

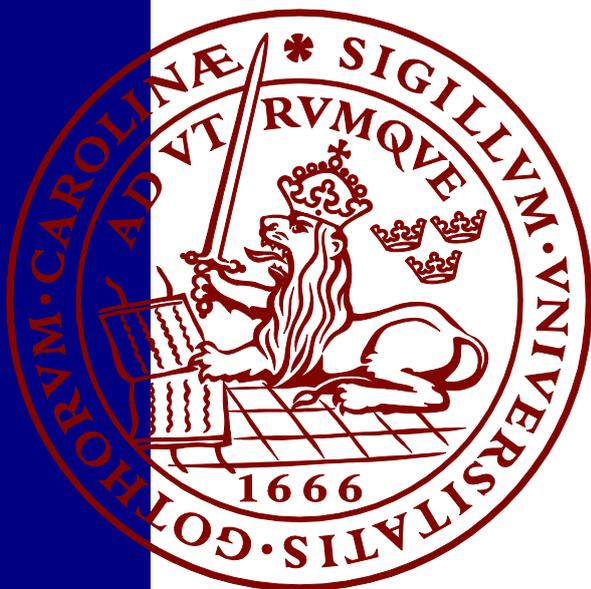
Save the bay

A case study of fisheries co-management in Gökova Bay,
Turkey

Utku Kuran

Master Thesis Series in Environmental Studies and Sustainability Science,
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A thesis submitted in partial fulfillment of the requirements of Lund University
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Supervisor: Torsten Krause, LUCSUS, Lund University

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Abstract:

Overfishing is one of the most serious problems threatening the health of the seas and local coastal communities. Marine Protected Areas with No Fishing Zones are valuable biodiversity conservation tools to ensure the sustainable use of diminishing fish stocks. Nevertheless, to be successful for long-term conservation these areas have to be monitored and rules must be enforced. Using semi-structured interviews and participant observation I analyze collective action efforts for marine conservation in Turkey, Gökova Bay. Guided by Elinor Ostrom's social-ecological systems framework and design principles I analyze the challenges and advantages of co-management in a social setting, and its role to scale-up marine conservation. Interviews showed that traditional forms of management are not applicable in Gökova Bay and the co-management governance approach offers collaboration between small-scale fishermen, government agencies, and NGOs. However there is an urgent need for top-down steering and assistance especially regarding sanctioning and rule enforcement by the state.

Key words: small-scale fisheries, common-pool resources, socio-ecological systems, co-management, design principles, the Gökova Bay

Word count: 11,668

Note to the reader: Before I started this research I did not realize how challenging the job of a small-scale fisherman is. Spending time out on the sea with fishermen I learned first-hand of their frustrations, how they are valued in the current system, and how their job is deeply intertwined with economics, and politics. By completing this thesis I tried to reveal the complexities of natural and social conditions that fishermen face in Gökova Bay.



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Abbreviations

CPR	Common pool resource(s)
DP	Design Principle(s)
NGO	Non-governmental organization
MCS	Mediterranean Conservation Society
MoEU	Ministry of Environment and Urbanization
MoAF	Ministry of Agriculture and Forestry
PDoFA	Provincial Directorate of Fisheries and Aquaculture
GB	Gökova Bay
SSF	Small Scale Fisheries
SES	Social Ecological System(s)
SESF	Social Ecological Systems Framework
NFZ	No Fishing Zone(s)
MPA	Marine Protected Area

1. Introduction

Human activities, in particular overfishing and illegal fishing, pose an unprecedented threat to marine life, degrading and destroying marine ecosystems worldwide (FAO, 2018). In the Mediterranean Basin social and natural systems have been co-evolving for millennia. However in terms of marine life and habitat loss especially in the last half century the situation has been particularly severe. Globally, the Mediterranean Sea is the most overfished sea (FAO, 2018) with approximately 80% of fish populations being overfished (Gomei et al., 2019). A reduction in fish stocks affects the ecological balance of the ecosystem and coastal communities depending on fish for food. In the last 50 years, Mediterranean marine mammal populations shrank by 41% (Gomei et al., 2019) and in the Eastern Mediterranean, one of the apex predators of the ecosystem, monk seals (*Monachus monachus*) are currently “critically endangered” (Karamanlidis & Dendrinou, 2015). The marine ecosystem degradation directly affects fishing communities, moreover, illegal fishing, over-extraction, and destruction of fragile habitats further lowers incomes and prosperity of small-scale fisheries (SSF) (FAO, 2018). In the Mediterranean, the fisheries sector is mostly comprised of SSF. 83% of fishing fleets are SSF and 59% of on board fishing vessel’s employment consists of small-scale fishermen (FAO, 2018). Hence SSF are an important part of the social and cultural history of the Mediterranean playing a crucial role for fish-related economic activities and food security for local communities (FAO, 2018).

1.1 Problem Definition

Small-scale fisheries are situated within complex social-ecological systems and play valuable roles in the cooperative management (co-management hereby after) process for marine conservation (Basurto et al., 2013). SSF are interlinked with marine conservation with multiple scales. Improving SSFs long-term cooperation in conservation demands equal power sharing between them and state actors (Carlsson & Berkes, 2005; Pomeroy & Berkes, 1997). To achieve sustainable collaborative governance however, it is necessary that fishermen have formal rights to organize themselves and share knowledge with different actors (Armitage et al. 2008). However, in most places around the world SSF struggle to organize themselves effectively without the support or assistance of the state and NGOs (Wallner-Hahn et al., 2016). Due to limited resources of fisheries it is necessary that state and NGOs work collaboratively to improve management mechanisms and increase their efficacy. As a response to these complex problems there has been a growing consensus that the co-management mechanism provides effective resolution tools for SSF (Berkes et al., 2001). Co-management not only states the importance of the collaboration between state,

NGO and fishermen but also indicates the significance of SSF's participation in the decision-making process for marine conservation.

Co-management has been implemented for the first time in Turkey, Gökova Bay (Ünal et al., 2019). However, implementation processes of this governance approach are currently weak due to Turkish centralistic fisheries perspectives and lack of support from local government authorities. Traditional fisheries management approaches don't function effectively for natural resource governance in the bay therefore there is a common feeling among fishermen that they have been abandoned by the local authorities. This feeling decreases their participation in collective action efforts and further aggravates social-ecological problems in Gökova SES. To understand challenges during the co-management process I analyze the social and ecological conditions of Gökova Bay (GB). I use CPR theory guided by eight design principles to gain a deeper understanding of common-pool resource (CPR) management challenges for the conservation of Gökova Marine Protected Area (MPA) and No-fishing zones (NFZ).

1.2 Research Questions and aim of the case study

In this thesis I analyze the role of different actors in the co-management implementation process and the conservation interventions for sustainable SSF management in Gökova Bay on the southeastern coast of Turkey. In particular, I focus on the extent to which the current co-management governance approach allows fishermen to continue their activities while supporting the recovery and use of fish resources in GB. By analyzing the participation of fisheries in the decision making process at the local level my objective is to assess the success of co-management implementation based on Ostrom's eight design principles situated in the realm of commons theory.

To this end I asked the following research questions:

RQ 1-What are the benefits and, challenges that fishermen perceive by being involved in the co-management of fisheries in Gökova Bay?

RQ 2- How do the centralized fisheries management procedures in Turkey affect the involvement of local actors in the co-management decision-making process?

RQ 3- How can the current co-management in Gökova Bay be improved to strengthen fishermen's involvement to achieve long-term sustainable fisheries?

1.3 Linkages with Sustainability Science

Overexploitation of fish stocks beyond sustainable harvest rates and ever more fragile habitats presents complex environmental and ultimately societal challenges (Gordon et al., 2018). To find solutions for these complex social and ecological system problems innovative approaches are necessary (Jerneck et al., 2010). Drawing on the social-ecological systems framework (SESF) and the eight design principles for managing common resources, I am linking this research with sustainability science by analyzing co-management as a potential response to cross-scale complex problems (Cash et al., 2006). By combining natural and social system dynamics I show the crucial importance of locally focused, trusted and stable institutions (Kates et al., 2001). Therefore, by studying the complex dynamics that emerge from interactions between human and environmental systems I am contributing to sustainability science with a local case study of fisheries co-management.

2 Background

2.1 Study area: Gökova Bay

Located in the South-Eastern Mediterranean, Gökova Bay is one of the largest bays in Turkey. With its rich fisheries culture and marine ecosystem, it is one of the most biodiverse marine spots in Turkish coastal waters (Kızılkaya et al., 2013). The bay is located in the Mediterranean Basin, a global biodiversity hotspot and among the WWF Global 200 ecoregions (Olson & Dinerstein, 2002). GB is home to endangered marine species and habitats such as Mediterranean monk seals, sandbar sharks and seagrass meadows (Okuş et al., 2006; Bilecenoglu, 2008). Further, 73% of fish species in Turkish waters can be found in Gökova (Kızılkaya et al., 2015). Although GB contains rich biological diversity, overexploitation of marine commons has been a major stressor for Gökova SES. In 2012, in the Eastern Mediterranean, Gökova Bay was recorded as having among the lowest fish biomass, less than 4 g/m² (Sala et al., 2012; Ünal & Kızılkaya, 2019).

As a Mediterranean coastal ecosystem, besides direct human impacts, GB is also heavily threatened by climate change. In the last two centuries average water temperature in the Mediterranean Sea increased by 1.4°C (Cramer et al., 2018) and measured as 19.7° (Shaltout & Omstedt, 2014). This situation led to invasive species such as silver-cheeked toadfish migrating to Gökova reshaping the functioning of the marine ecosystem (Ünal et al., 2015). Invasive species suppress local fish populations, damage fishing gear, and indirectly cause a decline of incomes among fishermen (Ünal & Kızılkaya, 2019). Between 2013 and 2016, more than 25% of fish catch by SSF constituted invasive species (Ünal & Kızılkaya, 2019). Therefore to tackle human and climate driven impacts, developing a well-fitted management mechanism for the relevant biodiversity conservation areas is a highly important part of conservation in Gökova SES.



Figure 1. A view of Gökova Bay from a No-Fishing zone. Provided by the author. April 2021.

2.2 Gökova MPA & No-Fishing Zones

Gökova MPA was first declared after the declaration of Special Environmental Protected Area (SEPA) in 1988 (Ünal et al., 2019). Although on the terrestrial side the government implemented several strict restrictions for land conservation, on the marine side such regulations or conservation plans have not been implemented (Ünal et al., 2019). This has led to an increase in unregulated fishing and a lack of management plans for marine conservation. SEPA was declared by the Ministry of Environment and Urbanization (MoEU) and marine areas are named as Gökova MPA in the relevant literature (Gabrié et al., 2012; Kızılkaya & Ünal, 2019; Ünal et al., 2021). Therefore in this study I have also named marine areas covered by SEPA as Gökova MPA.

Beginning in the 2000s due to unregulated fishing, degradation of the marine ecosystem and depleted local fish stocks in Gökova led to an increase in poverty among fishermen. In 2010 it became clear that central governance for fisheries hadn't been successful in overcoming resource exhaustion and there was an urgent need for a participatory management plan. To find sustainable resolutions for the ecological and social crisis, several discussions and meetings were initiated by NGOs, universities, and international

development agencies with representatives of state agencies. The main aim of the meetings and discussions was to identify the problems and conflicts affecting the sustainability of CPR management in Gökova. As a result of various international projects, local, national and international actors together agreed to establish six NFZs within the Gökova MPA. The UNDP funded SMAP- 3 project was finalized in 2009 and the Underwater Research Society's SAD-AFAG & SAD-EKOG Projects were finalized in 2010. The termination of these projects together resulted in the establishment of six NFZs with restrictions on large-scale fishing in Gökova MPA. Borders were decided jointly by NGOs, local fishermen, state authorities, and scientists (Kızılkaya et al., 2015). One more NFZ was added in 2021 and currently 7 NFZs prohibit any type of commercial fishing. Networks between the seven NFZs are an important tool for biodiversity conservation and fish stock replenishment.

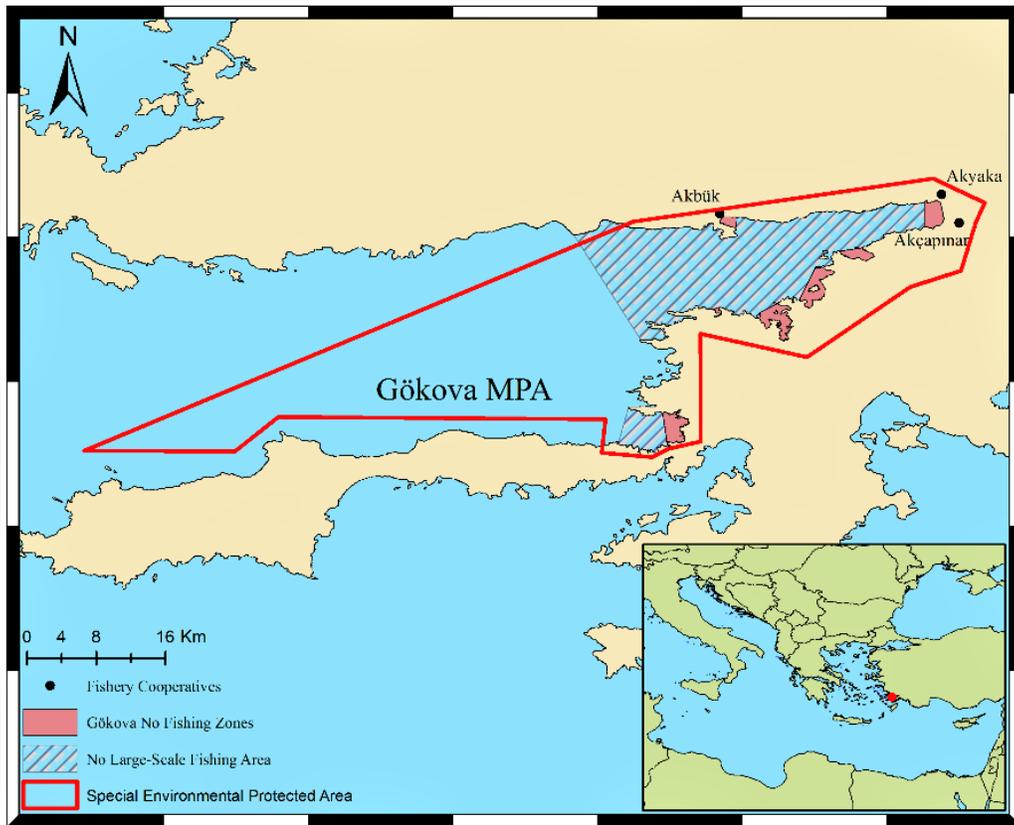


Figure 2. Gökova Bay MPA map. Data taken from MCS. *Provided by the author, March 2021*

2.3 Small-scale fisheries and fishery cooperatives in Gökova Bay

The economy of the region mostly depends on seasonal tourism, agriculture, and fishing. Currently the fishing sector, dominated by SSF, is the primary income activity for most families. Fishing in the bay historically started with Greek fishermen but there is no certain date when fishing started. However, current commercial fishing started in the 1940's (Personal communication) and is currently practiced as a profession by both women and men. SSF developed well in the region due to favorable geographical conditions, yield potential and rich coastlines (Ünal, 2010). However, in recent years due to several pressures on the marine ecosystem and a decline in fish stocks, particularly in Akyaka, tourism activities have become more attractive for the younger generation.

Currently nearly 200 SSF are actively working in the bay (Ünal et al., 2021). All fishermen have inner motored, 6mt to 12mt long wooden boats. Most of them use traditional fishing gear such as gillnets and longlines. In Akyaka fishery cooperative all the members are licensed and 59.3% of fishermen depend on fishing as a major source of income (Ünal et al., 2021). Members in the cooperative work all year-round as professional fishermen and some of them also have seasonal side jobs. During the summer season, as Akyaka becomes a popular tourist destination, fishermen also work in the tourism sector for additional income. There are three fishery cooperatives in the bay. The oldest being Akçapınar (1973), followed by Akyaka (1992) and, Akbük (1999) (Ünal & Franquesa, 2010). The three cooperatives have 50 members in total, and in all except for Akbük cooperative, members are obliged to give all catch to the cooperatives for commercial purposes. Akyaka cooperative has 25 members with an average age of 55 and average experience of more than 40 years. Akyaka cooperative is the most organized, actively working and profitable cooperative in the bay (Personal communication). Common pandora (*Pagellus erythrinus*) is currently one of the most targeted fish among SSF. In 2019, the cooperative made \$112,098 in catches from Common pandora which generated a quarter of Akyaka cooperative's annual income. However, in 2020 due to the COVID-19 pandemic all cooperatives' catches declined sharply compared to previous years (Ünal et al., 2021).



Figure 5. A small-scale fisherman. Provided by the author, March 2021



Figure 3. Common Pandora (*Pagellus erythrinus*). Provided by the author, April 2021



Figure 4. A small-scale fisherman boat. Provided by the author, March 2021

2.4 Mediterranean Conservation Society

The Mediterranean Conservation Society (MCS - Akdeniz Koruma Derneği in Turkish) was officially founded in 2012. The MCS works on biodiversity rehabilitation and fisheries management in the bay. After the MCS was founded, the marine conservation and fisheries management plan in GB was solidified with a more formalized body. To avoid open access fishing and reduce illegal activities in protected areas, the MCS became a change agent for marine conservation. Although in 2010 the protected area was formally established, illegal fishing persisted as a main problem. After then, as a locally grounded organization, the MCS engaged with both SSF and state agencies to develop ideas for conservation and poverty reduction of fishermen. Along with national and local level authorities the MCS brought all relevant stakeholders to the table which led to a co-management governance mechanism evolving in Gökova Bay.

In addition to these capacity building activities, the MCS currently works on ecosystem restoration and monitoring of endangered species, such as Mediterranean monk seals and sandbar sharks, in NFZs. Working with local populations, the MCS also cleans up ghost nets, nets that have been left or lost by fisherman, in coastal waters. By implementing different projects in Gökova, the MCS aims to raise local awareness of biodiversity conservation, negative impacts of invasive species and most importantly illegal fishing and overfishing activities in the bay.

2.4.1 Marine Ranger System

To avoid illegal fishing and overfishing activities in Gökova another important project that the MCS developed is the marine ranger system. To mitigate illegal fishing in NFZs monitoring and rule enforcement are key parts for long term conservation. Therefore in 2013 due to a lack of monitoring activities by state actors, the MCS developed the marine ranger system with daily patrols (Kızılkaya et al., 2015). At the core of this ranger system, the MCS chose fishermen as rangers to participate in marine resource management, monitoring, and reporting because this model aims to engage SSF directly with the conservation practices. The main aims are to engage fishermen with a sense of ownership of the protected areas and bridge local traditional knowledge with scientific knowledge. This system is among the first bottom-up initiatives for co-management implementation in Turkey. Currently under the MCS there are 4 rangers working in two different locations in the bay, and there are twice-daily patrols in protected areas.



Figure 6. MCS Marine ranger boat. Provided by the author. April, 2021

3. Theoretical background and analytical framework

The co-management literature is extensive and encompasses common-pool resource (CPR) theory. To ensure the sustainability of natural resources CPR theory clarifies that effective management of natural resources should be embedded in 'polycentric' systems in which local, national and international actors have certain roles (Ostrom et al., 2012). Co-management was perceived as a solution for the natural resource crisis in the 1980s (Jentoft et al., 1998). For this purpose, co-management provides a necessary toolbox for conservationists, policy makers and resource users in complex marine socio-ecological systems. Elinor Ostrom's eight design principles underline the specific rules to produce sustainable outcomes for CPR management. Therefore as a baseline for this study I apply the principles with the social-ecological systems framework to examine to what extent current co-management meets the rules in Gökova Bay.

3.1 Common-pool resource theory

CPR theory delivers crucial insights for the governance of marine commons to halt the depletion of fish stocks. Fisheries mainly suffer from insufficient incentives by the state which results in more free-riding behavior (Ostrom & Basurto, 2009). Free riding mostly occurs when fish resources are not protected formally. An unowned state of resources results in a lack of conservation measurements leaving fish open to exploitation by outsiders. As Garret Hardin stated in 1968, exploiting commons without formal regulations increases free-riding behavior and leads to a "tragedy of commons". Therefore formalizing exclusion devices prevents others from benefiting from resource misuse. According to Hardin, excluding others can be delivered by either private or state ownership of resources. However, as Ostrom (1990) argued, private or state ownership doesn't mean that fishes will not be over-exploited. As it is demonstrated in several fishery cases across the world, state ownership often results in the implementation of centralistic traditional management mechanisms which don't devolve authority to resource users or consider local conditions for rule making (Berkes, 2004).

CPR theory focuses on building trust among actors by sharing power and considering local conditions for marine conservation. There are examples where fishery communities succeeded in managing resources and developing exclusion methods to prevent the "tragedy of commons" without state or private actors (Ostrom, 1990; Ostrom & Basurto, 2009). The CPR literature states that encouraging resource users to solve their own CPR dilemmas and aid them in participating directly in local law-making are effective solutions for overcoming unsustainable resource use (Schlager, 2004; Ostrom, 1990). Empowering resource users to apply their own rules has the potential to build trust, increase social capital and share similar mindsets for the conservation of resource units (Agrawal, 2003; Ostrom, 2008).

As main resource users, Gökova fisheries often have more knowledge on ecologic conditions than state agencies. Therefore, central governments or policy makers should be conscious of this when providing or implementing solutions in Gökova.

Nonetheless, self-governed CPR management requires the resolution of complex SES problems by empowerment, commitment, and monitoring. Monitoring and rule enforcement discourages rule breaking and ensures each resource user follows the necessary rules (Schlager, 2004). This is a particularly critical problem that is challenging for the CPR management in Gökova, because monitoring can't be practiced effectively and is a barrier to social learning and institutional evolution (Schlager, 2004). Moreover, a lack of monitoring and rule enforcement decreases the commitments for conservation of protected areas, resulting in increased illegal fishing in the NFZs. This situation may also lead to a decrease in the credibility of commitments among fishermen that obey the rules in fishery cooperatives (Ostrom, 1990). To manage CPR effectively, fisheries in Gökova should share six characteristics. Valuing the CPRs together is the first step for collective action. Secondly, the transfer of social capital among themselves. Thirdly, building trust and forth, having a certain understanding and level of common belief in rule changes. Fifth, building autonomy towards CPRs, and lastly, investing in local leadership skills in cooperatives (Schlager, 2004).

3.1.1 Co-management governance approach

Co-management, "joint management of the commons" creates collective practices to find solutions and structures in a more formalized body (Carlsson & Berkes, 2005). Co-management delivers promising outcomes for the sustainability of worldwide fisheries (Gutiérrez et al., 2011). To eliminate top-down approaches and improve collective action among local communities by equal power sharing with the state, co-management aims to increase local governance of CPR management with relevant local and national institutions (Pomeroy, 2001). Co-management governance in fisheries is applied around the world to deliver collaborative solutions to CPR dilemmas (Carrillo et al., 2019). Several cases showed that rather than seeing power sharing as a starting point of the process as Carlson & Berkes (2005) indicates, it is the result of continued problem-solving processes for co-management. Therefore providing a supportive environment and assistance for fishery cooperatives to create their own rules and devise mechanisms to enforcement is a necessary step for co-management implementation in the long-term CPR management (Basurto et al., 2013).

The co-management governance approach in Gökova should create incentives by formalizing local conservation rules, so that state and fisheries can prevent free-riding behaviors collaboratively and show that local fisheries' conservation efforts are worthwhile. In particular, this enhances common belief for rule change and builds trust between the state and resource users. The increased trust enhances the enforcement of regulations and internalization of rules by resource users (Pomeroy & Rivera-Guieb, 2005.). However formalization of local rules requires legitimization which is one of the most challenging points to achieve in the co-management process (Cinner et al., 2012). This process requires radical change in policy structures for deliberative democracy practices. Governments should be aware of "reason", "publicity", "equality" and "non-tyranny" which are the preconditions of deliberative democracy in co-management procedures (Zachrisson, 2009). As Evans (2012) clarifies, to manage CPRs collectively and tackle the complex social-ecological problems, connecting policy with ecological problems is one of the most challenging parts of effective environmental governance. To cope with this challenge, ecology should be a permanent part of government policy and practiced by policy makers, not only by scientists and public managers.

In Gökova co-management can be categorized as consultative which creates better incentives at the local level. By bridging scientific knowledge with traditional knowledge it promotes information sharing among key actors. However, the main purpose of current co-management implementation in Gökova is to shift to a cooperative co-management model because this involves stronger interaction among stakeholders and enhances sustainable CPR management in the long-term (McConney et al., 2004).

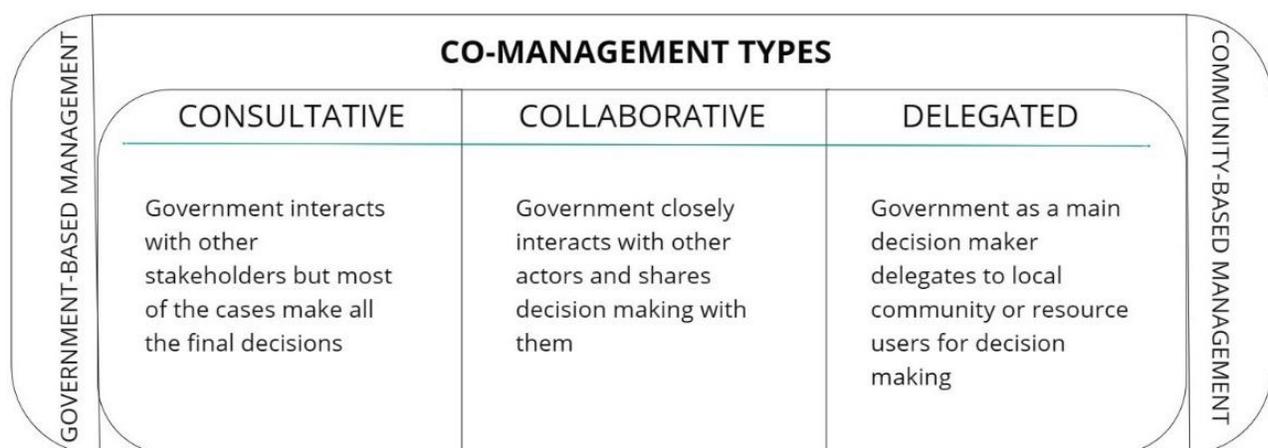


Figure 7. Description of co-management types. Derived from McConney et al., 2004. Provided by the author.

3.2 Analytical Framework

3.2.1 Design Principles

Ostrom (1990) clarifies that design principles are elements to reach desirable environmental conditions which measure the success of institutions in sustaining CPRs (Ostrom, 1990). The more the various design principles are met, the more likely that the commons will be managed sustainably (Saunders, 2014). Characteristics of the resource, nature of the group, institutional regime, and the nature of the relationship among actors affect DPs' success (Agrawal, 2003). DPs were developed for making a SES robust by assuring that fishermen will follow the rules and become effective monitors of CPRs (Ostrom, 1990). One of the most important DPs in Gökova is "monitoring rule enforcement conditions", "graduated sanctions" and "recognition of the right to organize" which facilitates fishermen to engage in co-management practices directly (Cox et al., 2010). However due to a lack of state monitoring and rule enforcement in Gökova, robustness of SES is weak and is decelerating the effectiveness of NFZs. For DPs to be met, the majority of fishermen in local fishery cooperatives should know that there will be positive long-term outcomes for themselves as a result of meeting each principle (Schlager, 2004). Further, as Cox et al. (2010) emphasizes, each fishermen should adopt the principles willingly otherwise they won't be able to provide sustainable solutions in the long term.

The eight design principles are as follows;

Table 1. Description of eight design principles. Derived from Ostrom, 1990; Cox et al., 2010. Provided by the author.

Guiding Principles		Descriptions	
1.	Clearly defined boundaries	1.	Resource users must define who benefits from the resources in a specific area.
2.	Congruence between benefits and costs	2.	Regulations and rules must be relevant to local resource conditions. Resource users should know that rules are equitable and everyone pays the same costs.
3.	Collective choice arrangements	3.	Users have to be participants in rule modification.
4A.	Monitoring of resource units	4A	Monitoring the condition of resources evidences whether resource units are thriving/degrading.
4B.	Monitoring rule enforcement conditions	4B.	Monitoring for authorized users and watching fishing activities.
5.	Graduated sanctions	5.	The severity of sanctions should be equal to the violation of rules.
6.	Conflict resolution mechanisms	6.	Resource users should be able to create methods that resolve conflict among themselves with low-cost methods.
7.	Recognition of the right to organize	7.	Organization of local rules should not be challenged by external state agencies and rights should be formalized by the state for resource users to create their own rules.
8.	Nested enterprises	8.	Multiple actors from local to central level should be active with all aspects for governance of the SES.

3.2.2 Social-Ecological System Framework

Fisheries are complex and dynamic SESs thus posing several challenges to sustainability scientists. Ostrom's SES framework was proposed to evaluate these challenges within a systematic manner and with the scope of natural resource governance under a common language (Epstein et al. 2013). The SES framework is composed of four core subsystems –Actors (A), Governance System (GS), Resource Unit (RU), and Resource System (RS) – which I explain in detail within the results part. These four core subsystems are integrated with each other under one large SES to provide a diagnostic approach for complexities (McGinnis & Ostrom, 2014).

I use the SESF as a tool to identify Gökova fisheries' complexities. Various scholars have used the SES framework to analyze the complexities of fisheries in different places around the world (Basurto & Coleman, 2010). For the marine SES in particular, CPR management is more complex because resource units (e.g. Fish) are highly mobile. High mobility of resource units imposes challenges such as sense of ownership over resources, establishing rules, taking responsibility to protect the fishing grounds and accountability for excessive resource use. These challenges in turn result in overfishing and/or illegal fishing tendencies (Ostrom, 2007). Particularly excessive use of resources might affect the resource appropriation for the long-term which challenges sustainable management of fish stocks (Schlager et al., 1994; Ostrom, 2007).

Gökova Bay marine area spans 1851 km² with a MPA of 827 km², and NFZs of 28 km² (Ünal et al., 2015; Kiraç et al., 2010). The Resource System (RS) is the small-scale fishery sector. The Governance System (GS) of these marine areas involves characteristics related to the national and provincial state agencies. The MPA is currently state property, seven NFZs constitute the main marine reserve areas in the bay and are restricted for any commercial fishing activities. These combined improve marine biodiversity and can rebuild local fish stocks. Resource units (RU) mainly consist of fish and fishermen mostly target species such as Common pandora, Dentex and White grouper which have a high market value. In Gökova SES I divided resource users into two categories under actors (A), key resource users and other resource users. Key resource users are the ones who directly depend on the resource units and fish as a profession in Gökova, and other resource users are amateurs and tourists who mostly fish for recreational purposes in the bay. Other actors that are involved in the SSF sector are the local NGO (MCS), fishery cooperative members (SSF), researchers and state agencies. Central and local government are the main decision-makers for rules and regulations. Spatial area closures, gear types and species bans are subject to central fishery laws which determine the behavior and personal mindsets of fishermen.

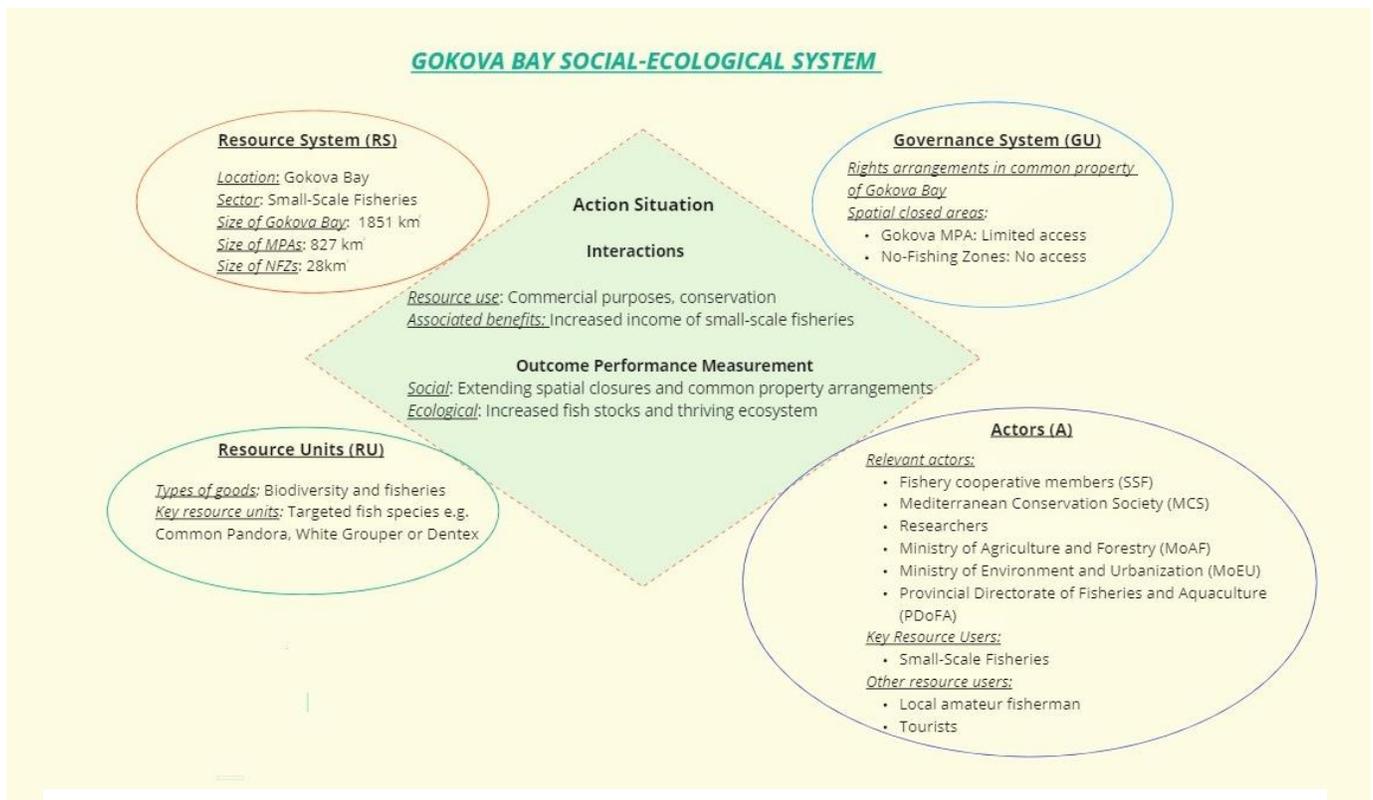


Figure 8. A visual of Gokova SES framework four core subsystems. Derived from Ban et al., 2015. Provided by the author.

4. Methodology

4.1 Case Study

In my thesis I employ a single exploratory case study research design method which is one of the most widely applied methods for qualitative research (Yin, 2018). Since I study co-management in fisheries, I use case study research design to emphasize certain challenges and benefits of the co-management governance approach on the ground. I chose specifically to study Akyaka fishery cooperative in Gökova Bay because it is considered the most organized cooperative in the area and thus presents a good exemplary case for my research. By providing a deeper understanding and consideration of the complex nature of fisheries in Gökova Bay, this research design facilitated my perception of the compound problems faced by fishermen in Akyaka fishery cooperative (Bryman, 2016). Additionally, to analyze challenges and management gaps during the co-management implementation process, case study research design helped me to understand and analyze challenges that are external to the SES.

4.2 Data collection

I mainly collected qualitative data using semi-structured interviews with small-scale fishermen to assess the benefits and challenges they face and to better understand the co-management process from their perspective. To address the eight design principles, I conducted related literature reviews on co-management of small-scale fisheries and collected relevant information from formal, legislative documents from Akyaka fishery cooperative and the Mediterranean Conservation Organization. Additionally, to get detailed information about the process, I also had phone calls with scholars who are involved in the co-management process in Gökova Bay.

Further, in order to gather relevant empirical evidence from the local fishermen's perspective I tried to be present in the field as much as I could during the two months residing in Akyaka. The analysis was supported with relevant peer-reviewed literature, documents, reports, semi-structured interviews, and participant observation (Hancock & Algozzine, 2006). I collected field data by taking notes, photographs, and voice recordings during field visits to Akyaka fishery cooperative. I was in the field during March-April 2021 and conducted semi-structured interviews with nine fishermen, which constitutes my primary data. I gathered secondary data through phone calls with scholars, participant observation, literature reviews, unofficial documents, and field notes.

4.2.1 Semi-structured interviews

Interviews are one of the most common forms of data collection in case study research (Bryman, 2016). Semi-structured interviews with fishermen allowed me to obtain personalized information (Hancock & Algozzine, 2006). Using Goodman's (1961) snowball sampling method and recommendations from the MCS's field research team I identified nine fishermen who are/were members of Akyaka fishery cooperative and supported the co-management process by participating actively. By conducting one-on-one interviews, I was able to adapt the questions to other topics which could potentially be important for my research. Keeping the interviews as semi-structured conversations (guided by main 12 questions) led me to uncover different topics and to think of effective follow-up questions. I was able to discuss detailed issues of interest with interviewees (Bryman, 2016). Most of the interviewees expressed themselves openly which helped me to clearly understand their emotions, knowledge, and experiences with the co-management process.

All fishermen were Turkish thus I conducted all the interviews in Turkish language. I selected the fishermen according to their profession, expertise, familiarity with the topic, and participation within the co-management governance process since 2010. The fishermen's average experience was more than 40 years and the more experienced fishermen provided more specific information with regard to the co-management governance approach. Each interview took between one to two hours, during the interviews I took additional notes.

4.2.2 Participant observation

As secondary data I used participant observation methods for this research. To gain a deeper understanding of the case I aimed to observe daily life and fishermen's rituals in Akyaka fishery cooperative. Firstly, to know and become known by the fishermen I observed their daily activities by visiting them on their boats several times. I identified myself as a Masters student and defined my research to the fishermen. While observing daily activities and having informal conversations with other fishermen, I also engaged in daily practices in the cooperative such as cleaning the boat and taking fish out from nets. Additionally, I offered help with their fishing activities and took part in some as well. This helped me to analyze the spatial area better, understand the gear types and the NFZ boundaries. Further, participating in fishing with some interviewees helped me to observe their rituals, culture, and interactions with the sea and the fish (DeWalt & DeWalt, 2002). While fishing I naturally started to help fishermen which allowed me to bond with them and made the interviews flow more naturally.

4.3 Ethical aspects & Limitations

The nature of fisheries management is complex and I only had a certain amount of time to uncover and fully analyze co-management governance in Gökova Bay. However through participant observation and semi-structured interviews, I obtained valuable insights and was able to engage with fishermen directly and structure the case in a specific timeframe. Reaching out to each fisherman and finding the right person to interview was a lengthy process. Most of the fishermen didn't have email accounts therefore I took their numbers from both the MCS field researchers and other fishermen. I introduced myself on the phone and after considering appropriate social distancing measures for COVID-19 I met with each interviewee physically. In particular, I aimed to arrange the interviews on fishermen's own boats or at the cooperative to avoid mixing with crowds. This not only allowed me to conduct interviews in a silent, non-distracting environment, but also helped interviewees feel more comfortable and be more open and willing to answer my questions during the interview process (Bryman, 2016). Before each interview each fisherman gave their verbal consent for me to record the interview (Yin, 2018).

4.4 Data Analysis

I finalized nine interviews with the fishermen in March 2021 and transcribed each one according to different themes that appeared during the interviews. I coded the interviews and analyzed them according to CPR theory. First, I considered critical aspects of CPR theory to sort out relevant themes according to the SES framework's core subsystems and extracted relevant themes into sub-themes for the eight design principles. As Vaismoradi (2016, p.102) writes "a subtheme exists underneath the umbrella of a theme. Sub-themes share the same central organizing concept as the theme, but focuses on one notable specific element." Therefore, to evaluate each design principle for my analysis, I sorted out "notable specific elements" under general themes that I extracted from the SES core subsystems. Particularly, to have relevant answers for my research questions to understand challenges, and benefits of the co-management governance approach (RQ1) I extracted the themes according to the Governance System (GS), Resource System (RS), and Actors (A). Then, to understand the challenges of centralized fisheries management (RQ2) I mainly focused on A and GS, then sorted the sub-themes to analyze the eight design principles. I coded the sub-themes according to the eight design principals which created my original themes. For instance, to analyze monitoring of rule enforcement or sanctioning I coded "state didn't keep promises" or "our motivation decreased". Lastly for the sub-themes I added "improvement of co-management" to understand how to strengthen the co-management process in Gökova Bay (RQ3).

5. Results

In this section I mainly examine the eight design principles posited to assess co-management in GB. To understand the management gaps, challenges, benefits around the co-management implementation process, I analyzed the first-tier variables to define the particular focal points of the CPR system in GB. I focused on the Resource System (RS), Actors (A) involved in the use of Resource Units (RU) and, the Governance System (GS). To present my findings from interviews, I illustrated certain barriers that lead to implementation challenges of co-management. Using the interview data I evaluated the fishermen's experience of co-management since the NFZs were established in the bay.

5.1 Resource System and Resource Units

The Gökova marine habitat is highly sensitive to human and climate driven impacts. The main objective of NFZs and the MPA is to protect the ecosystem and local fish stocks in order to increase the resilience of Gökova SES (Kızılkaya et al., 2013). Fish populations move between the Aegean and the Mediterranean Sea, and during migration season, fish of reproductive age prefer GB as a spawning area (Personal communication). Akyaka especially is a suitable location as a spawning area because of its highly nutrient rich inflow of freshwater systems to the sea (Ünal et al., 2021). Currently there are two fresh water inflows to Akyaka NFZ which brings alluvial deposits and creates sandy grounds in the shallows. This increases the productivity of fish spawning in the bay and attracts large fish species such as white grouper, dusky grouper, dentex, bonito and sardine.

In GB while some fishermen fish at far distances from Akyaka others prefer to fish in buffer zones close to the Akyaka NFZ. However generally fishermen prefers to fish in 1-2 hour distances. As I8 revealed, before the establishment of NFZs most of the fishermen used to travel 4-5 hours to catch fish because there were not enough fish close to Akyaka. However after the restriction on large scale fisheries from the MPA and the establishment of NFZs, fish populations have increased at closer distances and they've reduced the frequency of those longer trips. Currently once or twice in a month they travel further distances for fishing.

In the local resource system, targeted species bring valuable income to both fishermen and the Akyaka fishery cooperative. Most of the fish caught in Akyaka change with the seasons. In 2019, Akyaka cooperative landing fish was constituted mostly of Common pandora (24.4%), Gilt head-bream (12.9%), and Randall's threadfin bream (12.8%) but also White grouper, and the Mugil are among the main target species (Ünal et al., 2021). According to cooperative rules, member fishermen are required to give all catches to the cooperative for commercial purposes which is well-received by the fishermen.

The cooperative sets fish prices according to the abundance of local fish species and supports the fisheries with gas and microloans for gear fixes, however some fishermen aren't satisfied with the current support.

As IS reveals;

“Last year I had to buy new nets to replace the old ones. I asked the cooperative to provide me with cash but they didn't help much. I had to go to a bank for a loan. Now I am still in debt because of the interest rate. I make money in the year and pay all that money for gear, boat fixes and loans. The state should provide zero rate interest loans for us and the cooperative should create lending options.”

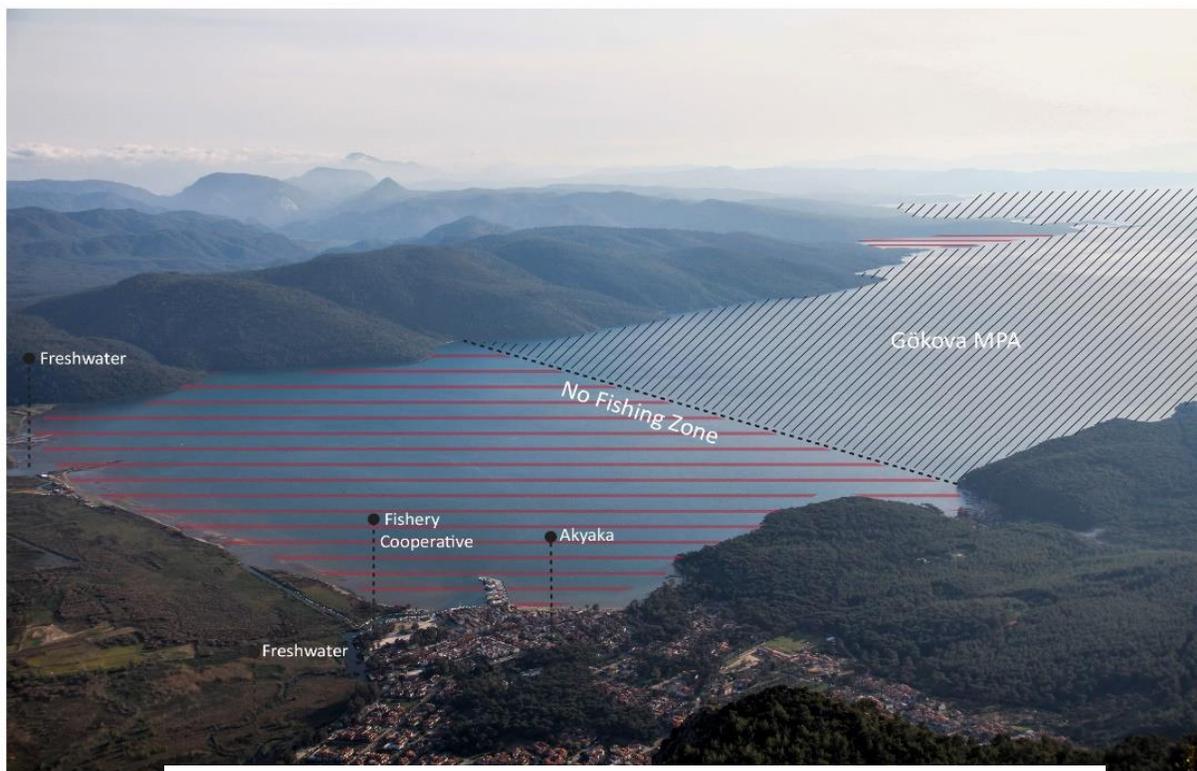


Figure 9. An aerial photo of local resource system. Provided by the author. April, 2021

5.2 Governance system (GS) and Actors (A)

Organizing several meetings, discussions with all stakeholders, and excluding the purse-seiners, trawlers, beach seines and boat seines from Gökova MPA was a crucial success for the participatory decision making procedure and SSF's motivation for biodiversity conservation (Ünal & Kızılkaya, 2019). Currently there is no closed season for SSF in Gökova but according to central fishing regulations temporal restrictions are in place for certain species such white grouper between June 1 and August 31, and the common octopus between April 15 and October 31 (Ünal & Kızılkaya, 2019). Though some of these rules are valid for Gökova most of the national fishery laws are not decided according to local conditions or norms. Mostly central fishery laws and regulations are prepared according to the conditions of fisheries in the Black Sea region and Istanbul since they are the most profitable fisheries in Turkey.

As I9 stated;

“In Akyaka we want to change the rules according to Gökova conditions but this is almost impossible for now. Ministries mostly listen to Istanbul and the Black Sea region fisheries because they are the most profitable ones. Particularly anchovy fisheries have lobbying power in Turkey. This gives anchovy fishermen immense power. For example, they can call ministers by phone directly but we can't even reach the provincial directorates here.”

To address management gaps in central Turkish fishery laws, although the evolution of participatory decision making and the co-management procedure have provided social and ecological outcomes, state support hasn't been consistent in the long-term. There are two main reasons that state support hasn't been consistent for marine conservation in Gökova SES (Ünal & Kızılkaya, 2019). Firstly, in Turkey marine areas are under governmental jurisdiction by the Ministry of Environment and Urbanization (MoEU) (Gomei et al., 2019) but national fishery laws and regulations are subject to MoAF's decisions. Fishery boat licenses are given by the Ministry of Transport and Infrastructure but police power (i.e coastal guards and gendarme) is managed by the Ministry of Interior. This has led to serious ambiguity of authority between the ministries. Secondly, since MoAF is the main authority for rule making, enforcement, monitoring and sanctioning, surveillance of illegal fishing should legally be carried out by the Provincial Directorate of Fisheries and Aquaculture (PDoFA) under The Ministry of Agriculture and Forestry (MoAF). However, currently in Gökova both of the agencies support is too weak to enforce formal rules and monitoring. As Sowman et al. (2013) indicates, when central state support is weak this determines the success of rule

enforcement and monitoring. In Gökova these inconsistencies and the lack of support for CPR management has led to violations of law and increased illegal activities among SSF and free-riders. It has also created distrust in state authorities and decreased fishermen's cooperation in self-governance of CPRs.

5.3 Design Principles applied

Each design principle has been included in this study to examine the necessary conditions for the sustainability of marine commons and collective action processes. Ostrom's design principles were beneficial in finding answers within the SES framework. I have assessed eight design principles to find answers to my first and second research questions. Based on my observations and data I will show that there is an urgent need to improve monitoring of the resources and rule enforcement (principle 4), graduated sanctioning (principle 5), and recognition of rights to organize (principle 7). Aside from the crucial importance of improving compliance with these principles, partial success of the other principles together increases the durability and robustness of the Gökova SES.

5.3.1. Design Principle 1: Clearly defined boundaries

Clearly defined user and resource boundaries are significant in order to develop the co-management mechanism and improve collective action efforts in Gökova SES (Cox et al., 2010). However, in the marine ecosystems defining the boundaries for mobile resource units is challenging (Basurto et al., 2013). In spite of difficulties determining resource boundaries, defining clear boundaries for resource users and excluding free-riders has provided various social and ecological benefits for Gökova SSF. In the Gökova MPA the restrictions on large-scale fishing and NFZs are collectively decided as core zones to encourage ecosystem rehabilitation.

Distinguishing legitimate and non-legitimate users in Gökova MPA and NFZs was a crucial step to prevent the free-rider problem, over-use of resources, and encourage the regeneration of marine habitats (Kırac, et al., 2010). As key drivers of resource decline, trawlers (*trol*) and purse-seiners (*gırgır*) targeted the same species as SSF. Particularly in the 2000s, serious declines of white grouper and shrimp populations, which constituted 40% of SSF income, affected the prosperity of fishermen in Gökova (Ünal et al., 2021).

Since 2010, formally restricting large-scale fishing from defined areas increased the mobilization of SSF in the bay and reflected positively upon their incomes. As Ünal et al. (2019) indicated in his findings, following 5 years of implementation, in 2015, the white grouper population increased by 25% and this resulted in a fourfold increase in the average revenue of SSF. Between 2010 and 2016, SSF's income increased monthly by 1,422 to 6,277 Turkish Lira per boat (MCS, personal communication). Defining SSF as legitimate resource users in these areas motivated them to organize in Akyaka. However, in the long-term as state assistance declined, many challenges started to re-emerge in the monitoring of the MPA and NFZs. Illegal fishing by purse seiners, trawlers, night scuba divers, and other fishermen continue to be major pressures on ecosystem rehabilitation efforts. As stated by I3,

“In a single night one bottom trawler or purse seiner can take up to a year’s worth of fish for one small scale fisherman. We can’t compete with their advanced technologies. Before the establishment of the MPA and NFZs trawlers and seiners were everywhere in the bay. They used to come up to the Akyaka beach area where waters are shallow. By digging the seabed they used to scrape everything in their way.”

5.3.2 Design Principle 2: Congruence between cost and benefit

Congruence between cost and benefit is one of the most important design principles in understanding how fishermen perceive themselves within the co-management mechanism, and how they are encouraged/discouraged by state actors (Ostrom, 1990; Cox et al., 2010). Co-management efforts were perceived positively among fishermen. As their income rose fishermen started to perceive themselves as resource owners in the bay, voluntary monitoring activities and reporting of illegal activities increased among them as well.

Until 2018 information sharing between fishermen, coastal guard and gendarme boosted collective action efforts. Particularly between 2013 and 2018, patrols by fishermen increased its effectiveness in the bay, these fishermen also acted as local leaders. For effective long-term co-management the role of local leaders is significant (Gutiérrez et al., 2011). Therefore the presence of volunteer fishermen as “fish wardens” motivated other fishermen and encouraged them to make personal commitments for conservation as well. However as interviews revealed, patrols took time, involved risk at nighttime, cost money, and, impacted fishermen’s health. In the long run it appeared that fishermen who didn’t participate

in patrols and conservation efforts received more benefits than those who sacrificed time, money, and health. This inequity between resource users and lack of formal support from the state led fishermen to cease monitoring activities.

As one former volunteer patrol (I1) stated;

“Few of us were very passionate about conservation in Gökova before. We were aware that our efforts would change something. We were the ones who sacrificed time, money, and health for this purpose. We used to go patrolling at 3am at night stormy weathers whenever someone informed us about illegal activities. The more we became successful the more we got motivated for conservation. But we were only supported by MCS and coastal guards, the Ministry of Agriculture was always absent.”

While cooperation among the coastal guard and fishermen has reduced illegal activities, Ministry of Agriculture and Forestry (MoAF) led monitoring has always been missing in Gökova. Even though voluntary patrolling wasn't practiced by many, almost all fishermen reported illegal activities in the bay which prevented trawlers, night scuba divers or purse seiners. But in the long-term feelings of inequity between rules and efforts demotivated fishermen.

As I8 revealed out;

“As fish populations boosted, every fisherman's income increased. This all made us motivated for monitoring. But there were no rules or legitimacy to sustain our efforts. The unstable political environment affected the central management of fisheries and broke our relationship with government authorities. We were the ones that sacrificed more but benefited less.” (I8)

5.3.3 Design Principle 3: Collective choice arrangements

Collective choice arrangements propose that fisheries who are affected by state rules have to have the power to make changes or participate during rule making processes (Cox et al., 2010). On this point, at the beginning of the establishment of the NFZs this principle was partially supported. Although fishermen's choices weren't formalized in co-management, by taking their decisions into consideration, NFZ boundaries were determined according to the advice of the 3 fishery cooperatives. The main purpose was to ensure every fisherman's participation in meetings, and the determining of rules and restrictions by taking local communities' advice. Since fishermen have historical knowledge of the breeding grounds, spawning areas and condition of the seabed, their advice was crucial for policy makers. As I4 revealed;

“To be part of the decision-making process and exchange information with stakeholders we always tried to attend annual and regular meetings with scientists and state officials. We told them our long historical experiences and observations. By collaborating with other cooperative members we held meetings for 3 years with MCS and policy makers. However, our condition was to monitor the area together with PDoFA's boat.”

The majority of respondents confirmed that meetings were valuable at the beginning however, there was a lack of communication between central government and local actors in the longer term. This led to a miss communication and mismatch of rules with local conditions. Centralistic fishery laws prevented resource users from implementing their collective choices according to local conditions. As I4 explained;

“In 2014 white grouper started to thrive in here again. Our monitoring efforts were successful and our incomes increased. However, in 2016 the ministry made a statistical analysis across Turkey and they concluded that the white grouper population decreased in Turkish waters. But they didn't consider Gökova specifically. They banned the catch of white grouper for four years in all Turkish waters. As white grouper is a very valuable fish for us, our incomes decreased again. That was a terrible mistake.”

5.3.4 Design Principle 4a: Monitoring of resources

In spatial closure regimes high resource mobility makes the monitoring process complex but necessary (Ayer et al., 2018). To maintain conservation motivation among resource users it is essential to provide them with the current state of recovery of the ecosystem and the conditions of the CPR (Cinner et al., 2009). According to accounting statistics provided by Akyaka cooperative, in 2013 after three years of establishment of NFZs the overall income of cooperative members grew by 53% and the total fish population by 27% (Kızılkaya et al., 2013). Currently to observe fish population changes, Akyaka fishery cooperative has been collaborating with MCS by collecting landing data of fish from fishermen since 2015 (Ünal et al., 2021). In 2018, 25,556kg landing was recorded which is the highest annual fish catch recorded by Akyaka fishery cooperative since they started (Ünal et al., 2021). This sort of data provides scientific information about the effectiveness of NFZs and the MPA. Additionally MCS's field researchers regularly monitor endangered species (i.e sandbar sharks and monk seals) in the bay and resource conditions by diving or setting camera traps in certain spots.

5.3.5 Design Principle 4b: Monitoring of rule enforcement

Local monitoring and rule enforcement mechanisms are one of the most important DPs to assess the efficacy of co-management arrangements and the success of local institutions for maintaining CPR management in Gökova SES. Since 2013 though the community based marine ranger system has established joint monitoring efforts, a formal monitoring process is still absent in GB. As interviews revealed, the lack of legitimate authorization of fishermen patrols and PDoFA's formal monitoring practices at the local level reduced the effectiveness of NFZs and the MPA.

“We started to patrol informally here. No one supported us legally. We were aware that strangers with scuba equipment used to collect tons of white grouper and dentex with nets or harpoons. Night scuba divers and fishers from other cities used to come frequently. Strangers were taking out our incomes. These illegal activities reduced sharply when we started monitoring with MCS.” (17)

Between 2013 and 2018 with the collaboration of the coastal guard, fishermen and MCS, illegal activities reduced the free rider problem. However in 2016, with the refugee crisis in the Mediterranean, the coastal

guards' involvement decreased. Though monitoring by fishermen continued, sanctioning and formal reporting heavily reduced. Fishermen tackled legal procedures and went on legal trails various times.

As I9 continues;

“We sued all the illegal fishermen we caught. The state wasn’t supportive but our passion for Gökova was enough. Neither trawler, purse seiner, nor night scuba divers had the courage to come into our fishing area because they knew that there was a high certainty of being caught by us. But whenever legal reporting decreased and we couldn’t document illegal activities, illegal fishing rose again.”

5.3.5.1 Challenges of monitoring

As interviews revealed, despite mutual trust between state authorities and fishermen having decreased, fishermen still report illegal fishing activities but their reporting rarely reaches the Provincial Directorate of Fisheries and Aquaculture’s office. Since MoAF has no local office in Akyaka, when a fisherman or MCS reports illegal activity, it takes at least one hour for a PDoFA’s boat to arrive (Personal communication). In one hour, illegal fishermen can escape and evade the authorities. Besides this, rapid changes of government officials in national and sub-national state offices leads to a decline in collective action efforts for monitoring (Personal communication). The new officers at the PDoFA or MoAF fail to follow the process and deliberately reach out to resource users. This results in discouragement of process orientation, decreases collective social capital and limits the capability of addressing complex questions about monitoring.

5.3.6 Design Principle 5: Graduated sanctions

As Ostrom (1990) indicates, by imposing necessary fines for illegal activities, graduated sanctions maintain the unity of local communities in the long-term. Sanction mechanisms increase the homogeneity of thoughts around marine conservation and reduce the excessive, repetitiveness of violations of community rules (Cox et al., 2010). Currently in GB graduated sanctioning is absent. The interviews affirm that there are two main reasons for which the absence of a gradated sanctioning process has prevented the success of collective action efforts in recent years. The first reason is a lack of functionality in the national and sub-national government offices. Secondly, nepotism and corruption is rife in government institutions. Political

power elite's involvement in illegal fishing hinders sanctioning efforts because anti-democratic decisions lead to lengthy legal procedures and insufficiently severe penalties. Despite official rules and procedures being in place, these are often ignored by individuals in state offices when making decisions. This increases managerial gaps in co-management both horizontally and vertically.

Related to these reasons as I5 claimed;

"We fish much smaller amounts than trawler or purse seiners. If they fish 1 ton we fish 10kg. Maybe this is the reason high positioned state officials don't support us. For example, two years ago during a patrol, we caught a purse seiner engaging in illegal activity. We reported the boat immediately, then the boat was sanctioned with a penalty but on that condition the boat's license should have been confiscated. After some time we learnt that the boat hadn't received a serious sanction because it was owned by a mayor."

In addition to lack of severe sanctions for illegal activities, ambiguity of duty between state authorities is another handicap for implementation of sanctions. The Ministry of Environment's and Ministry of Agriculture and Forestry's sanctions are implemented differently in the bay, while MoAF's fine is 1000TL (approx. 100EU) MoEU's sanction is 25.000TL (2500EU). Although the MoEU enacted the NFZs and MPA, they don't take responsibility for the task of biodiversity conservation in these areas. Instead, the MoAF is in charge of monitoring and sanctioning which leads to a lack of clarity in the responsibilities of ministries. Hence to clear misconceptions and ambiguity of duty between authorities it is necessary for MoEU to take part in the sanctioning process as well.

Lastly, nepotism in government institutions is another problem for implementing co-management and graduated sanctions fully in the bay. As many respondents revealed, in previous years, when a person reported illegal activity, it would be a crucial problem in PDoFA and central level agencies. Local state authorities knew who was responsible for the illegal activities and information could spread among local institutions to national-level institutions. However, currently reports of illegal activities don't spread in the government as before, instead information stays with individuals. If the illegal fisherman knows someone in government, that officer doesn't spread the details of the case with national and local authorities. Therefore, favoritism of individuals at the central level prevents information sharing across levels. In fact, corruption and nepotism in government offices also leads to miscommunication among state officials.

As I6 stated;

“5 years ago, MoAF assigned a consultant to our (Akyaka) cooperative to report illegal activities here. We used to go on patrols together and since we don’t have any power for sanctioning, he used to report and fine each illegal activity. One day we caught a fisherman in NFZ and he wrote the penalty. Half an hour later he had a phone call from central office to ask him to cancel the sanction. Most likely the illegal fisherman knew someone that had power at the central level.”

5.3.7 Design Principle 6: Conflict resolution mechanisms

To be successful in CPR management, conflict resolution mechanisms have to be easily accessible and low-cost (Ostrom, 1990; Cox et al., 2010). As I showed in the previous principles, there are several conflicts between SSF and state actors, among the resource users, and between SSF and large-scale fisheries. These conflicts not only lower the motivation efforts for CPR management but also result in violence at the local level. Although violations and conflicts among SSF are partially resolved by cooperative bylaws, conflict resolution mechanisms for free-riders and state agencies are absent due to centralistic management, slow legal procedures and corruption in government agencies. In addition, resolving conflicts between free-riders and SSF is not affordable for small-scale fisheries because costly resolution mechanisms prevents them from continuing legal processes.

“4 years ago I caught a night scuba diver. After, we had to go to a court but the trial took so long and I couldn't afford to retain a lawyer. Luckily MCS supported me on that but the case was not resolved in the end. This sort of case can take up to 10 years making it difficult for us to pursue.”

(18)

Apart from outsider and SSF conflicts, during my field visits I observed that there were no occasions when cooperative members gathered together. I was mostly with certain people within small groups. As participant observation and interviews revealed, there are two types of fishermen in the local community. One group who supports monitoring and sanctioning, and is opposed to illegal activities. The other group is involved in illegal activities and claim NFZs are not effective. These two groups are currently in conflict in the cooperative and this situation is reflected in the violation of local norms and respect between them.

Heterogeneity of thoughts and different mental models challenges the implementation of co-management practices effectively at the local level. These can be overcome by the support of SURKOP (Central Union of Fisheries Cooperatives), however, since they are funded by the state there is also a lack of initiatives implemented by them (personal communication). Moreover, although the formal structure of cooperative bylaws prescribes certain rules to prevent illegal fishing they are not completely applied. Some bylaws are also not relevant under today's conditions because they haven't been comprehensively revised since 1972 (personal communication). The dated structure of the bylaws prevents meaningful attempts to resolve conflicts at the local level since it is not participatory or inclusive, and admonitory. As conflicts can't be solved among resource users fully, more fishermen in Akyaka create illegal fishing networks among themselves. This situation leads to misalignments in the cooperative and prevents low-cost resolution mechanisms.

5.3.8 Design Principle 7: Recognition of right to organize

To achieve long-term sustainability and CPR management fishermen should have the right to define their own rules as long as they obey the formal rules determined by the government (Trimble & Berkes, 2015). Additionally, the state should be respectful of the rights of local communities when establishing local rules or institutions for better engagement with CPR management (Cox, 2010). This principle is not met in Gökova because of central decision making by the state. Previously as I showed, the MoAF is the major government body that is responsible for fisheries monitoring, control, and surveillance. Therefore, it is important to note that laws, rules, closed areas or any type of regulation are not managed by regionally based, fishery based, or species-based plans (Ünal & Göncüoğlu, 2012; Ünal & Kızılkaya, 2019).

According to national fishery laws, established in 1971, 1986, 2003 and 2019, regulations and restrictions are determined by Turkish Statistical Institute's data and scientists' advice. Although the statistics rarely match with the local conditions of Gökova, the final decision on rules and regulations is made by the authorities. Additionally, the institute collect data from different fisheries in Turkey but there have been concerns about the accuracy of the data for many years (Tıraşın & Ünlüoğlu, 2012). Therefore there have been many occasions when one region's statistics differ from Gökova's conditions in previous years. Hence there is a lack of formal rules and recognition of local rights for resource users which poses challenges to collective efforts for marine conservation. As I showed in previous DPs there are various explanations for this but one of the major reasons is as I9 stated;

“In Turkey being a fisherman doesn’t count as a professional job. That is the reason we are still attached to the Ministry of Agriculture and Forestry. Although Turkey has more than 8000km coastline, the central government doesn’t consider establishing a Ministry of Fisheries and Marine Resources. I think this is one of the most important reasons why our rights and demands are not fully recognized.”

Although respondents perceived themselves as crucial decision makers and advisors at the beginning of the co-management implementation process, they are also aware that they don’t have power or recognition to create their own local rules in the bay. Central management of legal procedures stand as an obstacle for encouragement for collective action and the common sense of ownership over resource units.

5.3.9 Design Principle 8: Nested enterprises

As Ostrom (1990) clarifies, in complex SESs between the multiple scales, “nested” governance enterprises are crucial for achieving internalization of SES. From this perspective, DP 7 is a facilitator for this principle in supporting cross-scale institutional factors and local governance activities. Currently there are gaps between nested governance enterprises because of the centralistic management of fisheries and nonfulfillment of promises by the state.

In GB monitoring and enforcement are both crucial tasks but their implementation by different actors and different levels of hierarchies creates a lack of clarity in CPR management from the perspective of fishermen. This is affirmed by participant observations and field visits which illustrate that there is a general expectancy of fishermen for MCS or state authorities to monitor and manage fisheries in GB. This situation prevents the development of self-governance of CPRs and hinders the transition towards a cooperative type of co-management. On the other hand, the lack of clarity between hierarchies results in political and legal mismatches at the state level. Conflict of interest prevents the implementation of rule enforcement and leads to miscommunications between MoEU, MoAF and Ministry of Interior. Since the gendarme and coastal guard are connected to the Ministry of Interior, there is an ambiguity of responsibilities between the MoAF and PDoFA for formal monitoring practices.

Nesting in Gökova is mainly supported by international donors and NGOs. Implementing Underwater Research Society’s “Integrated Marine and Coastal Areas Management Planning Projects” (SMAP-3, SAD-AFAG & SAD-EKOG) with the support of the United Nations Development Program (UNDP) increased

marine conservation efforts between 2006 and 2010. Following the establishment of the MCS in 2012, the MCS collaborated with the Food and Agricultural Organization on the East Mediterranean Project (FAO-EastMed) in 2016 to 2018. FAO EastMed project was initiated to develop institutional and scientific collaboration in the Eastern Mediterranean with fisheries. Currently MCS plays an intermediary role to improve the deliberation process between resource users, state institutions and development agencies. However, miscommunication, corruption at the state level, and lack of organization in cooperatives creates cross-scale incoherencies among national and local actors. Therefore, this situation prevents embeddedness of enterprises and allocation of tasks in nested institutions. These combined increase the transaction costs of fishermen and decreases the trustworthiness of state institutions at the local, national, and international level.

“This collective process started with close cooperation between us, NGOs, scientists and the state. Many international projects with high budgets were implemented here. Now we are all waiting for solid support from the state. It has been three years and there is no action yet. These all damage our trust in government.” (I3)

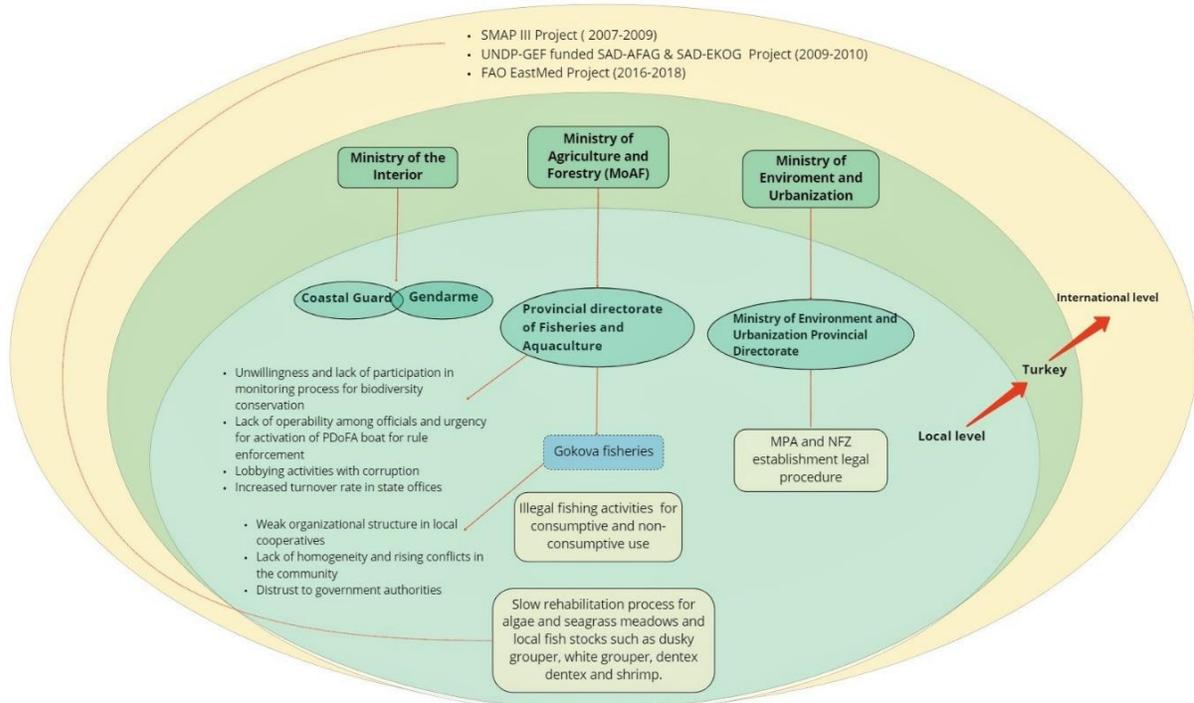


Figure 10. Nested enterprises from local level to international level in Gokova SES. Derived from Krause et al., 2019.

6. Analysis

By taking the results section as a main standing point, I will integrate CPR theory for the analysis. Considering the challenges and benefits that fishermen have been experiencing during co-management implementation in GB, my purpose is to find answers for my third research question. "How can current co-management be improved to strengthen fishermen's involvement in order to achieve long-term sustainable fisheries in Gökova bay?"

As I explored during my research most of the challenges that fishermen experience are closely interlinked with my second research question; "How do the centralized fisheries management procedures in Turkey affect the involvement of local actors in the co-management decision-making process?". As interview data and commons literature showed, the repetition of inappropriate top-down approaches for marine commons governance leads to unsustainable resource use and coercive policies that are not relevant to local norms or conditions (Ostrom & Schlager, 1992; Castro & Nielsen, 2001). This situation results in a weak institutional framework in Akyaka fishery cooperative and inadequate support services across hierarchical levels. Moreover, in Akyaka fishery cooperative different mental models towards NFZs and conservation leads to inequities among resource users. Although there are approximately 200 SSF working professionally in the bay only 50 of them are represented in the cooperatives since many former members were expelled as a result of their involvement in illegal fishing activities or conflicts.

To reduce the involvement of local fishermen in illegal fishing activities and resolve conflicts among them, it is crucial for cooperatives and state agencies to legitimize conflict resolution mechanisms in fishery cooperative bylaws. Moreover, with the support of the state, cooperatives must renew the cooperative rules to tackle illegal fishing together with all the fishermen in the bay. On this point especially, local leaders play a key role in the long-term sustainability of CPRs at the local level because local leaders without self-benefits, increase the resilience of SES, influence other resource users to actively participate in conservation efforts, and enhance conflict resolution (Gutiérrez et al., 2011). To achieve this however, there is an urgent need to legitimize and empower community leaders with institutional arrangements (Schlager, 2004).

To strengthen fishermen's involvement in sustainable resource use and CPR management, there is no alternative other than to rely on devolving power to local actors and creating formalized participatory fishery laws. To improve monitoring activities and rule enforcement by fishermen, as Pomeroy and Berkes

(1997) indicated, state agencies are required to change policies and create more localized procedures to connect politics with power sharing. However, as I presented, achieving co-management of marine commons with localized and legitimate management procedures is fraught with challenges in Turkey. This is driven by a highly centralist and unstable political climate where vested interests in the fishing industry and powerful elites resist such changes. However, the process has shown that effective governance strategies and high rule adaptation have the ability to empower SSF and make them permanent decision makers in fisheries national development procedures. Additionally, empowerment strategies allow fishermen to avoid bureaucracy and increases their functional autonomy in the hierarchy of decision making (Pomeroy et al., 2001).

Established trust and social capital among fishermen have decreased over time (Schlager & Ostrom, 1992). Though the MCS provides monitoring support for local communities and the coastal guard plays an active role in sanctioning, there is a common feeling among resource users that they have been abandoned in recent years. To maintain trust and develop self-organizing capabilities among the key resource users, it is important that institutional certainty persists at the local level (Saunders, 2014). On this point, instead of coastal guards or gendarme, PDoFA's boat has to be active with day-to-day patrols on the ground. This increases the formality of the co-management implementation process, improves resource user's mental model towards conservation activities and strengthens fishermen's ability to adapt to changing conditions. At the local level to increase MoAF's and PDoFA's conservation activities, one resolution can be creating a Fishery Advisory Committee in Akyaka (Ünal et al., 2021). This solution was implemented in Bangladesh. As Berkes (2002, p.306) writes about the process "In the government agency/NGO strategy, one field officer each from the government and the NGO worked jointly with the community, to give a three-way relationship for development and resource management until the NGO was ready to phase itself out. These various strategies resulted in a rich variety of cross-scale linkages, including the vertical linking of the local level to the government level." As practiced in Bangladesh to facilitate cross-scale interlinkages and cooperation between policy makers, scientists and key resource users, co-management in Gökova can catalyze common purpose by building a Fisheries Advisory Committee. Field officers from the MCS, MoAF, and Akyaka fishery cooperative can accelerate the co-management implementation process and increase collective action efforts. Increasing cooperation among local actors integrates system feedbacks into the decision making process, and the institutionalization of monitoring activities increases cross-scale communication among key actors (Folke, 2006).

In addition to creating a Fisheries Advisory Committee, it is important that fishermen are also involved in monitoring activities directly in the bay. As highlighted by several scholars, it is crucial for resource users to participate in monitoring and rule enforcement for long-term social-ecological benefits of SESs (Ostrom, 1990; Berkes et al., 2001; Schalager, 2004). Therefore, as a second step, to integrate fishermen's participation in monitoring and to strengthen their involvement in CPR management, it is necessary to institutionalize their efforts under a state agency. One example of this solution was practiced in Zanzibar, Tanzania. *Bwana Dikos (Beach recorders)* are "public officials" that have daily monitoring activities and contact with resource users. They are financially supported by the state and formally recognized by the Department of Fisheries and Marine Resources, Zanzibar. They are formally responsible for monitoring, controlling, reporting, and enforcing the necessary fishery laws in the selected locations (de la Torre-Castro, 2006). This can be implemented in GB with incentives from the state and the support of member fishermen in cooperatives. This initiative not only helps to build mutual trust between fishermen and the state but can also improve collective efforts towards marine conservation in Gökova.

Implementation of these alternative resolutions can reduce conflict among fishermen and lead to a more harmonious group. Bridging traditional ecosystem knowledge with scientific knowledge, collective action at the local level helps to bring legitimacy to local management, change fishermen's mental model in cooperatives, and facilitates homogeneity of thoughts with regard to marine commons. This leads to a greater success of the SES with regards to illegal fishing and common understanding of marine conservation (Carrillo et al., 2019). Particularly, building a Fisheries Advisory Committee can facilitate the spread of scientific information among resource users leading to a common understanding of marine conservation among them and encouraging them to embrace conservation efforts faster. This increases mutual trust, the development of good communication networks and leads to constructive dialogues among actors. As Ostrom (1990) points out; collective action is more likely to occur when there are strong bonds, common interests, and stability of group memberships.

7. Conclusion

Marine ecosystems are complex SESs that involve many uncertainties and complexities. Therefore instead of top-down governance approaches cooperative bottom-up approaches should be adopted by policy makers and public managers. As Finkbeiner & Basurto (2015) points out “allowing fishers to partake in decision-making processes can aid in the creation of flexible, locally appropriate rules, allowing fishers to adapt in the face of change.”

In this study by identifying collective action challenges in the context of a local case study I aimed to investigate the necessary elements for successful institutions and sustainability of CPR management. Also observing the benefits of co-management, and providing a deeper analysis of current CPR governance, my research was informed by CPR theory and I applied Elinor Ostrom’s SES framework. Guided by the eight design principles, I explored the negative effects of traditional centralistic fisheries management in Turkey. Gökova Bay. As my results show, co-management approaches and collective action in Gökova can be described as fragile at present. Thus it is urgent that marine ecology becomes a permanent part of state fisheries’ policies and that co-management is placed as a formal government-supported management plan in Turkey.

Gökova Bay, with its great marine biodiversity and location, provides great sheltering and spawning areas for many local marine fish species. The Gökova MPA and NFZ network together have the ability to protect local fish assemblages from the direct effects of human and climate impacts. Thus in this thesis, co-management arrangements should not be perceived only as a way to tackle direct human pressures but also as a way to enhance the adaptive capacities for changing conditions in the face of climate change. Since 2010, Gökova’s open-access condition has been prevented by applying defined boundaries to exclude free-riders and help unique native species thrive again but unregulated fishing still persists in the bay. Thus there are important signs pointing to the need to empower fishermen and enhance cohesive group dynamics at the local level. In the long-run it is crucial for nested governance institutions to generate stronger collaboration, build community for marine conservation and assist SSF to increase their capability for self-organization. For the co-management procedure to gain momentum I suggest two recommendations. First, long-term consistent cooperation among stakeholders with the Fishery Advisory Committee and second, strengthening fishermen’s involvement in formal monitoring activities at the local level.

To facilitate the transition towards sustainable fisheries, these recommendations guide local actor's propensity to increase the robustness of the Gökova SES. However it is important to note that both recommendations demand consistency, support, and care by government actors. As CPR theory suggests this is a trial-and-error process (Schlager & Ostrom, 1992). Therefore, I am not suggesting that these recommendations will be a panacea for resource users and resolve all co-management challenges in Gökova Bay, however, such marine conservation efforts will increase resource user involvement and ultimately the resilience of Gökova SES.

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9. Appendices

9.1 Appendix A. Interview identification

#	Respondent ID	Details	Interview date and relevant data	Interview location
1	I1	Former fisherman, volunteer patrol and not a member of cooperative	I visited I1's house with MCS's field researcher on 17th of March. He was one of the local leader for monitoring activities among fisherman	Interviewee's house
2	I2	Former fisherman and not member of cooperative	I visited I2's house with MCS's field researcher on 17th of March. He is current marine ranger and works with MCS. He stopped working as a fisherman since 2014.	Interviewee's house
3	I3	Fisherman, former patrol, current member	We met few times with him. I conducted the interview on 18th of March.	Interviewee's boat
4	I4	Fisherman and current member	He is fisherman at Akçapınar Cooperative and head of the cooperative as well. I met with him on 18th of March	Interviewee's boat
5	I5	Fisherman and current member	We met with him few times. I conducted the interview with him on 18th of March.	Interviewee's boat
6	I6	Fisherman and current member	He is fisherman and current vice president in Akbük cooperative. I met with him on 23th of March	Akyaka fishery cooperative
7	I7	Former fisherman and not a member of cooperative	The son of I3. It was beneficial for me to understand the perception of young generation about the process. He sometime fishes with his dad otherwise actively works in tourism sector in Akyaka. I met with him on 19th of March	Interviewee's boat
8	I8	Fisherman, former volunteer patrol, current member	Head of the cooperative. He has been one of the most active person during co-management process. I met with him on 21th of March. Couple of interviews made.	Akyaka fishery cooperative
9	I9	Fisherman and current member	He has been working actively in co-management process. Attended several meetings with I8. Also he is collecting fisheries catchment data for MCS. Manager of the cooperative and I met with him on 23th of March.	Akyaka fishery cooperative

9.2 Appendix B. Interview Guide

Merhaba ben Utku Kuran. Bugün zamanınızı bana ayırdığınız için ve bu röportaj için bana yardımcı olmayı kabul ettiğiniz için teşekkür ederim. Ben İsveç Lund üniversitesinde çevre çalışmaları ve sürdürülebilirlik bilimi yüksek lisans öğrencisiyim. Tez çalışmam için Gökova Körfezindeki küçük ölçekli balıkçılarn sürdürülebilirliğini anlamak üzerine bir tez çalışması yürütüyorum. Bu yüzden sizin tecrübeleriniz ve vereceğiniz cevaplar araştırmam için çok önemli. Bu çalışmamda buraki ortak yönetim mekanizmasını incelerken bir yandan balıkçılığa kapalı alanların 2010 yılından kapatılmasıyla ilgili olarak 2021e kadar olan süreç içerisinde balıkçıların, Akdeniz Koruma Derneğinin ve devletin ilişkisine bakıyorum. Gökovadaki balıkların balıkçılığa kapalı alanlar yürürlüğe konduktan sonraki artış/azalış durumu, sizlere olan etkisi, ortak yönetimdeki eksiklikler ve faydalarını sizlerle konuşmayı planlıyorum. Özellikle 2010 yılında sizlerin de karar verici etkisini göz önünde bulundurursak deniz koruma alanı ve balıkçılığa kapalı alanlarda izleme, kural yaptırımı ve cezai işlemler özellikle sizden öğrenmek istediğim noktalar. Bunların uygulaması, kural mekanizması ve balıkçıların bu duruma bakış açısı benim için çok önemli. Röportajı sizin zamanınıza göre uzatıp kısaltabiliriz dolayısıyla size göre belirleyeceğim ben de sorularımı. Son olarak, eğer izin verirseniz ses kaydı olarak röportajı kaydedeceğim. İsminiz ve alıntı yapacağım noktalar anonim olacağı için rahat olabilirsiniz. Hazırsanız başlayabiliriz.

Konuya giriş için sorular -Introduction Questions-

- Bana geçmişinizden biraz bahseder misiniz?
- Balıkçılığa ne zaman başladınız?
- Geçmişiniz nedir?
- Kaç yıldır buradasınız?
- Ne tür teknikler kullanıyorsunuz? Hangi ağ/araçlar ile avlanıyorsunuz?
- Günlük olarak ortalama kaç kilogram balık tutuyorsunuz?
- Hangi tür balıkları hedef olarak avlıyorsunuz?
- Hedef tür dışında hangi balıklar geliyor?
- Akyaka kooperatifte kaç yıldır çalışıyorsunuz?
- İklim değişikliği tuttuğunuz balıkları etkiledi mi?
- Öyleyse, hangi yönlerden?
- Diğer balıklara olan etkisi nasıl oldu Gökova'da?

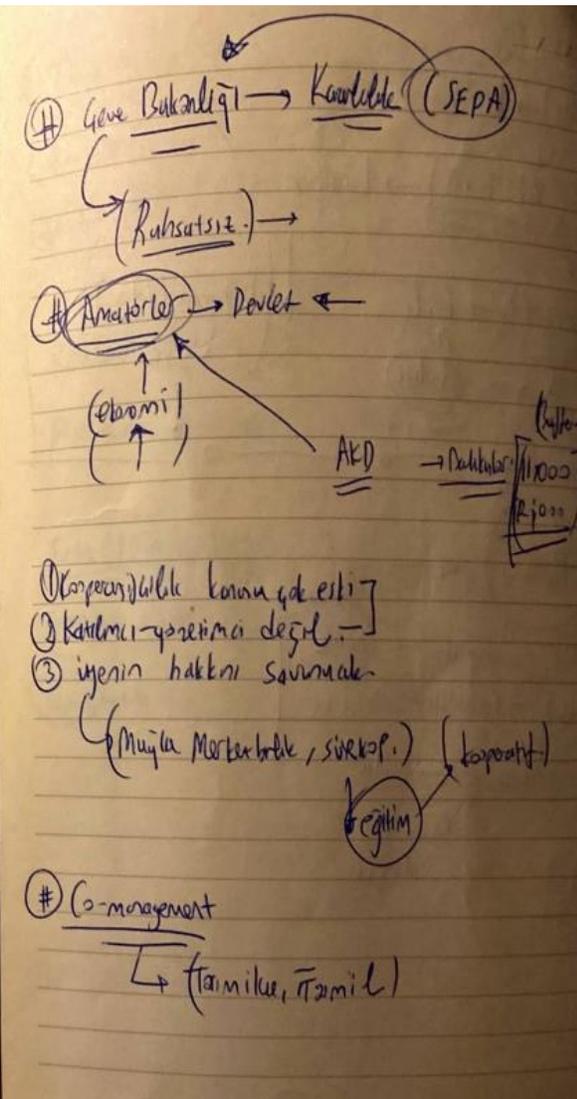
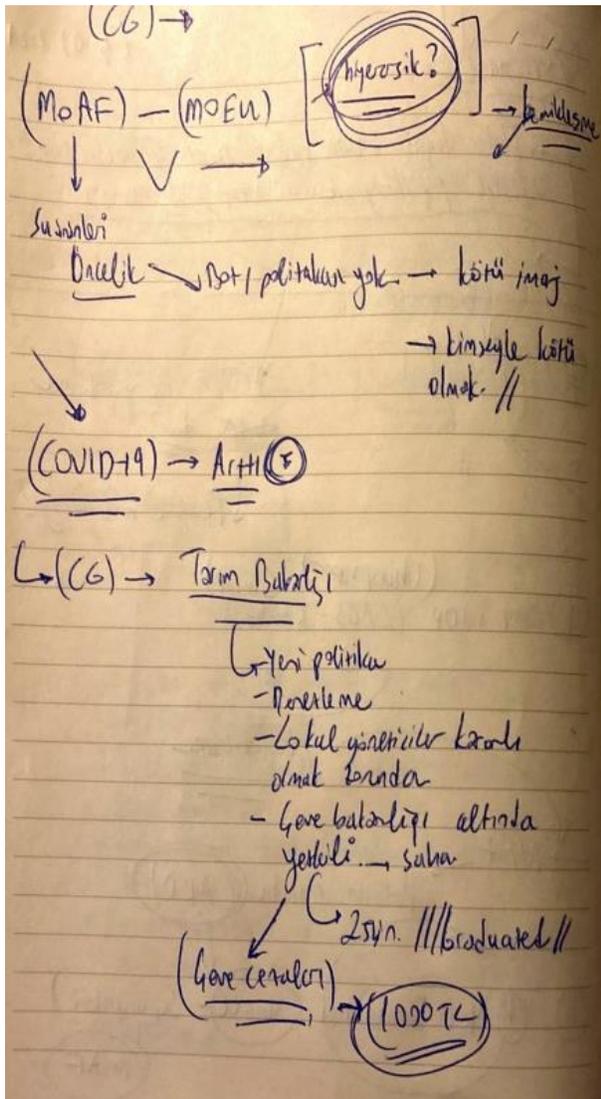
GELİŞME 2- (Main interview questions)

- 1- 10 sene öncesinde balık çok azaldığında genel durum nasıldı? Balıkçılık durma noktasına mı gelmişti? Senin gözlemin nedir?
- 2- 2010dan sonra balıkçılığa kapalı alanların oluşturulmasıyla belirli alanlar da troll ve gırgıra kapatıldığında bu kararda sizlerin de payı oldu mu? Bu kararın sizlere etkisi ne oldu?
- 3- Bu bölgelerin gırgıra ve trole kapanmasının yanında 6 alan balıkçılığa kapalı alan olarak ilan edildi 2010 yılında. Bu alanlar dışında da belirli bir alanda troll, gırgır dışında sadece sizler avcılık yapabiliyorsunuz değil mi? Bu alanların oluşturulmasıyla beraber yasak avcılık nasıl değişti? Bu hala büyük bir sıkıntı mı, ne düşünüyorsunuz?
- 4- 10 yıllık süreci düşündüğümüzde balıkçılar açısından bakarsak şuana kadar ortak katılım yönetimiyle beraber faydalar ve maliyeti kıyaslarsak birbirine göre durumu nasıl değişti? (Faydalar eğer zaman içinde arttıysa sizlerin ortak yönetim katılımınız, çevre koruması adına yaptıklarını nasıl etkiledi? – bu kısım eğer faydalarından daha çok bahsederse sorulacak aksi halde önceden sorulmayacak.)
- 5- Uygulanan kurallar zamanla değişti değil mi? Gelişti eksiltildi veya arttırıldı belki de. Bu kuralların içinde sizi doğrudan etkileyen kurallar neler mesela? (tür yasağı, sezon, kota ve malzeme kullanımı gibi.)
- 6- Bu kuralların belirlenmesinde sizlerin rolü oldu mu? Kararlar alınırken kooperatif olarak ne söylendi? kararlar alınırken süreç nasıl işledi? Sizler burada yıllardır bulunan kişiler olarak ne gibi bilgiler sağladınız?
- 7- Bu kurallarla beraber yasak avcılığı engellemek için korucular dışında başka ne yapıldı/yapılıyor? Sizler mesela yasak avlanan birini görünce/duyunca ihbar ediyor musunuz? Ya da yasak avlanan birini düşündüğünüzde sizin avınızı çalıyormuş gibi hissediyor musunuz?
- 8- İhbar sistemin bir sonraki adımı olarak korucu sistemi geliştirildi. Bu korucular özellikle balıkçılar içinden seçildi. Neye göre seçildi, siz bunun üzerine ne düşünüyorsunuz?
- 9- Yasak avcılıkta veya diğer kural ihlallerinde düşündüğümüzde daha yüksek ve caydırıcı cezaların olmasını ister miydiniz?
- 10- Geçmişten bugüne ortak çevre korumasının geliştirilmesiyle ilgili olarak kooperatif içinde, ticari balıkçılarla, akd ile veya devletle herhangi bir tartışma/çatışma durumu oldu mu? eğer olduysa bu tarz tartışmaların çözümü gerçekleşiyor mu? Gerçekleşiyorsa nasıl, gerçekleşmiyorsa neden? Balıkçıların çözüm sürecindeki rolü nedir ?
- 11- Kooperatifdeki ortak anlayış nasıl? Birbirine sahip çıkıyor mu balıkçılar? 2010 yılından itibaren değişen bir şey oldu mu? Örnek olarak kooperatif oy birliğiyle bir kural koymak veya veya değiştirmek istiyorsa devlet veya karar verici kişiler tarafından nasıl karşılanıyor bu durum?

12- Kooperatif içinde özel çözüm yöntemleri var mı? Varsa nelerdir?

13- Bu anlamda akd veya devlet veya kooperatif bu üçlü arasındaki ilişki nasıl? Birbiriyle olan bağlantıları nasıl sizin gözünüzden?

9.3 Appendix C. Fieldwork notes



9.4 Appendix D. Fieldwork photos



Figure D1. Fishermen's dock, Akyaka Cooperative



Figure D2. Akyaka fishery cooperative



Figure D3. The entrance to the dock. The location that fresh river water meets with the sea



Figure D4..PDoFA's boat



Figure D5. Fisherwomen taking the grey mullet out from the gillnet (non-member of Akyaka cooperative).



Figure D6. Fishes saved in the baskets until delivering them to the cooperative.