How could we convince fisheries stakeholders to establish no-take zones? Lessons from small-scale fisheries in Gökova Bay (eastern Mediterranean), Turkey

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ABSTRACT

This study aims to share the experiences and procedures followed on the way to establish 6 separate no-take zones (NTZ) within the marine protected area (MPA) in Gökova Bay, eastern Mediterranean, Turkey. Although many small and large budget projects and studies have been carried out in the Gökova Bay in the last decade pertaining directly or indirectly to small-scale fisheries, we have observed a falling rate of production and increasing unhappiness among fishermen. Over a couple of years, fishermen began to suffer from puffer fish damage (*Lagocephalus sceleratus*), which had been firstly recorded in their fishing zones in 2003. In the following years, landings of a commercially significant species, caramote prawn (*Penaeus kerathurus*), dramatically decreased in the area. Through illegal spearfishing – especially practiced during the night times by light and scuba equipment – large amounts of grouper species were harvested. This discontent peaked in 2009. We studied the production quantities and income records of local cooperatives between 2006 and 2009; the comparison revealed serious declines. Traditional management tools were insufficient neither for the fisherman nor for the preservation of the fish. We also detected a significant decrease in the incomes and catch quantities of fishermen, be them working independently or as cooperative shareholders. In 2010, we started organizing a series of meetings within the scope of a UNDP GEF Small grant Programme (GEF/SGP) project and invited all shareholders, fishermen leaders, cooperative managers, representatives of legislative bodies, scientists who had worked in the area as well as NGOs. The topic was obvious: to eradicate illegal fishing in Gökova Bay, to include all fishermen and shareholders in the management and revive the fisheries of the area to its days of abundance. To accomplish this, we observed that traditional management tools were insufficient and NTZs should be established within the MPA, and that both fishermen and NGOs should partake in the fight against illegal fishing. In July 2010, a number of 6 NTZs were established; a declaration was passed to regulate fisheries and fishing in the bay. This was a first success of the co-management movement. Efforts for establishing NTZs in the Gökova MPA also contributed to the development of co-management, which indeed is an important approach to fisheries management. The evaluations in the following three years contain plenty of information and experience that could well be the subject of another study.

INTRODUCTION

In our days, we face the consequences of diminishing resources and deterioration in the marine areas due to excessive use. The fact that underwater world is not visible to naked eye could be leading to the indifference of people towards the conditions of underwater living resources; however this attitude also results in a diminution of the services complex underwater ecosystems like fish stocks offer and thus confront us with further serious problems, solutions of which scientists and managers are looking for. The establishment of MPAs and NTZs and successful protection and management of these zones appear to be the foremost remedies for a sustainable use of marine resources and to overcome these problems. Traditional fisheries management measures and tools are not sufficient to protect biodiversity and ensure sustainability in marine fisheries (Holland and Brazee, 1996; Roberts, 1997; Ramos Esplá *et al.*, 2004). Despite long years of debate, for the last two decades ecosystem-based fisheries management (EBFM) and MPAs as tools for this approach, and more importantly NTZs, are considered as the most effective to improve fish stocks and the ecosystem as well as for a successful fisheries management (Holland and Brazee, 1996; Badalamenti *et al.*, 2000; Roberts *et al.*, 2001; Salm *et al.*, 2000; Sumaila *et al.*, 2000; Ramos Esplá *et al.*, 2004).

MPAs cover only 2.3 percent of world seas (Spalding *et al.*, 2012). In the Mediterranean, however, this ratio is 1.08 percent and NTZs merely account for 0.1 percent of the whole Mediterranean (Gabrié *et al.*, 2012). In Turkey, special environmental protection areas (SEPA) cover 2 866 km^2 marine and 10 493.08 km^2 land areas. The protected coastal line accounts for approximately 15 percent of the Turkish coastal line, with 1 134 km (Aktaş *et al.*, 2011). Although the situation hardly differs from that of the Mediterranean in terms of NTZs, co-management approaches in recent years have led to important steps and declarations of NTZs one after the other with the attendance of fishermen.

This study aims to share the experiences and procedure followed on the way to establish 6 separate NTZs within the MPA in Gökova Bay, eastern Mediterranean, Turkey.

FIGURE 1

Map of Gökova Bay and protected area (Southern Aegean Sea), Turkey

Source: AktaŞ *et al.*, 2011.

MATERIAL AND METHOD

Study site, background information and fisheries features of the Gökova Bay

There are a total of 16 SEPAs in Turkey. Part of the Gökova Bay including both marine and land areas was determined and declared as a SEPA by Decree no. 88/13019 of the Cabinet of Ministers (dated 12 June 1988). Afterwards, the border change of the Gökova SEPA was approved by Decree no. 90/1117 of the Cabinet of Ministers (dated 22 October 1990) (Aktaş *et al*., 2011). Considering only the marine area, Gökova Bay is one of the 8 special MPAs in Turkey (Figure 1). With a land area of 270 km^2 and a marine area of 827 km^2, the economy of the region relies on tourism, agriculture and fishing. Fishing in the region has developed as small-scale due to the conditions of the coastal line, the geography and productivity of the bay as well as the status of the area pertaining to conservation.

The Gökova MPA is abundant with eggs and larvae, reaching 667 eggs per m^2 in patches. The diversity of species is also relatively higher. Researchers have identified 723 macroscopic species belonging to 19 systematic groups within the Gökova MPA. Thirty-four of these species are protected under national and international treaties. Twenty-six species have moved to the Mediterranean through various routes and some have even become dominant over the local species in time (Okuş *et al*., 2006).

Three main settlements in the study area (Akyaka, Akçapınar, Sarnıç) also have their own fishery cooperatives. The Akcapinar Fishery Cooperative of Gökova and neighbourhood was established in 1973. The fishermen of Akyaka established their own cooperative in 1992. With the Akyaka Fishery Cooperative, not only a more organized fishery began in the bay but also relations improved with other stakeholders. Lastly, in 1999, a limited number of fishermen from the village of Sarnıç came together to establish the Sarnic-Akbük Fishery Cooperative. All these cooperatives had the aim of marketing the members' products at better prices and eliminate fishmongers. Cooperatives which helped to stop dynamite fishing are now fighting against illegal spearfishing which is practiced with scuba diving equipment (especially during night times using lights). Also, many of the fishery cooperatives have helped their members to market their own products and fight illegal fishing.

Today, there are 77 members of the fishery cooperatives with fisheries activities in Gökova. In all three fishery cooperatives, groups are small enough to retain the interest of fishers; additionally, there is no evidence of corruption, larceny or other dishonest activities in any of the cooperatives. All have been formed on the basis of local initiatives, in response to the fishers themselves (Ünal *et al*., 2009). All three cooperatives have managers. Two of them, which also offer marketing services (Akyaka and Akçapınar), have a full time employee. The salaries of the managers are symbolic as they are paid below the minimum wage. None of the cooperatives in the region has a professional manager. Almost 99 percent of the cooperatives' revenues come from marketing fish.

A total of 100 vessels are located around the Gökova MPA. Approximately 15 more vessels arrive occasionally from neighbouring areas. Gillnet and longline fisheries dominate the small-scale fishery in the bay. Species that belong to Sparidae and Epinephelinae are the target species in this region.

Although small-scale fishing dominates the fishing activity with about 115 fishing boats presently operating, there are 2 local purse seiners localized in the bay. Small-scale fishing boats are 6–12 meters in length, locally built and made of wood. Usually each boat is operated by one or two fishermen. They use gillnets, trammel nets and longlines. Additionally, the small-scale fishery provides more employments (approx. 200 fishers) than large-scale fishery all around the Gökova MPA.

Illegal fishing is considered to be the most important problem among local traditional fishers. It has disastrous environmental and socio-economic impacts in the Gökova Bay. It causes the depletion of local and high valued fish stocks which

play a vital role in traditional fishermen's life in Gökova Bay and it contributes to the decreasing income of local fishermen and unfair competition. Fishery cooperatives and coastguard succeeded to stop fishing by dynamite in the region a long time ago, but illegal spearfishing – especially practiced during the night times by light and scuba equipment – replaced dynamite fishing (Ünal and Erdem, 2009). Illegal fishing with spearfishing is practiced by professional divers (usually outsiders) with the help of a light source and scuba equipment at night time in many different locations of the bay. Cooperative authorities report that 2.5 tonnes of groupers, 1 tonne of *Dentex dentex*, 1.5–2 tonnes of *Dicentrarchus labrax* are caught in this way each season. It can be ascertained through the reports of cooperative authorities that the amount of illegally caught *Epinephelus aeneus, E. alexandrinus, Epinephelus guaza, Dentex dentex and Dicentrarchus labrax* is larger than the cooperative's annual catch of these species (C. Gorgun, pers. comm.). Pufferfish, (*Lagocephalus sceleratus*), firstly observed and recorded in 2003 in the Gökova Bay from the eastern Mediterranean by Akyol *et al.* (2005), has also been a serious problem threatening the gear and catches of fishermen.

Data

The study is based on three types of secondary data sources: earlier studies, quantitative data from cooperative records, qualitative data and information collected from prominent and experienced fishermen of the area.

Meetings with stakeholders

Meetings with stakeholders were held at three levels.

a) Information on catch zones, fish stocks and socio-economic conditions of fishermen were discussed in the first meetings attended by all stakeholders, especially the fishermen, with data gathered through scientific studies as well as surveys with fishermen or collected directly from cooperative records. Also in each meeting, an experienced and respected fisherman of the area was invited for the keynote speech and the information he gave was examined.

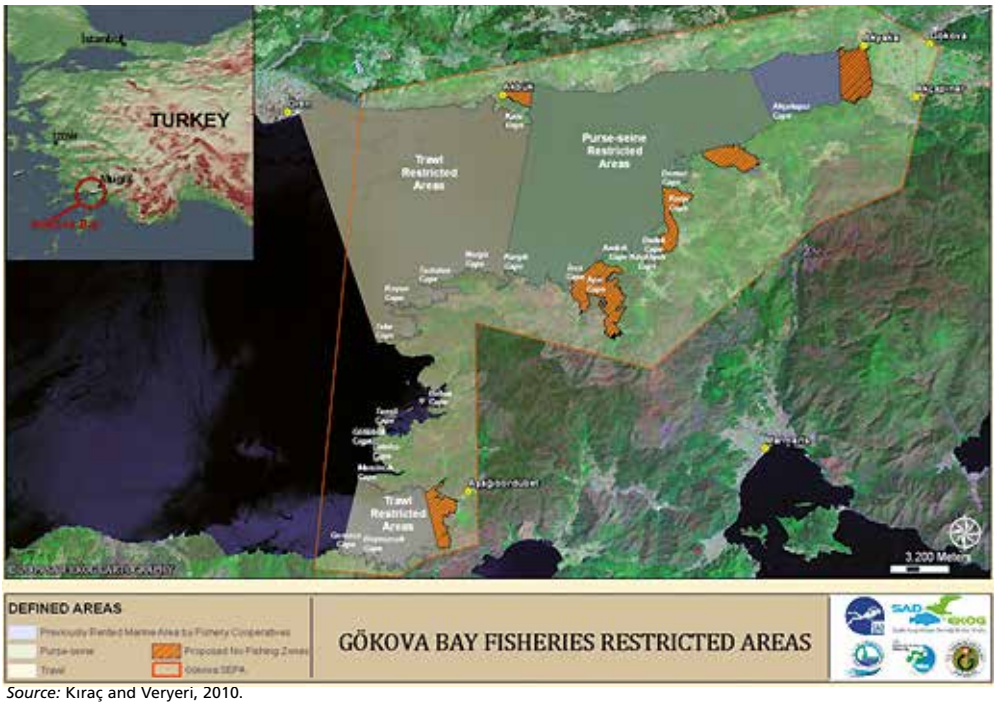
b) During the meetings, MPAs and NTZs were introduced along with successful examples from the world and the Mediterranean, which the stakeholders were also asked to contemplate on. Points were raised on the impossibility to sustain fisheries through traditional management measures such as minimum mesh size and minimum landing size and the need to adopt a new approach. The stakeholders were told that they needed to take on a role in this, that a new management approach and declaring NTZs could be profitable in the mid and long terms. At this point the fishermen were given time to think and asked to hold meetings among themselves in order to propose potential NTZs.

c) In the last phase, a request to close the potential zones proposed in the discussions to all kinds of fishing activities was brought to the managerial boards of cooperatives in the area for voting. Cooperative managers, NGO representatives, scientists studying or carrying projects in the area and representatives of related authorities came together in the capital, Ankara, for a final full-day meeting where the grounds on closing these areas to fishing activities, prospective profits, threats and problems were discussed in the details.

RESULTS

Among all stakeholders, a consensus was reached on declaring 6 critical areas as NTZs within the Gökova Bay (Figure 2). These areas were announced in the issue 27 637 of the Official Gazette (dated 10 July 2010) and appeared in the fishing notification which regulates fisheries.

FIGURE 2
Designated NTZs in Gökova Bay (eastern Mediterranean), Turkey



Source: Kıraç and Veryeri, 2010.

The NTZs shown in figure 2 were published in the Official Gazette in 2010 and were applied through fishing notifications which cover the existing regulations of commercial and recreational fisheries. These areas and their coordinates are shown below.

Any kind of fishing activity is prohibited in six selected areas within the Gökova Bay since 10 July 2010. The closed fishing areas in the Gökova Bay are as follows ("(16) In Gökova Bay):

- In Akbük harbour; at the eastern part of the line connecting 37° 01, 431' N – 28° 06,863' E and 37° 02,108' N – 28° 06,915' E;
- In Akyaka; at the eastern part of the line connecting the point 37° 03,041' N – 28° 18,600' E and 37° 01,540' N – 28° 18,600' E;
- In Çamlı; at the southern part of the line connecting the Çapa nose (37° 00,044' N – 28° 13,250' E) and the point 37° 00,240' N – 28° 14,731' E;
- At the eastern part of the line connecting Boncuk bay – Karaca harbour (36° 59, 016' N – 28° 11,828' E) and Dedek nose (36° 56, 967' N – 28° 11,618' E);
- At the south-eastern part of the line connecting English harbour (Değirmen Bükü) (36° 56, 170' N – 28° 08,358' E) and (36° 56,812' N – 28° 09,542' E);
- Bördübet harbour; at the eastern part of the line connecting two points (36° 49, 800' N – 28° 02,649' E) and (36° 48,156' N – 28° 03,176' E).

Although the declaration of NTZs relied on almost a decade of experience and well-formed relations, the solid results were obtained through a small-scale UNDP project (Kızılkaya and Yıldırım, 2010) in 2009.

The TAGEM project (2001–2004), the OCEANOS project (carried out between 2005 and 2006 on "The Identification of biodiversity in marine and coastal areas of Gökova Special Protection Area"), the EU SMAP III project-MED/2005/110-655 (SMAP III Gökova project, "Preparation and implementation of the integrated management action plan in collaboration with stakeholders for the inner Gökova Bay and the Sedir Island within Gökova SEPA", a 3-year project that ended in the first quarter of 2009), the Gökova ICMM project (from January 2009 to November 2010,

with a main objective to design a draft integrated coastal and marine management planning of the Gökova SEPA) and the "Strengthening the system of marine and coastal protected areas of Turkey" Project (2009–2014; aiming to facilitate the expansion of the national system of marine and coastal protected areas and to improve its management effectiveness) are noteworthy projects in terms of contribution to the process.

However an UNDP GEF project, the UNDP GEF project TUR/SGP/OP4/RAF/, (Kızılkaya and Yıldırım, 2010), started on May 2009 by the authors of this paper through the Underwater Research Society (SAD), was the milestone. The aim of this project was to close certain areas to fishing activities and thus to contribute to the improvement of the ecosystem. The fishermen stood against the idea at the first meeting, but, through further meetings and awareness studies, they became part of the project where they helped determine which areas to close. On 6 December 2009, a second local meeting was held in Akyaka (Gökova) with the participation of leaders of all fishery cooperatives, two respected and experienced fishers who were not members of cooperatives, scholars from fisheries department of the Ege University and Muğla University and the project team. Proposed closed fishing areas were decided upon considering the results of previous projects and taking into consideration demands of fishers. As the project continued, the project manager attended an international advanced course on the "Establishment of marine protected areas and management for fisheries" held in Zaragoza, Spain, in 2010 and introduced the project for establishing closed fishing areas in the Gökova Bay to receive expertise opinions, contribution and advice from international experts. Another meeting was held later to reach the final level, with the attendance of local fishery cooperatives, SAD and scientists on the scale and location of these areas. During the same month, on 26 March 2010, all representatives – Directorate General for Fisheries and Aquaculture (DGFA), Environmental Protection Agency for Special Areas (EPASA), Coast Guard Command, Undersecretariat of Maritime Affairs, General Command of Gendarmerie, SAD, universities, and fishery cooperatives from Gökova – gathered in Ankara and agreed unanimously to close these areas to all fishing activities. Stakeholders also agreed at this meeting to increase the protection around the Gökova Bay, especially in these areas. Soon after, in the last meeting held in Ankara, on 10 July 2010, a total of 6 areas and approximately 24 km^2 (the coordinates and names of which appeared in notice 2010/25 of the Official Gazette, issue 27637) were closed for all types of fishing activities. However, shore-based recreational fishing (angling) was permitted in two of these areas (Akyaka and Boncuk) which were announced in the issue 28388 of the Official Gazette (dated 18 August 2012).

The project titled "Towards community centered marine conservation in Gökova Bay, Turkey" and funded by Flora Fauna International started by the Mediterranean Conservation Society has a powerful impact on the effective protection of NTZs. The organization bought two boats, trained two of the fishermen and employed them as rangers. Their salaries are paid from the project budget and they are guarding the NTZs on a 24/7 basis, in coordination with the Coast Guard Command. The latest NTZs evaluation meeting was held on 6 September 2013 with the support of the project "Strengthening the System of Marine and Coastal Protected Areas of Turkey", and attended by all representatives of the stakeholder groups, especially the fishermen. Full support to continue NTZ was ensured in the meeting whereas a revision in two of the areas was decided.

DISCUSSION AND CONCLUSION

Fishermen are aware of overfishing and its consequences. Sala *et al.* (2011), in their study on certain coastal areas of Mediterranean including Gökova, report that there is an important loss of biodiversity due to serious desertification in the rocky habitats of Eastern Mediterranean. The study revealed that algae, which are the key species of

rocky habitats, are consumed by the Siganus spp. of Red Sea origin, revealing how the Mediterranean ecosystem is being altered by an invading species. During the meetings, fishermen were introduced with the results of such studies, and were explained how the loss in biodiversity and damage in the ecosystem play a role on decreasing fish stocks and that MPAs and NTZs could contribute to the resilience of the ecosystem against such invading species and loss of biological diversity.

Fishermen tend to agree with NTZ declaration only when transparent communication is made and when the results of scientific studies are shared with them and they are included as a party in the decision-making process. Six areas declared as NTZs, formerly used as catch zones by fishermen in the Gökova Bay, are a good example of this. Despite 3 years have passed since their declaration, the fact that these zones are still intact and better protected than before, the monitoring activities and annual evaluation meetings are noteworthy developments which raise hope for future studies. Co-operation and co-management have already begun in Gökova Bay fisheries. With a considerable part declared as SEPA, the required basis has now been established in Gökova so that its fisheries be specially managed as well.

One must also emphasize on Ornat's (2006) observation that one of the key elements affecting the success of NTZs is stakeholder participation. On the other hand, Yagi *et al.* (2010) reported that at least 1 161 MPAs exist in Japan. Out of these, 1 055 are implemented in conjunction with fishery regulations under the form of NTZs. More than 30 percent of the individual MPAs in Japan were established by self-imposed instruments agreed by members of fishery co-management organizations.

Although there are no more than a dozen of NTZs declared through the proposals and consents of fishermen or cooperatives in Turkey, the NTZs declared in Gökova, Datça and Kaş in recent years matter as a promising start. Increasing this number depends on the successful management and protection of the existing areas and their ability to offer a solid profit to both the fishermen and the ecosystem. Proper protection, control and monitoring activities in the NTZs are of utmost importance. At this stage, the gravity of the roles of decision-makers, scientists and NGOs in maintaining coordination is more eminent than ever.

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