation of Greek idiotēs), from proprius, one's own' (Property, The American Heritage® Dictionary of the English Language, 2008), Ownership comes from "Middle English owen, from Old English āgen (Ownership, The American Heritage® Dictionary of the English Language, 2008).

Although the described rights are independent from each other, in regard to fisheries, they are usually cumulative. The more complete the right, the more inclusive of the less complete rights. The relation is the inverse from less to complete rights. In other words, the right to alienate includes also by definition the right to exclude, to manage, to withdraw and to access, but the contrary is not the case.

Regarding the holders with less complete rights — authorized users — they lack the authority to plan their own harvesting rules or to exclude others from gaining access to fishing grounds (Schlager and Ostrom, 1992, p. 252). Although they might be able to sell their harvest, authorized users lack the authority to change rules ("shared understandings on prescriptions that apply to more than a single individual") regarding management, exclusion, or alienation rights.

Claimants, the second class of holders, are individuals who posses the same rights of entry as authorized users in addition to the right to management or plan extraction They cannot however, limit access, nor can they alienate their management right. Both access and extraction rights belong to the "operational level" of property rights. The other three stronger rights belong to collective choice rights level, implying the authority or power to change the rules.

Thus proprietors, the third class of holders, are defined as individuals who possess management and exclusion rights, but not the right to alienate these rights (Schlager and Ostrom, 1992, p. 253). The last and fourth class of holders — the "owners" — hold all the former rights, by

TABLE 2.5 Property rights associated with different holders.

	Holders			
Rights	Owner *(dueño, propietario)*	Proprietor *(poseedor)*	Claimant	Authorized User
5. Alienation: the right to sell, lease or inherit either or both management and exclusion rights	X			
4. Exclusion: the right to determine who will have an access right and how that right may be transferred	X	X		
3. Management: the right to regulate internal use patterns and transform the resource by making improvements	X	X	X	
2. Withdrawal: the right to obtain the "products" of a resource	X	X	X	X
1. Access: the right to enter a defined physical property	X	X	X	X

Source: Schlager and Ostrom (1992, pp. 250–252).

which they can sell or lease these rights, or part of them. However, Schlager and Ostrom (1992) emphasize the point that that the power to alienate refers only to the collective-choice rights. Different to the proprietors, the owners can alienate their rights. In Spanish this difference is less clear. The translation of owner is *propietario* or *dueño* (i.e., proprietor). It could also be possessor (*poseedor*), which is understood as weaker (with less rights) than *propietario*. However, property and the right to alienate is thus an essential characteristic of private ownership. To clarify, however, this is in relation to the power to alienate the right to use the resource (i.e., a sea area) and not about selling the resource.

Schlager and Ostrom (1992) distinguish in an intricate way, between three sorts of action or activities in relation to *cpr:* operational activities, collective choice rights, and constitutional choice. The difference between the two first rights (withdrawal and access) constitutes a divide in the strengths of rights' bundles discussed above, and belongs to the operational level described in Table 2.6. Nevertheless, rules, regardless of whether they are deemed operational, collective or constitutional, significantly influence individual behaviour. What the constitutional-choice actions mean, is explained in a footnote and not very clear.[7] An association the reader gets by the term constitutional is a level of action that takes place in a higher sphere (regionally or nationally) like for example fishers being able to participate in defining law or administrative fishing measures.

According to Jentoft (2004, p. 218), operational rules structure day-to-day activities of institutions, while constitutional rules refer to the basic principles in which the institution is built, defining who the members are, how the tasks should be performed. As with Schlager and Ostrom (1992), there is a collective choice decision-making sphere that defines the operational rules. So all the commons commentators reviewed agree that it is the higher level that dictates to the lower level and not vice-versa. However, according to Jentoft (2004) operational and constitutional rules pertain to the regulatory pillars of institutions.

Jentoft (2004, p. 217) considers Scott's [1995] perception of institutions a better alternative of governance instruments than Ostrom's (1999) narrow and legalistic definition based on a rational choice perspective as Scott's view on institutions is less rule-centred, stressing also their moral and normative aspects. According to Jentoft (2004, p. 217) it is easy in fisheries management practices to identify Scott's three institutional "pillars": rules, norms and knowledge.

Fisheries management institutions confer rules of conduct; their compliance being a source of concern for authorities. It encompasses how rules are established, how the rules are seen by those who decide about the rules and who benefits from the rules. Norms are also morally binding and therefore influence decision making choice, not only individual rational choice, calculations or "strategies". The normative aspects concern question of values and behavioural standards involved in the institution; e.g., which means are legitimate to reach a particular goal. The cognitive pillar refers to situations in which fishers break the rules also due to ignorance and therefore the invocation of either a formal penalty or moral condemnation does not help in this regard. This aspect raises questions of whose knowledge has preponderance, and how experience is interpreted and fed back into decision making processes. Also important is how nature and society are envisioned in management discourses (Jentoft, 2004, pp. 217–219).

Regardless of the discussion of the role of various levels of rules, what is important is the fishers' participation and the strength or extent of the control that fishers as use rights holders can exercise over the resource; i.e., rights of access, harvest, management, exclusion and alienation. It is with participative approaches

[7] According to these authors:

"Constitutional choice-action entails devising collective-choice rules. In establishing an organization or changing the process by which operational rules are to be devised within an existing organization, individuals engage in constitutional choice actions. Fishers creating a marketing cooperative is an example of a constitutional-choice action" (Schlager and Ostrom, 1992, p. 250, footnote 2).

TABLE 2.6 Operational and collective-choice level of fishing activities.

Level	Characteristics
Operational	Rules related to the use of the *cpr* such as the specifications of fishing equipment authorized or forbidden at particular locations within fishing ground. Of the bundle of rights associated with *cpr* both access (right to enter the resource, for example through licenses) and extraction (right to capture fish in perhaps special ground through those used by fishers to specify of types rotation) rights belong to the operational level.
Collective-choice	Specifies who may participate in changing operational rules and the level of agreement required for their change such as for example changing the type of fishing equipment. There are collective-choice actions that change operational rules and not vice-versa. Of the bundle of rights associated to *cpr,* management, exclusion and alienation belong to the collective choice rights. The difference between rights at an operational level and collective choice level is fundamental: in the first it is about exercising a right; in the second about participating in the redefinitions of those rights.

Source: Schlager and Ostrom (1992, pp. 250–251).

that co-management starts to develop as an alternative to top-down approaches including all or part of the named bundles of rights.

FISHERIES MANAGEMENT

Berkes et al. (2001) argue that a sound management of fisheries involves both the protection of the aquatic habitat and conservation of the fish stocks, and the socio-economic objective of sustaining or obtaining better economic benefits from fishing. Hersoug et al. (2004, p. 70) differentiates between resource management and fisheries management. While resource management, more narrowly, deals with the fixing of total catch or total effort and the distribution of quotas and rights, fisheries management is wider, embracing all the responsibilities related to "traffic regulation", macro policies, credit, education, extension, etc. For Píriz (2004, p. 60), though, fisheries management is keeping marine resources

> in a good shape (quantitatively and qualitatively) and the harvestable surplus allocated to resources users. Central aspects of fisheries management are who is to be involved in defining the management system, how the resource and the users' community are defined for the purpose of taking management decisions, the scale of the management unit, the prevailing regime of rights and finally the degree of transfer of decision making power, authority, administrative responsibilities and resource partners in co-management.

Historically, top-down management has been advocated to force fishers to follow rules defined by authorities and whose implementation has required strong control from authorities. This type of management has relied heavily on biological parameters based on stocks-and-species assessments, disregarding eco-system interrelations (Píriz, 2004). The shortcoming of these approaches have led to eco-system based approaches, such as diverse types of co-management within which we find right-based systems and users' participation, e.g. TPFR or TURFs. The new paradigm views the fishers as part of the solution instead of the problem; governance is decentralized and management authority redirected to community or organization level (Berkes et al., 2001). The eco-system approach explicitly acknowledges the complexity of eco-systems and the interconnectedness among components parts (Garcia et al., 2003, Chap. 1, p. 3). As such, the approach encompasses five elements: 1) definition and scientific description of the eco-system (scale, structure, extent and functioning); 2) health state evaluation, 3) threats evaluation, 4) maintenance, protection, mitigation, rehabilitation, etc, using 5) adaptive management strategies (Garcia et al., 2003, Chap. 1, p. 3).

According to Píriz (2004) the eco-system approach is not about making stocks assessments for an increasing number of species, but about maintaining biological diversity and ensuring that the functional integrity and dynamics of the eco-system are perfectly safeguarded (p. 41), and about "maintaining resilience of the coastal eco-system in the front of natural and man-made processes, and its

capacity to deliver the full range of environmental goods and services, including a surplus of fish to be commercialized'' (p. 41).

Garcia et al. (2003) have presented a schematic review of fisheries management and ecosystem management (see Table 2.7) with emphasises on large-scale fisheries. Only some of the criteria and its characteristics are valid for small-scale fisheries. I have highlighted those relating to Chilean MA or TURF in italics. As can be seen, by the paradigm of fisheries management, Garcia et al. (2003) seems to portray a rather conventional fisheries management, which differs from Píriz's (2004) understanding of the same concept (see above).

Having presented the different definitions and main features of both fisheries management and eco-system management, I will now focus on co-management and TURF. Following the distinction made by Hersoug et al. (2004) between resource management and fisheries management, I have inserted TURFs within a simple arrangement in a descending order in Figure 2.1, which comprises fisheries management, resource management (see Hersoug et al.'s (2004) differentiation above), followed by co-management (including TURF).

CO-MANAGEMENT

There seems to be consensus among scholars in what co-management means, perhaps due to loose definitions. According to Píriz (2004), co-management refers to a situation where capacities of both resource users and government are jointly engaged in the management (decision-making, implementation, monitoring and control) of the resource use. In Berkes et al.

TABLE 2.7 Schematic comparison between fisheries and eco-system management.

Criteria	Fisheries management	Ecosystem management
Paradigm	Sector-based. Vertically integrated. Focusing on target resource and people.	*Area-based.* Holistic. Loosely cross-sectorial. *Focusing on habitats and eco-system integrity.*
Governance		
Objectives	Not always coherent or transparent. ''Optimal'' system output. Social peace.	*A desired state of the eco-system (health, integrity).*
Scientific input	Formalized (particularly in regional commissions). Variable impact.	*Less formalized.* Less operational. Often insufficient. Stronger role of advocacy science.
Decision-making	Most often top-down. Strongly influenced by industry lobbying. Growing role of environmental NGOs.	Highly variable. *Often more participative.* Strongly influenced by environmental lobbies. Stronger use of tribunals.
Role of the media	Historically limited. Growing as fisheries crisis spreads.	Stronger
Regional and global institutions	Food and Agriculture Organization of the UN and regional fishery bodies.	United Nations Environment Programme (UNEP) and the Regional Seas Conventions.
Geographical basis	A process of overlapping and cascading subdivision of the oceans for allocation of resources and responsibilities.	A progressive consideration of larger-scale eco-systems for more comprehensive management, e.g. from specific areas to entire coastal zones and Large Marine Eco-systems (LME).
Stakeholder and political base	Narrow. Essentially fishery stakeholders. Progressively opening to other interests.	*Much broader.* Society-wide. Often with support from recreational and *small-scale fisheries.*
Global instruments	1982 Law of the Sea Convention, UN Fish Stock Agreement and FAO Code of Conduct.	Ramsar Convention, UN Conference on Environment and Development and 1992 Agenda 21, Convention on Biological Diversity and Jakarta Mandate.
Measures	Regulation of human activity inputs (gear, effort, capacity) or output (removals, quotas) and trade.	*Protection of specified areas and habitats, including limitation or exclusion of extractive human activities. Total or partial ban of some human activities.*

Source: Garcia et al. (2003; Table 2.1). With permission from Stephen A. Dembner, FAO.

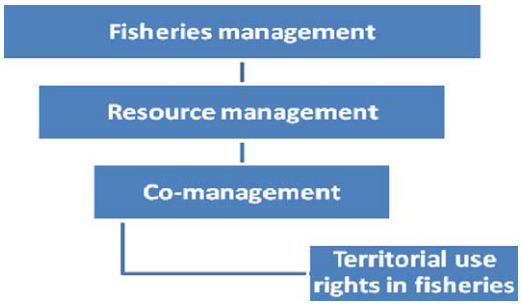


FIGURE 2.1 TURF within fisheries management

(2001, Glossary, p. 2) we find the following inclusive description of co-management:

> A partnership arrangement in which government, the community of local resource users (fishers), external agents (non-governmental organizations, academic, and research institutions), and other fisheries and coastal resource stakeholders (boat owners, fish traders, money lenders, tourism establishments, etc.) share the responsibility and authority for decision-making in the management of a fishery.

Hara (2003, p. 19) defines co-management as a

> type of collaborative institutional and organizational arrangement between government, user group and stakeholders for effective management of a defined resource.

According to Hauck and Sowman (2005, p. 3):

> Co-management is a partnership arrangement primarily between government and resources users, but may also include other stakeholders, to share the responsibility and authority for managing resources.

Hauck and Sowman (2005) also make clear that co-management is a process, being alone in stressing this aspect, connected to adaptive management. They mean that co-management should be a permanent forum for discussion and action including "rule-making, criteria for access to resources, conflict management, decision making powers, monitoring and enforcement, roles and responsibilities, leadership and livelihood issues" (Hauck and Sowman, 2005, p. 3).

According to Hersoug et al. (2004) and also Hauck and Sowman (2005), co-management is a theoretical model proposed by social scientists for fisheries resource management to improve existing models. Nonetheless, co-management as practice has preceded the theory around the world (Jentoft, 2004, p. 113). The World Convention Council defines co-management as

> a partnership in which government agencies, local communities and resource users, NGOs and other stakeholders, share, as appropriate to each context, the authority and responsibility for the management of a specific territory or a set of resources (WCC, [1996], in Hersoug et al., 2004, p. 69).

Hersoug et al. (2004) find Pinkerton's definition of co-management useful, not being too narrow nor too broad:

> Co-management is misnamed unless it involves the right to participate in making decisions about how, when, where and how much fishing will occur (Hersoug et al., 2004, p. 69).

Hersoug et al. (2004, p. 69) distinguish five dimensions that answer five questions: What, How, When, Where and Who. "What" deals with the policy areas that are included in the co-management regime. "How" refers to the specific set-up of the regime, ranging from consultation to devolved management. "When", refers to when users and stakeholders are involved in the project cycle; i.e., during planning, decision-making, implementation or the evaluation phase. "Where" refers to the level of co-management (local, regional, national), and "Who" refers to the selection of user stakeholders involved and how they should be represented.

The assumptions are that co-management ideally leads to several concatenated benefits (Hara, 2003, p. 23). To these belong participatory democracy, broader knowledge, better regulations, increased legitimacy, increased adherence and increased proficiency. Since co-management is relatively new, Hara (2003) stresses that these benefits are expected results as there still are few cases of successful management regimes, especially regarding sustainable development.

A defining element in co-management is then the extent of sharing in decision-making. This is illustrated by Hauck and Sowman (2005, p. 4) in a typology that is reproduced in Figure 2.2.

In this co-management continuum, Hauck and Sowman (2005) distinguish five types. The first on is governmental driven co-management.

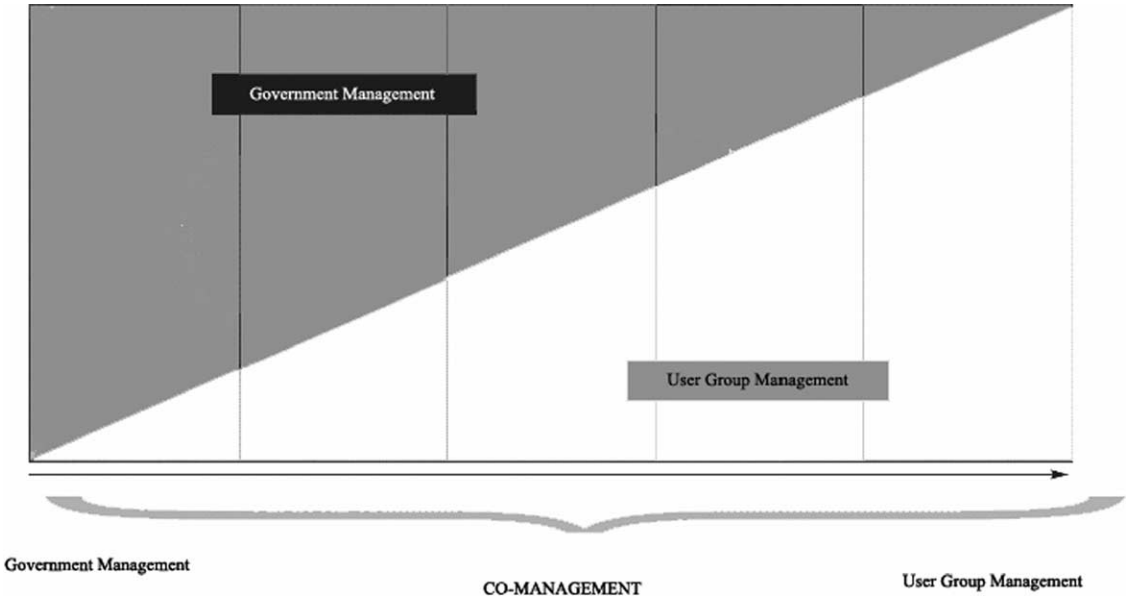


FIGURE 2.2 The co-management continuum
Source: Hauck and Sowman (2005)
Reproduced with the permission of M. Hauck.

The second is consultative co-management in which resource users are consulted but government maintains decision-making. The third one is co-operative co-management where government and user group share decision-making, powers and responsibilities. The fourth type is delegated co-management in which government delegates considerable powers and responsibilities to an organized user group. In this model control is shifted to the fishers, and authorities act in an advisory and supportive role rather than directing management. Lastly, there is the so called user group driven co-management, being perhaps the most participative management.

In many co-management arrangements fishers might be little involved in setting the management objectives and marginally involved in its implementation. Furthermore, in most developing countries co-management is very much government initiated and remains top-down. Paradoxically in many developing countries, user participation has been imposed as one of the conditions for development (Hara, 2003, p. 19), so one can wonder how participatory participation is.

Pretty et al. (1995) has devised a typology to characterize the grade of participation in decision making regarding development projects in communities. This typology, presented in Table 2.8, is useful for judging the level of fishers' participation. As can be seen, there are several similarities between Pretty et al.'s (1995) participation typology and the diverse types of co-management regarding the level or degree of decision-making at the association and community level.

As suggested, there are different sorts of eco-system based management approaches such as co-management, community-based management (CBRM), community-centred co-management (CCCM). Common to many of them is the call for a more participatory management, involving those who are central in solving resource degradation: the fishers. There are also many types of participation whose extent or degree also define the type of co-management arrangement. Community-based

TABLE 2.8 Participation typology.

Types	Characteristics
1. Passive participation:	Peoples' opinions are not considered; they are informed about what is going to happen or has happened, being therefore a one way communication on behalf of the administrative or project management The shared information belongs thus to external professionals, who do not need to listen to peoples' reactions.
2. Participants used as a source of information	Information is extracted from people via surveys without people being able to influence proceedings, neither informed about the findings nor validated with them.
3. Participants used as consultation source	People are consulted and listened to by external professionals who define the problem and the solution, but the consultation does not imply that people participate in decision making and external agents are not obliged to consider people's views.
4. Materialist participation	People participates supplying resources (for example, labour) in exchange for material incentives, but when incentives disappear, so does also the activities.
5. Supportive participation (''Functional'' in Pretty et al., 1995);	Externally initiated group formation and support to meet the needs of an already ongoing project and process. The group tends to be dependant on external leaders and facilitators and risks disappearing when support stops.
6. Interactive participation	Group analysis of problems leading to the creation of new local organization (or strengthen those existing) that take action to solve problems. The group is in control of local decisions.
7. Self mobilization	People act to change their situation without external influence. Although they may require external help to perform their aims, they hold decision-making. This kind of self- mobilisation may or may not question the status quo.

Source: Pretty et al. (1995, p. 61, Box 4.4).

management (CBRM) differs from co-management in that CBRM is more people-centred and community-centred and therefore also more narrow than co-management. In CBRM the intervention of the State is minor, and limited to give legitimacy to the CBRM as the overall grantee of property, use and tenure rights. There is also a community-centred co-management (CCCM) that includes the characteristics of both co-management and CBRM; that is: people-centred, community oriented, resource-base oriented and partnership based (Berkes et al., 2001).

The reasons for the introduction of co-management are varied. There is seldom only one reason and commonly a number reasons and conditions coalesce to generate the political space to enable these interventions. These can include: resource depletion, political demands from donor agencies, conflict among users, unsuccessfully centralized conventional fisheries management. Several authors agree that co-management starts when resource users and stakeholders recognize a resource problem that threatens their livelihoods (Christy, 1992; Ostrom, 1999; Berkes et al., 2001). Many governments view co-management as a convenient and resource efficient way to devolve themselves of management responsibility for resources, unfortunately often when the resource is already overexploited, as with the case of *Loco* fishery in Chile.

It is hardly surprising if co-management initiatives fail given the problematic social and environmental circumstances in which they emerge. In response to this observation, Hersoug et al. (2004, p. 71) argue that where co-management has had some success in the South, three conditions have been met: that the fishers (and other stakeholders groups) are organized at different levels, that the fishers are literate, numerate and competent in modern fisheries management, and that there is an organized administration willing to delegate part of fisheries management (Hersoug et al. 2004, p. 71). These conditions are not always present in ''developing'' countries.

TABLE 2.9 Ideal conditions and principles for fisheries co-management arrangements and Common Property Resource (CPR) institutions.

	Ideal conditions for the success of fisheries co-management arrangements Berkes *et al.* (2001; Chap. 8, p. 19 and section 8.5.2.)	Design principles of long-enduring CPR institutions Ostrom (1999, p. 90)
Community level		
1. *Clearly defined boundaries*	*For the fishers distinct, well known and understandable eco-system based physical boundaries of the resources managed, and whose size allows management in transportation and communication terms (i.e., with available technology).*	*Clearly defined boundaries of the CPR itself. Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined.*
2. *Clearly defined membership*	*Clearly defined individual fishers or households with rights to fish and participate in the management area, whose number should allow among them a relatively easy communication and decision-making.*	
3. *Group cohesion*	*Permanent settlement of the fisher group or organization near the managed area.The group is preferably homogenous sharing kinship, ethnicity, religion, and fishing devices, as well as a common perception of problems, solution and results. Common customs, values and belief help to deal with common problems.*	
4. *Participation by those affected (inclusivity) in decision group*	*Inclusive participation of most of those affected by the management area in the group deciding about its arrangements. Group coincidence between those who collect information on the fisheries and the one that makes decisions about the area.*	*Collective-choice arrangements. Most individuals affected by the operational rules can participate in modifying the operational rules.*
5. *Community level cooperation and leadership*	*Motivation and readiness from fishers to engage in terms of time, effort, and economic means into fisheries management. Active group or individual leadership responsibility for the management process.*	
6. *Leadership*	*Local leaders pioneer the co-management process, mobilizing the rest.*	
7. *Empowerment*	*Through education and training, members become empowered, which builds community and individuals' social awareness, autonomy in decision-making, and self-reliance, thus balancing power relations.Empowerment facilitates collective action values and responsibility for resource management and decision-making.*	
8. *Property rights over the resource*	*Property rights (individual or collective) are defined, addressing the legal ownership of a resource, the necessary mechanisms (economic, administrative, collective) and structures for use rights' allocation, which will optimize resources use and conservation as well as enforcement's procedures and means.*	*Congruence between appropriation and provision rules and local conditions. Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labour, material, and/or money.*
9. *Appropriate local organizations*	*Clearly defined and representative organization, recognised legally, autonomy from government and political influences.*	*Minimal recognition of rights to organize. The rights of appropriators to devise their own institutions are not challenged by external governmental authorities*

(*continued*)

TABLE 2.9 (*Continued*)

	Ideal conditions for the success of fisheries co-management arrangements Berkes *et al.* (2001; Chap. 8, p. 19 and section 8.5.2.)	Design principles of long-enduring CPR institutions Ostrom (1999, p. 90)
10. *Adequate financial resources(exist to some extent)*	*Accessible, sufficient and sustained funds to support the co-management process in time.*	
11. *Sense of ownership of the co-management process*	*Partnerships and partner's active involvement in the planning and implementation process of the co-management help to create a sense of ownership and commitment to the arrangements.*	*Nested enterprises.Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.*
12. *Accountability and transparency*	*Management is fair and open as well as answerable for the maintenance of the co-management agreement.*	*Monitors, who actively audit CPR conditions and appropriator behaviour, are accountable to the appropriators or are the appropriators.*
13. Strong co-management institution	Availability *in situ* of a competent, reliable institution (committee, or a round table) created by the co-management agreement to make decisions and manage conflict.	Conflict-resolution mechanisms. Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.
Individual level		
14. *Individual incentive structure*	*Sufficient incentives (economic, social, political) structure that attract individuals to be part of the initiative, so the benefits from participating in and fulfil with management exceed the costs of their investments.*	
15. *Credible rules and effective enforcement*	*Credible and equitable management rules. Effective, fair, and sustained enforcement of rules call for the participation of all partners. The benefits of regulations comply must exceed those of violating the rules. Availability of State support in using its police power to support regulations.*	*Graduated sanctions. Appropriators who violate operational rules are likely to be subjected to graduated sanctions (depending on the seriousness and context of the offence) by other appropriators, by officials accountable to these appropriators, or by both.*

Berkes et al. (2001) present a longer list of ideal conditions (17) for the success of fisheries co-management. He distinguishes between community level conditions and individual level conditions. Many of the descriptions seem to be based on the idea of community-based management, not totally suitable for the TURFs (organization- and area-based) under study. So in response to this, the Berkes et al. (2001) term "community" has been replaced with organization. Berkes et al. (2001, Chap. 8, p. 4) also suggest the concept "social community" which is suitable for some examples of the Chilean TURFs, meaning "a group of fishers using the same gear type or a fisher organization". Even the term "virtual community", meaning a "non-geographical-based community of fishers" is suitable as in many coves fishers do not necessarily come from the same locality, but usually from nearby places. Some coves with time and due to the permanency of the TURFS are perhaps becoming "real" communities.

Many of these ideal conditions coincide with Stevenson's (1991) conditions for common property described above as well as with Ostrom's (1999) conditions for long enduring common property institutions. The ideal institutional design factors identified by Berkes et al. (2001) and Ostrom[8] (1999), although not coinciding precisely, are listed in Table 2.9. When these conditions and characteristics are pertinent to the Chilean TURFs, I have denoted them in italics.

[8] Note that Ostrom's (1999) eight conditions refer to common property resources (CPR) and not specifically to common pool resources (*cpr*).

TERRITORIAL USE RIGHTS FOR FISHERIES (TURFs)

TURFs exist in various contexts, but especially in Japan. According to Makino and Matsuda (2005), the Japanese variation of TURF co-management has their origin in the Japanese early feudal period (1603–1700). With the exception of some historical periods, such as the Modernization period (1868–1901), and the period after World War II Protectorate, these historical Japanese fishery co-management regimes still, with some contemporary modifications, operate today. They operated under the principle that coastal resources (different to land) were open access and free from taxes, therefore the coasts were for common use and managed by local users. Rooted in the Tang dynasty (A.D. 618–907) of China, this practice was maintained by successive rulers. Basic concepts in the feudal period were that

> (1) coastal fishing grounds in near shore waters should be used only by the people from local fishing communities; and
>
> (2) offshore fishing grounds should be left open for free access to any fishermen (Makino and Matsuda, 2005, p. 442).

Coastal waters were seen as a prolongation of feudal land and therefore feudal domain. The communities in charge of coastal waters came to constitute the basis for the subsequent Fisheries Societies under the Meiji Fishery Law (1901–1945) and of the present-day Fisheries Cooperative Associations.

In 1886 the government enacted the Fishermen's Union Regulation encouraging the establishment of local unions, this being the first formal recognition of an organization constituted of fishers that could operate as a management authority. Later, the 1901 Fishery Law put fishing rights and licences in constitutional form for the first time. By this, fishing rights were granted to both collectives such as local fisherman's unions, Fisheries Societies, and to individuals. These rights were classified into four categories:

> (1) set-net fishing rights; (2) specific fishing rights for beach seines, boats seines, etc. (3) aquaculture rights for oyster, pearl, etc. and (4) exclusive fishing rights (Makino and Matsuda, 2005, p. 443).

Exclusive fishing rights, the last category, were subdivided into traditional exclusive fishing rights, those that could be granted to individuals based on customary use and newer exclusive collective rights granted to local Fisheries Associations by the central government. Exclusive fishing rights were area-based, including all the resources existing in the area as well as those passing through it, representing the Japanese territorial use right for fisheries. After the 1910 modification of the law, these rights became *de facto* property rights due to the non-revision of the expiration period. Rights could be sold, leased, transferred and collateralized, thus leading to concentration in the hands of few people. Many fishers worked for absentee right owners. The post World War II administration, in conjunction with the Allied Occupation after 1945, demanded a democratic reformation of the Japanese fishing institution. After a legislative process, based more on a personal property rights system (the US line) and consisting of fishing rights that prioritized fishers' organizations (the USSR line), the Japanese government preferred the latter and the 1949 fisheries law was passed. Marine fisheries were classified in three categories: (1) fishing rights for coastal marine fisheries that in turn are classified in three: (a) common fishing rights only for Fisheries Cooperative Associations and (b) large-scale set–net fishing rights and c) aquaculture demarcated fishing rights. The second category is (2) fishing licenses for offshore and distant waters fisheries; and (3) free fisheries (Makino and Matsuda, 2005, p. 444).

The local Fisheries Cooperative Associations that are granted common fishing rights (category 1a) are composed of local fishers of fishing communities. The associations established operational regulations that stipulate gear restrictions, as well as closures of the fishing ground on a seasonal or area basis. Up to the present, local fishers remain the principal decision makers. Resource management rules set by the Fisheries Cooperative Associations are tailored to the local conditions thus

have the opportunity to be flexible and sensitive to changes. In this way this self-governing resource management regime is suitable for adaptive management (Makino and Matsuda, 2005, p. 449). Furthermore, because of its autonomy and localized emphasis this system of co-management reduces transaction costs, especially monitoring, enforcement and compliance.

Nonetheless, the exercise of full rights and licences is restrained by a legal requirement to consider resource conservation, which involves the inclusion of stakeholders other than just the resource users. Government and research agencies provide administrative advice and scientific information as well as coordination above the local levels. Makino (2005) suggests that the Japanese system has many advantages such as decentralized management, adaptive management process, use of local resources, local and scientific knowledge, multi-scale and interlinked management, and promotion of sustainable resource use in an economic context.

Judging from Makino and Matsuda's (2005) and Makino's (2005) accounts, the Japanese TURFs seem to enjoy the advantages of local independent governance of common pool resources (cpr) described by Ostrom (see the Pros of Table 2.10). Moreover, they seems to be truly rooted both in local communities and organizations with a long tradition, which corresponds well with the eco-system principles regarding management delegation to grass roots level of resource users. A possible weakness could be the inability of local resource users to handle larger scale common pool resources, but it is exactly due to this disadvantage that the state and the scientific community play a role in co-management arrangements.

Due to their long tradition, the fishers involved in the Japanese TURFs seem to demonstrate all seven user attributes described by Ostrom (1999) (Table 2.11). Some of the resource attributes may also be consistent with the Japanese TURFs.

Around the world, the ecological impacts of over-fishing have been the driving force that has stimulated the search for alternative exploitation and organization formulas, like the TURFs, especially when conventional attempts to improve fishing communities' wellbeing and efforts to stop depletion have not been successful (Christy, 1992). This idea is captured by Ostrom's first resource attribute that it is still possible to restore the depleted resource via organizational means (see Table 2.11).

The main reasons why the TURFs have attracted interest are, according to Christy (1992, Chapter One, p. 1), efficiency goals and the welfare of small-scale fishing communities in developing countries. Christy (1992) distinguishes between definitional elements of the TURF and several conditions, natural and social, that facilitate the development of TURFs and their maintenance, although the difference between the definitional elements and the conditions is not always clear. Nonetheless, the inter-relationships among these conditions that both influence the creation and maintenance of an efficient localized TURF are strong.

TABLE 2.10 Advantages and limitations of independent local governance of common pool resources (*cpr*).

Strengths	Weaknesses
Use of local knowledge	Some appropriators will not organise
Inclusion of trustworthy participants	Some self-organised effort will fail
Reliance on dis-aggregated knowledge	Local tyrannies may prevail
Better adapted rules	Stagnation may occur
Lower enforcement costs	Inappropriate discrimination may result from the use of identity tags
Redundancy	Access to scientific information may be limited
	Conflict may arise among appropriators
	Appropriators may be unable to cope with larger scale common pool resources

Source: Ostrom [1999] in Píriz (2004, p. 59).

TABLE 2.11 Condition conducive to collective action.

Resources attributes	
1. Viable improvement	Resource recuperation still viable through organization or so under-utilized that organization would imply advantages.
2. Indicators	Reliable and inexpensive information about resource conditions available.
3. Predictability	Calculable availability of resource quantities.
4. Spatial extent	The resource area relatively small so users with the available technology and transportation can identify its boundaries and internal microenvironment.
Users' attributes	
1. Salience	Users are considerable dependent on the resource economically or else.
2. Common resource understanding	Users share a common resource view and how their actions mutually affect themselves and the resource.
3. Discount rate	Low discount rate in comparison to potential resource benefits.
4. Shared interests	Users with higher economic and political assets are also affected by resource misuse.
5. Trusts	Mutual trust among users regarding acquired compromises and reciprocate each other.
6. Autonomy	Users are capacitated to internally determine access and harvesting rules without authority intervention and revoking.
7. Organizational experience	Previous organizational experience among users.

Source: Ostrom [1999] in Píriz (2004, p. 53).

None of them alone are sufficient to build an effective TURF (Table 2.12). TURF

> generally refers to a relatively small and clearly distinguishable territory; provides rights of exclusion and determination of kind and amount of use and rights to extract benefits; and is relatively specific in its ownership (Christy, 1992, Chap. 2b, p. 4).

The first definitional element of the TURF consists of four types of rights. The right of exclusion means the right to limit or control access to the territory. The second is the right to determine the amount and kind of use within the territory. The third is the right to extract benefits from the use of the resources within the territory, and the fourth is the right to future returns from the use of the territory. These rights are quite similar to Schlager and Ostrom's (1992) bundles of rights.

The second element refers to the "specificity" of the use right, meaning type (e.g., individual or collective) of owner (right holder) and its efficiency in decision making. That is, it is easier for an individual to decide than for a group. The right-holders, the possessor of a TURF, can be varied, including private individual, a cooperative (in which individual rights are constrained by joint decisions); an enterprise; an association or a community; a political subdivision, such as a town or a province; or a national government. The specificity of tenure is also associated with its length, which may vary, but should at least be sufficient to allow the owner (right holder) to capture a satisfactory return on any capital investments he/she has made. In the case of a community held TURF, the tenure may be perpetual.

The third definitional element of TURF is that the extent of the territory will vary in accordance with use, resources, and geography. The Extended Economic Zones (EEZs) are TURFs exercised by the states. While small-scale fishing communities are an example of a localized TURF, the EEZs are an example of a generalized TURF. There is not a clear distinction in terms of content of use rights for localized and generalized TURFs more than the size of the territory and the specificity of ownership. The economic incentives of the use of external territories should be less than those from the use of the TURF's area, or the non-TURF area should not diminish the value of use of the TURF area. In other words, the use of non-TURF territory should not significantly diminish the value of use within the territory. If a fisher can obtain the same or more of a resource outside a TURF, the incentive to be part of the TURF vanishes. According to Christy, these elements of the definition do not necessarily imply that the territory must fully

TABLE 2.12 Definitional elements of TURF.

1. Kind of use rights	Right of exclusion. Right to determine amount and kind of use Right to extract benefits, Right to future returns
2. Nature of tenure	"Ownership" specificity (communal, private, etc) of the right of use, length of tenure and security associated with it.
3. The size	The territory should be big enough so that the use of the external territory (to the TURF) is not more beneficial than the TURFs' own territory
4. Nature of the territory	The territory can relate to the surface, the bottom, the water column. The TURFs are site specific rather than resource specifics and therefore the effectiveness of a TURF can be measured by the economic value associated to the territory.

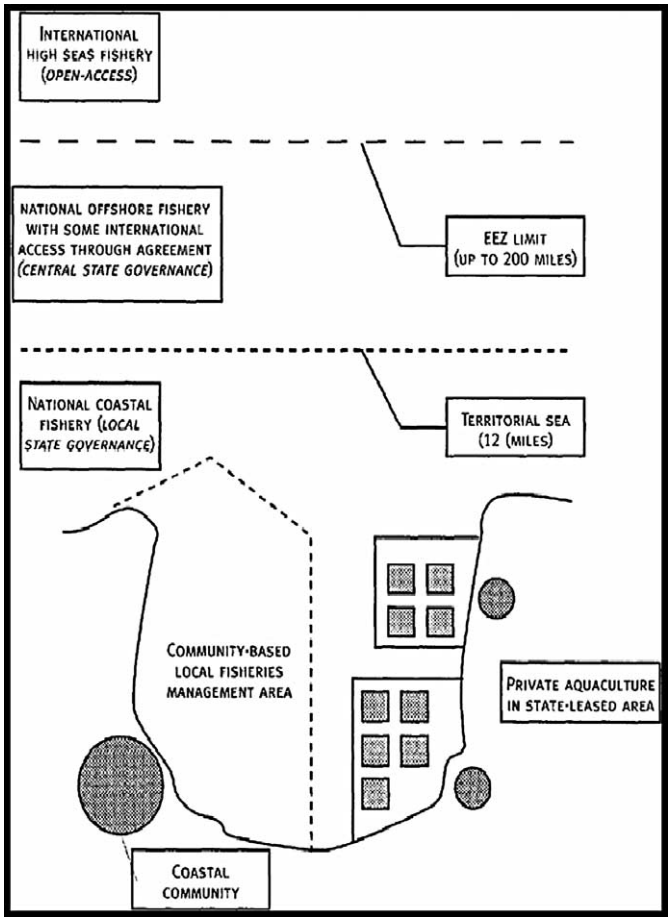
Source: Based on Christy (1992).

embrace the whole stock of fish throughout its migratory movements. As he puts it:

> A TURF is not so much resource specific as it is *site specific* (. . .) The significant element is not the degree of enclosure of the stock, but the degree to which there is a value associated with the territory (Christy, 1992, Chap. 2, p. 2; emphasis added).

The territory should have clear and identifiable boundaries to enable it to be readily defensible and protected. This is one of the conditions facilitating the creation and maintenance of TURFs. And the territory should be under the State's legal and institutional protection, conditional upon the following two criteria being met, which are both typical of the ideal co-management arrangements as described by Berkes et al. (2001), see Table 2.9. First, there must be laws and institutions that permit governments to exercise the necessary authority to support the protection and maintenance of TURFs. Second, that government must, enjoy sufficient authority to be able to apply the distribution of use rights and enforce them. If there is no strong legal and institutional protection to back TURFs, and the area is attractive for non-holders, the chances for success diminish. For the right-holders, the cost to protect TURFs will be larger than the incomes, and without the legal authority to support protection, control efforts would not be sustainable. Thus, TURFs emerge traditionally where it is relatively easy to both obtain and protect them. Boundaries can easily be associated with physical features such as a small island or reef, a lagoon or a river mouth. There are also socially constructed land boundaries where communities or individuals define marine territories along the coast and out to a distance where activities can easily be controlled from land. Boundaries can also be defined with regard to artificial devices placed on the sea surface as a fish aggregation device. In general, the easier to identify and define a boundary at sea, the easier to inspect and observe the use of the territory. GPS and other technological devices have changed this situation making it easier to control fishing activities in increasingly large marine areas like, for example, in the EEZ. Again, most of these elements are quite typical for other common property or common pool regimes as well.

The fourth definitional element, the territory under a TURF, can be horizontal (the surface or the bottom), or vertical (a water column). This refers to the nature of the territory or resource. Although TURFs are better suited for sedentary marine resources, they might serve for migratory resources as well. This refers to what is called natural resource attributes (see also Ostrom in Table 2.11). Resource attributes pertain to another of the conditions affecting the creation and maintenance of TURFs. "Sedentary species can easily be put under territorial use rights—either on the bottom or when attached to rafts." (Christy, 1992, Chap. 4, p. 1) Also biomass associated with natural or artificial reefs offers suitable territories. Localized TURFs can also be created for species raised in cages. TURF being a use right, and due to the physical nature of the marine resource base, the control of the means of production is relative rather than an



MAP 2.2 Property and fisheries management regimes
Source: (Reproduced from Berkes et al. (2001 Figure 7.2).
With permission from Bill Carman, IDRC.

absolute. Therefore, according to Christy (1992), there is not clear-cut distinction between open access and TURF.

Addressing a political problem Christy (1992) argues that the major problem associated with the establishment of localized TURFs is that they may require a re-distribution of wealth. "The provision of exclusive rights means that some present users of the territory are likely to be excluded" (Christy, 1992, Chap. 2, p. 4). This can meet opposition and be politically difficult. An effective localized territorial use right will therefore have a direct effect on the distribution of at least potential wealth, since providing a value to the use right-holder (individual or community) deprives at the same time those excluded.

The redistribution of wealth is one of the most important factors to be considered thoroughly both in the creation of new localized TURFs, and in taking measures to protect traditional TURFs. Thus, decisions to create or protect localized TURFs are essentially political in nature and in this sense perhaps more related to equity than efficiency. TURFs are presumed to provide a more economically efficient use of the resources and help to improve small-scale fishing communities' welfare, whereas individually held TURFs could in some circumstances disadvantage communities. One of the major advantages associated with a localized TURF is the right to determine the objectives of the use of the territory. TURFs

give both the opportunity and incentive to manage the resources within the territory. Ideally

> the community would be in a position to choose whether it wishes to extract resource rents, to increase the income levels of its fishermen, to increase employment opportunities, or to achieve some combination of these goals. It could also determine the kind of gear to be used, the technological innovations to adopt, the time and seasons of fishing, and other management measures (Christy, 1992, Chap. 5, p. 1).

Since the "owners" of a TURF have an exclusive right to future products, it is in the fishers' interest to secure future availability of the resource. This refers to the assumptions behind co-management arrangements described previously by Hara (2003, p. 23) in the sense that co-management leads to benefits such as participatory democracy, broader knowledge, better regulations, increased legitimacy, increased adherence and increased proficiency. It is believed that the motivation to secure future availability of the resource (certainty) on part of the fishers stimulates the prudent management of that resource.

Christy (1992) specifies a further condition helping the formation of TURFs: the cultural aspect of the specific country's property rights tradition; an issue to which I will return in the last chapter as it has special relevance for Chile. Map 2.2, taken from Berkes et al. (2001), illustrates several properties and fisheries management regimes. The example of CBRM on the map also serves to illustrate an example of a TURF.

PART II

CHILEAN FISHERIES AND THE MANAGEMENT AND EXPLOITATION AREAS FOR BENTHIC RESOURCES

3 Chile's Coast and Fisheries Legal and Policy Framework

INTRODUCTION

In the first part of this chapter, I examine the coastal authorities. Given the connection between the physical location of the fishing coves and land administration and property rights on the coast, the second part of this chapter highlights who is in control of Chile's long continental coastline.

The third part of this chapter gives an overview of the history and organization of Chilean fisheries as a background to the *Concholepas* fishery and the MA discussed in Chapter Five. Therefore Sernapesca's structure (Servicio Nacional de Pesca, National Fishing Service; former Sernap) is presented as well as a non-exhaustive list of relevant stakeholders and institutions dealing with fishing, starting with the Subpesca (Subsecretaría de Pesca, Fishing Subsecretary), under which Sernapesca is placed. The chapter is illustrated by tables, figures and maps. The tables are divided into three columns according to institutions, level in which they are found (national, regional and communal), and according to their functions and missions, including the type and number of stakeholders. Later in the study, we will find many of these actors constituting part of the stakeholder group within the co-management of the MAs or Chilean TURFs. The institutional functions and missions will be described briefly to provide adequate background information for the reader to access the empirical chapters. In the table describing formal institutions, the involvement of artisanal fishers is depicted in italics.

COASTAL BORDER ADMINISTRATION

Every country declares its sovereign rights over its coast, Chile not being an exception. The administration of the coastal border belongs to the Ministry of National Defence, through its Marine Subsecretary (Decree with force of Law (DFL), No. 340, 1960), serves as a link between the Chilean Navy and the government. The Subsecretaries in Chile are subsumed under the ministries.

The Marine Subsecretary is in charge of administering the national and state public goods located in the littoral zone of the coast and for use of the coastal border area (see Fig. 3.1). The areas that are regionally available for the development of MAs are, for example, defined in consultancy with this Subsecretary.

The Civil Code ([actualized 2000], 2006), Art. No. 589, defines as national goods those whose domain belongs to the whole nation. If the use of these national goods belongs to all of inhabitants of the nation (such as streets, squares, bridges, roads, the adjacent sea and its beaches), they are called *national goods of public use, or public goods*. The national goods that generally do not belong to the inhabitants are called *state goods* (fiscal in Spanish). Examples of state goods are all lands within the national territory that do not belong to other owners, the mines of gold, silver, etc. in spite of the domain of corporations or individuals (Código Civil, de lo Bienes Nacionales, Títutlo 2, 2006). Examining the definitions of public and state goods is important since it is around such definitions that many problems and uncertainties exist regarding the access to the land bordering the sea.

The function of the National Commission for the Use of the Coastal Border is to create a coherent national policy for the use of the coastal border (Decreto 475, 1994). This authority has 12 Regional commissions. In each of the regional commissions we find, among many stakeholders, two representatives of the artisan fishers sector as well as two representatives of the aquaculture sector. While the National Commission is headed by the

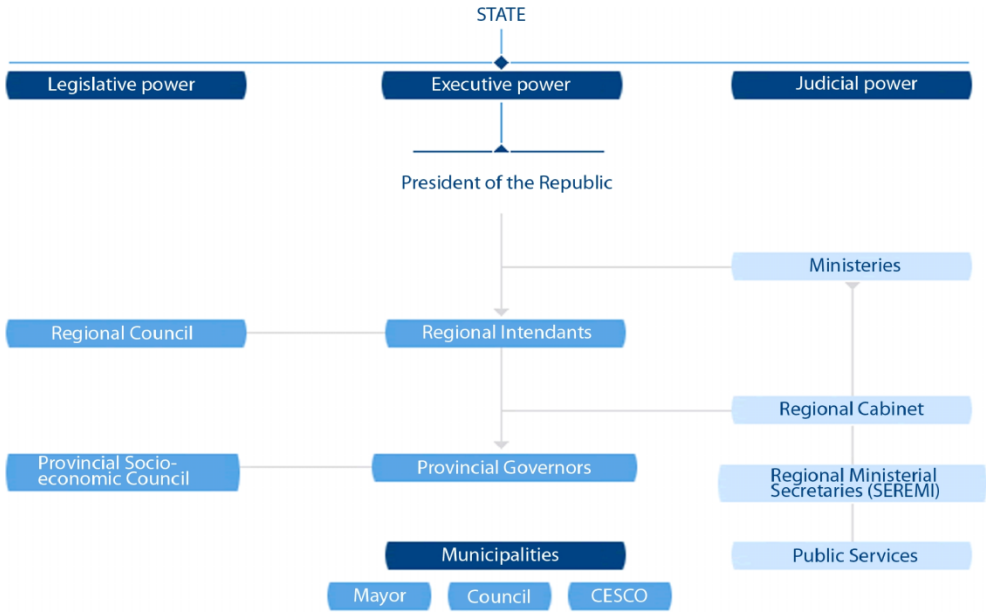


FIGURE 3.1 Structure of the Chilean Government. (Open access according to government policy).

Minister of National Defence, the regional commissions are headed by the regional Intendants who represent the President of the republic in each region.

Under the Marine Subsecretary is the General Direction of Maritime Territorial and Merchant Marine (DIRECTEMAR), which among other things supports the Marine Subsecretary in control tasks on aquaculture and marine concessions. Under DIRECTEMAR we find Maritime governments in each region and also the Harbour Captaincies that perform more or less the same function of DIRECTEMAR, but at regional and local level.

In order to place some of the institutional posts named in Table 3.1 — such as for example the Intendants which are the regional political representatives of the President of the Republic — a scheme presenting the structure of the Chilean government is also presented in Fig. 3.1.

Having broadly identified the institutions that administer the Coastal Border, we can now proceed to provide a more detailed description and who and what is involved in this process. The Ministry of National Defence has jurisdiction over:

a. *state* beach terrains, situated within a strip of 80 meters breadth counted from the highest line of tide water of the sea coast,
b. the beach,
c. the bays, gulfs, interior small channel (*estrechos*) and channels and,
d. the territorial sea of the Republic (Ministerio de Defensa Nacional, 1994, p. 3, my emphasis).

The Coastal Border is defined as that, "strip of land comprising the terrain of *state* beaches, the beach, the bays, the gulfs, the interior small channels and channels, and the territorial sea of the Republic" (Ministerio de Defensa Nacional, 1994, p. 1; my emphasis).

According to a document from the Armada de Chile (Navy) from 1994 called "Bases for the Formulation of a National Oceanic Policy: a Contribution to Development", the sea beach is defined by the Civil Code in its Art. 513 as "the extension of land that the waves bath and de-occupies alternatively until where the highest tide water reaches, *and that have the condition of national good of public use"* (Armada de Chile, 1994, p. 1; my emphasis).

TABLE 3.1 Institutional scheme of Chilean coast administration*.

Level	Organization	Functions/missions
National	MINISTRY OF NATIONAL DEFENCE	
	Marine Subsecretary	To administer the national goods of public use and state goods of sea bottom, portions of water, beaches and beach terrain situated in the littoral coast and in the rivers and navigable lakes by vessels of more than 100 tonnes. It implements the National Politics of use of Coastal Border.
	DIRECTEMAR (General Direction of the Maritime Territorial and Merchant Marine — Maritime Governments (in each region) — Harbour captaincy (where pertinent)	It looks after the fulfilment of the law and international agreements for the protection of human life in the sea, the environment and natural resources, and regulates the activities that develop in the aquatic realm of its jurisdiction. It supports the undersecretary of the navy in control tasks on aquiculture and marine concession.
	National Commission of Coastal Border	To propose to the President of the Republic actions that drive the Politics of Use of the Coastal Border forward, propose a zone division of the same, elaborate every two years an evaluation of the implementation of the national politics of the use of the coastal border and propose adjustments, formulate proposition, suggestions and opinions for the authorities in charge of studying and approving the diverse communal and intra-communal plans for the coherence of the use of the coastal border, propose solutions for the discrepancies that exists regarding the best use of the coastal border, gather the studies that diverse state administration organs perform regarding the use of the coastal border and within its competence formulate recommendations to the state administration organs. It is composed of: • The Minister of National Defence who heads it • The Marine Subsecretary • A representative of the Administrative Regional Development Subsecretary of the Ministry of Interior • A representative of the Fishing subsecretary of the Ministry of Economy • A representative of Planning and Cooperation • A representative of Public Works, Housing and Urbanism • A representative of Transport and Telecommunications • A representative of the National Real Estates • A representative of the Chilean Navy • A representative of the National Tourism Service • A representative of the National Environment Commission
Regional	12 Regional Commissions for the Use of the Coastal Border	In addition to support the labour of the National Commission, the principal aim of the Regional Commissions for the Use of the Coastal Border are like above. It also includes receiving the solicitations from the public and proposals for changes in the use of the coastal border that imply a modification of the existing zone division, and there will be redirected to the National Commission. They are composed of: • The Regional Intendant who heads it • Provincial Governors with territorial jurisdiction over the respective region's coastal border • The Mayors of the coastal communes with jurisdiction over the respective regions coastal border • The Regional Ministerial Secretary of Economy • The Regional Ministerial Secretary of Planning and Cooperation • The Regional Ministerial Secretary of Public Works, Housing and Urbanism • The Regional Ministerial Secretary of National Real Estate • A representative of the Chilean Navy

(continued)

TABLE 3.1 (*Continued*)

Level	Organization	Functions/missions
		• The Maritime Governors of the regions • The regional director of Harbour Works • The regional director of the National Tourism Service • The regional director of Sernapesca • The regional director of National Environment Commission • The corresponding Zone fishing director • 2 representatives of the Regional Council • *2 representative of the artisan fisher sector* • 2 representative of the aquaculture sector • 2 representative of the tourism sector • Representatives of the other sectors designated by the regional Intendant

*Sources: Cerda, G., Sernapesca; Lira, S. Subsecretaria de Marina; Elissetche, J., Sernapesca; Bolbarán, D., Subpesca.

In the Civil Code (2006), Second Book, Title III: Of National Goods, Art. 594 contains the definition of a beach as the extension of land that the waves bath and de-occupies alternatively until where the highest tide water reaches (Código Civil de la República de Chile, 2006). The condition of national good of public use for the beaches is otherwise established in Art. No. 589 of the Civil Code where the sovereign rights of the nation are highlighted (Código Civil de la República de Chile, 2006), as already seen above. However, continuing with the Navy document, it specifies what happens when we are not dealing with state goods, but with private property:

> In those cases where *private property reaches the line of the beach*, *the ''beach terrain'' does not exists,* by which the use and enjoyment of the 80 meters strip breadth measured from the beach line, is regulated by the norms generated by the Right, *forcing* the proprietor to give right of way to access to the beach (Armada de Chile, 1994, p. 1; my emphasis).

The document deals with ''the [private] property that extends to the coast border and that has its origin in historical rights prior to the republican period, and that includes in the description of its borders, expressions such as 'to the sea' or to the Pacific Ocean'' (Armada de Chile, 1994, p. 1).

The 1995 Supreme Decree (M) N° 002, Art. 1°, no. 38, section 3°, that approved the new ''Rules of Marine Concessions'', dictates the following:

> The terrains of private property that according to their titles, limits with beach terrain sectors or with the beach coast line or the Border of river or lakes, *are not beach terrains.* In those titles of private property that specifies as border the sea, the Pacific Ocean, the marine, the beach, the harbour, the bay, the river, the lake, the coast, etc., it should be understood that this border refers to the beach line (Harlowe, J., Ministerio de Defensa, through González, S., Pers. Comm. via email 2006-09-13).

The spaces considered as the coastal Border are, as the norm recognizes, a limited resource permitting multiple uses being ''in some cases'', exclusive and excluding (Ministerio de Defensa Nacional, 1994, Letter e). The state guarantees some exceptions for the common good like bath places (*balneario*), coastal settlements, and maritime terminals as well as areas especially apt for aquaculture and in specific cases, eco-systems or habitats of special ecological and scientific interest (Armada de Chile, 1994, p. 2).

No definition of a bath place (*balneario*) is given in this Navy document, but it should correspond logically to the beaches that are apt and used for bathing. Not all beaches are therefore bath places (*balneario*), but people use them anyway, and in this respect, many beaches (unsuitable for bathing) are located within private properties, being therefore inaccessible to the public. This contradicts ''the norms generated by the Right, *forcing* the proprietor to give right of way to access to the beach'' (Armada de Chile, 1994, p. 1). These norms do not always

work in practice, or they are interpreted in a very restricted way.

The National Commission for the Coastal Border reserves the right to propose the preferential use of the seaborder, for example, "the regularization of *existent human settlements and artisan fishing coves"* and "areas of public use for recreation" (Ministerio de Defensa Nacional, 1994, IV. Objetivos Específicos, No. 5, Letra c and d; my emphasis). The politics of the seaborder establishes also that best use is based on the respect of "the rights of individuals and their interests, these be in agreement with the necessity of the community and the country" (Ministerio de Defensa Nacional, 1994, IV. Letra g).

Regarding application to access to beaches, the Ministry of Real State's webpage advises that "the beaches are a national good of public use, that belong to the whole nation, and therefore, its equal use and free access to these goods is a right that correspond to all its inhabitants" (Ministerio de Bienes Nacionales, 2006).

The Ministry of Real Estates has the mission to "recognize, administer and handle the state patrimony, the regularization of the real small property and the superior control over the national estates of public use...". The access to the beaches is generally pedestrian and according the Art. 13 Law Decree N° 1939 of 1977 from the Ministry of Real Estates

> the owners of lands adjacent with sea beaches, rivers or lakes, should facilitate for free the access to these, for purposes of tourism and fishing when it does not exist other thoroughfare or public ways to this effect (Martínez, C., Oficina Bienes Nacionales, Pers. Comm. via email 2006-08-28).

The application to obtain the access can be done

> any time that an individual is limited in access to a beach — and always when it does not exist other thoroughfare or public ways to this effect — can apply in a written form to the Regional Intendent to fix the free access directly o through the Provincial Governor or communal authorities. (Ministerio de Bienes Nacionales, 2006).

Nonetheless, even though this right of access is secured by law, it deals with access by foot, and not for vehicle access. This is a considerable limitation given that many beaches are remote from the main road. The Civil Code (2006), actualized 2000 (Second Book, Title IV: On the Occupation of National Goods), however, continues to regulate both the rights and duties of fishers and owners of land adjacent to the beaches. It declares in Art. 612 that these

> can make of the sea beaches the necessary use for fishing, building huts, landing their boats and implements, and the catch, drying their snares, etc.; yet, keeping from making any use of the buildings or constructions existing there without the permission of their owners, or limiting the legitimate use of other fishers (Código Civil de Chile, 2006).

Furthermore, it defines the area of allowable activity in more precise terms. Art. 613 establishes that "they also can for the stated activities make use of the continuing *land up to a distance of eight meters from the beach*..."(Código Civil de Chile, 2006; my emphasis). Art. 614 furthermore states the responsibilities of the owners of the land:

> The owners of the land neighbouring the beach cannot raise enclosures, nor buildings, constructions or farms within the said eight meters, but leave sufficient and comfortable spaces for the fishing activities. In the contrary case the fisher can go to the local authorities who will decide on a convenient solution (Código Civil de Chile, 2006).

The three articles referred to be above were adopted in the Constitution of 1925.

Figs. 3.2 and 3.3 illustrate the configuration of the coastal border adjacent to private and state goods. Both figures suggest the big difference between property rights of the coast under the two property regimes. Adjacent to the sea (a national good) (see Fig. 3.3), the beach terrain, starting after the sea beach, consists of 80 meters, which is classified as a state good, under the administration of the Marine Subsecretary. After the 80 meters, land is still considered to be a state good, but it is under the administration of the Real Estate Ministry.

Adjacent to private property (Fig. 3.2), the sea as a national good of public use corresponds only to the beach sea, reaching up to the highest tide water line, being usually up to 8 meters; the rest is considered to be to private property. Consequently, where land is under private

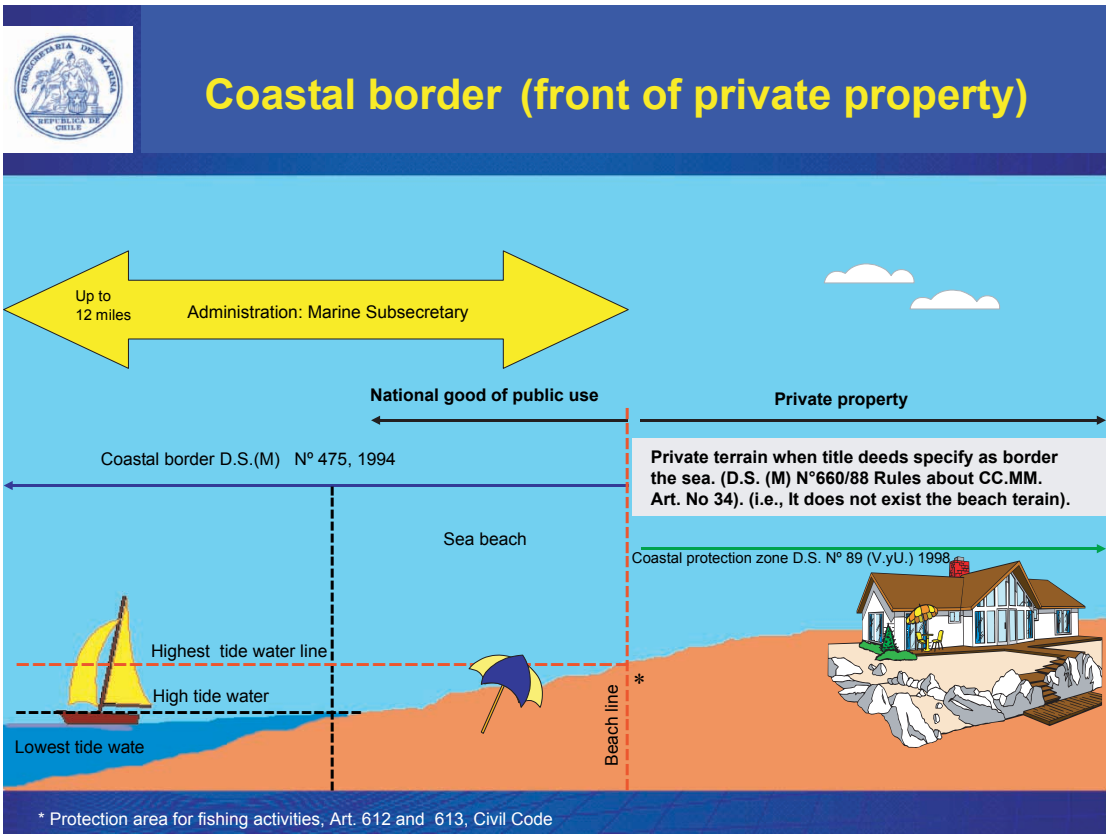


FIGURE 3.2 Coastal border in front of private property
Source: courtesy and permission from Farias, B., Oficina Borde Costero, Subsecretaría de Marina, Ministerio de Defensa Nacional. My translation.

ownership, property rights strongly restrict public activities in the beach terrain. What then are the property regimes dominating the Chilean coasts? This is the issue of the next section.

PROPERTY REGIMES ALONG THE CHILEAN COAST

Artisan fisheries are land based, and the question of coastal land ownership is central for the development of MAs. Land access for artisan fishers varies along the Chilean coast depending on whether land where the fishing coves are situated is state or private. When land is private, in the rural areas, land access might be contested and it is normally difficult for artisnal fishers to negotiate over space for settlement or infrastructure. Land use change over time also affects the possibility of resolving land access around fishing coves. The cove of El Quisco, for example, is located in what today is an urban middle class holiday resort and as we shall see (Chapter Seven) access to the cove is not longer a problem. Nonetheless, before El Quisco became a modern summer resort, the fishers faced more than one time problems with the local Yacht Club, disputing the land. Although these tensions belong to the past, for the fishers it meant that they were forced to abandon their living places in the cove and settle in less attractive and distant places, dislocating women from the cove's fishing activities (Vildósola and Rossón, 1997).

A study (Caballol et al., 2006) from the Ministery of Real State that measured the length of the continental Chilean coast and

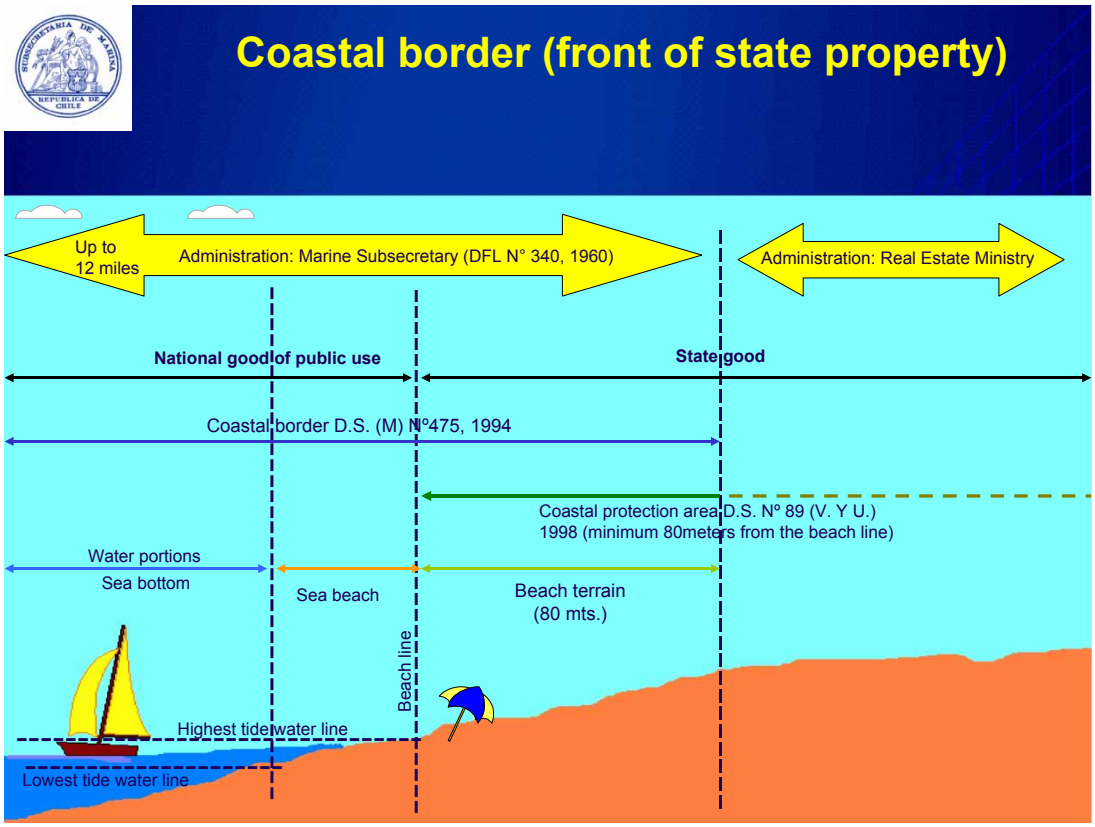


FIGURE 3.3 Coastal border in front of state property
Source: courtesy and permission from Farias, B., Oficina Borde Costero, Subsecretaría de Marina, Ministerio de Defensa Nacional. My translation.

mapped tenure distribution, showed that 56 percent is state property and that 44 percent of the coast is in private hands. This is a proportional distribution that appears, at least superficially, to be quite even (see Table 3.2).

However, if we analyse the regional distribution of state and private property, we get a different picture. State property dominates only in three regions, these being in the two extremes of the country: the desert (Regions I of Tarapacá and II of Antofagasta) and the extreme south (Region XI of Aisén) (see Picture 3.1). It is also in these Regions that there is State land available, which in the future can be subjected to rent, concession, sale, etc. The situation is the inverse in the remainder of the Regions. Between Regions IV of Coquimbo and Region X of Los Lagos — where most of the country's population lives — the lowest percent in private hands is 88 represented to Region IV, where Puerto Oscuro is situated.

According to the study, the results regarding the length of the continental coast (18.771 kilometer) are approximate, being neither official nor exact. The total does not include the coast of the islands of Tierra del Fuego and Navarino in the Antarctic that together have 3,326 kilometer of coast. The length of the coast of the more than 10,000 islands of Chile is unknown (Mártinez, C. Bienes Nacionales; Pers. Comm. via email 2006-08-25).

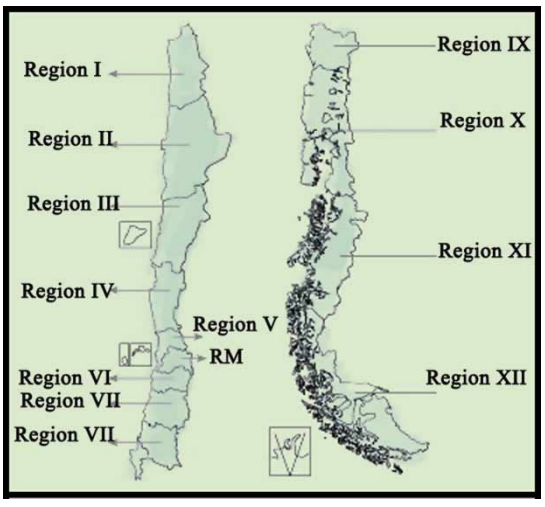
Given the reigning property regime of the Chilean coasts, the situation of the beaches is congruent with the predominating character of private property of the coast. The study from Ministerio de Bienes Nacionales that includes only the beaches between Regions I of Tarapacá to Region X of Los Lagos, registers a total of 562

TABLE 3.2 Total length (km) of the continental coast and property regimens by regions (percent) in Chile.

Regions	Coast's Total Length (Km)	Private		State (Km)				
		Km	%	Disposable[1]	Assigned[2]	Other[3]	Total	%
I	501	53	11	325	103	20	448	89
II	831	225	27	531	66	9	606	73
III	621	353	57	210	31	27	268	43
IV	**520**	**460**	**88**	**0**	**45**	**15**	**60**	**12**
V	**335**	**335**	**100**	**0**	**0**	**0**	**0**	**0**
VI	**115**	**115**	**100**	**0**	**0**	**0**	**0**	**0**
VII	**180**	**177**	**98**	**0**	**0**	**3**	**3**	**2**
VIII	**567**	**561**	**99**	**0**	**6**	**0**	**6**	**1**
IX	**112**	**104**	**93**	**0**	**5**	**3**	**8**	**7**
X	**1,551**	**1,448**	**93**	**46**	**57**	**0**	**103**	**7**
XI	6,429	726	11	680	5,023	0	5,703	89
XII	7,009	3,606	51	126	3,277	0	3,403	49
Total	**18,771**	**8,163**	**43**	**1,918**	**8,613**	**77**	**10,608**	**57**

Source: Caballol et al. (2006): Diagnóstico de la situación de la propiedad y acceso a playas de mar, lagos y rios a nivel nacional, Informe final, Ministerio de Bienes Nacionales.
[1] State available.
[2] State assigned (ex. Ministerio de Defensa Nacional, CONAF, etc.).
[3] Other (free access, rented, etc.).

beaches. Of these beaches only 30 are juxtaposed with state lands, corresponding to only 5.3 percent of the total. Of these 562 beaches, 35 would have a problem regarding public access (Caballol et al., 2006). There is no definition of a beach given in the study, but it is unlikely to be the same as above (Art. 594, Civil Code) because in that case the beaches would be very difficult to quantify. According to a letter from Martínez, one of the authors of the report, following DIRECTEMAR (Dirección General de Territorio Marítimo y Marina Mercante), they considered beaches that were appropriate for bathing and sunbathing. Due to these very specific characteristics considered in the study, thousands of beaches remain excluded, and many others remain unknown. Furthermore, DIRECTEMAR divide the beaches into two types: *Apt beaches* meaning that they can be utilized for bathing and sunbathing. They must meet "natural" and "acquired" conditions. Natural conditions: having a flat bottom and soft slope, clean, without rests of submarine constructions or shipwrecks, healthy waters, soft waves, scarce streams and without rocks. Acquired conditions: responsible concessionary, security system of first aid, and counts with lifeguards. *Not apt beaches* which can be utilized only for sunbathing (Martinez, Bienes Nacionales, Pers. Comm. via email 2006-08-28).



Picture 3.1 Map of Chile and its regions

It is uncertain what the study considers as problematic regarding access to the beaches. In Region IV, in the case of Agua Dulce (Canela commune, Region IV), the public has no access. Probably, this beach is not considered apt either for bathing or sunbathing, and this might

explain why it is not included on the list. Therefore this beach is probably not counted as having problems of access. Puerto Oscuro, being suitable for bathing and sunbathing due to its natural conditions, should fall outside the definitions of "apt beach" of DIRECTEMAR as it lacks the acquired conditions (i.e., responsible concessionary, security system of first aid, and counts with lifeguards).

Now, if we examine the situation of the lakes and rivers in terms of property rights, there is an extremely high presence of private property. Of the 69 navigable lakes and 10 navigable rivers (from Region VI of Libertador General Bernardo O'Higgins to Region XI of Aisén) all, except two lakes, are surrounded by private property. These are the famous San Rafael Lacunae in Region XI of Aisén, and its adjacent lands form the National Park of the same name, and Lake Conguillío in IX of Araucanía is within the Conguillío National Park. This Region also has the 15.5 ha Lago Calafquén and the 5.3 ha Lake Colico, both of which are state-owned.

So, what can we conclude? The distribution of land tenure makes the administration and control of all Chilean coasts by the State rather weak. State property in vast areas of the country is the exception and private property is much more extensive. The consequence is that vast private property holdings pose restrictions on the rights of others to access beach areas that belong to the whole nation. This land tenure structure was substantially established under the colonialist system of *Mercedes de tierra* (land grants) granted by the Spanish Crown to its conquerors and colonisers. This legacy left behind large private landed properties that the agrarian reform of the 1960s and 1970s did not affect considerably; and if it did, Pinochets "contra" agrarian reform partially changed land tenure structure again. In this regard, the first (1855) and second (1925) Constitutions continued to privilege the rights that the landlords inherited from colonial times. In 1925 for the first time certain concepts about the social function of the land were introduced (CIDA, 1966, p. 11). In this respect the Constitution of 1925 says that

> the exercise of right to property is subject to the limitations or rules that demand the maintenance or progress of the social order and, in such sense, the law will be able to impose on it obligations or servitude of public usefulness in favour of the interests of the State and of the public health (CIDA, 1966, p. 11).

As CIDA indicates, the legal property regime in Chile was characterized, until 1925, by an almost total freedom in the possession and usufruct of property for those who had the monopoly of the land in the country. Art. 582 of the Chilean Civil Code, Title II: Of Dominance, still today defines the right to property as "the dominance on a corporal thing to enjoy and have it arbitrarily, not being against the law or other persons rights" (Código Civil de la República de Chile, 2006). Art. 10 of the Chilean Constitution reaffirms this right, indicating that it

> assures all the inhabitants of the Republic the inviolability of all the properties, without any distinction and that nobody can be deprived of its property or part of it or from the right that he may have to it, but by virtue of a judicial judgement or of expropriation by cause of public usefulness qualified by a law (CIDA, 1966, p. 11).

This right, presently slightly reformulated, is not affected by the Constitution of 1981 dictated during the Pinochet era and is described in Art. 24, Chapter III: About the Constitutional Rights and Obligations (Constitución de Chile [1981], Art. 24, Cap. III, 2006). Obviously, the general interest highlighted in law is only extended up to where it does not endanger the existing large landed private properties. So, not only the coastal land of the sea and its beaches are under private property, but also those of the lakes and rivers. It seems that there is no study available that analyses how property concentration looks like along the Chilean coasts. However, it is known that Chile, in spite of the agrarian reform, is among the countries with the highest land concentration. The coasts are not an exception and it is within this context that the MAs are developing in Chile. Let us now proceed with an overview of the institutional structure of Chilean fisheries and related organizations.

THE INTERNATIONALIZATION OF FISHERIES

Chilean fisheries have gone though important changes in response to internationalization of production and consumption systems. Industrial and artisanal fishing are the two main fishing sectors. Aquaculture is included in the industrial sector. Since the mid 1970s with the introduction of a neo-liberal export policy both industrial and artisanal fishing have increased considerably. During the 1980s, fisheries were the fastest growing sector in Chile (Castilla et al., 2007, p. 28), and although Chile is a relatively small nation, it occupies an important place in worldwide landing statistics. Neo-liberal policies resulted in a re-structuring and adaptation of the fishing sector in accordance with globalization requirements. Similar to other parts of the world, Chile's export policy re-channelled fisheries supply from local and regional market to international markets.

As Kay (2002) argues, from 1975 Chile was the first country to thoroughly implement neoliberal economic and social policy. Before this period, Chile had a relatively closed economy, and agriculture including forestry constituted less than 5 percent of the total export value. Until the military coup of 1973, Chile had an inward-looking development that combined import substitution, high level of protection for domestic industry with an extensive public sector. Currently Chile is regarded as one of the most successful cases of non-traditional agro-export (Kay, 2002). During the 1990s the agricultural sector contributed 30 percent towards total export value.

The new policy internationalized the economy and protection of national enterprises was reduced. Among the measures to support the new outward-looking development was the unilateral reduction of tariffs, which is currently at 10 percent, with plans to reduce it by a further 2 percent (to 8 percent). Non-tariff restrictions were eliminated and exchange rates were unified and the rate devaluated (Galleguillos and Moraga, 1999). Prior to 1975, two hundred firms exported 200 products to 50 countries. In 1998, around 6,000 firms exported more than 3,800 products to 172 countries and the value of export grew from US$5 billion in 1970 to about US$19 billion in 1998 (Galleguillos and Moraga, 1999). Continuous integration of Chilean production into international markets has been secured by international agreements and the expansion of foreign capital is also sanctioned by the post Pinochet governments, led by the centre-left coalition Partido por la Democracia (PPD). The free trade treaty between Chile and EU, which started to operate in February 2003, allows European investors to buy 100 percent of Chilean companies along with their respective fish licences and quotas, necessary to operate in Chilean territorial waters. In this way the EU secured access to resources such as pelagic[1] fish of central and north Chile, as well as demersal[2] fish from southern Chile. The Protocol of Fish Investment (PIP) allows European interests to buy coastal land to build related fisheries and industrial infrastructure. Before 1991 foreign interests were allowed to buy land only within 5 kilometer from the coast. The Chilean free trade agreement with the USA leads to the same process, strengthening the traditional model based on export of primary products and raw materials; a role assigned a long time ago to southern countries. In 1998, Chile's four major export products were: copper, 37 percent; cellulose, 5 percent; grapes, 4 percent and fishmeal, 2 percent (Galleguillos and Moraga, 1999). During 1994 and 2004 fish exports made up 10.5 percent average of export total value (see Table 3.4, Chapter Four).

The 1991 General Law of Fishing and Aquaculture (LPA N° 430) gives national fish patrimony to big international companies to the disadvantage of small and medium fishers, the environment and national food sovereignty (Cárdenas et al., 2003). Fishing export has resulted in over exploitation of marine resources, and makes fish less available for the poor. It is usual that export based development tends to narrow production to fewer species (Hersoug et al., 2004).

[1] Living and feeding in the open sea.
[2] Sinking to or lying on the bottom; living on or near the bottom and feeding on benthic organisms.

The case of salmon farming in Chile illustrates how international capital places production abroad, taking advantage of distant social and ecological factors, and thereby exporting environmental problems. In 2003 and 2004 Chile was second only to Norway in salmon production. An indication of the enormous growth in this enterprise is provided by an increase from 487 tonnes in 2003 to 569 tonnes in 2004, corresponding to a 17 percent increase in one year (Subpesca, 2004, 2005a).

Pernicious environmental and human effects of salmon farming in Chile have been reported from Scandinavia. Chile and Norway have some things in common. Both are rich in coastal resources. But while Norway has several fish companies in Chile, Chile has none in Norway (Löfgren, 2001). Norwegian companies control at least 20 percent of Chilean salmon industry (Ecoceanos News, 2003-07-01, in Dagbladet, 2003-06-28).

Norwegian capital in Chile accesses not only markets that it cannot reach from Norway — e.g., the EU-market (Norway is outside EU) as well USA and Japan — but it also secures the availability of cheap salmon feed, which is the largest production cost for commercial aquaculture (Naylor et al., 2000). Every kilogram of salmon requires an input of 3 kilograms of wild fish, meaning that every kilogram of salmon demands more fish protein than it produces (Löfgren, 2001). Many aquaculture systems use 2–5 times more fish protein in the form of fish meal to feed the farmed species (Naylor et al., 2000, p. 1018). The increased world aquaculture production from 10 million tonnes in 1987 to 29 million tonnes in 1997 explains the patterns of fish capture in the oceans. ''Between 1986 and 1994, four of the top five, and eight of the top 20 captures species were used for feed production for the aquaculture and livestock industry''. One species used for feed production is the jack mackerel (*Trachurus murphyi*) — a principal commercial fish in Chile. The system of Maximum Limit of Capture in the 1991 Fishing Law (LPA)[3] assigned to the fish industry 98 percent of the Jack mackerel quota during the ensuing 10 years (Cardenas et al., 2003).

What is fish feed for industry is food for people. Salmon is now nourished in Chile with *Caballa* or Chub mackerel (*Scomber japonicus*). To eat fish in Chile, one of the leading producers of marine animal protein, is becoming an expensive luxury beyond the means of the poor. Chilean consumption of fish is one of the lowest in the world with around 7 kilograms per capita/year, which can be compared with 22 in Peru, 40 in Spain and 70 kilograms in Japan (Chile Científico, 2006). This low consumption is not only cultural, such as preference for red meat and poultry, but also a product of market mechanisms such as price and marketing. Nonetheless, farming carnivorous species not only demands large inputs of wild fish for feed, they also reduce fish supply through habitat modification, wild seedstock collection and other ecological impacts such as waste disposal and pathogen invasions. Aquaculture presents a paradox as a possible solution to the shortfall in ocean harvests as fisheries deteriorate, and aquaculture is also a contributing factor to the collapse of the same fisheries stocks worldwide (Naylor et al., 2000).

Another rationale for Norwegian investment in Chile is the cheap, largely unorganized (due to the long repression under Pinochet) and unskilled labour force. Chilean labourers that work for Mainstream earn one-eighth of their counterparts' income in Norway (Ecoceanos News, 2003). Norwegian companies have been accused of adopting double environmental and labour standards; one for Chile, one for Norway. Mainstream is a Chilean filial of the Norwegian Cermaq, which is 80 percent owned by the Norwegian State (Ecoceanos News, 2003). Mainstream is one of the five most important salmon producing companies in the world. In 2007 (TV Nacional) there was a total of 5,000 salmon workers employed in aquaculture in Chile. International companies have been criticized by the Chilean Labour Inspection because they do not allow workers to organize, and attempts to collectivize usually result in sackings. The companies are also well-known for only offering casual working conditions with very little security.

[3] Ley de Pesca y Acuicultura (LPA) 430/1991.

INSTITUTIONAL STRUCTURE OF FISHING AUTHORITIES

The history of Chilean fishery regulation is rather recent. The first national fishing legislation dates from the 1930s, after recognizing that fishers lack appropriate extraction and commercialization techniques. The lack of information on fish stocks made appropriate investments and policy decisions difficult. Artisanal fishing was not even mentioned in the 1930s fisheries legislation (Meltzoff et al., 2002, p. 97).

Until 1978 fishing was handled by the Division of Fishing Protection under the National Agricultural and Cattle Service (SAG), which in turn was the jurisdiction of the Ministry of Agriculture. From 1978 onwards fishing was handled by Ministry of Economy, Fomenting and Reconstruction.[4] Under this Ministry, a discrete fisheries authority was established, the Fishing Subsecretary (Subpesca). This shift reflects the State's interest in the fishing sector in the new era of economic liberalization. From 1975 the fishing sector had an importance never held before, and therefore needed an agency of its own to administer its affairs.

From 1991, when the Fishing and Aquaculture Law (LPA) was promulgated, Sernapesca restructured in order to respond to technological and normative, changes, especially its increasing integration into the international arena.

The Fishing Subsecretary (Subpesca) has authority over the management of all fisheries, i.e., industrial and offshore and artisanal and inshore. Under Subpesca comes Sernapesca. It has an executive role, being in charge of law enforcement and statistics. In regard to MAs, Sernapesca also produces statistics, supervises the provision of areas to the artisanal fishing organizations and supports the implementation of the administrative measures through coordinating action with other public institutions (including, Subpesca, CORFO, SERCOTEC, Gobiernos Regionales, Fondo de Fomento para la Pesca Artesanal) (Sernapesca, 2007c). It is also the role of Sernapesca to control and inspect the studies and management plans, according to the general fishing law and more specifically, the rules of the MEABRs (this is discussed more in Chapter Five).

In 2007, the Subpesca employed 156 employees of which 63 were permanent and 93 non-permanent staff (Bolborán, D., Subpesca, Pers. Comm. via email 2007-05-04). Sernapesca has 566 employees of whom 351 are permanent staff and 215 non-permanent (Villagra, C., Sernapesca, Pers. Comm. via email 2007-05-02).

Sernapesca (see Fig. 3.4) consists of a Centralized Directorate with 13 Regional Directorates, 45 Provincial Offices and one Institutional Coordination Office in Santiago. The Regional Intendencias are authorized to create the Regional Fish Councils whose principal objectives are the identification of regional problems affecting the fishing sector, the elaboration of proposals of solutions and technical reports. The legislation also establishes the creation of five macro zone based organs called Zone Fishing Councils (Consejos Zonales de Pesca) (Sernapesca, 2007c).

As indicated in Table 3.3, under Subpesca the National Fishing Council, headed by Fishing Subsecretary, has a democratizing role, integrating the fishing stakeholders at a national level. Among the members of the National Fishing Council are four artisanal fishers representing the macro zones and one representing the national level, as selected by fishing organizations and/or federations. These representatives are not specified in the 1991 LPA, and in 2005 these positions were vacant, leaving these perspectives unrepresented in the Council (Supreme Decree, Nr 56, Subpesca, 2005-01-27). The procedure to fill these posts is quite bureaucratically onerous and it seems that the fishers' bodies did not succeeded in fulfilling these formal requirements.

The National Fishing Council is then organized into five Fishing Councils organized by geographical zones incorporating more than one region. Their role is to decentralize fishing administration and foster the participation of regional and local stakeholders, and to set rules at the zone level. Artisanal fishers also have a representative on each of the Zone Fishing

[4] Law decree N° 2442.

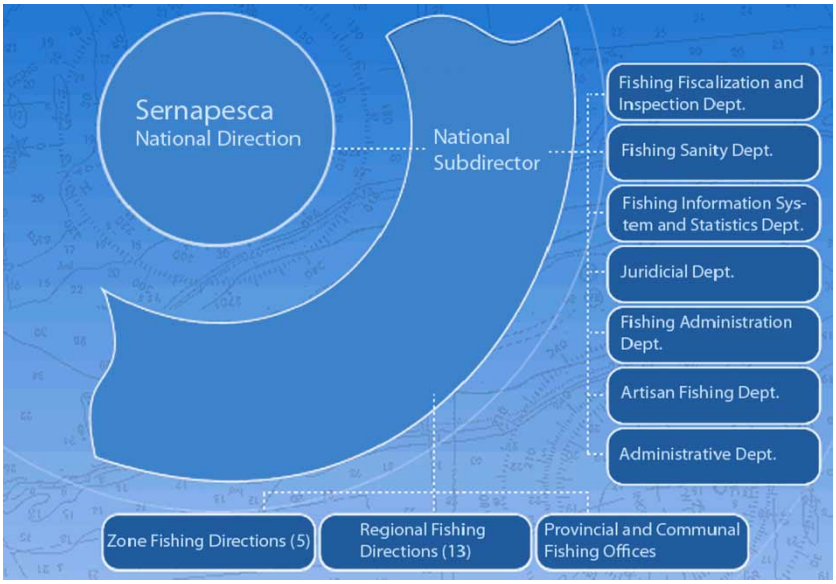


FIGURE 3.4 Structure of National Fishing Service
Source: Sernapesca (2007c). Permission from Lillo, D., Sernapesca.

Councils. Artisanal fishers also have representatives in the Fomentation Fund for Artisanal Fishing (FFPA) — the body in charge of promoting sustainable development of artisanal fishing.

Lastly, there is the Regional Fishing Councils that seems to exist only in certain regions. The existence of these Regional Councils is seemingly discretionary upon the decision of the Regional Intendants — the regional representatives of the President of the Republic. Wherever they are in place, artisanal fishers have two representatives. Giving participation to artisanal fishers is probably not only a democratic initiative but also a way to acknowledge the economic importance of the sector within the national context. Artisanal fishers are represented in formal structures, but how much their voice is heard in practice remains to be studied. However, through their own organizations like the National Confederation of Fishers (CONAPACH), among others, fishers have also been active in the formulation of the fishing law.

According to CONAPACH (2001), the national leaders of this organization participated in the redaction commissions of the 1991 LPA, with extensive discussions at grass-root level. One important goal that fishers succeeded in advocating was the five marine miles for artisanal fishers, the priority of coastal communities to obtain concessions of land, sea bottom and MAs. Artisanal fishers achieved as well representation on the zonal, regional and national fishing councils, discussed above.

FISHING RESEARCH AND RELATED STAKEHOLDERS

Regarding research, there is principally Instituto de Fomento Pesquero (IFOP) (Fishing Foment Institute) and Fondo de Investigación Pesquero (FIP) (Fishing Research Fund) (see Table 3.4). IFOP is a semi-governmental body that was created in 1964. IFOP provides the technical and scientific knowledge that underpins the regulation of fisheries and aquaculture and the conservation of water resources and eco-systems. It is also in charge of export statistics for these areas. It has been important in the development of MAs, performing the first benthic resource evaluation and management project that informed the basis of the present ESBA studies (Estudio de Situación Base) and the Management and Exploitation Plans (PMEA) (discussed more in Chapter Five).

TABLE 3.3 Institutional scheme of Chilean fisheries administration*

Level	Organization	Functions/missions
National	MINISTERY OF ECONOMY Fishing Subsecretary (Legislative role)	To promote sustainable development of fishing and aquaculture activities, policy making and applying norms that increase the sector's social and economic benefit for the well-being of the present and future generations of the country. It heads the five Zone Fishing Councils
National	National Fishing Council	To facilitate the participation of the fishing stakeholders at national level. It is composed of: • The Fishing subsecretary • The Director of DIRECTEMAR • The Director of Sernapesca • The Executive Director of IFOP • 7 Representatives nominated by the President in accordance with the 3/5 of the Senate. • Representative of the enterprise sector representing four macro-zones, 1 representative of small scale industrial ship-owners and 1 from the aquaculture sector designated by their respective organizations. • Representatives of the enterprise labour sector, designated by the labour organization. • Representatives of the artisanal fishing sector representing four macro-zones and one representing the national level, designated by the fishing organizations or federation[1].
Zone (more than one region ' macro zone')	5 Zone Fishing Councils: — I & II, seated in Iquique — II & IV, seated in Coquimbo — V to IX seated in Talcahuano — X & XI, seated in Puerto Montt — XII, seated in Punta Arenas	Created with the aim of decentralizing the administrative measures of authority and make effective the participation of the fishing stakeholders at the zone level in matters related with fishing activities and aquaculture. They have a consultative or resolute character. Their aim is to generate fishing norms at the zone level, involving the regions that are part of the zone. They are integrated by: • Zone Director from Fishing Subsecretary who heads it and a Regional Director of Sernapesca of the respective zone.[2] • The Marine Governor of the Region that seats the Zone council • IFOP's Zonal council. • A Regional Ministerial Secretary of Planning and Cooperation from the respective zone proposed to the President by the Ministry of Economy. • 2 representatives from universities or professional institutes from the zone directly linked to the sea science proposed to the President by the rectors of the universities or professional institutes from the respective zone. • 4 counsellors representing the guilt organization of ship-owners, small-ship-owners, processing plants, and titular of concessions/authorizations of aquiculture of the zone. • 4 counsellors representing the guilt vessel official's organization, crew, industrial labour *and artisanal fishers elected by the guilt associations, union federation and firm or cooperative unions.* • A representative of all the juridical non-commercial instances working with the environment or preservation of natural resources or investigation, designated by the President.
National	Sernapesca (*Servicio Nacional de Pesca*) (Executive role)	Controls fishing aquaculture, sanitary and environmental norms, as well as international agreements that regulate the activity with the aim to conserve the hydro-biological resources and to secure sustainable development. Sernapesca holds the national register of artisanal fishers and the boats, according to regions, province, communes and localities and categories of fishers and fisheries. It heads:

TABLE 3.3 (*Continued*)

Level	Organization	Functions/missions
		• The 13 Regional Fishing Councils. • It heads and acts as Executive Secretary of the Fomentation Fund for Artisanal Fishing (FFPA)
National	Fomentation Fund for Artisanal Fishing (FFPA)	The mission of FFPA is to promote the sustainable development of the artisanal fishing sector, and support the efforts of artisanal fishing organizations that seek to improve the living and working conditions of its members, respecting the resources and the environment through the co-financing of projects carried out by the organizations themselves. The adjudication of funds is done through public auctions and cover the following areas: • Development of infrastructure for artisanal fishing. • Capacitating and technical assistance directed to the artisanal fisher and their organizations. • Repopulation of hydro-biological resources that are exported by artisanal fisher and artificial cultivators. • Commercialization of artisanal fishing product and administration of the production centre. • It has regional representation through the Regional Fishing Directions. It is compost of: • IFOPs Executive director • The National director of harbour works; • A representative of the Ministry of Planning and Cooperation • A representative of Fishing Subsecretary • *3 representatives of the artisanal fishers among which should be represented the artisanal fishers themselves, the divers, cultivators and weeds harvesters, coming from the fishing macro-zones.*
Zone Provincial/ Communal	5 Zone Fishing Directions	The functions of these directions are the same as above (Sernapesca), but at a zone level.
Regional	13 Regional Fishing Directions	The functions of the 13 regional directions are the same above (Sernapesca), but at regional level.
	Provincial and Communal Fishing Offices	The functions of these offices are the same as above (Sernapesca), but at a Provincial and Communal level.
Regional	(Regional Fishing Councils)	The Fishing Law allows the Regional Intendancy (regional representatives of the President of the), to form Regional fishing Councils when a region has significant fishing and aquaculture activities. Their aim is to identify problems affecting the regional fishing sector, elaborating proposal of solution and technical reports, being headed by each Regional Director of Sernapesca. They should consist of: • The Regional director of Sernapesca, who chairs it. • 4 institutional representatives, one from the university or institute related to the fishing activity. • A representative of the fishing enterprise sector. • *4 representatives of the labour sector, two of which must come from the artisanal fishing sector.*
Regional	Committee of Regional Assignation: • Fishing Committee of Regional Assignation	Under the Committee of Regional Assignation (CAR) are the Fishing Committee of Regional Assignation (CAR-*Pesca*) which distributes development funds in different areas. The CARs are under the Regional Intendancy (whose Intendant represents the President of the Republic in each region). CAR-*Pesca* has representatives from Sernapesca and from all sector organizations with investment funds (like CORFO), and the investment advisors.

(continued)

TABLE 3.3 (*Continued*)

Level	Organization	Functions/missions
Other State Organs		
	CORFO, Sercotec, Fosis, DOP (Direction of Harbour Works), Conicyt and international funds	Diverse institutions support with financing the development of fishing activities, among others.

*Sources: Cerda, G., Sernapesca; Lira, S. Subsecretaria de Marina; Elissetche, J., Sernapesca; Bolbarán, D., Subpesca.
1. See comments above regarding this group not been part of the National Fishing Council in the 1991 LPA, but that was apparently incorporated later on.
2. Sernapesca's home page specifies that it is the Zone Director from Sernapesca who heads the Zone Fishing Councils. According to Bolbarán this will be the case if the modifications of the LPA are accepted (Bolbarán, D., Sernapesca).

TABLE 3.4 Fishing related research organizations (private and public)*

Level	Organization	Functions/missions
National	IFOP (Instituto de Fomento Pesquero; Fishing Foment Institute)	Elaborates and provides the technical antecedents and scientific bases for the regulation of fisheries an aquaculture and the conservation of the hydro-biological resources and their eco-systems.
	FIP (Fondo de Investigación Pesquero; Fishing Research Fund)	Finance fishing and aquaculture research projects, consist of eight experts and headed by the fishing Subsecretary.
	Universities, institutes**	Univ. Arturo Pratt, Univ. Austral de Chile, Univ. Católica del Norte, Univ. Católica de la SSMA Concepción, Univ. Católica de Valparaíso, Univ. de Concepción, Univ. Nacional Andrés Bello.
Private organizations working within the fishing sector		
	Consult firms**	Alvarez y Asociados Ltda, BIOCEAN, BIOMAR Estudios Ltda., BITECMA Ltda., Depto. de Pastoral Obrera, Estudios Marinos Ltda., FUNCAP, Fundación OCAC, Mares Chile Ltda., Promar Pacífico Ltda., SODEPAR Ltda.

*Sources: Cerda, G., Sernapesca; Lira, S. Subsecretaria de Marina; Elissetche, J., Sernapesca; Bolbarán, D., Subpesca.
**Sernaspesca (2007c).

FIP finances most of the management oriented fishing and aquaculture research (Moreno et al., 2007). According to Reyes (1990), although not referring to this institution specifically, at the end of the 1990s, only 48 million *pesos* were destined for research of the *Concholepas concholepas* species, which is less in value than many individually, registered illegal capture of the species.

In 2005, among the 14 research projects that received financing from FIP, only one deals with *Concholepas concholepas* reproduction (FIP Projecto No. 2005-32). This grant was for 30 millions *pesos* (FIP, Concurso No. 5, 2005), corresponding to *about* US$54,000.[5] There is also a second project aiming to study the exploitation criteria of secondary benthic resources in the MAs (FIP Proyecto No. 2005-42) for a similar grant amount. Of the 14 successful projects that received grants, seven were adjudicated by universities, five by IFOP and two were mixed between one university and IFOP and one between a university and a consultancy firm (FIP, Concurso No. 5, 2005). There are several consultancy firms working with fishing activities, particularly with artisanal fishing organizations after the emergence of the MAs in the 1990s. They get access to funds from bodies such as FFPA and Sercotec (see Table 3.3).

The following chapter offers an overview of the main fishing sectors also serves as a background to Chapter Five which deals with the fisheries of the *Locos* and hence with the MAs.

[5] Average rate 559.76 *pesos* per US$1, year 2005 (Banco Central de Chile 2005).

4 Industrial and Artisanal Fishing Landing in Chile

INTRODUCTION

The long coastline and rich Ocean make Chile a prominent fishing nation. The Chilean Exclusive Economic Zone (EEZ) is 2.4 million km^2 of ocean, three times larger than the country's area (Fundación Mar de Chile, 2008). Of the 200 nautical miles of Chilean EEZ, the major part (195 miles) is reserved for industrial fishing, while artisanal fishing has a mere 5 miles (LPA, 1991, Art. 3 and 4). If there are any artisanal fishing activities in an area, industrial fishing might still be allowed within the 5 marine miles reserved for artisanal fishing, with the exception of the strip of one territorial marine mile (LPA, 1991, Art. 47). However, this exception does not embrace aquaculture whose activities take place "in the sea beach area, state beach terrain, portions of water and bottom, and rocks, within and outside the bays, and in the rivers and lakes that are navigable by vessels of more than 100 tonnes of gross register..." (LPA, 1991, Título VI de la acuicultura, Parráfo, 1, Art. 67).

This arrangement leads to tensions between industrial and artisanal sectors, and artisanal fishers feel discriminated against. CONAPACH (Confederación de Pescadores Artesanales de Chile), one of the two national fisher confederations, representing half of the country's artisanal fisher organizations, asserts that in Regions III and IV (see Map 1.1 for regions), industrial fishing is allowed within the 5 miles because artisanal fishing does not fill the capture quotas. On the other hand, artisanal fishers cannot fish in the waters reserved for industrial fishing although certain pelagic species can only be fished further out than 5 miles. Another point of complaint is that industrial vessels can fish in the whole marine territory while artisanal fishers are limited to the region where they are registered. Furthermore, salmon aquaculture is authorized within the reserved 5-mile zone, affecting artisanal fishing through contamination (CONAPACH, 2007a). On 29th January 2008 CONAPACH (2008), in collaboration with the NGOs Greenpeace and Ecoceanos, a public campaign was launched in Valparaiso to eliminate trawling in Chilean coastal waters. Around 1,000 fishers participated at the launch implying that Subpesca favours industrial fishing.

According to the 1991 Fishing Law (LPA), industrial fishing is "that extractive fishery that is realized by industrial ship-owners, utilizing fishing boats in conformity with this law" (Art. 2:31). Industrial boats are above 22.5 meters lopsided, and weigh 100 tonnes.

In spite of the fact that artisanal fishing seems to have many disadvantages, such as low education level, low capacity level, little diversification, commercialization problems and low aggregated value, this sector has not only been able to improve its production but also its capacity to adapt to new market demands, new laws and management policies.

Between 1977 and 1987, artisanal landings increased by 478 percent while labour increased by 278 percent. In other terms, this meant an increase from 17,182 fishers in 1975 to 47,800 in 1987. Between 1980 and 1987 artisanal exports increased from US$57.1 million to US$154 million, thereby constituting an increase of 269.7 percent (Arrizaga et al., 1989, p. 295).

According to the 1991 Fishing Law, artisanal fishing is "extractive fishing activity realized by particular individuals that in a personal, direct and habitual way work as artisanal fishers", as well as "the extractive fishing activity that is realized by juridical persons only if these are composed of particular individuals registered as artisanal fishers" (Art. 2:29).

After 1994, when Chile reached its maximum historical number of landings (extractive and aquaculture) with 8 million tonnes, occupying the fourth place in the world, landings began to decline. In 1995 Chile landed around 7 million

TABLE 4.1 World fishing landings (extractive fishing and aquaculture) 1999–2003 (tonnes).

Place	Country	1999	2000	2001	2002	2003
1	China	47,499,759	49,635,826	51,005,810	53,426,645	55,687,878
2	Peru	8,439,122	10,666,450	7,995,998	8,780,782	6,111,342
3	Japan	6,625,691	6,400,758	6,148,084	5,878,500	6,036,834
4	Indonesia	4,952,185	5,157,834	5,385,862	5,537,639	5,960,930
5	India	5,686,964	5,668,632	5,936,931	5,932,542	5,913,334
6	USA	5,309,964	5,216,045	5,461,055	5,482,095	5,533,020
7	**Chile**	**5,585,877**	**4,972,376**	**4,663,027**	**5,132,798**	**4,563,441**
8	Filipinas	2,924,305	3,000,339	3,172,377	3,372,093	3,620,756
9	Thailand	3,646,079	3,735,550	3,547,992	3,463,912	3,590,452
10	Russia	4,238,532	4,104,502	3,746,673	3,389,221	3,429,141
	Other	43,071,766	43,833,622	45,445,623	45,475,501	45,850,912
	Total	**137,980,244**	**142,391,934**	**142,509,432**	**145,871,728**	**146,298,040**

Source: Subpesca (2004). Permission from Bolbarán, D., Subpesca.

tonnes, occupying a third place globally, behind China and Peru. In 1998 landings dropped quite significantly to 3.8 million tonnes. As can be seen in Table 4.1, in 1999 landings increased again to reach 5.5 million tonnes and thereafter oscillates at around 4.5 to 5.5 million tonnes, occupying a seventh place in the world between 1999 and 2003. In 2004, the national landing went up to 6.0 million tonnes decreasing in 2005 to 4.9 million tonnes (Subpesca, 2005a).

In terms of export value, Chile occupies a rather privileged position with US$2.5 million in 2004 (see Table 4.2), which represents 3.4 percent of the world total value (Subpesca, 2005a). In spite of decreasing landings, export value has not decreased, reaching US$3 million in 2005 (Subpesca, 2005a), corresponding to a historical maximum in the sector. Its value has maintained its increasing trend from 1998, with the exception of 2001. Thus, while the volume of fish export declined in the period between 1994 and 2004, the value during the same period increased. The average export price per tonne has more than doubled.

According to Subpesca (2005a, p. 2), from 2004 to 2005, export volume increased by 21

TABLE 4.2 Total value, volume and average price export US$/t of Chilean export, fish sector and its representation with respect to the Total Value (Thousand millions US$) and Export Volume (tonnes).

Year	Total national export US$ (1)	Volume (tonnes in million)	Average price export US$/t	Value export fishing sector US$	% export value fishing sector of National Total
1993	9,198	1,232	951	1,172	12.7
1994	11,604	1,602	853	1,366	11.8
1995	16,136	1,792	994	1,782	11.0
1996	16,627	1,520	1,165	1,772	10.7
1997	17,870	1,351	1,385	1,873	10.5
1998	16,323	932	1,796	1,674	10.3
1999	17,162	1,071	1,664	1,784	10.4
2000	19,210	1,052	1,781	1,875	9.8
2001	18,272	1,141	1,630	1,861	10.2
2002	18,180	1,212	1,616	1,959	10.8
2003	21,524	1,293	1,737	2,246	10.4
2004	32,025	1,312	1,965	2,579	8.1
Average 1993–2004					**10.5%**

Source: Subpesca (2004). Permission from Bolbarán, D., Subpesca.
(1) It differs from the series of previous years in that it includes the re-expeditions from the Port Free Zona Franca, acquires goods in harbour by transport means of non-residents and reparations and export of services (Subpesca, 2004).

percent from 1.3 million to around 1.6 millions tonnes. Although between 1995 and 2005, the fishing export value increased by 70 percent, its part of the total national export value did not change radically because during the same period the total export value increased by 250 percent, induced principally by the high copper prices in the world market.

In the context of the national Gross Domestic Product (GDP) (see Table 4.3), the fish and aquiculture sector has increased slightly in its importance from 2.4 percent in 1994 to almost 3.2 percent in 2004 (Subpesca, 2004), and then it fell to 2.9 percent in 2005 (Subpesca, 2005a).

As can be seen in Table 4.4, of the total national landing figures divided by type of resources, fish represent 86 percent of the total in 2004 with 5.1 million tonnes, followed by seaweed and shellfish, respectively. During this period, seaweed, shellfish and the category "Other species" (see Table 4.4) have increased constantly, while fish and crustacean figures fluctuate. Most of fish landings are destined to become fishmeal, which in 1998 made up the fourth major export product of Chile (Galleguillos and Moraga, 1999).

Industrial landing figures are constantly higher than the artisanal figures. In 2004, of a total of 6 million tonnes making up the national landing figures, 71.9 percent (4.3 million tonnes) were attributed to industrial landings and 28.1 percent (1.6 million tonnes) to artisanal landings (see Table 4.5).

Artisanal fish landings encompass a wide variety in types of resources. This can be explained by the fact that "artisan fishers are the sole harvesters of benthic resources and dredging and trawling are banned in inshore waters" (Moreno et al., 2007).

TABLE 4.3 Gross Domestic Product (GDP), national, fish and aquaculture sector (in million *pesos* from 1996).

Year	GDP fish and aquaculture sector	National GDP	% of National GDP
1994	599,280	24,628,535	2.43
1995	744,048	26,005,439	2.86
1996	764,083	31,237,289	2.45
1997	734,339	33,300,693	2.21
1998	699,370	34,376,598	2.03
1999	761,681	34,115,042	2.23
2000	850,736	35,646,492	2.39
2001	983,324	36,850,288	2.67
2002	1,189,672	37,655,139	3.16
2003	1,086,993	39,060,131	2.78
2004	1,318,848	41,427,296	3.18

Source: Subpesca (2004). Permission from Bolbarán, D., Subpesca.

TABLE 4.4 National (industrial and artisanal) landing figures by group of resources (tonnes), years 1990–2004.

Year	Seaweed	Fish	Shellfish	Crustacean	Other spp*	Total
1990	228,861	5,043,170	105,718	26,713	19,785	5,424,247
1991	159,586	5,829,724	122,094	28,676	26,006	6,166,086
1992	126,566	6,303,609	134,609	30,213	33,368	6,628,365
1993	155,757	5,863,550	109,836	26,200	35,503	6,190,846
1994	182,542	7,660,140	104,817	30,826	42,718	8,021,043
1995	299,221	7,411,357	90,607	30,971	58,086	7,890,242
1996	322,027	6,725,734	96,106	32,615	56,197	7,232,679
1997	281,606	5,904,582	93,269	37,327	48,751	6,365,535
1998	265,881	3,362,315	109,225	39,407	47,403	3,824,231
1999	261,481	5,117,917	110,402	38,870	58,468	5,587,138
2000	280,847	4,486,158	110,050	37,311	57,897	4,972,263
2001	299,791	4,150,966	138,368	26,109	48,199	4,663,433
2002	315,668	4,620,502	111,270	23,812	61,489	5,132,741
2003	349,008	3,970,747	145,466	19,096	44,000	4,528,317
2004**	410,850	5,176,071	355,691	20,486	50,545	6,013,643

Source: Subpesca (2004). Permission from Bolbarán, D., Subpesca.

*erizo (*Loxechinus albus*, White sea urchin), *piure* (*Pyura chilensis*, Chilean pyurid, red sea squiert) and *pepino de mar* (*Athyonidium chilensis*, Chilean sea cucumber).

**Preliminary estimation: Sernapesca 2005a. Permission from Lillo, D., Sernapesca.

TABLE 4.5 Artisanal landing by group of resources (tonnes) and years (1990–2004).

Year	Seaweed	Fish	Shellfish	Crustacean	Other spp*	Total	% National Landing
1990	190,844	284,251	101,866	9,273	19,785	606,019	11.2
1991	101,907	275,278	112,968	9,115	26,006	525,274	8.5
1992	78,759	295,048	124,763	7,717	33,368	539,655	8.1
1993	107,109	450,798	99,475	8,494	35,305	701,181	11.3
1994	116,755	621,427	88,652	9,361	42,718	878,913	11.0
1995	250,038	418,973	74,634	9,402	58,086	811,133	10.3
1996	216,815	610,314	77,456	8,742	56,197	969,524	13.4
1997	178,839	458,103	69,171	9,083	48,751	763,947	12.0
1998	197,495	290,835	75,833	11,060	47,403	622,626	16.3
1999	230,203	668,867	66,694	13,647	58,466	1,037,877	18.6
2000	247,376	595,675	61,093	18,560	57,896	980,600	19.7
2001	234,253	636,566	76,514	19,258	48,199	1,014,790	21.8
2002	244,020	825,012	47,294	17,532	61,489	1,195,347	23.3
2003	309,065	800,150	65,387	13,262	43,998	1,231,862	27.2
2004**	390,557	995,345	240,855	14,829	50,544	1,692,130	28.1
Average 1990–2004							**16.1**

Source: Subpesca (2004). Permission from Bolbarán, D., Subpesca.
**erizo* (*Loxechinus albus,* White sea urchin), *piure* (*Pyura chilensis,* Chilean pyurid, red sea squiert) and *pepino de mar* (*Athyonidium chilensis,* Chilean sea cucumber).
**Preliminary estimation: Sernapesca 2005a. Permission from Lillo, D., Sernapesca.

Fish is the only resource category where industrial fishing landings surpass those of artisanal fishing. The industrial fishing catch was 19.2 percent (995 thousand tonnes of 5.1 million tonnes; see Table 4.4 and Table 4.5) of the total landing in 2004. Proportionally, artisanal fishing made up 95 percent of the seaweed, 67.7 percent of the shellfish and 72.4 percent of the crustaceans of the total landings in 2004. Artisanally fished species make up the entire category of "Other species". The Sea urchin is counted within this category constituting one of the species of highest export value, reaching US$62 million in 2005 (Subpesca, 2005a).

Table 4.5 shows that for artisanal fishing fish landings is predominant at 58.82 percent, followed by seaweed at 23.08 percent, and shellfish at 14.2 percent. The artisanal fishing sector has steadily increased its percentage of the national landings, from 11 percent in 1994 to 28 percent in 2004, with an average of 16.1 percent for the period 1990–2004. In 2005, it was estimated that this percentage decreased to 24.5 percent of the national landings after several years of increase. Furthermore, it was estimated that the major increase as a proportion of the national landing figures is represented by a growth in aquaculture from 11.6 percent in 2004 to 14.5 percent in 2005.

Table 4.6 shows the distribution of artisanal landings, by resource and regions, indicating that the south of Chile has the largest proportion of landings with 59 percent of the total, represented by Region VIII of Bío-Bío with 41.5 percent and by Region X of Los Lagos with 17.5 percent. Region IV of Coquimbo occupies the third place of the total of artisanal landing with 9.3 percent.

EMPLOYMENT IN INDUSTRIAL AND ARTISANAL FISHING SECTORS

In spite of the big difference in landing volume between industrial and artisanal fishing, the number of fishers working in each of the sectors does not vary considerably. In 2005 the combined industrial and artisanal fishing sector directly employed around 126,000 people, which represented 2 percent of the employed labour force nationally. While industrial fishing employed 55 percent (68,703) (see Table 4.7) of the total occupied labour force within fishing, artisanal fishing employed 45 percent, with around 57,000 persons (see Table 4.8). Gender

TABLE 4.6 Artisanal landing by group of resource and regions, 2004 (tonnes).

Region	Seaweed	Fish	Shellfish	Crustacean	Other spp*	Total
I	68	151,859	1,816	51	1,856	155,650
II	63,699	48,893	11,046	13	4,617	128,268
III	69,564	71,294	5,088	215	940	147,101
IV	83,594	37,637	34,758	1,404	241	157,634
V	15,718	17,505	6,605	492	12	40,332
VI	2,262	925	4	7	3	3,201
VII	10	6,437	132	13	20	6,612
VIII	20,598	540,876	140,983	242	252	702,951
IX	0	553	0	0	0	553
X	129,580	111,101	36,089	5,111	14,004	295,885
XI	2,788	5,286	891	588	6,085	15,638
XII	2,696	2,979	3,443	6,693	22,514	38,325
Total	**390,577**	**995,345**	**240,855**	**14,829**	**50,544**	**1,692,150**

Source: Sernapesca (2005a). Permission from Lillo, D., Sernapesca.
**erizo (Loxechinus albus,* White sea urchin), *piure* (*Pyura chilensis,* Chilean pyurid, red sea squiert) and *pepino de mar* (*Athyonidium chilensis,* Chilean sea cucumber).

distribution between the two sectors differed considerably. While women represented 39 percent of the employed labour in the industrial sector, they only represented 7.5 percent of the labour force in artisanal fishing in 2005 (see Tables 4.7 and 4.9). Nonetheless, Subpesca lacks statistics for women in many regions and therefore the figures regarding gender distribution are approximations (i.e., 42,033 and 26,669 respectively) (Bolbarán, D., Subpesca, Pers. Comm. via email 2007-08-23). In the Gender Distribution column, the totals below in brackets correspond to the sum of the given numbers for the regions where some data exists. Furthermore, the column Total in the industrial fishing employment has been highlighted in italics because the regional total given by Subpesca did not coincide with the regional data.

According to the Fishing Subsecretary (Subpesca, 2005a), the number of people employed in industrial fishing increased from 64,447 in 2004 to 68,703 in 2005, which amounts to an

TABLE 4.7 Industrial fishing employment 2004.

					Gender Distribution		
Regions	Factories	Boats	Aquaculture	*Total*	Men	Women	Total
I	2,116	1.511	111	*3,738*	2,457	1,048	3,505
II	500	295	–	*546*	437	109	546
III	624	157	1,502	*2,251*			0
IV	1,811	126	2,074	*3,935*			0
V	916	104	589	*1,619*			0
VI		–	–	–			0
VII	18	–	–	*18*			0
VIII	7,891	982	5,680	*14,771*	9,319	5,452	14,771
IX	3	–	97	*100*			0,00
X	20,494	202	13,875	*34,471*	17,043	17,428	34,471
XI	2,212	179	754	*3,241*			0
XII	2,762	336	40	*3,177*			0
RM	741	–	–	*741*			0
Total	**40,088**	**3,892**	**24, 722**	***68,703***	**42,033** ***[29,256]***	**26,669** ***[26,669]***	**68,702**

Source: Subpesca (2005a); Bolbarán, D., Subpesca. Permission from Bolbarán, D., Subpesca.

TABLE 4.8 Number of fishers inscribed in the artisanal fishing register1993–2005.

Year	Fishers
1993	31,327
1994	36,759
1995	38,977
1996	40,574
1997	42,717
1998	45,764
1999	48,642
2000	50,873
2001	37,777
2002	49,185
2003	52,320
2004	53,410
2005	57,013

Source: courtesy of Villagra, C., Sernapesca. Permission from Lillo, D., Sernapesca.

additional 4,226 people or a 6.6 percent increase. Whilst men represented 61 percent women represented 39 percent, maintaining the same proportion in both 2004 and 2005. Most workers were employed in factories (60 percent), then fish farms (27.7 percent), and finally those who worked on boats (6.3 percent). These are regarded as approximate figures.

The largest regional employment concentration was in Region X of Los Lagos, which contained 7.1 percent of all labour, with an equal gender distribution (49.4 percent men and 50.6 percent women). The high labour concentration in this region was due to the presence of salmon farming which alone employed about 5,000 people, representing 16.5 percent of the total of the regional fishing labour force at the time.

THE ARTISANAL FISHERS

The 1991 Fishing Law distinguishes between artisanal ship-owners, artisanal fishers and shellfish divers/shore sea-weed collectors. A person can belong to more than one category only if the activity is exercised in the same region. An artisanal fisher is "the person that acts as a patron or crew in an artisanal boat independent of the payment form" (LPA, 1991, Art. 2:29). And "an artisanal ship-owner is that artisanal fisher in whose name are registered up to two artisanal boats whose tonnage together does not exceed the 50 tonnes." (LPA, 1991, Art. 2:29). "A shellfish diver is a person who undertakes extractive activity of mollusks, crustaceous, echinoderms and shellfish in general with or without utilizing an artisanal boat" (LPA, 1991, Art. 2:29). The shore seaweed collector is that "artisanal fisher that recollects and cuts seaweed with or without the use of an artisanal boat" (LPA, 1991, Art. 2:29). The

TABLE 4.9 Artisanal fishers, by category, region and gender 2005.

	Shore seaweed Collector		Boat owner		Shellfish Divers		Fisher		Total		
Region	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Total
I	266	57	534	20	520	1	1,500	21	2,146	77	2,223
II	598	115	533	20	729	2	1,309	10	2,483	127	2,610
III	629	121	405	9	521	2	1,352	26	2,187	140	2,327
IV	683	200	980	15	1,258	5	2,423	29	3,980	226	4,206
V	184	63	852	12	566	3	3,452	37	3,871	101	3,972
VI	371	130	59	2	115	2	239	7	689	136	825
VII	132	58	313	6	138	–	1,229	19	1,398	77	1,475
VIII	605	454	2,109	125	2,051	2	9,032	399	10,825	831	11,656
IX	60	41	156	1	42	1	436	34	530	77	607
X	1,111	1,010	4,461	96	5,529	26	11,402	936	16,080	1,931	18,011
XI	–	2	925	45	807	7	2,260	254	2,528	260	2,788
XII	16	14	819	69	872	–	3,444	105	3,929	122	4,051
Sub-Total	4,655	2,265	12,146	420	13,148	51	38,078	1,877	50,646	4,105	
Total	**6,920**		**12,566**		**13,199**		**39,955**		**54,751**		**54,751**

Source: Sernapesca (2005a). Permission from Lillo, D., Sernapesca.

measurements of an artisanal boat are maximum 18 meters lopsidedness and up to 50 tonnes.

The number of artisanal fishers has increased constantly since the export boom of the *Loco* and other species. Sernapesca does not have systematized data about the number of fishers prior to 1993 (Villagra, C., Sernapesca, Pers. Comm. via email 2007-04-25). However, according to Arrizaga et al. (1989, p. 295) in 1975 there were 17,182 fishers, which increased to 47,800 in 1987, an increase of 178 percent.

As can be seen in Table 4.8, from 1993 to 2005, artisanal fishers increased with 82 percent from 31,327 to 57,013, which amounts to an average of 4.8 percent yearly. The number of fishers for 1987 (47,800), given by Arrizaga et al. (1989, p. 295), is incongruent with the 31,327 for 1993 in Table 4.8, given the scale of the deficit discrepancy. The 1993 systematized register of Sernapesca should be cognizant that 1993 was the year when the territorial use rights in fisheries (TURFs) were introduced in Chile for the management of benthic resources, enabled under the new Fishing Law of 1991 (more about that in Chapter Five). Furthermore, and as can be seen from the examined period (1993–2005), 2001 marks a quite abrupt decrease in number with reference to 2000. From 2002 all the categories steadily increases again. According to Sernapesca, the fall registered in the 2001 figures is not real, but rather a reflection that from the beginning the registers were regional, but in 2001 the registration was standardized nationally and it took some time to complete the national register (Villagra, C., Sernapesca, Pers. Comm. via email 2007-05-02). Also Tables 4.8 and 4.9 differ in the total number of fishers, although both consider the same year as a source.

According to Sernapesca's statistics (2005a), those who have increased most from 1993 to 2005 are the fishers (77.4 percent). In second place we find shore seaweed collectors at 61.1 percent. The third group are boat owners at 33.4 percent. The group that showed the slowest growth rate were the divers, who increased to 23.6 percent. However, from 1975 and up to 2005, the increase in the number of fishers is significant at 231.8 percent. According to CONAPACH (2001), the real number of fishers is around 60,000. The official figure is an underestimate, given that many fishers do not formally register with Sernapesca.

Table 4.9 breaks up artisanal fishers in 2005 by vocational category and has a regional distribution and gender breakdown, although this is incongruent with the artisanal fisher numbers presented in Table 4.8 for the same year. Of a total of 54,751 fishers, 72.3 percent (39,955) were fishers, 24 percent (13,199) shellfish divers, 23 percent (12,566) boat owners, and 12.6 percent (6,920) shore seaweed collectors.

In contrast to the gender distribution in industrial fishing, (see disaggregated data in Table 4.9) women represented 7.5 percent (4,105) of the artisanal workforce. The workforce was primarily made up of shore seaweed collectors who comprised 55.2 percent (2,265), with fishers representing only 4.9 percent (1,877). Among boats owners, women represented only 3.5 percent. The category where women had least representation was diving, with 0.4 percent.

Similarly to industrial fishing labour, artisanal fishers are unevenly distributed along the coastline, with the majority located in the south (see Table 4.9). The largest number of artisanal fishers were in Region X of Los Lagos with 32.9 percent (18,011) next largest was Region VIII del Bío-Bío with 19.8 percent (10,825 fishers). Region IV of Coquimbo comprised 7.7 percent (4,206) of the total. Of these, 5.3 percent (226) were women with the vast majority (200) being shore seaweed collectors. Lastly, Region V of Valparaíso had 7.3 percent (3,972) of the total number of fishers. Of this number, 2.5 percent (101) were women made up mostly of shore seaweed collectors, 62.4 percent (63).

Table 4.10 shows the regional distribution of registered fishers designated by gender in the national artisanal register in 2004. This table shows that the major representation of registered women fishers is in the southern regions.

THE BOATS

While small scale boats in 2004 numbered over 14.000 units, authorized industrial boats constituted a total of 326 boats, of which only 217 were in operation using the TAC (Total Allowable

TABLE 4.10 Fishers - enrolement in the Artisanal Register 2004.

Region	Women	% of women	Men	Total
I	74	3.37	2,124	2,198
II	124	4.73	2,495	2,619
III	129	5.63	2,162	2,291
IV	224	5.32	3,989	4,213
V	92	2.32	3,875	3,967
VI	136	16.41	693	829
VII	77	5.24	1,393	1,470
VIII	564	5.07	10,569	11,133
IX	73	12.50	511	584
X	1,860	10.46	15,930	17,790
XI	249	8.81	2,577	2,826
XII	112	2.83	3,843	3,955
Total	**3,714**	**6.89**	**50,161**	**53,875**

Source: Subpesca (2004). Permission from Bolbarán, D., Subpesca.

Catch Limit) per ship owner (Subpesca, 2004). This is a reduction of 33.4 percent compared to the capacity in 2001. The main reason for this reduction can be attributed to the 1991 Fishing Law and the TAC per boat owner from 2001 onwards with the aim to reduce over-fishing (Subpesca, 2004).

Table 4.11 shows the distribution of the number of artisanal fishing boats by regions, type of boat and disaggregated by gender.[1] The majority of artisanal boats, 63.4 percent (13,776), belong to the type "motor boat". The 2005 statistics, which include disaggregated data by gender, shows that participation of women in the general boat ownership category of artisanal fishers was 3.3 percent (455).[2]

[1] The Supreme Decree nr 388, 1995, (Sernapesca 2005a:7) defines Boat as a vessel without complete cover, with or without motor of propulsion. *Little launch*: vessel with complete cover and propulsion motor with a total length up to 12 meters. *Middle launch*: vessel with complete cover and propulsion motor with a total length of more than 12 meters and up to 15 meters. *Big launch*: vessel with complete cover and propulsion motor, with a length of more than 15 meters and up to 18 meters.

[2] Of the total number of boats, most are in Region X of Los Lagos with 45 percent (4,823), Region VIII del Bío-Bío with 18.3 percent (2,521), and Region IV of Coquimbo with 7.9 percent (1,088). In this Region, 1.5 percent (16) of the boats have women as owners. Region V of Valparaíso has 6.7 percent (917) of the total of artisanal boats with 1.2 percent (11) having women as owners.

Fig. 4.1 overleaf shows the geographical distribution of boats according to regions.

THE FISHING COVES

The term *caleta* or cove (small bay) is used in Chile to designate the places where artisanal fishing activities take place and where fishers berth their boats. Although harbour, bay and cove are synonymous, I reserve the Chilean usage of the term cove to refer to the places artisanal fishers use for their operations. The *caletas* are also referred to as hamlets.

Many coves are rural. The living conditions in the rural coves are usually humble since many fishers reside elsewhere. Thus, fishers often live in simple huts, without electricity, running water, and with minimal utensils and implements. Alcohol consumption among some fishers in their free time is high, perhaps due to the absence of family, the lack of recreational options and their general isolation. Women and children usually join their fisher relatives during the summer months when the children are on vacation. Historically, the fishing produce was picked and transported directly from the coves. Transporters acted as intermediaries between the fishers and companies. The introduction of MAs have in many instances changed the conditions described above. The fishing organizations now sell directly to the firms. Since fishers have been organized through MAs, there is not only major internal control and rules, but also the bonds among union members have become tighter (more about this in the empirical chapters). This stricter working environment may have also reduced alcohol consumption.

Furthermore, the availability of cellular phones has radically reduced the fishers' isolation, improving communication with families and the world beyond. According to my own observations in El Quisco it is not unusual for a family to have three cellular phones.

The official list of permanent coves was established in 1998,[3] and modified in 2004.[4] The

[3] Supreme decree (Marina) nr. 240, in Sernapesca (2005a:5–6).

[4] Supreme decree (Marina) nr. 337, in Sernapesca (2005a:5–6).

TABLE 4.11 Artisanal fishing boats May 2005.

	Paddle/mailing Boat		Motor Boat		Little launch		Middle launch		Big launch	
Region	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
I	71	4	396	19	42	0	42	0	33	2
II	66	4	469	16	46	0	19	1	6	0
III	29	0	349	7	21	0	29	1	14	3
IV	115	2	898	13	12	0	26	0	21	1
V	38	0	802	8	28	0	38	1	31	2
VI	21	1	48	1	0	0	0	0	0	0
VII	29	1	292	6	0	0	8	0	18	0
VIII	516	31	1,311	47	159	10	104	3	294	46
IX	74	1	50	0	38	0	9	0	0	0
X	121	6	2,540	51	1,757	25	223	9	81	10
XI	48	5	902	38	66	2	23	2	7	0
XII	38	3	459	17	336	38	84	14	24	4
Sub total	1,166	58	8,16	223	2,505	75	605	31	529	68
Total	**1,224**		**8,739**		**2,580**		**636**		**597**	
Great Total	**13,776**									

Source: Sernapesca (2005a). Permission from Lillo, D., Sernapesca.

sectors of temporary use for anchoring or of sporadic fishing activities were now called anchoress. Table 4.12 shows that along the Chilean coasts there is a total of 559 coves, of which 81 percent are permanent and 19 percent are designated for temporary use. Of the total of 453 permanent coves, 76 percent are located in rural environs and 24 percent are considered urban. Of the non-permanent coves 98 percent (103) are in rural settings and 2 percent (2) are located in urban areas. Of the total of 558 coves, the majority at 80 percent are rural coves.

THE ARTISANAL FISHING ORGANIZATIONS

After the instauration of the dictatorship in Chile in 1973, most cooperatives and labour organizations were dissolved. Fishing organizations had been organized nationally since 1965 through FENAPACH (Federación Nacional de Pescadores Artesanales de Chile) (CONAPACH, 2001). FENAPACH held nine national congresses before it ceased to operate nationally after the 1973 coup d'état. After this, until 1985, activities were minor and localized. However,

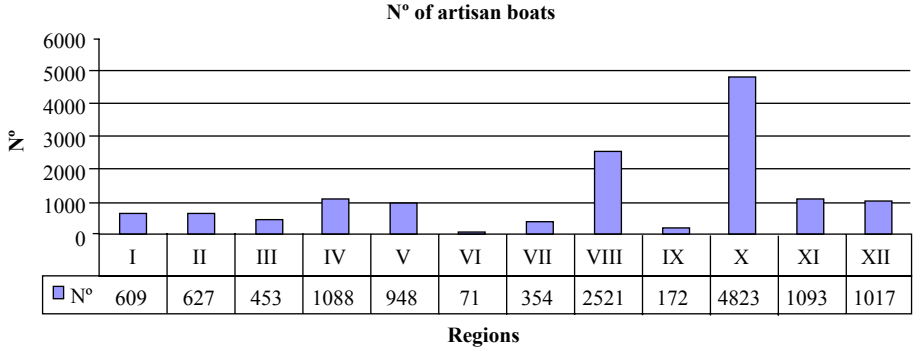


FIGURE 4.1 Artisanal boats 2005.
Source: Sernapesca (2005a). Permission from Lillo, D., Sernapesca.

TABLE 4.12 Artisanal fishing coves 2005.

	Permanent coves			Anchoress			
Regions	Total	Rural	Urban	Total	Rural	Urban	Total Nº of coves
I	12	9	3	3	3	0	15
II	18	12	6	8	8	0	26
III	22	19	3	17	17	0	39
IV	31	22	9	3	3	0	34
V	33	8	25	2	2	0	35
VI	5	1	4	1	1	0	6
VII	13	8	5	4	3	1	17
VIII	75	54	21	7	6	1	82
IX	9	6	3	3	3	0	12
X	206	182	24	14	14	0	220
XI	19	15	4	37	37	0	56
XII	11	7	4	6	6	0	17
Total	**454**	**343**	**111**	**105**	**103**	**2**	**559**

Source: Sernapesca (2005a). Permission from Lillo, D., Sernapesca.

in 1985, still under Pinochet rule, new efforts to reorganize nationally were started. In 1985 a national commission for the support of the artisanal fishers gathered fishing professionals and scientists, which in 1986 led to the 10th national congress where the National Council of Artisanal Fishers was born. In 1990, in the post Pinochet era of democratic reform, the council became CONAPACH. In 2006, this federation affiliated 346 fishing organizations (Olivares, CONAPACH, Pers. Comm. via email 2006-11-03), or 50 percent of the total of artisanal fishing organizations that existed in 2005. The rest of the organizations are affiliated under CONFEPACH, which is the other national confederation of artisanal fishers (Table 4.13).

The relationship between the two national confederations has been tense lately because CONAPACH was allocated all five artisanal fishers representative places on the National Fishing Council (CONAPACH, 2007b).

As seen with CONAPACH (2007a), not all the fishers are registered with Sernapesca. Furthermore, of those registered, not all are organized in a collective. Considering the number of registered fishers in 2005 in Table 4.8 and CONAPACHs data regarding the number of artisanal fishers, estimated to around 60,000, the number of unregistered fishers at the time would be around 3,000. Furthermore, the number of organized fishers in 2005 was 42,091 (see Table 4.14), which amounts to 77 percent of the total of 54.751 registered fishers in the 2005 Sernapesca Artisanal Fishers Register (see Table 4.9). This means, then, that around 23 percent of the registered fishers did not belong to any organization (more about this in Chapter Five). This figure will be larger if we consider data from Table 4.8 or CONAPACH's calculations regarding that the total number of artisanal fishers are *ca* 60,000.

As can be seen in Table 4.14 there were 687 artisanal fishing organizations in 2005 of which 35 were regional federations containing regional fishing organizations. Therefore the total number of individual fishing organizations was 652. Of these, 77.4 percent were unions, 18.3 percent were guild associations and 4.4 percent were cooperatives. The majority of the fishing organizations in the country correspond to unions in all of the regions, with the exception of Region IV of Coquimbo, where guild associations predominate.[5]

[5] The biggest number of organizations is in Region X of Los Lagos, with 301 organizations followed by Region VIII del Bío-Bío, with 78 organizations. Region IV has the third largest number of the total of organizations (8.2 percent or 54 of 652). It also has the second largest number of organized fishers (7,498), representing 17.8 percent of all the organized fishers in the country (42,091).

TABLE 4.13 Fisher organizations*

Level	Organization**	Functions/missions
National	CONAPACH (1986) (Confederación Nacional de Pescadores Artesanales de Chile; Chilean National Confederation of Artisanal Fishers)	To defend the rights of its members and improve the life quality of the fishing communities in Chile. It represents coastal communities both during the process of legislative discussions or in front of the institutions that regulate the sector's activities. It also supports the strengthening of artisanal fishing and performs a constant professional, intellectual and cultural improvement CONAPACH affiliates 346 fishing organizations.
	CONFEPACH (Confederación Nacional de Federaciones de Pescadores Artesanales, National Confederation of Artisanal Fishing Federations)	No information obtained.
Regional	35 Regional Federations	To represent and coordinate the communal and regional interests of its member organizations. For ex. FEPEMACH (Federación de Pescadores Artesanales y Buzos Mariscadores de la Provincia del Choapa, Region IV). In spite of its geographical name (Choapa province), it considers coves from the whole region. It embraces 21 fishers and divers organizations and has *ca* 1600 members.
Province/ Communal/ Local	505 unions, 28 cooperatives, 119 guilt associations	To represent the interest of its members.

*Built with various contacts: Cerda, G., Sernapesca; Lira, S., Subsecretaria de Marina; Elissetche, J., Sernapesca; Bolbarán, D., Subpesca.
**It does not include the organization of the industrial sector, such as Sonapesca (Sociedad Nacional de Pesca), Asipes (Asociación de Industriales Pesqueros del Bio-Bio), SalmonChile (Asociación de la Industria del Salmón).

TABLE 4.14 Types of organizations of artisanal fishers 2005.

Region	Unions	Guiltassociations	Cooperatives	Regional federations	Total N° Organizations	Total N° organized fishers
I	22	2	2	1	27	2,748
II	28	1	0	2	31	1,691
III	19	3	0	2	24	1,615
IV	18	29	4	3	54	7,498
V	37	7	3	2	49	4,275
VI	16	0	0	2	18	794
VII	21	3	0	1	25	995
VIII	53	19	4	2	78	6,913
IX	7	2	0	1	10	924
X	240	38	12	11	301	11,405
XI	32	13	0	7	52	1,932
XII	12	2	3	1	18	1,301
Total	**505**	**119**	**28**	**35**	**687**	**42,091**

Source: Sernapesca (2005a). Permission from Lillo, D., Sernapesca.

Unions, guild associations and cooperatives are the different ways to organize as a non-profit collective and all of them have their own legal regulation. In order to establish a MA, fishers are required to be organized as a collective and the fisher organizations can opt for any of the aforementioned legal forms in order to represent the interest of their members. For example, according to the Decree Law 2.757, Art. 1 of 1979 (Ministerio de Economía, Chile), guild associations are

> those organizations legally constituted in accordance to this law, that gather natural or juridical persons or both, with the aim to promote a rationalization, development and protection of the activities that are common to them, in accordance to their profession, occupation or production branch or service and of those connected to the said common activities.

Guild association rules demand at least 25 members. Unions are defined according to the Labour Code, (art. 216, c). "Independent workers union is the one that gather workers that are not depending on any employer".

To organize under any of these collective forms is cheap or without cost and the process is done at the Labour Inspection of the Labour Direction (Ministery of Labour and Social Prevision). If fishers, instead, choose to organize as a firm of limited liability (Ltda.), as profit organization, it is more costly, since legal advice and support is required. However, to be a non-profit organization is problematic for fishing organizations. Non-profit organizations can develop activities that generate profit with the restrictive condition that the profits of these activities be invested back into the formally and legally articulated objectives and statutes of the organization. Simply put, this means that non-profit organizations cannot divide any profit earned among the members. The solution to this problem is to divide the profit as benefits to the members through committees within the organizations which, for example, form mutual funds to pay hospitalizations, help widows, distribute food baskets, purchase Christmas presents, and celebrate special days.

5 *Loco* Fishery and the Management Areas

INTRODUCTION

This chapter presents a history of *Concholepas* fishery and the implementation in the 1990s of TURF as a response to resource depletion. This is done in chronological order and accompanied by several tables that give a yearly tally of *Loco* landings in relation to exploitation regimes. Also the prelude to the advent of TURF is described, then the transition to its incorporation into the 1991 Fishing Law (LPA), and finally its formal evolution into co-management in practice. Then the legal framework that enables the establishment of MAs is discussed. The chapter finishes with an overview of the expansion of MAs in Chile and a presentation of export statistics and prices from 1987 onwards, disaggregated into different exploitation regimes.

First, some key biological aspects of the *Loco* fishery are introduced, followed by a description of the people involved in artisanal fishing, which is the activity that has the most severe impact on *Loco* populations (perhaps except for the more indirect anthropogenic effects influencing El Niño/La Niña cycles and related global climate change).

BIOLOGICAL ASPECTS OF THE *LOCO*

Although *Locos* are also called False abalone, the shellfish *Concholepas concholepas* belongs to the *Muricidae* family and their biology is different from the Halotidae abalone (Dauphin et al., 2003). Both abalones and *Locos* are mollusca (*phylum*) and gastropeda (*class*). However, while *Locos* are carnivorous and not cultivated commercially in captivity (Geaghan and Castilla, 1988), abalones are herbivorous and possible to cultivate.[1]

The maturation of *Locos* is slow and, thus far, it has not reproduced in captivity. There seems to be a lack of enough knowledge of the larvae (Castilla, 1988). *Locos* change from herbivorous to carnivorous through their life cycle and this poses a problem for breeding (Paillaman, A., Sernapesca, Pers. Comm. via email 2007-03-29). IFOP is conducting experimental research in this area and progress have been made, but many problems remain, such as the substitution of *Locos*' natural diet for an artificial one (FONDEF, 2007).

Locos are restricted to the influences of the Humboldt and Sub-Antarctic sea currents (Instituto del Mar del Perú, 2004; Moreno et al., 2007). *Loco* is described in the following way:

> Medium sized, oval in profile, flattened, spire very short, aperture enormous and open. Sculpture of axial lamellae and spiral cords. Columella excavated. Outer lip dentate with a blunt tooth. Operculum elongate with lateral nucleus, much too small to close aperture.
>
> *Concholepas* represents an extreme in the trend to limpet-like features seen in other muricid genera, such as *Purpura*. Only a single species is known (Bioscience, 2007).

The bathymetric (underwater depth) range inhabited *by Locos* extends from the inter-tidal zone to depths of 30–40 meters (Dubois et al., 1980). The inter-tidal zone or littoral zone is the area between tide marks which are uncovered at low tide and submerged at high tide. The sub-tidal area is seaward of the intertidal zone.

The spawning or massive reproduction of *Locos* in Chile varies according to latitude. In central Chile the spawning (called *maicillos* or *flor de Loco*) period occurs in the sub-tidal areas

[1] Abalones are cultured in Japan, China, Taiwan, USA, Mexico, South Africa, Australia and Chile, among others. In 1998, Asia (principally China and Taiwan), cultivated 75 percent of the world production of cultured abalone. In 2001 Chile produced 73,000 tonnes of cultivated Red Abalon (*Haliotius rufescens*) (Subpesca, 2005c). There are more than 130 species of abalone, all belonging to the genus *Haliotis* and around 25 species are commercially exploited (Ponce et al., 2003).

during summer and the beginning of autumn (January – May in the Southern Hemisphere) (Oliva and Castilla, 1990, p. 280). This step is followed by capsule deposition and development (from February to July). The capsules are attached to the rocky substrate in the inter-tidal and sub-tidal areas (Geaghan and Castilla, 1988, p. 59–61). After their metamorphosis, the larvae stay in plankton for between two and four months before settling in the rocky inter-tidal zone between August and November. The settlement of juveniles in the inter-tidal zone makes them vulnerable to human and non-human predators.[2] As they mature *Locos* move from the inter-tidal to sub-tidal areas after a year (Castilla, 1988, p. 62). After more than three years (Tobella, 1975, p. 188) *Locos* in the sub-tidal area can measure up to 16 cm (Castilla, 1983, p. 40).

Humans are part of the *Loco* eco-system as predators (Moreno et al., 1987). The effects of human impacts are not limited to artisanal fishing in the sub-tidal area. Free divers (*resuello*), as well as shore shellfish gatherers (*mariscadores de orillas*) collect juveniles in the inter-tidal zone (Oliva and Castilla, 1990, p. 273). More generally, recreational activities in the rocky inter-tidal area have a negative impact on the fauna and flora, especially during the summer months. As Addessi (1994) points out (for California), diverse human activities such as tide pooling, food collection, research, educational field trips, seaside strolling, photography and fishing affect biota, involving for example, tramping, turning over of the rocks and intensive collection of certain species, reduce populations and disturb benthic communities.

In Chile, humans are the principal predators of *Locos* (Castilla and Durán, 1985). The presence of *Locos* is critical in coastal benthic eco-system, constituting it a keystone species (Castilla, 1995, p. 158). As human harvest stops, the population increases considerably, which can led to the decrease of a competitive mussel (*Perumytilus purpuratus*).

> Locos readily consume the competitive dominant mussel in the mid-intertidal zone and in doing so they change the entire ecological scene by permitting the use of primary space by other species of sessile invertebrates and algae (Castilla and Durán, 1985, p. 398).

Or in other words, "the removal of the herbivores diminished the grazing pressure on intertidal algae which flourished in their absence" (Addessi, 1994, p. 787).

Moreno et al. (1987, p. 55) reported the same from the Mehuín Research Reserve where the increase in *Loco* size also diminished the quantity of the mussel. So where mussels are abundant it is because humankind is extracting their natural predators. It has been estimated that human harvest reduces *Loco* density in the inter-tidal area from 4.3 to 1.5 per square meter (Geaghan and Castilla, 1988, p. 62).

Not only are species inter-related but ecological zones also interact and overlap. Moreno et al. (1987) are critical towards the concept of MAs in that they consider it to be too narrowly focussed and describe it as a mono-species fishing administrative measure for benthic resources. The present legislation seems to overlook the ecological interdependence of species, as well as the interactions between the inter-tidal and sub-tidal rocky communities. *Loco* production in MAs is also largely affected by oceanographic processes on a scale that is not controllable in the limited sized MAs (Stotz, 1997, p. 67).

A sustainable harvest of *Locos* should probably be in accordance with the spatial and temporal variability of abundance and reproduction of *Locos*, their prey and their predators. Moreover, in order to reach an increment and/or conservation of production, exploitation should be restricted only to MAs (Stotz, 1997, p. 67), which is the situation today, but illegal extraction outside and inside the MAs seems to continue. I shall return to this issue.

[2] Among the other *Loco* predators we find: birds such as, *gaviota* or *Larus dominicanus Lichtenstein*, the *pilpilen* or *Haematopus ater Vieillot and Oudart*; fish such as, *Sicyases sanguineus Müller and Troschel* (*pejesapo*) and *Pimclotopon maculates* (*pejeperro*); *asteroids* such as, the sea star *Heliaster helianthus* (Lamarck) (Castilla, 1983, p. 40); crustaceans such as, *Homalasis plana* (*jaiva mora*), *cancer coronatus* (*jaiba reina*), *Rhynchocineters typus Milde Edwards* (*camarón*), and mammals such as, *chungungo* or *chinchimén* (*Lontra felina*), and *Otaria flavences* (Castilla and Cancino, 1979), seals or *lobo marino* (IFOP, 2000).

MODUS OPERANDI OF THE *LOCO* HARVEST

Traditionally the *Loco* harvest, at least in Central and Northern Chile, was performed from open wooden boats of 5–20 meters length (eslora), with an exterior motor (15–50 HP). The fishing lasted one day, depending on weather conditions, in the sub-tidal areas seldom exceeding the 5-mile offshore limit (Payne and Castilla, 1994, p. 10). There were three crew members: the patron or boatman, an auxiliary and the diver. The auxiliary, called a "telegrapher", takes care of the air compressor, the life rope and the hoses. The air compressor has one air exit for the diver. He lifts and sinks the bag, helped by the patron. The diver harvests *Locos* using a rubber suit. Diving is between 2 to 6 hours each trip, and although the result varies, between 200 and 400 *Locos* are taken in one day (Castilla, 1983). The diver pulls out *Locos* one by one with a kind of short pike (*chope*), and gathers between 40 and 100 *Locos* in his waist bag. When the bag is full, he gives a signal to the "telegrapher" by drawing the rope. The "telegrapher" lifts the bag and sends a replacement to the diver (Castilla, 1983).

The only artisan fishing activity that requires some type of formalized training is diving. Formally, every diver must pass a course containing theoretical and practical components. The course is run by the Maritime Government and includes learning the essential techniques of decompression (Vildósola and Rosson, 1997).

HISTORY OF THE *LOCO* FISHERY

In evolutionary history, *Concholepas concholepas* existed in Australia, New Zealand, North America and Europe in the Miocene epoch, but only in South America after the Pliocene and the Pleistocene epochs (Stuardo, 1979).

The harvesting of *Locos* for food among coastal inhabitants in Northern Chile and South of Peru can be traced back 6,000 years. Colonial chronicles describe *Loco* as the name given to the species by Mapuche folk. The Chilean colonial scientist Molina gives the mollusc its first scientific name, *Murex Loco* in 1782. Later the name *Concholepas* was assigned by Brugiere (1789) (Reyes, 1986). In 1801 Lamarck added the name *Concholepas* to Bruguiere's *Concholepas*, which combined became the *Loco*'s scientific name, *Concholepas concholepas*.

The modern known history of the *Loco* fishery is short, not more than six decades. The earliest record that Sernapesca has of *Locos* landings is from the 1950s (Donoso, E. Sernapesca, Pers. Comm. via email 2007-04-19). These data were inherited from SAG, the precursor of Sernapesca (prior to 1978). Information on landings prior to the 1960s in the literature is rare. However, we know that in 1926, 67 tonnes of *Locos* were landed (Reyes, 1986). Furthermore, during the 1940s *Loco* landings were between 1,000 and 2,000 tonnes per year (Reyes, 1986).

The scientific literature on *Locos* does not begin before the late 1970s (Castilla, 1988). In 1977, 40 specialists held a symposium about *Loco* biology (Reyes, 1986). Export records are in the hands of the National Toll Service, but it is IFOP that keeps statistics. IFOP (created in 1964) started with export data for *Loco* in 1987 (Ortego M., I., IFOP, Pers. Comm. via email, 2006-09-13).

Fig. 5.1, shows the dramatic landing increase and decrease associated with the export of the species since mid 1970s. The Chilean situation is parallel to that of Peru (see Fig. 5.2) where the *Concholepas concholepas* (locally called Chanque or Tolina) also is one of the major molluscs of economic importance. In Peru, the high demand from international markets during the 1980s increased harvests considerably, leading to a dramatic landing decrease to a mere 128 tonnes in 2004, from 8,000 tonnes in 1990. The Peruvian Government reacted by declaring the species under the regime of recuperation in the south of the country where the species is exploited (Instituto del Mar del Perú, 2007). The minimum size for extraction in Peru is 8 cm. Peruvian fluctuations and Asian market demands bear a striking parallel to the Chilean case.

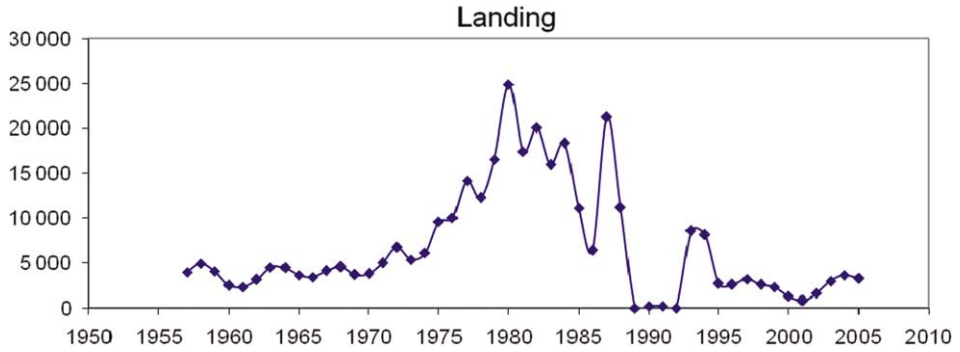


FIGURE 5.1 *Loco* landing in Chile 1950–2005 (tonnes)
Source: Courtesy and permission of Donoso, E., Sernapesca Biólogo Marino, Depto. SIEP.

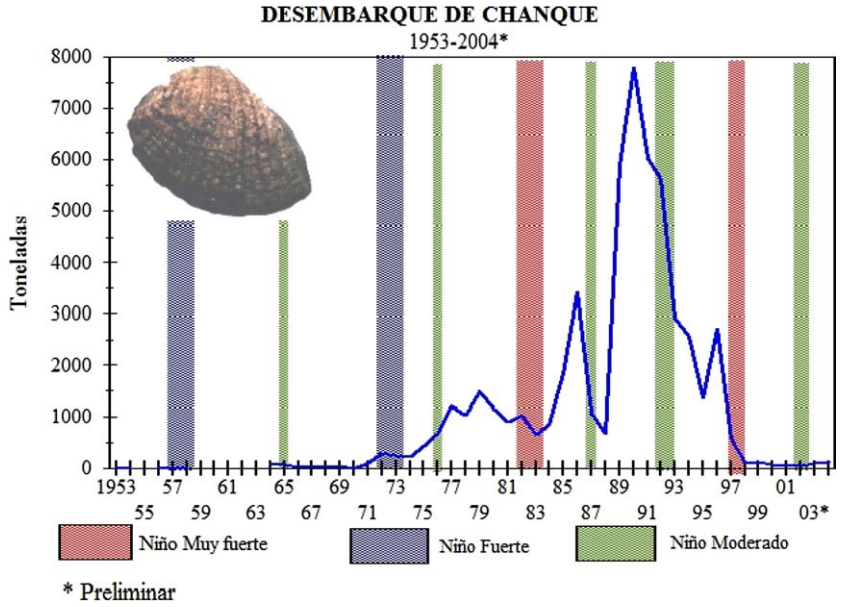


FIGURE 5.2 *Loco* landing in Peru 1953–2004 in relation to the El Niño and La Niña sea currents
Source: Instituto del Mar del Perú (2007).

Peruvian export reached 76 percent of the Chilean export volume in 2005, and 54 percent in 2006 (Montoya, 2007). According to Montoya (2007) the Peruvian exports may include landings from Chile, meaning that there is possibly illegal trafficking. The species are comparably scarce in Peru and live only in the south (Montoya, M., Sernapesca, Pers. Comm. via email 2007-04-02).

Castilla (1995) distinguishes four periods up to 1990 in the history of *Loco* fisheries. Castilla et al. (2007) up to year 2000 divide the same history in two big phases and several periods. I refer below to Castilla's first and second periodization.

FROM DOMESTIC PRODUCTION AND CONSUMPTION TO PRODUCTION FOR EXPORT

First Period (1960–1974): Production for the Domestic Market

Before the *Loco* export boom in the 1970s, the species was exploited for the national market

TABLE 5.1 *Loco* landing years 1970–1980 (tonnes).

Open Access										
Socialist government					Military Junta					
Extraction for domestic market					Extraction for domestic/external market					
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
3,758	4,962	6,712	5,367	6,076	9,590	10,012	14,161	12,252	16,571	24,856

Sernapesca, Desembarque *Loco* 1975–1992, courtesy A. Carrère L., Encargado Reg. Artesanal Dirección Nacional, Sernapesca.

(1960–1974; see Table 5.1) (Castilla, 1995). Extraction was performed under open access regime, without any regulatory control. During this period *Loco* landings per year were about 4,000 tonnes. Consumption was mainly during summer and the prices were low and affordable. Up to the beginning of the 1970s, *Locos* and other benthic species, were relatively easily gathered by summer visitors during low tides (based on personal memories). The number of registered fishers in 1975 was 17,000 (Castilla et al., 2007) jumping to 57,000 fishers in 2005. Of the 2005 total, over 13,000 fishers were registered as divers (Sernapesca, 2005a; see Table 4.9).

Second Period (1975–1980): Production for the International Market

A dramatic change occurred during this period (see Table 5.1) as a result of the implementation of the neo-liberal economic policy that enabled export, mainly to Asian markets. At this time, fishing still occurred under open access. Credits programs were launched which encouraged investment in new boats and processing plants, stimulating the capacity to satisfy the growing demand (Meltzoff et al., 2002; Castilla et al., 2007; Moreno et al., 2007). A favourable exchange rate, introduced in 1974/75, changed the national currency from *escudos* to *pesos* and had the effect of stimulating export. *Loco* landings increased dramatically from around 10,000 tonnes to 25,000 in five years. It was during this period that the historical maximum catch was reached. Even mining workers went into fishing attracted by the high prices of *Locos*.

In 1976 export to Japan was 48 tonnes for a total value of US$62,000. In 1977 export increased to 2,368 tonnes for a total value of US$6 million (Reyes, 1986). During the early 1980s, the Region IV Director of Sernapesca, visiting Japan, learnt that Chilean *Locos* were processed there and then re-exported to Taiwan and Hong Kong for a price per unit of almost 100 times higher than that received in Chile. However, to add value for these markets can become complicated. Abalone, for example, is processed in a special, secret and ceremonial form (Gordon and Cook, 2000, p. 568).

From 25,000 tonnes in 1980, landing figures fell in 1981 to 17,400 tonnes. This fall led authorities to think that *Locos* export was under threat, although overexploitation was never verified (Castilla, 1995). I will return to this issue later. Due to this probable overexploitation, restrictions were introduced. Although it is not clear whether the Chilean fisheries administration were following international trends in fishing management, the measures adopted mirrored an adaptive management, part of the eco-system approach.

Third Period (1981–1992): from Limiting Reproductive Season to Total Closure

During this period (see Table 5.2), three different regulations were sequentially introduced. All of these were aimed at controlling access, but they had little effect. These measures were: (1) Reproductive seasons or seasonal closing (1981–1984); (2) Global quota (1985–1989); and (3) Total closure (1990–1992).

TABLE 5.2 *Loco* landings years 1981–1992 (tonnes).

Controlled Access through diverse regulatory measures											
Military Junta									Democratic centre — left coalition gov.		
Reproductive seasons (seasonal ban/closing)				Global quota (4,000 M.T. per)					Total closure		
1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
17,471	20,097	15,990	18,359	11,103	6,369	21,236	11,180	0	227	218	5

Source: based on Sernapesca (Desembarque *Loco* 1975–1992, courtesy. Carrère, A, Sernapesca.

Reproductive Seasons (1981–1984)

The first extraction closing measure was in place between 1981 and 1984 in the northern part of country and involved several seasonal closings during several months. The first action was to allow the recuperation of the species affected during 1982 and 1983 by an El Niño event, rather than by overexploitation (Reyes, 1986). According to Reyes (1986), however, after 1985 global quota restriction measures were adopted in direct response to concerns over unsustainable fishing practices.

As landings diminished, perhaps partly because of it, the external value of *Locos* continued to increase. A record sale was reached in 1982 when 5,950 net tonnes[3] of *Locos* were exported at a value of US$26 million (Reyes, 1986). Between 1982 and 1984, average total landings per year were 16,000–18,000 tonnes with an export value of US$18–25 million (Castilla, 1995, p. 156). A new drastic landings decrease from 11,000 tonnes in 1985, to 6,000 in 1986 induced authorities to change from a seasonal ban to a global quota as a regulatory measure (Geaghan and Castilla, 1988, p. 58).

Global Quota (1985–1989)

From September 1985, the government introduced a global (meaning for the whole country) quota consisting of 4,000 tonnes per year, initially to 1987 and then it was subsequently prolonged to 1989. The *Loco* fishery was closed nationally with the exception of the southern Regions X, XI and XII because there it was believed to be under-exploited (Geaghan and Castilla, 1988, p. 58). The global quota for the southern Regions of Chiloé (Region X) and Aisén (Region XI) was 4,000 tonnes per year, but the quota was exceeded in 1985 and 1986. In 1986 the quota for five months of fishing was finished in less than 30 days. In 1987 closure was lifted and harvest was officially allowed during 45 days, and during this time 21,000 tonnes of *Loco* were extracted. Also during this year, one million units of illegally caught *Locos* were confiscated by authorities (Reyes, 1990; Meltzoff et al., 2002).[4]

These events were covered by the mass media as the *Loco* "fever" or *Loco* "war" (Meltzoff et al., 2002). Thousands of divers arrived in the south and with them, the money, alcohol and prostitution also flourished (Diario Llanquihue, 2002). That year artisanal fishers reached 47,800 (Arrizaga et al., 1989), compared with 17,000 in 1975. Export value reached US$42 million in 1987, which was a new record high. As detailed in Table 5.5, the US$42 million is the actual export value, equating a net export quantity of around 4,000 tonnes,

[3] One tonne of *Locos* in shell gives *ca* a third in net tonnes.

[4] It is uncertain what state the one million *Locos* units were in and therefore one should be cautious converting it to a weight metric. *Loco* catch are variously measured in different states (in shell, frozen without shell, canned without shell). We know that around four *Locos* in shell make one kilo of *Locos* and one tonne of *Locos* in shell is equivalent to around a third in net tonnes. If we suppose that half a million of the confiscated *Locos* were in shell and half without, then the first half would mean around 125 tonnes *Locos*, and the second around 41.6 net tonnes.

and not 21,000 tonnes which was the quantity harvested that year.

In 1988, the take quota was 5,000 tonnes and for only 15 days, but in less than a week 11,000 tonnes were extracted (Geaghan and Castilla, 1988).[5] The official opening was delayed one and half months and the fishers were not given advanced notice of this delay and in anticipation of the season opening fishers had already illegally stored *Locos* on mesh bags. As a consequence of the delay much of the catch was spoiled. This method of underwater storage is called *apozamiento,* and the law defines it as "the accumulation of hydrological benthic resources in their own life environment, be it that they are confined or free, those who have been removed and moved from their natural habitat." (LPA, 1991, Titulo I: Art. 2, p. 6). Article 49 "forbids the *apozamiento* (. . .) along the whole coast of the country, in periods that corresponds to their ban."

During this "*Loco* war" period, the species was smuggled for export, even canned as strawberries (Meltzoff et al., 2002). Table 5.5 shows that the 1988 export was around 4,000 net tonnes, about the same as the year before, but at a lower price (US$34 million). This net export amount seems to be more congruent with the gross landing for that year (11,000 tonnes) if we also take away the national consumption which, at least before the export period, was around 4,000 tonnes. National consumption reduced from almost 12,000 tonnes in shell in 1980, to 2,000 tonnes in 1988 (Reyes, 1990).

The aim of the global quota policy was to control the exploitation of *Locos*. Clearly, it did not work (Castilla, 1995). Fishers responded by poaching, harvesting in advance of the ban and hiding the illicitly caught *Locos* in underwater storages (Geaghan and Castilla, 1988). The official quotas were filled too quickly and, more often than not, were exceeded. The response to this unacceptable situation was total closure.

[5] Also according to Geaghan and Castilla (1988), the quota was of 5,000 tonnes, but according to Sernapesca, the quota was of 4,000 tonnes (see Table 5.2).

Total Closure (1990–1992)

The third implemented control measure (Castillas et al.'s (2007) fourth period) was total closure. According to Castilla et al. (2007, p. 29), the total closure started in 1989 (see Table 5.2), but according to Meltzoff et al. (2002) total closure was declared in 1988. While Sernapesca registers zero landings for 1989 (see Table 5.2), Table 5.5 shows that 1,206 tonnes were exported. This apparent anomaly can be explained by harvests being saved until the following year.

The attraction of high prices abroad and the possibility of illegal fishing asserted pressure on the closure and it ultimately failed. It is estimated that 5,000–7,000 tonnes were illegally taken during 1990–1992 (Castilla, 1995). Table 5.5 shows that the exported quantities during these three years of closure were congruent with Sernapesca's registered landings.

State tax losses were great. Because of the ban (with only illegal fishing), no stock evaluation was undertaken (Meltzoff et al., 2002; Castilla et al., 2007). According to Stotz (1997), in Region IV for the ban period 1989–1992, estimations from fishers suggest that between 279 and 1,379 tonnes were illegally extracted as a way to compensate for the losses of income that the ban caused on those dependant on the resource.

As detailed in Table 5.2, in spite of the three year ban there were still some landings: 227 tonnes in 1990, 218 tonnes in 1991 and 5 tonnes in 1992. According to Table 5.5, 16.1 tonnes were exported in 1992, although there were only 5 tonnes landed. The majority of the landings for the period 1990–1992 were due to illegal harvest. It has been estimated that around 90 percent of the capture during this time was illegal (Carrere, A., Sernapesca, Pers. Comm. via email 2006-09-12).

PRELUDE TO THE TERRITORIAL USE RIGHTS FOR FISHERIES (TURFS)

Castilla et al. (2007) sums up the *Locos* fishery policy, emphasizing the regulations since the late 1980s, which is the period setting the context for the establishment of Management

Areas (MAs) (see Table 5.3). They distinguish two main time periods: a pre-policy period (effectively an open access regime, although formal regulations existed) and a policy period (TURF or MEABR), with the total ban (closed) period in between. Within each of the two main periods they distinguish three phases (see Table 5.3 below), which roughly coincides with the four phases described above.

The early phase in the policy period began in 1988 with informal MAs regulated by fishers themselves, including an experimental no-take zone. These applications were initiated in central Chile by marine ecologists such as Dr. Castilla and his colleagues together with fisher organizations under the name "Natural Shellfish Restockning or Repopulation via Rotational Exploited Areas" (Castilla et al., 2007, p. 29).

According to Oliva and Castilla (1990, p. 283), "natural repopulation consists in allowing the growth and development of the population in a given system naturally". It is called repopulation by management when the population is managed for its recuperation. The rotation of areas is another form of repopulation by management. Repopulation means for the fisher that he evolves from being a collector into a cultivator (Oliva and Castilla, 1990, p. 273).

These informal MAs were based on university protection experiments. The first of the experimental no-take zones was established in the university area of Las Cruces, between 1982 and 1988. The approach of restrictions and rotation of extraction areas for relatively small fisheries showed positive results. The results from Mehuín, another scientific station in southern Chile, showed similar results. After six years of protection *Locos* showed a population distribution with the maximum range of sizes (Moreno et al., 1987, p. 52).

Two coves near Las Cruces will follow this example. As the official rules for the second regime MEABR were not ready until 1995, the first area established in Quintay (Region V) in 1988 functioned in accordance with the Benthic Extraction Regime; another regulatory measure being trialled for inclusion in the 1991 LPA (see Table 5.4). Also other fisher organizations in Region V like El Quisco in 1991, and in Region IV, like Puerto Oscuro — the case-study sites in this study — decided to protect some *Loco* areas. These two areas also operated under the Benthic Extraction Regime (Sernapesca, 2005b).

Both research and fishers' protected areas showed many advantages in comparison with the regime of open access (Castilla et al., 1993, p. 4). Within the experimental no-take zone of Las Cruces, the population increased tenfold, showing larger sizes in comparison with neighbouring sites (Castilla et al., 2007). Furthermore, in the case of the El Quisco MA, not only were the economic results superior in comparison with open access sites, but the catch per unit effort (number of *Loco* caught per hour diving) was also greater. Diver searching and travelling time was also reduced significantly.

However, Castilla et al. (1993) warned about the generalization of these experiences for use in other places as there may be differences in population genetics along the long Chilean coast, a position shared with Stotz (1997), Meltzoff et al. (2002) and Moreno et al. (2007). In Region IV, six coves, in collaboration with Dr. Stotz from the regional Universidad Católica del Norte, Coquimbo, put aside *Loco* areas for conservation in September 1989 after the

TABLE 5.3 Periodization of *Loco* fishery in Chile*.

I. Pre-policy period Open access				II. Policy period TURF or MEABR		
1960–75	1976–80	1982–88	Total Ban	1993–95	1996–99	2000–
Domestic market phase	Export market phase	Regulation problem phase	1989–1992 1993–2002 2003–2008	Pre-development policy phase	Development policy phase	Maturation phase —

* Based on Castilla et al. (2007) and Sernapesca (2007d).

TABLE 5.4 *Loco* landing years 1993–2005 (tonnes).

Territorial Use Rights Fisheries (TURFs)												
Democratic centre-left coalition government												
Benthic Extraction Regime (Global regional quotas: 5 and 9 days in 1993, and 30 days in 1994)		Management Area and Exploitation of Benthic Resources (Exclusive rights over a *portion* of water to artisan fishing organizations)										
1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
8,574	8,111	2,670	2,541	3,154	2,564	2,294	1,274	828	1,622	2,963	3,601	3,270
Total 1993–2005: 43,466 tonnes												

Build with data from SERNAP 1993–1997; 1995–2005: Anuario Estadístico de Pesca, courtesy of J. Elissetche, Sernapesca

experience from Las Cruces and Mehuín (Stotz, 1997, p. 73). These coves subsequently reinforced the previous experience by showing positive trends in terms of population density and recuperation of shell sizes (Stotz, 1997, p. 70).

In 1993 there were 183 fishing coves participating in the precursor form of the MA system, and the first cove that formally established an MA in 1998 was Los Vilos from Region IV (Godoy, C., Sernapesca, Pers. Comm. via email 2007-06-11 and 2007-06-21); a key region regarding the development of MAs (Meltzoff et al., 2002). These successful experiences in natural resource restocking served as the underpinning basis for the integration of the TURF concept in the 1991 LPA via the AMERB (in Spanish) or MEABR (in English) regulation.

THE INTRODUCTION OF TERRITORIAL USE RIGHTS IN FISHERIES (TURFs) IN CHILE (1991)

While the new Fishing Law was under development, including new regulatory measurements for the use of benthic resources such as *Locos*, the total ban period that had started in 1988 and run up to 1992 was extended, starting from June 1993; MAs excluded. The 1993 ban in its turn has been extended still through December 2008 (Sernapesca, 2007d). It still allows for certain experimentation, though, outside the MAs.

In 1993, a new phase was commenced with the introduction of TURF. This move can be seen as the overlapping of two phases. These were the Benthic Extraction Regime (1993–1997), and the Management Area and Exploitation of Benthic Resources (MEABR or just MAs). The Benthic Extraction Regime and the MEABR are two of the five measures (or prohibitions) contained in Article 48 (letters d and e, respectively) of the fishing law, which otherwise has 172 articles (LPA, 1991).

LPA (1991) Article 48, under Title IV on Artisan Fishing, paragraph 1 deals with "access regime and attributions for the conservation of hydrological resources" as the 5 miles of marine coast and the interior waters reserved for artisan fishing. The others measures or prohibitions in Article 48 (LPA, 1991) are: extractive bans on species in certain areas, creation of marine reserves, and installation of seeds collectors in natural banks of hydrological resources.

When government LPA (1991) declared *Locos* open to exploitation it became possible to apply a Benthic Extraction Regime (Castilla et al., 1993, p. 5) as a means to stop open access (Castilla, 1995). Between 1991 and 1997, fisher organizations could also apply to formally establish MAs via the MEABR regulatory measure (Castilla et al., 2007, p. 30). The LPA (1991) changed the procedure of fisher's registration. Regarding access it establishes:

> The access regime for exploitation of benthic hydrological resources for the artisan fishing is of fishing liberty. However, to exercise fishing extracting activities,

> artisan fishers and their boats must previously inscribe in the artisan register held by the Service (LPA, Art. 49).

A general register has been in place since the first Fishing Law from the 1930s, but the requirement to be registered only in one region was first introduced in the 1991 LPA (Art.51: d). With this change, migration, widely practiced before, came to an end and with that the possibility to fish freely in any fishery. According to Moreno et al. (2007, p. 46) there is in a strict sense no open access fisheries in Chile, given that access is restricted even in non-regulated fisheries. The requirement that artisan fishers have to register regionally is, on one hand, a way to limit entry to fisheries, and on the other, a means of confining fishers to one locality (Meltzoff et al., 2002). In the case of several endangered fisheries such as the sea urchin, fisher organizations in agreement with government have voluntarily closed the fisheries (i.e., the fisher registers) (Moreno, C., Universidad Austral de Chile, Pers. Comm. via email 2007-09-16).

Despite the 5 marine miles reserved for artisan fishers (see Chapter Four), the State reserves, the right to impose bans, marine reserves, and definitions of MAs, (Asociación Chilena de Pesquerías, *s.a*), as already seen in Article 48, Title IV on Artisan Fishing (LPA, 1991). It is Art. 48, letter d, that states that within the 5 marine miles, measures like the MEABR regime can be established, to which artisan fishing organizations can legally opt (LPA, 1991).

The Benthic Extraction Regime (1993–1997)

The first measure, the Benthic Extraction Regime (LPA, Art. 48, letter e), was in effect from 1993 to 1997 (see Table 5.4). It gave a global regional quota that was proportionally divided between divers and which was administered through an allocation of tickets corresponding to a predetermined quota of *Locos* to be harvested upon the lifting of the ban. For example, three experimental openings were allowed in 1993 and 1994 (Castilla, 1995). In 1993, the ban was lifted twice: five and nine days in January and July, respectively, in which over 8,500 tonnes were extracted by around 10,000 divers (Payne and Castilla, 1994, p. 11). In 1994 the ban was lifted during 30 days in August (Castilla et al., 1993) showing similar results in terms of landings.

The control of this system was expensive and complicated since it demanded the control of landing places, processing plants and restaurants. The measure was not watertight. Individual quota tickets were easy to re-use and they started to be transferred illegally, and there was also the possibility of counterfeiting them (Paillaman, A., Sernapesca, Pers. Comm. via email 2006-09-05). This measure did not work as (Sernap, Dic. 2005b) the *Loco* population continued to fall (Paillaman, A., Sernapesca, Pers. Comm. via email 2006-09-08). Although the measure was not meant to be transitory, it proved to be so in practice (Montoya, M., Sernapesca, Pers. Comm. via email 2007-05-02). This regime gave room for MEABR to develop, and although its rules did not achieve formal approval until 1995 (No 355/95),[6] the regime had informally been operating in parallel with the Benthic Extraction Regime since the early 1990s. In order to keep track of landings in relation to exploitation regimes, below I briefly highlight some key data regarding the MA rules and further on in the book I present a section detailing the MA legal framework more extensively.

The MEABRs (1995–)

LPA (1991) Article 48d prescribes the rules of MAs. The rules deals with the conditions of MAs and contain 24 articles in six titles: (I) General dispositions; (II) Establishment of the management areas and exploitation of benthic resources; (III) Juridical subjects targeted; (IV) On the application and procedure; (V) Technical term of references of the management and exploitation projects; (VI) Of the execute institutions and Final Title (Subpesca, 1995, Reglamento MEABR). Sernapesca describes the concept of a MA

> as a limited geographical coastal zone given in use in an exclusive form by the National Fishing Service (Serna-

[6] According to Castilla et al. (2007, p. 30), the decree of the MEABR was approved in 1997, which seems to be a mistake.

> pesca) to an artisan fishing organization, legally constituted, with the purpose to perform controlled exploitation of the benthic resources present in the area through a management plan within the 5 marine miles reserved for artisan fishing or in terrestrial and interior waters (Sernapesca, 2007a).

In 1997 there were already 206 formally established MAs. Of these, 93 were managed by unions or associations in collaboration with university experts. Sernapesca and private consultants supported the remaining MAs (Castilla et al., 2007, p. 31).

From 1995, when the MA regime starts, landings are reduced considerably from 8,000 tonnes in 1994 to less than 3,000 tonnes in 1995, never surpassing the pre-export period quantity of 4,000 tonnes, including year 2006 (see Table 5.4). The landings under the MAs, regime are the result of the total ban outside the MAs, on one hand, and on the other, the natural repopulation of *Locos* supported through MAs. Under this regime harvesting of *Locos* has become the exclusive right of those organized through MEABR regulations, by TURFs in co-management with the state and research organizations, including universities and consultants. However, a consequence of when rights become exclusive is that others become excluded. This perspective is discussed further in Chapter Eight.

The Management Area Legal Framework

The MEABR regulation is one of the five measures or prohibitions contained in Article 48 of the 1991 Fishing Law. This formal measure enables the establishment of MAs in practice. The essential aims of the MEABR measure are first to regulate the extraction regime through suitable access and sustainable exploitation of the resources, and second, to obtain local knowledge about the population dynamics of benthic marine invertebrates in regulated areas (Sernapesca, 2007a).

According to the MEABR regulation (Subpesca, 1995), a MA is defined as "that geographical zone given by the National Fishing Service to an artisan fishing organization, for the execution of a project of management and with the purpose of exploiting benthic resources" (Subpesca, 1995, Reglamento Sobre AMERB, N. 355).[7] The general objective of the management areas are to:

- Contribute to the conservation of benthic resources,
- Contribute to the sustainability of artisan economic activity,
- Maintain or increase biological productivity of benthic resources,
- Increase knowledge of the functioning of benthic eco-system, generating useful information for management, and
- Promote a participative management (Sernapesca. 2005b).

The LPA (1991, Art. 14, Titulo I Disposiciones generales) defines conservation as "present and future, rational, efficacious and efficient use of natural resources and their environment".

To apply for and get approval to establish a MA is a complicated procedure, especially when considering those targeted by the measure. Generally, artisan fishers are humble people with little formal education. Due to the Chilean bureaucratic and political system, every supreme decree connected with the establishment of a MA is required to be signed by the President of the Republic, beside the involvement of the the Ministry of Economy (through Subpesca) and of the Ministry of Defence, (through the Marine Subsecretary).

Subpesca aims to promote the sustainable development of fishing, define policy and apply regulations. The Marine Subsecretary is in charge of administering the national goods of public use and state goods on the littoral coast, and in rivers and lakes. In other words, amongst the regulatory state institutions the fisheries responsibility is divided so that Subpesca has the normative and policy role, IFOP is in charge of investigation and assessments, and

[7] The same rules define the mentioned management plan as a "compendium of norms and group of actions that allow the administration of a fishery based on the actualized bio-fishing, economic and social knowledge that exist about it" (Subpesca, 1995, Reglamento Sobre AMERB, N. 355, Art. 34: Titulo I: Disposiciones generales).

the Sernapesca has a revenue collection role (See Chapter Three for more details concerning the institutional arrangements for the Chilean Fisheries).

The process of establishing a MA consists of two main components: the formalized steps and the other more concerned with coordination at the fisher organization level. Let us first discuss the latter.

Selection and Proposition of a Marine Seabed or Area

The sea sectors or areas available for the development of MAs are established regionally through a supreme decree from the Ministry of Economy. This process is informed by work undertaken by Subpesca and the Marine Subsecretary in consultation with the respective Zone Fishing Councils[8] in charge of implementing participation of fishing stakeholders. When the decree is signed by the President and by Minister of Economy, and after the Republic General Auditory has been notified, it is published by Subpesca in the Official Diary of the Nation. Once the decree has been published, Sernapesca can apply with the Marine Subsecretary to formally establish the MA (see Fig. 5.3).

Application Procedure to Obtain a Management Area

For the applicant fisher organization, the process to establish a MA involves three clear steps: (1) a proposal of Base Situation Study (ESBA); (2) the execution of the same (ESBA) and (3) the formulation of a management and exploitation plan project for the area (PMEA in Spanish) (see Fig. 5.4A and B). When the project is approved by Subpesca — according to the official process described above — Sernapesca write an agreement with the applicant organization, which gives exclusive rights to the organization to manage the benthic resources of the area (Sernapesca, 2007a). The agreement is in effect for four years, renewable by the same procedure. This right cannot be alienated, rented or other rights be constituted to benefit of third parties.

The first benthic resource evaluation and management project in the country was performed by IFOP between 1991 and 1994, thereby establishing the conceptual and methodological basis for the present Base Situation Study (ESBA) format and the management and exploitation plans (PMEA) (Godoy, Sernapesca, Pers. Comm. via email 2007-06-11). This evaluation included 13 fishing coves from the Choapa province in Region IV. The ESBA and the MEABR regulations require that the fishing organizations present the following to Sernapesca:

- Copy of the organization statutes
- Certificate of the juridical personality of the organization that certify the number of members
- List of members
- Proposal of ESBA related to the area under application
- Copy of the contract of technical assistance (Subpesca, 1995, Reglamento MEABRs 1995, Article 9, Title IV).

The list of members must include information such as names, identification card number, and the inscription number in the register of artisan fishers. It must also contain the fisher's classification in the National Register of Artisan fishers. To register as a fisher, a person has to, among other things, provide evidence of a place of residence. A further condition is that a fisher cannot be registered in two regions simultaneously (LPA, 1991, Titulo IV, Art. 51d, Del Registro de Pescadores Artesanales). A fisher can be a member of more than one organization, only if it is not the same type. That is, a fisher cannot, for instance, be a member of two unions, but he can be a member of a union and a cooperative.

In 1997, important aspects of the formal MA arrangements were modified through Act 19.492, which enabled the prolongation of the registeration of MAs, through agreement between Sernapesca and the relevant fisher

[8] These are organized according to five macro zones.

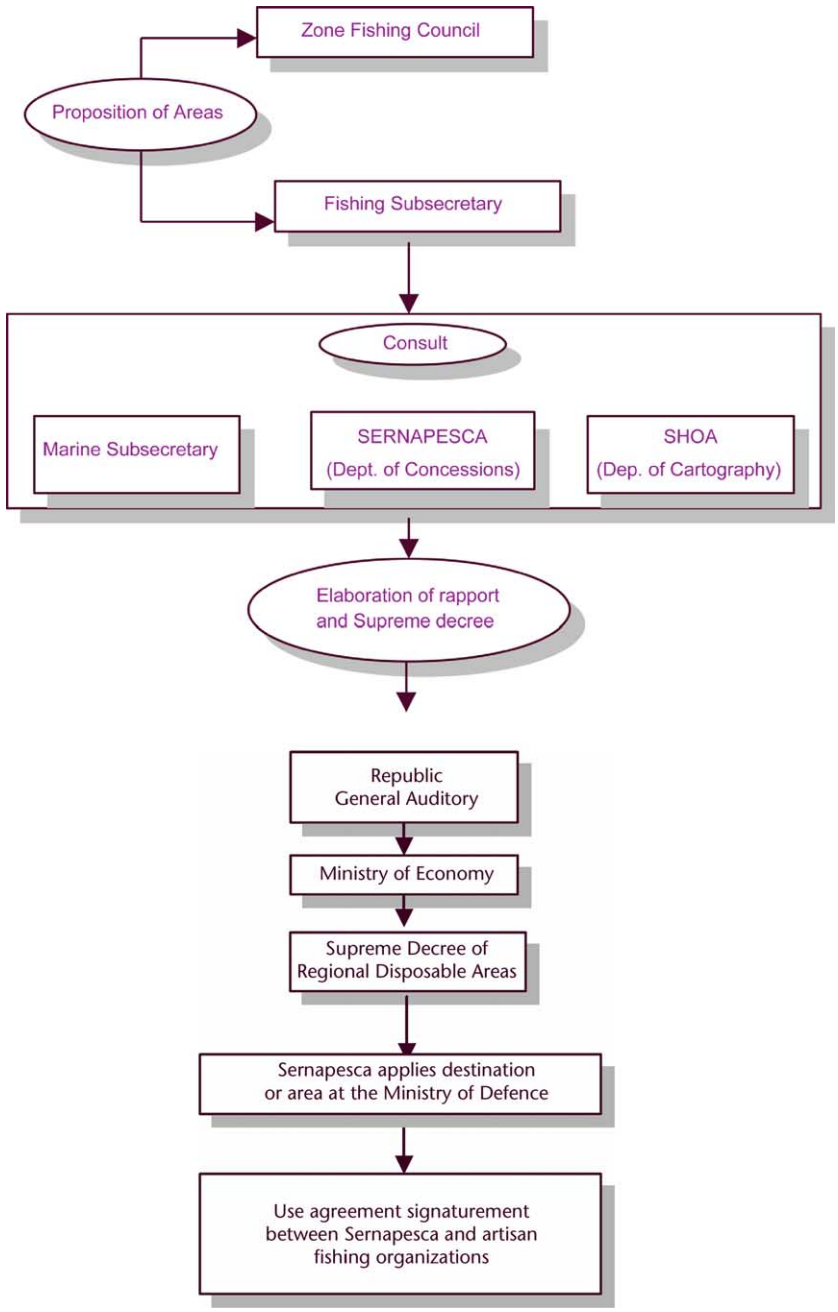


FIGURE 5.3 Procedure Decree of Disposable Areas for the Execution of Management and Exploitation of Benthic Resources Project
Source: Sernapesca (2007a), permission from Lillo, D., Sernapesca.

organization, from two to four years (LPA, 1991, Art. 48, Letter d). It also imposed a tax on MAs to the value of 1 UTM (*Unidad Tributaria* or tax) per hectare or fraction of hectare to be paid after the renewal of the first agreement of use:

> After the fourth such assessment, syndicates [fisher organizations] are required to pay an annual fee to the

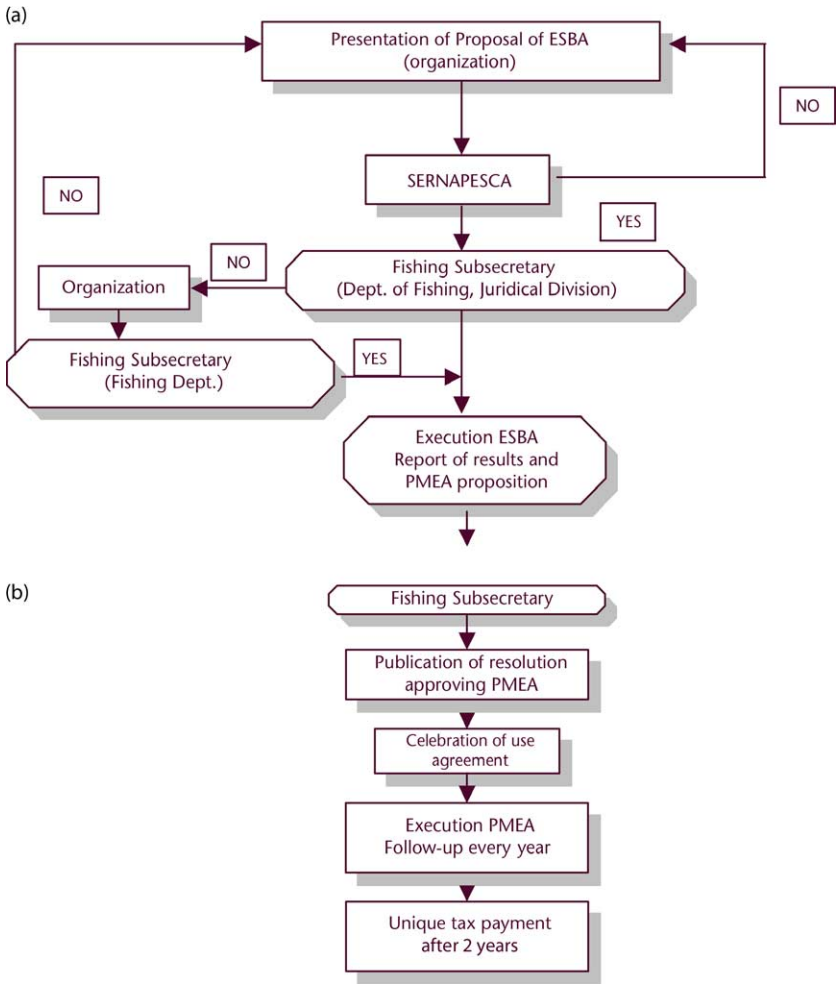


FIGURE 5.4 Procedure application of managementx and exploitation area project
Source: Sernapesca (2007a), permission from Lillo, D., Sernapesca.

> government [owning] the seabed for the right to maintain the management area. This fee is fixed per hectare of seabed, and as such is not related to catch and revenue obtained from the management area (Gelcich et al., 2005, p. 308; my parenthesis).

Understandably, fishers were critical towards this tax imposition (Stotz, 1997, p. 81) particularly because it was a flat tax which took no account of the variability in the productivity of different areas along the coast. As Stotz (1997) notes, this legislative action differs from similar taxes such as those on land which vary according to land quality and aptitudes. However, in November 2004, after pressure being exerted by fishers, the tax of MAs was reduced to 25 UTM per ha or fraction of ha (through the modification of art. 48d, LPA, 1991). At the same time, and less positive for the fishers, the payment of the first tax was now due in the second year after the agreement has been signed between the parties (Sernapesca, 2005b, p. 3).

In this process, the applicant fisher organization is partially responsible for the financing of the required base line study (ESBA) of the claimed area. The study establishes the resource quotas and a management plan and the fishers organizations "are also required to contract external consultants to undertake yearly

follow-up assessment of stocks in the management area, and to determine changes in the total allowable catches'' (Gelcich et al., 2005, p. 308). The fishers of the applicant fisher organization can actively participate in the stock assessments and other key activities with scientists preparing the ESBA. The period of recollection of the species is defined through common agreement between the regional fishing authorities (Sernapesca) and the fishers themselves, and is subject to an annual evaluation.

When Sernapesca receives the ESBA proposition it has 15 days to revise it and if it fulfils the requirements, it is remitted to Subpesca for processing within 45 days. It can within this timeframe make a decision of approval, modification or rejection. In the latter case, the organization has 30 days to reformulate the proposition, which it then presents to Subpesca for its consideration and decision within 30 days. The proposition is approved and the technical report is forwarded to the applicant fisher organization through Sernapesca. After this, the applicant fishing organization has 120 days to deliver to Subpesca, together with the results of the process just described, the proposition containing the management plan and plan for exploitation of the area (PMEA) (see Fig. 5.4A). PMEAs are described in more detail in the next section.

The Management Plan and Exploitation of Area (PMEA)

When the fishing organization delivers the PMEA, Subpesca has 60 days to decide whether to approve or reject the application and is then responsible for publishing its decision in the Official Diary (Sernapesca, 2007a). Thus, the official procedure to get a MA takes almost a year.

According to LPA (1991), the PMEA presented by the fishing organization must contain the following:

- Description of geographical localization and included species
- Bio-fishery background of the species and its exploitation strategy
- Conservation measures and access regime
- Production and market information
- Research requirements for conservation and management purposes (LPA, Art. 9: Titulo II: De los Planes de Manejo)

Fisher organizations are required to present the proposed MA area on a map from SHOA (Servicio Hidrográfico y Oceanográfico de la Armada) or IGM (Instituto Geográfico Militar). Subpesca then defines the geographical coordinates. Although not mandatory, Subpesca usually verifies the coordinates with the assistance of SHOA.

If it is deemed that the MA application requires modifications, the applicant fishing organization is requested to change its application and reinitiate the whole procedure from the beginning. When two or more artisan fishing organizations apply for the same area or when areas overlap, the one that is situated nearest to the proposed MA area will be given precedence. In case there is more than one fishing organization in the same place, and both are interested in establishing a MA, priority is given to the one with most members. If both are equal in numbers, the oldest will be favoured (LPA, 1991, Art. 48, Letter d). These prioritizing criteria regulate, at least in theory, possible conflicts among fishing organizations.

The MA must present annual follow-up reports to Subpesca, revised by supports organizations. The report may be postponed by 90 days. Failure to deliver the annual report is considered a serious breach of MA obligations. The annual follow-up or assessment report should include:

- Principal and secondary purpose of the follow-up (i.e., description of the benthic community of the area with focus on the principal ecological and economic species relevant for the equilibrium of the benthic community, direct quantification of the principal species, characterization, identification and distribution of the strata present at the sea bottom).
- Study methodology

- Information about landings and management realized
- Assessment of principal species and of the benthic community
- Analysis of the general performance of the area
- Management actions planned for the coming year
- Programme of activities and chronogram (Reglamento MAs, Art. 19 bis).

There are several reasons for an organization to loose their MA:

(a) Non approved use
(b) Failure to pay the tax
(c) When members of the organization introduce exotic species, and if the organization fails to exclude them within the five days after the respective judicial veredict has been executed
(d) Extraction during ban periods
(e) To capture species under the minimum size or with forbidden techniques (Asociación Chilena de Pesquerías, *s.a.* p. 14)

EXPANSION AND IMPLEMENTATION OF THE MANAGEMENT AREA: INSTITUTIONAL PROBLEMS AND MULTIPLE INTEREST

By May 2000, 20 percent (or 96) of the registered fishing organizations in the country had applied for 103 MAs. In 2001, Subpesca (2001) had expectations that Chile could be pioneering in this area. However, according to Meltzoff et al. (2002, p. 86), the Government has been slow in the implementation. Between the promulgation of the LPA in 1991 and the active implementation of the MAs, a decade passed during which fishing organizations partly lost faith in the process. It was not until 1999 that government started to push to formalize the establishment of a MA in every cove as a *panacea* to solve the problem of the illegal harvesting of *Locos*. The ban on *Locos* fishing outside of MAs became a major incentive for fishing organizations to obtain a MA, as this was the only way to legally access *Loco* fisheries.

The delay in Government action to implement MAs was due to their hesitation to give sea tenure to the fishing organizations (Meltzoff et al., 2002, p. 93–94). This intransigence can be linked back to problems inherent in co-management applications, where several organizations with varying degrees of power and economic interests are influential. I will return to this issue in the last chapter.

Until 1995, the Government could lay the blame for the delay of MA implementation on the lack of MA regulations. This issue was resolved in 1995, but LPA (1991) still contained articles like 5 and 6, which that tended to protract the MA application process. Articles 5 and 6 dealt with the referred need of the decree that designated the regional areas available for carrying on a MA, but the legal details of this decree were not ready until 1998, making MAs ineffective. It was not until 1998 that a MA decree was delivered to individual fishing organizations, and not until January 1999 that the first MA (Chanavayita in Region I) had succeeded in passing all the formal stages (Meltzoff et al., 2002, p. 94). Since May 2000, the number of MAs has expanded constantly. By 2005 there were 472 operational MAs involving 11,301 divers (Montoya. M., Sernapesca, Pers. Comm. via email 2007-05-02). By June 2006, the total number of decrees passed to the establishment of MAs had increased to 599, distributed to nearly every fishing cove in Chile. Of these 559 MAs, 365 have had their Management Plan approved; the step prior to the formal adoption of a MA (Sernapesca, 2006c). The 599 MAs occupy a total of 101,898 ha (Sernapesca, 2006c).

Some coves might hold more than one MA. The number of MAs does not match the number of artisan fishing organizations either as some organizations have more than one MA. The total number of organizations involved in the 559 MAs in 2006 is around 320, which amounts to an average of 1.87 MA per organization. The 320 organizations linked to the 559 MAs with decrees correspond to around 50 percent of the total of 652 registered artisan fishing organizations. These 320 fishing organizations were made up of approximately 17,000 members, or 41 percent of the total number of organized fishers (i.e., 42.000) in

Chile (see Figure 4.14, Chapter Four). Almost half of the artisanal fishing organizations in the country, and around 40 percent of its members are organized in MAs. So in 2005, 17,000 (amounting to one-third) of registered fishers were participating in TURF regimes out of a potential 55,000 listed fishers in the Artisan Fishermen Register (see Table 4.9).

Since it is tricky to count the total number of organizations and its members, this issue deserves a methodological note. For example, a fishing organization involved in three MAs might have 90 members in one, 46 in the second and 67 in the third. In cases of this kind I took the highest number of members, taking for granted that only part of the total membership of 90 are involved in other MAs. Further, the status of MAs vary (e.g., some MAs listed as left without effect, negated, expired, desisted, quit, etc.), making, it also complex to decide whether to discount its members from the total for a region or not, when their number is still included in the list. In some cases there was no data available regarding the number of members of the MAs. I did not include these cases. In spite of these complications, I thought it worthwhile not only to determine the percentage of organizations involved in the MAs in proportion to the total number of registered organizations but also to identify the actual number of fishers involved in MAs. That is, to roughly indentify the number of the members in MAs and to compare it to the total number of members in the registered organizations, and the number of fishers in the Artisan Fishermen Register. This revealed that 23 percent of fishers registered with Sernapesca do not belong to any organization. The implication of this is that these fishers are unable to obtain a MA given that fishers have to be affiliated with a fisher union, guild association or cooperative to be eligible as an applicant. Thus, according to Meltzoff et al. (2002), these fishers have no say in co-management and tend to disrespect restrictions and therefore probably continue with illegal harvest. This data could help toward finding out about the probable number of illegal *Loco* fishers, considering that these fishers are operating outside of the organizations representing the collective interests of the fishers, and therefore not within the regulatory regimes of MAs.

MAs are geographically unevenly spread. Fig. 5.5 shows the number of functioning MAs (with managing plans in place in the table) in 2005 in the south of Chile (Regions X of Los Lagos and VIII of Bío-Bío) and in Region IV of Coquimbo.

Fig. 5.6 shows that the sea surface area of MAs in Region VIII of Bío-Bío is 26,000 ha (or 26.3 percent of the total), Region X of

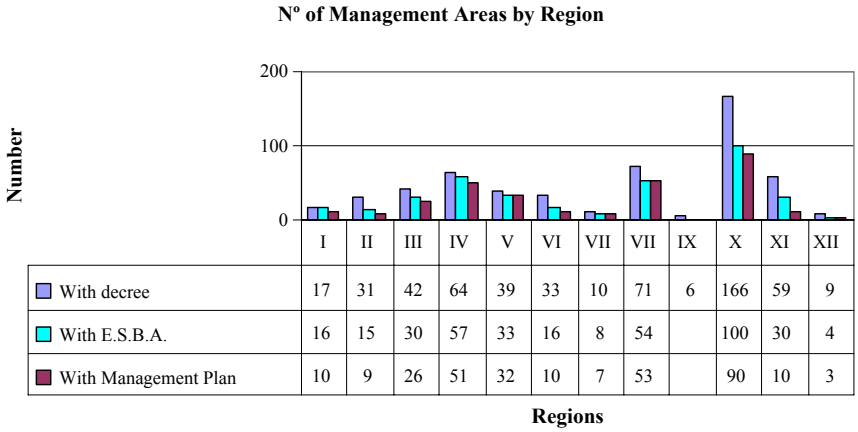


FIGURE 5.5 Number of management areas by regions, 2005
Source: Sernapesca (2005a); permission from Lillo, D., Sernapesca.

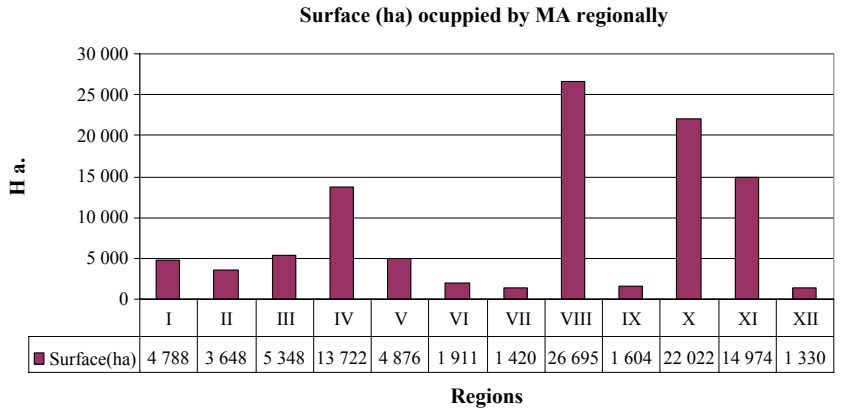


FIGURE 5.6 Surface (ha) occupied by the MAs classified by regions, 2005
Source: Sernapesca (2005a), permission from Lillo, D., Sernapesca.

Los Lagos is 22,000 ha (21.6 percent), and Region XI of Aysén is 15,000 ha (14.8 percent). Region IV of Coquimbo comes in fourth place and is 14,000 ha (13.5 percent), and Region V of Valparaíso is 5,000 ha (4.8 percent).

If we analyse the relationship between sea surface area/number of MAs (Fig. 5.7), we can observe that the highest average sea hectares per MA is in Regions I, VIII, XI and IV. This is partially due to the presence of some large MAs like in Region I of Tarapacá (Arica); Region IV of Coquimbo (Los Choros); Region VIII of Bío-Bío (Weste Isla Mocha, Norte Río Paicaví, Isla Mocha Sector Quechol Sur and Sur Río Paicaví); and Region XI of Aysén. (El Enjambre, Puerto Aysén sector B and Puerto Melinka sector A).

By March 2007 there had been an increase to 664 MAs (with decree) of which 327 had fulfilled the requirements for the entire application procedure, and now being in a position to apply for a management plan. Of these, 60 percent are situated within Regions IV, VIII and X (Godoy, C., Sernapesca, Pers. Comm. via email 2007-06-11 and 2007-06-21). Map 5.1, from the Marine Subsecretary, shows the distribution of MAs by region (called AMERBs) in Chile in 2007. The numbers given in this diagram do not correspond completely with Sernapesca's data.

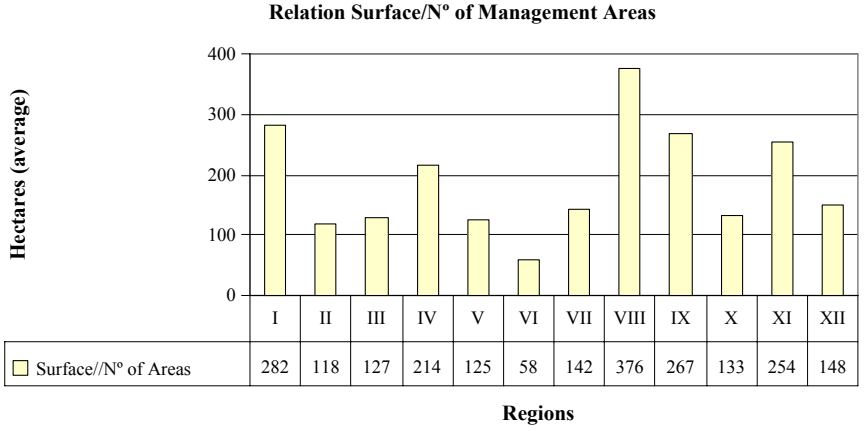
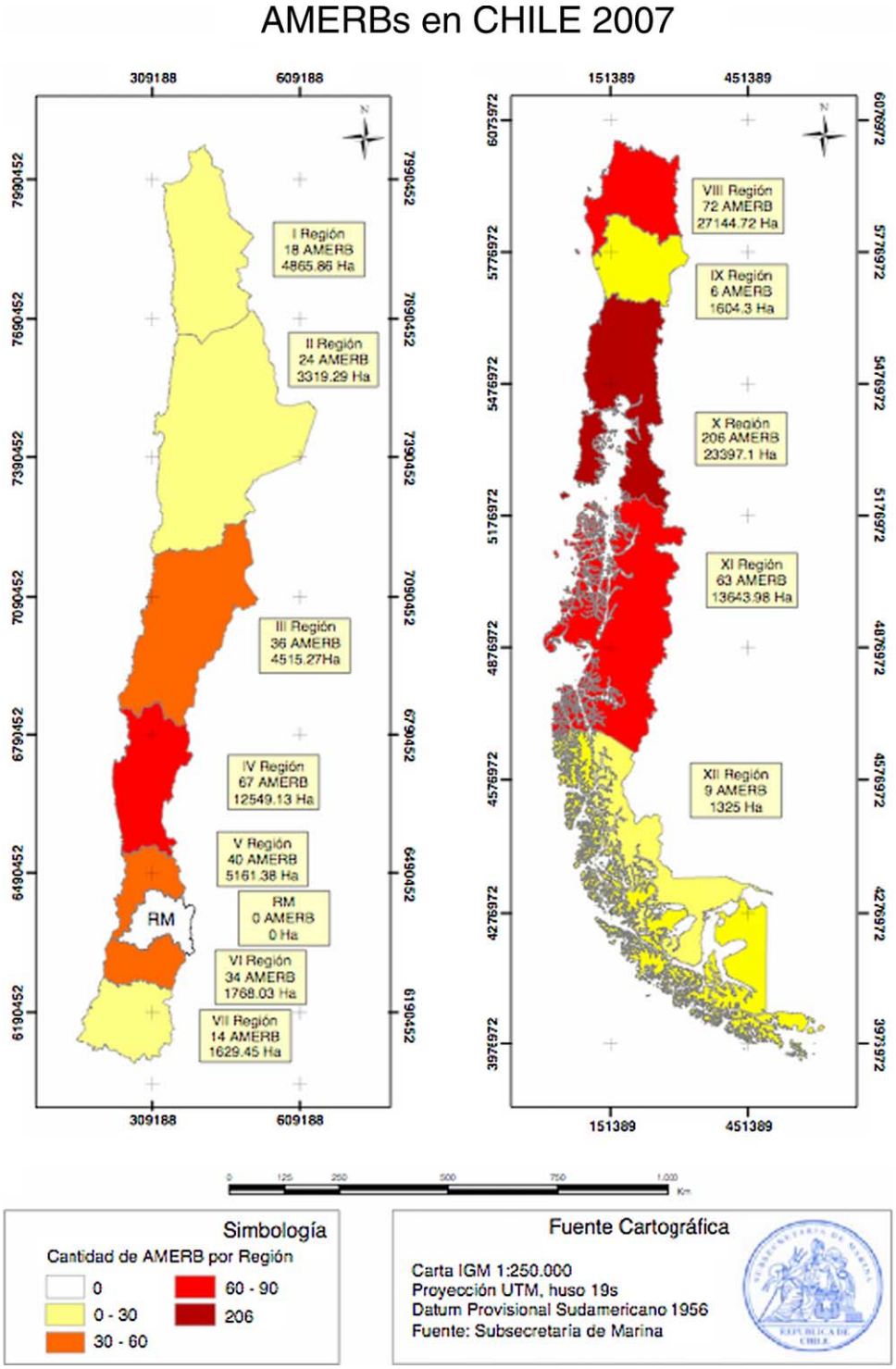


FIGURE 5.7 Relation surface/number of MAs classified by regions, 2005
Source: Sernapesca (2005a), permission from Lillo, D., Sernapesca.



MAP 5.1 Management and Exploitation Area for Benthic Resources (MEABRs). in Chile 2007
Source: Courtesy and permission from Alarcón J. C., Subsecretaría de Marina.

LOCO EXPORT AND REVENUES (1987–2005)

Table 5.5 below shows export statistics from 1987 to 2005, including net tonnes quantity, total value in millions of US$ and price per net/tonnes. I have added the exploitation regimes. The table shows how, after the introduction of MAs, export goes down, especially after 1997 and up to 2003. In spite of that, and although the prices fluctuate constantly after 1993, all the yearly net tonnes prices are above the levels prior to 1993. While the average was 10.136 US$/net tonnes between 1987 and 1992, the average between 1995 and 2005 was of 18.056 US$/net tonnes; i.e., an increase of 78 percent.

According to experts from Sernapesca many variables might have intervene in the 1993 record net price per tonne. This issue deserves a closer view. As already suggested, during 1992 the *Loco* fishery was under an extractive ban; a ban that had started in 1988. The export figures registered in 1992 (16.1 net tonnes) are based on the auction of remnant stocks of refinement plants. Therefore, the quality of the product in 1992 was below the quality of the catch in 1993, when *Loco* extractive activities were legally opened again after five years of ban (1988–1993) and three years (1990–1992) of scarce export. Thus in 1993, 17 million units (around 8,000 tonnes) of fresh, big and high quality *Locos* are put on the market at the same time as there is a great demand and high expectations from Taiwanese and Japanese markets leading to the registered high prices. Another factor that drove up the prices was the collective negotiations of an organized force of fishers. However, the over-supply produced during the same year (part of which was sold the following year), in addition to the extracted volume in 1994 (28 million units, or 8,000 tonnes), generated an over-supply, which led to a subsequent fall in prices and widespread disillusionment amongst fishers (Rivas, D., Sernapescal, Pers. Comm. via email 2007-04-31; Montoya, M., Sernapesca, Pers. Comm. via email 2007-05-02).

The principal destination of *Loco* export continues to be Asia with 85.3 percent of the

TABLE 5.5 Export *Loco* years 1987–2005 (net tonnes) (1993 marks the start of the TURFs).

Exploitation regimes	Years	Quantity Net T.	Price US$/net t.	Value US$
Global quota	1987	3,948.9	10,796.3	42,633,509.1
	1988	4,008.0	8,578.9	34,384,231.2
	1989	1,206.1	8,216.2	9,909,558.8
Total closure	1990	132.6	10,608.4	1,406,673.8
	1991	210.2	11,559.1	2,429,722.8
	1992	16.1	11,060.0	178,066.0
TURFs				
Benthic Extraction Regime	1993	2,392.7	26,603.9	63,655,151.5
	1994	1,622.8	14,037.3	22,779,730.4
Management Areas and Exploitation of Benthic (MEABRs)	1995	1,777.7	13,555.2	24,097,079.0
	1996	837.8	18,401.2	15,416,525.4
	1997	1,015.0	21,401.6	21,722,624.0
	1998	764.7	18,626.7	14,243,837.5
	1999	663.6	22,503.5	14,933,322.6
	2000	386.4	24,044.0	9,290,601.6
	2001	287.8	18,803.1	5,411,532.2
	2002	372.2	20,776.8	7,733,125.0
	2003	845.8	14,787.0	12,506,844.6
	2004	1,124.3	14,145.4	15,903,673.2
	2005	916.7	15,600.3	14,300,795.0
	Total	22,529.4	16,005.5*	332,936,603.8

* Average price US$/ton for 1987–2005.
Source: Based in IFOP 2005, which is based on toll information, courtesy of Ortego, M.I., IFOP.

total (or 832 of a total of 975 tonnes). The six principal countries where *Loco*s were exported in 2006 were in decreasing order: Taiwan (Formosa), Japan, Hong Kong, USA, Canada and China (Montoya, 2007). In USA and Canada, the product is largely consumed by ethnic Asian communities (Ponce et al., 2003).

The *Loco* export for 2006 was 975 tonnes, which represents an increase of 6.4 percent in relation to 2005. The average price per tonne was US$16,200, representing a minor increase of 1.1 percent on 2005 prices (Montoya, Subpesca, 2007).

Post Management Area Illegal Harvesting

A recurrent issue during all the examined phases of the *Loco* fishery's history has been illegal fishing. However, there is no doubt that illegal fishing is continuing in spite of continued expansion of MAs. Indications to this effect come both from fishers and experts. Violations of LPA (1991) and confiscated catch demonstrate that this is the case. Formally recorded infractions, however, may be a gross underestimate of the real extent of illicit fishing. It is difficult to know how large the illegal *Loco* harvest is, how organized it is — for instance, the traffic to Peru and fishers' illegal harvest for local consumption. If illegal trafficking of *Locos* is occurring in Chile, then there are parallels with the *Abalone* situation in South Africa. This links to a broader issue of the impact of international markets on local fisheries production and relatedly threatened marine species. Meltzoff et al. (2002, p. 94) estimate that during the 1990s the illegal *Locos* catch was as high or perhaps double that of the legal catch.

A point made in this chapter is that another clue to the extent of illegal harvest is the proportion of fishers operating outside the MAs. This is estimated at 23 percent, meaning that around 12,260 of the registered fishers at Sernapesca are not organized in any collective, and therefore are not part of the MA system. It should be noted however, that not all of these fishers are divers. Furthermore, it is quite probable that illegal harvests are also undertaken outside of the MAs by some fishers formally involved in MAs.

TABLE 5.6 *Loco* infractions and confiscations year 2000.

Region	Number of infractions	Incaution (tonnes)
I	16	0,439
II	24	0,668
III	23	4,620
IV	30	0,990
V	21	0,235
VI	2	0,030
VII	2	0,009
VIII	8	0,034
IX	0	0,000
X	6	2,710
XI	0	0,000
XII	1	0,140
Total	**133**	**9,875**

Source: Godoy, C., Sernapesca.

TABLE 5.7 *Loco* infractions and confiscations up to May 2006.

Region	Number of infractions	Incaution (tonnes)
I	5	0,003
II	13	0,220
III	35	3,250
IV	24	0,498
V	14	0,250
VI	4	0,018
VII	0	0,000
VIII	7	0,013
IX	0	0,000
X	3	0,072
XI	0	0,000
XII	0	0,000
Total	**105**	**4,324**

Source: Godoy, C., Sernapesca.

There are apparently no systematic studies that approach the illegal harvest of *Locos* after (or before for that matter) the introduction of the MAs in Chile. Sernapesca does have nationally systematized data on the issue. Due to my request, for the purposes of this research, data for 2006 was gathered from the regions, which included data on infractions and confiscated catch only up until May. Sernapesca also provided the same information

for the entire 2000 (Godoy, C., Sernapesca, Pers. Comm. via email 2007-06-11). From this scarce information it is difficult to draw any firm conclusions.

In 2000 (Table 5.6), 133 infractions were reported amounting to around 10 tonnes of illegal *Locos,* which corresponds to 0.8 percent of the total of 1,274 tonnes landed that year (see Table 5.4). Up to May 2006 (see Table 5.7), there were 105 infractions and over 4 tonnes of confiscated *Locos*, which may mean that the total confiscations during 2007 could be similar to that of 2000. If this is the case it could indicate that the number of infractions is relatively constant, but as discussed above this is likely to be a fraction of the real extent of illicit catch.

PART III

SEASCAPES OF CONFLICT, SEASCAPES OF CONFIDENCE: THE CASE STUDIES

6 Puerto Oscuro: The Seascape of Conflict

INTRODUCTION

Before I start with this chapter I need to introduce here a methodological note. The information about the MA Puerto Oscuro is based on semi-structured and open interviews with two key informers. The first is Mariano Castillo, the oldest and most experienced fisher, born 1934, being the only one living in Puerto Oscuro all year round since the 1960s. Due to age, he finished diving in 1983. I interviewed him several times during 2001 and 2003 (January). The second informant is Leonardo Ocares (35 years old in 2001) in his capacity as President of the Puerto Oscuro fisher guild association whom I interviewed early in January 2001 in Puerto Oscuro. I interviewed Mr. Ocares again in Los Vilos in 2007. He was then also President of the regional federation of fishermen (Federación de Pescadores Artesanales y Buzos Mariscadores de la Provincia del Choapa, IV Region (FEPEMACH)).

Part of the rest of the interviews were performed by Field Assistant Javiera Espinoza V., a university geography student who also collected demographic data from Puerto Oscuro and from the lawsuit. She interviewed several informers and municipal, marine and judicial authorities in Los Vilos and Canela during 2005 (see Chapter One for methodological details).

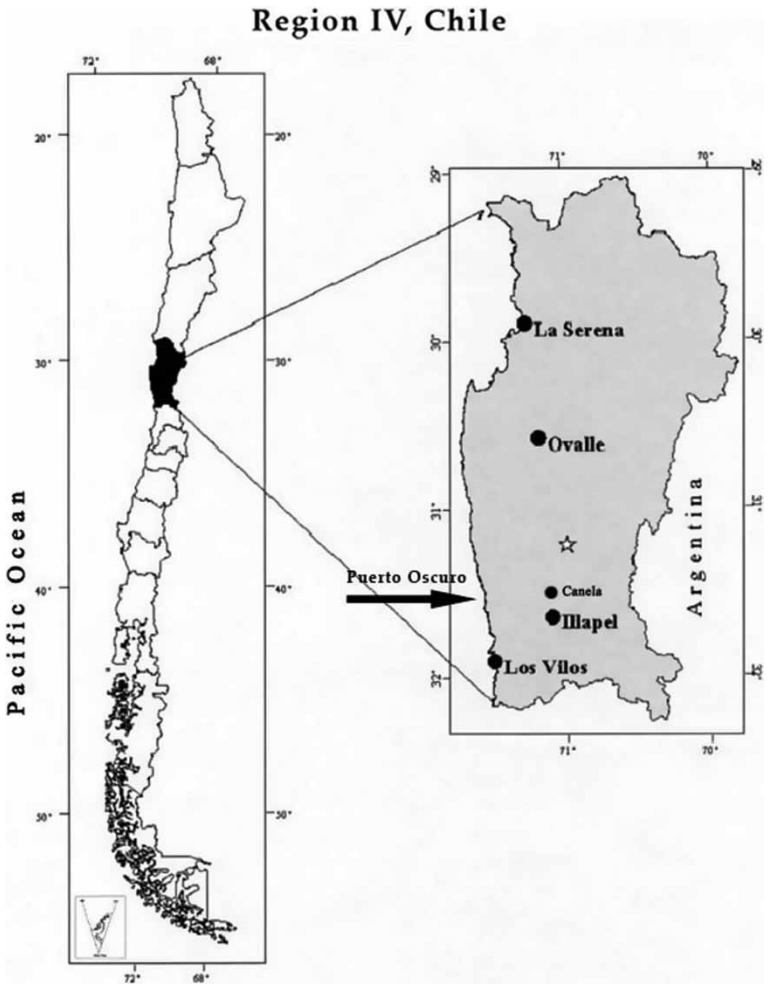
Puerto Oscuro: Multiple Stakeholders, Multiple Claims

Puerto Oscuro — situated in the commune of Canela, Choapa province, Region IV of Coquimbo, around 280 kilometers north of Santiago, the capital of Chile (see Map 6.1) — is a small natural harbour which functioned commercially up to the 1920s. As the ships became larger they could not berth in the harbour which was then closed. From that moment the fishing activities developed. During the 1950s, the cove was used to store oil and material for the construction of the Pan-American Highway. The access road to the cove — originally a mule track — which passes through the private property Puerto Oscuro, dates back to the 1800s and was broadened up during the time of the construction of the Pan America Highway.

The landed property, Puerto Oscuro, which surrounds the cove, probably derives its name from the harbour. The harbour has been defined as strategically important by the responsible authority, the Marine Subsecretary, and is sometimes used for military exercises. The fishing cove where the MA under study is located is also part of Puerto Oscuro. Puerto Oscuro is also a public beach — one of the few in the commune, and to add further to the complication of the cultural landscape, Puerto Oscuro nestles several summer houses whose inhabitants, at least during summer, form a community. Thus, Puerto Oscuro, as a seascape, hosts various seasonal and sedentary stakeholders and resource users; all with their own relationship to the place, and all with their own claims. Thus the wide range of stakeholders include: proprietors, claimants, state authorities,[1] researchers, consultant firms and resource users i.e., the fishers, their organization and families.

Fishers have a direct and dependant relationship to the coastal border and to support their livelihoods need to work in the cove all year round. The summer house owners use the area for recreation and bathing, mostly during summer. This usage also applies to the general public. Although sporadically, the Chilean navy also uses the harbour and therefore has a stake in the area. The owners of the adjacent landed property Puerto Oscuro mostly use the cove for

[1] For example: Sernapesca, Subpesca, Corporación de Fomento (CORFO), Servicio de Cooperación Tecnica (SERCOTEC), Gobiernos Regionales, Fondo de Fomento para la Pesca Artesanal, (FFPA), etc.



MAP 6.1 Region 1V of Coquimbo

recreation, but also as a source of potential business, as well as having summer houses on the high parts of the properties. Of these five key groups with a fairly direct relationship with Puerto Oscuro, let us concentrate on three: the fishers, the summer house owners and the property owners, focussing on their mutual relationships and property rights.

The Puerto Oscuro Landed Property

Due to its origin as a colonial property, the private property holding Puerto Oscuro belongs to those properties whose borders reach to the sea. In the historical tenure documents of the landed property or *fundo*,[2] it is mentioned that the property stretches to the Pacific Ocean and includes a natural harbour. These specifications are also given for the *fundo* El Totoral from which Puerto Oscuro was detached as property through inheritance — dating back to 1679 — and up to 1929[3] when it become the property of the family Echavarría with which[4] there is presently

[2] The concepts *latifundium, hacienda* or *fundo* as specified in Chapter One, denote a large landed estate. *Minifundium* refers to small landed estates.

[3] Illapel's RP, 1929, no. 70, folio 75, Venta fundo de Lorenz a Echavarría, in Gallardo, G., 2002.

[4] Illapel's RP, 1964, no. 73, folio 67, Herencia fundo hijos Echavarría, in Gallardo, G., 2002.

a lawsuit. The details of the lawsuit will be discussed in more detail later in this chapter.

José A. Echavarría T. bought the *fundo* in 1929 and it was then inherited by his five children in 1964 (Gallardo, 2002). The *fundo* was expropriated in 1972 under the Allende government according to the 3rd Article of the Law 16,640 of the Agrarian Reform, which dealt with estates that were considered to be badly run.[5]

In 1974, during the Pinochet government, the five heirs requested the Corporation of Agarian Reform (CORA) to review the expropriation and to exclude a part of the *fundo* from it. CORA approved the petition, and returned approximately 2,700 ha, including 33 HRB (basic irrigated hectare) located along the coast, west of the Pan-American Highway. The borders of Puerto Oscuro today are

> The El Totoral fundo to the north, the Angostura community to the south, the Pan-American Highway to the east, *and the Pacific Ocean to the west*. (emphasis added) (CORA, Consejo de Secretaría, CHC/COW/amb. A/C no. 1,773. Courtesy of J. A. Echavarría E., in Gallardo, 2002).

During the 2000s, the remaining sons of T. Echavarría and their children decided to divide the 2,700 hectares among them. They all live in Santiago and visit the reserve mostly during vacations. Conflict emerged between the heirs that appropriated the part of the property embracing the cove and certain summer house owners. All of the five family branches are involved in the lawsuit (as the lawful property owners). This legal action, which began in 2004, has not yet (2008), been resolved and it has meant that the property has yet to be formally (*de jure*) divided amongst the family branches, although there is *de facto* use of different parts of the property by family members.

The Fishers

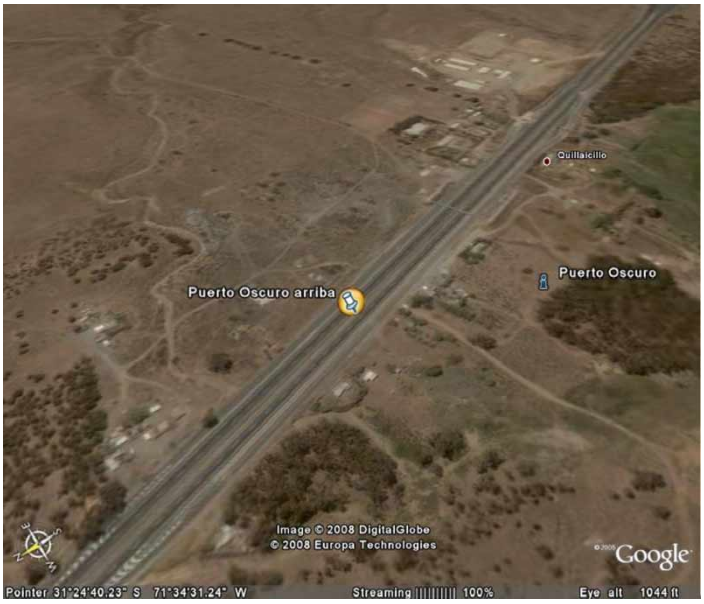
The 15 local fishers, with the exception of one (Castillo), live in the high part of the area mainly along the east side of the main road (Panamerican Highway), in lands that until recently belonged to the Sociedad Britto, Cortés y Co. Ldt. This society, bought by local peasants (*comuneros*), is situated in the part of the *fundo* that was not given back by Pinochet to the Echavarría family (Gallardo, 2002). When a property has not been legally divided between the inheritors it is legally called "succession" in Chile, referring to the owners of the still undivided property. Some fishers have houses in the west side of the road in lands belonging to the Echavarría family reserve (see Picture 6.1).

There are 15 households in total, and in 13 there is one person or more who had fishing as occupation during 2005. Several of these fishers also had other occupations, and others, especially the elderly, received some form of government economic assistance. The 15 households had a total of 64 inhabitants, one with 13 people, including grandchildren and *compadres* (information compiled with the help of school pupils from Puerto Oscuro by H. Soto, local school teacher. Soto was interviewed by J. Espinoza, Field Assistant, Pers. Comm. via email 2005-10-20).

Since the 15 households are located both within the property Sociedad Britto, Cortés y Co. Ldt (the peasant's society) and the Echavarría reserve, in order to provide them with some land tenure security, the Municipality of Canela, after intense negotiations, bought 17.5 ha from Britto, Cortés y Co. Ldt. in September 2003 for 27 million *pesos* (R. Cuevas Municip. Secretary, Phone interviewed by J. Espinoza, Field Assistant, Pers. Comm. with J. Espinoza, via email 2006-09-14) or US$39,000,[6] so the fishers could build subsidized permanent houses (C. Narvaez, Municip. de Canela, Pers. Comm. via email 2006-08-16). In consequence the fishers had to leave the old dwellings. I have no information about whether they get any indemnification for the buildings they have been asked to vacate. According to the plans, the solution accommodates 20 families, but during 2006, 30 families were applying for

[5] The expropriation agreement was published in the Diario Oficial 15 de mayo de, 1972 (CORA, Consejo de Secretaría, CHC/COW/amb. A/C no. 3,551, 12 de Julio de, 1972. Courtesy of J. A. Echavarría E, in Gallardo, 2002).

[6] Average of 688.94 *pesos* per US$, year 2002 (Banco Central de Chile 2003).



PICTURE 6.1 Puerto Oscuro at the Panamerican high way. Permission from Chuck Herring, Digital Globe.

subsidies (R. Cuevas, Municip. de Canela, Secretary, phone interviewed by J. Espinoza, Field Assistant, Pers. Comm. via with J. Espinoza, via email 2006-09-14).

The Cottage Owners

The cove has around 35 summer houses of diverse standards. At the beginning of the 1960s, families that spent summer in Puerto Oscuro were very few and all of them had good relationships with the owner of the landed property, who died in the 1960s. According to the family that has the oldest summer house in the cove, their house was built with permission from the property owner. In the mid 1960s there were only three summer houses in the cove (G. Galleguillos, Puerto Oscuro summer house owner, interviewed by J. Espinoza, Field Assistant, Pers. Comm. with Espinoza via email 2006-09-01). The owners of the Puerto Oscuro property claim that the summer houses have been built there without their permission. Their view was that the old owner only agreed to allow the erection of summer tents, not the construction of summer houses (Picture 6.2).

The cove is supplied with water through simple and uncovered pipes, from a little lagoon belonging to the reserve and from which they have the permission to extract water from the Puerto Oscuro property, but when "things get hot", the land owners have in the past stopped

PICTURE 6.2 Puerto Oscuro cove with summer houses. Permission from Skullybones.

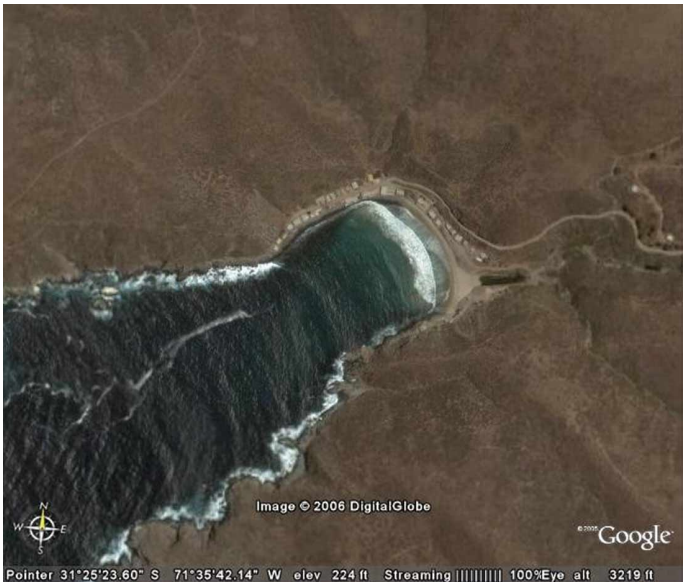
access to this water supply. In accordance with summer house rules that were established not to contaminate the sea, the houses have their own septic toilets to dispose of wastewater.

The Conflict, The Lawsuit

To understand the conflict and the ongoing lawsuit we must turn to the summer resorts sector in Chile, which has grown in response to the burgeoning demands of the swelling middle and upper-class that has led to an increase in the value of coastal land, and relatedly, the prospect of gaining profit from it (see Chapter Three) (Picture 6.3).

The dispute between fishers and summer house owners and the land owners of Puerto Oscuro has been long and acrimonious. One of the owners of the reserve has been particularly active. The problems grew in the 1990s. This was at the same time that the issue of the succession started to be dealt with by the Puerto Oscuro property family owners.

The unresolved lawsuit is between Puerto Oscuro property owners, the five family branches — the succession Echavarría — and those who have summer houses in the cove, and not with the fishers, although among the 31 persons there are four fishers who own houses. Some of the summer house owners are not part of the lawsuit. However, there is obviously a latent conflict with the fishers and, as a result, the fishers have not been able to develop an appropriate infrastructure to support their fishing activities. To settle there is out of question. When the fisher association tried to build upon an existing unfinished house fundament — that was started by one of the heirs of the reserve long ago — a social club with a toilet for the fishers with economic help of the Municipality, one of the owners pulled down the construction (Interview with H. Jorquera, former mayor of the commune (1990–1992), interviewed by J. Espinoza Pers. Comm. with J. Espinoza via email 2005-09-29). From this it becomes evident that there is a conflict between the fishers and the property owners. There have been several fishing infrastructure projects over the past years that have not come to fruition, predominately due to the opposition of the property owners. Among these projects, mentioned by an IFOP study, are the endowment of potable water for the cove (1997); implementation,



PICTURE 6.3 The Puerto Oscuro cove. Permission from Chuck Herring, Digital Globe.

operation and administration of a boat dragger (*huinche*) (1997); construction of boxes and store house (1997); cleaning of the ravine (1999); implementation of an electric generator for the association's centre (1999); and capacity building in diving security (2000) (IFOP, 2000). Lastly, a net meshes and trawl line project (1999) did not come off either because the Marine Subsecretary did not give permission.

There are some provisional shelters where the fishers can put their equipment as well as a sanctuary of Virgin Mary where they commend themselves before going to sea. Hence, the fishers in the cove do not have the possibility to develop a basic harbour infrastructure or services such as electricity, potable water or sewage. They do, however, possess a radio system that enables them to communicate with the outside world, which was financed in 1995 by Fondo Nacional de Desarrollo Regional (FNDR) (IFOP, 2000), from the Subsecretaría de Desarrollo Regional y Administrativo (SUBDERE); a descentralized program of public investment (SUBDERE, 2008, Ministerio del Interior).

Access to the cove for the fishers, dating back from the time of the harbour, has not been a problem recently, since it has been a regulated as right of way (*paso de servidumbre*), which is not the case of the cove Puerto Manso and the Agua Dulce beach. There is a document from the Ministry of Real Estate from 1985 that establishes the right of access of 3 kilometer to the cove within the property of the reserve for the purpose of artisanal fishing. This right of way was granted after the fishers contacted the Ministerio de Bienes Nacionales (MBN, (Secretaría Regional Ministerial IV Region Coquimbo, La Serena, exp. no. 850357-21-LS). The fishers are responsible for maintaining the access road, which is usually in poor condition. The Municipality annually repairs the road in summer after the winter rains. The owners of the *fundo* also help with financing for this purpose.

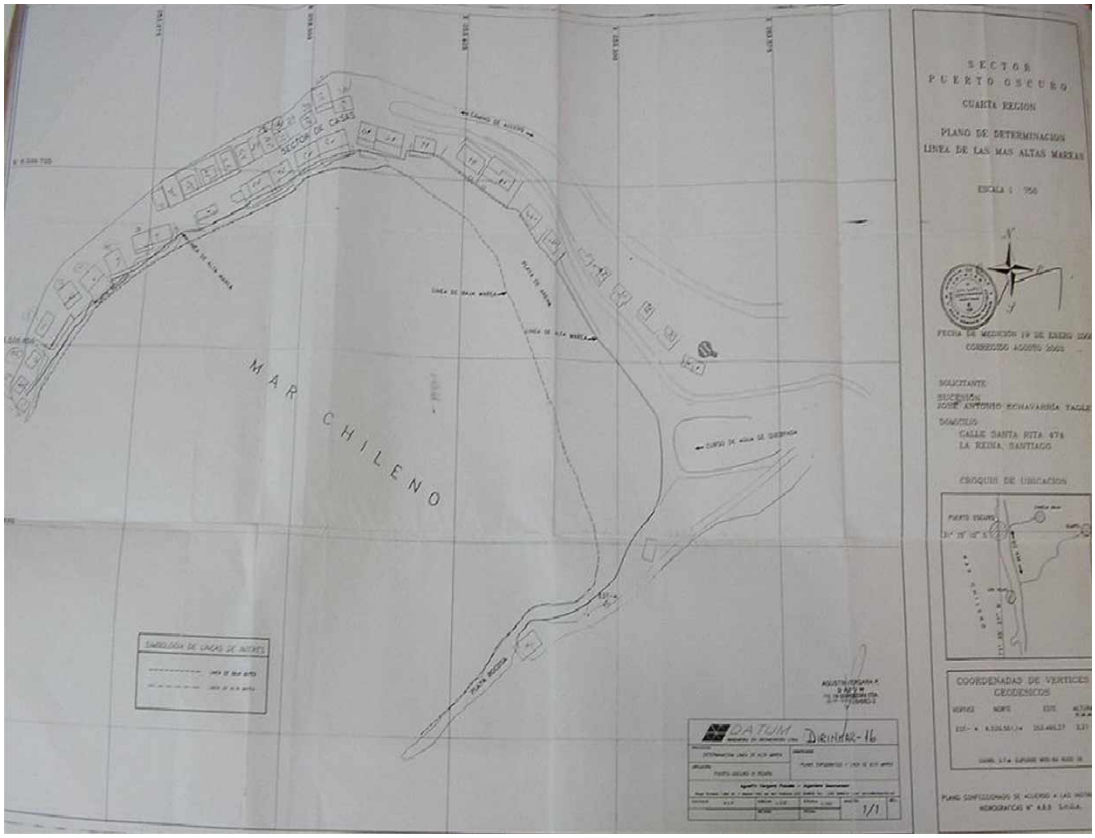
Those involved in the lawsuit from the Puerto Oscuro reserve are 17 persons, representing the five family branches. They state in their claim that the houses occupy, "a piece of [land] of an area of approximately 1.5 ha, corresponding to 370 meters north and 40 meters from east to west running parallel to the coast of the referred cove" (Juzgado Civil de Los Vilos, 2004, Papel de Juicio 7.020, Materia: Juicio Sumario Precario, folios 16–18; my parenthesis; see Picture 6.1, Picture 6.2 and Map 6.2). The lawsuit contains 91 folios and three maps. The concept *precario* refers to those lawsuits involving land problems in Chile.

The succession family have requested that the 31 summer house residents vacate their houses. To support their case they have presented a copy of a map that delineates the water marks of the highest and lowest tide according to the map of DIRINMAR-16 (scale 1:750) from the General Direction of Maritime Territory and Merchant Marine.[7] Datum Ingeniería Asociados, the company that drew up the map supporting the case, was contracted and paid by the succession family. This mapping of the relationship between the tidal zones, beach areas and summer house locations was signed off by the responsible authority in December 2003 and it furthermore directed that this mapping interpretation be registered and communicated to the different affected parties of the lawsuit (DGTM y MM, No. 12.000/34 vrs. L.PYA 17/03, in Juzgado Civil de Los Vilos, 2004, Papel de Juicio 7.020 . . . folios 1 (the map) and 15. Signed by the Vice-Admiral R. Codina D).

It is probably because of the formalized status of this decision that the reserve owners decided to go to trial. The map determines the high tide water mark and it shows that the houses are constructed just in the landward margin of the line, and therefore in the private property of the reserve (see Map 6.2).

The summer house owners, through their representatives, dispute the placement of the high-water mark on the map and argue that the summer houses are built on the state controlled beach area of public use belonging to Bienes Nacionales (Real State Office). That is, in the space between the sea and the high tide water

[7] Dirección General del Territorio Maritimo y Marina Mercante (DGTM and MM).



MAP 6.2 Map depicting the high-water mark in the cove Puerto Oscuro

mark (Juzgado Civil de Los Vilos, 2004, Papel de Juicio 7.020… folio 62).

As part of the lawsuit, a legal assistant from Los Vilos visited the Puerto Oscuro cove in October and November 2004 to verify whether the summer house residents (36 in total) were actually in their houses. This task was called a personal search and resulted in the following finding, "without being found" (Juzgado Civil de Los Vilos, 2004, Papel de Juicio 7.020… folios 12–16). However, it is not clear whether it is a legally accepted practice to leave written citations at a place where the persons do not formally or permanently reside. Some of those referred to in the citations were absent and some are deceased (Juzgado Civil de Los Vilos, 2004, Papel de Juicio 7.020… folio 86). The way that these citations were delivered is being used as part of the challenge by the summer house representatives. They are arguing that the notification is not juridically valid with reference to Articles 59 and 60 of the Civil Code.

The plaintiffs have started a new legal action against the summer house owners. They requested in January of 2005 that the Navy investigate whether the houses comply with the general order of urbanization and construction. They have also requested an investigation in to whether the summer houses are complying with relevant taxation legislation. During February 2005 the local authorities notified the owners that they had to regularize the properties. If summer house owners did not approach the municipality in order to regularize the situation (an uneasy legal process), after a while, the case would be sent to the Judge in Los Vilos, who apparently has the right to order the summer houses to be demolished. The owners of the

summer houses had four days to get guidance from the Municipality, but at the time none of them made act of appearance at the Municipality. The Director of Construction of the Municipality thus advised the Mayor in June of 2005 that none of the summer houses owners received the required permission to build and therefore have contravened planning laws and are subject to fines (Registros de partes de la Municipalidad No. 76819, in Juzgado Civil de Los Vilos, 2004, Papel de Juicio 7.020… folio 89).

According to the Director of Construction, no such legal action has yet been taken against the summer house owners (Narvaez, C., Municip. de Canela, Pers. Comm. via email 2006-08-17). It is not clear whether rules can be validly applied for houses built before the rules were in effect. It is not certain either whether the plaintiff — the Echavarría sucession — complies with the relevant regulations themselves. They have built several houses within the property during the same period. Furthermore, it is questionable whether the Municipality can regulate the construction of houses built on lands whose ownership is contested and is subject to an ongoing legal process.

The summer house owners also add other arguments, among them that the DIRINMAR map delivered to the case is a copy of the original, which is why it is not possible to certify its authenticity (Juzgado Civil de Los Vilos, 2004, Papel de Juicio 7.020… folio 63).

In January of 2005, the summer house owners requested that the Marine Subsecretary grant them a land concession of one hectare corresponding to the land where their houses are located. They argued that they have invested around US$1 million in total in their properties (Carta Leonardo Rafo a Tomás Puig, Subsecretario de Marina, 26 de enero 2005, in Juzgado Civil de Los Vilos, Papel de Juicio 7.020… folio 80). Divided by the 35 houses existing there (sometimes they refer to 37 houses), US$1 million would mean 28,000 dollar per house (18 million Chilean *pesos*). For some reason the quantity is given in dollars; perhaps another sign of market forces acting on coastal areas.

Another document from 2002 addressed to the Los Vilos harbour Captain, signed by Sui, as President of the group, says that the summer house owners act as a juridical person since October 2000 under the name Centro Recreacional Caleta Puerto Oscuro. However, Sui does not appear among those involved in the lawsuit. In the 2002 document, the group gives power of attorney to a lawyer (a different lawyer to the one representing them in the lawsuit initiated in 2004) to represent them (Carta al Capitan de Puerto Los Vilos, de N. Sui, 2002, in Juzgado Civil de Los Vilos, Papel de Juicio, 2004… folio 70).

The lawsuit consists of copious amounts of documents representing myriad arguments, which for my purposes are unnecessary to describe it in detail. Sufficient to say that the arguments contained within the lawsuit reflect the transformation of Puerto Oscuro into a seascape of conflict, where the social relationships of those who have a significant emotional, social and economic relation to the place have been severely infected. Emotional, because of the personal attachment to Puerto Oscuro's scenic beauty and natural values; social, reflecting the regular patterns of interaction by the same people every summer, and economic because of the investment in their summer houses. Of course the aspirations of the summer house owners mix with and further complicate the plans of the fishers and the future development of their MA. The lawsuit continues and the outcome is unknown.

Uncertain Outcomes

Clearly, there is considerable misunderstanding of the rule relating to use of the 80 meters of beach area controlled by the State. By law, the sea beach zone is the State controlled zone which stretches up to the high tide mark (80 meters), provided that the beach is not within private property in which case the law is on the side of the owners of the property and the 80 meters (valid for State property) becomes reduced to 8 meters.

Many questions arise in case the summer houses owners lose the court case. Will the

summer house owners leave willingly? Would the authorities use force to evict them and destroy their houses? Which authority would be responsible for handling the eviction, the navy that controls the coast or the police that control the land? Can the houses be destroyed without any compensation? Most probably things will continue as now even in case the property owners win, given the conditions established for these cases by the Civil Code.

The Civil Code considers different situations and solutions when a person constructs a dwelling on land that they do not legally own (Código Civil de Chile, 2000, Art. 669). One case is when a person builds without the knowledge of the owner. In this case, the owner of the land is able to assume legal ownership of that building, with compensation for the house builder negotiated between the two parties. In this case, as part of the legal settlement, the building owner is required to pay a rental price to the landowner for the land for the period of occupation (by the building). The second situation considered by the Civil Code is when someone has built "with the science and patience" (explicit knowledge) of the landholder and in this scenario the landholder is obliged to pay the other party the value of the building as compensation in order to evacuate the other party from his land (Código Civil de Chile, 2000, Art. 669).

It is difficult to say whether the people that have built their cottages in Puerto Oscuro correspond to the first or the second case. In any case, the cottage owners have to be paid either a negotiated compensation (in the first case) or the value of their properties (in the second). A key question is whether the five family branches would be prepared to pay whatever the outcome when it is only one branch that has aspirations to keep the cove. In other words, considering that the reserve has now been divided by a *de facto* arrangement, and that one of the five family branches will have exclusive claim on the land adjacent to the harbour — the most valuable part — will all of the family branches agree to act collectively to pay any required compensation? Furthermore, will they be able to manage it economically?

However, for the fishers it seems to be quite clear that the reserve owners cannot restrict them from developing their activities on the beach and "*of the continuing land up to a distance of eight meters from the beach*", and that this also implies to building huts in this zone for fishing support purposes (Código Civil de Chile, 2000, Art. 612 and 613). It is unclear whether the huts (*cabañas*) are for residential purposes or just to shelter.

Nonetheless, rules and praxis may be two different things. So, despite the existence of these rules since the establishment of the Constitution in 1925, they offered no protection to the fishers when they, in conjunction with the local Municipality, tried to construct a hut which was subsequently damaged by one of the property owners. If the local authorities are not clear about what the Constitution guarantees, what can be expected from people in far more humble circumstances? If authorities give fishers exclusive use rights to a portion of the sea for their MA, then why do the authorities abandon the needs of fishers on land?

The reserve owners cannot directly hinder fishing activities as this would go against the spirit and intent of the LPA, particularly since the formalization of MAs. But to allow the petitions of the fishers (see the list of unmaterialized projects above) would mean to improve facilities and services that would also benefit the summer houses owners; the same buildings that the property owners want to eradicate. It would also give further permanency to the fishing activities when they consider that the land adjacent to the beach, and the bay, belong to the Echavarría family.

The "regulation of existent human settlements and artisanal fishing coves" belongs, "except in some circumstances", to the National Commission for the Coastal Board (Ministerio de Defensa Nacional, 1994, Decreto 475, Política Uso de Borde Costero, Título IV, Objetivos Específicos, No. 5, letra c). According to Sergio Lira Arias, Navy Captain, Chief of Maritime Business, Marine Subsecretary, the coves within

private properties (these are the exceptions) are not under this jurisdiction. Moreover, that they fall within the responsibility of regional authorities, this being the case of Puerto Oscuro. He indicates furthermore that the State controls only 20 percent of the territory in the coastal border, the rest being in private hands, (Lira, S., Marine Subsecretary, Pers. Comm. via email 2006-11-17). This is contradicted by information on property regimes of the coastal border coming from the Ministry of Real Estates, which estimates around 56 percent to be state controlled (Caballol, et al., 2006).

With the implementation the MAs it is reasonable to expect that the fishers would be informed about their rights on land, particularly given that the fishers are poorly educated and have relatively low levels of literacy. Furthermore, the applicable laws are difficult to understand as they involve many exceptions and subtleties and require nuanced and expert interpretations. It is rather apparent that without the direct and active support of the authorities, given the open and active hostility the fishers have experienced from the reserve owners, they would hardly dare to take any further initiative to realize their rights, let alone try and establish support infrastructure.

Fishers and the property owners will continue to share Puerto Oscuro as a common seascape for their activities in the foreseeable future. If, in addition, the owners of the property win the lawsuit against the summer house owners, it is likely to weaken the fishers psychologically, making their situation even more precarious. These are not the best conditions for the continued development of a policy that tries to protect the environment and secure the livelihood of those living off artisanal fishing, which is the aim of the fishing policy. This conflict allows an examination of the way the Constitution and other legal rights are influenced by differing class interests (and associated power and influence) when being translated into practice. More specifically, whose priorities count within a neo-liberal economy and export market oriented policy?

THE MANAGEMENT AREA PUERTO OSCURO

Puerto Oscuro: The Times Prior to the Management Area

Despite Canela posessing approximately 60 kilometers of coast, some suitable *caletas* or coves for fishing and a rich variety of edible marine species, fishing as an occupation is marginal.[8] Besides Puerto Oscuro (30 members), there are two other MAs in Canela commune: Puerto Manso (29 members) and Huentelauquén (39 members) (Sernapesca, 2006c). Like Puerto Oscuro, these two MAs are also situated within private properties. In Canela, the first MA to be formed was Huentelauquén (December 1998), the second Puerto Oscuro (July 1999) and the third Puerto Manso (July 2000) (Sernapesca, 2006c). However, in the Official Newspaper of the Republic it is stated that both the Puerto Oscuro and Huentelauquén MAs were established even earlier as the notice was published on the 20th of February 1998. The ESBA study to support the establishment of the Puerto Oscuro MA was performed as early as between 1993 and 1994 (IFOP, 2000).

Before the introduction of the MAs in the late 1990s, the number of fishers in the commune varied. It increased when the ban on the *Loco* were lifted. During the 1980s, fishers numbered, between 30 and 50 (based on my own observations). According to CONAF (1981, p. 44), they totalled around 80. With few exceptions, these fishers were originally from other localities like Los Vilos — 60 kilometers south of Puerto Oscuro — and Tongoy — 160 kilometer north of Puerto Oscuro.

The fish produce was either sold locally by the fishers themselves in the cove area or in Los Vilos to intermediary merchants for transport

[8] That the commune's inhabitants are more for the land than the sea is due to the agro-pastoral tradition from the colonial time that predominates in the commune composed mainly of agricultural communities that own their land in common. Furthermore, except for two communities (Angostura de Gálvez and Huentelauquén) situated on the coast, all the agricultural communities (21) are located in the interior of the commune (Gallardo, 2002).

to the markets of the capital. After the introduction of the MAs the intermediaries have generally been substituted by export firms that buy directly from the MAs. As is becoming more apparent as this book addresses the range of different issues affecting coastal settlement, the social conditions of the fishers in these coves were and are still precarious.

Fishing is also a marginal occupation throughout Region IV of Coquimbo in spite of the 440 kilometers of coastline. The artisanal fishers (3,133) represented only 2.8 percent of the labour force of Region IV in 1980. This figure includes around 1,000 seaweed collectors and 600 cove workers helping with fishing activities called auxiliaries (CONAF, 1981, p. 44). Discounting the auxiliaries, artisanal fishers amounted to 2,533 people. In 2004, the total number employed in fishing was 7,341. Of this total, 3,128 corresponded to the industrial sector and 4,213 to the artisanal sector (Subpesca, 2004). According to Ocares (semi-structured interview, 2007-01-14), artisanal fishers presently [2008] number around 4,500, while in 1993, before the implementation of the MAs, they were 2,000. Sernapesca has allowed the registration of new fishers. Most probably, newcomers have been integrated in the existing fishing organization by means of family and friendship links.

Being the President of FEPEMACH, Leonardo Ocares also represents and coordinates the regional interests of FEPEMACHs' member organizations. In spite of its geographical name (Choapa province), the federation covers the whole Region, embracing 21 fishers and divers organizations, reaching around 1,600 members; including their family members, this totals approximately 6,000 persons (FEPEMACH, 2006).

According to Mariano Castillo (semi-structured interview, 2001-01-10), between the 1930s and up to the 1960s, the most important exploited fish resources were the *Congrio* or Red kingklip (Genypterus *Chilensis*; (see Picture 6.4, Subpesca, 2005c, permission from Bolbarán, D., Subpesca, Pers. Comm. via email 2008-04-08); the *Erizo* or Urchin (*Loxechinus Albus*); and the *Champa*, also called *Chasca* (Agar-agar, *Gelidium sp*). Approximately 20 boats were active at that time. From the 1970s and up to the middle of the 1980s, the main exploited resource was the *Loco*.

In Puerto Oscuro, as in other coves, the *Locos* also diminished considerably during the 1980s as a consequence of the export boom and MAs, and other management measures were implemented. Castillo (semi-structured interview, 2001-01-10) describes that during the 1960s, and at the beginning of the 1970s, if fishers extracted 2,000 *Locos* it was considered a bad day trip for one boat with three crews. When it was good, they harvested 3,000–3,500 *Locos*. There were between 10 and 15 active boats during the 1970s. Although of humble origin, the fishers themselves differ in their assets and activities. Some of them own their artisanal or motorized boats and other gear for fishing; others do not.

Calculating 10 boats per day and at 3,000 *Locos* per boat, they would have had the capacity to harvest a total of 30,000 *Locos* daily. In contrast in 2001, if fishers harvested 200–300 *Locos* "they considered themselves happy". It is worth noting, however, that the price of *Locos* was much lower before the export boom in the middle of the 1970s, being approximately 200 *pesos* per *Loco*. Mr. Castillo (semi-structured interviews, 2001-01-10) believes that the principal reason for the *Locos* decline was the local exploitation system, they practiced during the open access period. In this system, the boat owner received 67 percent of the large *Locos*, and the diver 33 percent. The small sized *Locos* were not counted and were kept by the divers. This, according to Mr. Castillo (semi-structured interviews, 2001-01-10), was the principal reason behind resource depletion. The system encouraged the extraction of juvenile *Locos*.

Although there had been a legal minimum size regulation in place since 1965, the fishers either did not know about it, or ignored it. In the

PICTURE 6.4 *Congrio*

local system described above, the harvest of small *Locos* was in fact an explicit part of the agreement, and therefore a relied on source of income for their diving efforts. This situation characterizes the "tragedy" of open access that operated in a *de facto* way until stock exhaustion started to be evident nationally. Although the fishers, as years passed, must have become aware of the fact that juvenile harvesting endangered *Locos* reproduction, the rationale was probably something like: "If I don't harvest the available *Locos*, somebody else will do it anyway".

The Constitution of the Management Area

In order to establish the MA at Puerto Oscuro the fishers organized as a guild association (see Chapter Four), which is most common organizational form in the region. Of a total of 51 regional artisanal fisher organizations, 29 are guilds, 18 unions and four cooperatives. When they formed the Guild Association of fishers, divers and shore collectors of Puerto Oscuro cove,[9] they were 27 members. The rules demand a minimum of 25 members to establish an association (Decreto Ley. 2.757 de 1979, Texto actualizado, Art. 3, Asociaciones gremiales, Ministerio de Economía, Chile). If someone withdraws from the association, they have to be substituted (Ocares, semi-structured interview, 2001-01-10). In the 2006 list of Sernapesca, the association appears with 30 members, which probably means that Sernapesca counted three old non-active fishers. In 2005 there were 25 fishers according to the data collected in this research.

The 25 fishers originate from and live in different places. Fifteen fishers are local. Of the 10 non-local, six are from Los Vilos, three from the close-by agricultural community of Angostura, and one from Canela, the commune capital. Seven fishers own a boat. As can be seen in Table 6.1, a boat owner or another fisher can belong to different categories (such as, boat owner, captain, fisher, diver, shore seaweed collector, or assistant diver).

The years before the MA (up to 1997), Puerto Oscuro fishers functioned in accordance with the Benthic Extraction Regime. This regime was in place prior to the establishment of MAs (see Chapter Five). According to IFOP (2000, p. 2), as early as 1999, 55 percent of the total extraction of *Locos* of the Region of Coquimbo came from established MAs.

The Puerto Oscuro MA consists of 627 hectares.[10] There are seven benthic species targeted for extraction (see corresponding pictures in Chapter Four). *Locos* and *Lapas* or Chilean limpet are considered most important (*Fissurella Spp*). *Erizo* (sea Urchin) the second most important fish is followed by *Piure* or *Chilean pyurid*, Red sea squiert (*Pyura Chilensis*), Jaiba marmola or *Rock crab* (*Cancer Edwardsi*) *Picoroco* or Giant barnacle (*Austromegaba-lanus Psittacus*) and Seaweeds (IFOP, 2000).

Since the Puerto Oscuro MA was established, fishers normally harvest during spring and summer (November – January). They use six or seven boats. The incomes are divided equally among the members, except for 20 percent that goes to the fisher association. Just after the establishment of the MA, the association received, together with seven other regional coves, a state subsidy of 30 million *pesos* or US $71,397 (1994 value)[11] to pay the Base Situation Study (ESBA) performed by IFOP between 1993 and 1994 (IFOP, 2000). This subsidy covered 70 percent of the study cost and MA application process. The other 30 percent had to be covered by the fishing organizations.

After the MAs had been operating for three years (in 2003), the fisher organization, as required, has to continue contracting a university or other consultants for the technical

[9] In Spanish: Asociación Gremial de Pescadores Artesanales, Buzos Mariscadores y Recolectores de Orilla de Caletas Puerto Oscuro.

[10] According to the Subpesca its precise coordinates are Vertex A (South Latitude 31° 23′ 16,06″ and West Longitude 71 ° 36′ 56,79″ to Vertex I (South Latitude 31° 25′ 11,71″ and West Longitude 71° 53′ 52,05″) (Subpesca Ministerio de Economía, Fomento y Reconstrucción, Stgo, 10 Septiembre de 2002, Modifica Decreto Supremo No. 10 de 1998, Decreto. Exento No. 726).

[11] Average of 420.18 *pesos* per US$1, year 1994 (Banco Central de Chile 2003).

TABLE 6.1 Fishers in Puerto Oscuro according to occupation type and origin, 2005.

N°	Name	Boat Owner	Fisher	Diver	Seaweed collector	Diver auxiliary	Origin
*Non-local fishers**							
1	A.A.L.	x		x			Canela
2	E.B.M.				x		A.de G.***
3	M.M.O.				x	X	A.de G.
4	J.O.Z.	x		x	x		A.de G.
5	L.D.O.		x				Los Vilos
6	J.B.M.					X	Los Vilos
7	R.A.G.	x		x			Los Vilos
8	J.A.B.	x		x			Los Vilos
9	E.C.H.			x	x		Los Vilos
10	R.S.G.			x			Los Vilos
*Local fishers***							
11	E.C.C.	x	x		x	X	P.O.****
12	J.O.J.					X	P.O.
13	O.V.V.					X	P.O.
14	J.C.V.				x	X	P.O.
15	F.C.V.				x		P.O.
16	C.C.C.				x	X	P.O.
17	M.L.V.				x	X	P.O.
18	C.C.V.		x				P.O.
19	J.R.R.		x				P.O.
20	F.R.C.				x		P.O.
21	V.R.R.				x		P.O.
22	M.V.I.				x		P.O.
23	M.C.C.	x	x		x		P.O.
24	H.A.B.		x				P.O.
25	J.H.S.	x	x			X	P.O.
Total		*7*	*7*	**6**	**13**	**9**	

* Source: Contreras E., Sea Mayor, Los Vilos, 2005-09-30, Interviewed by Espinoza, J., Field Assistant, Pers. Comm. via email 2005-10-12.
** Source: Information compiled by by Soto H., local school teacher, Soto was interviewed by Espinoza, J., Field Assistant, 2005-09-29, Pers. Comm. via email 2005-10-20.
*** A. de G. = Angostura de Gálvez.
**** P O = Puerto Oscuro.

support to regularly evaluate the fish resources. These costs were paid for from regional funds in the first two years. In this adaptive management approach, the association decides the time for the harvest, but the capture quota to be harvested per year is decided together with the consultants. The actual harvest data is then required to be reported to Sernapesca. The costs to support this work are estimated at around 4 million *pesos* or US$6,299 (2001 value),[12] yearly. After four years of operation, MAs are subject to taxes (*patent*), which are calculated on a per hectare basis at one UTM (*Unidad Tributaria or Tributary Unit*) per hectare (27,000 *pesos* in 2001). In taxes, the 627 hectares required payment of 16,929 million *pesos,* or US$26,662 (2001 value).[13] With these costs, the fishers did not consider the MA profitable (Ocares, semi-structured interview, 2001-01-10). Actually these tax obligations were considered to be a huge problem and highly unfair. Of the 627 hectares that make up the Puerto Oscuro MA, only a small proportion is economically exploitable.

[12] Average of 634.94 *pesos* per US$1, year 2001 (Banco Central de Chile 2003).

[13] Average of 634.94 *pesos* per US$1, year 2001 (Banco Central de Chile 2003).

At a national level, fishers argued that they should pay according to production (per unit) or per productive hectare, rather than on the basis of the entire area of the MA.

The advocacy of the fishers was partially successful and the Government heared the call and taxes were reduced in 2004, so the tax costs for the Puerto Oscuro MA were less that year. However, the structure of the tax system was not reformed and taxes continued to be based on overall MA areas, regardless of its productive capacity. The only concession made by Government was a reduction in the UTM rate from one UTM per hectare to 0.25 UTM per hectare (Paillaman, A., Sernapesca, Pers. Comm. via email 2006-08-17). Clearly taxes of this magnitude, when considered with other operational costs (including those associated with the engagement of "experts" to assist with monitoring and reporting) imposed a considerable burden on the MAs to the point where their viability was questioned and their survival threatened.

An ESBA study from IFOP (2000, p. 3, 39) confirms the claims of the fishers that only part of Puerto Oscuro is productive for fishing. According to IFOP, the geography of the MA limits its productive potential due to large areas of slopes and cliffs with winds from the south and east for the major part of the year, causing turbulences and strong waves such that the potential for extraction is limited. Furthermore, the high incidence of unsuitable conditions situated below the 25-meters deep, are not accessible for diving extraction (IFOP, 2000, p. 81). The area that is suitable for extraction comprises around 166 hectares or only 25 percent of the total MA area.

Production and Projections

In 2000, the study year, the *Loco* abundance in Puerto Oscuro (size 2–13 cm) was 220,432 (IFOP, 2000). Of this only 36 percent conforms to the extractable minimum size (10 cm); however, the actual allowable catch is far less than this so as to allow recuperation. With a growing stock, the economic situation of the association should improve, which should place it in a better position to afford taxes and other expenses associated with the MA in the future.

Table 6.2 below shows the planned capture quotas up to 2007 according to the Puerto Oscuro Proposition of Management Plan and Exploitation of the MA (PMEA, see Chapter Five). As can be seen, already in the second year (2001), the estimated quota increased by 73.5 percent relative to 2000. From there, the planned quota stabilizes at around 30,000 *Locos* per year up to 2007. Extracted quantities differ from planned, though. In order to show the discrepancies I introduced an extra column (*in Italics*) in both Table 6.2 and Table 6.3 for years with available information, both from Mr. Ocares (semi-structured interview, 2007-01-14), IFOP or both.

Table 6.3 below shows the harvest of the principal three species of Puerto Oscuro's MA between 1997 and 2001. Since they are given in tonnes, I have converted the tonnes in units of *Locos* (four *Locos* in shell per kilo) in order to allow a comparison with Table 6.2.

Production between 1997 and 1999

For the three years for which data exists for Puerto Oscuro, prior to becoming a MA, Sernapesca (2007b) registered (see Table 6.3) an extraction of 6.3 tonnes of *Locos* in 1997, corresponding to around 25,000 *Locos*. In 1998, extraction was 4 tonnes of *Locos*, corresponding to around 16,000 units of *Locos*. In 1999, extraction was 3.5 tonnes, or around 14,000 *Locos* (Sernapesca, 2007b).

However, according to IFOP (2000), in 1997 the *Loco* catch was 9 tonnes, or *around* 36,000 in shell units; 2 tonnes in 1998, and 5 tonnes in 1996 (IFOP, 2000). The IFOP landing data does not agree with Sernapesca's data (Table 6.3). Ocares's (semi-structured interview, 2007-01-14) opinion seems to confirm the high result (9 tonnes) for 1997 given by IFOP. Nonetheless, this incongruence between the data shows that although both Sernapesca and IFOP are credible institutions, the data they generate are not always reliable.

TABLE 6.2 Planned capture quotas of *Locos* for the MA Puerto Oscuro, 2000–2007.

Year	IFOPs planned capture quotas (units of *Locos*)	*Capture according to Ocares (units/average)*
2000	16,787	*5,200*
2001	29,135	*29,300*
2002	29,205	*7,000*
2003	29,729	*17–20,000*
2004	29,745	*17–20,000*
2005	29,791	
2006	29,967	*4,200*
2007	30,071	

Source: IFOP (2000); Ocares, President of the Puerto Oscuro fisher association, semi-structured interview, 2007-01-14.

TABLE 6.3 Sernapesca's registered harvest on the beach (tonnes) for Puerto Oscuro, 1997–2001.

Species	Year	Tonnes In shell units	Approx. Equivalence In shell units	Harvest according to *IPOF prior to the MA and projections in tonnes* (shell units) *and units*	
Loco	2001	7,3	29,200		*29,135*
	2000	1,3	5,200		*16,787*
	1999	3,5	14,000		
	1998	4,0	16,000	2	*8,000*
	1997	6,3	25,200	9	*36,000*
	Total	**22,4**	**89,600**		
Lapas	2001	15,7			
	2000	26,6			
	1999	41,0			
	1998	23,8			
	1997	41,0			
	Total	**148,1**			
Sea Urchin	2001	0,0			
	2000	0,8			
	1999	3,5			
	1998	1,7			
	1997	11,5			
	Total	**17,5**			

Source: Sernapesca (2007b).

According to Sernapesca (2007b), the extraction of *Lapas* by Puerto Oscuro fishers was 41.0 tonnes in 1997, 23.8 tonnes in 1998 and 41.0 tonnes in 1999. IFOP in its turn gives over 18 tonnes per year of *Lapas* landing in Puerto Oscuro and this was more than double previous to 1996, while the contrary occurred in the rest of the country (IFOP, 2000, p. 48). As seen, IFOPs results are lower than those given by Sernapesca.

Production between 2000 and 2001

In 2000 the fishers harvested *Locos* for first time from Puerto Oscuro as a MA, and the entire harvest went for export. It was recorded that

extraction was 1.3 tonnes (5,200 units) or approximately one-third of the 16,787 *Locos* of the capture quota proposed in the Puerto Oscuro PMEA (see Table 6.2 above) (Sernapesca, 2007b).

In 2001, during 10 days, 7.3 tonnes, (29,300 units) were extracted. This is a little more than that prescribed. According to Mr. Ocares (semi-structured interview, 2001-01-10), when needed, they employ extra labour during extraction days. An auxiliary that helps with the harvest obtained, in 2001, 70,000 *pesos* or US$110 monthly, and a diver twice as much. The entire harvest was exported.

When 10 units of *Locos* without shell make a kilogram, it is considered a good result (Ocares, semi-structured interview, 2001-01-10). In 2001 the revenue was 1,200 *pesos* per unit, or US$1.8 (2001 value).[14] Thus, the 29,300 *Locos* should have given gross of around 35.1 million of *pesos*, or US$55,375 (rates as above). Keeping the same values as above, the 5,200 *Locos* landed in 2000 should have given around 6.2 million *pesos* or US$9,827.

Regarding *Lapas,* in 2000 and 2001 26.6 and 15.7 tonnes, respectively were extracted (Sernapesca, 2007b). The programmed quotas for those years were 3 and 4 tonnes, respectively (IFOP, 2000, Anexos, Table 19), which is much less than what was actually landed. The kilogram price for *Lapas* with shell in 2001 was 2,000 *pesos* or US$3.10.[15] This means that for *the Lapas* harvest in 2000 the association received 53.2 million *pesos* or US$83,787 (rates as above). In 2001, they should have got 31.4 million *pesos* or US$49,453 (keeping the prices and conversion rates as above). Although the result for the *Loco* harvest was less than expected, the *Lapas* harvest generated more than expected and therefore, to some extent, this balanced the overall from the MA.

GROSS AND NET INCOMES

Income from the *Loco* harvest was around 150,000 *pesos* per fisher annually, which allows them to survive economically for two months (Ocares, semi-structured interview, 2001-01-10). My calculation based on the prices above for 2000 and 2001, and on the registers of Sernapesca (2007b), gives a higher income from the MA (considering only *Locos* and *Lapas*), although incomes are highly variable due to a number of factors, as discussed below.

Costs to fishers are composed of variable and fixed costs, in addition to the collective expenses of taxes and research. The variable costs consist of the expense incurred whilst undertaking operations, or on number of trips. This includes such expenses as fuel, oil, technical maintenance of equipment, in addition to the cost of opportunity of the labour force such as salary or and/or share of the crew. The fixed cost consists of the depreciation of capital goods, technical maintenance of equipment (boat, motor and compressor), administration of salary payments and of the social quotas paid by the members to the organization and also to the cost of opportunity of inverted capital, which corresponds to the interest (IFOP, 2000).

According to IFOP's projections, the added gross income for both *Locos* and *Lapas* should have been in the order of 16 and 27 million *pesos* for 2000 and 2001, respectively. The net benefits (discounting variable and fixed costs) should have been around 11 and 21 million *pesos* in 2000 and 2001, respectively. The net benefits per individual member per year therefore should have been around 445,000 and 859,000 *pesos* 2000 and 2001, respectively. This translates into a monthly income of 37,083 and 71,583 *pesos.* IFOP's costs do not include tax payments (which the association started paying in 2003), nor research (that they started paying in 2002).

Since the percentage for the fixed and variable costs varies in IFOP's calculations for 2000 (31.2 percent) and 2001 (22.2 percent) but remains stable in their calculations from 2002 to 2007 of around 20 percent, I use the latter percentage in my calculations, being more representative of a

[14] Average of 634.94 *pesos* per US$1, year 2001 (Banco Central de Chile 2003).

[15] Average of 634.94 *pesos* per US$1, year 2001 (Banco Central de Chile 2003).

TABLE 6.4 Average gross and net income (*pesos* and US$) for the *Locos* and the *Lapas* in the MA Puerto Oscuro 2000–2001.

	2000			2001		
	Nº	Income *(pesos)*	Income (US$*)	Nº	Income *(pesos)*	Income (US$*)
Locos (units)	5200	6,200,000	9,764.70	29,300	35,100,000	55,280,81
Lapas (tonnes)	26,6	53,200,000	83,787.44	15,7	31,400,000	49,453.49
Total gross Income		59,400,000	93,552.15		66,500,000	104,734,31
Cost 20.5% (fix, variables, taxes, consultancy)		12,177,000	19,178		13,632,500	21,471
Net Income		**47,223,000**	**74,374**		**52, 867,500**	**83,264**
Net Income 25 fishers/year		1,888,920,00	2,974,96		2,114,700,00	3,330,55
Net income fisher/month		157,410,00	247,91		176,225,00	277,55

* *pesos* converted average rate of 634.94 *pesos* per US$1 in 2001 (Banco Central de Chile 2003).

normal year. To be consistent, this percentage should be discounted for each year from the gross incomes. This agrees with the 20 percent that the association declared they should reserve from their income to cover the costs of the MA.

Thus, with reference to Sernapesca's registered harvest for *Locos* and *Lapas* in 2000 and 2001, the association would have received a gross income of 59 and 66 million *pesos,* respectively (see Table 6.4). After having discounted by 20 percent for costs every year, this gives an average net income of 47 and 53 million *pesos* for 2000 and 2001, respectively. The total income generated in 2000 by the association divided by the 25 fisher members would mean 1.8 million *pesos* per year and fisher, or 157,410 *pesos* per month. For 2001, it would be an average gross income of 2.1 million *pesos*, or 176,225 *pesos* per month per fisher. These incomes can be compared with the minimum salary in Chile, which was 105,500 *pesos* or US$166 in July 2001[16]. Note that I am only considering the income derived from for the two main targeted species.

Production after 2001

In 2007, Ocares (semi-structured interview, 2007-01-14) seemed to be less optimistic about their MA. Ocares declares that after 2001, 17–20,000 *Locos* were extracted per year, which is below IFOP's projected quota (Table 6.2). According to him, in 2002 only 7,000 *Locos* were extracted due to scarcity. In 2003, *Locos* were still too scarce to meet quota targets. Some fishers think that the scarcity of *Locos* is due to wastes from the Los Pelambres copper mine in Los Vilos (around 60 kilometers south from Puerto Oscuro) which pollutes the water, affecting the reproductive performance of *Locos* negatively (Mr. Ocares, semi-structured interview, 2001-01-10). I will return to this issue as Mr. Ocares raised it again in 2007.

Not only harvest is lower than projections, but also the prices. The average price for *Locos* between 2002 and 2004 was 700 *pesos* (*or* US$1.5) per unit, and 700 *pesos* per kilogram for *Lapa*. From 2004 to 2006 the price per *Loco* lowered to 520 *pesos* (US$1) per *Loco* in 2006. This year (in 2007) 4,200 *Locos* were extracted, yielding only 2.2 million *pesos*; this apparently puts the MA in economic predicament as we shall see below.

Table 6.5 shows *Loco* landing statistics. I have compared these results with IFOP's projections for recent years.

Sernapesca's regional register for 2006 is not complete. But Mr. Ocares (semi-structered interview, 2007-01-14) declared that the total catch for 2007 was 4,220 *Locos*. In general, the

[16] Average of 634.94 *pesos* per US$1, year 2001 (Banco Central de Chile 2003).

TABLE 6.5 *Loco* landing according to regional Sernapesca-Coquimbo on the beach (tonnes and units) for Puerto Oscuro, 2002–2006.

Year>	Tonnes	Units according Sernapesca	Harvest according to IFOPs projections in units
2006	1,1	(Jan.–Oct.) 4,287	29,967
2005	3,0	11,390	29,791
2004	9,1	27,450	29,745
2003	1,0	3,000	29,729
2002	4,1	12,371	29,205
Total	**18,3**	**58,498**	**148,437**

Source: Cerda, G., Sernapesca-Coquimbo, Pers. Comm. via email 2007-07-03.

results are considerably below the projected ones. The total (actually extracted) 58,498 units of *Locos* for these five years correspond to 39.2 percent of IFOP's projected amount. The 22.4 tonnes of the previous five years (1997–2001) diminished to 18.3 tonnes during the period 2002–2007.

In contrast to the *Locos* division between projected and actual catch, *Lapas* statistics from Coquimbo's regional Sernapesca, presented in Table 6.6, show that the landings during the last five years are close to those projected.

Problems and Achievements: Mr. Ocares' Perceptions

From 2001 to 2007 the perceptions have obviously changed. In 2001 the fishers, according to Ocares (semi-structured interview, 2007-01-14), were of the view that the MA was performing well as 60 percent of the area had been repopulated since its establishment in 1998. The optimal scenario for the association, he then advised, was to rehabilitate the population level of *Locos* to that in the 1970s. Reflecting back to the accounts given above in terms of real catch and considering the *Locos* extraction experience in the 1970s where it was claimed that a reasonable day catch per boat was between 3,000 and 3,500 *Locos*, Ocares and the fishers expectations seem unrealistic. Such halcyon days of *Locos* fishing may never return.

In reality, Ocares says, the *Locos* population started to diminish as from 1997 and this was when the economic sustainability of the MAs became less viable. In fact, 1997 was the last year in Puerto Oscuro that was "good" for *Loco* extraction. According to Cerda (Sernapesca, Pers. Comm. via email 2007-07-03 and 2007-07-04), Puerto Oscuro is not alone regarding unfulfilled harvest expectations. Apparently there are also other MAs with more scarce populations of *Locos* in the region.

TABLE 6.6 *Lapas* landings according to regional Sernapesca-Coquimbo on the beach (in tonnes) for Puerto Oscuro, 2002–2006.

Year	Tonnes in shell	IFOP projections (tonnes in shell)
2006	(Jan.–May.) 2.1	3,3
2005	2,9	3,4
2004	3,9	3,5
2003	3,3	3,6
2002	4,7	3,9
2001	3,5	4,3
Total	**20,4**	**22,0**

Source: Cerda, G., Sernapesca-Coquimbo, Pers. Comm. via email 2007-07-03.

Regional fishers' perceptions of why *Locos* are diminishing includes climatic, land-based environmental problems and social issues. The fishers believe, according to Mr. Ocares, that the periodical influence of El Niño or La Niña, affects the species, perhaps explaining its deterioration in number and growth. The most recent El Niño event began in the spring months of 1997 (the fishers explicitly make the link with the last "good year" for *Loco* harvest). El Niño events are considered to have a direct impact on marine species. When El Niño occurs,

> the cool nutrient-rich sea water normally found along the coast of Peru is replaced by warmer water depleted of nutrients, resulting in a dramatic reduction in marine fish and plant life…In contrast to El Niño, La Niña (female child) refers to an anomaly of unusually cold sea surface temperatures found in the eastern tropical Pacific. La Niña occurs roughly half as often as El Niño (Department of Atmospheric Sciences (DAS) University of Illinois, 2007).

The last La Niña years were 1995–1996. El Niño

> initially referred to a weak, warm current appearing annually around Christmas time along the coast of Ecuador and Peru and lasting only a few weeks to a month or more. Every three to seven years, an El Niño event may last for many months, having significant economic and atmospheric consequences worldwide. During the past forty years, ten of these major El Niño events have been recorded, the worst of which occurred in 1997–1998. Previous to this, the El Niño event in 1982–1983 was the strongest. Some of the El Niño events have persisted more than one year (Department of Atmospheric Sciences (DAS) University of Illinois, 2007).

There is also an increasing exploitation of diverse types of weeds also demanded by the international markets that might be changing the habitat of benthic species, amongst them, *Loco.* There are different opinions as to whether it has a negative or positive influence on *Loco* populations. Those who argue this position assert the (now harvested) weeds provide refuge for *Locos* and therefore increased protection from its predators (Ocares, semi-structured interview, 2007-01-14).

A third factor argued as negative by Ocares are the externalities generated from mining activities in the region, namely both the tailings generated by the Pelambres Copper Mine at the head of the catchment, which flow into the Choapa River, and the activities of the port facility used for shipping the extracted minerals. The port commenced operations in 1997; i.e., the last "good year" for *Loco* harvest. Ocares says that the Los Pelambres mine pays five fisher organizations in two coves near the shipping port 200 million *pesos* annually to mitigate the problems that this mine "might" cause. This corresponds to US$371,457,[17] or 40 million *pesos* per organization. It would be roughly equivalent to one of Puerto Oscuro's best years of income from *Loco* harvest.

Another factor that may also have increased the resource pressure, thereby providing a partial explanation why MAs have not performed well, is that they attracted more people into fishing. From 1993, the number of fishers in Region IV more than doubled (Ocares, semi-structered interview, 2007-01-14).

Nonetheless, and in spite of the despondency caused by the problems referred to above, a note of confidence and faith in local capability to ensure the positive future of the MA ís still apparent in Ocares' statements. This is no more evident than in his following response where he explained that if MAs have partially worked it is because many fishers are engaged in the initiative and are willing to actively contribute towards making it work. Several organizations of the regional federation pioneered the MAs. This is confirmed by Sernapesca: the first organizations in the country to have their ESBA accepted (in April 1998) were those of Los Vilos (Godoy, C., Sernapesca, Pers. Comm. via email 2007-06-21). At least 16 fisher organizations in Region IV were successful in getting their ESBA accepted during 1998.

By way of providing further support for his argument, Ocares advises that the federation has participated in the formulation of MA rules, and was also active in the discussions and formulation of the 1991 LPA. The federation was also the prime mover of the initiative to

[17] This is 538 *pesos* per US$1 (Diario El Mercurio, 2007-02-28).

reduce the tax obligations of the MAs from 1 UT/ha to 0.25 UT/ha (FEPEMACH, 2006).

Among the other advantages of MAs, Ocares commented in the 2007 interview, individual members can now apply for loans for the education of the children or for complementing the household economy. The Guild Association of fishers, divers and shore collectors of Puerto Oscuro cove negotiated a voluntary life and death insurance for its members that they pay individually. In 2006, a life insurance cost 300 *pesos* monthly (less than US$1). A life insurance to cover the eventuality of death costs 500 *pesos* a year. The association can also borrow money collectively. In 2006 the association borrowed 12 million *pesos* from the Banco del Estado to pay a consultancy to monitor *Locos* stocks. As suggested before, not only the harvest of the *Locos* (4,220 units) was much below the planned quota for that year, but the prices were also low — dealing the association a double blow. The loan to pay the consultancy is a clear signal of economic difficulties.

On the Connection between the Management Areas and the Historical Areas

During the rest of the year, fishers work in the historical areas. Ocares acknowledged during the 2001 interview that association fishers probably extracted *Locos* from the historical areas. To my knowledge, they sold this illicit catch at half price, although it is unlawful and in spite of having their own MA. This showed a lack of management awareness of the connection between the stock recuperation in the historical areas and the MA. I did not consider this attitude surprising given that only three years had passed between the establishment of the MA in 1998 and the year of my first interview with Ocares in 2001. After all, old customs and practices do not change over a night.

Ocares was in 2001 of the opinion that fishers were more aware compared to previously and that stricter vigilance was not needed within the MA, and nobody extracted *Locos* out of self interest. He said "It is like having your own plot of land: you take care of what is yours". Another fisher, listening to our conversation, added: "Of all the bad things, it is the best we have".

It seems, then, that the fishing of *Locos* in the historical areas still continues. The illicit fishing activities are perhaps understandable given that the MA is under-performing economically. According to Ocares, after the MA implementation it has been the historical areas that have suffered the negative impact as both members and non-members of the MAs use them for illegal extraction of *Loco* and other benthic species. The resources there, he says, are scarce and of "bad quality" — meaning too small to get a good price. These areas are not actively managed by the State and so there is little risk of getting caught and punished, so fishers take resources that are not only banned but also catch that does not comply with legal size limits. In trying to protect the benthic resources, Ocares argues that the state has forgotten the fishers, implying that fishers are forced to continue to rely on catch from the historical areas to meet subsistence needs.

Ocares (semi-structured interview, 2007-01-14) told me that the fishers of the region decided to patrol the entire regional coast themselves, even outside of MAs. The initiative was declared unconstitutional and national authorities stopped it. The federation is of the opinion that historical areas should be converted from open access areas into areas of limited access (ALA or *áreas de acceso limitado* (AAL)) and their administration allocated to the existing fishing organizations according to historical use. This way every organization would, in addition to their MA, also exploit and take care of areas designated AAL, thereby preventing exploitation from "outsiders". This would lead to a regulation of open access areas according to the existing norm (in MAs) for the exploitation of benthic resources, allowing regulatory control and monitoring by accountable association members of harvest,

timing, amount and size. This information is not available today (Ocares, semi-structured interview, 2007-01-14) as there is a formal ban on fishing in these areas.

What the fishers argue is that the ban does not work in the historical areas, and should be redesignated under another form, which in practice would mean an extension of MAs. An obvious, but vital question that emerges from this aspiration is how MA fishers would manage to limit access and effectively control and monitor harvest of benthic species in even larger areas (than the current MAs).

Production in the Historical Areas

The most important commercial fin fish is the *Congrio* or Red kingklip (*Genypterus Chilensis*). The catch for this species is on average around 200 kilograms of *Congrio* per night per boat. In 2002 the price per kilogram of C*ongrio* was around 800 *pesos* or US$1.20.[18] Only half of the days of the year do weather conditions allow fishing. Using *Congrio* as an example, a rough estimate of income from the historical areas of seven boats fishing together is about 1,400 kilograms in one night. In 182 days (half of the year) this would total 254,000 kilograms, which would give an income of 20,384.000 *pesos*. Divided by 25, the fishers would get 815,360 *pesos* or a monthly income of *around* 68,000 *pesos*.

If we now add this income to that derived from the MA (176,000 *pesos* monthly per fisher) it totals around 244,000 *pesos* monthly, or US$354 (same rate as above). This is slightly above the June 2002 of 111,200 *pesos* or US$161 (same rate as above). These estimates do not consider other incomes coming from the historical areas.

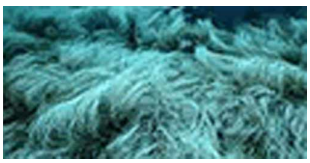
Castillo (semi-structured interviews, 2001-01-10) told me that before he finished diving in 1983, he used to fish principally for *Congrio* using a trawl line. During the 1960s–1970s, he alone could catch 80–100 kilograms

PICTURE 6.5 *Langostinos*

Congrio in one night (compared with 200 kilograms presently per night and boat). The principal reason, according to him, for the reduction of *Congrio* is industrial fishing which removes *Congrio*'s food, i.e. the *Langostino* or Squat lobster (*Pleuroncodes Monodonz*). According to Castillo (semi-structured interviews, 2001-01-10), *Langostinos* (see Picture 6.5, Subpesca, 2005c, permission from Bolbarán, D., Subpesca, Pers. Comm. via email 2008-04-08) are now extremely rare.

In 1989, a visiting consultant showed a video that portrayed how seaweed was harvested in Korea. This specialist gathered 150 fishers from the region, but few took interest. The idea was to involve at least five coves in order to collect seaweeds commercially. It was possible to get a subsidy of 50 million *pesos* to develop seaweed cultivation for the five coves, but it was not possible for Puerto Oscuro to be part of the project due to its role as a strategic army harbour (Castillo, open interview, January 2003). In IFOPs' study (2000), this project appears as capacity building in the cultivation of the seaweed *Pelillo* (*Gracilaria spp*) financed by CIID-Canada in 1994–95 (see Picture 6.6, Subpesca, 2005c, permission from Bolbarán, D., Subpesca, Pers. Comm. via email 2008-04-08).

Since 1994, after he finished diving, Castillo collected shore seaweed. During summer he also



PICTURE 6.6 *Pelillo*

[18] Average of 688.94 *pesos* per US$1, year 2002 (Banco Central de Chile 2003).

cuts seaweed from the rocks on the coast, which does not require any diving. During one month he gathers around 1,500 kilos and obtains 40 *pesos* per kilo, which provides an income of around 60,000 *pesos* monthly,[19] or US$94[20] from this activity. The seaweed is collected once a month by one of several buyers. This activity is risk free and much better than diving, he says. He manages somehow economically, with seaweed collection as his main income generating activity, although he also needs other income sources to survive (Castillo, open interview, January 2003).

Future Plans

Ocares declared in 2007 that 14 organizations with around 450 fishers from the Choapa and Limarí province are planning a project supported by CORFO and together with the University of Los Lagos, in southern Chile, aimed at strengthening MAs and improving their yields.

The project includes the repopulation of MAs with 40,000 *Locos* from southern Chile and the cultivation of mussels for the same purpose. This ambitious project also aims to establish a coordination centre for the region, as well as a research and experimentation centre where fishers can also be hired. To support these initiatives they have applied for 1,200 million *pesos* for two years from CORFO. The cost of the third year will be financed by the organizations themselves and regional funds.

CONCLUSIONS

It is not easy to draw any definitive conclusions regarding the effect of the Puerto Oscuro MA, even after revising 10 years of production. There are both positive and less positive trends. Among the positive is that the MA is already in place and functioning, and this is a major achievement as it demands a great deal of initiative, commitment and organization. Institutionally, fishers' regional representatives have learned to participate in policy making on matters that affect their concerns, as it is clear to see from Ocares accounts; he himself was first the President of the MA Puerto Oscuro and has even become President of one of the regional fishing confederations. This engagement in matters of importance and relevance to the fishers themselves has had an empowering effect and has enabled them to develop the confidence and competencies to act effectively as stakeholders and resource user group. They negotiate internally about resource management, when and how much to harvest in coordinated actions allowing efficient planning, thus demanding less time and energy. The fisher organizations negotiate as collectives with the buyers, obtaining better prices. Thus they do not only hold sea tenure in common, but also management, harvests and economic results are common concerns.

As a collective, the MA can also design development projects and apply for financing both at central and regional levels, and also concerns be taken more seriously as the MAs also form regional federations and national confederations. As such, they can also exercise pressure in policy making matters at varying scales leading to better opportunities to influence outcomes of decisions that have a bearing on their interests.

The benefits of *Loco* fishing in MAs are not filling expectations, while the *Lapas* catch seems to be more closely aligned with landing projections. A more comprehensive study over a longer period of time and including a more expansive range of resources would enable more definitive conclusions.

The connection between the MA and the historical areas is currently problematic. Although effectively managing the MA, some fishers continue to extract *Locos* illegally from outside the MA. As the historical areas and the MAs are interconnected ecologically, to take care of one but not the other might lead to a vicious circle. This problem can be related to their insecure economic situation as well as

[19] Minimum wage January 2000 was 100,000 *pesos* or US$157 (CEDOC- INE, 2005b; Trincado, INE, Pers. Comm. via email 2005-08-12)).

[20] Average of 634.94 per US$1, year 2001(Banco Central de Chile 2003).

to the dilemma of common pool resources to which I return in the last chapter. The taxes are still a problem that could be easily resolved by harmonizing rates payable with real production. This would improve the economic situation of the MAs, which in turn could perhaps diminish the pressure on the historical areas. However, so far these conclusions do not consider the problem of the access to land, which we have already discussed.

7 El Quisco: The Seascape of Hope

SECTION 1: THE LOCATION: HISTORICAL BACKGROUND

INTRODUCTION

This chapter presents the results and analysis of field research in El Quisco. Every tool or exercise is presented in the form of a table that includes its purpose, participants and other basic data; which is then followed by a corresponding analysis (see methodology Chapter One). The pictures and figures show either the direct flipcharts of every tool produced by the participants or a redrawing of it. The chapter is divided into three main sections and 12 sub-sections.

Sub-section two displays the results of the village maps as perceived by participating men and women. Section three develops a historic profile of the fishing village. This is followed by sub-section four, which presents reasons for the introduction of the El Quisco MA, followed by how the fishers perceive the concept of sustainable development (issues assessed with the help of the stepping stones and drawing concept tools, respectively). The fifth sub-section deals with the institutional arrangement of the Union. It is complemented with the Venn diagram tool that illustrates the institutional linkages between the Union and the surrounding actors, including an evaluation of their role in relation to the Union. An assessment of the committee structure of the Union is also considered.

Sub-section six shows the graphic results of several tools, focusing on fishing, both inside and outside the MA generated by the seasonal calendar tool, among others. This section starts with the Union's labour distribution and boat infrastructure, also discussing social differentiation among fishers in terms of fishing assets.

The seasonal calendar tool is divided into several tables and diagrams, dealing with availability of resources, labour distribution and economic assessment of both production spheres: inside and outside the MA. Use of the sea transect tool enabled the generation of data about fishers' perception of resources, predators and so on. This presentation is followed by an illustration of the production and commercialisation of one day of harvest. This issue was assessed using a system flow analysis tool showing the linkages between different land and sea based economic activities, and their market links. These data are complemented by the daily calendar of a diver to illustrate what a working day looks like.

The next sub-section treats the fishing activity in the historical areas. An interview with an experienced fisher, which was not included in the seasonal calendar, was performed separately to assess the fishing species of the historical areas. As well, the daily calendar of a historical area fisher is included.

Sub-section seven presents data collected on fishing incomes. This is complemented with an analysis of the actual production during the last years according to Sernapesca's statistics, and prospects of production and income as anticipated in the Management Plan (PMEA) of the Union calculated by BITECMA for the period 2001–2010.

Using the impact analysis tool mens' and womens' perceptions of the effects the MA has had in their lives is presented in sub-section eight. An evaluation on the impact of the MA would be incomplete if not followed by an analysis of the problems that the fishers perceive (sub-section nine, using the problem-tree tool). While men's problems focused on the MA, women's were centred on their personal lives, including the household situation and family. Women's problems are complemented with the results of an open interview with the women's group. In addition, their seasonal calendar regarding illness and related expenses is also included here. Furthermore, the daily calendar of a woman is presented. Sub-section 10 deals in its turn with an analysis of mens' and womens' proposed solutions to their respective problems. This was done with the help of the solution-tree tool.

Sub-section 11 includes the participants' evaluation of the methodology. The opinions of both men and women are displayed in the form of three tables: what participants liked, what participants did not like and what participants learnt. The 12th and last sub-section is the conclusions.

THE LOCATION

El Quisco is situated around 150 km from the capital city of Santiago, in the Region V of Valparaiso (see Picture 7.1). El Quisco has undergone significant changes during the last five decades to the extent that a village and a fishing cove are now also a summer middle- and upper middle-class hub. The population and the number of houses have increased. In 1970, there were 2,217 inhabitants in the entire commune (INE, Muñoz, Pers. Comm. via email 2007-10-09), including El Quisco, Isla Negra (famous because the Nobel Prize winner, Pablo Neruda had one of his residences there — a popular tourist attraction), and El Totoral. In 1992 the commune's population reached 6,097 inhabitants (INE, 2002). There were 8,273 houses, but only 1,829 were permanently occupied. The remaining were seasonally occupied, belonging mainly to people residing in Santiago. During summers, the population — seasonal and tourists — exceeds 200,000 persons (Vildósola and Rosson, 1997, p. 183–184). In 2002 there were 9,467 inhabitants (INE, 2002); i.e., an increase of 55.3 percent compared to 1992. The residential population has increased 327 percent since 1970.

PICTURE 7.1 Location of El Quisco

Becoming a summer resort has resulted in major social differentiation for El Quisco, while improving the town's infrastructure. For the fishers it meant, on the one hand, a threat to their activities that soon developed into a struggle over physical space; an event that would have a significant connotation for them as a collective. On the other hand, the summer and weekend guests also meant an economic boost: more demand for their products, and job opportunities; i.e., as care takers of the summer houses, principality the women. Otherwise, in terms of stable job opportunities, labour demand is low with the exception of some construction teams and those related to increasing bureaucratic posts around the Municipally, health care and schools.

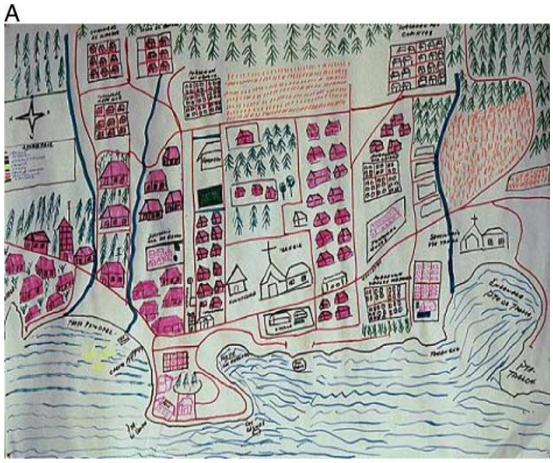
Social differentiation and house segregation were raised by the fishers and their wives in the results using village maps tools. This can also be seen in the women's problem-tree and solution-tree tools.

The aim of the village maps was to obtain fishers' and womens' general perception of places, resources and city structure and to see whether there was a gender difference in these perspectives. The mens' map (see Pictures 7.2A and 7.2B) clearly distinguishes between the well-off summer residences, which they have

TABLE 7.1 Men's village map (*Mapa del Pueblo*).

Purpose:	To obtain a perception of the distribution of places, resources and city structure in general.
Participants:	Luis Pizarro, Guillermo Alvarez and Silvio Crovetto.
Place:	The Union's Social Centre. *Date*: July 19th, 2001. *Duration*: *ca* three hours.
Process and Comments:	Several steps were required to draw the final version. The participants particularly enjoyed drawing the map; it caused a lot of amusement and comments from onlookers.
Facilitator:	Rosson, A.

A



B

Legend	*Simbologia*
Roads	*Caminos*
Woods)	*Bosques*
Rivulets & swimming pool	*Esteros y piscinas*
Cove	*Caleta*
Houses	*Casas*
Summer houses	*Casas de verano*
Reforested area	*Plantaciones*
Football arenas	*Canchas*

PICTURE 7.2 (A) Men's village map, (B) Legend (*simbologia*)

coloured pink, from the *poblaciones* or settlements where they live, which they have coloured black. In comparison with the women's map (see Pictures 7.3A and 7.3B), the men's map is more detailed. Football and other sports activities are delineated, as well as churches. Paradoxically, the cove with its boats and the Union Social Centre is more visible in the women's map than in the men's map. In contrast, the site where the yacht club is situated, neighbouring the cove, is more visible in the mens' map, as is the coastline.

TABLE 7.2 Women's village map (*Mapa del Pueblo*).

Purpose:	To obtain a perception of the distribution of places, resources and city structure in general.
Participants:	Flora Marin and Johanna Bianchi.
Place:	The Union's Social Centre. *Date*: July 20th, 2001. *Duration*: One and a half-hour.
Process and Comments:	Easy. The participants enjoyed the activity much.
Facilitator:	The Author.

The prominence of the yacht club is probably due to it being a conflict zone for the fishers.

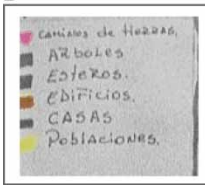
The womens' map clearly distinguishes (see Pictures 7.3A and 7.3B) the unpaved roads (pink) that lead to the poorer places of the village and which get muddy during winter and where they live (*poblaciones* or settlements), from the main paved road near the beach that leads to the well-off summer residences and apartments. Like the men, the women make an obvious distinction between these well-off houses and their own *poblaciones*. The cove with its boats and the Union Social Centre is more visible in the women's map than in the men's (Table 7.2).

Analysis of Village Map Tools

Both men and women depicted the typical small town, but highlighted class difference by house segregation as a significant issue. They represented their own living places in the more distant and higher parts of town with many equal small houses close to each other, circumscribed by small boxes, which men coloured

A

B



Dirt roads	*Caminos de tierra*
Trees	*Arboles*
Rivulets	*Esteros*
Houses	*Casas*
Settlements	*Poblaciones*

PICTURE 7.3 (A) Women's village map, (B) Legend (*simbologia*)

black and women yellow. This in contrast to many large individual and dispersed summer houses (coloured in vivid pink by men and red and grey by women), many of which are surrounded by trees and modern apartment buildings near the beach and the city centre. In both maps, the higher the place, the smaller and more alike are the houses. Now that we have presented representations of the village we proceed to give the historical background to the cove as described by the fishers.

HISTORICAL BACKGROUND OF THE EL QUISCO FISHING COVE

The historical profile shows that the history of the cove as a fishing place is not long. In 1940 there were only two fishers. According to another source, there were six fishers in 1935 (Vildósola and Rosson, 1997). The number of fishers grew slowly and in 1952 there were eight independent divers. The fishers built their living place close to the cove and catch was used for both home consumption and sale. They mainly fished *Locos* and *Sea Urchins*. In 1953, the first motor boat, a Penta 8 HP appeared. In 1955, the number of fishers had increased to between 15 and 20 and the number of artisan boats to 10. In 1997 there were 36 boats of which seven were launches, which are larger and more modern, as well as, 20 artisan boats (Vildósola and Rosson, 1997) (Table 7.3A).

As the number of fishers increased, the social landscape also changed. The transition to a summer resort hub brought new stakeholders with new interests, economic power and influence, and the current struggle over the cove space began. As the prices for the property lots near the sea increased, so did the pressure on fishers to leave the places where they had built their modest shelters, forcing them to settle in more distant places; a concern stressed by men and women in the village maps. This displacement implies that women became dissociated from the sea and from fish processing activities.

The land where they lived had been lent to them by a landowner, whom later started selling parts of it (the Union bears the name of the landowner: Narciso Aguirre). The group that bought the lot to build the yacht club tried to remove the fishing activities. This resulted in a conflict over the space and subsequently to the fishers organising a Union to defend their rights to the cove.

As the historical profile (Table 7.3B) shows, the Union was formed in 1957, consisting then of 26 members and four 14-year-old youths. The Union received the status of a legal entity two years later (1959) (Vildósola and Rosson, 1997). With the development of the area, the presence of the authorities also became visible and the fishers discovered that they needed permission via a license to fish. The problems with the yacht club calmed down, according to one testimony cited by Vildósola and Rosson (1997), at least for the time during the socialist government of Allende (1970–1973), when some of those active (mostly right-wing supporters) in the Yacht Club left the country.

In 1966, the Union had around 60 members, and in 1969 they started building a social centre which was just 25 square meters. It also operated as an eating place and shelter for the fishers. It was named "*La Fritanga*" (where things get fried). This collective initiative proved to be a good investment as the centre also became a popular restaurant for summer and week-end guests. It also meant a loss of privacy for the fishers in their own centre, though. As we shall see later, the economic contribution of the restaurant is still vital for the Union.

As the interest in the restaurant as a source of income increased, its concession, first granted to a fisher, was soon given to a non-fisher. It was shown later that the Union could

TABLE 7.3A Historical profile, men (*Perfil Histórico*).

Purpose:	To grasp the history of the people of the Union/ fishing cove and their most important moments.
Participants:	Mario Andrade, Rafel Pizarro, Victor Mella and Manuel Alvarez.
Place:	The Union's Social Centre.
	Date: July 20th–21st, 2001.
Duration:	Three hours one day and one hour of presentation for the other participants, further complemented during the following day.
Facilitator:	Rosson, A. first day, Rosson and the author, the second day.

TABLE 7.3B Reproduction of the historical profile.

1940	Two divers with diving suit (*escafandr*a).
1949	Read tides (fish and shellfish died).
1952	Eight independent divers. Extracting *Locos* and Sea Urchins for self consumption and sale.
1953	First Penta 8 HP motor boat.
1950–57	Struggle with the Yacht Club over cove space.
1955	Between 15 and 20 fishers with 10 small artisan boat.
1957	The Union formed with 26 members and four youths (14 years old) whom paid half quota.
1958	Earthquake.
1965	The construction of a social centre starts, which later became a popular restaurant. The Union reached 60 members.
1969	Two fishers died in ''bad weather''.
1970	The social centre (restaurant) was given in concession to a private, non-fisher administrator. For the concession he paid in *natura:* an electric boat dragger (*huinche*).
1973	Production still for the internal market.
1975	Second contract for the restaurant. Payment in *natura:* fishing shop, sheds and public toilets.
1975	Exploitation and commercialization of *Loco* according to the legal measurement (10 cm). Better price (750 *pesos*/unit, sold on beach).
1976	Storm: one diver and two fishers died.
1979	Earthquake.
1980	Third contract in *natura* payment: enlargement of the social centre (kitchen, personnel's toilet) and Union's office.
1983	Earthquake: Japanese experts visited the zone and measured a land elevation of 4 meters.
1987	Official national ban of *Loco.*
1987	The Union starts to sell *Locos* directly to exporting firms (930 *pesos*/unit).
1988–93	Self-imposed ban of Zone A (La Puntilla).
1990	Fourth contract: renegotiation of contract. Rent payment in cash (40 millions *pesos*: 10 for the Welfare committee, six for Recreation committee and 24 for the Union: labour, construction, water, telephone, contributions, etc.).
1991	Legal procedure to obtain La Puntilla MA started.
1992	Boom of Fly Jumbo Squid (Jibia o Calamar Rojo, *Dosicus giga*) They started to fish it.
1993	Individual harvest in Zone A (La Puntilla). The ban is lifted twice. The diver Manuel Alvarez [President of the Union during my field-work] extracted 1500 *Locos* in 1 1/2 hour after five years of self-imposed ban.
1994	By Union decision: no harvest undertaken due to low price of *Locos* (680 *pesos*/unit).
1995	Official rules for the MA are delivered.
19??–96	Official ban of *Loco* the whole year in the rest of the country.
1997	By Union decision: common harvest of the MA (Zone A).
1997	Two new MAs were integrated in the Union (Zone B and C).
1999	ESBA performance.
2001	70,000 *Locos* available for extraction in the MA.

not collect rent due to the rules regarding places with only rights of use. As a solution to the problem, the concessionary of the restaurant paid in kind (i.e., *natura*, or by bartering work). The first contract was written and the social centre (restaurant) was given as a concession for five years; and renewed several times, adding up to 17 years in total.

According to the data derived from the historical profile, in the first agreement, the Union got an electric boat dragger (*huinche*), which greatly increased the efficiency of their work. Until then, they dragged the boats from the sea manually and with horses. In 1973, the production was still aimed at the domestic Chilean market.

The next renegotiation of the contract occured in 1975. The second piece of work-payment in kind agreed upon was infrastructure improvements. The Union got a fishing-shop; sheds to store their equipment and importantly, due to sanitary reasons, public toilets. In the next year the Union started with the exploitation and commercialisation of *Locos* according to legal

stipulated measurement (10 cm), something that gives a better price (750 *pesos*/unit sold on the beach).[1]

The third contract for the restaurant, brokered in 1980, led to an enlargement of the Union's office in the form of a kitchen and staff toilet. Ironically, at this point the restaurant had become fashionable with prices too high for fishers. Furthermore, it is likely that a self-chosen class exclusion contributes to their alienation from the restaurant. That is, not only are prices too high, but social class also manifests itself in attitudes and dress code. Nevertheless, the restaurant became a lucrative business and the Union strengthened its negotiation position. All in all, the infrastructure the Union received from leasing the restaurant was worth 26 million *pesos* or US$66,000 (1995 value).[2] The restaurant and the terrace including their equipment were valued in the same year at 150 million *pesos* or US$377,000 (Vildósola and Rosson, 1997).

In 1990, the time came to renegotiate the fourth contract. This time the Union demanded payment in cash as they had discovered a new law permitting them to rent out the restaurant. The Union ended the contract with the former administrator who wanted to pay 4 million *pesos* or US$13,119 (value 1990),[3] which the fishers did not accept. The Union auctioned the administration publicly for a minimum price of 8 million *pesos* (US$26,238). Finally, an outsider was granted the concession for 17.5 million annually or US$57,395 per year (Rosson BITECMA, Pers. Comm. via email 2005-09-28). According to the information generated from the historical profile, it was 40 million *pesos*. As this sum (40 millions) in the exercise seems to be incorrect, it is difficult to say, how the seventeen and a half million (about which Rosson informs) were divided among the committees of the Union.

The fishers started building a new social centre in 1993 as a result of the improved economy of the Union. In 1993 — the same year the Union started the legal procedure to obtain their MA — the struggle over the contested space at the cove was revived. This time liberal democracy had returned to Chile after Pinochet's withdrawal. With this new situation, the political colour of those engaged in the struggle from the yacht club side changed. Judging from those who were involved, it was no longer people with right-wing sympathies. The new event started in 1988 when the national Direction of Port Work presented a proposal of a port infrastructure for El Quisco, including the construction of a pier — an old dream among fishers — aimed at supporting sea operations and therefore also the harvesting.[4] Also there was no infrastructure to lift larger boats. The plans did start to take form until 1995 after the Union got support from the government (Vildósola and Rosson, 1997).

Because of the magnitude of the new plans, few in the commune remained indifferent. The local newspapers ran the story that the Union wanted to construct a maritime complex the costs of which were estimated at around 300 million *pesos* or US$7.5 million (1995 value).[5] It was proposed that the complex would include a refrigerated plant, a repair dock, a crane to lift boats, a wave-breaker, a protected embarkation pier, a terrace, access roads, open recreational spaces and toilets. In response to the proposal, social division emerged in the community (including summer residents), dividing the opinions into for and against factions. Amongst those opposing the development was the yacht club. The President of the yacht club claimed that they had solicited the space for the club, something that was denied by the Municipality in February 1994 as the area plan prohibited any construction on the coast. The club members demanded a public explanation from the Mayor

[1] I do not convert this price to US$ since conversion is not very reliable due to the fact that in 1975 the national currency was changed from *escudos* to *pesos*.

[2] Average 396.77 *pesos* per US$, year 1995 (Banco Central de Chile 2003).

[3] Average of 304.90 *pesos* per US$, year 1990 (Banco Central de Chile 2004).

[4] The need for such a pier obeyed the geographical and hydrological conditions of the cove, which is too open and exposed to winds, often hindering fishing activities.

[5] Average of 396.77 *pesos* per US$, year 1995 (Banco Central de Chile 2003).

of the commune who responded by stating that it was highly unlikely that the club members were unaware that the area plan had been modified in October of the same year. The new regulations did allow the construction of additional buildings on the coast line, where both the Union and the yacht club have their facilities. At the end of 1995, a new discontented group appeared: the "Committee of recuperation of El Quisco", presided over by an ex-foreign affairs minister (during Aylwin's government, 1990–1994) and senator of the Republic — a social-democrat who has his summer residence in El Quisco. The committee's primary objective was to obstruct the progress of the marina plans. A zone deputy, belonging to the same political party as the ex-minister, intervened supporting the fishers' cause and declared in the local newspaper that to obstruct the fishers' right to modernisation was an act of egoism. Furthermore, commenting on the ex-foreign affairs minister's involvement he said, "I think that persons that only live seasonally in El Quisco should refrain from giving opinions and interfere in internal problems that only affect those who live here permanently" (Vildósola and Rosson, 1997, p. 177). This comment reflects the divide and ambivalence of the natives against the "outsiders".

Finally, in February 1998, the Minister of Public Works, Ricardo Lagos, later to be President of the Republic (2000–2006), opened the new pier. The area covers 1,000 metres squared with a head 26 meters long, 7 meters wide and 3 meters deep (Vildósola and Rosson, 1997). Although not all the planned facilities materialised, the positive balance was this time in favour of the fishers who emerged strengthened from this struggle, securing their right to the physical landscape of the cove. In addition to the pier, they had also realised an old dream. Picture 7.4 shows the pier infrastructure "overseen" by the fishers' own religious symbol, Saint Peter, who stands in a boat. Behind Saint Peter the names of those fishers who have lost their lives on the sea are engraved.

The historical profile tends to understate some types of events, such as those related to tragedies, which occupy a special place: two

PICTURE 7.4 San Pedro, fishers' saint, watching the pier and the bay

fishers died in 1969 due to "bad weather", and one diver and two fishers died in 1976. Tragedies also include the earthquakes of 1958, 1979 and 1983. According to the fishers, the "1983" earthquake resulted in an elevation of land by four meters affecting the cove and the harvest. This view was also supported by visiting Japanese experts. The "1983" earthquake actually occurred in 1985. According to Oliva and Castilla (1990, p. 391), in central Chile the earthquake's effect caused an elevation of the coast, which probably diminished the density of the *Locos* population in the inter-tidal zone. The effects in the sub-tidal area seemed to be less.

Fishers also mentioned some significant changes in the sea conditions that have forced them to modify their fishing strategy. For example, in 1949 there were "*red tides*" or "*red waters*" (toxic algal bloom), causing the death of fish and shellfish. In 1992, there was a boom of Fly jumbo squid (*Jibia or Calamar rojo, Dosidicus giga,* see Picture 7.5) due to a maritime trend, enabling them to fish this suddenly abundant species, which had not been exploited before.

PICTURE 7.5 *Jibia*

Analysis of the Historical Profile

An analysis of the history derived from data from the historical profile tool (see Table 7.3B) reflects both the process of El Quisco becoming an urban village and the development of artisan fishing activities in the cove, including key issues such as the establishment and consolidation of the Union, the struggle with the yacht club, the exploitation of different species, and the development and attainment of the three zones of their MA.

The analysis of the historical profile shows a formation process of the fishers' cultural-and-class identity. During the initial years this cultural identity and social cohesion started to form around sustenance activities, demanding trust and collaboration. Loss of lives and tragedy related to weather conditions have been a painful way to strengthen bonds. Then a class identity was shaped and the development of negotiation power was stimulated due to the arrival of a wealthy social group that not only contests the fishers' rights to their living place, but also their right to the cove.

The transformation of El Quisco — from a village into an urban centre — initially a threat to the fishers, paradoxically ultimately favoured their struggle over the seascape. Then they won the right to keep their social identity as fishers, which enabled them to continue with their activities, which now leads us into the next phase of fishing of benthic resources: the MA.

FROM EXTINCTION TO SUSTAINABLE DEVELOPMENT

Like the rest of the country, the fishers of El Quisco cove have been fishing *Loco* and other benthic resources under open access, which has commonly led to unsustainable resource extraction trends. Around 1975, concern amongst the fishers over overexploitation of *Locos* started to emerge. The export had started only one year before. Over-fishing is one of the most important of the six stepping stones that precede the introduction of the self-regulation system of the species (later manifesting in an MA) according to the PRA stepping stones tool (see Table 7.4B). By 1975, the fishers had already started to extract and commercialise *Locos* according to the legal measurement (10 cm). This was perhaps their first step towards a more sustainable fishery (Table 7.4A).

TABLE 7.4A Stepping stones, men (*Hitos*).

Purpose:	To understand the reasons for the introduction of the MA.
Participants:	Patricio Alvarez, Guillermo Alvarez, J. Campos. Enrique Leal, J.C. Valencia, Mario Luis Castro and Ricardo Moraga.
Place:	The Union's Social Centre. *Date*: July 18th, 2001.
Duration:	One and a half-hour in addition to another one and a half-hour of reciprocal Presentations with the group working with the drawing concepts exercise.
Process and Comments:	Easy and effective. For more comments, see description.
Facilitator:	The Author.

Thus, due to overexploitation, the Union initiated the self-imposed-ban of *Locos* in Zone A (La Puntilla) around 1987. This was one year before the government started the ban, so they were pioneers in this respect (that was in 1988 and not in 1987, as in the exercise). The government ban was in effect from 1989 to 1992 in north and central Chile (IFOP, 2000, p. 42). Universidad Católica de Chile, Santiago had been experimenting with a no-take zone near El Quisco, and these experiences inspired the self-imposed ban in El Quisco (see Chapter Five), which was undertaken in close collaboration with Dr. Castilla and his team.

During the first self-imposed ban in 1988, the fishers, instead of selling to intermediaries, started selling *Locos* directly to exporting firms, at a price of 930 *pesos*/unit or US$3.8 (value 1988)[6], which at the time was considered to be a very good price. The ban situation soon changed the commercialisation scenario, not only for the fishers but also for the buyers. The bans and buyers competition encouraged both exporting firms and fishers to fix the commercialisation of *Locos* by establishing direct

[6] Average of 245 *pesos* per US$, year 1988 (Banco Central de Chile 2004).

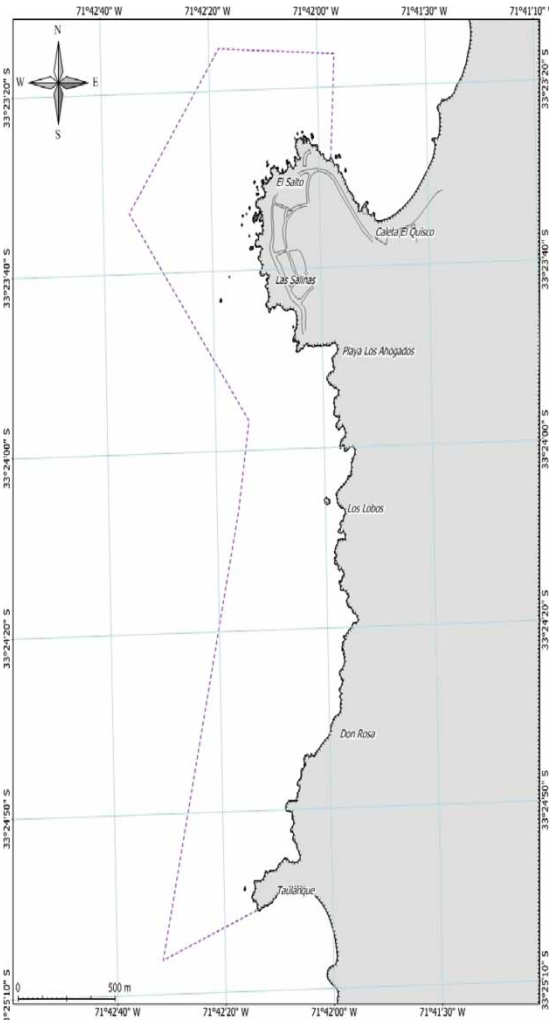
TABLE 7.4B Reproduction of men's stepping stones.

I	Overexploitation of the *Loco.*	1975
II	Self-ban introduced by the fishers/divers themselves in Zone A (La Puntilla) in connection with the Universidad Católica de Chile of Santiago.	1987
III	Official government ban of the *Loco.*	1992
IV	Individual harvest in Zone A (La Puntilla). Auto-ban yields good economic results.	1993
V	Common harvest in Zone A (La Puntilla) led and decided on by the Union.	1997
VI	Extension of management areas to Zones B and C.	1997

trading relations. The legal procedure to obtain the La Puntilla MA started in 1991, which was the same year that the new LPA was promulgated.

In 1993, a first harvest was performed after five years of the self-imposed ban or no-take of *Locos* in Zone A (La Puntilla; Picture 7.6). *Locos* were harvested by individual groups, following a traditional approach of three crew per boat. This first experience gave a rich harvest and good economic results (see Picture 7.7). In 1994 the Union decided not to harvest *Locos* due to the low market price (680 *pesos*/unit of *Loco* or US$1.6, value 1994,[7] compared with 930 *pesos*/unit in 1988, or US$3.8). In 1995 on a national level the official rules for MAs in Chile were formalised (see Chapter Five).

In 1997, four years after the first harvest of the new management regime, the Union decided to harvest the area (Zone A) in common instead of individually (more about this below). Two new zones were integrated into the MA (Zones B and C). In 1999, the ESBA was performed for Zone A in collaboration with BITECMA, the consultants working with the Union. The ESBA for the three areas cost around 34 million *pesos* or US$67,000 (value 1999)[8], of which 70 percent was subsidised by the state. The rest was paid by the Union. Fifteen percent was in the form of material and collaborative support (in kind) and 15 percent in cash (Rosson,



PICTURE 7.6 The MA El Quisco, zone A
Source: BITECMA, courtesy and permission by A Rosson.

BITECMA, Pers. Comm. via email 2005-09-28). The annual follow-up costs are approximately 1.5 million *pesos* or US$2,362 (value 2001)[9] per area. The cost depends on whether and how much the Union collaborates in the follow-up activities.

In 2001, the year of my field-work, the Union had, according to BITECMA's planning, intended to extract 70,000 units of *Locos* from the MAs, although they had planned a harvest

[7] Average of 420.18 *pesos* per US$, year 1994 (Banco Central de Chile 2004).

[8] Average of 508.78 *pesos* per US$, year 1999 (Banco Central de Chile 2003).

[9] Average of 634.94 *pesos* per US$, year 2001 (Banco Central de Chile 2003).

PICTURE 7.7 *Loco* harvest
(picture reproduction of a borrowed picture with permission from the Union, July 2001)

of only 32,000 *Locos*. Nonetheless, the 70,000 units would mean, in theory, approx. 60 million *pesos* or US$95,000 US$ (value 2001),[10] I will return to this issue later.

Analysis of the Reasons for the Introduction of the Management Area

We have seen, through the stepping stones data, how the El Quisco MA was created as an answer to resource depletion. This exercise did not specifically consider the factor behind the transition from an individual to a common harvest during the second time the Union harvested *Locos* within an MA framework. It is not difficult to imagine the experience of around 100 people trying to collect as many *Locos* as possible in competition with each other. This individualised harvesting contrasts with the experience during the preceding several years that fishers had been taking care of the area and the resource in common. This new division of labour of common harvest thus becomes more congruent with the collective nurturing of the species as well as with collective arrangements for commercialisation. Competition is then substituted with collaboration and the weakest and the strongest, the young and old, the most skilled and less skilled divers and fishers, all get their share. What is important to realise is that the fishers are related and many of them would have been competing with members of their own family. Eliminating competition during harvest diminishes rivalry among fishers and converts the extraction days into a collective event. The "free-riders" phenomenon is avoided by rewarding every diver per extracted unit, "since all the divers do not realise the same effort in extracting the *Locos*" (Reglamento Interno para el Cuidado, Administración y Explotación de los Recursos Objetivos de las Areas de Manejo, *s.a.,* Letra b.5; hereinafter Reglamento Interno).

With successful harvest experiences, the Union felt encouraged to go further and decided to integrate, by application to Sernapesca, two new zones as management areas. These enlargements would not prosper, though. From the first self-imposed ban in 1987/88 to the incorporation of the two new areas in 1997, one decade has passed in which they have had two positive harvests. The time span for the fishers is long but they continue to fish outside the protected areas for their livelihood, including for benthic species when permitted. Nonetheless, the time span for the *Locos* population is not so long, given its slow reproductive rate. It is only when the resource becomes ready for exploitation that one can meaningfully assess the results. Only then can the social negotiation process start and agreements be reached within a group consisting of almost 100 persons.

The next PRA tool (drawing concepts) deals with the concept of sustainable development. It allows differentiating between two main issues that may help us understand the transition from an individual to a common harvest in the MA.

Sustainable Development: Fishers' Perceptions

Sustainable development is one of the main reasons for the introduction of a MA, both in order to preserve the species and protect the economic livelihood of artisan fishers. One of my research questions was whether the fishers understood this concept, using the drawing concepts tool. To perform this (Table 7.5B), the fishers used the Chilean hake (*Merluza or*

[10] Average of 634.94 *pesos* per US$, year 2001 (Banco Central de Chile 2003).

Merluccius gayi gayi) as an example. This species is captured outside the MA — where most of the fishers' individual income actually comes from (Table 7.5A).

The first main issue possible to differentiate in the Drawing Concepts tool (Table 7.5B) relating more directly to the concept of sustainable development, is the protection of the resource (Item I) and to administer it with social sense (Item V), taking into consideration the time span to ensure that the present exploitation safeguards the survival of resources for future generations (Item VI).

The second issue is more related to an ideal situation for the fishers and would help reach sustainability. Item II is concerned with substituting the present fishing policy from authorities of regional shared quotas with one of sharing quotas among Unions, which is the fishers' ambition. There are 37 fishing coves (Montoya, 2004), and 49 fishing organizations in the region (Sernapesca, 2005a) which compete with each other, creating rivalry. According to Item IV, quotas to the fishers organizations would mean saving on equipment like fishhooks and a more controlled extraction, which would mean better prices for the resource. Thus, according to Item III, defined quotas for Unions would eliminate competition among them, which would then help to diminish rivalry.

TABLE 7.5A Men's drawing concepts (*Dibujando Conceptos*).

Purpose:	To understand how fishers perceive the concept of sustainable development, referring to an ideal or wanted scenario.
Participants:	Victor Mella, Eduardo Gonzalez, Patricio Aranda, Manuel Bravo, Silvio Corvetto and Eduardo Pizarro.
Place:	The Union Social Centre. *Date*: July 18th, 2001.
Duration:	One and a half-hour in addition to another one and a half-hour of reciprocal presentations with the group working with the stepping stones tool.
Process and comments:	For more, see description in the text.
Facilitator:	Rosson, A.

TABLE 7.5B Reproduction of the men's drawing concepts: sustainable development.

I	To protect the exploited resource, for ex. Merluza (*Merluccius gayi gayi*), Chilean hake.
II	Official share of quotas to the Unions instead of regional quotas.
III	Sharing quotas to the Unions would eliminate rivalry with other fishing unions.
IV	Know how to manage the new quotas: (a) less need of fishhooks; (b) rational and controlled extraction; (c) the less the extraction quantities, the higher the prices, and thus more income.
V	Management with social sense (present and immediate future).
VI	To leave the resource so it is inheritable for future generations.

Analysis of the Sustainable Development Concept

The key factors such as protecting the species and competition are intimately related to each other. That data suggests that creating conditions of competition, which fosters rivalry amongst different stakeholders, is not a viable or sustainable appropriation strategy in this case. Furthermore, it is clear that such an approach results in unsustainable exploitation of resources by nurturing uncooperative fishing behaviour, leading eventually and inevitably to the tragedy of open access. This supports the idea about the substitution of individual harvest with a common one in the MA. Reducing all ideas to seven items in this exercise, the fishers were able to point out several key issues that form part of the concept of sustainable development applied to a resource that is fished outside their MA.

It was difficult in the beginning for the fishers to make concrete such an abstract concept as sustainable development, but as discussion progressed, they agreed on what the concept meant for them. When the exercise was finished they also felt quite proud that they could formulate a concept on paper that seemed, at the beginning, extremely abstract. As the fishers together analysed the results of the stepping Stones and drawing Concepts tools, there was a clear agreement about the

reasons for the introduction of the self-imposed ban, which was due to overexploitation, validating the result of their respective tools. The drawing concepts' group also helped the stepping stones' group to fill in some details and the years.

We have now considered both the reasons for the introduction of the MA and fishers' perceptions of sustainable development, so in the following section the focus will be on the institutional analysis of the Union.

The Union, Governance Arrangements and Institutional Linkages

In order to explore the internal organization and division of labour of the Union, a diagram of the Union was made (see Table 7.6 and Fig. 7.1). In drawing the diagram the participants demonstrated good knowledge about the Union's committees, as well as their responsibilities and powers. The performance of the committees and of other organizations that have a relationship with the Union was examined using the Venn diagram tool (see Table 7.7, Picture 7.8 and Fig. 7.2). The Venn diagram was arranged similarly to the scale used in the Chilean education system; i.e., from one to seven: the higher the rating the more important the influence and closeness of the organizations/institutions/groups to the Union as judged by fishers.

The Union has a traditional structure consisting of the membership at the base, and a board of three elected members: the President, the Treasurer and the Secretary. The Union has 92 members plus 20 passive members. The Union is regulated through rules of membership, committees, members' rights and duties and disciplinary procedures.

The first document "Estatutos del Sindicato de Trabajadores Independientes "Narciso Aguirre de Pescadores Artesanales de la Comuna de El Quisco" (1998, hereinafter Estatutos) deals with the statutes of Union, and is composed of 50 Articles divided into the following nine titles: (1) Goals and principles; (2) Assembly; (3) Board; (4) President, Secretary and Treasurer; (5) Members; (6) Commissions; (7) Patrimony of the Union; (8) Censure; and (9) Sanctions (Estatutos, 1998).

The second document "Reglamento Interno" (*s.a.*) consists of three titles regulating (1) Vigilance; (2) Transects or follow-up; and (3) Extraction. It also has two other titles consisting of: (1) Sharing of money; and (2) Discounting for faults. The third and last document "Reglamento de Sanciones" deals specifically with the Sanctions, determining the amount for faults and other sanctions. The key elements of these documents follow below.

Union Organization and Governance Arrangements

The management of the MA is distributed between six committees. The most important is the steering bodies of the Management Area Committee and the Board. They are responsible for general aspects related to the commercialisation of the Union's fishing operations, in addition to the control, functioning and monitoring of the MA. Of special importance is the Disciplinary Committee. This committee manages breaches of rules, and punishment includes different fines for disobeying rules like not attending meetings, drinking alcohol within the cove or using bad language in the cove, amongst other punishable offences.

To become a Union member, a fisher has to apply; then a special commission prepares and presents it and decision is taken by the whole membership. All of the membership of the

TABLE 7.6 Diagram of the union (*Diagrama del Sindicato*).

Purpose:	To understand how the Union and its parts are organized and its functions. Only men.
Participants:	Victor Mella, Eduardo Gonzalez, Patricio Aranda, Manuel Bravo, Silvio Corvetto and Eduardo Pizarro.
Place:	The Union Social Centre. *Date*: July 22nd, 2001.
Duration:	One and a half-hour.
Process:	Expedite.
Comments:	For comments see the description.
Facilitator:	The Author.

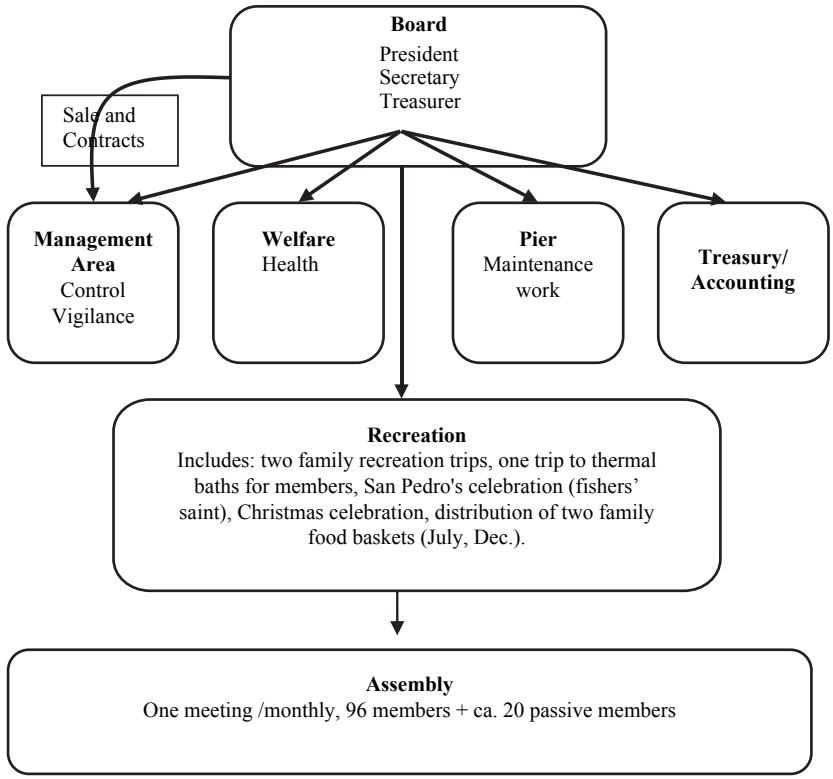


FIGURE 7.1 Reproduction of the diagram of the union, men

Union gather monthly.[11] Every member has to pay a monthly fee (corresponding to 5.6 percent of a national official minimum salary) and a one-off "incorporation quota" of half a million Chilean *pesos* or US$1,172 (value 1998).[12] The latter can be paid over a year (Estatutos, 1998, Art. 29). If a member does not pay the fees for more than six months, the membership is withdrawn.

New members can enjoy the social benefits of the Union from the first day, but get access to the commercial benefits only after two years of membership (Estatutos, 1998, Art. 2, letra I). Two years of membership are also necessary for a fisher to be able to participate in the harvest. Before fishing commences every year, the Union undertakes a survey along the same transects to count the species together, under the supervision of the engaged consultants. Cooperation is firmly regulated by the Union rules. All the members must assist and collaborate according to a strict schedule and those who leave their allocated activities before the day is over or come late are considered to be absent. Those that are absent without justification lose 50 percent of their income that day.

Loss or damage to fishing equipment or the boats are compensated for by the MA. The owners are otherwise not entitled to any extra share for the use of their belongings in the harvest (Estatutos, 1998). In contrast, the divers receive an additional share for every unit they harvest. The amount for that extra benefit is decided on by the assembly.

All members with two years of membership must participate in monitoring and enforcement duties, which are performed daily during the

[11] According to the statutes "It might belong to this Union those independent workers that exercise the Union's base occupation and that accomplish the requirements demanded by the statutes of the organization" (Estatutos, Art. 28).

[12] Average of 426.29 *pesos* per US$, year 1998 (Banco Central de Chile 2004).

TABLE 7.7 Men's Venn diagram (*Diagrama Venn*).

Purpose:	Venn Diagram reflects the degree of importance/performance/influence and nearness of the existing institutions and other instances in relation to the Union, including the Union's committees.
Participants:	Victor Erices, Orlando Mella, Enrique Leal and Silvio Corvetto.
Place:	The Union Social Centre. *Date*: July 21st–22nd, 2001.
Duration:	One and a half-hours plus an extra hour the following day.
Process:	Without problems.
Comments:	The diagram was made in two steps/days. In the first day the institutions/organizations were identified and placed in relation to the Union. On the second day, their degree of nearness and significance of the different components in relation to the Union was decided according to the scale from 1 to 7 referred in tool number 5.
Facilitator:	The Author.

whole year, with two men allocated per zone during 14 hours of the day between 05:00 and 19:00 hrs. The other two zones, B and C, have been excluded and the other is not in operation (Rosson, BITECMA, Pers. Comm. via email 2007-07-30). All eligible members must participate in eight shifts of patrol duty each year in Zone A.

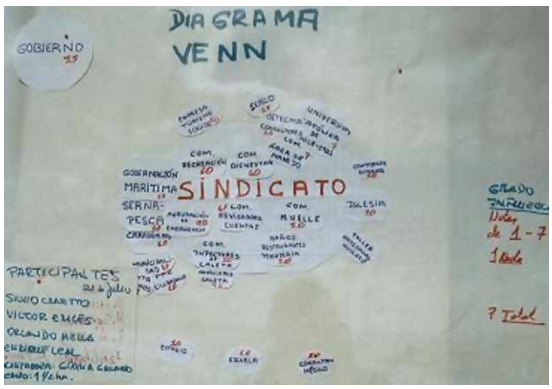
If a person does not complete his duties, or arrange a substitute, he is fined 20,000 *pesos* or US$31.5 (value 2001)[13] every time he is absent. The money from the fines is used to cover the cost of the MA and fine's money is withdrawn from the individual share from *Locos* extraction. After being absent five times from the patrol duty the member loses his right to participate in *Locos* extraction and thereby the related income.

The internal and external relationships of the Union and the MA was explored with the Venn Diagram tool. Discounting the committees of the Union and three other related sections, participants referred to 16 different actors including consultancy firm, cooperation institutions, government, local political administration, civil, educational, commercial and religious organizations, displaying a broad and varied net of relationships with the external world. The varied number of committees and related sections illustrate the specialised internal division of labour of the MA.

Internal Structure

All the committees (marked with bold line) were placed within the Union's circle in Fig. 7.2. Of the six committees the Management Area Committee gets the highest rating (7) regarding importance and performance in the Venn Diagram. The Management Area Committee is followed by the body that administers the toilets, restaurant and fish shop, which also scored the highest rating (7). Its rating is reflected in the economic importance it has for the Union. The majority of yearly Union income is derived from the activities it has responsibility for. The finance committee, which operates on a two-year term and independently from the Board renders accounts directly to the Union membership, received the second highest rating of 6.7.

Highly appreciated is also the Recreation Committee (rating 6) which is responsible for organising the celebration of important dates with common MA funds, such as the fishers' day of San Pedro (Saint Peter) and the Christmas celebration. Both celebrations have an important role for the cohesion of the group, especially



PICTURE 7.8 Venn diagram

[13] Average of 643 *pesos* per US$, year 2001 (Banco Central de Chile 2003).

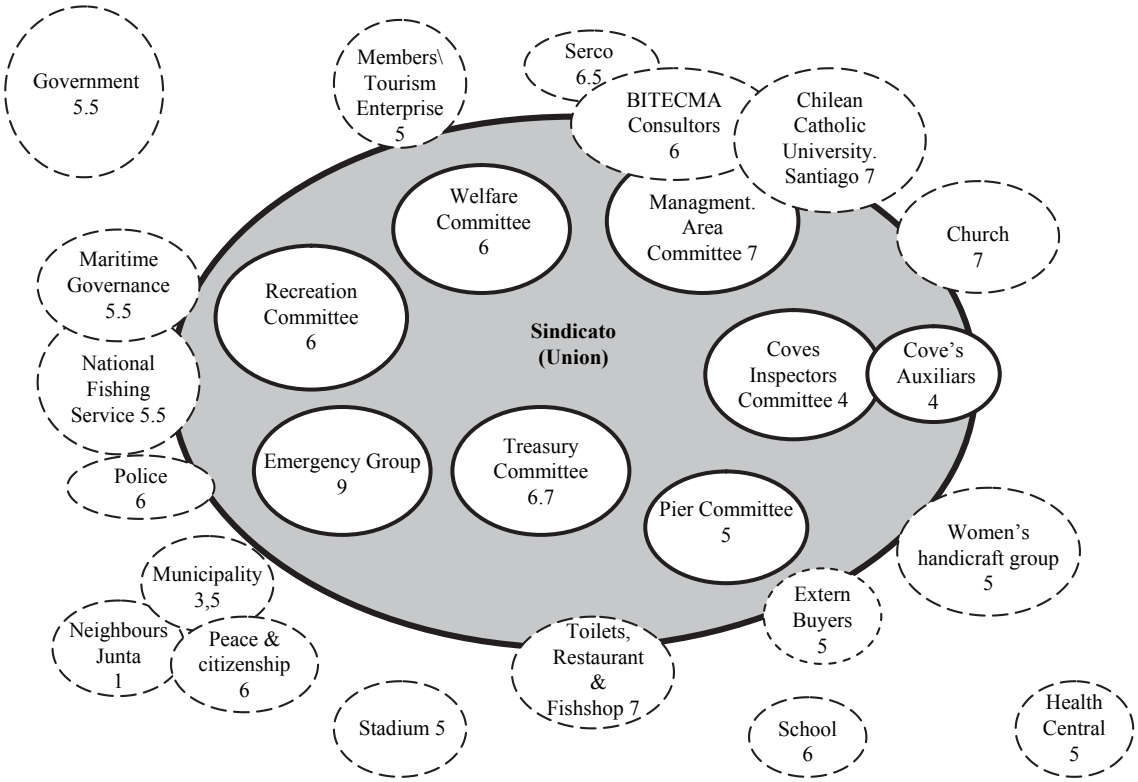


FIGURE 7.2 Reproduction of Venn diagram

the San Pedro's day celebration, which strengthens their collective identity as fishers.

The committee also finances two short vacation trips: one for the families and one for the fishers. The latter is spent at thermal baths. The committee is also in charge of the distribution of two food baskets during the year. Further, the Welfare Committee (rating 6) handles mutual aid and technical education, pension to the retired, economic help for those ill, grants for the funerals and a pension during one year for widows, and food basket for members with economic troubles. The Pier Committee, responsible for the pier, tourist trips and fishing issues, received a rating of 5, and is also responsible for generating economic benefits for the Union through boat tourism. The Members Tourism Enterprise which is in control of the two boats of the Union and also received a rating of 5, is related to the Pier Committee. One of the boats was specially bought for tourism purposes (BITECMA, 1999, ESBA-study). There is also the Coves Inspectors Committee and the closely related the Cove's Auxiliars, which both received a rating of 4. Amongst the rest of the bodies closely related to the Union, we find the Women's handicraft group, getting a rating of 5. We have, lastly, external buyers consisting of commercial firms that buy their products (degree 5).

There are also other resource persons supporting the Union such as Rosson (a marine technologist) from BITECMA; an accountant, a cleaning auxiliary, a controller of Maritime Destination and a Secretary (Vildósola and Rosson, 1997).

External Institutional Linkages

Amongst the external institutions and other organizations of importance, we find the "co-operation" institutions headed by the Universidad Católica de Chile (Santiago), which received the highest rating followed by SERCO or SERCOTEC (Servicio de Cooperación

Técnica (CORFO)/Technical Cooperation Service), which also got a high rating (6.5). SERCOTEC from Region V co-financed the ESBA with the Union. The ESBA study was undertaken by BITECMA, the consulting firm that has been working with the university and the Union in the development of the MA (BITECMA received a rating of 6).

Of the authorities, the Government, Maritime Governance and Sernapesca received ratings of 5.5 with the Police getting an even higher rating of 6. Local politicians represented by the municipality seem not to enjoy high popularity, obtaining the second lowest rating of all the institutions mapped in the Venn diagram. The Neighbours Junta,[14] a civil society based institution, received the lowest rating of 1. Another civil society based group called Peace & Citizenship was highly valued, receiving a rating of 6. Finally, we have the Stadium and Health centre, both of which received a rating of 5. The Fishers also seem to be satisfied with the school as it received a rating of 6. The Church belongs to the institutions and organizations that were rated the most important with seven.

Analysis of the Organization and Institutional Linkages

As seen above, the internal organization of the Union and the MA is regulated formally. This is contrary to the lack of written contracts regarding their reciprocal labour relations and share of fish landings, which have traditionally been in the form of oral agreements. This illustrates the traditional trust that exists among fishers, which is still in effect in the historical areas. However, with the arrival of the MAs oral agreements have been substituted by more formal and written arrangements. A well institutionalised system of punishment also standardises penalties, which is central within a small-sized community dominated by near family relationships, placing this way the Union beyond familiar or *compadrazgo* links. Within this context, faults are not disregarded and the penalties in order to be effective are targeted against a vulnerable part of the members: their private economy.

We can draw the conclusion from the Venn Diagram data that there is internal and mutual trust and confidence regarding the Union and its committees, and therefore also about the functioning of the MA. Whether this implies that they were also satisfied with the Board was not under evaluation. Nonetheless, if the Union is working well, it might be taken as a proxy indicator (own speculation) as a good evaluation of the Board as it has the main responsibility for the Union's functioning.

Regarding the question of the external linkages with the outside world, the collaboration institutions specifically enjoy high respect from fishers, which is illustrative of their good relationship over time. Also, the external social and political relationships with both governmental institutions and other service bodies like school and heath, seem quite unproblematic and without major problems. Local administration through the Municipality seems not to enjoy the same popularity among fishers; an issue that it is not considered in this study.

Since the aim of the Venn diagram tool was to grasp the institutional linkages of importance for the Union and their MA perceived by the fishers, this analysis excludes the former conflicts with the Union's neighbour, the Yacht Club, whose members mostly live seasonally in El Quisco; a problem that otherwise was analysed using the historical profile tool. Now that we have an idea of how the Union and the MA of El Quisco is structured, let us consider the fishers' main livelihood activity: fishing. However, before discussing fishing in the next section, let us first examine the way Union labour and boat infrastructure is managed.

SECTION 2: FISHING

Social Differentiation and Boat Infrastructure

Social differentiation is above all given by being a member or not of the Union. Among those who are members, differentiation is determined

[14] They have as a function to "promote the integration, participation and development of the neighbours of a locality" (Decreto nr. 58 de 1997, Juntas de Vecinos, Biblioteca del Congreso Nacional de Chile 2008).

TABLE 7.8 Fishing labour force in the El Quisco cove.

Categories of members	Categories of non-members/auxiliars
Fisher-boat owner Fisher-boat owner and equipment owner Diver-owner diving equipment Fisher Diver Algae collector	*Encarnadores* (put the bait in the hook); get paid in cash. *Tiradores* (boat draggers) get paid in species. Lifter/fish cleaners, get paid in species from fishers and get tips from customers.

by the ownership of a boat and diving equipment. Boats are privately owned with the ownership ratio being one boat for every fourth fisher. The total number of boats in 1997 was 36. Seven were launches of up to 18 tonnes and 20 were artisan boats (BITECMA, 1999). The large boats are used to fish big species like swordfish, tuna and sharks. Before the acquisition of large boats only one swordfish (between 180 and 250 kilos) could be carried per trip. The pomfret fish (see 7.14) boom around mid 1990s led fishers to acquire new carbon fibre boats that weigh less and are faster (Vildósola and Rosson, 1997). Labour categories amongst the fishers constitute other differentiation factors.

The direct producers are the fishers and the divers, followed by the auxiliaries, which are not members of the Union. Among these categories, we find different types of specialisation which are interchangeable, perhaps with the exception of the diving activity. A diver can be a fisher, but a fisher is not always a diver. Table 7.8 displays the categories of fishers. Of the 92 active members, 84 are fishers and 41 are divers. BITECMA's (2007) follow-up study reports that of 87 members, 57 are fishers and 30 are divers.

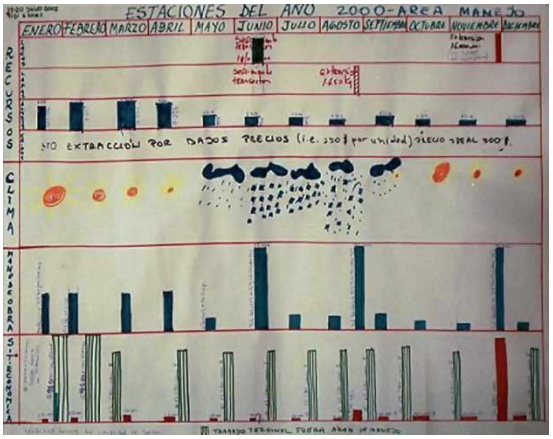
Among the fishers we have the following specialisations (I use the local Spanish names here): the *calador* places the fishing device, the *bogador* paddles to place the fishing device in order, the *desenmallador* separates the fish from the nets, the *adujador* handles the equipment in the boat and the *timotel* steers the boat. These specialisations are not fixed; fishers can alternate roles, which means that an experienced fisher can handle several activities.

We have, then, the divers (see Chapter Five) as well as the *telegrafista.* There are also divers that dive alone just off the shore without special equipment. The fishers who posses neither a boat nor diving equipment, have the weakest economic position, and normally assist both the diver and the patron of the boat in the fishing activity. However, this role can also be performed by a boat owner. In the historical areas, boat owners get a larger share of the landing. For example, in a crew of four persons, the landing is divided into six parts, and the owner of the boat and the crew get three parts (Paillaman, Sernapesca, Pers. Comm. via email 2007-08-09). In the MA the divers get an extra share regardless of whether he is the owner of the equipment or not.

Last in the hierarchy come the auxiliaries who assist in fishing activities on land. They vary in the type of work they undertake and the payment they receive. There are 17 auxiliaries in El Quisco. They are divided into three categories: The *encarnadores* put the bait on the hook and sort out the trawl line. They get paid in cash and in 1995 they received 1,000 *pesos* per basket or US$2.5 (value 1995).[15] There are also the *Tiradores* who take care of the electric boat dragger (*huinche*) and put the boat to sea, often getting paid in fish. Lastly, within the category of auxiliaries, there are the *cargadores* or lifters that transport the diving suits and fishing equipment to the boats. They also place the harvest in the transport tracks and clean the fish for customers from whom they get tips, whereas from the fishers they get paid in fish (Vildósola and Rosson, 1997).

To assess the distribution of the fishing activities during the year and their economic importance, the seasonal calendar tool was used embracing both fishing activities outside the MA

[15] Average of 396.77 *pesos* per US$, year 1995 (Banco Central de Chile 2003).



PICTURE 7.9 Men's seasonal calendar

PICTURE 7.10 El Quisco cove
Permission from Chuck Herring, Digital Globe

and inside it, the amount of labour and main benthic resources fished in the MA (see Picture 7.9). Also the main species fished in the historical areas are displayed, based on an open interview. In order to make the seasonal calendar data understandable, the different items are separated and represented as tables. Neither rain nor sun distribution is represented as they are depicted in the calendar (see Picture 7.9) (Table 7.9).

FISHING IN THE MANAGEMENT AREA

The operation of the MA requires coordination and cooperation between members as well as allocation of responsibility according to specialised division of labour. The seasonal calendar shows that in 2000 the estimation of the numbers of species that are ready for extraction occurred in June, and extraction in November. As seen in Table 7.10 the number of members of the Union that engage monthly varies in number. The months of most activity are those corresponding to the follow-ups and harvests. Those days, of the total of 92 fishers, it is possible to see that 32 dive and 59 perform the rest of the activities, some staying ashore, administering the whole process. During other months, the number of divers and fishers is less (Picture 7.10).

TABLE 7.9 Seasonal calendar, men (*Calendarios anuales por temporadas de actividades*).

Purpose:	To explore monthly and seasonal distribution of activities, their relation to household economy, demand of labour (mainly in the MA).
Participants:	Orlando Mella, Luis Eduardo Pizarro, Patricio Alvarez and Rafael Pizarro.
Place:	The Union's Social Centre. *Date*: July 19th–20th, 2001.
Duration:	Six hours.
Process and comments:	This exercise took the most time to do as it involved economic evaluation of several activities, both inside and outside the MA. For more comments, see description in the text.
Facilitator:	The Author.

TABLE 7.10 Reproduction of total monthly labour distribution during 2001 in the MA (from men's seasonal calendar).

	Jan.	Feb.	March	Apr.	May	Jun.	Jul.	Augt.	Sept.	Oct.	Nov.	Dec.
N° of divers working per month	14	14	14	14	7	32	7	32	7	7	32	7
N° of fishers working per month	28	28	28	28	14	59	14	59	14	14	59	14

In order represent the sea spatial distribution of the species and the *modus operandi* of the fishing activity in the MA, the fishers performed sea transects.

Modus Operandi of the *Loco* Harvest within the Management Area

Several drawings needed to be undertaken to represent the *Loco* harvest through transects. The first transect (A) (Picture 7.12) was made twice in table form, but in my view, it was not clear enough. J. C. Campos, a young fisher in the group, suggested that it was easier to represent and understand the harvest through another drawing. He was happy to show his drawing skills and this became transect B (Picture 7.13A and 7.13B), which clearly represented the lines the fishers follow under the surface, and in relation to the beach. His more experienced fellow fishers helped him with the necessary specifications. He told me that soon after becoming a member he went to extract *Locos* on his own and was penalised by the Union and required to pay fines. After these initial transgressions, he reformed his behaviour. Campos' experience provides evidence that the penalty system is being enforced. The fishers obviously enjoyed showing off their deep knowledge about the aquatic world. They felt proud to help me in my ignorance. Picture 7.11 shows the camaraderie between some fishers as they cooperated to finish the drawings (Table 7.11A).

TABLE 7.11A Sea transect tool (*Transectas del Mar*).

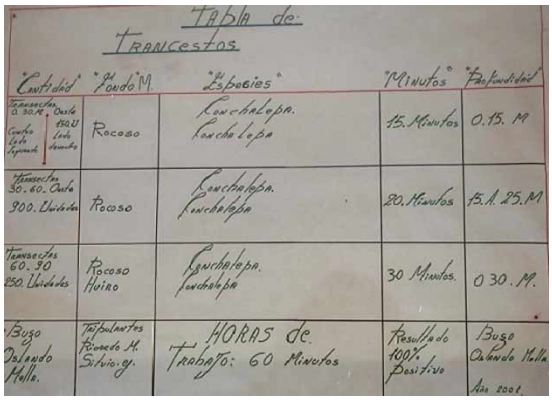
Purpose:	To represent the sea spatial distribution of the species and how the fishers/divers obtain the *Loco*. Only men.
Participants:	Orlando Mella, J.C. Campos and G. Ricardo Moraga.
Place:	The Union's Social Centre.
Date:	July 19th–20th, 2001.
Duration:	Six hours in two days.
Process and comments:	See comments on the description in the text.
Facilitator:	The Author.

To harvest (See Picture 7.12 of transect A), the boat with two crew members and the diver follows first a transect of 30 meters from east to the west (from the beach to the open sea). Then they follow the next 30 meters, and so forth. The further the distance from the beach, the deeper, the last transect not being deeper than 25–30 meters.

To dive, divers do not use oxygen tubes (see Picture 7.13A of transect B) but depend on the oxygen from a hooka diving hose that gives them air controlled by the *telegrafista* (diver's assistant). The other crew is the patron whose role it is to manage the boat. Trust among these three crew members is central. According to the official national fishing rules, the diver should not dive deeper than 20 meters but they dive up to 30 meters as can be seen in transect A (see Picture 7.12 and Table 7.11B).

The small black dots in Picture 7.13A represent *Locos* in the rocks at the sea bottom.

PICTURE 7.11 Campos drawing the transect



PICTURE 7.12 Sea transect A

TABLE 7.11B Reproduction of the sea transect A, men. (from East to West)

Distance/Quantity	Type of sea bottom	Species	Time in minutes	Deep in meters
Transect distance: 0–30 m. Left side counting Quantity: 150 units	Rocky	*Concholepas concholepas*	15	0–15
Transect distance 30–60 m. Quantity: 90 units*	Rocky	*Concholepas concholepas*	20	15–25
Transect distance 60–90 m. Quantity: 250 units	Rocky Weedy	*Concholepas concholepas*	30	−30
Diver, Orlando Mella	Two crews: Ricardo M. and Silvio C.	Total working time: one hour.	Results: 100% positive.	Diver: Orlando Mella

* the first design specified 90 U (units of *Loco*), which in the second version by confusion, were converted into 900 because the U was understood as it was a 0 (see picture above).

Also the predators of *Locos* are specified (see Picture 7.13B). A reflection about the fishers' and divers' list of predators is whether they are aware of the fact that to eliminate predators of *Locos* endangers the ecological interactions that are vital for the continued well-being of the marine environment. They have learned, with the help of marine science experts, about the risks posed to the ecology (and hence resources), but how extensive their knowledge and consciousness is, unclear (Table 7.12A).

The day of a diver harvesting *Locos* within the MA consists of two stages: one at sea and one on land with a total of eight working hours (Table 7.12B). The following descriptions provide an insight into a regular day of a diver harvesting *Locos*: The harvest starts relatively late in the day, around 9 a.m. and after 20 minutes the diver has extracted the first 100 units of *Locos*. Up to 1 p.m. he has completed 1,000 units, spending a total of five hours in the water, returning to the cove early in the afternoon. After the harvest he goes home and relaxes, returning to the cove at 4 p.m. when he meets the rest of the fishers to discuss the harvest and the economic results. Compared to the work load of a fisher, it seems that a diver has less in terms of working hours, but on the other hand, perhaps not in effort since he spends many hours diving under the sea in cold water.

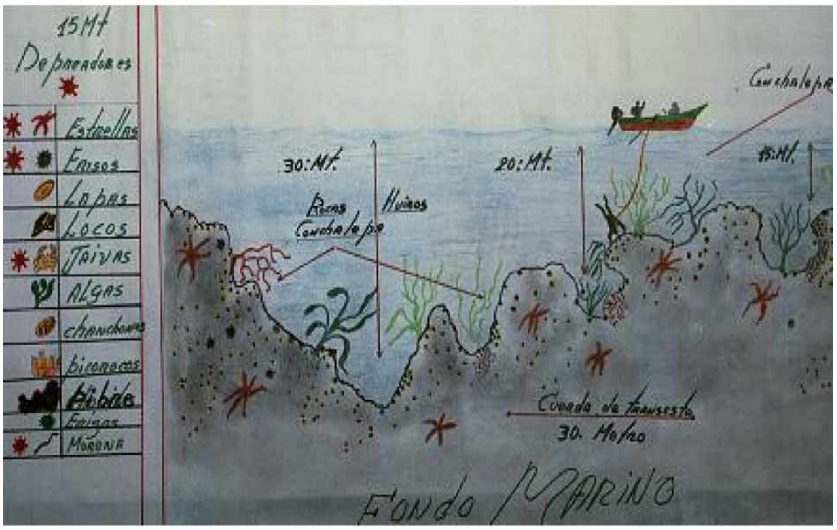
Let us now turn to the system and see how it is organised during one of the days when the collective harvest is performed within the MA. To illustrate this important event, the participants completed a system flow diagram that covered the whole process from harvesting to commercialisation. This tool permits an appreciation of the complexities of linkages and relationships between the diver and the crew, between the fishers themselves, the union and the export firms.

Harvesting the Fruits of the Management Area and Commercialisation Process

The harvest has roughly three phases (see Pictures 7.14A and 7.14B). The process starts with an evaluation of the number of *Loco* units per kilogram the MA can yield, referred to above as a follow-up study. Once this is done, the MA offers the potential product to different speculators by phone; a responsibility that is taken care of by the Board in consultation with the MA committee. Once the buyer with the best price bid is identified, the harvest day is decided on in agreement with the buyer. The practical details are then organised, the division of labour decided upon and the whole Union is mobilised (Table 7.13).

The second phase is the fishing. At sea, the resource is extracted according to transects assigned in advance. *Locos* are measured on the boat to judge whether they fulfil the legal measurement of 10 cm/shell. The crew counts how much of the resource the diver has extracted, followed by the writing of the activity report, specifying the place, the time and the names of the crew in addition to the registration of the number of the resource units that were extracted.

A



B

	Predators	
Estrella	*Cl. Asteridea*	Starfish
Erizo	*Hericius*	Sea urchin
Lapa	*Fisurella spp*	Chilean limpet
Loco	*Concholepas concholepas*	Chilean abalone
Jaiba	*Cancer (diverse types)*	Crab
Algas	*Algae*	Algal
¿?		
Picoroco	*Austromegabalanus psittacus*	Giant barnacle
Piure	*Pyura chilensis*	Chilean pudrid
Erizo negro	*Arbacia lixula*	Black sea urchin
Morena or Anguila	*Ophichthus pacifici,*	Common snake eel

PICTURE 7.13 (A) Sea transect B: *Loco* Extraction and Predators (drawing by and permission to reproduce from J.C. Campos), (B) Predators

The third phase is quality and activity control on shore by specially designated members. This consists of activities relating to: size control, counting, selecting and weighting. The shells that do not fulfil the legal size requirement are thrown back into the sea. The retained shells are put in units of 100 in baskets and then loaded onto a truck which waits to transport them to the factory. There, the *Locos* are processed and selected according to three different qualities. This quality sorting process determines the final price. Then the *Locos* are canned or frozen and exported. The Commission distributes the profits among the divers and crew. Many rules

TABLE 7.12A Daily calendar of a diver (*Calendario del dia de un buzo*).

Purpose:	To see the distribution of activities during the day for a diver when they extract *Locos* in the MA.
Participants:	Anonymous (see comments below).
Place:	At home. *Date*: July 18th, 2001.
Process and comments:	When the facilitator explained the purpose of the exercise, a diver and a fisher decided to do the calendar at home as it was quite late. The calendars were delivered the next day. It was only afterwards that I discovered that they had not given their names and therefore this and the following fisher's calendar are anonymous.
Facilitator:	Rosson, A.

TABLE 7.12B Reproduction of the daily calendar of a diver during *Loco* harvest in the MA.

Time	Activities
07:00	Get up.
08:00	Walk to the cove.
08:30	Fix the diving implements, fix the boat, leave to the sea.
09:00	Start diving.
09:20	First extraction: 100 units of *Loco.*
13:00	Complete extraction: 1000 units of *Loco.*
13:30	Back to the cove, store the implements, sell the product.
14:30	Lunch at home.
13:30	Rest or *siesta.*
16:00	Back to the cove to know the results and commentaries.
18:00	Back home, tea and sandwiches, watch TV, and spend time with the family.
23:00	Go to bed.

are in place such that these steps are undertaken efficiently and effectively.

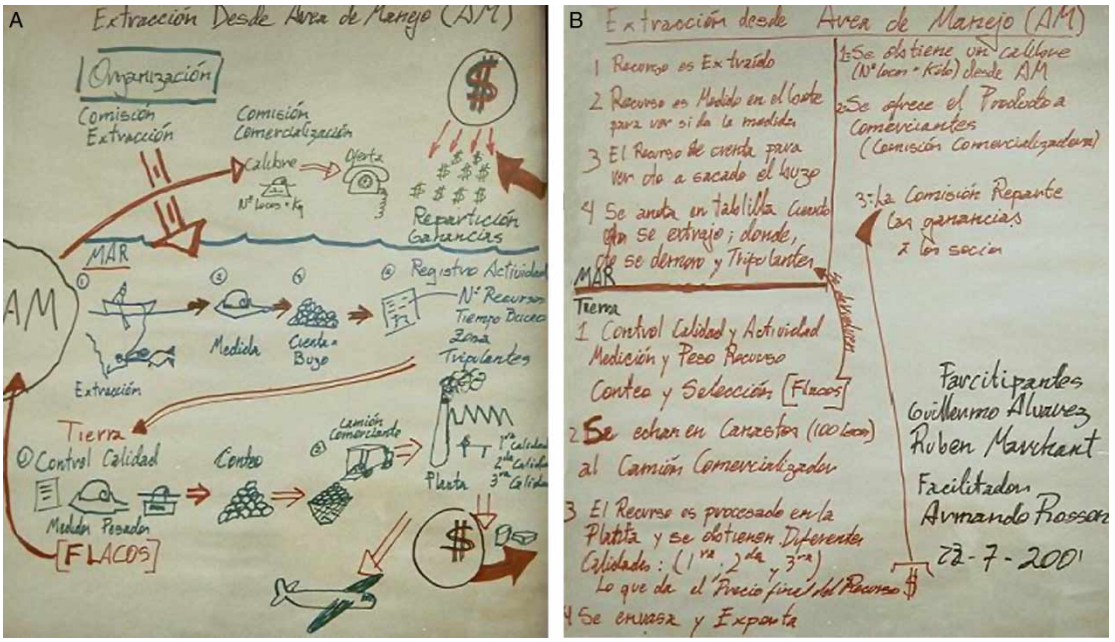
In 2001, during the time of my research, the Union harvested the product during 12 days where a similar process is repeated: September (one day), October (five days), November (four days,) and December (two days) (Sernapesca, 2007b). In this year, as we shall see, they succeeded in harvesting more than 25 tonnes of (in shell) *Locos.*

Fishing in the Historical Areas

In the historical areas, the nine most important species that are fished are presented in Table 7.14. The equipment to fish fin fish varies depending on the species being fished, going from the use of harpoon for swordfish, for example, to trawl line, hand line, and net, amongst others. The depth is counted in *brazas* (fathoms) corresponding to 1.67 meters. The deepest fishing is up to 180 *brazas,* where they find the *merluza* or Chilean hake. The number of fishers per boat also varies depending on the boat and the fish and in the case of the swordfish for example, the crew is between five and eight persons (Vildósola and Rosson, 1997). The fishing of large species is done at open sea (within the five nautical miles aimed for artisan fisheries) and takes several days. Fishers can also work with what they call selective fishing in other regions, which means

TABLE 7.13 Men's system flow diagram (*Diagrama Flujo de Sistema*).

Purpose:	To represent in a diagram how the production and trade systems work; and to understand the complexities of linkage and relationships at different levels. The different steps were numbered and then complemented in the following sheet with an explanation.
Participants:	Rubén Marchant and Guillermo Alvarez and some others who, while observing the process, interfered vividly giving ideas and suggestions.
Place:	The Union's Social Centre. *Date*: July 22nd, 2001.
Duration:	(four hours in three steps (drawing the first draft, drawing final version and last, writing the explanation of the steps and symbols).
Process and comments:	Easy. They enjoyed very much drawing the flow. Many laughs. The result gave them pride and satisfaction.
Facilitator:	Rosson, A.



PICTURE 7.14 (A) System Flow Diagram (B) Explanation of System Flow Diagram

TABLE 7.14 Most common fished species in El Quisco (Interview with Silvio Corveta, July 19th, 2001).

Specie (Spanish, Latin and English)	Device	Deep (*:1 braza (fathom) = 1.67 m.
Merluza-*Merluccius gayi gayi* Chilean hake or southern pacific hake 	Bottom trawl line half water *(Espinel fondo medio agua)*	Summer:40–80 brazas* Winter:80–q80 brazas
Congrio-*Genypterus chilensis Blacodes and maculates* Red, golden an d black kingklip 	Bottom trawl line (*Espinel fondo)* Bottom hand line *(Línea de mano fondo*	Summer: 50–90 brazas Winter:20 to 60 brazas
Albacora o pez espada *Xiphias gladius*-Sword-fish 	Half water surface net *(Red media agua de la superficie)* Hand harpoon surface down *(Arpon de Mano superficie hacia abajo)*	5–20 brazas in the surface
Corvina-*Cilus gilberti* Southern grunt 	Bottom net and surface down *(Red fondo y superficie hacia abajo)* Hand line surface *(Linea de mano superficie)*	5–10 brazas and Surface Surface and 1–15brazas

(*Continued*)

TABLE 7.14 (*Continued*)

Specie (Spanish, Latin and English)	Device	Deep (*:1 braza (fathom) = 1.67 m.
Sierra-*Thyrsites atun*-Snoek Or barracuta 	Botton half water net *(Red media agua de la superficie)*	5–20 brazas
	Hand line surface and by motor *(Línea de mano superficie y a motor)*	1–3 brazas
Cojinoba del Norte-*Seriolella violacea* Palm ruff 	Bottom net *(Red fondo)*	30–50 brazas
Palometa or Dorado-*Paroma signata*-Yellowtail 	Net surface down *(Red superficies hacia abajo)*	1–30 brazas
	Hand line, surface down *(Linea de mano superficie hacia abajo)*	
Reineta-*Brama australis*-Pomfret or smallscale Pomfret 	Half water trawl line *(Espinel media agua)*	5–20 brazas
	Hand line, surface down *(Linea de mano superficie hacia abajo)*	1–20 brazas
Jurel-*Trachurus symetricus* Jack mackerel 	Bottom half water surface net *(Red fondo media agua superficie)*	20–5 brazas
	Hand line surface *(Linea de mano superficie)*	1–20 brazas

Source: http://www.sernapesca.cl/areas/pequerias/iconografias/peces.html, 2005-05-23, permission from Lillo, D., Sernapesca.

that they are away for these periods. For instance, with Chilean hake and the pomfret fishing.

Artisan fishing is for the local and regional market and is sold on the beach to intermediaries, restaurant people and individual consumers. In these sales the fishers get cash in hand for their catch. A day in the life of a fisher when he fishes in the historical areas is presented below. The exercise was done with the help of the daily calendar tool (see Table 7.15A).

Similarly to the diver, the day of a fisher in the historical areas consists of two phases: one at sea and one on that land, which together add up to more than 12 hours (Table 7.15B). The day of a fisher starts much earlier and is also longer. The fishers leave at around 6 a.m., arriving at the fishing destination approximately half an hour later. It takes about an hour to spread the trawl line and then they leave it for about two and a half hours, after which they lift up the line and the fish, spending in total about five hours at sea.

TABLE 7.15A Daily calendar of a fisher *(Calendario del Día)*.

Purpose:	To see the distribution of activities during the day for a fisher in a normal working day in the historical areas.
Participants:	Anonymous.
Place:	The Union's Social Centre. *Date*: July 19th, 2001.
Duration:	One hour.
Process and comments:	See comments in Table 7.15.
Facilitator:	Rosson, A.

TABLE 7.15B Reproduction of the daily calendar of a fisher in the historical areas.

Time	Activities
5–6:00	Get up and walk to the cove.
6–6:30	Leave the cove and arrive to the fishing area.
6:30–7:30	Calando the boat, spreading the trawl line.
7:30–8:00	Trawl line reposes.
8–10:00	Lift the trawl line.
10:00	Order all the material or the trawl line used/ finish.
10–11:00	Back to the cove.
11–18.00	Breakfast, sell the product, fixing material, baiting fishhook.
18:30–19	Back to home, eat.
19:30–22	Spending time with family, watching TV.
22:00	Go to bed.

Returning at 11 a.m. to the cove, they eat breakfast and proceed to sell the product. During the rest of the time up to around 6 p.m. they repair their equipment and prepare the new fishhooks for the next fishing day. The fishers go back home around 6 p.m.

Let us examine in the next section the question of the fishing income both in the historical areas and the MA according to the seasonal calendar followed by an analysis of the actual results, according to Sernapesca's statistics during the last few years.

Availability of *Locos* and *Lapas*

According to the seasonal calendar undertaken by fishers, the allowable quota of *Locos* at that time was 32,000 but due to low market prices the Union planned to extract only 16,000 units (sees Table 7.16). Something similar happened with the *Erizo* (Sea Urchin), which I did not reproduce in a table or figure since there was no harvest due to their low price.[16] These non-harvest decisions show how the common management allows a more economically rational exploitation of target species, which they hoped will result in a better price.

Sernapesca's recorded landing for 2001 was 25.4 tonnes of *Locos* (Sernapesca, 2007b; see Table 7.19), or around 100,000 units, while BITECMA's expected result was 60,421 units (BITECMA, 1999; see Table 7.19). These figures do not agree with those of the seasonal calendar when they reported an availability of 32,000 units. There may be many reasons for this. What is sure is that the variation between the real harvests and those expected are considerable, as can be seen in Table 7.19. However, this shows that planning for marine resources is far from reliable. I will return to this issue both below and in the last chapter.

The register of export prices seems to confirm the low prices that fishers referred to in 2001, as compared to 2000.[17] It is reasonable to expect that fluctuations of export prices should influence fishers' harvest decisions. Apparently, the decision to harvest all the allowable *Locos* during 2001 and 2002, contrary to the first decision of harvesting only half in 2001, was a good decision as prices rose in 2002 (US$20,776 net/t.) and dropped abruptly again in 2003 (US$14,787 net/t.).

The harvest of 2001 was the second most successful in the history of the MA up until 2006. It was only surpassed by the 2002 harvest of 33.2 tonnes *Locos* (Sernapesca, 2007b) (around 132,000 units), while BITECMA's expected results were 66,207 units.

Regarding the second most important resource, the *Lapas* (*Fisurella spp.* or Chilean

[16] This is 250 *pesos* or US$0.39 instead of the normal 500 *pesos* or US$0.79, which the fishers considered to be a reasonable price.

[17] So, for example, while the export price for one net tonne of *Locos* year 2001 was of US$18,803, in 2000 it was of U$24,044 (Ortego, IFOP 2006; see Table 5.5 in Chapter Five).

TABLE 7.16 Reproduction of the availability and extraction of *Locos* (per unit) year 2001 in the MA, men. (from the seasonal calendar)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Availability of *Locos*: units						32,000						
Extraction of *Locos*: units due to low prices)											16,000	

TABLE 7.17 Reproduction of the availability and extraction of *Lapas* and *Almejas* (kilo), year 2001 (from the men's seasonal calendar).

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Availability *Lapas*						1650						
Extraction *Lapas*								1650				
Extraction *Almejas*	420	620	750	520	300	300	300	300	300	300	300	300

limpet), as the *Locos*, it is also counted on one occasion, and harvested on another (Table 7.17). The *Almejas* (*Venus antiqua* or Chilean littleneck) are harvested constantly through the year. According to the seasonal calendar developed by the fishers, the allowable quota of *Lapas* in 2001 was 1,650 kilograms, while BITECMAs was 2 tonnes. The results were apparently better than anticipated as Sernapesca registered a landing of 4 tonnes for 2001 (see Table 7.19).

ECONOMY: FISHING INCOMES IN THE MANAGEMENT AREAS AND THE HISTORICAL AREAS

The fishers spend most working time in the historical areas, and the highest proportion of income also comes from there. With the exception of two summer months and the specific months when the *Loco* or the *Lapas* are harvested, income from both outside and inside the MA is quite constant, as is shown in the seasonal calendar data (see Picture 7.9, and Table 7.10). In 2001 the total income outside the MA for all the fishers was approximately 31.5 million *pesos* or around US$0.5 million, which would give an average of 3.5 million *pesos* or US$5.400/year per capita (92 members). It corresponds to a monthly income of around 285,000 *pesos* or US$449 per capita (Table 7.18).

The total sum inside the MA for all the fishers during the year, according to the income distribution in the seasonal calendar, is 19 million *pesos* or US$31,000 which would give an average per capita of 212,000 *pesos* or US$335/year (Table 7.18). This corresponds to a monthly income of around 18,000 *pesos* or US$28 per capita in 2001.

Both averages inside and outside the MA would give a yearly income of a little above 3.5

TABLE 7.18 Reproduction of the income from the seasonal calendar, men total monthly income inside and outside the MA for the union's members 2001 (in US$).

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Income outside MA	143,436	143,436	20,932	20,932	20,932	20,932	20,932	20,932	20,932	20,932	20,932	20,932
Total yearly income outside MA: ≈US$500,000												
Income MA	435	586	709	492	284	284	284	318	284	284	23,738	284
Total yearly income within MA: US$30,842												

million *pesos* or US$5,728 per fisher, which would give a monthly income of 303,000 *pesos* or US$477.[18] However, this calculation does not consider the taxes the union has to pay to the Treasury, of 1 UTM (Unidad Tributaria) per hectare, which in 2001 was around 27,000 *pesos.* This meant in total 4 and a half million *pesos* or slightly over US$7,000 for their 168 hectares.[19] In 2004 these taxes were reduced to 0.25 UTM per hectare, resulting in a considerable reduction of this expense. The calculations of the income earned inside the MA specified above do not consider either the consultancy costs for the annual follow-up, which costs approximately 1.5 million *pesos* or US$2,300 for one zone. On the other hand, nor do the calculations consider other incomes such as those coming from the concession of the restaurant (17 million *pesos* or US$57,000 per year), or from the fish shop; which provides the largest income for the Union (Vildósola and Rosson, 1997). The fish-shop is operated on a commercial basis and does not stock the fishers' own products.

As evident in Table 7.18 there is a big difference between fishing income earned outside and inside the MA. The MA yields only 6.2 percent of the total income, based on the data generated from the seasonal calendar. Nonetheless, in the MA, a few days labour harvesting *Loco* gave 15 million *pesos* or US$24,000, excluding the cost of the eight days of vigilance per member/year. The 15 million *pesos* calculated by the fishers for 2001 corresponds to 77 percent of all the yearly income from the MA, highlighting the economic importance of *Locos* as a resource for their livelihoods in comparison to other benthic resources from the MA (see Table 7.18; November month). Nonetheless, according to new calculations based in Sernapesca's statistics, the actual income earned in 2001 was considerably more than the projected revenue.

[18] Minimum salary in Chile in December 2001 was 105,500 *pesos* (CEDOC-INE 2005b) or US$166.These calculations are based on the market yearly average rate of 634.94 *pesos* per US$, year 2001 (Banco Central de Chile 2003).

[19] Average rate of 634.94 *pesos* per US$, year 2001 (Banco Central de Chile 2003).

According to Gelcich et al. (2006b), in El Quisco, benthic resources represent 15 percent of the Union's landing, which is a higher proportion than identified in the seasonal calendar exercise. Gelcich et al.'s (2006b) study confirms that their main source of income is from fin fish, algae gathering and other non-fishing activities; confirming that fishers' livelihoods are diversified in terms of fishing and related activities. Women's economic activities can also be added to this to ascertain a household perspective (see problem-tree and solution for women).

Real and Programmed Landings 1997–2006

Let us now turn to the real landings and incomes derived from *Locos* harvesting based on the official registers of Sernapesca for El Quisco up until 2006 (Tables 7.19, 7.20 and 7.21). To Sernapesca's landings, in Table 7.19 I have added the prospected results up to 2010 according to BITECMAs calculations at an exploitation rate of 20 percent of the available resources (BITECMA also did a calculation based on a 30 percent exploitation rate). These projections only show expected results from Zone A of the MA, but according to Rosson (BITECMA, Pers. Comm. via email 2007-07-39), this is not a problem since, of the other two obtained MAs zones, one has been left without control and the other is not working.

Since Sernapesca's landing statistics for the MA from 1997 to 2006 are given in "in shell" tonnes and BITECMAs projections are in units, in order to enable a meaningful comparison, I have converted Sernapescas tonnes (in shell) to units (in shell). I also converted the latter to net tonnes (average four *Locos* in shell per kilo).

Incomes in Relation to Landings 1997–2006

Table 7.20 displays the gross income from *Locos* landings for the period 1997–2000, which are the last two pre-MA years and the first two years of the operation of the MA. I distinguish between the two periods because during this initial period the cost for the MA varied making it difficult to deduce net income. Therefore, the calculation of the income for the first period is in gross terms. When the MA became established, costs stabi-

TABLE 7.19 Sernapesca's registered harvest on the beach (in tonnes) in El Quisco, 1997–2006 and BITECMAs projections for the MA.

Specie	Year	Total tonnes	Approx. equivalence of tonnes to shell units	Approx. equivalence of shell units to net tonnes	*BITECMAs harvest projections, 20% exploitation rate (units)*
	MA period				
Loco	2006	3,0	12,000	1,1	67,715
	2005	1,4	5,600	0,5	67,715
	2004	1,4	5,600	0,5	67,715
	2003	3,5	14,000	1,3	69,184
	2002	33,2	132,800	12,0	66,207
	2001	25,4	101,600	9,2	60,421
	2000	5,4	21,600	2,0	51,624
	1999	11,2	44,800	4,1	38,607
	Pre-MA period				
	1998	3,5	14,000	1,3	
	1997	21,0	84,000	7,6	
Total	1997–2006	**109,0**	**436,000**	**39,4**	
Total (whole period)	1999–2006		**338,000** (69% of 489,188)		**489,188**
Total (half period)	2001–2006		**271,600** (68% of 398,957)		**398,957**
Lapas					**Tonnes**
	2006	0,2			5,305
	2005	0,0			4,752
	2004	0,1			4,067
	2003	4,1			3,287
	2002	2,1			2,511
	2001	4,0			2,076
	2000	12,2			1,902
	1999	3,3			2,365
	1998	5,2			
	1997	6,0			
Total	1997–1999	14,5			
Total	1999–2006	26,0			26,265
Sea	2001	1,0			
Urchin	2000	0,1			
	1999	0,3			
	1998	1,3			
	1997	2,0			
Total		4,7			

1. Sernapesca (2007b).
2. BITECMA (1999), Tabla 23 and Tabla 29: Matriz de Proyección Anual del Stock de *Concholepas concholepas.*

TABLE 7.20 Gross income from *Locos* landing in El Quisco 1997–2000.

	Pesos (millions)			US$ (thousand)		
Year	Total MA	Yearly per fisher	Monthly per fisher	Total MA	Yearly per fisher	Monthly per fisher
1997	68,199	741,299	61,774	162,645	1.767	0.1473
1998	11,145	121,141	10,095	24,213	0.263	0.0219
1999	45,790	497,717	41,476	90,000	0.978	0.0815
2000	25,471	276,858	23,071	47,213	0.513	0.0428
Total	150,605	1,637.015	136,416	324,071	3.521	0.2934
Average	37,651	409,253.75	333,329	81,018	0.880	0.073

TABLE 7.21 Real and projected gross and net income for the MA El Quisco for the resources *Locos* and *Lapas*, 2001–2010 in *pesos* and US$ (1)

	BITECMA (2)									My calculation based on Sernapesca's landing register (3) (see Table 7.19)			
	Gross income (*pesos**)		Total gross income	Total gross income	Total cost		Total cost	Net income	Net income	Real gross income	Real gross income	Real net income	Real net income
Year	*Loco*	*Lapa*	(*pesos*)	(USD)	(*pesos*)	Cost in%	(US$)**	(*pesos*)	(US$)	(*pesos*)	(US$)	(*pesos*)	(US$)
2001	33.830	1.655	35.485	55,887	28.717	80.9	45,228	6.768	10,659	119.000	187,419	90.283	142,191
2002	45.361	1.331	46.692	67,774	28.717	61.5	41,683	17.975	26,091	173.000	251,110	144.283	209,428
2003	53.157	1.453	54.610	78,077	28.717	52.6	41,057	25.893	37,020	19.223	27,483	−9.494	−13,573
2004	58.298	1.758	60.056	98,529	33.722	56.2	55,325	26.334	43,204	7.072	11,602	−26.650	−43,722
2005	60.962	2.301	63.263	113,018	33.722	53.3	60,244	29.541	52,774	7.800	13,934	−25.922	−46,309
2006	59.668	2.848	62.516		33.722	53.9		28.794					
2007	59.668	3.326	62.994		33.722	53.5		29.272					
2008	59.668	3.714	63.382		33.722	53.2		29.660					
2009	59.668	3.994	63.662		33.722	53.0		29.940					
2010	59.668	4.213	63.881		33.722	52.8		30.159					
Total MA projected by BITECMA for 2001–2010								**54.336**	**169,748**				
Average yearly MA projected by BITECMA for 2001–2010								**25.434**	**16,974**				
Total yearly income per fisher								**0.276**	**184**				
Total monthly income per fisher								**0.023**	**15**				
Real gross and net total MA 2001–2005										**326.10**	**491,548**	**172.500**	**248,015**
Real yearly average gross and net MA 2001–2005										**65.22**	**98,309**	**34.500**	**49,603**
Real total yearly gross and net income per fisher 2001–2005										**0.708**	**1,068**	**0.375**	**539**
Real total monthly gross and net income per fisher 2001–2005										**0.059**	**89**	**0.031**	**45**

**Pesos* in million.

***I did not convert to US$ in this column BITECMA's total yearly net income since it predicts up to 2010, and these values cannot be estimated in advance. I stopped doing the conversion after the 2003 procedure, which explains the empty rows in the column.

1. Conversion to US$ or vice-versa according to the yearly average of *pesos* to US$. Banco Central de Chile (2003).
2. BITECMA (1999), Tabla N° 37: Flujo caja a un 20% de extracción.
3. Sernapesca (2007b).

lised. Real and projected gross and net incomes as well as costs have been systematically estimated by BITECMA (Table 7.21).

In describing the income for the first period (1997–2000), I give in the text (not in the tables) both the yearly and monthly per capita income for the fishers and at points to illustrate its relative importance I compare this to the minimum salary for that year. Table 7.20 and Table 7.21 specify the total and average income for the MA and the average yearly and monthly per capita income per period.

As stated in Table 7.19, in 1997 — a pre official MA year — the MA produced 21 tonnes *Locos* (around 84,000 units). This was the third largest harvest since the MA was established, and the 1997 harvest was according to the date generated from the historical profile, the second best harvest after the self-imposed ban.

The 84,000 units of *Locos* in 1997 equates to around 7.6 net tonnes (average 11 net *Locos* per kilo). Considering that the export price that year was US$21,000 net/t. (Table 5.5, Chapter Five), the 7.6 tonnes from El Quisco should have generated around US$163,000, or 68 million *pesos* (Table 7.20).[20] Per fisher this translates to a yearly gross income of 741,000 *pesos* which in monthly terms amounts to 61,000 *pesos*. The minimum salary in Chile that year was of around 72,000 *pesos* for the period June–December (CEDOC-INE, 2005a) (see Table 7.19).

In 1998 — a pre official MA year — the MA produced only 3.5 tonnes *Locos (*approximately 14,000 units or 1.3 net tonnes). The export price that year was only US$18,626 net/tonnes, which would give a gross income of 11 million *pesos* or US$24,213 (value 1998).[21] This is a tremendous difference compared with the 68 million *pesos* from the previous year.

The harvest increased in 1999 — the first official MA year — to 11.2 tonnes (or around 44,800 units or four net tonnes). This result surpasses the projected harvest from BITECMA that estimated a catch of 38,607 units, at a 20 percent exploitation rate. Since the export price was US$22,503 per net tonne, it gave a gross income of US$90,000, which means around 46 million *pesos.*[22] Per fisher this means a yearly gross income of 497,000 *pesos or* 41,000 *pesos* monthly.

In 2000, landing was even lower than 1999, reaching 5.4 tonnes (21,600 units or 2 net tonnes). According to BITECMAs projected results that year, there should had been 51,624 units, which is more than double the actual harvest. The export price went up this year to 24,000 US$ net/tonne, which up until then was the second highest price since 1987 when prices started to be systematised by IFOP. The two net tonnes gave a gross income of US$47,000 or 25 million *pesos.*[23] Per fisher means a yearly gross income of 276,000 *pesos* or 23,000 *pesos* monthly.

The total gross income for the four year period 1997–2000 was 150 million *pesos* (Table 7.20), which give an average of 37 million per year. These results are far from satisfactory.

Real and Projected Incomes 2001–2010

In 2001 and 2002, the harvests reached record levels. During 2001, the 25.4 tonnes (or 101,600 units) translated to 9.2 net tonnes. Unfortunately for the Union, the prices went down from US$24,000 per net tonne to 18.8. The 9.2 net tonnes gave 119 million *pesos* or US$187,000[24] (Table 7.21). Discounting the 28.7 million *pesos* or US$45,000[25] of this total for the cost of the MA, according to the projections for 2001–2010 from BITECMA, the remaining benefits are 90.2 million *pesos*, which give a yearly income per member of 981,000 *pesos* or 82,000 monthly. The minimum salary in Chile that year was of 105,500 *pesos* for the period June–December (CEDOC-INE, 2005b).

[20] Average rate 419.31 *pesos* per US$, year 1997 (Banco Central de Chile 2003). BITECMAs ESBA-study from 1999 gives for this year 13,940 million *pesos* for the diverse cost of the MA.

[21] Average rate 460.29 *pesos* per US$, year 1998 (Banco Central de Chile 2003).

[22] Average rate 508.78 *pesos* per US$, year 1999 (Banco Central de Chile 2003).

[23] Average rate of 539.49 *pesos* per US$, year 2000 (Banco Central de Chile 2003).

[24] Average rate 634.94 *pesos* per US$, year 2001 (Banco Central de Chile 2003)

[25] Average rate 634, 94 *pesos* per US$, year 2001 (Banco Central de Chile 2003).

In 2002, the MA achieved its highest landing ever, with 33.2 tonnes or 132,800 units, translating to 12 net tonnes. The prices this time went up from US$18,800 to US$20,700 per net tonne, which should have given US$251,000[26] or 173 million *pesos*. Discounting the 28.7 million from this total for the cost of the MA, the remaining benefits are 144 million *pesos,* which give a yearly income of 1.6 million *pesos* or 131,000 *pesos* monthly per capita. The minimum salary that year in Chile was 112,200 *pesos* for the period June–December (CEDOC-INE, 2005b). Of the three years (1997, 2001 and 2002) when *Loco* landings were high, only the 2002 income barely surpasses the minimum salary. During the following years the harvests were (Table 7.20) quite low again and so were also the export prices (See Table 5.5, Chapter Five).

In terms of *Lapas* (Table 7.19) the total of 26 tonnes for the period 1999–2006 is in accord with the projected average predicted by BITECMA. Taking, to simplify, the same price calculated for Puerto Oscuro (Chapter Six) valid for 2001 of 2,000 *pesos* per kilo, the 26 tonnes of *Lapas* would have generated an income of 52 million *pesos* or an average of 6.5 million per year equalling an average 70,000 *pesos* per member.

If we consider BITECMAs total net income for the period 2001–2010 counting *Locos* and *Lapas,* the picture looks different (Table 7.21) in terms of projected economic results. Actual incomes achieved are not as high as projected as can be seen in Table 7.21. Per fisher this means a yearly net income of 276,000 *pesos* or 23,000 *pesos* monthly.

In Table 7.21, I subtracted the cost of the MAs based on the same amount estimated by BITECMA (fix, variables, consultancy and taxes) which amounts to between 28 and 33 million *pesos* per year during 2001–2010. Therefore Table 7.21 displays both BITECMA's projected net incomes and real net income based on Sernapesca's landing statistics. Since BITECMA's projection in the ESBA study is only from 1999 to 2008, in order to complement it, I used additional data regarding harvest projections and incomes for 2001–2010 from BITECMA.

As seen in Table 7.21, the costs for the MA year 2001 and 2002 were 81 and 61.5 percent of the projected incomes, respectively. Thereafter, although these costs increase, the yearly percentage in relation to the total incomes stabilises at around 53 percent. Please note, that with the exception of the *Lapas,* the calculated incomes do not include other MA resources and therefore these calculations do not reflect real total income.

Analysis of Income and Production

BITECMA has estimated a net total income for the period 2001–2010 of 254 million *pesos* for the MA, and a yearly average of 25.4 million *pesos*. Now, the real net income from the MA (for the first five the years 2001–2005) was in fact 172.5 million *pesos* or US$248,000. The yearly average was 34.5 million *pesos* or US$49,000 (375,000 *pesos* yearly per fisher or 31,000 *pesos* monthly). That is, only in half of period (2001–2005) did the MA actually provided 68 percent (172.5 of 254 programmed million) of BITECMAs expected results of 10 years (2001–2010).[27]

If we now consider production in term of units for the period 2001–2006, corresponding to half of the period, we can see in Table 7.19 that the total actual average results (271,600 units of *Locos*) corresponds to 68 percent of the expected 398,957 units for that period according to BITECMAs projections. In this way, we can say that although the MA provided 32 percent less than expected in terms of production, the economic returns were as expected, which for half of the period should have been 127.1 million *pesos* instead of the actual 172.5 million *pesos*. These results are better than those of the period described first (1997–2000). Nonetheless in terms of per capita incomes for both periods, the economic benefits are far too low for a viable fishers' livelihood.

[26] Average rate 688.94 *pesos* per US$, year 2002 (Banco Central de Chile 2003).

[27] I would also suspect that given tax were reduced in 2004, and the calculation was done by BITECMA in 1999, the Union 'saved' at least three million *pesos* per year (after 2004).

Production results do not vary significantly if we view the entire period (1999–2006), starting from BITECMA's first year of projections, as the total actual result (338,000 units of *Locos*) corresponds to 69 percent of the 489,180 *pesos* projected by BITECMA for that period (see Table 7.19). In light of these reflections on income and production results of the MA, have they succeeded or failed? The answer will depend on what we consider. If we consider production, the actual outcomes are around 32 percent below BITECMA's estimations. On the other hand incomes are higher than expected. At first glance this should be positive; more income has been generated by the Union with less than anticipated work and production efforts. If the fishers did not lose income due to lower production, we can perhaps say that this was because market prices compensated. However, such positive market trends cannot be relied on, as they are to a large degree outside the influence of the fishers and their union.

According to the 2007 BITECMAs follow-up study, the MA faces problems of commercialisation and organization of the extractions. "Given that the organization seeks equity before better outcomes, the efficiency of the extraction work has been hindered" (Rosson, BITECMA, 2007). As no further explanations are given it is difficult to understand how the "problem" has been defined here. All one can say is that BITECMA believes that the Union trades off equity in outcomes for efficiency, but no elaboration of the basis for this appraisal has been given.

SECTION 3: ACHIEVEMENTS, CHALLENGES AND WAYS FORWARD IN THE EL QUISCO MANAGEMENT AREA

Fishers' Perceptions of the Impacts of the Management Areas

One of my research questions is: How do men and women in the fishing communities perceive the MA and its impact? Considering both the perspective of fishers/divers and women, I assessed the question with the Impact Analysis tool. Both men and women raised six impact elements. It is worth noting that the Impact Analysis was made in 2001. I start with the men.

Conservation of the species is the first impact of the MA that the men mention (Table 7.22 and Fig. 7.3). Economic welfare is a second impact of the MA, and closely related to that, social welfare. Fishers connected social welfare with three other elements: tranquillity, organization, and comradeship between members as a result of disappearing rivalry. This leads to what they called "organised solidarity" (i.e., through the union, in my own interpretation). All their identified impacts are components of the concept of sustainable development (see Section four and Chapter Two).

Women's Perceptions of the Impacts of the Management Areas

As did the men, women placed resource protection first in their impact analysis of the MA (Table 7.23 and Fig. 7.4). This was followed (similarly to the men) by economic reasoning. That is, better availability of food during winter, which is in line with the fifth element (major economic income), which should allow a better income distribution through the year (connected to this was the fifth element). As the third element the women pointed out food security and integration between the union's members, and in fourth place was that "One learns how to defend own rights" (Fig. 7.4), an organizational capacity in the form of the union and the MA. After that came "major economic income" (fifth element; Fig. 7.4) which "enables economic compro-

TABLE 7.22 Mens' impact analysis *(Análisis de impacto)*.

Purpose:	To evaluate the impacts of the MA from the perspective of fishers/divers.
Participants:	Silvio Corvetto, Luis Pizarro, Victor Erices, Juan Campos, Orlando Mella Guillermo Alvarez and Ruben Marchant.
Place:	The Union's Social Centre. *Date*: July 21st, 2001.
Duration:	One hour.
Process and comments:	Expedite.
Facilitator:	The Author.

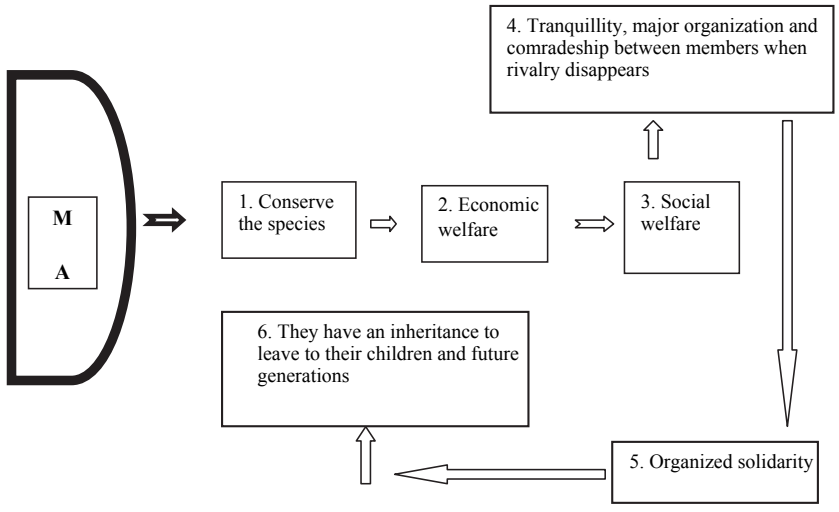


FIGURE 7.3 Reproduction of men's impact analysis

TABLE 7.23 Women's impact analysis *(Análisis de impacto)*.

Purpose:	To evaluate the impacts of the MA from the perspective of women.
Participants:	Adela Gallardo and Salomé Aranda.
Place:	The Union's Social Centre. *Date*: July 24th, 2001.
Duration:	One hour.
Process and comments:	Easy, in addition to a clear agreement between the two participants.
Facilitator:	Rosson, A.

mises'' (i.e., plan for the future, apply for loans, etc.), which is the sixth element.

Analysis

The men concluded in both the stepping stones and drawing concepts tools that the reason for the introduction of the MA was overexploitation of *Locos*, and that the intention of sustainable development was to protect the resource.

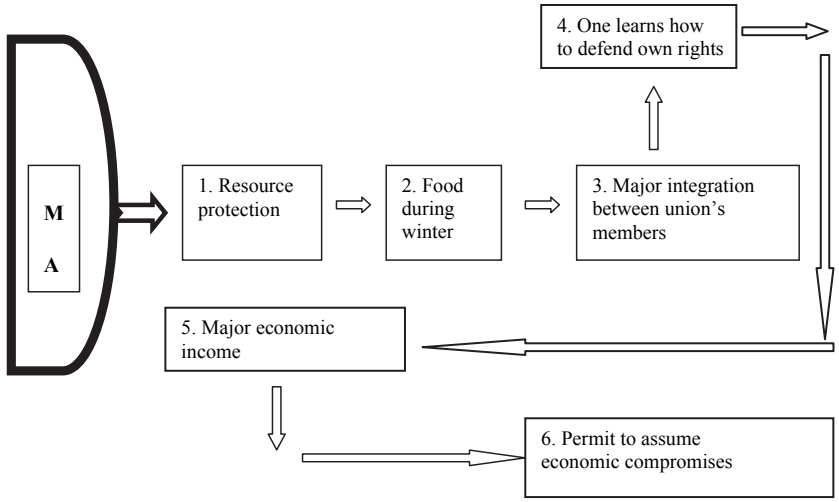


FIGURE 7.4 Reproduction of women's impact analysis

Although the question was what the impacts of the MA had been so far, men and women did not differ much between actually experienced and anticipated impacts of the MA. Regarding the men, of the six elements they mention, with the exception of economic and social welfare which both can be considered as expected results, the rest seems to be impacts already achieved by the MA. Regarding the women, of the six named impacts, at least the first four seem to deal with things they have already actually experienced, while the last two ones are more of expected results given that the MA succeeds. Of the rest of the six impacts named by the women, three are of economic character, compared to only one such mentioned by the men. Except for the environmental element, the women raised the integration between fishers and the acquisition of new skills in exercising their rights. This tool also shows that the women understood the ecological importance of the MA, illustrating that they are not marginalised from the main purpose of the process. The women's emphasis on economic matters might be explained by the fact that they run household economy. Women are also more immediately preoccupied with the future of the children, especially the cost of higher education.

Although an analysis of the impact of the MA shows a general satisfaction with the MA both on part of men and women, there is still some frustration. The women are particularly concerned about the future. To address these issues the problem-tree tool was utilised. It consists of problem identification, related causes and effects and who is affected.

CHALLENGES

With the introduction of the MA a new form of illegal harvest has entered the scene: stealing from the stocks within the MAs. Since the areas have long periods where a no-take regulation prevails, *Locos* become big, concentrated and easily harvested, making stealing profitable. This issue might account for the lower production of *Locos* in some years in El Quisco. According to the last follow-up study (BITECMA, 2007), the Union, despite enacting a surveillance regime, has not been able to stop the theft.

The main challenge of the MA of El Quisco (and the Union) is poaching of *Locos*. The exercise did not seek to obtain information on whether the fishers of the MA also harvest *Locos* outside the MA under ban or whether they did it before the introduction of the MA. The unsolved illegal harvest under the ban was one of the reasons for the introduction of the MAs country-wide. According to an expert (that I have done anonymous, 2007), the reason why two zones within the MAs have not proved bountiful might be due to the interest in having some sectors free from the MA regime for clandestine exploitation. This is speculative, but the MA fishers might be continuing to harvest *Locos* in the historical areas, yet complaining about theft from their own MA.

Illegal harvest of *Locos* in the country seems to continue in spite of the MAs although there are no studies of this problem at a national scale. The level of organization and size of illegal fishing and traffic remain unknown (see Chapter Five).

Men's Problem Perceptions

Clandestine extraction of *Locos* by outsiders, symbolised by a man wearing a black capuchin (the thieve) was a big concern in the problem-tree exercise (Table 7.24, Picture 7.15 and Fig. 7.5). Theft is the main reason for the vigilance system of the MA.

Theft is also problematic because even though fishers discover the thieves in the MA and report the offences to the local police, they cannot intervene due to jurisdictional boundaries (*cause* 2b, Fig. 7.5). The police, who are locally based, have jurisdiction over land while Maritime Governance, which is located in the regional capital, has jurisdiction over the sea (San Antonio).

This institutional problem of divided jurisdictions means that the police cannot intervene directly in activities occurring in the sea but must inform the Maritime Governance, although this usually happens when it is too late. The fishers see this difficulty as a lack of connection between Maritime Governance and

TABLE 7.24 Men's problem-tree (*Árbol de Problemas*).

Purpose:	To analyze how the fishers perceive the main problems connected with the MA.
Participants:	Roberto Olivares, Fernando Romo and Francisco Aranda.
Place:	Outside the Union's Social Centre, where they work near the boats.
Date:	July 23th, 2001. *Duration*: One and a half-hour.
Process and comments:	By this day, the storm was over and fishing activities had started again. Therefore this exercise was done in an open space outside the social centre while the fishers were working. Thus, I drew the flip chart myself, following the instruction of the fishers.
Facilitator:	The Author.

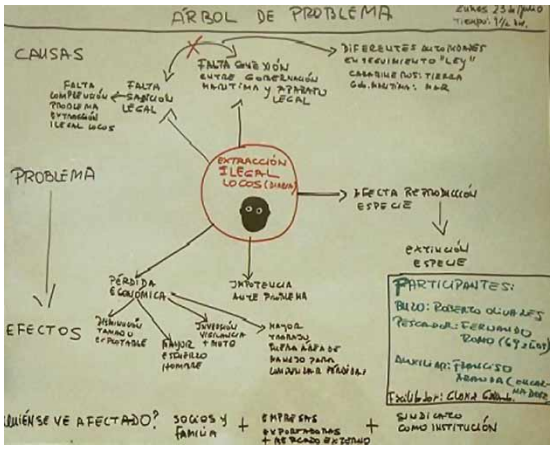
the legal apparatus (*cause* 2a). Similarly, in *causes,* they blame the lack of legal sanctions for *Locos* poaching and complain that there is a lack of appreciation of the extent and impact of this problem. In their view, *Locos* poaching is a problem primarily because it puts additional stress on the *Locos* reproduction (1a), that is, an action that threatens the extractive viability of *Locos* (1b), which they aim to protect through the MA for their own benefit.

The problem of *Locos* poaching has several consequences. The first is economic loss for the MA. Secondly, it means that the largest shells are lost. It also means effort for each of them in trying to compensate means extra work. They have to invest in patrolling and the equipment and fuel to support it (e.g., man power, motorcycle, fuel, cellular phone). They also feel frustrated. In asking *who was affected by Locos* poaching, the fishers answered that it was the members of the Union (and the Union itself) and their families, the export companies and the domestic market.

It was clear that the fishers were very aware of the problem, and that it was something they had thought about and discussed. There was consensus regarding the issues and their order of importance. Non-participating fishers around the participants nodded their approval to the different elements that were raised. For me now, it is easier to understand the concern over the reservoir of *Locos* in situ, on the sea bottom, since it constitutes an accumulated treasure, never seen by the fishers before, especially given the bumper harvest results of Sernapesca's landings statistics obtained during 2001 and 2002. It is also against this background that the results of the solution-tree tool can be contextualised and better understood (Picture 7.16).

Women's Problems Perceptions

Women's problems are different from men's. They have no connection with the MA but deal with their own situation mainly as house-



PICTURE 7.15 Men's problem-tree

PICTURE 7.16 Finishing problem-tree

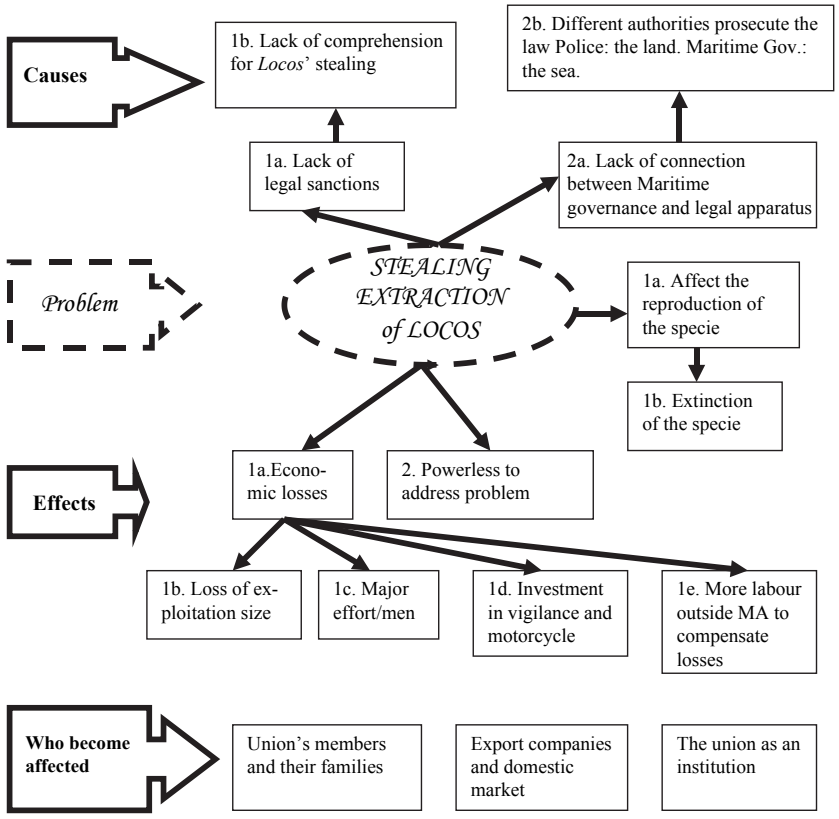


FIGURE 7.5 Reproduction of men's problem-tree

wives or house-keepers (*dueñas de casa*) (Table 7.25, Picture 7.17 and Fig. 7.6). The main problem suggested by the women was the lack of stable job opportunities and the shortage of economic means with which to complement the economy of the household. They explained that the lack of jobs was connected with the lack of private initiatives, rather than with Government initiatives, although, having said that, expectations were placed on local politicians and the State when they identified the causes of the

TABLE 7.25 Women's problem-tree (*Árbol de Problemas*).

Purpose:	To analyze what the women perceives as main problems in their life.
Participants:	Joanna Bianchi, Norma Sagredo and Lorena Leal.
Place:	The Union's Social Centre.
Date:	July 24th, 2001.
Duration:	One and a half-hour.
Process and comments:	Similar to how it was with men, there was clarity and consensus about the main problems they confront as women.
Facilitator:	The Author.

PICTURE 7.17 Women's problem-tree

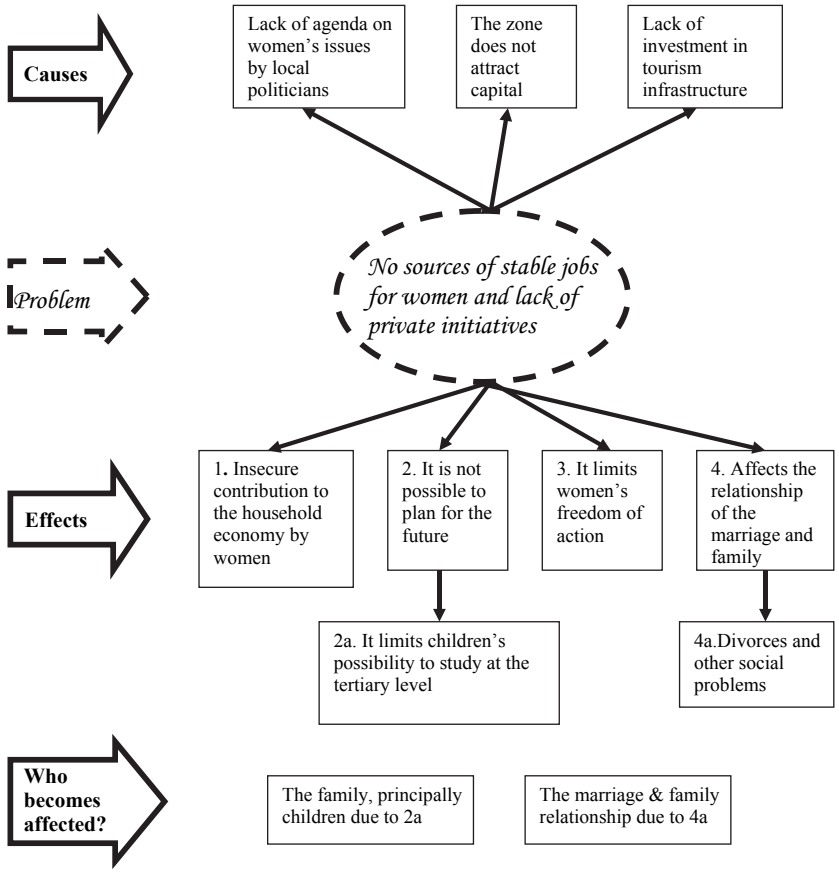


FIGURE 7.6 Reproduction of women's problem-tree

problem. As a *cause,* they identified the lack of a gender consciousness and gender specific strategy among local politicians. They also pointed out that the area does not attract capital, that is, that the investment in tourism infrastructure is low.

The *effect* of the lack of job opportunities meant that women's contribution to the household economy was unstable and this made it difficult to plan for the future, especially the possibility for children to study at a higher level. Job scarcity also meant a limitation of their decision-making role about economic matters and dependence on their husbands. Furthermore, the lack of jobs affects the marital relationship and the family in general as there is not enough income. This may lead to separations and other social problems.

Who then becomes affected by the lack of jobs for women? The answer is the family, principally children (as it limits their future education), and the marital and family relationship. This is congruent with what the effects were in the problem-tree described above.

Through complementary open interviews with the women, they stated that they work mainly during the summer (December–February) as home-maids in the summer houses and apartments for which they get a salary of 60,000 *pesos* a month or US$95.[28] To look after the summer houses during the rest of the year women get 20,000 *pesos* a month or US$31.5. Economically, the worst months are June–August. During July, the Union supports the

[28] Average rate of 643 *pesos* per US$, year 2001 (Banco Central de Chile 2003).

TABLE 7.26A Women's seasonal calendar, yearly illness and related expenses.

Purpose:	To see the seasonal distribution of illness and related expenses in the household economy.
Participants:	Raquel Cisternas, Adela Gallardo and Lorena Leal.
Place:	The Union's Social Centre, *Date*: July 20th, 2001. *Duration*: One hour.
Process and comments:	Expedite.
Facilitator:	The Author.

TABLE 7.26B Reproduction of seasonal calendar. Yearly illness and related expenses, women 2001 (in US$).

	Diarrhoea	Sun burns	Sun lotions/ body lotions	Influenza body lotions & colds	Allergies
Jan.–Feb.	15,76	31,52	39,41	0	0
Mar.–Apr.	0	0	0	0	0
May–Sep.	0	0	0	78,81	0
Oct.–Dec.	0	0	0	0	47,29

TABLE 7.27A Women's daily calendar *(Calendario del Día)*.

Purpose:	To see the distribution of activities during the day in a normal working day.
Participants:	Veronica Diaz, Norma Sagrado y Salomé Aranda.
Place:	The Union's Social Centre. *Date*: July 20th, 2001. *Duration*: One and a half-hour.
Process and comments:	Expedite.
Facilitator:	The Author.

families with the first food basket. During the non-summer months, women also work with handicraft (such as leather, shells, ceramic, sewing). Among other problems the women mentioned were that the family lose the right to economic support for the children if the family owns its house. There is no health insurance for fishers and their families and no pensions available for retired fishers. When a fisher dies, the Union supports the widow and her family for one year. After that, they have to manage for themselves.

Children's education is another big concern. There is no technical high school in the locality. The nearest high school is in the next village. To send children to that school costs 1,000 *pesos* or US$1.6 in transport and lunch has to be paid for, too. Family costs to send two children to the neighbouring town would be approximately 200,000 *pesos* or US$315[29] per year without counting food, school materials and uniform, things that parents also have to pay for. It is noteworthy to compare this cost with the minimum salary in Chile, which was 105,500 *pesos* or US$166 in July 2001.

The health situation was also assessed among women by developing a seasonal calendar of the most common illness and expenses. The data generated from this exercise clearly shows that most expenses are incurred during the summer months in the form of sun protection and medicine for diarrhoea. As can be seen in Table 7.26B, these costs for a family are near the minimum salary in Chile. Also important are expenses to treat influenzas and colds during winter and allergies during spring (Table 7.26A and Table 7.26B). Lastly, information about the women's situation was complemented by developing a daily calendar (Table 7.27A and 7.27B). Compared to the working day of a diver or fisher, women's working day often finishes near midnight, although a long break is usually taken after lunch.

[29] Average rate of 634.94 *pesos* per US$ for 2001 (Banco Central de Chile 2003).

TABLE 7.27B Reproduction of women's daily calendar.

Time	Activities
7–7:30	Get up to do house duties, personal hygiene.
7:30—8	Breakfast for the children before school.
8–10:30	Clean the house, the backyard, throw away the garbage.
10:30—13	Buy food, lunch preparation, lunch, wash dishes, the kitchen, laundry.
14—16	Rest (watch TV: news, soap opera; *siesta*).
19—20	Preparation of tea and sandwiches when the children come from school.
20—21	Help children change school clothes, more cleaning, help children with homework.
21—22	Supper, prepare the children for bed.
22:30–23	End of the working day, spend time with the husband and elderly children.

TABLE 7.28 Men's solution-tree (*Árbol de Solución*).

Purpose:	To analyze the possible solutions for the problems identified in the Problem-Tree.
Participants:	Rafael Pizarro, Jose Cisternas and Salvador Silva.
Place:	Outside the Union's Social Centre, in their labour place near the boats. *Date*: July 24th, 2001. *Duration*: One hour.
Process and comments:	See comments in Problem-Tree. *Facilitator*: The Author.

WAYS FORWARD

The solutions to the main problems as seen by men and women were raised in the problem-tree exercise. The next tool is the solution-tree. It deals with solutions, their implications, effects and who should be given the responsibility for the action aimed to solve the problem (see Table 7.28). This tool was used by both men and women.

Fishers' Perception of the Solution to their Main Problem

As a *solution* to *Loco* poaching (Fig. 7.7), fishers suggested that specific laws that protect the MAs and its resources be established. It was proposed that these laws would include: the application of costly fines, authorisation of judges to impose sanctions, the possibility to withdraw the fishing equipment of the thieves and finally, time in jail based on the severity of the crime.

It was believed that the *implications* of such a solution would mean less theft and increased tranquility in the MA, and a better economic situation, as well improved social welfare. It would furthermore strengthen the MA and the Union as a valid alternative form of production and organization and increase respect for artisan fisher organizations.

The *effects* of the problem solution in the form of the creation of specific laws would mean a larger exploitable stock, less need for extra work outside the MA when the economic losses in the MA diminish. They considered it the responsibility of the Union and the Maritime Governance together with the local police and the court in charge of implementing this solution.

PICTURE 7.18 Men's solution-tree

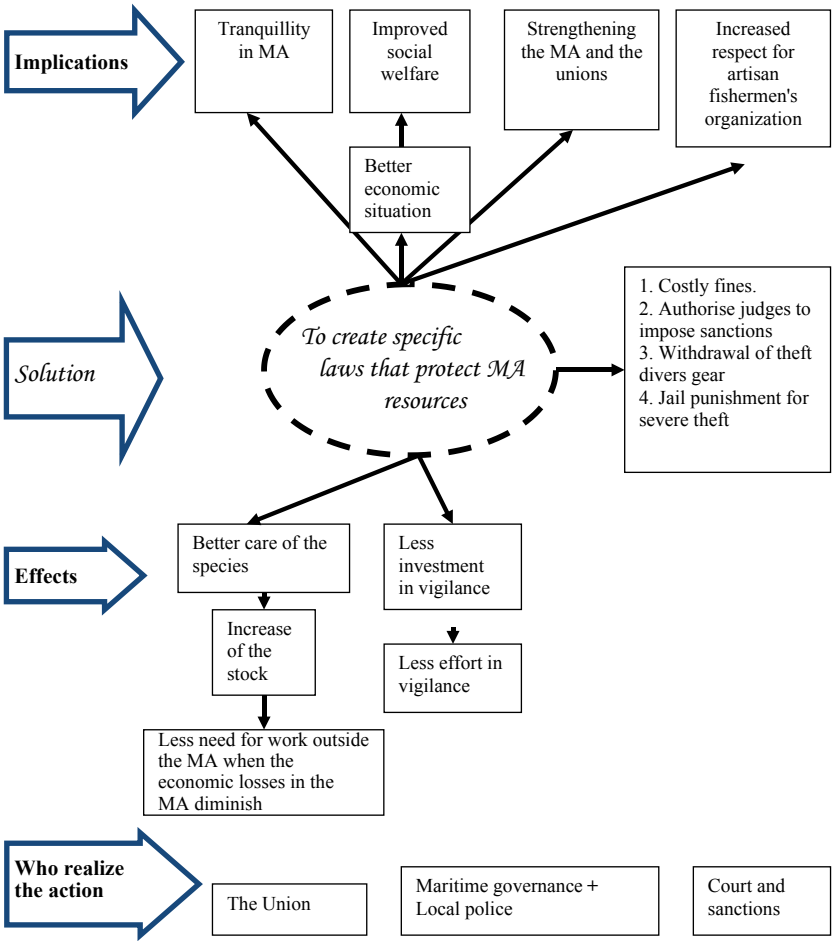


FIGURE 7.7 Reproduction of men's solution-tree

Women's Perceptions of the Solution to their Main Problems

The results of the women's solution-tree (see Fig. 7.8) exercise were similar to the items developed in the preceding problem-tree. The proposed *solution* to the shortage of jobs for women was the creation of private and public salaried occupations, in addition to an economic initiative which supports the diversification of employment opportunities to avoid dependency on just one or two sources of jobs (Table 7.29) (Picture 7.19).

The implications of such a solution would mean a better life and include better opportunities to plan the future including their children's education. It would also mean improvement in their social and economic welfare due to a more stable household income, which would lead to family stability as well as to independence for them as women, which could imply increased decision power. When economic problems decrease, family problems do, too. The economic situation seems to be the main source of problems affecting the family in general, but to have a job is not only a means to solve economic difficulties but also to bridge inequality gaps between women and men. Those charged with *realising the action* to solve job shortages were, according to the participants, the same agents that are part of the solution. It means that both private and regional/municipal offices should initiate diversification of local employment opportunities. This action is something women

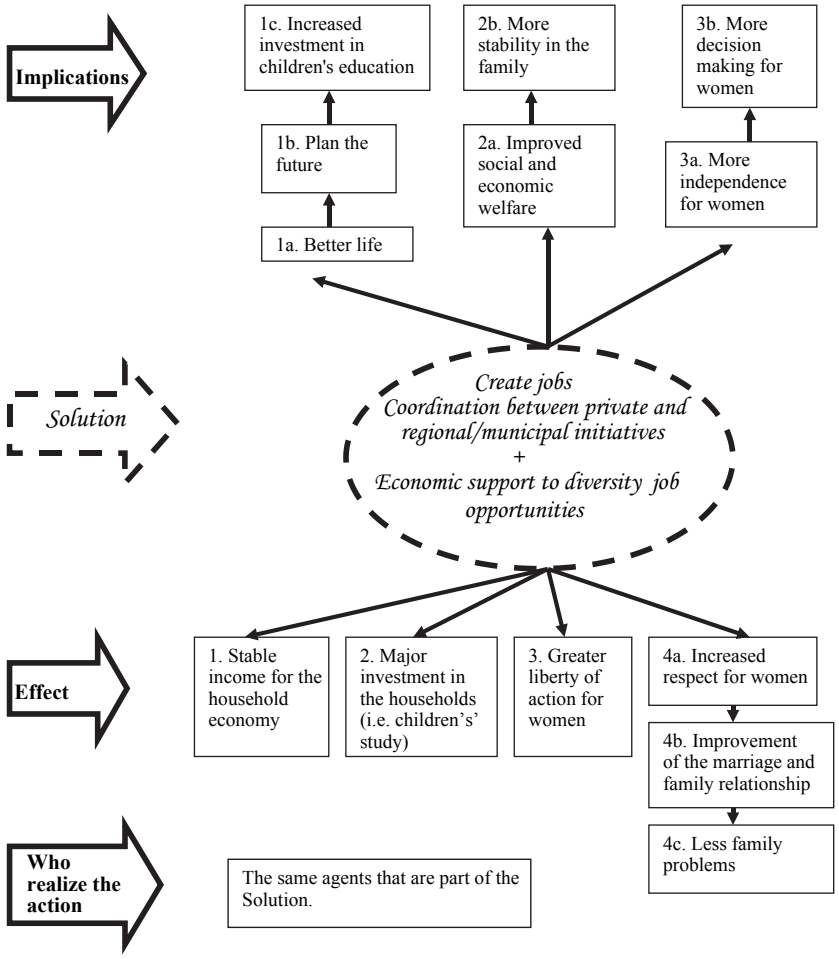
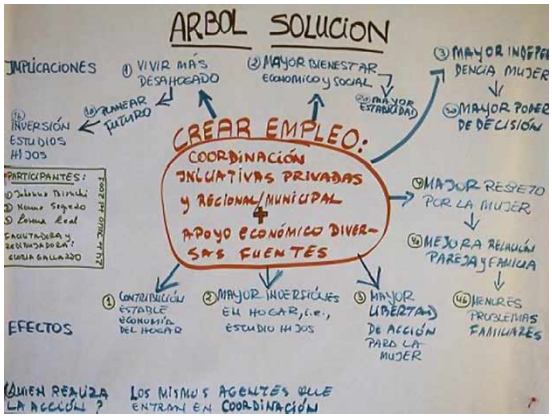


FIGURE 7.8 Reproduction of women's solution-tree

TABLE 7.29 Women's solution-tree (*Árbol de Solución*).

Purpose:	To analyze the possible solutions to the proposed problems.
Participants:	Joanna Bianchi, Norma Salgado and Lorena Leal.
Place:	The Union's Social Centre. *Date*: July 24th, 2001.
Duration:	One and a half-hour.
Process and comments:	See comments in Problem-Tree.
Facilitator:	The Author.



PICTURE 7.19 Reproduction of women's solution-tree

TABLE 7.30A General evaluation of the methodology and the process, men (*Evaluación del Proceso y los Métodos*).

Purpose:	To evaluate the process and the methods.
Participants:	See Table 7.29. Some of the participants were not present in the first evaluation, which was complemented later by Armando, but not with all the fishers, whose participation varied from exercise to exercise.
Place:	The Union's Social Centre. *Date*: July 25th, 2001. *Duration*: One hour.
Process and comments:	Difficult to perform with all the members that were part of the exercise from the very beginning.
Facilitator:	Initiated by the author and complemented by Rosson, A. in the days following my departure.

expected from these agencies, which implied excluding themselves from taking the initiative.

Analysis of the Proposed Solutions to Problems

The problem-tree and solution-tree exercises (for both men and women) showed considerable consciousness and reflection about their situation. As opposed to the women, the fishers included themselves in their solution to the problem.

Regarding the men's solution, laws against theft already exist, which makes the solution proposed by the fishers difficult to comprehend and implement. Nonetheless, the fishers' have a point since despite having exclusive use rights, MA resources cannot be said to be the property of the MA and the fishers in the same sense that a house would be.

The Union has exclusive use rights to the MA, but marine resources are fugitive and normally become property only after captured. Nonetheless, since fishers are fishers and not lawyers, they proposed as a solution a "special law" rather than more of targeted sanctions.

PARTICIPANTS' METHODOLOGY EVALUATION

Since the evaluation of the methodology used in El Quisco was analysed in Chapter One, only the tables are presented here. Three main questions are answered: What did you like? What did you not like? What did you learn? (Tables 7.30A, 7.30B, 7.31A and 7.31B)

CONCLUSIONS

In the late 1980s, when the collaboration with the University and the self-imposed ban started in El Quisco, the Union had already developed assets that paved the way for the MA. The unity,

TABLE 7.30B Reproduction of the general evaluation of the methodology and the process, men.

Participants	What did you liked?
1&2	Good experience, new experience. Facilitators were common people, easy to access. Good and nice (Rafael Pizarro and Jose Cisternas).
3	I liked the approach based in the MA. The participation of people in groups is good; the methods allow the participation of all present (Carlos Valencia).
4	I liked to be informed and learn about ourselves. It is important for us that our labour is known (Juan Carlos Campos).
5	Good. We work in groups, ideas are understood, and one participates with those who work (Patricio Aranda).
6	Interesting to get to know the work in groups. Presentations can be made (Guillermo Alvarez).
7	I liked the study system (Ruben Marchant).
8	Nice way of working, one learns more (Enrique Leal).
9&10	Easy (Francisco Aranda and Fernando Romo).
11	I liked the work in groups (Manuel Bravo).
12	Groups work is good (Orlando Mella).
13	Interesting work (Gonzalo Leiva).
14	Nice work (Ricardo Moraga).

TABLE 7.30B (*Continued*)

Participants	What did you not like?
1&2	Nothing, we lacked more participation (Rafael Pizarro and Jose Cisternas).
3	Little cooperation from the union's members to assist in the workshops (Carlos Valencia).
4	That not all the people participate when it concerns everybody (Juan Carlos Campos).
5	There was lack of information regarding the MA. Those who work are always the same (Patricio Aranda).
6	Lack of cooperation of the comrades so they can understand the process. Scarce disposition from the people if there is not income involved (Guillermo Alvarez).
7	There was poor assistance from the rest of members (Ruben Marchant).
8	Nothing (Enrique Leal).
9&10	Nothing (Francisco Aranda and Fernando Romo).
11	Little cooperation from some of the members (Manuel Bravo).
12	Scarce participation from some members (Orlando Mella).
13	Nothing (Gonzalo Leiva).
14	Not to have been able to participate in everything (Ricardo Moraga).

Participants	What did you learn?
1&2	We learned how to be prepared for next time (Rafael Pizarro and Jose Cisternas).
3	I learned that all people can participate, not only the directors of the union. That it is possible to obtain ideas from the rest, from the base, that all can have an opinion (Carlos Valencia).
4	More communication between the members; better understanding of the system (Juan Carlos Campos).
5	It is convenient to work in group, things are discussed (Patricio Aranda).
6	One learns to express what one thinks and expose those ideas (Guillermo Alvarez).
7	One obtains new knowledge (Ruben Marchant).
8	One learns how the MA got started (Enrique Leal).
9&10	One shares ideas when discussing with others (Francisco Aranda and Fernando Romo).
11	I noted that people could express their ideas and that consensus was quickly reached in the dialogue (Manuel Bravo, President of the union).
12	One learns the ideas of the others (Orlando Mella).
13	One learns how to work in group (Gonzalo Leiva).
14	One learns to know the process off the MA (Ricardo Moraga).

TABLE 7.31A General evaluation of the methodology and the process, women (*Evaluación del Proceso y los Métodos*).

Purpose:	To evaluate the process and the methods.
Participants:	Joanna Bianchi, Norma Sagredo and Lorena Leal.
Place:	The Union's Social Centre. *Date*: July 24th, 2001. *Duration*: One hour.
Process and comments:	As it became too late, this exercise was left to be done after my departure. Rosson succeeded in gathering only three of the women that had been participating previously.
Facilitator:	Rosson, A.

collective decision-making ability and the negotiation power were part of the soft capital assets that the fishers of the Union already had in their tradition. These have been strengthened with the struggle over the physical landscape with the Yacht Club and from the periodical negotiations over the restaurant's concession. It is also from the leasing of the restaurant and the fish shop that the main incomes of the Union are derived. Due to its improved negotiation position, the Union has prospered in areas other than fishing leading to a diversification of activities.

Since the first self-imposed ban in the late 1980s up to 2001, the following milestone achievements were obtained: the official request of the MA in 1995; the first harvest of the MA during 1993 done individually by boat groups; the substitution of individual harvest with

TABLE 7.31B Reproduction of the general evaluation of the methodology and the process, women.

Participants	*What did you like?*
1	New ideas come up as you spend time in the group.
2	To spend time in the group and discuss problems that one thinks are private but turn to be common.
3	Coordination of ideas and to find the average.
Participants	***What did you not like?***
1	Nothing.
2	Nothing.
3	Nothing.
Participants	***What did you learn?***
1	To draw conclusions in collective.
2	To gain self-confidence when recognizing that problems are common.
3	To recognize that one is capable of expressing ideas in group and these ideas have value and are useful and not as wrong as one thinks.

common harvest during the second harvest year of 1997; an application for two new MAs under the same union in 1997. The latter did not prosper for unclear reasons, but an expert expressed that this could have a connection with the fishers' desire to have an area free of explicit restrictions on *Loco* harvesting, although harvesting in these areas would be illegal. In 1999, the ESBA study was done for the three zones and the projections for a ten years period were estimated in terms of landings and income.

Since the self-imposed ban, the harvest and selling routines changed. The substitution of individual harvest by a common harvest happened in parallel to a move to common commercialisations. Common harvest decisions and group negotiation for the price started. As seen, both postponing harvest due to the low market price of *Locos*, and group negotiations have been part of the early strategies used by the Union in order to get better prices. The fishers began to rationalise sale of *Locos* according to market mechanisms. This could be construed as a more active role that goes beyond that of the mere direct producer, a role that displays market savvy, indicating that the producers are moving into new social arenas.

Evaluating the MA, the strategy goes along three common collective actions: (a) common management (i.e., administration); (b) common or collective harvest; and (c) common commercialisation of the species. Giving every diver an extra monetary share per extraction "since all the divers do not realise the same effort in extracting the resource *Loco*" (Reglamento interno . . .b.5), seems to make extraction more effective, avoiding perhaps a kind of "free-rider" phenomenon.

Regarding harvest and income from the MA, the results are better in terms of income if compared to those expected, but less satisfactory in terms of production. The reasons for the lower production might be several, including poaching, which cannot be evaluated in this investigation. If diminishing production is due to ecological reasons experts have no definitive answer regarding the cause as ocean phenomena are complex. Whatever the reasons, the lower production results make it evident that planning for marine resources is far from being reliable. This is a big challenge for the MA, perhaps possible to solve by diversifying economic activities even more, to make livelihoods less vulnerable. In terms of MA production, decisions to harvest according to market fluctua-

tions might become risky, adventuring labour efforts.

Regarding individual income, the calculated amounts that the fishers said they derived from the MA are bleak compared to the national minimum salary. However, the fishers' livelihoods depend on several activities. Although this activity may be limited in terms of income, there is also women's economic activities, which needs to be considered in a household situation. Nonetheless, neither gender group excepted that the MA alone would solve their economic situation. If we consider the data given in the seasonal calendar, the fishers seem to get incomes two or three times above those of the minimum salary in Chile. Income is thus derived from the historical areas, from the MA and from the other economic activities of the Union, and from women's contribution. Most income comes from the restaurant and fish shop. In this regard, the El Quisco Union cannot be said to be representative as not all fishing organizations have these sources of income, although El Quisco is not alone in this regard, with many coves connected to well visited bathing sites bringing tourism.

What can be said about the success of the MA as a way to protect the *Locos* as an economic resource? As we saw, landing results oscillate considerably from year to year. Nonetheless, it is assumed that without the MA, still under open access, every fisher would have extracted as much as possible of the resource probably without consideration of the legal size or market price and in competition with each other, which was the situation prior to the MA reform. This is not the case any longer in this particular MA area. Nevertheless, illegal harvests seem to continue by the members of the Union around the MA as it seems also to be the case in the rest of country (see previous section). One can only hope that illegal fishing diminishes. This may occur given that the MAs extraction and commercialisation have become more organised, reducing channels to commercialise *Locos* outside of this framework. In this case, illegal harvests (if not well organized with traffic export purposes) is most probable for the local and regional market and therefore also hopefully limited in scope. Theft within the MA is a more recent problem, and to solve this problem vigilance is used but this is demanding in terms of labour efforts. One of the conditions commonly named by the common resources approach (Ostrom, 1999; Schlager and Ostrom, 1992) is that the cost of controlling the resource should not be too high, which seems not to be the case with the MAs. On the other hand, if vigilance were more demanding, the more scarce the fish, the more expensive they become (Christy, 1992), which also makes the question of the cost of vigilance relative.

8 From Seascape of Extinction to Seascape of Confidence

CONCLUDING REMARKS

Due to high extraction rates in the 20th century sea resources have become almost non-renewable. Industrial fishing is a major cause of resource depletion whereas small-scale fisheries have been seen as less threatening for the ecosystem. Nevertheless, through the process of economic globalization, also small-scale artisanal fisheries have been incorporated into the international market as a result of the demand for high value commodities. This has led to over-harvesting resulting in depletion of coastal marine resources, showing the interconnection between consumption in high-income countries and production in low-income countries. The implication of this relationship resource exhaustion.

The Chilean experience with the *Concholepas concholepas* (*Loco*) illustrates how Chile's integration into the global market under the implementation of a neo-liberal policy led to a significant increase in artisanal fishing activities during the middle 1970s showing, after a short and intensive export period, abrupt harvest falls in the early 1980s. *Loco*, a species indigenous to the Chilean and southern Peruvian coast, is not alone in being threatened due to export demand. In response to globalization and market demand of fish, Chile's administration adapted and modernized its institutions, fishing law and regulations. Although preponderance has been given to the economic interest of industrial fishing and international capital, there has also been a concern for artisanal fishing. In spite of its rudimentary character, this sector increased its importance bringing considerable export revenues to the state and to exporting firms. Benthic resources, exploited exclusively by the small-scale artisanal fishing sector, show higher export profits in comparison to those produced by the large-scale fishery sector (Castilla and Fernández, 1998, p. 125). Artisanal fishing is also central for local food security and livelihoods for coastal communities. As a response to a decreasing *Locos* harvest and that of other benthic resources, the Chilean government attempted, without much success, to adopt different measures to stop resource depletion, such as reproductive seasons (1981–1984), global quota (1985–1989) and total closure (1990–). These failures led to the legislation of a new co-management formula — TURF. TURF was adopted to avoid resource depletion and the social problems that would occur if artisanal fishers lost this part of their income. The rights inherent in TURF are given effect in Management and Exploitation Areas for Benthic Resources (MEABR), which in *vox populi* became the Management Areas (MAs). Experimenting with no-take sea areas in some parts of Chile, fishers themselves, together with scientists were the precursors to the Chilean TURF initiative. Importantly scientists and fishers, cooperating at a grassroots level, initiated the quest for more sustainable harvesting practices. This pioneer work was then formally institutionalized in the 1991 Fishing Law (LPA).

A relevant question is whether the pre MA process can be understood as a "tragedy of the commons"? According to Castilla, the *Loco* fishery portrays Harding's "tragedy of the commons" where "Each man is locked into a system (economic system) that compels him to increase his herd without limit — in a world that is limited" (in Castilla, 1995, p. 157). This is also how the situation was perceived by the authorities (Castilla et al., 2007). There was consensus that there were changes in resource stocks, but the driving forces seemed unclear. When the landing of *Loco* fell dramatically between 1980 and 1981, over-exploitation was never demonstrated (Castilla, 1995). Castilla himself suggests

in his 1995 article that 'the *Loco* decreases probably due to over-exploitation'. In the conclusion of the same article he writes that the rationale to introduce MAs was "the fact that the fisheries were over-exploited" (Castilla, 1995, p. 28, 38).[1] The meaning of "probably" (Castilla, 1995) is not completely congruent with saying (in the same article) that the rationale to introduce the MAs was the *fact* that the fisheries were over-exploited.[2] In their 2007 article, Castilla et al. (2007, p. 27) suggest that "due to the rise in fishing effort, *Locos* experienced over-exploitation", leading to socio-economic conflicts in the late 1980s, this being the primary reason for the changes to the 1991 fishery legislation (to the LPA). Castilla (1995) and Castilla et al. (2007) thus exhibit ambivalence regarding the over-exploitation.

Stotz (1997, p. 82) suggests that "the fluctuations in the landing of the *Locos* could be due to natural variations in the reproduction of the resource and that this hypothesis needs to be investigated; a position that Stotz maintained in 2007 (Stotz, W., Universidad Católica del Norte, Pers. Comm. via email). Given the lack of certainty regarding the causes of the diminishing *Loco* stocks, it could be argued that an interpretation of the precautionary principle had been adopted by scientists, government and fishing organizations, leading to the regulation of human use of fisheries resources by different measures. Whatever the causes of the resource deterioration, the social situation portrayed the dilemma of common pool resources; i.e., the costly and difficult question of how to limit access amongst multiple and competing harvesters to ensure sustainable use of a dynamic resource system.

The new fishing policy was nestled in a new democratising political context after Pinochet's military government (1973–1989). Fishers are now organized nationally once again. Among the goals that fishers pushed forward in the 1991 LPA was control over the five marine miles, the priority of coastal communities to obtain concessions of the interrelated areas of land, sea bottom and the MAs themselves. This is the way the Confederación Nacional de Pescadores Artesanales de Chile (CONAPACH, 2001) perceive their achievements. Artisanal fishers' participation is also assured in Art. 145 of the law, including as well the other fishing sectors in fisheries management, all of them being represented in the National and Regional Fishing Councils (Subpesca, 2003, D.S, p. 85). For instance, according to Meltzoff et al. (2002), in the old Fishing Law promulgated in 1931, artisanal fisheries were not mentioned. Artisanal fishers also continue to be a party in the co-management arrangements represented by their fishing organizations in 35 regional federations (Sernapesca, 2005a), and two national confederations. Through these structures fishers' organizations, with the support of scientists, have been able to forward their position, inducing some changes such as tax reduction.

Fishers' participation in policy-making has empowered them as resource users within a legal framework, which could be characterized as hierarchical and bureaucratic regarding such important issues as the very process of getting a MA. As Meltzoff et al. (2002) suggest, "Chilean fishers reside outside the culture of bureaucracy". Yet, MAs have expanded all over the country. The rapid proliferation of MAs along the Chilean coast perhaps corroborates the view that the fishers themselves consider the new regulated fishing of benthic resources as a valid alternative regime compared to the previous situation. Having said that, since the beginning of the 1980s there was not open access in practice. However, various institutionalized protection measures adopted during this time did not reduce resource harvesting as fishers found ways to extract as much as possible. This took the form of not always respecting the legal size, selling at a low price and in competition with others.

[1] According to the 1991 Fishing Law an overexploited resource 'is that hydro-biological resource whose level of exploitation is greater than that technically recommended for its conservation in the long run' (LPA 1991, Titulo I, Disposiciones Generales, Art. 38).

[2] 'Probably' means that 'the evidence makes it rational to believe, but does not make it certain that the proposition is true' (Bowell and Kemp 2005:86).

In less than 10 years, the situation changed, from 103 MAs in May 2000, to 664 by March 2007, and many fisher organizations were granted exclusive rights over their traditional fishing grounds. The old fishing strategy was giving way to harvesting marine benthic resources in accordance with management plans developed with the assistance of scientific experts, fishers and under the examination of fishing authorities; i.e., within a co-management framework with multiple stakeholders involved.

By introducing the MAs, government integrated a bottom-up approach with top-down management, where authorities are still not ready to delegate resource management (Meltzoff et al., 2002). Other scholars seldom go further than characterizing the Chilean MAs as co-management without describing the specificities of what they mean (see co-management continuum (Hauck and Sowman, 2005), Fig. 2.2 in Chapter Two). This is perhaps because it is not easy to determine the types of co-management given the complex nature of co-management arrangements and practice, including aspects of power sharing amongst multiple levels and partners. At what level (provincial, municipal and and/or village) should power be exercised and it relation to what?

In the co-management continuum referred to above, the Chilean case could perhaps be characterized as an example of co-operative co-management — government and user group share decision-making, powers and responsibilities (Hauck and Sowman, 2005) as Gelcich et al. (2006a, p. 963) suggest, although this takes a top-down fashion in some locations with traditional resource management institutions in place as it may not harmonize with the traditional system. Seeing it at the MA level, the arrangement could be characterized as a delegated co-management type, where government delegates a considerable part of its powers and responsibilities to an organized user group (Hauck and Sowman, 2005). In this line we find Moreno et al. (2007) who informs about a regional, formal multiple stakeholders participatory forum (Comisión de Manejo de las Pesquerías Bentónicas de las Regiones X y XI (CoMPeB)) in southern Chile for the urchin fishery, which have become an effectively regional participatory form of governance.

All in all, most voices seem to be positive to the model and practice of MAs. Stotz (1997) is among those who are critical to the adopted MA policy and its implementation (not to the model itself); he posits that the MA remains an experiment whose results cannot be predicted. Furthermore, Stotz (1997) emphasizes that the benefits from MAs go beyond only increasing or securing fish production. Their importance seem to be principally biological and social. Their major values are that they favor the generation of resource management knowledge, allowing experimental treatments and control of different areas. In this way, MAs contribute to the regulation of the fishing activity and at the same time involve and strengthen fishing organizations. The MAs thus contain an educational value for all participating parties (artisanal fishers, university researchers, government officers and other professionals), favoring the development of management strategies that integrate the biological with the social and economic aspects. Castilla and co-researchers, in spite of some criticism to the MA policy due, for example, to its major emphasis on a single species (*Loco*), belong to those most positive to the MA regime, portray it as a success story (Castilla et al., 2007; Defeo and Castilla, 2005):

> (1) MEABRs constitute today a co-management success with long-term effects in the economic welfare of fishers for the first time in Chile (...). (2) The strengthening of organizations/syndicates led to the implementation by fishers themselves, of effective monitoring, control and surveillance procedures that: (a) attenuated governmental enforcements cost; (b) significantly increased the effectiveness of management strategies based one control of the amount of catch and effort exerted, allowing the components of this multifaceted system to think that sustainability could actually be achieved in artisanal fisheries. Global operational management instruments (minimum legal sizes, gear restrictions) and area-based tools (catch levels per fishing ground) are more feasible to be implemented now than before (Castilla et al., 1998; Castilla and Defeo, 2001). (3) The co-management MEABRs have also been a success from a scientific point of view: allocation of TURFs fulfilled objectives for management conservation (Castilla, 2000) and have served as experimentation tools to refine stock assessment and management procedures (Defeo and Castilla, 2005, p. 275–277).

These authors point out, however, that the above description corresponds to examples where legislation has been properly used (central Chile) and have a relatively long experience in using the TURF regime. Moreno et al. (2007) describe similar positive results for southern Chile.

Importantly these results have been achieved in spite of the fact that the Chilean TURFs are a response to a crisis management situation, as several authors have suggested. The introduction of TURFs in crisis scenarios is not unusual. Frequently, governments push co-management solutions to encounter a crisis, delegating the resource management task to the fishers too late, i.e., when over-exploitation has already occurred (Berkes et al., 2001). This central issue of handing over responsibility of an exhausted resource could have been a reason that MAs have become unsuccessful in the Chilean case. This perhaps furthermore reinforces the idea that the MAs are giving satisfactory results, although many problems remain, as I will discuss below.

The Chilean co-management approach seems to be leading, although with some ambiguity, to some of the benefits stressed by Hara (2003, p. 23) such as participatory democracy, broader and shared knowledge, better regulations, increased legitimacy, increased adherence and increased proficiency. Unlike the Japanese TURF, the Chilean TURF does not seem to embrace a decentralized management, adaptive management process, use of local resources, local and scientific knowledge, multi-scale and interlinked management, or the promotion of sustainable use in an economic context (Makino, 2005). Multi-scale and interlinked management is in line with the propositions that Defoe and Castilla (2005) recommend as the next step for the Chilean coastal fisheries to implement. Both marine parks and reserves are in fact already considered in the 1991 Fishing Law (Moreno et al., 2007, p. 46).

The use rights associated with the Chilean TURF regime include (see Chapters One, Two, Five, Six and Seven) exclusive, non-transferable temporal access to a specific fishing ground, implying an exclusive extraction right, the management of the area itself as well as the power to exclude others. The management responsibility of the MA includes the decision to determine the number and type of species to be exploited (subject to obligatory scientific advice), when and the amount of the total allowable quota to harvest, and income distribution. As a collective, they can also negotiate better prices with the buyers and take out loans, insurance, among others.

The right to alienate a MA is excluded from the MAs' bundles of rights. Sea tenure is limited in time. Thus it is a vulnerable form of tenure since it must be renewed every four years. This abbreviated temporal approach enables the State to exercise the ultimate control over the MAs and fisher organizations. The State represents the long-term public interest of resource conservation, which implies limiting the exercise of fishers' full rights. Through the MAs, the State also uses public funds to co-finance the conservation of nationalized common pool resources. There is also perhaps an intention of "learning by doing" within the legislative framework. Laws and decrees are susceptible to change and improvement if necessary. Furthermore, stakeholders other than resource users have a say through administrative advice and scientific information in coastal fisheries, such as regional fisheries authorities, local universities and research agencies.

Under the new MA regime, fishers and divers — organized as collectives — are using the coast and its resources under the institution of the common instead of fishing in individual small groups. Not only sea tenure of the MA is common, but also its management, the harvest and the resulting economic benefits. The MA shows that to manage common pool resources, ownership of the resource — whether private or public — is not a necessary condition or requirement since what is important is the delegation of resource management to a resource dependant user group which is then held responsible and accountable for exploitation of the resource. Thus, TURFs are a kind of "sea tenure"; a tenure that does not imply ownership but a right of use in which the producers control the means of production in a limited coastal sea territory.

The process of capital accumulation does not necessarily mean privatization of the means

of production, which is still in the hands of small-scale producers in many low-income countries. Profit appropriation can still take place through the commoditizing of small-scale artisanal production. The integration of small-scale fishing production into the international circulation sphere does not imply a privatization of common pool resources, but rather the commoditizing of its resources. Therefore the Chilean TURFs as a production form rather represent the communalization of common pool resources or *res publica* as coastal resources belong to the nation. In other words, although producing for the international market, the MAs represent an example of a commons institution, which gives them use rights to a parcel of a global common pool resource like the sea. Therefore my position fits amongst those who see the MAs as an effort to treat the ocean as common property (Payne and Castilla, 1994, p. 10), or rather as a common pool resource. Within this perspective, and within a broader perspective, the MA could be seen as a way to defend the loss of natural heritage and genetic resources while simultaneously creating spaces for economic development at various levels.

With the globalization of trade, the MAs mean that a new capacity building is taking place that is empowering the fishers as a collective and enhancing their local strength as producers within the international context. Alternatively, as a result of being subject to a demand dictated by international markets, the fishing agenda no longer belongs to the fisher in the same way that it did (Meltzoff et al., 2002).

Although an MA covers an insignificant part of the Chilean coast in area terms, through the constant incorporation of more fisher organizations into the MA system, a regulated harvest should be contributing to the recuperation of *Locos* and of other benthic resources, while also securing an important part of artisanal income. The goals of sustainable management, including the protection of habitat and conservation of fish stocks, as well as maintaining or improving the economic compensation of fishing, have been partially accomplished by the MAs.

Both in El Quisco and Puerto Oscuro, fishers told me they believed that the *Locos* population was recuperating. This has been validated by other studies (Castilla, 1983; Castilla, 1995; Stotz, 1997; Montoya, 2004; Castilla et al., 2007; Moreno et al., 2007). For example, the extraction quota of *Locos* had increased from 2000 to 2003 by 540 percent, according to an official evaluation of 92 MAs. Economically, the price for *Locos* increased during the same period by 76 percent (Montoya, 2004, p. 6–8). Export volumes are relatively constant and in spite of them being smaller now than before MAs were established, average prices per net tonne have increased. Between 1993 and 2005, all the yearly net tonnes export prices were above the pre-1993 levels. Although TURF has brought better incomes from benthic resources, and even though their importance in economic terms for the fishers are apparently low compared to fishing income from the historical areas, incomes from MAs in the studied cases are not totally satisfactory; a situation shared with other MAs.

This is also confirmed by Meltzoff et al. (2002, p. 88), among others, who suggest that the economic reliance on *Locos* to sustain a MA is insufficient. The regional characteristics of the species vary and official standardizing measures (10 cm/length since 1981) do not, for example, consider variations that fishers know exist. Meltzoff et al. (2002, p. 88) are critical that MAs are implemented without considering regional and biological differences, when for example the *Locos* grow faster in the south, leaving at odds northern fishers who respond by fishing illegally.

Landing results in both cases studied oscillate considerably from year to year. Also the variation between the real harvests and those expected is considerable, showing that planning is far from reliable. Apparently, in 2007 in Region IV, there were less harvestable *Locos* in the MAs. There are also problems regarding trade, leading to lower prices. There is apparently an over production in the international market. Officially the causes are not clear, but unofficially it is believed that this is due to (a) the competition from the Peruvian *Loco*; and (b)

illegal harvest in Chile, but refined and exported by Peru. In both cases, the price is lower than the Chilean price (Cerda, G., Sernapesca, Pers. Comm. via email 2007-07-03). Also, Montoya (2007) from the Fishing Subsecretary expressed the same worries as discussed in the last section of Chapter Five.

Experiences in both case studies have been otherwise positive in terms of strengthening fishers' so-called soft assets. This is reflected in the language that fisher leaders and many fishers use which show the incorporation of scientific, environmental and official terms. An important element in co-management situations that relates to fishers' knowledge of the species, such as regional local variations of *Locos'* size referred to above, is the different perceptions that exist among fishers, biologists and ecologists. Fishers follow their judgement in relation to their own collective and long-term field experiences and knowledge of the sea with a tendency to focus on immediate survival needs. This may make it difficult for them to relate to the abstract models of scientists (Meltzoff et al., 2002).

In the MA version of co-management, scientists, fishers and authorities have different and perhaps not compatible interests (Meltzoff et al., 2002). While fishers mostly envision MAs as a possibility to improve incomes from a vulnerable species, biologists see it as an opportunity to manage selected species and preserve biodiversity and healthy eco-systems. Government has several interests: to secure artisanal fishers' livelihoods and tax revenues, facilitate international trade, and to preserve the species. In other words, the ecological (conservation) and economic (profitable co-management) goals can be difficult to combine (Meltzoff et al., 2002). Asociación Chilena de Pesca (*s.a.*) stresses that both the 1991 LPA and the rules of MA specify that the principal purpose is the conservation of the hydro-biological resources, but also that the MAs are aimed to give economic usufruct rights to artisanal fishing organizations. Another way of asking this is whether it is possible to conciliate the same foreign market demand that almost compelled *Locos* to extinction with a sustainable harvest? Thinking dialectically, might the current solution to the depletion of *Locos* lie in the same factor that caused it? It seems at least to be clear that the Chilean TURFs are a positive outcome of a development trend that was highly problematic for resource users and for the eco-system.

Consultants and universities are important stakeholder groups within the co-management arrangement. With some exceptions (Stotz, 1997; Melztoff et al., 2002), an issue that is seldom discussed in the literature is the obvious interdependency between the MA fisher organizations and the expert-based institutions supporting the MAs. Every year these two entities are required to cooperate to perform the monitoring of *Locos*. Doubtless, the initial state subsidies granted to the fishing organizations to support the cost of the initial baseline studies (ESBA) were spent on consultants and universities. There does not seem to be any documentation that records the consultancy firms that have been established to support the MA regime, but it is clear that a number of them have flourished. Since their relationship is a commercial one, one would expect that the fishers have the option to change consultancy firms if they are unsatisfied. It was confirmed by Mr. Ocares (Pers. Comm. 2007) that this has occurred. This implies that there is a mutual dependency that characterises the relationship.

There is also another social factor that can be problematic and to which the government has not paid sufficient attention and support. There are some competencies such as literacy and dealing with administrative matters for which the leaders of the fishing organizations need more training and support. Hersoug et al. (2004) indicate that literacy may be an important requisite for co-management. This view brings to mind Meltzoff et al.'s (2002) comment about fishers' alienation from bureaucracy. No doubt this is a difficult barrier to overcome.

As discussed earlier, fishers take care of the species within their MA, however, illegal harvests are seemingly continuing by both MA members and non-members. This is another problem that is not given enough attention when the MA regime is evaluated or examined, with Stotz (1997) and Meltzoff et al. (2002)

being exceptions. As there is no reliable statistical information on illegal fishing after (or before for that matter) the introduction of the MAs in Chile, it is difficult to evaluate this problem. Among non-MA fishers, illegal fishing occurs both in historical areas and in the MAs. Illegal fishing in the historical areas is a problem related to the dilemma of common pool resources; it is difficult to limit entry in practice through vigilance and enforcement due to the large scale of the coast.

Illegal fishing within the MA by "outsiders" is a more recent problem. Given the limited spatial character of the MAs, more vigilant patrolling is used to solve this problem, but this is demanding in terms of labour efforts. One of the conditions commonly cited as part of an effective common pool resources approach (Schlager and Ostrom, 1992; Ostrom, 1999) is that the cost of controlling the resource should not be too high; this does not seem to be a problem for the MA case study areas. If vigilance was more demanding, the more scarce the product, the more expensive they become (Christy, 1992), making the question of the cost of vigilance a relative matter. In other words, vigilance is viable due to high prices. This problem is also related to the characteristic of common pool resources meaning that although a fisher organization has exclusive use rights to a parcel of water, this does not completely secure its holders *ex ante* rights to the sedentary species living there as the stock can be easily taken by outsiders.

Both cases of illegal fishing described above (non-MA members in the historical areas and in the MAs) could be related to the 'discontents' of the system. Gelcich et al. (2005) found among fishers some negative perceptions towards the MAs because these have reduced open access areas (historical areas), leaving those fishers reluctant to adopt the MA unsatisfied and hence weakening the social ties in fishing communities. This issue relates to a political problem mentioned in Chapter Two (Christy, 1992); an issue that I have saved for this chapter. Christy (1992) means that the major problem associated with the establishment of localized TURFs is that some users may become excluded, which is an event that may lead to opposition. In the Chilean TURFs, the exclusion problem takes at least three expressions.

The first group is those fishing organizations which for different reasons do not want to be part of the system, as Gelcich et al. (2005) found in their study in Los Vilos. To apply for a MA is a voluntary decision. However, some organizations may apply for a MA in order to protect their traditional fishing grounds, as reported from southern Chile (Gelcich et al., 2006a). A fisher organization may as well apply for a MA to use it as coverage for selling benthic resources fished in the historical areas (Gelcich et al., 2005). I leave it unsaid whether any organization would for this purpose follow the elaborate MA allocation process, considering all the costs and efforts.

The second excluded group is fishers registered at Sernapesca who for some reason are not affiliated to any organization, this being an individual decision. The total number of registered fishers in 2005 was around 57,000 (see Table 4.8), and the number of organized fishers in diverse organizations was in the same year only 42,000 (see Table 4.14). This means that around 25 percent or around 15,000 fishers are unorganized. They cannot apply for a MA as only fisher unions, associations or cooperatives are eligible. So both becoming an organizational member and for the organization to apply for a MA is voluntary. One can discuss of course whether the national ban on *Locos* extraction outside the MAs leaves fishers' organizations with any other legal alternative than to enter into the system? It seems to be just a question of time and bureaucracy before all the working fishing organizations are part of the system in order to be able to exploit benthic resources.

The third excluded group are illegal fishers that are not officially registered at Sernapesca, which is compulsory. Non-registered fishers are outside the legal system, thus they fish without permission. The number of fishers in this situation in 2001 was estimated by CONAPACH (2001) to be around 3,000.

Consequently, those becoming negatively affected by the allocation of an MA are fisher organizations that do not want to be part of the

TURF system, in addition to unorganized and unregistered illegal fishers. Whether the expansion of MAs, as implied by Gelcich et al. (2005), leads to conflicts among different types of fishers or not, depends on the local context. Perhaps among these fishers — organized, unorganized and unregistered — it is possible to find "discontent" fishers practising illegal fishing possibly as a counterreaction, but as suggested, only a part of these excluded fishers are in fact divers.

The second aspect of the exclusion problem is when more than one organization aspires to the same fishing ground. For those cases, the 1991 Fishing Law (LPA) establishes three preference criteria for a fair allocation. In decreasing order these criteria are: nearness to the required MA, number of members, and antiquity. The organizations that are excluded have to apply for another fishing ground. All the organizations falling in this situation may feel unsatisfied with the allocations of fishing grounds. However, the search for other fishing grounds is not new as the number of local grounds of some traditional fishing communities is not sufficient for all fishers, especially for the new generations. This explains why fishers from Los Vilos have spread along the coast of the province Choapa, in the coves of Huentelauquén, Puerto Oscuro and Puerto Manso since the late 1960s. Therefore, when these fishers applied for their MAs in these locations it was not because the MA application process itself left them without grounds in their own locality, but because they had *de facto* appropriated their present MAs grounds prior to the MA reform. In this sense, the MA reform converts many fishing organizations into *de jure* appropriators of the sea areas and many MAs build obviously upon traditional and/or informal functioning local institutions (see below). This does not imply that the form under which production is organized is the same as before the MA. There rests, in my view, the big difference. However, in terms of time span, the self-allocation of coves that fishers groups have tacitly undertaken themselves is a matter of decades and not of centuries in contrast to the Japanese TURFs. Thus, the Chilean MAs can be seen as a relatively late phenomenon as compared to the Japanese. Nonetheless, it is difficult to generalize around time perspectives due to the big differences existing between fishing coves and local fishing traditions. In Southern Chile particularly, there are fishing coves that are directly connected to communities inhabiting the same physical place, some of them indigenous, and probably with a longer tradition than those belonging to the post colonial period. There is a lack of systematic historical and social science studies that show the formation of fishing traditions along Chile's long coasts. However, following Berkes et al. (2001), it could be argued that many MAs are not so much community oriented but rather organization- and resource-base oriented. Many of them are also "virtual" communities, by which Berkes et al. (2001) mean the co-location of fishers for fishing purposes, having their household and families in another place. This is the case with the coves Huentelauquén, Puerto Manso and Puerto Oscuro. Gallardo et al. (1993) studied eight rural coves in the Iquique region in Northern Chile and found that 92 percent of the inhabitants of these coves came from regions other than Iquique. This confirms my tenet that if MAs become permanent, permanent settlement should also be expected.

Gelcich et al. (2005, 2006a) warn about MAs weakening traditional institutions having negative effects on the level of trust within communities and thereby intensifying users' conflicts. Therefore, this view, if it were valid, would mean that MAs reduce the adaptive capacity of the management system thereby jeopardizing the "resilience" of the system. In the case of one specific MA studied by Gelcich et al. (2006a) this takes some of the following expressions. For example, the MA fishing organization must give notice to the fishing authorities every time a resource extraction activity is planned. Such a requirement is problematic in practice, given the isolation of many rural coves and because harvest depends on sea conditions, the reason why the learning process associated with harvest decisions gets "lost in favour of a frenetic one-day harvest every month" (Gelcich

et al., 2006a, p. 963). Another way of seeing this is that fishers must apply their sea knowledge anyway on the days they set off for harvest, although under the MAs the do it less often. Another argument is that, given fishers' rural isolation, it can hardly be easier to frequently sell small quantities than to concentrate both work and selling load during few days in the year. The "frenetic" days of concentrated harvest allow free time to undertake other activities to secure other incomes.

Another example that Gelcich et al. (2006a) mention as creating problems is the substitution of individual bargains by a collective one due to decision making in the MAs being concentrated in few hands. To have elected representatives to make decisions on behalf of members is one of the ideas of organizing as democratic collectives. The same principle allows changing, through elections, the directive if it is not deemed to be functioning well. So both harvesting and bargaining are largely viewed as advantages of the MAs as a group. Together fishers can get better prices than as dispersed individuals. This argument is also emphasized by Defoe and Castilla (2005, p. 277) who suggest that one of the incentives of the MA is that resource quotas are given to the community or associations. "Thus, Community Fisheries Quotas (CFQs), as opposed to individual quotas, provide the right incentives for cooperation instead of negotiation between fisheries." They declare moreover that the system from the beginning considered Individual Non-Transferable Quotas (INTQs) for small-scale fisheries, which became substituted soon by the CFQs. This process is parallel to the transition from individual harvest to a collective or common one within the MAs, described earlier in this study. Taking care of the species in common leads to harvesting and selling it in common.

The obligation to inform in advance about the harvest day to fishing authorities raised by Gelcich et al. (2006a) certainly is problematic and reflects a kind of paternalism in the MA system. As Meltzoff et al. (2002) suggest, the paternalist parts of the MAs are not totally congruent with the government's idea to convert the fishers of the MAs into stable, non-migrating businessmen. This type of paternalism existed also in the legislation of the agricultural communities (DFL 5; Gallardo, 2002) in Chile but was taken away after Pinochet exited from office. Before the 1993 modification of the law:

> the General Boards of the community — ordinary or extraordinary — must be assisted by the lawyer of the Office of National Estates, who will have the right to express his opinion. To this end, the community was able to notify the lawyer in writing with respect to the date and time for the board meeting. If the lawyer did not attend the meeting, the Board was able to send the decisions to his office within 15 days, or face the nullification (sic!) of the accords (Gallardo, 2002, p. 350–351).

The legal framework of MAs could easy emulate the modification of the 1993 legislation of the agricultural communities (Law 19.233; Gallardo, 2002). There are several similarities and lessons to be learnt from the long process of legal recognition of the rights of the institution of the commons of the agricultural communities of Chile and the TURFs regime, but this will hopefully be the issue of another study.

The use rights associated with the Chilean TURF differ for example from those associated with aquaculture concessions. Concession rights can be passed through inheritance or to third parties (LPA, 1991: Título VI de la acuicultura, Parráfo 2, Art. 81 and 82). Furthermore, while artisanal fishers have problems in building the necessary infrastructure in the coves due to private property rights, the "concessionaries and authorized title holders can perform in the concession all those material work, peers, landing place, investments and installations, previous authorization from the competent organ, when necessary" (LPA, 1991: Título VI de la acuicultura, Parráfo, 1, Art. 72). The lack of the same privileges for the MAs may be seen as a paternalist attitude on the part of the State.

According to Gelcich et al. (2006a, p. 953, 964), Defeo and Castilla (2005)[3] suggest that the implementation of the MAs in Chile was initially performed in areas with no working traditional

[3] Although Gelcich et al. (2006a) refers to Castilla and Defeo (2005), the article corresponds to Defeo and Castilla (2005).

resource management institutions, but as MAs spread, the implementation soon started to embrace areas with working traditional natural resource management systems. It is in the former cases where the MAs were effectively working in a sustainable way, while in the latter case the positive effects were not so clear. No specific examples are mentioned by Gelcich et al. (2006a) of areas where no existing traditional resource management institutions were in place, or how or whether in these cases fisher organizations were applying for MAs. Nor is the meaning of traditional in terms of time perspective discussed. Then one could ask, how does it come about that there were fisher organizations at all applying for MAs? A social organization does not appear from nowhere. Furthermore, the first areas experimenting with protected areas were coves inhabited by existing fishing organizations and with which Castilla, himself, was collaborating, although these were not the first organizations to formally become or be allocated MAs. The first areas to become formal MAs were, as reported by Sernapesca, in region IV, more specifically in Los Vilos where Gelcich et al. (2005) have been conducting their studies. According to these authors, in Los Vilos in the pre MA regime period, there was only a single organization (AG (guild association) San Pedro). When it applied for a MA, this produced tensions among fishers thus leading to two unions: the AG San Pedro and the cooperative Los Vilos, both having historical roots in the AG San Pedro. The third union Gelcich et al. (2005) found in los Vilos was Los Lobos, formed in 2001 with fishers that have no relation with the other two fisher organizations. However, this does not mean that they are fishers without fishing background; they presented themselves to these researchers in their study as the claimant of historical areas (Gelcich et al. 2005, p. 386) belonging to those challenging the MA regime that I would consider as belonging to the group of "discontents". Some of the areas mentioned by Sernapesca as being among the first to become formal MAs are those belonging to the Canela commune. And all of them have been in place — formal organizations or not — since the 1960s and a significant number of its members are from Los Vilos. It is in this sense that I mean that many MAs were established with connections to *de jure* appropriators of already occupied areas and therefore build upon pre-existing traditions. There are no studies addressing these issues so far; isolated rural poor fishing communities and artisanal fishers have not hitherto been the concern of scientists. Castilla and colleagues, through their numerous studies especially on *Locos,* have not only put Chilean artisanal fishers' livelihood and concerns on the national scene but also given them an international profile. It is important to recall that many organizations had to disappear during the dictatorship due to political repression; this also includes fisher organizations.

Nonetheless, Gelcich et al. (2005) warning about MAs weakening traditional institutions can be related to Christy's (1992) recommendations that studies on the TURFs should consider the assessment of the conditions permitting the creation of localized TURFs or the safeguarding and development of customary territorial rights, focusing on the ways in which the benefits of traditional systems are shared or distributed to ensure an equitable distribution of benefits both within communities acquiring the rights and among neighbouring communities of small-scale fishermen.

Apart from the illegal fishing performed by "outsiders" discussed above there is also illegal fishing by MA members in the historical areas. This is attached to the dilemma of common pool resources, as the historical areas cannot be controlled in the same way as a MA. One can only speculate that illegal fishing by MA members in the historical areas is a persistent custom that has not yet been eradicated given that MAs are still relatively new. The problem may reflect incapacity to galvanize/socialize the new regime. Another reason may be ignorance about the interconnection of the parts of the eco-system; a hypothesis that deserve to be studied. Another reason why illegal fishing apparently persists among members of MAs in the historical areas relates to economics, i.e., MAs do not achieve expected results. In the MA approach, the Government has put more emphasis on marine tenure than fisher incomes

(Meltzoff et al., 2002). The uncertain and sometimes poor economic results from MAs compel some fishers to complement their livelihood by harvesting outside their MA. The tax burden is still a major challenge for artisanal fishing organizations, especially if the MAs are not giving expected economic results, be it because of El Niño, sea pollution or the effects of industrial over-fishing. The tax system lacks a connection both to actual production and market prices. If taxes on MAs were harmonized with real production, it could improve the economic situation of the MAs and this, in turn, could perhaps diminish the fishing pressure in the historical areas. This burden is a challenge for the fisher organizations to handle in the near future. Having different tax rules for use rights to the sea than for those for on land seems to be discriminatory, particularly given that those practising artisinal fishing are amongst the most vulnerable in Chilean society. This discriminatory aspect is a challenge for government. The costly follow-up reports are another economic burden for the MA fishing organizations, making them less profitable. Nonetheless, illegal fishing specifically by MA fishers is a serious problem since the aim of the MAs was precisely to halt resource depletion. As the historical areas and the MAs are interconnected spatially and ecologically, to take care of one but not the other makes resource conservation ineffective; a problem that is exacerbated by illegal fishing by "outsiders" both within the historical areas and the MAs.

One can only hope that the rate of illegal fishing is reduced over time with the establishments of MAs. The MA system itself should in theory discourage individual fishing and selling of the species since the regular production allows the MAs to offer better and higher quality volumes for export, which they as organizations can negotiate to get favourable prices. To sell outside these channels is less profitable. The MAs have ordered not only extraction but also commercialization, reducing channels to commercialize the harvest outside this framework. In this case, illegal harvest (if not well organized with traffic export purposes as some suspect) is most probable for the local and regional market and therefore also hopefully limited in scope. This is a further problem that needs to be addressed.

Within an MA, group control which is usually effective within relatively small groups with face-to-face relationships, is at work. The sense of ownership that an MA creates also gives incitements to follow the rules. Lastly, also formal rules of every organization clearly define rights and duties. Thus, it is believed that the interests to secure future availability of the resource on the part of the fishers facilitates both the imposition of the management measure as well as the will to put it in force. The "most effective form of enforcement occurs where it is in the self-interest of the user to comply with the rules" (Christy, 1992, Chap. 2, p. 4) or "one cares about what one owns" according to a fisher from Puerto Oscuro (see Chapter Six). One could also perhaps add that the TURFs cannot be created and implemented by government unless the fishers believe in the usefulness of the measure and are ready to practice it. According to Stotz (1997, p. 69–70), when working with the fishers of the Fishing Confederation of the Choapa Province (FEMEPACH), he expressed to them that legislation is inefficient in protecting the resource if the users do not collaborate, but the fishers can protect the resource without the need of a law.

A general assumption on human nature is that without institutions, the tragedy of open access takes place, while with institutions in place (Ostrom's tenet), the tragedy is avoided due to group control (Röling, 2008).[4] A sociological query here is whether there exists a social situation that is prior to social institutions when more than one individual is involved and the relationship is somehow stable. Much of the research in social sciences is a reaction against the assumptions about the rational individual who maximises her benefits without considering either the resource or her group fellows. It is

[4] 'Convergence of sciences: the management of agriculture research' (Power Point Presentation), Kick-Off Workshop Natural Resource Management & Livelihoods (NRML)-Research school at SLU, 2008-04-23.

interesting to note here the parallel between the person causing the "tragedy of the commons" and methodological individualism's philosophical assumptions about the individual, on one hand and, on the other hand, the opposite position of an eco-system management approach that tries to bridge the divide between man and nature and their interdependency with methodological collectivism's assumptions about society.

A methodological individualist describes particular individuals without using the concept of structure (group, community) (Gilje and Grime, 1992). For example, the individual fishers and their actions are linked to each other, which leads to a social phenomenon; say the "tragedy of the commons". In this sense the "tragedy of the commons" as a social phenomenon is an aggregate of particular individuals' characteristics and this aggregate builds a pattern: over-fishing. The sum of their particular individual actions leads to resource depletion. The question that methodological collectivism poses is: what is an individual? The methodological individualist supposes that the individual is what she is independently of the group to which she belongs, without acknowledging that a human being is created and affected by the social system. She is part of and therefore a product of the social system she lives in. If we think away the social, the individual is reduced to an asocial animal denuded of language and culture. The methodological collectivist postulates that it is the society and its institutions which give identity and meaning to the action of the individuals because they establish the conditions that are necessary for actions to take place. Norms and rules as social phenomena can only be understood starting from groups, not from individuals. A person knows she is breaking a rule because she interacts with others. She cannot know that she is breaking a rule as a result of motivating forces connected to her own behaviour or reactions. To follow rules presupposes a community with other people and therefore also the existence of institutions. In other words, the rational individual who maximises her benefits without considering society and institutions to which she belongs hardly exists, and if she does, she will probably soon turn into a pariah. That institutions may work poorly and rules are not followed by some individuals is another story but this does not mean that every individual tries to maximize their own interest without considering the rest, i.e., that this rational choice individual would be the rule. However, that some may not follow rules is worth considering and a pertinent question would be why these people fall out of the system when the possibility to be part of it exists.

The MAs entail challenges not only associated with fisheries, but also within social arenas beyond fisheries. So far we have not in this chapter considered the problem of fishers' access to the land closest to the coves. My view is that given that MAs are becoming a permanent solution for the exploitation of coastal benthic resources, fishing in rural areas may lead to tensions as the fishers settle on coastal lands without entitlement, or are hindered from developing their own fishery infrastructure. Furthermore, this issue is related to tenure security, which the MAs do not necessarily offer as they are given for four years at a time. Nonetheless, access to the coastal border entails two different scenarios: within private landed properties and within State property. The issue that I have focussed on in this study is fishers' settlement problems and their need of infrastructure within private property that fringes the coast; a problem seldom acknowledged, except sometimes by mass media.

Arrizaga et al. (1989, p. 299) and Gallardo et al. (1993) address the problems of fishers' settlement within State property. Both Arrizaga et al. (1989) and Gallardo et al. (1993) suggest that part of the solution of an integrated coastal development is the granting of coastal concessions for fishing communities and the regularization of their deed titles in state lands. According to Christy (1992), a relevant condition helping the formation of TURF is the cultural aspect of the specific country's property rights tradition. He suggests that if there is private right to land, the possibility to extend rights to the sea should not be a problem. Sea tenure has been in fact granted, albeit tempora-

rily, through the TURF in Chile, but the land fringing the sea is in many rural areas under private ownership, which poses problems. I would argue that the more rooted the tradition of private property rights to the land are, the weaker the possibility of others to access these lands, except through market mechanisms. When coastal land becomes subjected to market forces, the more difficult it is to ensure access for fishers just based on the good will of the landowners. The increased demand for summer houses from an increasing middle- and upper-class in Chile during the last decades has contributed to this situation.

If in times prior to the agrarian reform of the mid 1960s and beginning of the 1970s, when oligarchy monopolized land and power, landowners had a paternalistic attitude to fishers, after the agrarian reform when many properties were expropriated, paternalism is likely in many cases to have been replaced by other problematic attitudes. Even during the dictatorship, landowners could still be generous due to the security they felt under Pinochet's regime. The new generations of landowners have lost the security the old oligarchy had, and is now not that condescending, given that they are required to act in a democratic system. Both El Quisco and Puerto Oscuro fishers experienced paternalism on the part of the landowners in times past. The El Quisco Union bears in fact the name of the old landowner of the lands once surrounding the cove. Fishers from Puerto Oscuro have experienced a lack of mercy from landowners during the democratic period, facing access problems and difficulties to build a minimal infrastructure, let alone build a settlement, although here, the Municipal authorities intervened and secured some land to build permanent houses for fisher families on land not belonging to the landowner family, although not in the cove.

Another interesting issue that the case of Puerto Oscuro conflict raises is the involvement of other stakeholders, a typical co-management situation regarding the administration of both coast and fisheries. When in the ongoing Puerto Oscuro lawsuit the landowners directed their claims to the civil juridical system (where it belongs), the summer house owners directed their concerns to the Navy which administers the costal border, and the Ministry of Real National Estates which administers the beach terrain of public good. So the sectoral interests of diverse stakeholders are all interrelated. As mentioned in Chapter Five, the Government's delay in implementing the MAs has a background in a hesitation to give sea tenure to the fishing organizations (Meltzoff et al., 2002, 93–94); a problem that is embedded in the characteristics of co-management where several actors with different degrees of power and economic interests have a voice. This implies conflicting interest among them. The unwillingness to delegate tenure, management and responsibilities can be interpreted as a lack of trust in grass root organizations, but it is most probably rooted in a reluctance not to encroach more powerful coast stakeholders such as industrial fishers, aquaculture and the tourism industry, not to forget coastal landowners.

According to Meltzoff et al. (2002), both the Chilean navy and politicians wanted to keep coastal waters under open access and tried to limit the percentage of coastal territory with MA potential, but did not succeed. Yet, in spite of a neo-liberal economic policy framework which strongly emphasises export as a kind of development panacea, within a seascape dominated by strong private property rights to land, backed by the Constitution, artisanal fishers are somehow at odds. The legal system is unable to fully handle the consequences of the reform, and prevailing power relations and private property rights work to the disadvantage of the fishers. To draw a parallel to McCay (1996, p. 208) "restricted access can result in sharp social discrimination, as in beaches reserved for the wealthy".

The artisanal fishing sector, in itself, presents many other weaknesses and despite the development of the MA regime in Chile, the sector still shows many rudimentary characteristics. In 1986, pre-MA, the Ministry of Economy stated that artisanal fishing in Chile was at a level of primary development; i.e., the artisanal fisher, seen individually, operates with equipment type and the scale of boats that only allow subsistence, but they lack the capitaliza-

tion to take this activity to a higher stratum of operation (Arrizaga et al., 1989, p. 294).

Also Gallardo et al. (1993) commented on problems related to artisanal fisheries in Northern Chile, suggesting that they were suffering from production instability, a lack of diversification, new and precarious labor organization, spread commercial activity and a profound social marginality exacerbated by the little or non-existent social assistance from the State. As solutions, Gallardo et al. (1993) proposed strategies such as improvement and diversification of the productive activity, the regulation of settlement places by imparting deed titles, access to credit systems, strengthening labour and social organization, as well as group management and commercialization. Arrizaga et al. (1989, p. 298) suggested regarding the quality of life for the fishers in their communities, that "to increase the production and efficiency means not only to apply technique to the processes in order to optimize the levels of extraction, but also diversify the capture, introduce cultivation techniques as well as to leave behind the primary level of the activity, adding value to the resource through its elaboration".

With the introduction of the MAs, many of the problems have changed and many of the suggested solutions discussed above have been implemented or developed in relation to the TURF regime, but the sector still shows many of the characteristics associated with small scale and subsistence artisanal fisheries. Of the 17 fisheries related characteristics enumerated by Berkes et al. (2001) (see Table 2.2 in this study), the *Loco* fisheries under the MA regime shows 14 related to either small scale or subsistence, artisanal categories, such as rudimentary means of production (small boats with outboard motors and manual gears), disperse ownership, part time commitment, seasonal occupation, and multi-occupations, low investment, limited catches capacity per fishing, family related and low division of labour, lack of processing of catch that goes to export, low level of incomes and reduced local management units. The only characteristics related rather to industrial large-scale fisheries in the *Loco* fisheries under the MA regime is the disposal of catch, which is mainly sold to external, organized markets and the extent of marketing is mainly in Asia. Despite this their integration into the economy is only partial. Due to the MA reform, fisheries data collection is not difficult given the authority's capacity; and that biological data, prospected landing and real harvest are demanded by the authority yearly and performed by fishers and certified consultants.[5]

During the development of the MAs both threats and problems have emerged regarding the fate of the MAs. Many of the concerns still to be studied are of a social science character, but research financing in Chile regarding benthic resources seems mostly to support narrow biological research. Nonetheless, within the biological area, an important issue to be studied are the consequences of the increasingly larger exploitation of diverse types of weeds for exportation; another activity born in connection with export (Ahumada and Retamal, 1988, p. 650), during the mid 1970s, and that some fishers perceive as making benthic resources more vulnerable. What are the consequences of coastal weeds cutting for the habitat of *Locos* and other benthic species?

From a social science perspective the issues that remain and deserve to be studied are many: for example, which fishing organizations have not yet applied for MAs and what are the reasons behind this? Also the extent and basis of illegal fishing, both among non-MA members and among MA members needs to be examined. What are the levels of organization and occurrence of illegal fishing? What are the channels and routes it follows and what are the groups prone to collaborate in this illegal activity? Regarding access to coastal land it is relevant to identify and systematize the MAs being created within both private and state property. How many MAs are facing problems of access, infrastructure and settlement? What forms do these take within private landed properties and state property? What are the regions where there is a major concentration of

[5] However, it should be noted that data collection for illegal fishing is not available.

MAs and what does land tenure structure look like? How many MAs have not got their right renewed after the first four years and what are the main reasons for their non-renewal? What are the circumstances of these areas? Another issue that deserves attention is the relationship between MAs and consultancy firms and the possible dependency of the fisher organizations with MAs on these institutions.

Lastly, on the global scale, possible threats to benthic resources are the periodical influence of natural factors such El Niño (o La Niña), which change environmental conditions. Another threat that affects the whole eco-system is climate change, which impinges specially on the survival of cold water species in the Humboldt stream. Climate warming, mostly a consequence of rich countries' way of life and consumption, affects not only consumers and producers of the South and the North, but the whole eco-system, which we all are responsible for.

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