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## Local community views on Marine Protected Areas on Greek islands

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## Summary

Marine Protected Areas (MPAs) are usually designated in areas with intense human activity. An MPA is therefore a complex socioeconomic system whose success and/or failure, and ability to deliver environmental, social and economic benefits, depend on local communities and their sensitivities. This paper examines how recently designated MPAs on three islands in the Cyclades group (Kythnos, Milos and Santorini), with differently structured local economies and levels of touristic development, are perceived by their local communities. Data are drawn from a phone survey of local residents, and the results show that the awareness, attitudes and perceptions of the local groups differ significantly depending on the area and their stake in the MPA. How much local communities know about the MPA regulatory framework and its location, past experiences and socioeconomic factors are deemed good predictors for the local communities' behaviors towards the MPAs. The positive interplay between the operation of an MPA and the development of scuba diving is also acknowledged, although the perceived trade-off between marine protection and fishers' revenue remains the main challenge facing MPA implementation. The paper's findings highlight the urgent need to deal with the information and knowledge deficit, and to bridge the gap between the perceptions and expectations of local communities and the MPAs' actual output. Applying a participatory approach to MPA decision-making and operation would build capacity for effective implementation. Thus, the delimitation of the protection zones within the MPAs, and the provision of specific constraints, should be based on both ecological and socioeconomic criteria.

## Introduction

Marine protected areas (MPAs) are a widely recognized, though still debated, policy instrument for the conservation and sustainable use of marine biodiversity (CBD, 2004; Craig, 2005). They can bring about ecological and economic benefits for local communities, such as increased employment and revenue from fisheries, sustainable tourism, and other activities within and beyond the MPAs (Rodriguez, 2015; Dudley, Stolton and Kettunen, 2013). The conservation and fisheries benefits are especially evident in the case of “no take” MPAs<sup>1</sup> (Lester and Halpern, 2008), while evidence reveals that protected areas and healthy biodiversity attract more tourists for scuba diving and snorkeling activities, thus generating economic benefits for local businesses. For example, MPAs in the Mendes islands (Spain) are an important source of income, and diving has enabled an extension of the tourist season (Ecorys, 2013, p. 72). Scuba diving accounts for up to 70% of the gross domestic product of these islands (OECD, 2017, p. 164) and scuba divers represent 9.3% of the total number of tourists (Ecorys, 2013, p. 27).

In this sense, MPAs, in addition to being tools for nature preservation and biodiversity conservation, are also widely acknowledged as socio-ecological systems. This means that human populations need to be considered as an integral part of ecosystems, not as an exogenous source of impacts, which is how they are viewed in many biological conservation studies (Armsworth et al., 2007). MPAs are thus social institutions and “not politically neutral instruments for marine conservation” (Jentoft et. al., 2012, p. 195); they are not created in a legal or social vacuum, but within existing social, economic and cultural contexts.

The Convention on Biological Diversity (CBD, 2017) and the Sustainable Development Goals (SDGs) aimed to expand the coverage of MPAs to 10% of coastal and marine areas by 2020. However, even though the global MPA coverage has increased, the evidence indicates that many MPAs are still a long way from achieving their intended objectives. Greater effort is thus required in designing and implementing effective MPAs which can generate the expected benefits (OECD, 2017). The greatest challenge to the expanded use of MPAs and their effective planning and implementation is the perceived trade-off among environmental protection, food production, and economic benefits for local communities. As the Food and Agriculture Organization of the United Nations suggests, if the planning and implementation of an MPA is conducted without involving local communities and resource users, and without considering their needs, there is a risk of failure (FAO, 2011). In this sense, factual knowledge and information on how the local communities perceive the MPA and the risks and opportunities it generates are essential, if the MPA is to be designed in a way that makes it environmentally effective and economically efficient.

Situated in the center of the Aegean Sea, the Cyclades region with its 36 inhabited islands is one of the most popular tourist destinations in Greece and the world. The marine waters of the Cyclades islands are unique ecosystems which host important marine habitats, such as the Posidonia Oceanica meadows and the unique Coralligenous reefs (maerl-tragana) (MoEE, 2016; Giakoumi & Kokkoris, 2013). However, economic development, overfishing, uncontrolled construction and, in many cases, mass tourism are threatening local ecosystems, as is the overall attractiveness of such areas (Ecorys,

<sup>1</sup> No-take zones are areas where fishing is totally prohibited.

2013). Greek Law 4519/2018 on Management Bodies for protected areas (Government Gazette 25/20.02.2018) stipulates the extension of the Natura 2000 network of Greek protected areas and the designation of MPAs for every island in the Cyclades. Given the islands' differing levels of economic and touristic development, the designation of protected areas has diverse impacts on local communities and poses different challenges for the sustainable use of natural resources, the effective management and implementation of MPAs, and therefore the protection of marine biodiversity around each island.

This paper sets out to examine the community perceptions of the recently designated MPAs on three Cyclades islands with different local economies and touristic development: Kythnos, Milos and Santorini. It describes the findings of a phone survey conducted on these islands in 2019 as part of the "Sustainable Tourism Development: Diving Tourism in MPAs and Thermal Tourism in Areas with Thermal/therapeutic natural resources" research project implemented by the National Center for Social Research (EKKE), Greece. The paper focuses on respondents' views of the socioeconomic impacts of the MPAs on the local community and economic sectors, their governance and management, as well as the potential benefits that may derive from the growth of diving tourism.

## The legislative framework of MPAs in Greece

Due to a long designation process, lack of political will, and obstruction on the part of local communities, Greece's designated MPAs still only covered 6% of its territorial waters by 2018. Specifically, there were only two MPAs: the National Marine Park of Alonissos—Northern Sporades (NMPANS) in the North Aegean Sea, which was established in 1992 with the aim of protecting the Mediterranean monk seal (*Monachus monachus*); and the National Marine Park of Zakynthos (NMPZ) in the Ionian Sea, which was established in 1999 to conserve the nesting beaches of the loggerhead sea turtle (*Caretta caretta*) in the Mediterranean. The two MPAs have internal zoning and apply different management measures and prohibitions, meaning that they are characterized by different degrees of protection.

Driven by European and international commitments to protect marine biodiversity<sup>2</sup>, Greece completed the evaluation of 183 marine areas in 2017 so as to expand the Natura 2000 network of protected areas. On the basis of scientific criteria and public consultation, 95 of these areas were selected for inclusion in the network with a view to preserving important habitats, such as the Posidonia Oceanica underwater meadows. This process has resulted in notable increases in the coverage of the national MPA network, which now comprises up to 20% of Greek territorial waters, and therefore far exceeds the international target (14.5%) (Greek Government, 2017).

Greek Law 4519/2018 addresses a long-term weakness in the governance of Greek protected areas, expanding the jurisdiction and territorial competences of the 28 existing Management Bodies in Greece and establishing eight new ones; together, these now cover all of the country's Natura 2000

<sup>2</sup> According to Aichi Target 11 under the Convention on Biological Diversity: "By 2020, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes". See also European Commission (2011) *Our life insurance, our natural capital: an EU biodiversity strategy to 2020*.

sites. Thus, the Management Body for Protected Areas in the Cyclades was formally established in 2018, with territorial competences covering both terrestrial and marine sites belonging to the Natura 2000 network on every island in the Cyclades (322,885 ha). Moreover, it resolves the management problems relating to the funding of the Protected Areas' Management Bodies, by stating that the necessary resources will be derived from the State budget. However, the lack of management plans still hinders the effective functioning of protected areas in Greece (OECD, 2020).

It should be noted that Law 4519/2018 only delimits the marine boundaries of protected areas, without delineating the protection zones and management framework for each area. To this end, the Hellenic Ministry of the Environment & Energy has launched a series of Special Environmental Studies, Presidential Decrees and Management Plans for all Natura 2000 sites, to be completed by 2022 (CHM-CBD, 2018). This legislation is considered a prerequisite for ensuring adequate protection and regulation for each MPA through the setting of conservation objectives and zoning systems, the specifying of management plans, goals and necessary activities, the determining of monitoring requirements, and the evaluation of management efficiency (European Commission, 2019c; OECD, 2020).<sup>3</sup>

Due to recurring delays, the designated protected areas have remained "Paper Parks", which is to say protected in name only. Consequently, in July 2019, the European Commission referred Greece to the Court of Justice of the EU for failing to establish the necessary objectives and measures for all Natura 2000 sites (European Commission, 2019c). While Greece is still failing in the establishment of well-managed protected areas, a new environmental law (Law 4685/2020) came into force in May 2020 which introduced a new management scheme for the country's protected areas. This initiative is indicative of the lack of continuity over time in the formulation and implementation of environmental policy in Greece, which remains one of its main weaknesses.

The new law provides *inter alia* for the abolishing of the Management Bodies previously established for the protected areas and the setting up of a new management body, the 'Organization for Natural Environment and Climate Change', under the auspices of the Hellenic Ministry of the Environment and Energy. This Organization will act as the central coordinator for all actions relating to the protected areas, with oversight over the 24 newly established Management Units.

The 36 former Management Bodies are merged into 24 Units and their respective local departments; their competences are assigned to the new Units. Local departments and committees representing local stakeholders and NGOs, are appointed with an advisory role in the management of protected areas. These reforms undermine both the decentralization of the decision-making process and the engagement of local stakeholders. On top of that, the new law does not ensure the effective functioning of the new management bodies, since it fails to address the main challenges facing MPA management in Greece in recent decades: namely, proper funding, essential infrastructure, and human resources (CHM-CBD, 2018).

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<sup>3</sup> In 2018, the European Commission urged Greece to respect its obligations under the Habitats Directive and establish conservation priorities, objectives and measures for all Natura 2000 sites. Then, in 2019, it called on Greece to improve the management of its Natura 2000 sites (European Commission 2019b).

## Local communities' perceptions of Marine Protected Areas

Exploring perceptions of marine ecosystems is important insomuch as anthropogenic pressures on ecosystems derive from individual choices. The perceptions of local communities determine their attitudes towards marine environment management policies, such as the designation of an MPA. Yet, research shows that, unlike other environmental problems such as climate change, the protection of the marine environment does not figure among the primary concerns of European citizens (Potts et al., 2016). It seems to be age that primarily determines an individual's level of concern about environmental quality, with older citizens tending to be more concerned, since they have witnessed the changes and are aware of environmental degradation (*ibid*).

*Eurobarometer* research on biodiversity reveals that, despite their limited information on relevant issues, Europeans are increasingly concerned about the degradation of the environment (European Commission 2019a). As much as 86% of EU-wide respondents believe that biodiversity loss is a "very" or "quite important" problem, while the corresponding percentage in Greece exceeds 96%. Europeans view water, air and soil pollution, as well as anthropogenic disasters and climate change, as the main threats to biodiversity. Overfishing in Europe and Greece is recognized as an important factor in marine biodiversity loss, but not the most important one. Only 64% of respondents in Greece and 49% in EU27 perceived biodiversity loss as something that will affect them on a personal level. Also, most European citizens (87%) are not willing to accept environmental degradation in exchange for economic development.

In Greece, 62% of respondents do not consider themselves to be well-informed about biodiversity loss, whereas the corresponding percentage for the EU27 is 54%. However, in both Greece and the EU27, the highest percentages of poorly informed citizens are reported in rural or provincial areas. In total, 65% have heard about the Natura 2000 network, while the corresponding percentage in the EU27 is 27%. Over 96% of respondents in the EU27 consider protected areas, such as the Natura 2000 network, to be very important, acknowledging their role in protecting endangered species and preventing the degradation of marine areas of rich and/or rare biodiversity. A large proportion of participants are in favor of the economic compensation of fishermen and farmers who contribute to the preservation of biodiversity (93% in Greece and 86% in the EU27).

Although the number of MPAs has increased worldwide in recent decades (Thorpe et al., 2011), the experience acquired to date has demonstrated that effectively implementing MPAs is far more challenging than was anticipated in 2010, when the Convention on Biological Diversity set the target of 10% of marine and coastal areas being designated protected areas by 2020 (UN 2010). Some crucial inconsistencies have been revealed between the goals pursued and the actual results; these have been attributed to environmental, social and cultural factors which are inextricably woven into the particularities of a given area (Thorpe et al., 2011, Pomeroy, Mascia & Pollnac, 2007). Scholars point out that socioeconomic and political factors often play a more important role than environmental aspects in the designation, management and effectiveness of MPAs (Pomeroy et al., 2004, Ferse et al., 2010).

In several cases, the ineffective operation of MPAs has been attributed to designation and planning that is both information-deficient and non-participatory, as well as to inappropriate legal and institutional frameworks which were drawn up and put in place without the local particularities being

taken into account. Many protected areas have been established by means of a conventional top-down approach (Andrade & Rhodes, 2012). However, recent evidence indicates that conservation policies can prove extremely difficult to enforce when local communities are not involved in the management of protected areas, and their needs and aspirations are ignored (Aswani & Weiant, 2004). Andrade and Rhodes (2012) conducted a meta-analysis of 55 case studies to identify the main factors that influence the level of community compliance with regulations applied in protected areas such as the existence of a buffer zone, the level of protection, the gross domestic product per capita, the population density and the level of local community participation in the management of the protected area. They found that local community participation in the decision-making process was the only variable that correlated significantly with the level of compliance with the measures applied. Assessing the attitudes of Maltese residents towards MPAs, Mifsud and Verret (2015) found that, even though local communities were in favor of protecting Malta's marine environment and acknowledged its rich biodiversity, the level of their knowledge about the marine environment and their awareness of local MPAs were both notably low. The survey conducted by Ciocănea et al. (2016) into public perceptions of protected areas in Romania's Iron Gates Natural Park demonstrates that, although most respondents had a positive attitude towards protected areas, limited knowledge, poor communication with authorities, and a lack of local participation in conservation activities remain the main factors that undermine the effectiveness of public policies.

According to Pomeroy et al. (2004), MPAs cannot be considered simply as policy tools, since they constitute systems of social and institutional regulations, involving various stakeholders with, more often than not, contradictory interests. In many cases, MPAs have actually met with skepticism from local communities, indeed even with outright rejection, in total contrast with the expectations formed during the designation process (Christie, 2004; Bustamante, Wellington & Troya, 2001). This backlash on the part of local communities may stem from inadequate information about what an MPA actually is and what it seeks to achieve. It may also derive from misconceptions or misinterpretations of the legal framework, which result in unfulfilled expectations with regard to the impact of an MPA. In addition, local communities may support MPA designation in general, just not in their own backyard, or they may question the MPAs' capacity to solve local problems (Pieraccini & Cardwell, 2016; Jentoft et al., 2012; Mangi & Austen, 2008), which raises the issue of environmental justice.

The Theory of Reasoned Action (Fishbein & Ajzen, 1975) and its extension, the Theory of Planned Behavior (Ajzen, 1991), have been widely applied to explain pro-environmental behavior. According to these theories, behavioral intentions are the most important predictors of a given behavior and are influenced by attitudes (i.e., a positive or negative evaluation of the relevant behavior, considering the outcomes of the behavior), subjective norms (i.e., individuals' perceptions of what others think about a given behavior), and perceived behavioral control (i.e., individuals' perceptions of their abilities to perform the behavior at hand). Perceived behavioral control also relates to the extent to which the individual perceives that a given behavior will successfully promote specific goals. Moreover, attitudes, norms and perceived behavioral control tend to be influenced by a wide range of additional factors, including demographic and socioeconomic factors, general outlooks and values, past experience and knowledge (Ajzen & Fishbein, 2005), as well as contextual factors such as laws and government regulations (Stern, 2000). Moreover, individual positive attitudes and

intentions may be hindered by the perceived absence of skills, knowledge or material items required to perform a given behavior (St John et al., 2010).

Even though attitudes and norms may be good predictors of how local residents behave towards protected areas, they are strongly influenced by demographic factors and perceptions of protected areas and locations (St John et al., 2010; Castilho et al., 2018). When a local community is positive about the establishment of a protected area, the presumption is that they must feel the benefits outweigh the costs implied by the new regulatory framework. This in turn depends on “the scale of benefits in relation to residents’ dependence on local resources, their knowledge and its potential to provide mostly tangible benefits” (Park et al., 2020). The study by Ward et al. (2018) demonstrates that participation in protected-area governance is limited by miscommunication and an unawareness of who can get involved and how. Limited benefits and high costs, as well as the uneven distribution of both within and between communities, were the prominent perceptions among local residents in the study area.

Some scholars point out that local communities’ attitudes towards MPAs are not associated with the MPA per se, nor with its legislative framework, but is primarily determined by the “images” these groups have configured concerning MPAs. For Jentoft et al. (2010), “an image is a representation of what people believe, what they perceive could happen, and what they think should be”. Images “are never an exclusively individual activity” but are “constructed by individuals in social settings” (Shore, 1996, p. 250). These “images” rest on underlying perceptions and attitudes and are inextricably associated with the sociocultural environment in which they take shape. Thus, the different “images” of diverse groups may have strong links to the information provided by the media, to local consultations carried out in the past regarding natural resource management, and to the experience which the actors acquired during the designation process in another area. These “images” are neither constant nor convertible. A positive shift in local communities’ attitudes is likely an aftereffect of a cognitive procedure stemming from substantial and meaningful participation in management bodies and the communities’ becoming familiar with the new management framework. It is also connected to the information and experiences acquired during the designation and implementation stage. Nonetheless, the initial attitude of local communities may also take a negative turn (Jentoft et al., 2012).

Several scholars consider local community involvement in MPAs’ designation, establishment and management procedures to be a prerequisite for their effectiveness (Giakoumi et al., 2018; Musa & Dimmock, 2015; Pomeroy & Duvere, 2008). The participation of local stakeholders may also serve to diffuse information and familiarize the community with the new framework, thus gradually altering the local population’s attitudes towards the MPA. Furthermore, when local actors feel alienated from the decision-making process and neither support the endeavor nor comply with the rules as a result, it will inevitably undermine implementation (Humphreys & Herbert, 2018, Pita et al., 2011). It is therefore important to understand the “images” that lie behind a community’s opinions and attitudes, because their bargaining capacity and interpretative scripts vary from one area to another. Answering questions relating to “what, why, how” these groups think will not provide insights into these different perceptions; rather, one must also ask “who, where and when” is involved in shaping these views (Jentoft et al., 2012).

## Methodology for conducting the survey

A phone survey was conducted by the National Center of Social Research (EKKE) on three islands in the Cyclades group in March 2019 in the framework of the “Sustainable Tourism Development: Diving Tourism in MPAs and Thermal Tourism” research project. The survey explored the residents’ perceptions of the MPAs’ socioeconomic impacts on the local community and economy, their governance and management, as well as the potential benefits to be derived from the development of diving tourism.

The population surveyed consisted of all the adult permanent residents of Kythnos, Milos, and Santorini, with ‘permanent resident’ defined as someone who lives on the island for more than five months in a year. A net sample size of 705 respondents was determined, limiting the total estimation error to within  $\pm 3.7\%$  at the 95% confidence level.

Sampling was conducted in accordance with the disproportional stratified sampling method: The research population was divided by island into three strata. An independent sample of each stratum was then selected using predetermined quotas for age and gender based on the latest Hellenic Statistical Authority (ELSTAT) census, which was held in 2011. In all, 405 respondents were selected from Santorini, 201 from Milos, and 99 from Kythnos. Men were slightly over-represented, at 51.2%.

Kythnos and Milos have the highest percentage of residents aged over 50 and hence the lowest percentages of residents in the most dynamic age group--in terms of the labor market—of the under-35s. In contrast, on Santorini, 38% of the population is under 35, while only 4.4% of residents are over 65.

The questionnaire tapped into awareness of MPAs designated in the study area, asking respondents to: estimate the MPAs’ contribution to the local economy and community; assess the stance of the local community and interest groups towards the operation of the MPA; express their views on the impact of diving tourism to local development.

## Results

Most of the respondents declared that they know what an MPA is. However, significant differences were recorded between the three islands in terms of the percentage of respondents who are aware of the delimitation of an MPA on their island. On Milos, 55.7% of respondents stated that they knew an MPA has been designated around the island, while on Kythnos and Santorini this percentage was 30.3% and 35.8% respectively (Table 1).

As for the exact location of the MPA on each island, the answers given broadly reference areas in relation to which a local consultation procedure was held in the past. The highest percentage of “correct answers” (almost 40%) was recorded on Milos, where the locations cited by the respondents coincided completely or partially with the area where the MPA has actually been demarcated.

		Kythnos	Milos	Santorini	Total
		%	%	%	%
Knowledge of what an MPA is	Yes	59.6	69.2	62.0	63.7
	No	40.4	30.8	38.0	36.3
Awareness of a designated MPAY	Yes	30.3	55.7	35.8	40.7
	No	40.4	20.9	38.8	33.9
	NA	29.3	23.4	25.4	25.4
Awareness of exact location	Yes	13.1	36.8	25.4	27.0
	No	17.2	18.9	10.4	13.8
	NA	69.7	44.3	64.2	59.3

Table 1. Knowledge of the definition, designation and location of MPAs

The highest percentages of poorly informed citizens on all three islands are recorded among the younger age groups (i.e., up to 49 years old), individuals employed in tourism and commerce, the unemployed/non-employed, and respondents with a very low or medium level of education (high school graduates). The low level of awareness among people employed in tourism is quite surprising; even more counterintuitive is the limited awareness of young people, as they constitute the most dynamic age group in terms both of the labor market and the shaping of future local development.

Irrespective of their level of awareness, most of the participants on all three islands (77.2%) saw MPAs as an opportunity for local development, believing they would contribute not only to touristic development, but also to a reduction in fishing-related activities and to enhanced environmental protection. In all, 80.7% of the respondents from Santorini, the most developed and populated island in the study, stated that the MPA would be an opportunity for the region, while the same view was also held, though less strongly, on the less developed islands of Milos and Kythnos (Table 2). Moreover, even those who believed the MPA would impede local development generally believed that it would enhance environmental protection.

	Kythnos	Milos	Santorini	Total
	%	%	%	%
<b>In terms of the development of the island, MPAs are:</b>				
a barrier	10.1	10.9	8.4	9.4
an opportunity	74.7	71.1	80.7	77.2
NA	15.2	17.9	10.9	13.5
<b>MPAs will contribute to</b>				
environmental protection	81.8	89.6	92.3	90.1
a reduction in fishing	61.6	71.1	69.6	68.9
restrictions on other economic activities	33.3	42.8	46.4	43.5
tourist development	66.7	63.2	66.7	65.7
other	1.0	2.5	1.7	1.8
nothing	5.1	1.5	1.0	1.7
NA	4.0	2.0	2.0	2.3

Table 2. MPA and local development

Even though most of the participants anticipate that the establishment of the MPA will have positive impacts, this view is even more widespread on Santorini (56.3%) and among individuals employed in tourism, services and the secondary sector. Despite the high level of awareness about MPAs among the residents of Milos, it appears that they are more reluctant than respondents on the other two islands to express the opinion that the outcome of establishing the MPA will be “neither positive nor negative” or “negative/very negative” (Table 3). It thus appears that the level of awareness does not seem to affect respondents’ attitudes concerning the positive and/or negative impacts of MPAs on local communities. Moreover, unemployed and economically inactive people tend to be the most reluctant in all that concerns the contribution of the MPA to the area’s development.

	Kythnos	Milos	Santorini	Total
The MPA's outcomes for the local economy will be:	%	%	%	%
Positive, very positive	50.5	46.8	56.3	52.8
Neither positive, nor negative	7.1	15.4	13.8	13.3
Both positive and negative	27.3	20.4	15.3	18.4
Negative / very negative	7.1	10.4	8.4	8.8
NA	8.1	7.0	6.2	6.7

*Table 3. Estimated outcomes of the MPA for the local economy*

Half of the residents of all three islands (51.6%) think that the establishment of the MPA will have negative impacts on fishers. Nevertheless, the prevailing belief among the local community is that the MPA will contribute positively to all local professions.

Moreover, most of the respondents on Santorini believe that the local community's attitude to the establishing of the MPA will be either positive or neutral (24.7%). On Kythnos, most respondents believed that the local community would be negatively predisposed (31.3%).

The respondents' estimations regarding the power of local interest groups to hinder the implementation of the MPA vary according to the perceived "opposing groups", and their influence, on each island. Most of the residents on all three islands maintain that it is the fishermen who are more likely to react to the establishment of an MPA (51.8%), with the highest proportion being on Kythnos, where 59.6% of residents believe this to be the case, even though they do not believe that, at the end of the day, fishermen can actually block the implementation of the MPA. In contrast, on Santorini, 36% of respondents believed that "opposing groups" are capable of hindering effective MPA implementation. In this case, however, "opposing groups" included not only the fishermen, but also hoteliers and others involved in tourism-related businesses.

Regarding how developed diving tourism is on each island, there are significant differences between the views of the inhabitants of Kythnos and Milos, on the one hand, and Santorini, on the other, where a markedly higher percentage (68.6%) of respondents stated that diving tourism was highly developed.

Most of the participants on all three islands believed that there are development opportunities for diving tourism in their area, stating that such a development would help to attract tourists, increase employment, enhance environmental protection and increase local income, as well as making their island's touristic product more competitive. Furthermore, residents of all three islands anticipate that the MPA will greatly favor the development of diving tourism.

## Discussion

The institutional framework for diving tourism, and in particular for diving parks and underwater museums, has been in place in Greece since 2005. However, the industry still has great development potential. Even though the growth of tourism, and particularly of diving tourism, has been different on the three islands, most respondents expect that enhancing the local scuba diving will attract more visitors and contribute to the local vacation industry. What is more, the perception and estimation of the size and importance of diving tourism does not necessarily coincide with real world indications, such as the number of the diving centers in each place. As expected, most of Santorini's residents believe that diving tourism is highly developed on their island, which has eight diving centers. However, on Kythnos, where only one diving center is operational, residents still declare that diving tourism is highly developed. This is perhaps because the diving center there enjoys recognition and acceptance, given the "soft" development of Kythnos' tourist industry.

Studies claim that the operation of MPAs can contribute decisively to the growth of diving tourism, encouraging synergy between environmental protection and leisure industry development (Roncin et al., 2008). This is also the prevailing view among our respondents, irrespective of their knowledge about MPAs and the level to which diving tourism has developed on their island. In many cases, the designation of an area as protected is enough to attract visitors (designation effect) (Blom et al., 2012; Roncin et al., 2008). However, the development of diving tourism is inextricably linked to the quality of the natural environment, and therefore to the ecological goals set for the MPAs being achieved.

This analysis demonstrates the substantial information deficit in the local community in relation to the MPAs designated on the three islands by Law 4519/2018 in February 2018. Although most respondents know what an MPA is, it seems they either *do not know* or *think they know* where the area designated as the MPA is actually located. In particular, citizens' responses regarding the location of the MPA coincide with areas which were subject to local discussions about designation in the past. Therefore, the level of awareness, as well as the local communities' positive or negative perceptions of the operation of the MPA, seem to be influenced by past consultations at the local level and by their experience regarding the governance of the MPA and the impact the operation of MPAs has had on other areas.

On Milos, previous local consultations about the establishment of an MPA may well have contributed to the residents' high level of awareness both of the existence and the location of the MPA. Similarly, on Santorini, where the designation of an MPA was discussed for many years and a consensus was reached between the stakeholders, the majority of the local community is in favor of the operation of the MPA on their island. In contrast, on Kythnos, the local community's previous experience of the operation of a marine shelter on nearby Gyaros island has fed into misunderstandings regarding the potential impacts of MPAs. Moreover, the island's large fishing fleet, and fears of possible restrictions on fishing, have made the local community more skeptical about the operation of a MPA. As Jentoft et al. (2012, p. 186) argue: "It is not the MPA itself and the promises it holds that determine how stakeholders respond; instead, it is the images that they have about what the MPA is and does that determines their reaction". Local communities may have negative experiences of MPA

governance elsewhere which influence how they perceive future initiatives relating to the operation of an MPA in their own area (Gonzalez & Jentoft, 2011).

The majority of respondents recognize the need for marine conservation and the potential contribution of the designated MPA to environmental protection through fishing restrictions and the tourism development. Other studies reveal that most local stakeholders are likely to acknowledge the damage economic activities cause to the marine environment, and the positive impacts the operation of MPAs can have in halting further decline (Jentoft et al., 2012). Among the stakeholders, fishermen are the local group with the most hesitant (if not negative) stance towards the MPAs (Pita et al., 2011; Dimench et al., 2009; Jones, 2008). This is why the residents of Kythnos, where fisheries accounts for a larger share of the local economy than on Santorini or Milos, envisage professional fishermen being the group most likely to react against the establishing of an MPA on their island, since “stakeholders arrive at their image of the MPA based on what they believe it might do to, and for, them” (Jentoft et al., 2012). Given an absence of relevant information, fear of the unknown may prevail and the operation of the MPA may disrupt social cohesion, especially in areas with less developed tourist industries and larger fishing fleets. According to Park et al. (2020): “As the local people are highly dependent on resources, they are more likely to support only ‘conditioned conservation’, which recognizes the value of biodiversity not only as aesthetic, ethical, or ecological, but also as a means to improve the quality of life of the local people”.

## Conclusions

A comprehensive understanding of the various factors that can impact on the attitudes and behaviors of local communities towards the establishment of an MPA is essential in order to predict the potential effectiveness a given action may have in influencing the behavior of local communities and enhancing the implementation of MPA regulations (St John et al., 2010). In line with previous studies, our research shows that the attitudes and perceptions of local groups differ significantly depending on the area and their stake in the MPA (Pita et al., 2011). In addition, it shows that there is an urgent need to deal with the information and knowledge deficit with regard to the operation and impacts of the MPAs at a local level, and to bridge the gap between local communities’ perceptions and expectations. A key finding of our research is that, although the majority of the citizens on all three islands acknowledge the positive interplay between the operation of an MPA and the development of scuba diving tourism, the perceived trade-off between marine protection and revenue from fishing remains a major challenge for MPA implementation.

This analysis demonstrates that the level of the local communities’ knowledge about the MPA’s regulatory framework, past experiences, the location of the MPA and socioeconomic factors (i.e., the role played by the fishing and tourism sectors in the local economy) may serve as good predictors of how the local residents will behave in relation to the protected areas. Although analysis of the perceptions of local communities alone may not accurately predict their actual behavior, empirical studies and theories on environmental behavior have verified the association between these factors and pro-environmental behavior and attitudes with regard to protected areas (Ajzen & Fishbein, 2005, Park et al., 2020).

The formal and brief consultation process that is usually followed before the adoption of any legislative act in Greece seems to have been insufficient to effectively inform the local actors and community. Communicating knowledge on marine conservation and improving communication among the institutions involved at the central and local level is considered essential for building trust in management bodies, increasing support for and enhancing local community awareness of MPA management and implementation (Abecasis et al., 2013). Communication addressing the local communities' image and perceptions of the MPA concept should be implemented in the early stages of the MPA design (Jentoft et al., 2012). In this way, citizens will feel that their voice is being heard in local deliberation processes, which will encourage them to engage meaningfully and not to perceive themselves as losers at the receiving end of environmental injustice. Several studies have shown that the non-engagement of local stakeholders, and fishers in particular, has a negative effect on the outcomes of the MPA: since fishermen feel alienated from the decision-making process, they will not support this initiative, will not comply with the new rules, and will inevitably undermine its implementation (Humphreys & Herbert, 2018; Pita et al., 2011).

A participatory approach to decision-making with regard to, and the operation of, MPAs is a prerequisite for encouraging the effective implementation of their marine conservation provisions (Giakoumi et al., 2018; Musa & Dimmock, 2015; Pomeroy & Duvere, 2008; Andrade & Rhodes, 2012). The participation of all the stakeholders involved in the MPA's managing body can act as a means of informing and familiarizing them with the new protection framework, and gradually change their perceptions of the newly established MPA.

Therefore, understanding the socioeconomic environment in which the MPAs are established, as well as the different sensibilities of the local communities with regard to the MPAs' operation, are considered essential for the designation, assessment and effective implementation of MPAs (Pomeroy et al., 2004). In this respect, the delimitation of protection zones within MPAs, and the imposition of specific constraints, should be based on both ecological and socioeconomic criteria.

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