STAKEHOLDER ANALYSIS IN THE PORTUGUESE ARTIFICIAL REEF CONTEXT: WINNERS AND LOSERS*

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ABSTRACT

In this stakeholder analysis related to the artificial reef (AR) program located in the Algarve (Southern Portugal mainland) 21 different stakeholder clusters were identified. Stakeholders were classified as primary, secondary and external. It was found that stakeholder interaction with the structures can be of private, public or cooperative interest. In the analysis there were also identified and mapped the impact of the program on stakeholders and their power to influence the ARs' outcomes. Stakeholders' interactions with the ARs were studied, along with their likely attitudes and behavior towards the man-made structures. Finally, all stakeholder clusters were classified according to their expected degree of involvement throughout the different AR stages. The purpose of this stakeholder analysis was to find out winners and losers connected with the reef deployment. It was found that most stakeholder clusters were affected positively, but also four clusters affected negatively. However, it is believed that those that may be affected negatively do not pose a serious threat to the expected AR development along its lifetime.

RESUMO

Nesta análise de intervenientes relativa ao programa de recifes artificiais (RAs) localizado na costa do Algarve (Sul de Portugal continental) foram identificados 21 grupos de atores distintos. Os intervenientes foram classificados em 3 grupos: primários, secundários e externos. Verificou-se que o interesse dos intervenientes face às estruturas recifais (interação) pode ser do tipo privado, público ou cooperativo. Na análise foram identificados os impactos do projeto sobre os intervenientes e o poder destes para influenciar os resultados do programa recifal. Foram definidas quais as interações e possíveis atitudes e comportamento dos intervenientes em relação aos RAs. Finalmente, todos os grupos de intervenientes foram classificados de acordo com o grau de envolvimento esperado ao longo das diferentes fases do programa recifal. O propósito desta análise de intervenientes foi identificar ganhadores e perdedores relacionados com a criação dos recifes artificiais. Verificou-se que a maioria dos grupos de intervenientes pode ser afetado positivamente, mas existem quatro grupos supostamente afetados negativamente. Contudo, acredita-se que estes últimos não constituem um risco sério ao desenvolvimento do programa recifal no decurso do seu tempo de vida.

Descritores: Stakeholder analysis, Artificial reefs, Project impact, Algarve (Portugal).
Descritores: Análise de grupos de intervenientes, Impacto do projeto, Recifes artificiais, Algarve (Portugal).

INTRODUCTION

One innovative measure taken to tackle the problem of diminishing fish stocks due to excess fishing pressure is the 'supply side' decision to deploy artificial reefs (ARs) in appropriate locations (SEAMAN JR; JENSEN, 2000). Especially in recent decades several AR projects have been developed in many places around the world (PICKERING et al., 1998). Most of the scientific research on ARs is related to the biological sciences, and there is still a lack of studies on social science aspects of ARs (SEAMAN JR et al., 1989; BORTONE, 2006). Nonetheless, some research has been undertaken using stakeholder analysis within the context of AR evaluation (e.g. MILON et al., 2000; SUTTON; BUSHNELL, 2007). Studies focusing on the particular aspects of conflicting views among stakeholders can be found in the literature on the decommissioning of

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(†) This paper is dedicated to the memory of Professor David Whitmarsh, who passed away on August 28, 2010, after a battle against cancer.

structures used in the oil industry for the purpose of rigs-to-reefs (BAINE, 2002; SCHROEDER; LOVE, 2004). However, each of these studies is either too generalized or just focuses on a particular group of stakeholders in a specific case study.

The Portuguese experience of AR projects includes that related to the Madeira Archipelago, which became operational in the early 1980s, but is mainly based on the structures deployed since the late 1980s in the Algarve region. Most of the AR actions consisted on the deployment of blocks or concrete modules, but sunken structures such as ships and barges have also been used (RAMOS et al., 2006). In the case of the Algarve ARs, the different groups of people involved are concerned about the functioning of the structures and their real or potential value. These people also want to know if the stated policy objectives have been accomplished (WHITMARSH et al., 2008).

It is of the greatest importance that a stakeholder analysis of an AR project should be undertaken in order to get to know how useful ARs are, from the human point of view, as related to different activities such as economic, scientific, recreational or others. When AR deployment is on the agenda, voices emerge supporting it, while others may oppose it. According to authors such as MILON et al. (2000) and WHITMARSH et al. (2008), stakeholders supporting the idea are those who expect some future benefit from the outcomes generated by the AR.

The purpose of the present paper is to make some contribution to filling in the gap in social analysis related to artificial reefs. In this study it is intended to carry out a simple stakeholder analysis of people involved with AR development, their use or through any other relationship, based on our case experience in the Algarve. Some stakeholder analyses use a dynamic stakeholder mapping process throughout the life stages of the project in which for instance stakeholder power and interest varies (OLANDER; LANDIN, 2005). In the stakeholder analysis of the present study we define a static stakeholder mapping process setting out the positioning of influence and impact, and assume a dynamic position just with regard to the different stages of the project.

RATIONALE FOR STAKEHOLDER: THEORY, MAPPING, AND ANALYSIS

The term *stakeholder* emerged in 1963. But the theoretical background on stakeholders was chiefly developed in the 1980s based on the strategic management of the firm (FREEMAN, 1984). Fundamentally, the theory is based on the ethics addressing the 'principle of who and what really counts', when dealing with values in management actions of an organization, including in a broader sense also a project or a program. There are several definitions for the term 'stakeholder'. For instance, Freeman's classic definition of stakeholder is 'any group or individual who can affect or is affected by the achievement of the organization's objectives' (op. cit.: 46). Clarkson (1995), however, defines stakeholders as 'persons or groups that have, or claim, ownership, rights, or interests in a corporation and its activities, past, present, or future'. A stake is something involving some degree of risk and which can, therefore, be lost (DONALDSON; PRESTON, 1995). Basically, a stakeholder is any person that has an interest in any given subject and can be positively or negatively impacted by, or stimulates an impact on the actions of an organization according to their power or influence (BRUGHA; VARVASOVSZKY, 2000; MEFFE et al., 2002). Mitchell et al. (1997) developed a model in which stakeholders can be identified if they possess some attributes such as: (1) power to influence, (2) legitimacy of the relationship, and (3) urgency of a claim. The various combinations of these attributes may result in stakeholders being classified in groups from the 'Dormant stakeholder' to the 'Definitive stakeholder'. Jones and Wicks (1999) discovered basically two divergent currents on stakeholder theory in the literature: one *normative*, and the other *instrumental*. Unhappy with the inadequacies of the previous currents of opinion, they defended a third called *convergent* stakeholder theory, whereby they demonstrate how managers can create approaches to make projects work. It basically involves a pragmatic combination of previous theories by applying instrumental theory ('what happens if?') to normative cores to see if they result in personally and organizationally viable outcomes.

Whatever the philosophy of stakeholder theory, it is understood that stakeholders need to be identified and their power and influence mapped in order to understand their impact on projects (BOURNE; WALKER, 2005; DE BAKKER; DEN HOND, 2008). These two attributes together can be used in the construction of a power/interest or similar matrix. The intention of such a matrix is to identify and classify stakeholders, whether by the power they hold or by the degree of interest showed in a project and can be used to evaluate the potential influence of stakeholders (MARKWICK, 2000). Stakeholder mapping can be bi-dimensional (e.g. influence versus interest, power versus impact, power versus interest. OLANDER; LANDIN, 2005), or tri-dimensional (e.g. power versus interest versus attitude), as described by some authors (e.g. BOURNE; WALKER, 2005; MURRAY-WEBSTER; SIMON, 2006). Stakeholder mapping is commonly used as a tool in management disciplines not only for the identification of stakeholders, but also for establishing priorities in

terms of managing stakeholder relationships (FREEMAN; REED, 1998). However, there are several commonly used methods for stakeholder mapping. For instance, Savage et al. (1991) have built up an approach by which stakeholders are ordered according to their potential either as a threat or as a cooperating body.

In terms of stakeholder typology, stakeholders may be defined in different ways (FREEMAN, 1984). For instance, Clarkson (1995) categorizes stakeholders according to their importance to the organization and according to their organizational location. According to their importance stakeholders are categorized as *primary* if they play a role considered fundamental to keeping the organization alive and in good shape and *secondary* if there is some interaction with the organization but to an extent that is not essential to its survival. In its turn, according to their organizational location, stakeholders are considered as: *internal* if they operate within the bounds of the organization, *interface* if they basically interact with external surroundings and *external* stakeholders if they are related to other organizations. The resultant relationships may diverge widely from collaboration to competition (BRUGHA; VARVASOVSZKY, 2000). Similarly, Wijnberg (2000) draws a distinction between primary/secondary stakeholders and between internal/external ones. Buysse and Verbeke (2003) introduced the distinction between internal primary stakeholders and external primary stakeholders. MACARTHUR (1997) in his revised method for stakeholder analysis gives an alternative grouping of stakeholders. Those people and groups that are the intended beneficiaries or directly affected by the project are called *primary* stakeholders. Those that deliver the project are *secondary* stakeholders, whether or not they belong to the public or private sector. Finally, the others that may derive some benefit from the project even if they are not directly involved in it, but which have some interest in its outcomes are denominated *external* stakeholders.

A stakeholder analysis refers to the action of assessing stakeholder attitudes towards a project. It can be carried out once or on a regular basis (HARVEY; SCHAEFER, 2001). Assessment on a regular basis is necessary because stakeholders' influence is not static. The stakeholder analysis must be conducted and updated throughout the life cycle of the project, with the purpose of gaining knowledge about the potential influence various stakeholders have at different stages of the project and because stakeholder attitudes may change over time (OLANDER; LANDIN, 2005). A stakeholder analysis can provide a wide range of benefits, such as ascertaining whether stakeholders' interests are affected positively or negatively, identifying potential risks, providing information to key-stakeholders during the execution of a project, among others (WARD; CHAPMAN, 2008). In stakeholder analysis it is important to identify all the parties as well as their involvement. Unlike the firm that only includes four parties (investors, employees, suppliers, and customers), in stakeholder theory it is argued that other parties are involved, including governmental bodies, the public and even competitors or parties affected negatively (POLONSKY, 1995).

Study Area

Most of the ARs in Portugal are located in the Algarve region (Fig. 1), which hosts the largest AR complex in Europe (JENSEN, 2002). In the Algarve reefs' program planning process, the institution responsible for delivering it (IPIMAR - National Fisheries and Marine Research Institute) gave serious reflection to the question of conditions of access to the ARs. In particular, it was decided that the structures should be deployed in such a way as to make them accessible for the future commercial fishing exploitation by eligible types of gear. At the same time it was proposed that the use of important types of fishing gear (such as dredges) operating in the region should not be interfered with. For this reason all the structures were deployed in waters deeper than 15 meters.

Data and Methodology

Data Collection

Multiple instruments of data collection were employed in this case study. The first instrument used was direct interview, intending to include the primary type of stakeholders. This instrument involved two strategies: (1) in the first instance semi-structured questionnaire-based interviews were conducted in order to discover potential AR users, and (2) seminars were given in three different fishing communities in order to promote the structures among fishermen and get feedback from those that expressed interest in the ARs. A second instrument used was a questionnaire survey, intending to widen the range of stakeholder types, including not only primary stakeholders (i.e. AR users or potential users), but also secondary and external stakeholders (i.e. AR non-users). Additional instruments based on secondary data were also used. These comprised documentary sources such as research archives (e.g. electronic files from the Fisheries Directorate - DGPA) and content analysis (e.g. newspapers and internet pages).

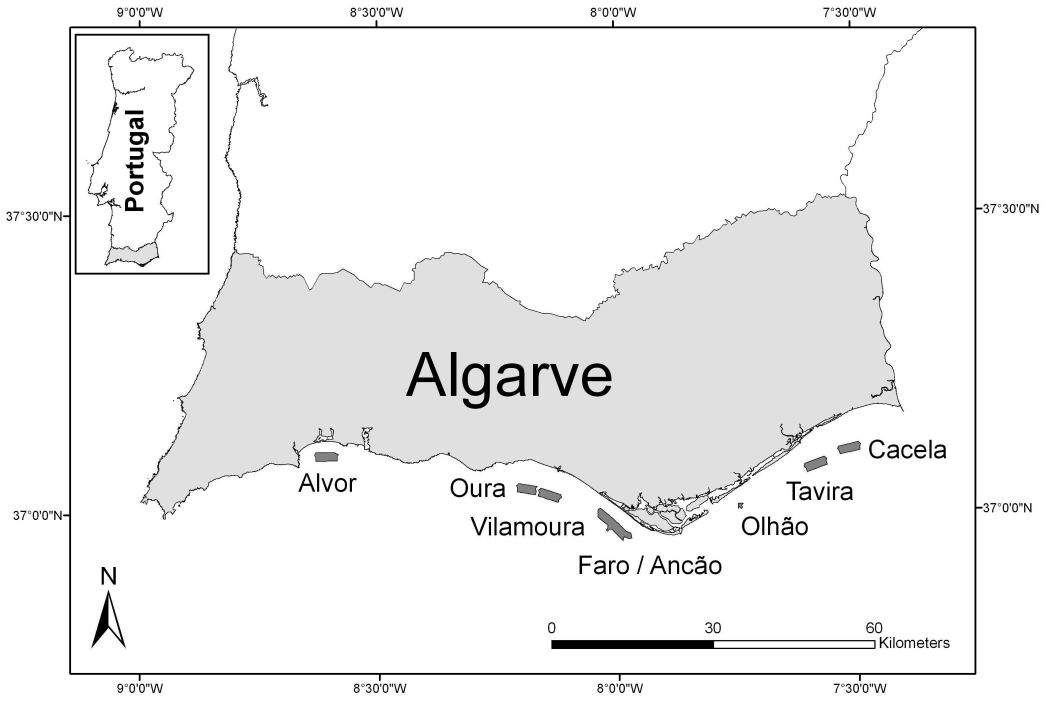

Fig. 1. Map showing ARs location in Portugal mainland.

Stakeholder Analysis

For the particular case of a social analysis of ARs, it is very important to identify all the relevant stakeholder clusters involved in reef development, as well as their relationship to the structures (JENKINS, 1999; MILON et al., 2000). There are different types of stakeholders and they can be identified in different ways (PRELL et al., 2009). It is necessary to know the power the different stakeholder groups may have to influence a project's outcomes (OLANDER; LANDIN, 2005; DE BAKKER; DEN HOND, 2008). Stakeholders' relationships with the reefs vary in accordance with many factors, such as: their level of knowledge of the structures, their degree of use/non-use according to their interests or expectations and satisfaction, likely attitudes and behavior, their interaction with the structures, and involvement in the process (SUTTON; BUSHNELL, 2007; TEH et al., 2008). Stakeholders' most likely attitudes and behavior vary according to their interaction with the structures and the value they attribute to them. Throughout the life of an AR project there are clearly defined stages, namely: project identification, planning, implementation, and monitoring and evaluation. There are a different number of stakeholders involved in each of these stages and the degree of involvement also varies throughout the lifetime of the project (VAN DE FLIERT; BRAUN, 2002).

The approach used here is based on a modified version of the one proposed by MacArthur (1997), but shaped also by the concepts and ideas outlined by Grimble and Wellard (1997). In the analysis six phases are involved.

For the first phase the most important goals and purposes of the AR program were identified. IPIMAR developed seven primary and four secondary goals for the AR program, most of them focusing on biological (benthos and ichthyology) and oceanographic functions (MONTEIRO; SANTOS, 2000). For the purpose of this stakeholder analysis it is important to select those goals that one may find important in order to address the saying that a 'reef that is not useful to people is not a successful reef' (MILON et al., 2000).

In the second phase a list of all the different parties that revealed any interest in the developments was drawn up, where these were the stakeholders (i.e. primary, secondary and external). All those stakeholders involved in the process of developing ARs (secondary stakeholders), or those that might derive any other forms of benefit or involvement from AR deployment, were identified from IPIMAR and DGPA (National Fisheries Directorate) sources, as well as internet and newspaper media.

The third phase consisted of determining the interests of the different stakeholders. The different stakeholders identified were questioned about their interests concerning the different policy objectives of the program. The data sources were: initial interviews with commercial fishermen and recreational users (anglers and divers), a questionnaire survey (RAMOS et al., 2007), and informal meetings.

The fourth phase considered the impact of the project on each stakeholder, and also the influence or power each stakeholder wielded on the program according to their own interests and influence on the project outcomes (JENKINS, 1999; RAMIREZ, 1999). On the basis of the different interests described in phase three, each stakeholder's position was plotted according to scales of impact and influence (Table 1).

Table 1. The impact (a) and influence (b) scales.

(a) The impact scale

Value	Description: AR policy objectives have had a…
5	outstanding positive impact
4	great positive impact
3	noticeable positive impact
2	fair impact
1	little positive impact
-1	little negative impact
-2	moderate negative impact
	… on stakeholder.

(b) The influence scale

Value	Description: Stakeholder has…
5	very great influence
4	great influence
3	some influence
2	little influence
1	very little influence
	… on AR outcomes.

The fifth phase dealt with the issue of interactivity during the various phases of the program, relating to stakeholders and/or actions addressed to the proposed program objectives. Interactivity depends on the value ARs may have for each stakeholder along the life of the project. Stakeholders may express their preferences when assessing the value of the changes brought about by the presence of ARs, and it is necessary to know if people think the changes improve or degrade the environment (HOMMES et al., 2009).

In the last phase, the levels of stakeholders' participation were established during the different stages of the AR program, i.e., project Identification, Planning, Implementation, Monitoring and Evaluation, as described by Van De Fliert and Braun (2002). Stakeholder participation depends on the interest manifested by each stakeholder over the life of the project, whether it is institutional, a firm, or individual (DE LOPEZ, 2001). Stakeholders have different degrees of inclusivity in accordance with the stage underway, depending on their power and behavior, (e.g. entrance or exit, increasing or decreasing interests). According to Meffe et al. (2002), the involvement and participation of stakeholders may be presented by 'orbits' and have the following sequence: Inform, Consult, Partnership, Delegate, and Control.

Results and Discussion

Identification of Most Important Goals of an AR Project

The policy objectives stated by IPIMAR imply that an anthropocentric view of the reefs is appropriate. Accordingly, goals that were perceived to have direct usefulness to people were identified and prioritized (Table 2). These goals are related to the delivery of the benefits derived from the structures to groups such as: commercial fishermen, divers, recreational anglers, and also future off-shore aquaculture operators.

Table 2. Policy goals of the Algarve artificial reef program.

Goals	Direct utility
Primary:	
(1) to protect juvenile fish, especially those ones having higher commercial value,	Yes
(2) to promote biodiversity and allow the diversification of catches,	Yes
(3) to contribute to the recovery of coastal fish resources,	Yes
(4) to create fishing areas and promote a controlled exploitation of coastal fishing resources,	Yes
(5) to develop a sustainable exploitation strategy,	Yes
(6) to reduce fishing costs, and	Yes
(7) to promote alternative fishing management measures.	Yes
Secondary**:**	
(1) to promote off-shore aquaculture,	Yes
(2) to carry out fish enhancement/restocking actions,	Yes
(3) to develop reef-related eco-tourism activities,	Yes
(4) to develop integrated studies of coastal ecosystems functioning.	No

List of Stakeholders and their Interests in ARs

Stakeholders can be listed and categorized in different ways. The selection of stakeholders classifies them as primary (I), secondary (II) or external (III). They can interact with the structures through having private, public or cooperative interest (Table 3).

Primary stakeholders (I) are all those people and groups that are affected by the project. This includes intended beneficiaries or those negatively affected (for example, fishermen that do not have eligible gear to fish on the ARs). Twelve clusters of stakeholders were identified as belonging to this class. They comprise 'local' and 'coastal' fleet users and non-users, and off-shore aquaculture operators. They represent firms of the private sector. There are some cooperatives representing fishermen and their production. There are also private firms that support their business in terms of recreational activities (charter boat owners, diving operators). Finally, individuals who practice their activity on their own (onshore anglers, spear-fishing divers) were also identified. Users' main interests vary. If they extract resources from the AR they focus more on factors that optimize time utilization, maximize catch certainty, and enhance safety conditions. If they do not extract resources or are non-users their interest is usually more focused on species protection.

Secondary stakeholders (II) are the intermediaries in the process of delivering the program to primary stakeholders; whether in terms of the materials, location, or set up and habitat after reef consolidation. In the current situation they are represented by the central government and local public administrators (including funding, implementing, monitoring and advocacy or governmental organizations). Six clusters were also identified in this class of stakeholder. Financial institutions are concerned with the social acceptability of the project. Some show interest in adequate fisheries management (Port Authorities, the Navy). Others show interest in the potential for stock sustainability or stability of the materials used for reefs (DGPA, Directorate for the Environment).

Table 3. Stakeholder identification table for the Algarve AR program.

#	Class	Stakeholder	Institutional sector	Interest(s) in the project
1	I	'Local' fleet users	Private (firms)	ARs close to save time, safety onboard, catch certainty
2	I	'Local' fleet non-users	Private (firms)	Hope that some species can be protected in the ARs
3	I	'Coastal' fleet users	Private (firms)	Catch certainty
4	I	'Coastal' fleet non-users	Private (firms)	Hope that some species can be protected in the ARs
5	I	Fishermen associations	Cooperative	Create more fishing opportunities for their associates
6	I	Fishermen producers org	Cooperative	To increase fishing production
7	I	Charter boat anglers	Private (firms)	Catch certainty or just recreation
8	I	Onshore anglers	Private (individuals)	Catch certainty or just recreation
9	I	Anglers clubs and associations	Cooperative	To diversify fishing sites for their associates
10	I	Diver operators	Private (firms)	Creation of extra diving sites
11	I	Spear-fishing divers	Private (individuals)	Catch certainty
12	I	Off-shore aquaculture	Private (firms)	To get a viable ground to produce their species
13	II	Fisheries research institute	Public (local administration)	Demonstrates AR potential, onsite observations, data collection
14	II	Directorate for fisheries	Public (local administration)	Protect stocks, avoid user conflicts
15	II	Directorate for the environment	Public (local administration)	Stability of the materials
16	II	Ports authority	Public (local administration)	Contribution to sort out fisheries management
17	II	Financial institutions (EU + Pt)	Public (central government)	Good acceptability by those involved
18	II	Navy	Public (local administration)	Contribution to sort out fisheries management
19	III	University	Public (local administration)	To diversify their knowledge base
20	III	City councils	Public (local government)	Creation of jobs related (both AR construction and use)
21	III	Environmental agencies	Public (NGOs)	Coastal and stock protection, correct selection of materials

External stakeholders (III) are other individuals or institutions which have personal interests at stake, as well as formal institutional objectives. Here we have identified and listed all those stakeholders who are perceived as having participated in the Algarve AR program throughout its different stages. In this class of stakeholder three clusters were identified. All of them comprise institutions from the public sector and represent the local administration (e.g. regional university, local city councils), and non-governmental organizations (environmental agencies). External stakeholders have diversified expectations and interests according to their concerns. Those with scientific purposes seek to expand knowledge and diversify subjects of study. Local city councils find the creation of jobs appealing, both during the construction and the use of ARs. Environmental agencies are concerned with coastal and stock protection and the right selection of materials.

Impact of the AR Project and Influence of Stakeholders

According to stakeholders' main interest(s), which may be various, there is inherently a degree of impact (whether positive or negative) the ARs may have on each cluster according to the policy goals of the program. There is an identical relative influence that each stakeholder has on the project in order to meet their own interests. Both dimensions are plotted in a scatter diagram (Fig. 2), where their positioning in the different areas show where their interests lie. In this particular plotting analysis it is possible to establish whether: (1) the program is meeting the interests of the primary stakeholders, and (2) there are strong negative interests that may put the success of the program at risk. In response to the first ascertainment it seems that most primary stakeholders have been impacted positively by reef deployment. The exceptions concern those that are non-users due to gear or other limitations, and consequently they feel that are impacted negatively. For the second consideration apparently there are no harmful interests, but just apprehension of possible weak negative impacts due to reef deployment.

From the plot it is possible to identify four areas where the groups of stakeholders may be found:

(1) High influence and positively impacted people - these people should be fully engaged in the project, especially if highly impacted (which was not the case); however, most of them are distributed within the area of low to fair impact. They are usually capable of providing information from ARs, one third of all stakeholders identified belong to this group, and they are just secondary or external stakeholders.

(2) High influence and negatively impacted people - these people may put a project at risk if they are moderately negatively impacted; in our particular case there was just a single case but related to the possibility of low impact.

(3) Moderate or low influence and positively impacted people - around half of stakeholders lie in this area, they are just primary; these people if well informed can help in maintaining the project.

(4) Moderate or low influence and negatively impacted people - these people usually are unaffected or receive no advantage from the project. In the case of primary stakeholders, the negative impact is because they may think that their money was invested without their receiving any direct benefit.

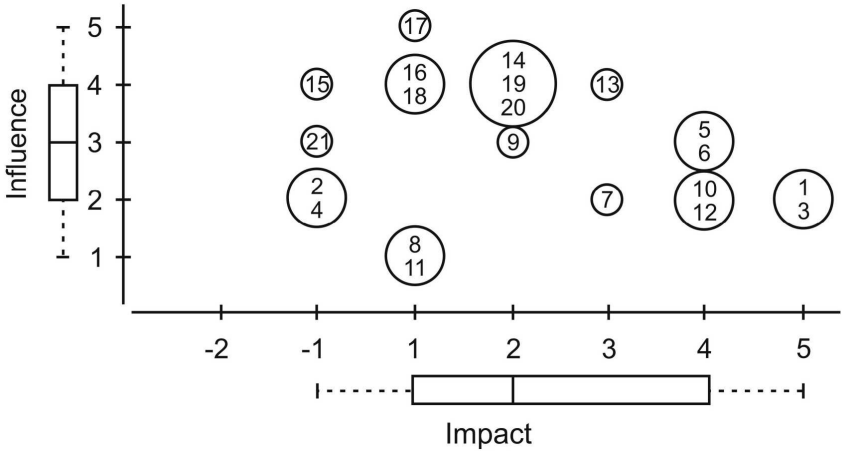

Fig. 2. Stakeholder Mapping: Bubble chart and box-plots showing the positioning of stakeholders concerning Impact and Influence in a discrete distribution.

Stakeholders' Interaction with the ARs and Likely Attitudes and Behavior

Stakeholders' interaction with the ARs may lead them to attribute different values to the structures and these will affect their attitudes and behavior (Table 4). The biological resources available in the AR area have direct use value for primary stakeholders, either by extracting resources (e.g. fish) or simply by their existence (e.g. diving as recreation). The extractive value is attributed by users to the belief that in order to make money they need to extract resources from the ARs. For other users, who believe that in order to make money there is no need to extract resources, ARs have a non-extractive value. For those fishermen who are unable to use the ARs, either due to gear or license limitations, the structures have no effect as they couldn't fish the areas, so ARs divert people to other areas.

ARs produce many 'outputs' that are not marketable (KONTOGIANNI et al., 2001). In the main, outputs are positive, taking the form of benefits; negative outputs may occur in the case of badly planned ARs that reduce the ability to provide a given service (e.g. if they impede maritime traffic). So, benefits from reef deployment extend beyond values other than just direct use value to include, for instance, the conservation value of protected habitats. Some non-users may attribute a reduced value to ARs because their interest is low or limited, or because they have just participated in the delivery process. Altogether, this means that the total economic value (TEV) of ARs is expected to be great because there are many interests at stake.

The attitudes stakeholders have concerning ARs come from judgments they make on the value of the structures. Most of these attitudes are generated by social learning from the environment (ERWIN, 2001), and reveal individuals' preferences regarding the ARs. Several factors play a role in an attitude resulting in a particular behavior. It is possible to find stakeholders who have a positive attitude towards reef usefulness but do not use it. It is to be expected that attitudes should change during the experience with ARs. An attitude shows a stakeholder's disposition and opinion concerning the ARs. It is also possible to find stakeholders ambivalent towards the subject of ARs, i.e., they can simultaneously have a positive and a negative attitude towards it.

Behavior is an indication of the intention of a given individual or group of individuals. In the socioeconomic context of ARs, attitudes when expressed in behavior reflect how and what people actually feel and think about the subject.

Table 4. Stakeholder interaction table for the Algarve AR program.

Stakeholder	AR interaction	More likely attitudes and/or behavior
'Local' fleet users	Extractive value	To use the ARs if they are close and if their target species can be found there
'Local' fleet non-users	Diversion effect	To be slightly discontented because ARs do not provide them with a direct income
'Coastal' fleet users	Extractive value	To use the ARs mainly in their corridors
'Coastal' fleet non-users	Diversion effect	To be slightly discontented because ARs do not provide them with a direct income
Fishermen associations	Conservation value	To preserve ARs because they are associates' common fishing grounds
Fishermen producers organizations	Future availability value	To catch only the necessary and sizeable fish species
Charter boat anglers	Extractive value	To try the ARs to see if there is potential to obtain large specimens
Onshore anglers	Non-users	To think ARs were not deployed for shore anglers
Anglers clubs and associations	Conservation value	ARs are an additional angling spot
Diver operators	Non-extractive value	ARs are an additional dive spot, but due to their similar design shapes their use will be only occasional
Spear-fishing divers	Extractive value	ARs are an additional spot, but snorkel divers have physiological limitations to use them
Off-shore aquaculture	Extractive value	The structures may provide the physical and biological support to establish a business
Fisheries research institute	All values	Trying to get data from more ARs
Directorate for fisheries	Non-users	Do not bother much if there are no or few signs of conflicts among users
Directorate for the environment	Indirect use value	May be slightly discontented due to probable sand retention around the structures
Ports authority	Non-users	They are involved in the consultation process
Financial institutions (EU + Pt)	Conservation value	To be happy if the investment shows signs of success
Navy	Non-users	They are involved in the consultation process
University	Conservation value	Trying to get data from more ARs
City councils	Non-users	Partial social and economic problems solved if ARs are contributing to increase jobs and economic benefits of users
Environmental agencies	Conservation value	To oppose to ARs if there are any signs of pollution or species over-fishing derived from congestion

Levels of Stakeholders' Involvement Throughout AR Lifetime

The involvement of stakeholders may be dependent on the degree of ownership felt and attributed to the activities of the development and the outputs generated by ARs (VARVASOVSZKY; BRUGHA, 2000; LIM et al., 2005). The inclusion of the entire set of stakeholders in all decisions and actions is probably not a right choice. However, it is important that all the interested stakeholders should be invited to participate in the management of ARs. This action is called the 'principle of inclusivity' (MEFFE et al., 2002). Inclusivity may be somehow problematic because it means that those stakeholders defending opposite or conflicting ideas can be invited to participate on common ground. Notwithstanding, it is possible to achieve valuable involvement on the part of different stakeholders and get people having different viewpoints to work together and reach the goals intended. Some mediation may be necessary in order to achieve these trade-offs. The commitment each stakeholder puts into their relationship with the ARs may show their own levels of involvement in the subject and their comfort (or discomfort) derived from it. According to the authors quoted this involvement is called 'self-selection'. It is important to collect more specific information from the stakeholders who achieve a higher degree of involvement - including their characteristics, interests, and needs so that they may adapt to the project.

In the earlier stages of the program few stakeholders are involved, whereas in the later stages some other stakeholders appear. The level of involvement differs according to the project stage (increasing, i.e., from project Identification at stage 1 to Monitoring and Evaluation at stage 4). If at the earlier stages (e.g. Planning process) most of the stakeholders have just low inclusivity (i.e. they are just informed), at a later stage (e.g. Monitoring and Evaluation) a much higher degree of inclusivity may be desired (e.g. partnership in or even delegation of responsibilities for ARs). The aim is to increase the level of participation of all the stakeholders (Fig. 3). The degrees of inclusivity vary from a high orbit (low involvement) to a low orbit (high involvement).

IPIMAR is considered to be the one that has led the project since the beginning (i.e. since project identification) and throughout all the stages of the project. Stage two sees the entrance of all other secondary stakeholders with an increasing degree of involvement, as well as those primary stakeholders that represent a group of social interests. At stage three most stakeholders intensify their participation because they feel it fundamental to get feedback from the structures (primary stakeholders) or from beneficiaries (secondary stakeholders). At stage four there is even deeper involvement of entities and the establishment of more partnerships. At this stage the delegation of responsibilities may change among secondary stakeholders.

CONCLUSIONS

There is a worldwide consensus that usually after reef deployment the benefits will outweigh the costs. However, there are losers as well as winners in this scenario. A stakeholder analysis approach makes it possible to group all the people who are perceived as involved into different clusters (i.e., primary, secondary, and external), and discover their interests in AR projects. It is also possible, in each analysis, to perceive their interaction and more likely attitudes and behavior towards reef development and use. In the stakeholder analysis the measurement techniques used can also be expressed by indicators. They are both qualitative (stakeholder interest, AR interaction, likely attitudes and behavior, stake and degree of involvement through the project stage) and quantitative (discrete variables for impact and influence of AR projects).

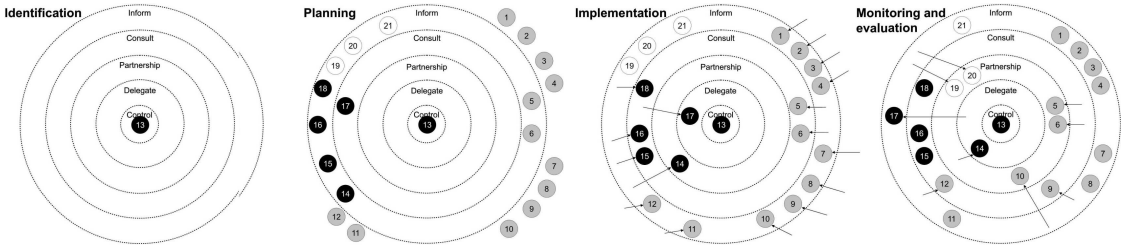

Fig. 3. The involvement and participation of stakeholders in the Algarve AR program. The figure in each cell represent stakeholders (1 to 12 primary, 13 to 18 secondary and 19 to 21 external).

As the project stages progress the number of stakeholders and their involvement increases. Within an economic perspective and considering primary stakeholders, winners were all those who used the reefs and achieved higher incomes from this action. However, some people become winners in other ways, namely those who even if they did not obtain higher revenues, gained in time-saving, catch certainty or safety. Primary stakeholders' interest was triggered by the experiences they encountered when using the reefs. If they enjoyed good outcomes when they used the reefs, they will repeat the experience. Losers were the ones that due to reef deployment were expelled from the reef area or suffered operational limitations (e.g. some purse seine owners). For instance, secondary stakeholders such as IPIMAR achieved a higher reputation among stakeholders by delivering the program along its stages. Finally, external stakeholders such as local City Councils were winners because they gained in terms of job creation both during the construction of the ARs and as a consequence of primary stakeholder gains. In their turn, losers were all those who lacked confidence in the stability of the materials used in the construction of the ARs and/or believed that some habitat was destroyed or lost for a certain number of species (e.g. flatfish).

Empirically stakeholders judged ARs in their own interests and evaluated them according to their needs. In this stakeholder analysis it seems that those stakeholders to whom AR deployment has impacted negatively do not pose a threat to the success of the AR program. Overall, the aggregated results show that most stakeholders are optimistic concerning the main objectives of AR policy and find them a useful way to invest in the marine environment, principally as a way of mitigating fishing problems and amplifying the economic value of the coastal area.

The strength of this method lies in its holistic presentation whereby it is easy to pinpoint the main subjects and relate them to the object of study. It is important to gather information on the success or failure of the reefs' functioning from within a social perspective. Through a simple stakeholder analysis it is possible to get the overall picture of stakeholder positioning about ARs right from pre-deployment and throughout the lifetime of the project. The main weakness of this approach is that for it to be adequately detailed is a time consuming task. The use of scales may sometimes generate ambiguous findings, but are nonetheless an appropriate methodology for transforming qualitative data into quantitative and measurable results. Stakeholder conflicts were not identified, but these may occur occasionally.

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