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MANAGEMENT AND CO-MANAGEMENT OPTIONS FOR SMALL-SCALE FISHERIES IN THE MEDITERRANEAN AND BLACK SEA

Thematic session II

prepared by Nicolas L. Gutiérrez

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INTRODUCTION

1. MANAGEMENT AND CO-MANAGEMENT: ACTUAL CO-MANAGEMENT VERSUS PARTICIPATORY ADVISORY SCHEMES

1.1. Definition of co-management

Traditional and self-management of natural resources, and fisheries in particular, has been around since early times. However, co-management is an approach that has been more recently adopted globally in response to the perceived failure of centralised management of fisheries in avoiding the decline of fish stocks, and to a lack of government resources to manage fishery resources effectively. Bringing together fishers, government officials and others operating within a fisheries sector, co-management systems and processes vary in terms of the nature of power sharing, composition and functions.

Although there is no single globally accepted definition of co-management (Armitage et al., 2007; Berkes, 2007), the term usually refers to a suite of arrangements with different degrees of power sharing allowing joint decision-making by the state and user groups about a set of resources or an area. Co-management shares many features with other kinds of partnerships and co-operative environmental governance arrangements involving multiple actors (Berkes, 2002; Plummer and FitzGibbon, 2004). However, a critical characteristic of co-management is the presence of at least one strong vertical link between the community or user group and the government, including formal arrangements for sharing responsibilities and authority (`Berkes, 2002; Borrini-Feyerabend et al., 2009). In addition, ad hoc public participation in management decisions or mere consultation is often not regarded as co-management.

The term co-management is relatively recent, where its earliest use has been traced to late 1970s (Pinkerton, 2003). However, as mentioned previously, the practice of power sharing in resources management goes back to earlier times (Ostrom, 1990). Most definitions of co-management entail some institutionalized arrangement for user participation in management and decision-making, a dynamic partnership using the capacities and interests of local fishers and communities, complemented by the ability of the state to provide enabling policies and legislation as well as enforcement and other assistance.

- Co-management refers to a suite of arrangements with different degrees of power sharing allowing joint decision-making by the state and user groups about a set of resources or an area.
- Co-management entails institutionalized arrangements for user participation in management and decision-making.
- Ad hoc public participation in management decisions or mere consultation is often not regarded as co-management

1.2. Types of co-management

Despite the inclusiveness of the co-management term, it can be defined as the sharing of responsibility and/or authority between the government and local resource users to manage a resource (Jentoft, 1989; Nielsen et al., 2004). In the literature, co-management covers a broad spectrum of management arrangements and the amount of responsibility and/or authority that the government and local resource users have will differ and depend upon country- and site-specific conditions (Pomeroy, 1995). A certain level of involvement and mode of communication between government and fishers is needed to

categorize a fishery as co-managed, as well as the presence of well-established co-management organizations and/or institutions with decision power in local fisheries management. Further, considering that most fisheries management systems, particularly in developed countries, involve some form of user involvement through participation of stakeholders on the decision making bodies (e.g., through consultative committees), those cases where the importance of the legal and political systems dominates the co-management aspects of the fisheries are often excluded from this categorization (Gutiérrez et al., 2011).

As several authors have noted, there are several degrees of co-management (Sen and Nielsen, 1996; Berkes, 2007; Castilla and Defeo, 2001). Within an instructive type of management arrangement, there is only minimal exchange of information between government and users and it only differs from centralized management by the existence of mechanisms for dialogue with users. A consultative type of management arrangement exists when mechanisms for consultation between government and users have been established but where decisions are still taken by government. These two types of management arrangements cannot be considered true co-management. In the other hand, cooperative types are closer to a true definition of co-management, which involves arrangements where governments and users co-operate on an equal basis in management and decision-making. Advisory co-management arrangements are those where the users advise government of decisions to be taken and government endorses them. Informative co-management occurs when government has delegated responsibility to user groups who are responsible for informing government of their decisions. Finally, self-governance, such as community-based management or traditional marine tenure systems, entail a total power devolution from the central government to the local users. Although some authors exclude community-based management or self-governance from the concept of co-management, others argue the contrary since these arrangements are recognised in national legislation or they form part of sectorial development policies (Gutiérrez et al. 2011 and references therein).

It is important to bear in mind that this typology is just a simplification of very complex management and governance structures. There is a multitude of tasks that can be co-managed under a different type of co-management arrangement at different stages in the process. Thus, co-management covers a broad spectrum of possible collaborative decision-making between government and communities or user groups.

- There are three main typologies of co-management with different levels of involvement in management and decision-making : cooperative, advisory, and informative
- Self-management or community-based management can be considered a form of co-management since these arrangements are often part of sectorial development policies and/or legal frameworks

1.3. Actual co-management (executive role of stakeholders) versus participative advisory schemes

Co-management is becoming increasingly important in contemporary fisheries management. As mentioned in previous section, co-management describes power and responsibility sharing agreements that are made between government and user groups. Co-management that involves true power-sharing and joint responsibilities between user groups and central government is sometimes difficult to achieve in a setting where stakeholders are polarized and or not encouraged to participate in the process actively. In fact, participation can happen at many different levels of inclusion. At a basic level, participation can be passive consultation where information is disseminated and those impacted are informed of future plans (Pomeroy and Berkes, 1997). However, effective participation of main stakeholders requires certain level of empowerment. In fact, Jentoft (2004), defines empowerment as ‘‘a process through which people become strong enough to participate within, share in the control of and influence, events and institutions affecting their lives’’.

True co-management requires a departure from thinking about the role of local, regional and federal governments and considers the political changes that are necessary for power devolution. An important concept behind power devolution and executive role of stakeholders is actually defining who are those relevant stakeholders. The popular term 'stakeholder' encompasses all sorts of professions and groups, besides fishers, who may possibly have an economic or cultural interest in fisheries, many of whom do not reside in geographically defined fishing communities. Environmentalists, processors and shippers among others might therefore be considered as stakeholders in the general sense of the term. Local fisheries management, however, requires considering local fishing communities and the fishers themselves as legitimate stakeholders. In general, a lack of representativeness of decentralized bodies and institutions usually precludes accountability goals.

Local engagement in management and fishers' participation in the decision-making is then an essential component of successful co-management. Certainly, there are many possible procedures that could lead to a successful co-management outcome that incorporates both biological and social concerns, and is considered legitimate by user groups. However, an essential component that all of these must contain is direct local community involvement. Thus, it is not only critical to characterize the most relevant stakeholders but also to clearly define local communities in geographic terms (Pinkerton 1999). Local ownership and control, when embedded into a system of institutions that delegate power and are truly interactive, may be a key principle in facilitating successful co-management (Ostrom, 1990, Pinkerton and John, 2008).

For example, most fisheries in the U.S. under the Fishery Management Council systems have formal consultation process with stakeholders at several stages of the decision-making process. In fact such consultation is found in fisheries throughout the developed world. The U.S. council system is unique (compared to Europe, Canada, Australia and New Zealand) in that some stakeholders sit on the Councils. However, these systems remain effectively top down managed, with the U.S. laws and the courts often being the dominant determinant of fisheries management actions. The U.S. councils also manage many fisheries, and it would often be the case that only 1 or 2 stakeholders from an individual fishery would be represented on the council. Thus, the U.S. council system is not true co-management although some exceptions prevail.

Meaningful co-management arrangements must go beyond consultation by redirecting the flow of social and economic benefits from the fishery back into communities. Unless geographically defined communities are allowed to share power and responsibility with government fisheries managers, both fish stocks and fishing as a way of life could be at risk.

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2. OVERVIEW OF TRADITIONAL FISHERIES MANAGEMENT IN THE REGION

2.1. Traditional schemes involving self-management

Attempts at managing European fisheries are ancient. Mediaeval Europeans consumed high quantities of fish thus the need to manage fisheries comes from ancient times (Arlinghaus et al., 2002; 2007). By the 13th century, legislators and managers already acknowledged the problems associated with overfishing at the same time that anthropogenic impacts on habitats were also affecting fishery resources and yields (Hoffmann, 1996). Between 1200 and 1400, Europeans became aware of shifts in the availability and the exhaustibility of fishery resources, stimulating the evolution of fisheries management. By then, fishermen were often grouped into guilds, which were in charge of exploiting and managing the resources at the local level. However, public authorities such as kings and lords undertook regulation of fisheries for both consumption and conservation purposes. The first fisheries laws in Europe came into effect during the 13th Century and considered the size of fish caught and both gear and temporal restrictions and closures. This simple fisheries management worked until the Industrial Revolution in the late 1800s which allowed rapid expansion of exploitation for an ever-growing market.

In other parts of the world, such as Hawaii and Florida, US, a study by McClenachan and Kittinger (2012) has shown that fisheries management four centuries prior to the arrival of Europeans was characterized by adaptive management with characteristics of common property resource governance systems. These management systems involved protected areas of the coral reefs, protection of vulnerable life-history stages of fish as well as species with high susceptibilities to overfishing. The authors also demonstrate that fisheries management and governance included strategies and social institutions to support resources allocations among community members and strict enforcement by a local rule-making authority. This form of self-management has allowed these coastal communities to manage their resources sustainably for centuries.

More recently, there are many examples of self-governance or sharing mechanisms for management of natural resources, including government–community partnerships for forest management in the Kumaon Himalayas, India, around 1900s (Agrawal, 2005), and in the council forests of Kirinyaga, Kenya, around 1930s (Castro and Nielsen, 2001). In the area of fisheries, the earliest documented legal arrangement seems to be the Lofoten Islands cod fishery in Norway in the 1890s (Jentoft and McCay, 1995), and Japanese inshore fisheries under Japan's 1901 Fisheries Act and its subsequent revisions (Lim et al., 1995). The early literature depicted co-management as a class of relatively simple partnership arrangements, for example, in the implementation of indigenous land and resource claims (Berkes et al., 2009 and references therein). However, the wide range of international experience accumulating since the 1980s indicates that co-management has become more complex and dynamic than might be concluded from this earlier literature and evolved in diverse directions (Plummer and Armitage, 2007).

For example, until the 1920s, fishing communities in Kenya used traditional ecological knowledge (TEK) and social norms to define the rules for resource management and governance. Traditionally, an elder was the leader of a landing site and provided advice about seasonality, issuing permission to fishers from other areas, ensuring social cohesion, and restricting specific fishing gears. Local social structures were used to enforce such rules or to impose sanctions when needed. After independence, the state took of the management of fishery resources and these management decisions were subsequently prescribed with little or no input from the fishers and other stakeholders resulting in negative consequences for the sustainability of the resource and the economic viability of the fishery (Berkes et al., 2000). Other examples include the Native American communities in the US Pacific Northwest (Hanna, 2003), the Eastern Indonesian 'Sasi' system (Bailey and Zerner, 1991), and the inshore northern cod fisheries of Newfoundland (Kearney et al., 2007). While some commercial

exchange was associated with these systems, they were for the most part artisanal, subsistence fisheries, which were either ignored or legislated away by governments during the emergence of industrial fisheries.

Many traditional, pre-industrial fisheries were also managed under some kind of self- or cooperative management involving different local actors. In less developed nations, fishing communities often controlled access to the fishery resource, mostly through the use of some sort of access rights (e.g., territorial use rights or TURFs). These community-based management systems often involved elaborated social customs and regulations at the local level aimed at controlling effort and/or limit harvests (Ruddle and Johannes, 1985). Under such systems, and given technological limitations of fishing, control over access to fishery resources was mostly in the hands of those most directly dependent upon them. In these communities, self-regulatory measures were mostly used to manage their resources sustainably. In fact, many pre-industrial fishery-based communities embraced cooperative management of some kind.

- Self-governance and sharing mechanisms for management of natural resources, including government–community partnerships in forest and fisheries were common since mediaeval times.
- In Kenya for example, fishing communities used traditional ecological knowledge (TEK) and social norms to define the rules for resource management and governance since the 1900.

2.2. Transfer of management responsibility from primary stakeholders to centralized state agencies in modern times

Many of the traditional access systems described in the previous section changed drastically after industrialization in the 1970s, when government policies in most developed countries were directed towards centralization of management functions and scientific advice. In many less-developed nations, governments looking for foreign exchange capital have entered into joint venture agreements with distant water fishing companies who have moved their operations inshore and forced community-based fishers to move from their traditional grounds, or reduced stocks and obliged them to fish harder and farther offshore to meet their domestic needs (Parfit, 1995). These conditions led to conflict confronting stakeholders in detriment of effective management of fishery resources. In addition, lack of proper management and enforcement of regulations in these centralized systems led to depletion of many coastal resources. For example, decades of top-down management with little or no enforcement led to a virtual collapse of many inland fisheries as well as severely depleted artisanal coral reef fisheries in Kenya (McClanahan et al., 2008). Likewise, while traditional or local community-based management systems have a long history of existence in Southeast Asia, the majority of these systems have been weakened or have disappeared, due partly to institutional restructuring under colonial administrations, technological modernization, the rise of the nation-state, and socio-economic stratification and unequal concentration of power and wealth within coastal communities.

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2.3. Contemporary schemes including co-management elements (e.g., Cofradias, Prud'Hommies)

By the late 1980s, a general disillusionment of stakeholders, development agencies and academics in the ability of centralized governments to plan, administer and implement development (Manor 1999) created the right incentives to move towards decentralization. In fact, community-based cooperative management has often arisen out of crises caused by stock depletion, a growing perception that central governments are incapable of managing stocks centrally, and political pressure stemming from an increasing sense of alienation amongst coastal communities toward their governments. Hence, decentralization, stakeholder participation and community involvement came to be considered as essential components of development and management.

The logic of this new thinking was based on bringing government closer to the users allowing the people whose livelihoods and well-being would be affected by the decisions to have a say in those decisions. Effective user participation and problem solving at the lowest feasible level of organization was considered within the "Subsidiarity principle" (Kooiman, 2003) as part of 'good governance'. Advocated by Agenda 21 of Rio (UNCED, 1992). This subsidiarity principle was incorporated into Article A of the Maastricht Treaty of 1992 establishing the European Community, such that "decisions are to be taken as closely as possible to the citizen" (McCay and Jentoft, 1996). Hence, by the 1990s, the governance focus had shifted to the local level, with almost all developing countries undertaking decentralization reforms (Ribot, 2002). For example in 1991 the government of the Philippines implemented the Local Government Code (LGC) providing policy structures necessary to decentralize the management of coastal resources to local government units, non-government organizations and people's organizations. This has resulted in the establishment of a new approach to fisheries management known in the Philippines as community-based coastal resources management or CBCRM (Pomeroy et al., 2007).

In place of top-down management, principles of 'grassroots' or bottom-up planning and management, such as public participation and co-management, became entrenched in various areas of environment and resources in both developing and industrialized countries (Borrini-Feyerabend et al., 2009; Gutiérrez et al., 2011). For example, as a result of ineffective top-down management, the Ministry of Fisheries Development in Kenya began developing legal frameworks to share management responsibility for fisheries in the 1990s. This type of co-management of fisheries resources was undertaken through a structure that enabled resource users to manage their landing sites within Beach Management Units (BMU; Samoilys et al., 2011). BMUs were first established on Lake Victoria and practiced by the three countries bordering the lake (Kenya, Uganda, and Tanzania) as a way of improving fisheries management. Guidelines have since been developed to supplement the provisions of the fisheries regulation to increase stakeholder understanding in setting up BMUs. On the Kenyan Coast, the BMUs are now being promoted by the government to create partnership between the government and local communities in the management of coastal resources. Through the Fisheries regulations of 2006, a BMU is given exclusive rights to manage resources at a particular landing site.

In Europe, another example of contemporary local management schemes is the Prud'homies (Feral, 1987). These are professional organizations of French Mediterranean fishermen that have been present since medieval times but officially recognised in 1859. Currently, there are 33 Prud'homies representing more than 1,522 fishing vessels along the Mediterranean coast of France. Their competencies are restricted to the 12 miles limits and focused on fishing organizations, regulation and conflict resolution both internally among members and externally. There are 4 Prud'hommes for each Prud'homie, which are elected by all the fishermen of the territory. A Prud'homie represents all fishermen from one territory defined by a National "décret".

These Institutions were efficient in keeping their fisheries sustainable and economically viable mostly by regulating gear authorisation and characteristics, share of space between fisheries in coastal salty ponds, and opening and closing dates of fishing. Most of the fishers in French Mediterranean coast are

small-scale fishers, they usually target species of high commercial value such as flatfish, sea bream, scorpion fish, wolf fish, hake, eel and various species of shellfish and use small boats from 6 to 12 m and less invasive fishing gears such as longlines, small nets and traps. One of the main arguments for fisheries sustainability by the Prud'homies was the need for local management and governance and the realization that EU policies consider "one-size-fits-all approach" that in most cases result in mismatch of scales between the policy and the local social-ecological characteristics of the fishery.

One of the major challenges faced by these Institutions was the industrialization of fishing around the 70' and the disavowal of national authorities. But even with the weakening fact, they still do exist and continue on to ensure that National and European regulations were kept relevant and appropriate for their small-scale multi-species fleets. In 2006, following the EU technical regulations for the Mediterranean, the Prud'homies reviewed and adjusted their local regulations, ensuring their own regulations were more stringent as well as better compliance among their members. Some examples of these stricter regulations include only 5 km allowance for nets, whereas the EU allows 6 km, banning of trawling within some of their fishing grounds and limited seasons (e.g., 4 months instead of year round as allowed by the EU for lobsters). The Prud'homies also have efficient systems for local compliance and enforcement, where in case of infraction, they first give a warning and then a fine and potentially a suspension of the fishing licences. In addition, the Prud'homies have been the drivers behind the creating of marine reserves in France, which have proven to be efficient in increasing abundance of certain fish species, individual sizes and local biodiversity (ISU, 2012). A critical aspect for the effectiveness of these reserves was the fact it was within the Prude'homie territory, allowing them to legally exclude other fishers.

The functions of these bodies included, and still do today, ensuring fair allocation of resources within the local jurisdiction of a Prud'homie, protecting the territory from outside intrusions, and protection of the resources through regulation of e.g. mesh sizes and fishing seasons. Their role in fisheries management seemed to weaken with the establishment of committees of marine fisheries and the priority given to development of trawling fleet in the 1970-1980. Nevertheless, for the last few years, it seems that they regain local power even if they have no official recognition in French fisheries management framework. Nevertheless, like committees of marine fisheries their weight depends strongly on the charisma of the leader. It is worth noticing that presidents of committees of marine fisheries and Prud'hommes are often personally invested in local politics. Regularly some of them occupy the post of Mayor or member of town council in charge of fisheries.

Fishermen Guilds in Spain, named Cofradias, also have a long history in fisheries management in Europe (Freire and García-Allut, 1999). Some of the present Cofradias were founded in the 12th Century as economic and religious associations. But with the Industrial Revolution the general conditions and institutional appearance changed, from a religious institution to industrial associations, cooperatives and trade unions. Under this different institutional appearance, the Cofradias represented a system to assure the collective economic exploitation of a geographical coastal area. Currently, Spanish fisheries are still organized under the Cofradias system and most industrial fisheries have their own system of Professional Organizations and Owners Associations. In general, the Cofradia is the institutional system for the 83% of the fishing employment in Spain bringing many benefits for their members. For example, consumers better appreciate their catches and products, which in turn generate higher prices per unit of effort. Nowadays, 229 Cofradias cover all the Spanish coastal line and islands (Franquesa, 2004).

Most of these Cofradias have different organization and ways of working, but in general they have the following key characteristics (Freire et al. 2002; Franquesa 2004; Frangoudes et al. 2008): (1) they include all the fishers that are working in their geographical area; (2) they have a democratic structure with two equally represented groups: the owners and the crew; (3) they have certain level of disaggregation by gears, where trawl is usually the most important, followed by purse seines, long lines, or shell gathering; (4) members should only sell their catch through the local first sale port market of their own Cofradias and there is a fee to sell in order to cover administrative costs; (5) Cofradias are not-for-profit and any surplus is used to improve infrastructures and equipment or

sometimes distributed among members; (5) under the general laws and rules established by the European Commission, Spanish Ministry and Autonomous Communities, the Cofradias can establish their own rules, such as control of fishing seasons, ban fishing gears in specific areas, and accept new members or suspend current ones; (7) they present evolved systems of control, surveillance and enforcement. For example, all members can participate in the surveillance of collective agreements and the transgressor is punished in real time at the market: their products cannot be sold in the market or he/she is forced to sell the last (with lower prices). Other system of penalization is the social isolation or lack of provision of the collective services (shops, ice, bar, etc.).

Another critical aspect of the Spanish Cofradias is the system of area-based access rights, particularly for sedentary species. In fact, some particular fisheries have been running as a *de facto* TURF management institution before the economists even established the intellectual concept. In Spain, the Administration allows the existence of this mechanism to minimize conflicts to be solved by political intervention. For instance, if the administration tries to reduce the fishing time, probably all fishers would resist this "political" regulation, but if the measure is adopted by fishers themselves because the costs are increasing and the catches going down, the role of the administration would be only to assure by additional control over a measure adopted by the fishermen themselves. Additionally, it minimizes the costs associated with control, surveillance and enforcement.

- By the late 1980s, a general disillusionment of stakeholders, development agencies and academics in the ability of centralized governments to plan, administer and implement fisheries management created the right incentives to move towards decentralization.
- In fact, community-based cooperative management has often arisen out of crises caused by stock depletion and a growing perception that central governments are incapable of managing stocks centrally.
- In Europe, two examples of decentralized management include the Prud'homies in France and the Cofradias in Spain.
- These Institutions attempt to keep their fisheries sustainable and economically viable in some cases by regulating fishing seasons and gears, imposing more stringent regulations than those stated by the EU, and by implementing evolved systems for local compliance and enforcement.

3. SOCIAL STRUCTURES AND INSTITUTIONS IN CO-MANAGEMENT

3.1. Fishers, fisheries agencies, scientists and civil society as co-managers: who should qualify to co-manage?

Co-management is envisaged as a partnership between the central government and the local users. Thus, the basic point of departure for co-management is a situation in which several actors bearing different interests and concerns for the management join their efforts and agree on a way to manage their resources together. However, the number and nature of partners or actors qualified to co-manage varies depending on the social-ecological context of fishery and the target resources. Typically, the major players with a stake in decision-making on matters that relate to fishery resources include fishers and their institutions, external agents such as NGOs, academic or research institutions, government institutions at different scales (e.g., national, regional, village), fisheries stakeholders (e.g., boat owners, recreational fishers), and other coastal stakeholders (e.g., tourist industry). In recent decades, the number of key actors interested in managing fishery resources has increased as a result of widespread socio-political change, including governments' decentralisation processes, the creation of

new democratic institutions and the privatisation of previously state-controlled schemes, together with the proliferation of NGOs, associations and business organizations. Many such "new actors" perceive environmental or social problems and opportunities and believe that they can adequately respond to those if they are allowed to participate in management decisions and actions. Besides the question of which key actors are qualified to co-manage a fishery resource, critical aspects of successful implementation of co-management systems include: (1) appropriate inclusiveness of major players or stakeholders; (2) clear roles and responsibilities of major players; and (3) clear and effective linkages among major players.

Inclusiveness of relevant stakeholders is a key aspect of successful implementation of co-management. In fact, co-management is usually multi-party but also multi-level and multi-disciplinary and all processes, agreements and institutions should be inclusive rather than exclusive. Although these processes and institutions should attempt to include all the bearers of interests and concerns who wish to participate, inclusiveness has to be balanced and is somehow constrained by transaction costs related to these processes. Hence, an important step in the co-management process is to compile a preliminary list of the agencies, organisations, groups and individuals with interests and concerns relative to fishery management. In an ideal case, all relevant actors would together take the initiative to meet, decide what to do and share fairly among themselves the relevant management rights and responsibilities. Unfortunately, this ideal case is not common and a more typical situation sees only one or a few actors holding most of the authority and the means to set a partnership process in motion.

The roles and responsibilities of the major players are often not clearly defined or understood by the players themselves, compromising an efficient and effective co-management of resources (Pomeroy and Berkes, 1997). Thus, it is essential that key actors have clear roles and responsibilities and sit down regularly to discuss potential changes. For example, main responsibilities for government institutions at all relevant scales should include an enabling environment through the specification of policy and legislation, technical support and human resource development, facilitating a participatory process and linkages, and giving trade and market support at the national level among others. And at the local level, the roles and responsibilities are executing policy, implementing management plans and measures, and issuing local administrative rules, regulations and ordinances. External agents such as NGOs or research institutions roles and responsibilities should include capacity building, advocacy, linkages, extension and pilots, and standard setting. Fishers and their institutions (e.g. committees, cooperatives, etc.) have roles and responsibilities including local planning and implementation, custodian/stewardship over resources, formulation/observance of local rules and regulations, participation in objective-setting and planning, facilitating participatory process/partnership in management and data collection, and involvement in national/regional processes (Brown et al., 2002).

Lastly, linkages between major players at different scales are critical for successful co-management. These are often determined by the structure of the vertical and horizontal interplay between actors, the characteristics of the resource being managed, aspects of agency such as the emergence of leadership and the translation of knowledge at different levels, and the social construction of crisis to overcome inertia and trigger change (Cash et al., 2005). The nature of the resources being managed clearly affects, to some degree, the institutional design. The size of the resources, the intensity and level of exploitation, the cost of enforcement, and the dynamic nature of resources all play a part in determining the governance structures of collective resources (Dolšak and Ostrom, 2003). These same factors are likely to be important in determining the cross-scale interactions that form part of the institutions of governance, and important design elements for robust social-ecological systems (Berkes, 2007). Local level resource users make common cause with communities in the same situation to learn lessons and spread best practice, as well as to act cooperatively in negotiating with government. These are portrayed as horizontal linkages between resource users, other civil society groups and scientific organizations, media and advocacy organizations both within and external to the locality and jurisdiction of the resources. Vertical external linkages include those by both communities and agencies to government and regulatory agencies at other levels. As linkages between different parts of systems across scales and levels emerge, it is important to ensure that empowerment of cross-scale institutions is matched with the resources that enable aspirations for sustainable management to

be fulfilled (Anderies et al. 2004). The persistence and stability of local governance systems depends on social cohesion, trust and unity. The key is to identify those linkages that promote the obvious potential for enhanced management and avoid those that have the potential to undermine trust between stakeholder groups.

- Given that co-management is a partnership between central government and local users, the basic point of departure is a situation in which several actors bearing different interests and concerns for the management join their efforts and agree on a way to manage their resources together.
- Inclusiveness of relevant stakeholders is a key aspect of successful implementation of co-management, but it has to be balanced with somehow constraining transaction costs related to multi-stakeholder systems.
- Horizontal linkages between stakeholders (e.g., fishers, NGOs, scientists) as well as vertical between local institutions and central governments are key for successful implementation and sustainability of co-management regimes.

3.2. Attributes for successful co-management; what worked, what didn't (meta-analysis of co-managed artisanal fisheries)

Across the co-management literature, four criteria or pillars are considered essential for successful co-management (FAO, 2005): (i) an enabling policy legislative environment; (ii) empowerment of communities; (iii) effective linkages and institutions; and (iv) adequate resources – a fishery considered worth managing, and the people and finances to implement the system.

An enabling policy and legal framework is essential to ensure that governments have appropriate systems in place to support the co-management process. Whilst the state is entrusted with the management of the resource, it can assign responsibility to or recognize the competence of local communities for the management of fisheries. Thus, local ownership improves compliance with locally agreed rules and improves compliance with national legislation. An important feature of this is a robust enforcement mechanism and the existence of implementable sanctions to ensure compliance with the locally agreed rules. A critical step in the implementation of co-management is then the government's demonstration of its willingness to change policy, involve communities in the preparation of policy and regulations, define roles and responsibilities of organizations and devolve power to local institutions.

Another pillar is community empowerment allowing local communities to participate effectively and proactively in the management as well as to ensure sustained involvement. There must be genuine sharing of power between governments and resource users in policy development and decision-making. Usually, other stakeholders such as eNGOs and the tourism industry may also need to be involved in some, or all, stages of the process.

Governments and other agencies must recognize the competence of fisher organizations and allow them to make their own rules. Capacity building in all aspects of fishery management and co-management process should accompany this process.

Effective co-management requires strong linkages between stakeholders. The networks of stakeholders must be understood and encouraged to share information. It must also be recognized that in a co-management system success criteria may differ between stakeholders and that there may be differing objectives and priorities. Ecological status (i.e., healthy fisheries and ecosystems) must be balanced with human well-being (i.e., the need for food or income) and this inevitably requires management trade-offs that must be recognized and addressed. Communication and dialogue between

stakeholders such as government management agencies, scientists and fishers must also take place effectively and be part of a participatory process.

Lastly, it must be recognized that effective co-management requires the existence of a resource that is considered worth managing since it requires the input of resources (time, effort, finance) by those involved. The transaction costs for participation in meetings, monitoring, enforcement and management can be considerable and are often underestimated at the start of a co-management initiative. Governments and communities must recognize and commit to providing these resources; otherwise these initiatives cannot be sustained. A clear example is when co-management systems are imposed through external funds by donors without creating the basic foundation for stewardship and long-term sustainability of scheme.

Despite these four pillars for successful co-management, the current state of knowledge shows that there are no simple formulae to ensure success in fisheries co-management initiatives. What works in one area may be inappropriate or fail in another for many different reasons.

The meta-analysis performed by Gutiérrez et al. (2011) highlighted several attributes as needed for a successful co-management of fisheries. Although presence of strong leaders and social cohesion were the most important attributes across the whole range of 130 fisheries analysed, the relative importance of these differed among categories, and particularly between artisanal and industrial fisheries (Figure 1). Looking at the 90 artisanal fisheries across 38 countries, the aggregated measure of co-management success (success score) varied between a total failure (SS = 0) to a complete success (SS = 8). The estimated mean ± s.d. of 4.3 ± 2.8 implied that Co-management in average has been successful in achieving social, ecological and economic objectives. Random forest analyses for the 90 case studies highlighted that community leaders, community-based protected areas and individual or community quotas were the three most important attributes predicting successful Co-management (Fig. 1). In addition, the relative importance of each attribute for Co-M success showed marked differences for 3 main attributes: Territorial Users Rights of Fishing (TURFs) and Monitoring Control and Surveillance (MCS). For artisanal fisheries, TURFs and MCS were ranked fifth and sixth in importance.

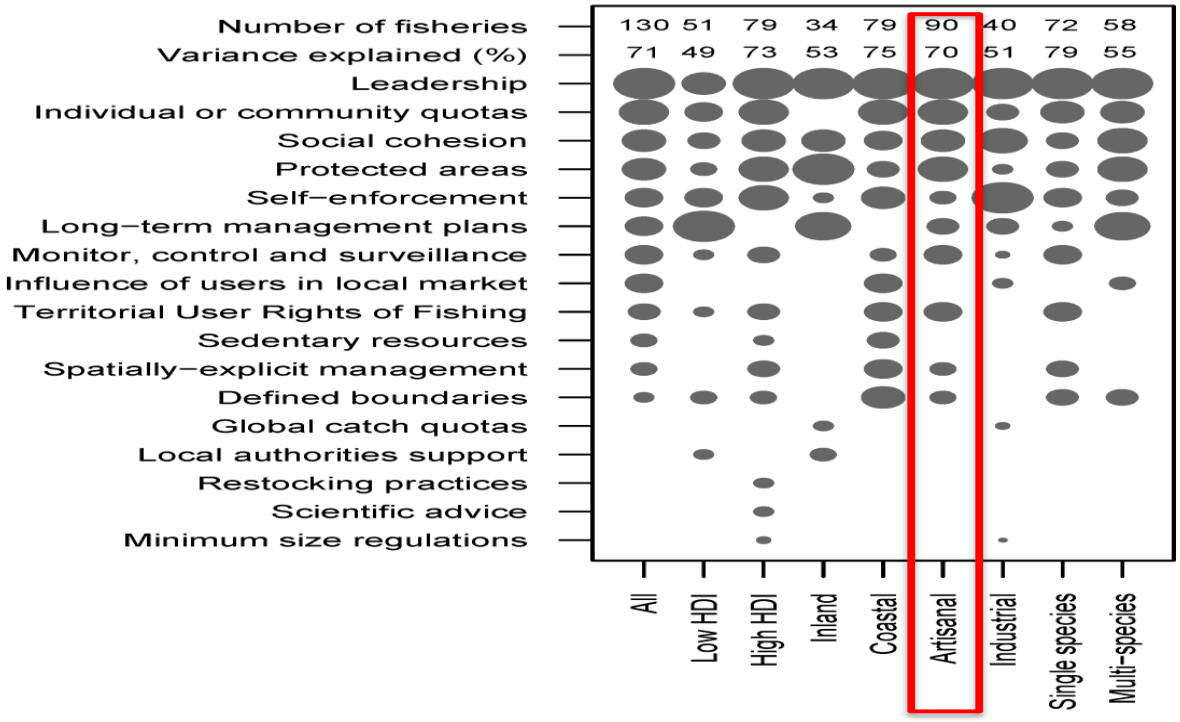

Figure 1. Relative importance of individual attributes (rank proportional to circle size) for 121 co-managed fisheries determined by random forests. The number of fisheries and variance explained are also indicated. Reproduced from Gutiérrez et al. (2011).

These results reinforce the critical role that TURFs play as an ancillary tool for co-management highlighted in several other studies (Defeo and Castilla, 2005). For example, it has been demonstrated that spatial access rights and self-imposed internal rules resulted in successful local fisheries when accompanied by co-management as the governance structure in place (Defeo and Castilla, 2005). A combination of strong community leaders, social cohesion of fishing cooperatives, and TURFs within a co-management approach was also critical for fisheries in developing world countries to achieve MSC certification, aimed at sustainable fisheries with low environmental impacts (Gutiérrez et al., 2012; Pérez-Ramírez et al., 2012).

- The four pillars described as essential for successful co-management are: (i) an enabling policy legislative environment; (ii) empowerment of communities; (iii) effective linkages and institutions; and (iv) adequate resources – a fishery considered worth managing, and the people and finances to implement the system.
- However, there are no simple formulae to ensure success in fisheries co-management initiatives. What works in one area may be inappropriate or fail in another for many different reasons.
- A critical step in the implementation of co-management is the government's demonstration of its willingness to change policy, involve communities in the preparation of policy and regulations, define roles and responsibilities of organizations and devolve power to local cohesive institutions.
- Key attributes for successful co-management in artisanal fisheries include strong community leaders, social cohesion, individual/community quotas or TURFs as incentives for access rights, and efficient mechanisms for monitoring, control and surveillance.

3.3. Committees, cooperatives and other institutions

Early conceptualizations of co-management involved only a relationship between the government and the local resource users. However, over the years the concept of co-management has evolved from this two links system to a multiple linkage and relationships system, which includes a wide array of actors and institutions. This polycentric networks connect different levels of governance by delivering communication channels for the different stakeholders in multilevel institutions, enhancing the interrelations between accomplishment, knowledge, and social-ecological contexts.

By engaging communities and other stakeholders in co-management, governments, conservation groups, and scientists alike aspire to make conservation initiatives more reflective of local conditions and consequently, create better incentives for stakeholder's compliance. This need for the development of local institutions to represent and implement community experience, knowledge, and desires of sustainable management of fishery resources has led to a proliferation of community-based organizations involved in managing these resources. The analysis by Gutiérrez et al. (2011) shows no particular type of organization (e.g., cooperatives, committees, associations) as more critical than others for co-management success. However, to be effective, such organization or institutions require several design principles aiming at providing users with a credible commitment. These principles include: (i) cohesion and trust among members; (ii) sense of ownership and resource stewardship; (iii) presence of leaders guided by collective interests; and (iv) simple and intuitive rules and regulations. For the later, Cinner and Huchery (2013) found that perceived compliance was higher when less than 2 rules were in use, suggesting in fact that the complexity of regulations can hinder compliance.

Several studies have shown that fishery cooperatives are able to resolve diverse management problems, improve economic conditions and achieve conservation benefits simultaneously (Deacon et al., 2008; Ovando et al., 2012). In particular, fishery cooperatives often take actions directed toward coordinating harvest activities, adopting and enforcing restrictions on fishing methods and effort, taking direct conservation actions such as establishment of marine reserves, and take business or marketing strategies that assure not only the environmental sustainability of the fishery but its economic viability. However, in light of the diversity in nature, structure, context and management of the world's fisheries, the existence of a particular type of institution cannot be expected to succeed in all cases. In fact, Gutiérrez et al. (2011) found type and nature of institutions not a relevant variable in determining success. Additionally, they found that resource users under locally managed protected areas and customary management arrangements were more likely to perceive beneficial livelihood outcomes than users under national park and devolved governance arrangements.

- No particular type of local institution seems to be more suitable for successful co-management.
- However, to be effective, institutions need to be characterized by strong cohesion and trust among members, sense of ownership and resource stewardship, presence of leaders guided by collective interests, and simple and intuitive rules, regulations and sanction systems.

4. FUNCTIONING OF CO-MANAGEMENT COMMITTEES

4.1. The case of the Co-management Committee of the Catalan sand-eel fishery

The sandeel fishery in Catalonia takes place within 12 miles from the coast and targets two species of sandeel, *Gymnamodytes cicerellus* and *Gymnamodytes semisquamatus*, which are small short-lived forage fish typically found in shallow sandy bottoms in the Mediterranean and adjacent East Atlantic waters (Sabatés et al., 1990). Unlike the industrial sandeel fishery in the North Sea harvesting hundreds of thousands of tonnes for reduction to fishmeal, the Catalan fishery is based on small-scale seines and yields less than one thousand tonnes of catch annually. Boats operate on a daily trip basis and landings are entirely aimed at direct human consumption, as the species is highly appreciated in the region and fetches a good price at the local markets. The currently authorized fleet is limited to 25 vessels operating from 7 different fishing ports along the Catalonian coast: Barcelona, Badalona, Arenys de Mar, Blanes, Palamos, Sant Feliu de Guíxols and L'Estartit. The number of fishermen on board is either 2 or 3 meaning that the total fishermen participating in the fishery could oscillate between 50 and 75. The fishing gear currently used (called sonsera after the fish called sonso in Catalan) has two lateral wings with a maximum length of 125 m followed by a cod-end of 30 m.

After a fishermen's initiative, the first regulatory framework specific for the fishery was adopted in 1987. A key element of this initial regulation was the implementation of a seasonal closure during the reproduction period. This period, proposed empirically by the fishermen following their traditional knowledge and observations, was set from 15 December to 1st March. However, illegal and unreported catches was widespread resulting in inefficient regulations and the development of black markets.

In 2006 the European Union adopted the first comprehensive regulatory framework concerning management and technical measures for the European countries in the Mediterranean, the so-called Mediterranean Regulation (EU Council Regulation 1967/2006). One of the pillars of this regulation is a provision for the compulsory adoption of management plans by Member States for fisheries conducted by trawl nets, boat seines, shore seines, surrounding nets and dredges within their territorial waters not later than December 2007. By the specific mention of boat seines this provision directly affects the "sonsera". Moreover, the same regulation adopts technical measures related to the mesh

size, and the minimum distance to the coast and depths allowed for towed nets, which have also impact on the fishery. From July 2008 the mesh size for towed gears was established either at 40 mm if square or 50 mm if diamond shaped at the cod-end; and the use of the gear was prohibited within 3 nautical miles of the coast or within the 50 m isobaths where the depth is reached at a shorter distance from the coast. Both technical measures, after the same regulation, benefit by a transitional derogation until end of May 2010. An indispensable additional requirement for vessels to obtain the later derogation (minimum distance to the coast) is to have a track record in the fishery of more than five years without any possibility of a future increase in fishing effort. This later measure had a crucial impact in the size of the fleet targeting sandeel in the Catalan region since it resulted in an effective close list of 25 vessels allowed to fish for the species.

The needed management plan for the fishery addressing the mentioned derogations was initially sent to the European Commission in 2010, and revised versions of the plan in 2011. In January 2012 the submitted plan was rejected due to the lack of any scientific study that would support the proposed measures and derogations. Therefore, the fishery was deemed illegal and forced to close producing a huge crisis in the sector, which approached the NGOs, scientists and the different administrations calling for support. After agreement of the members of the four groups (fishing sector, scientists, administration and NGOs) the Co-management Committee for the sandeel fishery in Catalonia was created in April 2012 (Catalan sand-eel Co-Management Committee, in press).

The Co-management Committee of the sand-eel fishery was created with the aim of promoting the long-term sustainability of the fishery by carrying out all the needed actions for the purpose, including: (i) the design of a scientific study aimed at developing and adopting the required comprehensive management plan for the species; (ii) setting the rules for the fishery under an adaptive management approach during the scientific fishery; and (iii) a close monitoring of the activity including assessing compliance to the rules in place, and agreement on sanctions when applicable.

Member of the Committee agreed on a formal composition of five pillars, each allocated to representatives of the fishing sector, the Catalan authorities, the Spanish central authorities, scientists, and NGOs, respectively; all on equal footing with respect to decision-making regarding the rules and their implementation. Two bodies, the Plenary and the Permanent Commission, compose the Committee. The Permanent Commission made of ten members works as a technical working group for the close follow up of the fishery and meets at least once a month. During this monthly meeting decisions are taken by consensus whenever possible and at least by a majority of seven votes. The Plenary of the Committee meets once a year or by petition of the Permanent Commission. The secretariat of the Committee is assumed by the Catalan administration and meetings usually take place in its headquarters.

The main management measures agreed for the period during which the scientific fishery takes place are: (i) the "sonsera" fishing gear can only operate in sandy bottoms; (ii) the exit and entrance of fishing vessels, landing and commercialization of the catches can only take place in the specified fishing ports and markets; (iii) the activity can take place only from Monday to Friday within a specific timeframe; (iv) a maximum daily catch per vessels and a maximum TAC for the whole 2013 fishing season. Therefore, the initially set daily catches already underwent adaptive variations later agreed during the monthly meetings of the Permanent Commission.

The control of the fishing activity is ruled by a "Control Protocol" adopted by the Committee, which includes: (i) strict control of the daily catch (up to 10% excess of the daily catch is allowed); (ii) landing control (all vessels should land their total catch in their base port); (iii) market measures (fish should be sold at the fish market associated to the base port; to guarantee a proper control of the first sale notes by the Co-management Committee, the first sale should take place only within the Catalan territory); (iv) strict fishing schedules (6:00 AM to 2:00 PM); and (v) disciplinary measures applied by the Permanent Commission of the Committee.

The Permanent Commission of the Committee is meeting once a month to analyse the fishing activity during the previous month, including the scientific sampling and evolution of the scientific study, the catch levels and associated compliance measures, communications and petitions from the sector and disciplinary measures if applicable. It is noteworthy that during the more than a year of life of the Committee all decisions of its Permanent Commission have been adopted by consensus with full agreement of all its members. Those decisions included a continuous improvement of management measures by adapting the original set of rules to the daily reality. This adaptive management has been identified as an effective or even necessary way to cope with new co-management systems (Olsson et al 2004; Folke et al., 2005). The functioning of the Co-management Committee and the permanent adaptation of the management and control measures has proven to be successful. Among the main reasons of this success has been the trust between all members of the committee and their huge commitment for working together towards the same objective.

Some indicators of success for the co-management of the sandeel in Catalonia include (Catalan sand-eel Co-management Committee, in press): (i) the sense of ownership of the management process among all relevant stakeholders resulted in a very high adherence to the rules; (ii) reduction in the fishing effort by half with threefold increase in profits for fishers due to the elimination of the black market, which overloaded the market by strongly reducing prices, and the strict control of the amount of fish at the auction market through the implementation of an individual daily quota; (iii) the model had also a positive social impact on the local communities since, due to the profitability of the fishery, the owners of vessels who operated with two fishermen on board had decided to increment its crew to three; (iv) the experience has been highly instructive for all stakeholders as regards the relevance of bottom-up participative approaches to dramatically improve management success; (v) the strong by-in from the two administrations involved, who are already promoting the replication of the model to other fisheries.

- Sandeel fishing has been regulated in Catalonia since 1987, but with the entry into force of EU Council Regulation 1967/2006 on Fishing in the Mediterranean, a management plan had to be submitted to the European Commission to allow this fishing practice.
- In April 2012 a Co-management Committee, composed by the fishing sector, fisheries administrations, scientists, and NGOs was created with the aim of achieving the long-term sustainability of the fishery.
- The Management Plan for the Catalan sand-eel fishery establishes strict measures including control of the daily catch and landings, fishing seasons/schedules, market measures, and disciplinary measures applied by the Permanent Commission of the Committee.
- Indicators of success for the co-management of this fishery include community empowerment and sense of ownership of the management process among all relevant stakeholders which derived in high adherence to rules and regulations, reduction of fishing effort and increase in profits for fishers, and strong by-in from the two administrations involved, who are already promoting the replication of the model to other fisheries.

4.2. Other examples of fisheries co-management in the region

There are other examples in Mediterranean countries where co-management, or at least some elements of it are present (Alegret, 1996; Symes et al., 2003). These include the presence of local cooperatives in Turkey where certain degree of power devolution allowed fishers to manage their resources effectively and maintain the economic viability of the fishery at the same time. In Italy, the inefficiency of the central government in managing a clam fishery has shifted the responsibilities to local institutions, and the benefits of a marine protected area has driven local fishers to actively

comply and even enforce fishery regulations. Finally, in France, the government organized the "Grenelle de la Mer" which includes the objective of developing co-management regimes, where administration, industry, scientists, and civil society decide together the management needed for sustainable exploitation of fisheries.

4.2.1. Turkey

Fishery management in Turkey is centralised. There are no local government jurisdictions or local village jurisdictions over fishing activities. However, fishers are normally organized in cooperatives, where their numbers have increased by almost 14% since the early 1990s (Unal et al. 2009). The 1986 amendment of the Fishery Law 1380 gave fishery cooperatives the rights to hire and operate fishing ports, which resulted in rapid increases in the number of cooperatives. The Turkish fishery cooperative movement started in 1942 and main responsibilities included the organization of credits, production, marketing, construction of cold storage facilities, as well as other industrial facilities such as fish oil factories.

A study of six cooperatives in the Aegean, highlighted the success of at least three of these cooperatives in marketing their fish but also in other functions such as supplies and service (e.g. providing bait, fuel and ice), defending members' rights, providing lobbying services, informing members about new regulations, and establishing rules and collaborating with the management agency and the universities. In these cooperatives, group sizes were small enough to retain the interest of fishers and no evidence of corruption, larceny or other dishonest activities were shown. All had been formed on the basis of local initiatives, in response to the needs of the fishers themselves.

Another example is the small-scale fishery in Alanya, on the Mediterranean coast of Turkey. This fishery is located on the edge of a deep basin, and the inshore zone for setting nets is very limited. The fishers have organised among themselves a system of rotating fishing areas so that each fisher receives equitable access to the more productive fishing spots. There are some 40 named fishing spots in Alanya's trammel net fishery, which takes place between September and May. The overall system of access rights and rules for taking turns is quite complicated but, starting in the 1980s, it has reduced conflict among fishers. However, given the centralized fisheries management in Turkey, fishers have struggled on how to provide legitimacy for the system they designed. In fact, they decided to draw legitimacy by using the Aquatic Resources Act as enabling legislation. The Act states that local cooperatives have jurisdiction over local arrangements. Thus, rules and regulations were written by the local fisheries cooperatives, agreed and endorsed by all members and handled to the local authorities (Borrini-Feyerabend et al., 2009).

4.2.2. Italy

The Venus clam fishery in Italy is considered as a case of self-management (OECD, 2008). In this country, the fishing of bivalve molluscs performed by means of hydraulic dredges is a relatively recent activity. Introduced in the first years of the 70s, this type of fishing activity is mainly concentrated along the Adriatic coast. The current clam management system is the outcome of a long process that was initiated in the early '90s. In 1980s, fishing capacity increased dramatically and the resource became overexploited. New measures were immediately established at the central level, including input and output measures and a specific licensing scheme. A National Management Committee was introduced whose task was to co-ordinate the management measures governing this fleet segment. Towards the end of the '90s, the failure of the strategy, which had been adopted by the central management, was evident, with overcapacity, high fishing effort and low fishers' income.

This crisis was attributed to a lack of efficiency from the management authority and fishers asked for financial support to develop a new management plan aimed at: (i) shifting of responsibility from the central administration to the users (i.e., ship owners) and (ii) replenishment of clam stocks and establishment of sustainable harvesting practices and quotas. As a result, the National Management

Committee was dismissed and Local Management Co-ordination Committees were established, with the power of defining and implementing management regulations (e.g., daily catch quota, number of fishing days in a week, season closure, maximum landings, area rotation, allowed gears, periods, landing sites, and restocking areas). Basically, they were granted all the powers previously held by the Ministry, which were added to those already in their control.

Some positive results of such power devolution included higher CPUE and higher unit prices, and a moratorium on new licenses. The successful management of this fishery was based on a progressive decentralisation of the decision level, ending up with a self-management regime including access rights (TURFs). Some of the local characteristics that can be associated to such success include: (i) the sedentary nature of the resource, which is distributed in specific areas easily identified in every fishing district; (ii) homogeneity of the fishery segment, allowing the introduction of rules largely understood and accepted by all fishermen; and (iii) the implementation of TURFs creating a sense of ownership and stewardship;

The Torre Guaceto Marine Protected Area (TGMPA), located adjacent to an artisanal fishing community, is another case with relevant elements for co-management in Italy. In 2005, scientists and fishermen who collaboratively studied the MPA designed an adaptive co-management plan to allow fishing in a partially protected area of the MPA. This plan was designed to sustain fishermen's income while also limiting fishing impacts. Scientists and fishermen worked together to select fishing gear that would minimize harm to the underwater habitats and protect functionally important fish predators and juvenile fishes, as well as to reduce the number of fishing days within the MPA to one a week.

Immediately after fishing was allowed in the partially protected area of the MPA, fishermen saw an increase in their income. Catch rates of commercially fished species including striped red mullet, octopus, and peacock wrasse averaged 4 times higher than catch rates outside of the MPA. After a few years, catch rates within the partially protected area had stabilized to a level that was greater than double the catch rates outside the MPA. Moreover, average catches obtained from 2005 to 2008 within the TGMPA were generally higher than the values reported from other Mediterranean locations. Along the coast of Italy, Spain, Greece, Croatia and France, average catches obtained with fixed nets from more than 20 locations ranged from 3 to 10 kg km^{-1} of net, with a few locations where average catch exceeds 20 kg km^{-1} of net, while catches exceeded 25 kg km^{-1} net in TGMPA (Guidetti et al., 2010).

Collaboration and co-management among fishermen, managers and scientists allowed for the maintenance of sustainable fisheries and the avoidance of overfishing in the partially protected area in Torre Guaceto (Claudet and Guidetti, 2010). Many fishermen support the MPA, including the marine reserve portion, because of the long-term benefits they receive for their fishery. Several characteristics of this system contributing to the successful co-management, including the relatively small size of the MPA, far away from big cities, and small number of local fishers. In addition, increased trust and collaboration between scientists and fishers was essential to designing effective marine reserves within MPAs that benefited both conservation and fisheries.

4.2.3. France

In 2009 the French government organized the "Grenelle de la Mer" where administration, industry, scientists, and civil society decided together the management needed for sustainable exploitation of the sea. This Grenelle resulted in the creation of 138 commitments, including the creation of 6 pilot sites of UEGC (Unités d'Exploitation et de Gestion Concertées – Integrated Exploitation and Management Units) to test ecosystem-based and concerted approaches for fisheries management. The projects are based on 5 pillars: (i) definition of the territorial unit; (ii) setting up a new form of governance based on co-management; (iii) organizing the market and commercialisation to enhance the value of fishing; (iv) designing of a long term management plan; and (v) the exercise strict control over the management of the resources.

The Var's project is one of those UEGC pilot projects, created with the objectives of developing a co-management system that includes all stakeholders an a specific territory. These stakeholders share common long terms objectives to rebuild and maintain healthy marines ecosystems and to develop sustainable and diversified artisanal fishing. The platform is composed by fishers' representatives (Comité départemental des pêches maritimes et élevages marins du Var / Project leader), scientists (Université de Nice, Laboratoire Ecomer), public establishment (Agence de l'Eau Rhône Méditerranée et Corse, Parc National de Port Cros), administration (Direction des pêches Maritimes et de l'Aquaculture, Direction Interregional de la Mer Mediterranée, direction départemental des territoires et de la mer du Var), NGOs (WWF France, Confédération Environnement Méditerranée), regional authorities (Conseil général du Var, Conseil régional PACA, Toulon Provence Méditerranée) and marines users (diving federation, recreative's organisations). The project focused on 4 major actions:

1. Refocus the role and the rules of the French Prud'homies in territorial maritime management;
2. Develop partnership between fishermen, coastal users and scientists;
3. Establishing local long term management plans and;
4. Bring consumers to choose their seafood through the choice of supporting a type of exploitation.

The experimental phase started in January 2012 and will finish in December 2013, with a possibility for renewal.

- There are several examples in Mediterranean countries where co-management, or at least some elements of it are present.
- In Turkey, the government has devolved power management to local cooperatives resulting in more effective management and economically viable fishery.
- In Italy, the inefficiency of the central government in managing a clam fishery has shifted the responsibilities to local institutions, and the benefits of a marine protected area has driven local fishers to actively comply and even enforce fishery regulations.
- In France, the government organized the "Grenelle de la Mer" which includes the objective of developing co-management regimes, where administration, industry, scientists, and civil society decide together the management needed for sustainable exploitation of fisheries.

5. RELEVANT OPTIONS FOR CO-MANAGEMENT: AREA-BASED MANAGEMENT; ACCESS LIMITATION; LIMITATION OF FISHING OPPORTUNITIES; TIME/AREA MANAGEMENT; MONITORING, CONTROL AND SURVEILLANCE (MCS)

5.1. Role of information and monitoring; assessing the stocks and value of Traditional Environmental Knowledge (TEK)

Sound and precautionary fisheries management entails high-quality information and analysis of the status and dynamics of fish stocks. In order to facilitate management and regulations, data needs to be collected and stock assessments conducted. Independently of the social-ecological conditions of the fishery, or whether is centrally or co-managed, there is a need to collect information to assess the state of the resource, as well as to monitor whether fishing regulations are effective to maintain the long-term sustainability of the resource and the livelihoods of those depending on them. In fact, fisheries monitoring is required to provide operational intellect to inform management decisions and to show to stakeholders that the objectives are being met. Normally, purpose of monitoring includes (i) description of current status; (ii) detection of trends; and (iii) prediction of future changes given the management regulations in place. Specifically, data should be available on stock structure, productivity and abundance, fleet composition, and all fishery removals.

Despite the importance of monitoring, fishery managers and stakeholders have often struggled in developing and implementing effective monitoring programs, particularly in small-scale fisheries with limited access to economic and human resources or where the nature of the fishery does not justify expensive surveys. Although monitoring systems need to be adapted to meet the needs of the fishery and its management framework, there are general guiding principles for each of the planning, development, and implementation stages. These guiding principles include (MRAG, 2011):

a. Stakeholder engagement. From the outset of designing a monitoring program, stakeholder engagement is key in defining common goals, avoid redundancies, and utilize local and/or traditional knowledge for the fishery. Thus, stakeholders should be involved in the design process and consulted to ensure the monitoring is doable and enforceable.

b. Fishery characteristics: The characteristics and complexities of fishing communities, resources and fishing operations must be monitored at appropriate spatial and temporal scales.

c. Objectives setting: Establishing clear objectives is a key step in developing efficient monitoring programs, allowing managers, scientists and fishers to identify what the program aims to achieve. These goals should consider diverse objectives and interests from all sectors, including science, management, and industry and should be assessed regularly to check progress and be adjusted as needed.

d. Monitoring strategies: Identifying the most appropriate monitoring strategy is a key component of a successful and efficient monitoring system. For example, in some situations sampling at sea may be more relevant than at port monitoring. An important aspect is to determine which elements of a monitoring system the management agency or government, industry, or fishers should conduct.

e. Cost considerations: In order to be efficient and doable, monitoring programs need to consider costs of data collection, processing and analysis. It is critical to determine beforehand who will have the financial responsibility for various aspects of a monitoring program and in most cases, consider requirements for fishers to fund at least a portion of the management and monitoring costs. In most cases, it is important to scale the monitoring efforts to the value of the fishery.

f. Adaptive approach. Periodic review of a monitoring program is needed to improve the system and adapt to changing needs in data collection. These programs should be dynamic, providing stability and consistency while also adapting to changes in fishery and resource circumstances. A feedback system should be used to evaluate the program to make sure it is achieving its goals and to identify needed changes.

Information on abundance, catches, effort, catch composition and size structure of target stocks are a valuable and needed element for stock assessment and sustainable management. However, this information is not always available for small-scale fisheries due to limited resources to conduct fieldwork and surveys and to implement sampling protocols by management institutions or government agencies. Likewise, data collection for sedentary and low mobility species (e.g., lobsters) with high levels of spatial and temporal variability may require more resources than are typically available for agencies tasked with such management. Thus, an increasingly adopted solution is when fishers are trained to collect fishery-dependent and fishery independent information at relevant temporal and spatial scales. In this respect, Prince (2003) has proposed extensive use of commercial fishermen as data collectors in order to gather enough information at appropriate scales to support fine-scale management. These community-based data collection programs (CBCP), which are usually more feasible and effective under strong co-management regimes, improve the quality and quantity of relevant fishery information by enhancing spatial, temporal and categorical resolution as well as significantly reduce the monetary costs of data collection (Schroeter et al. 2009).

A CBCP involves collecting, sharing, and synthesizing essential fishery and scientific data and motivating stewardship within the fishing community. These CBCP may be a way of moving out from

a data-limited situation and to support sustainable fishing. In fact, the purpose of collaborative data collection and research may be to establish data-driven management of the fishery in question and to reach the level of information and monitoring adequate for proper stock assessment. To do so, management agencies or co-management bodies need to develop and foster participation in a data collection program, to recruit and train fishers to collect and share essential data, to improve data storage and management systems, and to develop a stock assessment or review the existent one. Also critical to the success of these programs is to provide incentives and encourage new fishers to participate in the data collection program (e.g., show fishers the value of the information for their daily operations).

However, data gathered by fishers or others without a scientific training are often criticized for not being scientifically sound and accurate, and hence not often used to inform management. Thus, checking for data accuracy and data validation are key aspects of the CBCP needed to support integration of collected data into the management process. To address data accuracy and validity, robust procedures and protocols need to be clearly defined and easily carried out by fishers with minimal chance for individual interpretations. Validation of the data may be accomplished, for example, through landing port sampling and should constitute an important component of the CBCP.

In other cases, some biological and fishery information is available although incomplete, unreliable or inaccurate, and other sources of information become critical. An important but often disregarded source of information refers to both traditional ecological knowledge (TEK) and fishers' historical perspective of the systems under exploitation. TEK refers to indigenous, native or other forms of traditional knowledge regarding local environmental resources and usually defined as the cumulative body of knowledge, practice, and belief, accumulated through generations by cultural and experimental transmission. In fisheries management, it has been used as substitute for baseline data to measure changes in for example catch per unit of effort (CPUE) over time in remote regions that have little recorded scientific information. Although fishers have normally accumulated a large body of knowledge about their resources, in most cases there has been little effort to involve these users not only in decision-making, but also in determining research priorities or in the research activity itself. Indeed, in most nations, the vast majority of fishery research takes place within government and universities and although fishers may often express the desire to participate in such research, such cooperative attempts are not widespread. However, advantages of such approaches are multiple, including better understanding of complex systems, improved decisions based on diversity of perspectives, community empowerment and better compliance with rules and regulations (Freire and García-Allut, 1999; Garcia-Allut et al. 2003).

- Independently of the social-ecological conditions of the fishery, or whether is centrally or co-managed, there is a need to collect information to assess the state of the resource, as well as to monitor whether fishing regulations are effective to maintain the long-term sustainability of the resource and the livelihoods of those depending on them.
- For co-managed fisheries, it is critical to determine beforehand who will have the financial responsibility for various aspects of a monitoring program and in most cases, consider requirements for fishers to fund at least a portion of the management and monitoring costs.
- Community-based data collection programs (CBCP), where fishers are trained to collect fishery dependent and independent information, are a cost-effective way to collect the necessary information to assess the status of the resource and monitor the fishery.
- These CBCP are usually more feasible and effective under strong co-management regimes, improving the quality and quantity of relevant fishery information by enhancing spatial, temporal and categorical resolution as well as significantly reduce the monetary costs of data collection.
- In fact, CBCP are probably the only way to move from data-poor to data-rich situations in artisanal, small-scale fisheries.

5.2. Territorial-based management, access limitation, fishing limits (either on catch or effort)

Within co-management arrangements, diverse forms of fishery arrangements have been identify as successful depending on the social-ecological and political settings. Most commonly discussed are area closures, limited entry and other input controls (effort limitations) and output controls (quota allocations), and access rights. User rights options vary widely, including: Territorial Use Rights in Fishing (TURFs), which have been traditionally applied by indigenous communities in determining the fishing location where a member or group of members of the community can exploit the resource; limited entry, which was the initial approach taken by modern management of fisheries to provide a limited number of individual fishers with right access to the resource (e.g., fishing licences); and quota allocations made to individual fishers, communities, cooperatives or companies to have a share or quota of the total resource (e.g., TAC) or total effort allowed (e.g., number of traps).

It is important to note that while co-management not necessarily implies exclusive access, this may offer complementary effects enhancing the fishers' sense of ownership and stewardship over the resource, or facilitating the policy process and its outcomes by promoting more cooperative and equitable management approaches (Jentoft, 1989). It is also possible that the nature and success of the co-management arrangement will be influenced by the overall nature of the access rights regime in place. In fact, Gutierrez et al. (2011) fund that catch shares, a term referring to different sorts of access rights, and in their specific context related to individual or community quotas and TURFs, were an important attribute for co-management success across 130 fisheries. A more detailed analysis showed that these two attributes gain even more relevance when dealing with artisanal co-managed fisheries, or those in developing nations.

TURFs seem to be of critical importance for artisanal fisheries targeting more sedentary resources. Many studies have highlighted the benefits of TURFs in lobster fisheries in Mexico (Defeo and Castilla, 2005), an abalone fishery in Australia (Prince, 2003) and loco and sea urchin fisheries in Chile (Castilla et al., 1998) and for multi-species and multi-gear fisheries in Oceania (Johannes, 2002; Defeo and Castilla, 2005). However, Cinner et al. (2012) found that providing local resource users with exclusive rights to their fishing grounds in coral-reefs systems in developing countries actually decreases levels of compliance with rules and regulations due to marriage arrangements between right-holders and external users and lack of resources for monitoring, control and surveillance among members. In this context, social cohesion, trust and cooperation in fishing communities may alleviate conflicts and reduce the need for control and surveillance, subsequently increasing the benefit of access rights (Gutiérrez et al., 2011).

Thus, the effectiveness of the TURF system depends of several aspects, including but not restricted to (Castilla and Defeo, 2001): (i) the characteristics of the resources, being particularly effective when dealing with sedentary (lobster, abalone) and inefficient when dealing with highly migratory species (e.g., tuna); (ii) reduced number of users in the system, which in turns favour social cohesion and sense of unity; (iii) defined areas and territories (e.g., enclosed bays or "caletas"), facilitating control and surveillance; (iv) low levels of conflicts and unemployment rates, which lead to less social pressure of fishing as a main income and livelihood; (v) strong and efficient social institutions. TURF management systems need the existence of one institution (cooperative, association, guild) that assures the management of the common.

In Chile, TURFs allocated to small-scale fishers communities through Management and Exploitation Areas for Benthic Resources (MEABRs) constituted a major shift in the management framework of fisheries. In cases where legislation has been properly used, the cascading effects resulting from the allocation of TURFs included (i) long-term effects in the economic welfare of fishers, (ii) the strengthening of organizations/syndicates which led to the implementation, by fishers themselves, of effective monitoring, control and surveillance procedures, and (iii) use as experimentation tools to refine stock assessment and management procedures.

Despite the successful examples detailed above, most small-scale, artisanal fisheries around the world are still far from implementing TURFs due to a lack of legislation that includes exclusive access rights to a marine area. In fact, this has been identified as a major constraint for the successful implementation of co-management success in coastal fisheries targeting sedentary resources in Latin America (Castilla and Defeo, 2001).

- While co-management not necessarily implies exclusive access, this may offer complementary effects enhancing the fishers' sense of ownership and stewardship over the resource, or facilitating the policy process and its outcomes by promoting more cooperative and equitable management approaches
- Often, the nature and success of the co-management arrangement will be influenced by the overall nature of the access rights regime in place.
- A meta-analysis of 130 co-managed fisheries around the world showed that catch shares, a term referring to different sorts of access rights, that can take the form of individual or community quotas and TURFs, is an important attribute for co-management success.
- A more detailed analysis showed that these forms of access rights gain even more relevance when dealing with artisanal co-managed fisheries, or those in developing nations.

5.3. Time/area management (including different kinds of spatial closures) in co-management

Spatial closures, or time-area closures are one of the tools most commonly used by managers for all type of fisheries and management schemes, including co-management. They are also used outside of fisheries for a variety of conservation, research and other purposes. Often, the objective of these spatial and temporal closures is to reduce fishing mortality on one segment of the population (e.g., juveniles, spawning aggregations, etc.). Spatial and temporal closures have also other objectives such as re-distributing fishing effort, minimizing gear conflicts, reducing impacts of fishing in sensitive substrate or vulnerable fish habitats.

Closures are also recognised in a fisheries management context for their potential to provide a buffer against uncertainties in stock assessments, variability in recruitment, and catastrophic events by providing a refuge in space or time/seasons (Wilen, 2004). Through spill-over processes as well as through protection of spawning seasons among many other mechanisms, spatial and temporal closures would be expected to benefit the management of fisheries where other means of control on exploitation rates are limited. However, the effects of closures will depend upon the spatial and temporal population dynamics of the fish species, the spatio-temporal dynamics of the fishing fleet, and the other management controls in place.

Spatial management is used extensively in natural resource management to address sustainability and biodiversity issues, as well as to optimize yields or protect key parts of the life cycle of species that are utilized. However, spatial closures tended to succeed with respect to their specific design objective, but this benefit did not necessarily flow to other broad-scale objectives (Dichmont et al., 2012). Hence, there is often no single management tool which satisfies all objectives, and that a suite of management tools is needed. For successful co-management arrangements, two critically important and widely discussed type of spatial closure are community-based marine protected areas (MPA) and rotational harvesting as part of a cooperative scheme.

The term MPA often refers to a coastal or offshore marine region that has been defined for management and conservation measures, offering protection to parts of the ecosystem through formal

legislation or customary practices. Community based MPAs place local people at the forefront of the planning, implementation and running of marine reserves, providing a sense of ownership and reducing tensions generated by the loss of traditional fishing grounds. Essential to the success of any such program is a series of extensive educational workshops, open forums, and seminars. Other important factors in the overall success of community-based MPAs include (Christie and White, 2007; Pollnac et al., 2010): (i) relatively small local communities or population sizes; (ii) perceived crisis in terms of reduced fish stocks or CPUE; (iii) successful alternative income projects (e.g., tourism); (iv) a high level of community participation in decision making; (v) continued advice from the implementing organization and inputs from the local government.

Properly managed large MPAs, while sometimes more effective at protecting ecosystem functions, fish biomass and biodiversity, may not be feasible in developing world countries or as management tools for artisanal, localized fisheries (Christie et al., 2003). However, community-based MPAs, with their associated limitations, have been one of the few success stories within weak central governments and limitations in resources for design, implementation and enforcement of MPAs in many regions of the world. Moreover, Gutierrez et al (2011) and Cinner et al. (2012) identified this spatial management tools as an important attribute for successful co-management of fisheries.

Rotating harvesting strategies have considerable advantages over quota management schemes, particularly for spatially structured populations distributed as geographically isolated sub-populations. In these situations, there is an option to harvest different subareas separately. Thus, rotation harvesting should consider site-specific differences in biological characteristics (e.g., recruitment, growth and mortality), and attempt to ensure that each area has more or less the same carrying capacity. Economic factors (especially market demand and prices for preferred sizes) are critical to choosing rotation periods for rotating harvest schemes, especially where larger sizes command a higher price, or where there is the need to ensure that a reasonable proportion of larger fecund animals survive to spawning. Although these rotational schemes have been shown successful in many fisheries worldwide, their applicability can be restricted to (Caddy and Defeo, 2003): (i) the existence of at least *de facto* exclusive harvesting rights; (ii) control and enforcement mechanisms to avoid poaching in closed areas/seasons; (iii) presence of efficient management authorities to allocate fishing rights by area or season; (iv) existence of discrete number of population subunits; and (v) existence of alternative means of employment for local fishers and/or processors if a local resource area is closed for a number of years or months.

A closed season or a spatial rotational management scheme is not adequate on its own to manage the fishery, but imposes its particular control and surveillance requirements and impacts on access rights that will require strong adherence by fishers to the concept. Thus, this particular management tool is adequate and successful in co-management arrangements with strong community cohesion and cooperative harvesting.

- Spatial closures, or time-area closures are one of the tools most commonly used by managers for all type of fisheries and management schemes, including co-management.
- However, closed areas or season and spatial rotational management scheme are not necessary the best tools on their own to manage a fishery, but create a suitable framework for control and surveillance requirements and impacts on access rights, requiring strong adherence by local fishers.
- Time/area closures, and particularly marine protected areas are often successful in co-management arrangements with strong community involvement, group cohesion and cooperative harvesting strategies.

5.4. Control in co-management (MCS related issues)

Fisheries monitoring, control and surveillance (MCS) is the mechanism for effective implementation of agreed policies, plans or strategies for fisheries management. The absence of MCS operations renders a fisheries management scheme incomplete and ineffective. However, not all fisheries administrators understand the critical role of MCS as an implementing mechanism for fisheries management. The key indicator for MCS is the level of compliance, and this is affected by many factors (e.g. the number of fishers, the number of vessels, effort and area coverage of patrols, results of patrols, increase in voluntary compliance, etc.).

Mechanisms and tools for effective MCS depend on the social-ecological characteristic of the fishery and the economic and political settings of the system. However, some key tools for MCS for fisheries in general include (i) appropriate participatory management plans developed with stakeholder input; (ii) enforceable legislation and control mechanisms; (iii) data collection systems - dockside monitoring, observers, sea and port inspections; (iv) supporting communications systems; (v) appropriate logistics such as patrol vessels, aircraft available for rapid deployment to efficiently search large areas, and new technology (e.g., VMS, satellite, video, infra-red tracking, etc.); and (vi) support of the industry and fishers. This last component is critical for artisanal fisheries where resources for enforcement and monitoring are usually scarce and/or fishing operations and landings are sparse rendering MCS a very difficult task.

Another element of an effective enforcement, compliance and MCS is the application of consistent and transparent sanctions of sufficient severity. Post UNCLOS instruments provide wider criteria for the application of sanctions in fisheries. The first criteria relates to the application of sanctions in a consistent and transparent manner, which may be achieved through clear regulatory provisions and mechanisms. The second criterion is for sanctions to be of sufficient severity to ensure that penalties outweigh the benefits derived from conducting illegal fishing activities and hence prevent repeat offences. Sanctions may include administrative and criminal penalties depending on where the violation took place.

MCS mechanisms are often poorly implemented in artisanal fisheries and could not ensure that fisheries management measures are adequately enforced and complied. Regulatory agencies use to have very limited budgets and tend to respond late to the problems at hand, once they are more difficult or even impossible to resolve. This situation commonly occurs because many artisanal fisheries lack long-term strategic planning and accountability mechanisms. In addition, almost all MCS procedures directed to control the amount of catch and fishing effort exerted have been weakly implemented in the artisanal, small-scale fisheries, particularly in developing nations. Some of the reasons for weak enforcement include difficulties in control global quotas due to the high number of fishers involved, the easy access to high unit value resources along thousands of km of coasts, and the lack of control at landing sites because of extremely high enforcement costs where surveillance relies on government agencies, which generally have reduced budgets and staff. This is reflected in a lack of compliance in management regulations by the relevant stakeholders (Caddy and Defeo, 2003).

For artisanal fisheries, compliance with fisheries regulations depends greatly on enforcement by resource users (self-enforcement) and not only on fisheries enforcement by national authorities. In fact, the FAO Technical Guidelines No 4 on Fisheries Management provides that greater participation in the management process by fishers and interested group tends to lessen infringement of regulations. Involvement in the management process, through consultations and decision-making process typical of co-managed systems, allow fishers to assume greater responsibility in complying with MCS tools and reduces the responsibility borne by management authorities. This includes: (i) cooperation of fishers with management authorities in providing accurate fisheries data, (ii) willingness to be subjected to independent verification processes, and (ii) provision of additional, and sometimes confidential, information that may assist managers in adopting appropriate fisheries management measures.

In some co-managed artisanal fisheries, the strengthening of local institutions or organizations led to the implementation, by fishers themselves, of effective MCS procedures that: (i) attenuated governmental enforcement costs, (i) significantly increased the effectiveness of management strategies based on the 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 (Defeo and Castilla, 2005). In fact, Gutiérrez et al. (2011) concluded that both self-enforcement of rules and regulations and MCS mechanisms are important for a successful co-management of artisanal fisheries. Within these, the user's ability and effectiveness in enforcing management regulations (e.g., clear and effective system of penalties imposed by strong operational rules specified, enforced and controlled by local fishers) encouraged compliance on regulations resulting from management measures imposed in each co-managed site by the communities themselves.

- In artisanal fisheries, compliance with fisheries regulations depends greatly on enforcement by resource users (self-enforcement) and not only on fisheries enforcement by national authorities.
- Involvement in the management process, through consultations and decision-making process typical of co-managed systems, allow fishers to assume greater responsibility in complying with monitoring, control and surveillance (MCS) mechanism and reduces the responsibility borne by management authorities.
- In some co-managed artisanal fisheries, the strengthening of local institutions led to the implementation, by fishers themselves, of effective MCS procedures that attenuated governmental enforcement costs, increased the effectiveness of management strategies based on the control of catches and effort, contributing to the overall sustainability of the fishery
- Self-enforcement of rules and regulations and MCS mechanisms are hence critical for a successful co-management of artisanal fisheries.

6. A LEGAL FRAMEWORK FOR FISHERIES CO-MANAGEMENT: HOW DOES CO-MANAGEMENT FIT IN NATIONAL AND REGIONAL LEGAL FRAMEWORKS?

6.1. National and international legal frameworks in the Mediterranean

Several legal instruments adopted at the Mediterranean and Black Seas level confirm the trend towards regional co-operation among the States bordering these semi-enclosed seas. Regarding the protection of the marine environment, the main treaties are the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona, 1976; amended in 1995) with its seven protocols, the Convention on the Protection of the Black Sea against Pollution (Bucharest, 1992) with its three protocols, as well as the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (Monaco, 1996). In addition, the Agreement establishing the Mediterranean Science Commission (Madrid, 1919; today the International Commission for the Scientific Exploration of the Mediterranean Sea, CIESM) relates to cooperation in marine scientific research and in the field of fisheries, the two main Commissions include: (i) the General Fisheries Commission for the Mediterranean; and (ii) the International Commission for the Conservation of Atlantic Tunas.

The General Fisheries Commission (formerly Council) for the Mediterranean (GFCM) was established in 1949 as an institution under the auspices of the FAO to co-ordinate activities related to fishery management, regulation and research in the Mediterranean and Black Seas and connecting waters. The GFCM has the objective of promoting the development, conservation, rational management and best utilization of all marine living resources, as well as the sustainable development of aquaculture in the

area falling under its competence. Moreover, it is required to apply the precautionary approach, when formulating and recommending conservation and management measures, and to take into account the best scientific evidence available and the need to promote the development and proper utilization of marine living resources (Article 3). The Commission also exercises scientific and consultative functions, in order to keep the state of the resources and the state of the fisheries under review. Within the GFCM, a number of committees has been established, such as the Scientific Advisory Committee (SAC), advised by various sub-committees, the Committee on Aquaculture (CAC) and the Compliance Committee (COC). By a two-thirds majority the GFCM can adopt binding recommendations on conservation and rational management of the resources, as well as measures for their implementation in order to promote convergence and consistency within the fisheries legislation adopted by the parties.

Within several GFCM Members, there has been a lack of coordination between different institutions or agencies, which are entitled to exercise competencies in the field of fisheries and of related subjects, as the protection of the marine environment. For example, marine protected areas can be established by both the Ministry in charge of Fisheries and the Ministry in charge of the Environment. The general view is that overlaps and gaps should be avoided as much as possible, through a clear allocation of competencies and appropriate means of inter-agency coordination (GFCM, 2011). The question of competencies allocated to regional or local authorities should also be taken into consideration in this regard. In addition, in relation with small-scale, artisanal fisheries, the general view from member States is that traditional custom and institutions should be maintained and supported provided that they are consistent with responsible fisheries (GFCM, 2011).

At the National level, access to fisheries resources is generally controlled by States through an official document conferring on its holder the right to fish, as established under national legislation or fisheries access agreements. The name of this document, be it "licence", "authorization", "permit", "concession" or other, varies depending on national legislation. Regarding commercial fishing activities, access regimes apply to both individual fishers and fishing vessels. Supplementary authorizations may be required for certain specific fishing activities. Also recreational fishing activities occurring within territorial waters are often regulated, given their increasing importance in the region and their potential impact on commercial resources. Sometimes, fishing operations conducted solely for the purpose of scientific investigation are not subject to the fisheries regime, but fall under the legislation covering marine scientific research.

In terms of conservation and management measures at the National level, the Article 7.1.8 of the FAO Code of Conduct for Responsible Fisheries (CCRF) mentions that "States should take measures to prevent or eliminate excess fishing capacity and should ensure that levels of fishing effort are commensurate with the sustainable use of fishery resources as a means of ensuring the effectiveness of conservation and management measures". The conservation and management measures that have been frequently adopted in the Mediterranean and the Black Seas are related to the fishing capacity, the fishing effort, the protected areas (so-called area-based management tools) and species. Moreover, Article 7.7.3. of the CCRF establishes that "States, in conformity with their national laws, should implement effective fisheries monitoring, control, surveillance and law enforcement measures including, where appropriate, observer programs, inspection schemes and vessel monitoring systems".

- Several legal instruments adopted at the Mediterranean and Black Seas level, and particularly those within the domain of the General Fisheries Commission for the Mediterranean (GFCM) confirm the trend towards regional co-operation among the States bordering these semi-enclosed seas.
- In relation with small-scale, artisanal fisheries, the general view from the GFCM member States is that traditional custom and institutions should be maintained and supported provided that they are consistent with responsible fisheries

6.2. Particular legal needs for co-management

As mention in Section 3.2, the first pillar for successful co-management implementation relates to the existence of enabling legislation and policies. Moreover, for co-management to become a more mainstream scheme, governments in the region must establish appropriate legislation and policy frameworks, and more fully engage in the process. The establishment of appropriate government policies and enabling legal environments are essential in efforts to both sustain existing local level fisheries management systems and/or to develop new co-management systems.

In order to allow for a policy framework that is supportive of fisheries co-management, several attributes need to be present (McFadyen, 2004; Symes 2012): (i) decentralisation should be encouraged if not implemented within fisheries policy; (ii) the importance of undertaking legal/policy reviews of decentralisation of fisheries management/administration and co-management at the same time to ensure a cohesive and complimentary effect; (iii) an enabling policy environment supportive of co-management, more likely when a wide range of stakeholders are involved in the process to develop policy itself; (iv) fisheries policy content can be supportive of co-management through the inclusion of general statements of principle about the need for participatory, consultative and transparent management of the fisheries sector, and cross-sectoral integration; (v) fisheries policy documents can highlight co-management as a strategy to be used to accomplish fisheries management goals (e.g., "fisheries will be managed to ensure the long-term sustainability of resources, for example using a co-management approach"); (vi) policy content should directly or indirectly be supportive of co-management success factors, including access rights, institutional strength of local organizations and their leadership, recognition of existing local fisher community organizations, local political support, appropriate incentives for local users to engage with co-management, and the need for formal legislation to back up/codify community rules and resolve disputes (Gutierrez et al. 2011; Cinner et al. 2012); (vii) policy should contain support for research on how to move beyond pilot approaches to mainstreaming co-management, and on assessing the positive impacts of co-management; (viii) a policy framework supportive of co-management must be kept in place for the long-term so as to ensure gradual improvements and institutionalization of partnership arrangements, based on appropriate provision of financial resources and commitments to institutional strengthening; (ix) co-management initiatives might do well to engage more fully with larger-scale commercial/industrial interests so as to commit them with co-management partnerships; (x) co-management initiatives can be enhanced and supported through appropriate local level research and better linkages between researchers, policy makers and fishers at the local level; (xi) care must be taken to specify appropriate scales of co-management.

The legal basis for resource users' participation in resource management is also vital and must address fundamental concerns, which include (Pomeroy et al. 2001; Kuemlangan, 2004): 1) who has the right to use the resource; 2) who owns the resource; and 3) what is the legal framework for implementing co-management arrangements, as arrangements may be undermined in the absence of a legal basis. The role of the government in establishing conditions for co-management is therefore crucial. As in previous paragraph, some important considerations to bear in mind when developing legislative frameworks include (McFayden 2004): (i) non-fisheries specific legislation should be considered for its support to fisheries co-management, as well as for its relationship to specific fisheries legislation (either in place or being developed) that is supportive of co-management; (ii) a legal framework supportive of co-management, and supported by stakeholders, more likely when a wide range of stakeholders are involved in the process to develop legislation itself; (iii) co-management initiatives should ideally ensure that fisheries legislation is supportive of them; (iv) fisheries legislation should ideally contain dispute resolution mechanisms to deal with user conflicts, and to ensure that local rules/regulations do not conflict with national-level legislation and policy; (v) fisheries legislation should specify the extent to which local autonomy in developing management rules and legislation will be accepted; (vi) national fisheries legislation should provide for a broad and flexible legislative framework that enables a choice over co-management arrangements and rules, with detailed

mechanisms set out in regulations that can be changed if necessary; (vii) national fisheries legislation should contain specific reference to co-management, or provide indirect support to key success factors that need legislative support.

Although these attributes will contribute to legislations that are amenable or suitable for implementation of co-management schemes, the existence of specific legal frameworks are not a pre-requisite for the implementation of co-management *per se*. For instance, Gutiérrez et al. (2011) found that legislation on co-management practices at the national level was not a critical attribute for co-management success. On the contrary, political will is the key to the establishment of co-management mechanisms. It is a necessary pre-requisite without which co-management initiatives are unlikely to succeed. It must be reflected in attitudes and demeanours, as well as supported within policy, legislation and actions specific to the fisheries sector (Chuenpagdee and Jentoft, 2007). The nature of policy and legislative frameworks as well as the commitment by governments to co-management is sometimes more rhetoric than reality, with insufficient transfer of powers and financial resources to local levels.

- An existing enabling legal environment is essential in efforts to both sustain existing local level fisheries management systems and/or to develop new co-management systems.
- Although there are many attributes contributing to policies and legislations that are amenable or suitable for implementation of co-management schemes, the existence of specific legal frameworks are not a pre-requisite for the implementation of co-management *per se*.
- On the contrary, political will is the key to the establishment of co-management mechanisms. It is a necessary pre-requisite without which co-management initiatives are unlikely to succeed. It must be reflected in attitudes and demeanours, as well as support within policy, legislation and actions specific to the fisheries sector.

7. IDENTIFICATION OF CAPACITY-BUILDING NEEDS FOR FISHERIES CO-MANAGEMENT

The term "capacities" encompasses the attitudes, knowledge, skills, resources and social recognition that allow a stakeholder to take part in the co-management process. A variety of main actors, including governmental agencies, benefit from or even require support to build their capacity towards more participatory forms of fisheries management. This may entail changes in their structure, organisational objectives, attitudes, skills and work programmes. The agency staff needs orientation towards understanding people's needs and rights, appreciating their knowledge and practices, and grasping the social complexities of community rules. In additional, technical assistance in establishing the enabling regulatory framework for local empowerment, capacity building, and training for fisheries management needs to be present. Finally, simplification of stock assessment methodologies and simple ways of communicating its results would benefit the system by enabling fishers to attain greater capacity building and ownership of the process. However, to be meaningful, a reduction in the complexity of stock assessments must be accompanied by an increase in the degree of knowledge transfer between stock assessment scientists and managers and fishers (Freire and Garcia-Allut, 1999; Walmsley et al., 2005).

Capacity building is critical to empower fishing communities to actively participate in fisheries co-management. In general local user's motivation, an attitude that cannot be provided from outside, rather than external support, is an essential condition for successful co-management. The first "capacity" that should be supported to develop is the capacity to think collectively and develop an internal consensus on what is needed to be done or which local capacities are needed. Then, given that

users have identified their own capacity needs, they have then a strong motivation to acquire the relevant knowledge and skills.

The capacity of individuals within the users' organization to participate effectively in fisheries co-management must be enhanced through capacity building targeted to: (i) understanding co-management theory and practice; (ii) understanding how to organize and participate effectively; (iii) communicating information about fishery management and business administration to stakeholders; (iv) understanding how to participate in the negotiation process; (v) determining mission and strategy of the co-management plans; (vi) developing the organizational culture and structure (management methods, organization structure, and competence); (vii) developing the organizational interaction process (communication, planning, building consensus, research/development of policies, etc.); (viii) developing techniques in conflict management; (ix) understanding the source of information, understanding infrastructure and finances; and (x) understanding the importance of data collection, analysis, stock assessment and monitoring of their own resources.

Besides capacity building directed to managers and users, awareness and capacity building amongst senior decision-makers may be also a critical investments needed to ensure on-the-ground environmental and social sustainability at the community level (Wiber et al., 2004). It is important to consider that the capacity building process is inevitably time-consuming and effective results may take years to unfold.

In summary, "capacity-building" initiatives in co-management processes can support main actors to: (i) understand what co-management entails and how a stakeholders can organise themselves to participate proactively; (ii) master knowledge and information about the fishery resources at stake, including knowledge of existing environmental problems, needs, constraints and opportunities (comprising the costs and benefits of various management options), and assess relevant changes; (iii) foster participatory and communication skills, attitudes and behaviours needed to learn from users as well as methods for participatory learning and action among technical and scientific personnel; (iv) become a recognised and legitimate actor, which in most cases will imply taking on a legal identity; and (v) deal effectively with agenda of meetings, records, accountings, financial reports, proposals, etc.

- Capacity building is critical to empower fishing communities to actively participate in fisheries co-management.
- In general local user's motivation, an attitude that cannot be provided from outside, is an essential condition for successful co-management.
- The first "capacity" that should be supported is the capacity to think collectively and develop an internal consensus on what is needed to be done or which local capacities are needed.

CONCLUSIONS AND SALIENT ISSUES

Fisheries have taken place in the Mediterranean Sea for millennia. Such a protracted fishing tradition resulted in the emergence of self-management schemes that developed in the Middle Ages with formal structures - fishing guilds- some of which are still in place (Cofradias, Prud'Hommies). Self-management of fishing activities is a global phenomenon and occurs there where there is a long fishing tradition by well-structured coastal communities. Modernization of fisheries and a strong centralization of management in recent times weakened self-management and increasingly alienated fishermen, often resulting in mismanagement and overfishing.

Co-management may be considered a natural adaptation and evolution of former self-management schemes. Joint management by fishers, administrations, scientists and other stakeholders through "Co-management Committees" or equivalent arrangements often results in effective rules adapted to local realities, real time adaptive management and high compliance due to strong sense of ownership of the management process by stakeholders. Additionally, co-management has the potential for strongly reducing the cost of control and monitoring, which could be largely assumed by fishers themselves. In summary, co-management has the potential to represent an excellent delivery mechanism for sustainable fisheries in the Mediterranean.

Based on the present document, we recommend a progressive implantation of fisheries co-management in the Mediterranean region built on the following elements:

1. Establishment of an active network of fisheries co-management pilot cases in the Mediterranean. Such a network should include at least one case per country, whenever possible. A particular effort should be made to ensure a good coverage in the South and the East of the region.

2. GFCM, working with its Member countries and other partners, would facilitate a smooth functioning of the co-management network, including the compilation of good practices, the internal flow of information among members and the wide external dissemination of main achievements in view of encouraging and supporting replication to other fisheries in the region.

3. Evaluation of capacity building needs for fisheries co-management based on first lessons learned from pilot case experiences and other sources. A capacity building programme supporting co-management in the Mediterranean region should then be established and adequately funded.

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