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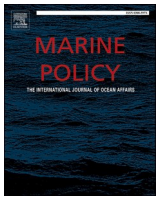

Engaging and legitimizing communities: co-designing a community-based Marine Protected Area

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ABSTRACT

Marine Protected Areas are increasingly used as tools to preserve marine habitats and biodiversity worldwide. Nonetheless, creating MPAs in densely populated multi-use coastal areas comes with intrinsic conflict potential, since protection and economic development are not always hand-in-hand and local users might disagree with the designation of such conservation tools. The use of inclusive and transparent participatory processes to co-design such MPAs can be seen as a way of protecting biodiversity while acknowledging the needs of local users and building conservation tools that fit both purposes. Here we describe a participatory process developed to co-design a Marine Protected Area of Community Interest in a biodiversity, fishing and tourism hotspot in the Algarve (southern Portugal) where the majority of involved stakeholders (96 %) endorsed the final MPA proposal. The methodology and tools used are described in detail, lessons learned are critically analysed and a roadmap to be used in other realities is provided. Evidences collected show that the approach developed allows conservation and economic activities to share the same ground and advocate for the same goals in preserving coastal marine habitats.

1. Introduction

Marine Protected Areas (MPAs) are tools to preserve nature, revert biodiversity loss, and ensure ecosystem services and uses [36,38]. Despite conservation being the main goal of MPAs, they often include socio-economic goals, as many MPAs are in coastal and densely populated areas. Consequently, early inclusion and support of local users are recognized as conditions for MPAs' success, and legitimacy, engagement, and justice are key ingredients in MPA planning and design [12,16,17,48,5,7,6,37].

The management of natural resources is, in fact, a process that should be seen as governing common goods [46], in which different actors

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influence and are influenced by the decision-making process. Ostrom [46] details a set of principles that can contribute to the sustainable governance of common goods, including the need to ensure that those affected by the rules can participate in modifying them. Further, collective actions are only possible when actors are able to effectively communicate [46]. Nevertheless, in many regions, MPAs have been implemented through top-down approaches by governments, authorities, and conservation bodies, without including and engaging other interested parties in the designing process [4]. This approach led to a negative relationship between MPAs and the coastal communities [31,4,60,61,63],

Participatory approaches to define and manage MPAs have shown promising results [17,34,44,61,66,53]. Such approaches use different engagement strategies, allowing the co-production of knowledge in a multi-actor context, and can lead to co-management governance models. The inclusion of the interested parties in a participatory process facilitates the representation of different knowledges, views and values, and helps to reach solutions for specific contexts and local needs [13,17,34,4,7,66,6,37]. In fact, combining science and stakeholder-based approaches is a recognized way to achieve balanced solutions, as it allows to accommodate stakeholders' interests while meeting conservation needs [55]. As argued by O'Connor et al. [44], if genuinely cooperative and generous, participatory approaches can be used as powerful tools to promote integration, enhancing human well-being and conservation goals of MPAs.

The present study describes the participatory approach developed to co-design a community-based MPA located in the Southern region of Portugal, the Algarve. The design of this MPA was, from the start, considered and entitled community-based for two main reasons: 1) local stakeholders drove the start of the process and 2) the main goal was to serve the community by promoting resilience and sustainability in managing their natural assets. The area is an important biodiversity and marine-based activities hotspot [54,57,58], hence, including users in the development of such an MPA was considered a priority since its early stages. The aim of this study is to critically describe the participatory process developed, underlying the process' strengths and weaknesses, and systematizing the lessons learned that can be useful to ongoing or future processes in other locations worldwide.

2. The Marine Protected Area (MPA): Natural Marine Park of the Algarve Reef – Pedra do Valado (NMPAR-PV); setting the scene

This community-based MPA is located at the Algarve (southern mainland Portugal), in the municipalities of Albufeira, Silves and Lagoa) extending to ~50 m of depth, with a total area of 156.3 km^2 (Fig. 1). The MPA was designated as community-based since it was proposed and co-designed[1] by the community[2] and is intended to be co-managed.

Overall, the area comprises one of the largest coastal rocky reefs in Portugal, including 63 km^2 of intricate rock/mixed habitats and around 31 km^2 of sandy substrate areas. Since 2003, several marine biodiversity mapping studies revealed exceptional natural values that need to be preserved or restored, as compiled in Sales Henriques et al. [57,58]. A total of 889 species (703 invertebrates, 111 fish and 75 algae species) have been reported for this area, representing almost 70 % of all species registered for the Algarve region [57,58]. Of these, 24 species have conservation status, including the seahorses (*Hippocampus* spp.), the dusky grouper (*Epinephelus marginatus*), and the gorgonian (*Eunicella verrucosa*); 45 represent new records for Portugal; and 12 new species for science [57,58]. Moreover, this area includes several priority marine habitats such as seagrass meadows of *Cymodocea nodosa*, coral gardens of *Eunicella* spp. and *Leptogorgia* spp., and *maerl* beds [45].

Besides being a biodiversity hotspot, the area also plays a strategic role for commercial fishing and marine-tourism activities, especially cetacean (whales and dolphins) watching, scuba diving, caves sightseeing, and recreational fishing. These different interests, responsible for important economic revenues of the region, operate, in most cases, in the same specific locations, causing intense use conflicts [54,57,58].

Overall, and to the best of our knowledge, this is the best studied Portuguese MPA before its establishment, with two decades of scientific studies addressing both the natural and cultural values of the region (e.g., [9,14,20,21,1,50,19,52,57,58,51,54]) (see Supplementary Material 1 for more references).

To address the complexity of managing common resources in such an important multi-use area, a participatory approach was implemented to involve those who have a stake and can determine the effectiveness of this MPA once established.

This bottom-up initiative was started by a group of stakeholders, henceforth designated as promoters. This promoters' group included scientists, as well as representatives of private (a national environmental-driven philanthropic institution), and public (municipalities) institutions. Between 2018 and 2021, this group assumed the role of leading the necessary actions towards the design of an MPA proposal, supported by most of the stakeholders engaged in the process, and delivered to the government in May 2021. The government acknowledged the importance of this innovative process during the United Nations Ocean Conference, in June 2022 [32]. However, it was only in June 2023 that the MPA mandatory public consultation period was launched to approve the designation decree, following a public event set by the government, where the steps needed for the MPA official designation, and the development of the special programme (specific management plan integrating all zones and regulations), were detailed. The Marine Protected Area was officially set as "Natural Marine Park of the Algarve Reef – Pedra do Valado" in January 2024 by the legal act *Resolução de Conselho de Ministros nº1/2024*. The special programme is expected to be finalized during 2025.

Since the beginning, the MPA was primarily set to protect the unique natural values present in one of the biggest coastal reefs in the Portuguese coast while integrating community interests and values and promoting the development of marine activities better aligned with blue economy principles. Therefore, the initial MPA's objectives were to: 1) protect existing natural values, particularly the most sensitive and threatened; 2) promote local artisanal fisheries; and 3) develop sustainable recreational activities. After starting the participatory process, a 4th objective was added by the participants: to promote ocean literacy."

3. Promoters and stakeholders of the MPA implementation initiative

The initiative aiming at co-designing[1] the MPA started with mapping of all relevant stakeholders, based on the human activities occurring in the area, including the public administration involved in their management (Table 1). The promoter's group, which was initially small and only included one municipality, increased throughout the process to integrate the remaining two municipalities included in the MPA area, since they also felt the need to take the lead in this initiative. This signalled the appropriation of the process by the main stakeholders of the region. Representatives of the institutions with relevance in the MPA area were considered pertinent stakeholders (Table 1) and were invited to join the participatory process. The initial stakeholder map was updated along the process with new arrivals, as the overall goal was to integrate, as much as possible, most interests.

[1] "Co-design describes active collaboration between stakeholders in the design of solutions to a pre-specified problem" [62]

[2] Community defined as: "a group of people with diverse characteristics who are linked by social ties, share common perspectives, and engage in joint action in geographical locations or settings" [39]

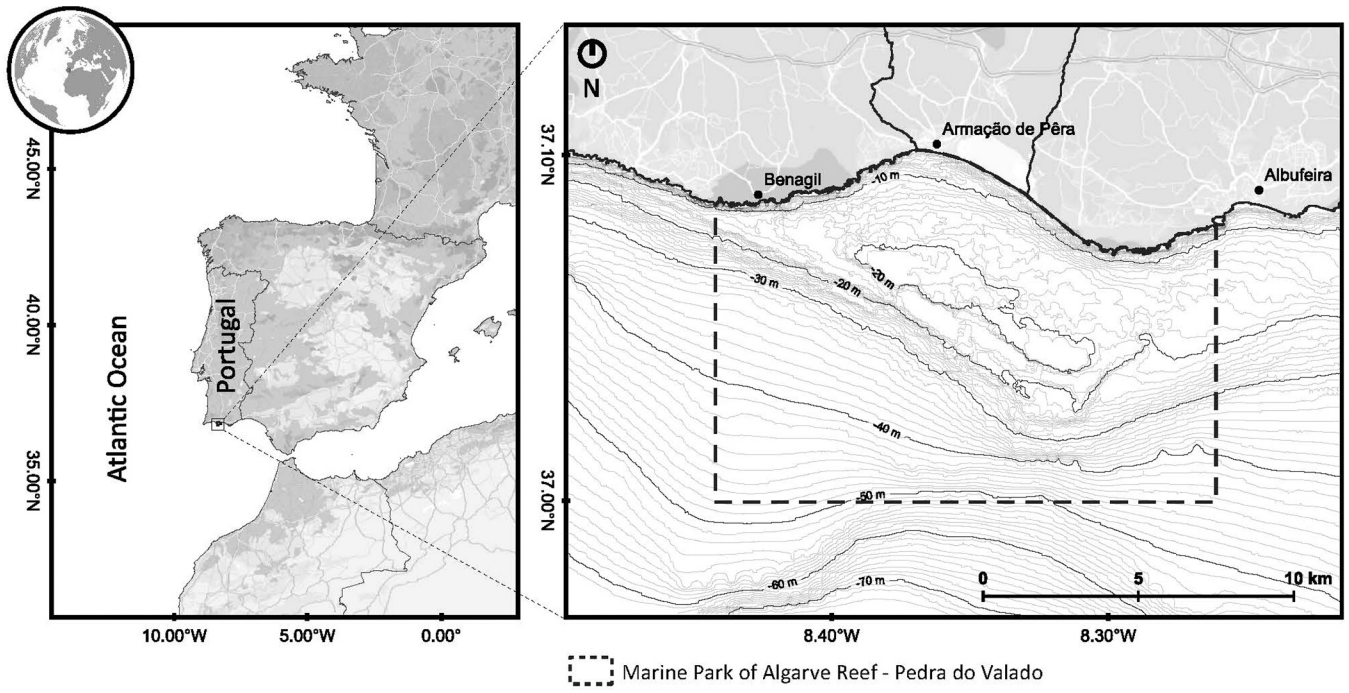

Fig. 1. The location of the Natural Marine Park of the Algarve Reef – Pedra do Valado.

Table 1
Stakeholder mapping effort at the final phase of the participatory process and institutions participating in the different phases of the MPA implementation initiative.

Typology of stakeholders	Sub-typology	N	Raising interest Launching initiative - Nov 28 2018	Multi-stakeholder workshops					Online public presentation Final zoning - Feb 5 2021
				Common vision - May 7 2019	User's mapping - May 30 2019	First zoning - Jul 8 2019	Intermediate zoning - Out 30 2019	Governance - Dec 18 2019	
Public administration	Local development	6	5	3	2	2	1	3	4
	Enterprises, businesses, and tourism	1	1	0	0	0	0	1	1
	Management of natural resources	5	2	2	2	2	0	1	3
	Education	2	0	2	1	0	1	0	1
	Ports and navigation	2	1	1	1	1	1	0	1
	Local administration	15	2	7	5	5	4	4	7
	Research focusing on marine systems	2	1	2	2	1	1	2	2
Non-governmental representatives & associations	Local development and sustainable use of natural resources	6	1	1	1	1	1	1	5
	Commercial fishing sector	12	7	3	8	5	4	7	10
	Underwater activities and recreational fishing	6	0	2	3	4	5	5	3
	Businesses & tourism	8	0	0	2	2	1	1	6
	Non-Governmental Organizations (NGOs)	12	3	3	2	3	1	2	7
	Research focusing on marine systems	1	1	1	1	1	0	1	1
Private companies	Hospitality/tourism sector	6	3	1	0	0	0	0	2
	Marinas	2	0	1	1	0	0	1	2
	Thematic parks and aquatic activities	1	1	0	0	0	0	0	0
	Environment & science communication	2	0	1	1	1	0	0	1
	Sum of institutions	**89**	**28**	**30**	**32**	**28**	**20**	**29**	**56**
	Number of participants	**166**	**45**	**50**	**51**	**46**	**36**	**52**	**114**

4. Activities and phases of the MPA participatory process

The overall **participatory process** is summarized in Figs. 2 and 3. Fig. 2 describes the timeline and activities of the initiative towards the co-design of the MPA proposal while Fig. 3 identifies the different phases and activities of the participatory process developed. A skilled facilitator designed and implemented the overall process [24], and the diversity of the promoter's group guaranteed the integration of different needed expertise, as highlighted by Hoffmann et al. [28]. The participants of the different phases are shown in Table 1.

The participatory process took place from November 2018 to May 2021 and included four engagement activity types; most were included in the different phases of the process:

1) **Raising interest**: large public event to present the initiative and invite stakeholders to integrate the participatory process. This was an opportunity to map relevant stakeholders and start communicating with them;
2) **Multi-stakeholder workshops**: participatory meetings to which all identified stakeholders (Table 1) were invited. These meetings started and ended with plenary sessions to discuss defined topics with the whole group, and included small discussion groups in between, allowing for in-depth debates on specific interests and views about the topic. Each workshop lasted 3 4 hours and took place in a location included in the MPA area. After each workshop, and prior to the next one, a report was produced and sent to all involved stakeholders for appreciation and validation. Workshops were evaluated after each session to address all issues and improve tools used (Supplementary Material 2). Methodologies used in specific workshops are described in dedicated publications: for details related to the zoning workshops see [33]; for details related to the visioning workshop see Guimarães et al. [25];
3) **Stakeholders' engagement meetings**: meetings developed with specific stakeholders throughout the process. Such meetings were organized at any given moment to clarify issues and concerns of specific stakeholders. These actions were essential to unblock obstacles that appeared along the process. Overall, over 50 engagement meetings took place during the process;
4) **Stakeholders' engagement actions**: on top of the above-described meetings, phone calls, emails, factsheets, and short communications were exchanged between the promoters' group and stakeholders to ensure that communication was fluid and well-articulated. As an example, over 200 phone calls took place along the process.

Activities were developed along seven phases of the participatory process (Figs. 2 and 3). These can be detailed as follows:

- **1st phase** included the activity of *raising interest* to promote an inclusive participatory process. Here, the most important engagement activity type was the initial public presentation, where the natural values, the intense use of the area by several activities and the need for protection were outlined. This event was publicized on social media, which also contributed to increasing interest.
- **2nd phase** focused on *creating a common vision* for the proposed MPA and was developed in the 1st (of the five) multi-stakeholder workshops (details in [25]). This allowed starting working with common views - a vision for the territory for a 15-year horizon, rather than highlighting distinct interests as in the following phases.
- **3rd to 6th phases** aimed at *co-constructing* the different components of the MPA i.e., zoning (details in [33]), regulation, and definition of governance models (i.e., the potential for co-management under the Portuguese law and local settings).

The **3rd phase** was dedicated to complement existing data with fine-scale mapping of uses to increase the amount of available information. To diminish as much as possible the conflict of interest between stakeholders, one workshop was dedicated to map the most important areas for the main activities/users occurring in the area, engaging stakeholders from commercial and recreational fisheries and marine-tourism activities (considered the three most important activities in the area – commercial and recreational fisheries and marine-tourism activities - regarding dependence, socio-economic relevance, and potential to be impacted by the MPA; details in [33]). In that exercise, participants were split into different homogeneous groups according to their main activity and asked to select their most important working areas inside the MPA in a printed map. Then their preferred sites were digitized, and maps were overlapped to recognise preferred areas from multiple activities.

The co-design of the zoning plan and associated regulations were addressed in the **4th phase**. The goal was to achieve a common agreement among the different stakeholders, highlighting transparently the principles of the zoning proposals development. As detailed in Horta e Costa et al., [33], the zoning proposals followed ecological, social, and design principles: i) including the most important ecological areas (i.e., biodiversity hotspots; data from previous ecological studies in the region; [57,58]) in no-take zones (i.e., no extractive activities allowed; corresponding to the fully protected area of the MPA guide level of protection; [23]); ii) reducing costs to users by avoiding overlapping no-take zones with

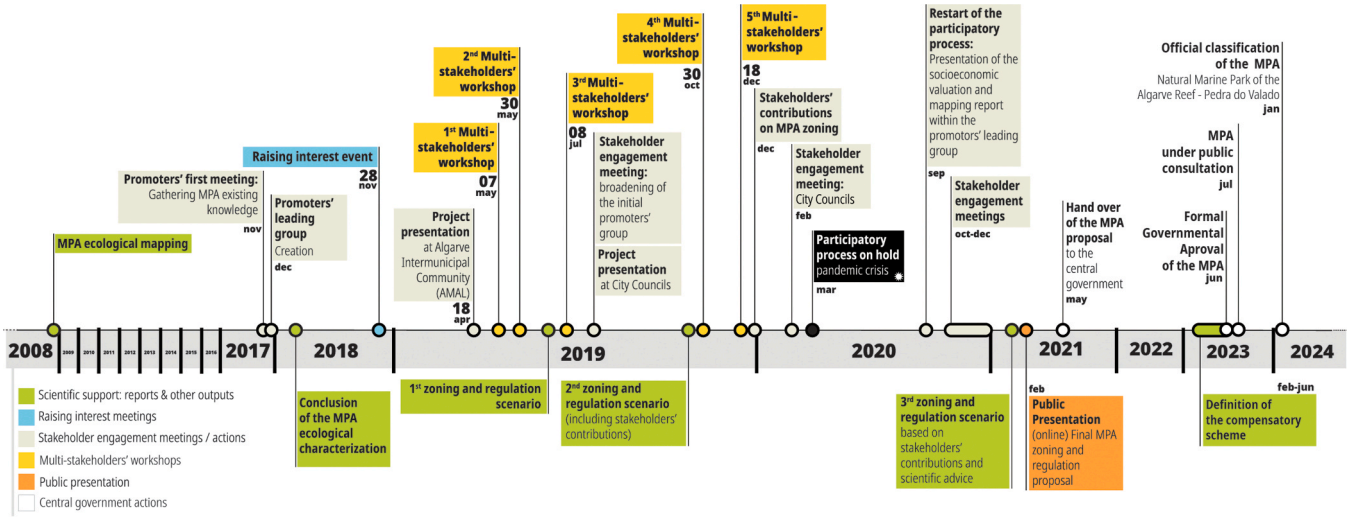

Fig. 2. Timeline of the initiative for co-designing the MPA Natural Marine Park of the Algarve Reef – Pedra do Valado.

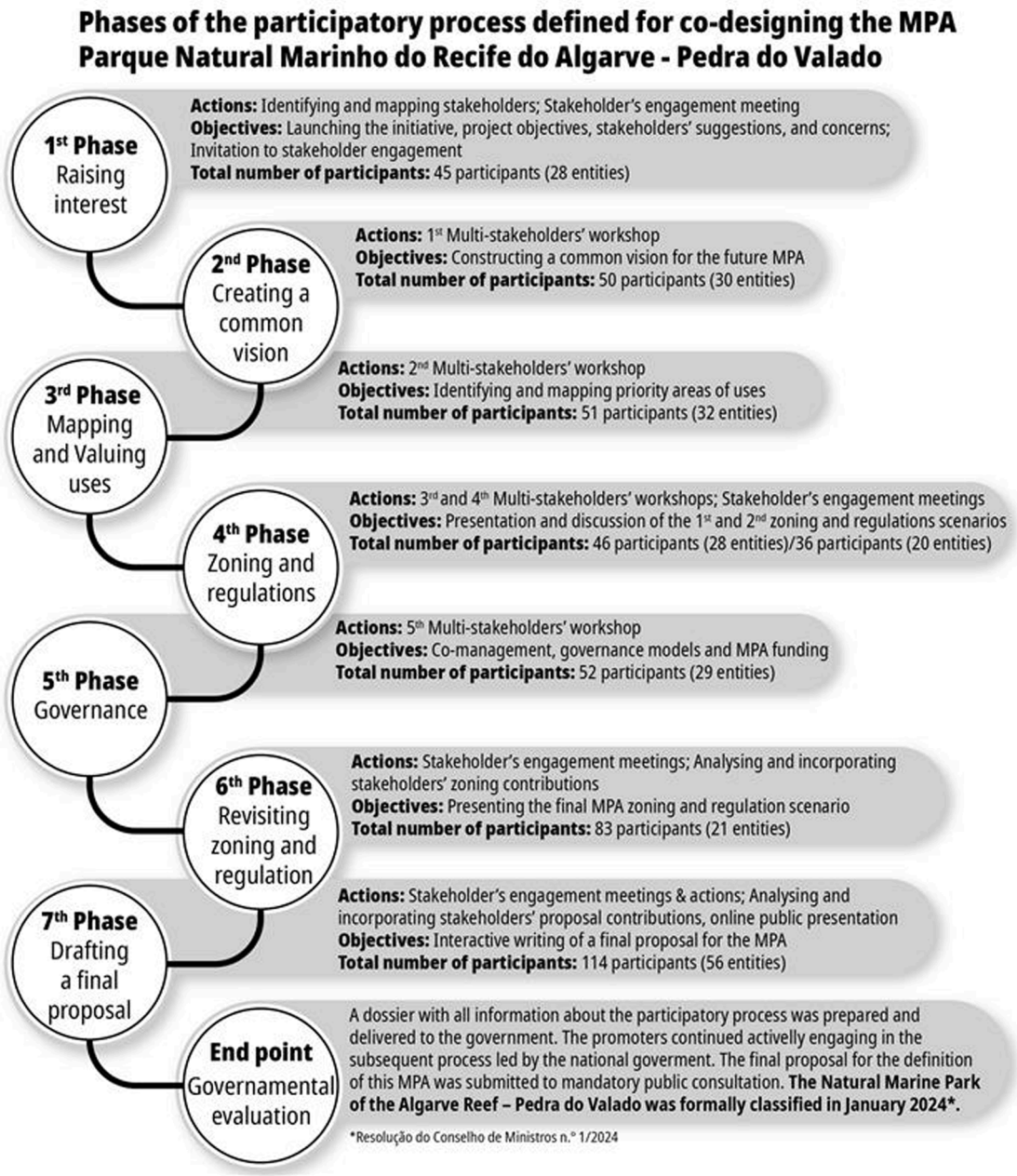

Fig. 3. Phases of the participatory process defined for co-designing the MPA Natural Marine Park of the Algarve Reef – Pedra do Valado.

preferred areas; and iii) keeping the best design standards with compact and relatively large no-take and associated buffer zones to reduce adjacent threats. From the 1st to the final proposal, several stakeholders' engagement meetings and actions were conducted between the promoters' group, the representatives of commercial and recreational fisheries, and tourism associations. Fine-tuning adjustments and compromises on the zones (size and borders) and regulations boosted general acceptance and support for the final proposal. In this iterative process, the final zoning scheme (Supplementary Material 3) resulted differently from the one initially proposed – e.g., during the participatory process, the first proposal included a highly protected zone surrounding a no-take zone (fully protected area), but this was removed because participants considered that it privileged local fishers; further, instead of limiting the no-take zone to the main biodiversity hotspot as portraited in the first proposal (avoiding overlapping preferred areas reported by main users), the no-take zone was enlarged to connect the two main biodiversity hotspots, following stakeholders' suggestions. This last option, however, included some areas reported as preferred for some commercial and/or recreational fishers. This required bilateral meetings to try to adjust the limits of the zones and reduce the impacts for local fishers with low capacity of displacement. All the details of this process are in Horta e Costa et al., [33].

In parallel with the work related to the zoning proposal, possible governance models were also discussed (**5th phase**). In the workshop dedicated to governance models, the legal options to set up a co-management setting in the future were presented, representing the governance model defended throughout the participatory process. In the Portuguese jurisdictive framework, co-management in natural areas lacks important regulating and decision-making powers, and includes a limited management body structure, so a supporting legal team suggested options to overcome these obstacles and achieve the desired effective co-management scheme. The suggestions were added to the MPA proposal delivered to the

government in the final stage of the process. During this workshop, unexpected participants (individual fishers not represented by a fishing association, and a representative of a large fishers' association with large vessels from outside the MPA), who did not join the process earlier, showed their disapproval concerning the overall process. Time to address the issues raised was needed, so the promoters explained the genesis and history of the process, postponing the discussion about the presented governance models. This incident signalled the need to rethink the overall process and make some adjustments to adequately engage this noisy minority. The main challenge was to improve and increase dialogue to clarify and find compromises on divergent interests among users (including this minority that was not participating in the process), particularly i) on the spatial location of the no-take zone (fully protected area) or ii) on the rules defined for the inner part of the reef, allowing only small-scale fishers with limited ability to displace further offshore (and where large vessels were banned to reduce effort, negative impacts and competition) (see Supplementary Material 3; [33]). Therefore, over 50 stakeholder engagement meetings (involving 21 institutions and 83 participants) and other parallel actions were conducted following the governance workshop. This represented the **6th phase** of the process and implied important adaptations. This was the moment when the promoter's group grew, and further revision of the zoning proposal was developed, recognizing that the current proposal had not been sufficiently discussed and understood (detailed in [33]). The need for addressing compensatory measures was highlighted as a way to support adaptation and offset eventual fisheries losses that might arise from the areas where all (no-take zones) or some fishers (inner part of the reef) were banned (details in Horta e Costa et al. [33]). Further, a list of Frequently Asked Questions (FAQs) was prepared to better elucidate about the zoning and respective regulations being discussed. During the **6th phase,** the enlarged group of promoters requested written contributions to the zoning proposal. From this iterative process, an updated and final zoning proposal was developed (details in [33]). This phase happened before and during the COVID-19 pandemic, and alternative communication formats were put in place to replace the face-to-face preferred interactions used until that moment. Most stakeholder bilateral engagement meetings occurred after the first national lockdown period (between March and May 2020), and until January 2021, being organized using online tools and face-to-face meetings with a limited number of participants. In this process, consensus was not always possible due to a diverse group of stakeholders with different interests (few fishers did not participate but claimed their legitimacy in final decisions), so decisions were made based on the majority. Yet, several attempts were made (in bilateral meetings) to fine-tune proposals to accommodate specific and individual concerns without compromising the design principles and the decisions taken by the majority.

7th phase implied the compilation of all necessary documentation in an MPA designation proposal. This coincided with the onset of the COVID-19 pandemic, so the sole possibility was to present the proposal in an online event. All stakeholders were invited to send their formal position regarding the final MPA proposal. Most of the stakeholders validated and supported the final proposal, and a total of 51 written positions were delivered, 49 in favour and 2 in disagreement depending on the definition of compensatory measures. The dossier with all these positions and the documents produced during the participatory process (e.g., reports of the multi-stakeholder workshops, minutes of the stakeholder engagement meetings, technical reports on the biodiversity characterization of the MPA, legal support reports, etc.) was prepared and delivered to the Portuguese government in May 2021, during an official public session with the presence of the Ministry of Sea, the Ministry of Environment and Energy Transition, the Secretaries of State of Fisheries and of Environment, and the President of the Portuguese Nature Conservation Agency (ICNF).

The delivery of the dossier was considered **the endpoint** of the structured participatory process for the MPA co-designing.

Yet, several subsequent events occurred. Two parliament fisheries' commission sessions were organized, allowing the national government and the opposition parties to listen to the concerns and opinions of different stakeholders about the participatory process and the final MPA proposal. After the audition, the commission approved a Parliament Resolution in favour of this MPA proposal.

The Portuguese Minister of the Environment and Climate Action announced the formal approval of this MPA final proposal during the United Nations Ocean Conference, in June of 2022 [32].

In April 2023 the government initiated the classification process, in a meeting led by the Minister of Environment and Climate Action, involving all governmental agencies,municipalities with interests in the MPA, and remaining promoters. The Minister highlighted the importance of designating the MPA as soon as possible and asked the research centre leading the promoters' team (CCMAR) to develop a study on the fairer and more adequate way of financially compensating fishers for the loss of fishing grounds (see the final proposal in Supplementary Material 3 for details on zones and protection zones). The study should also include the list of the valuation measures raised and discussed during and after the participatory process, as well as an estimate of the implementation costs, when possible. Afterwards, a series of meetings were held with all representatives of the commercial fishing sector to discuss and develop a set of proposals for a direct monetary compensation formulation. This aimed at ensuring that measures proposed by the sector were included in the study and that the final proposal was validated by the fishing community prior to being presented to the government.

In June 2023, the Minister of Environment and Climate Action announced, in a public event held at the University of Algarve, that the MPA of community interest designated as Natural Marine Park of the Algarve Reef – Pedra do Valado should be officially designated pending mandatory public consultation (public consultation referred to the designation decree, which included the MPA objectives, the MPA and no-take/no-access borders, and the activities forbidden in the whole MPA). The classification of this MPA was formally approved by the Portuguese Ministry Council on the 23rd of November of 2023 and its designation decree officially published in January 2024 (RCM 1/2024). After this formal procedure, which includes a general regulation including the setting of a 4 km^2 no-take/no- access area, the special programme (specific management plan integrating all zones and regulations) started being prepared by the Portuguese Nature Conservation Agency (ICNF) in collaboration with the research centre leading the promoter's group (CCMAR) and also with the other promoters, to guarantee that what was decided during the participatory process is reflected in the final document. After completion, the special programme will be submitted to the government for approval, public consultation, publication and formal application. The co-management setting is also being discussed and planned, to be included in this special programme, considering the proposal of the group and the possibilities given by the current Portuguese legislation on this matter.

5. Transforming insights into a guide for future community-based MPA design

Even though every strategy defined to co-design an MPA is context-dependent, from the lessons learned, we proposed the roadmap illustrated in Fig. 4. The roadmap simplifies and generalizes the key phases to achieve a participatory process to co-design a future MPA or to re-design an existing one. As an investment in the future success of the MPA, time and resources are needed to go through all these phases, move back before moving forward to allow adaptions when necessary.

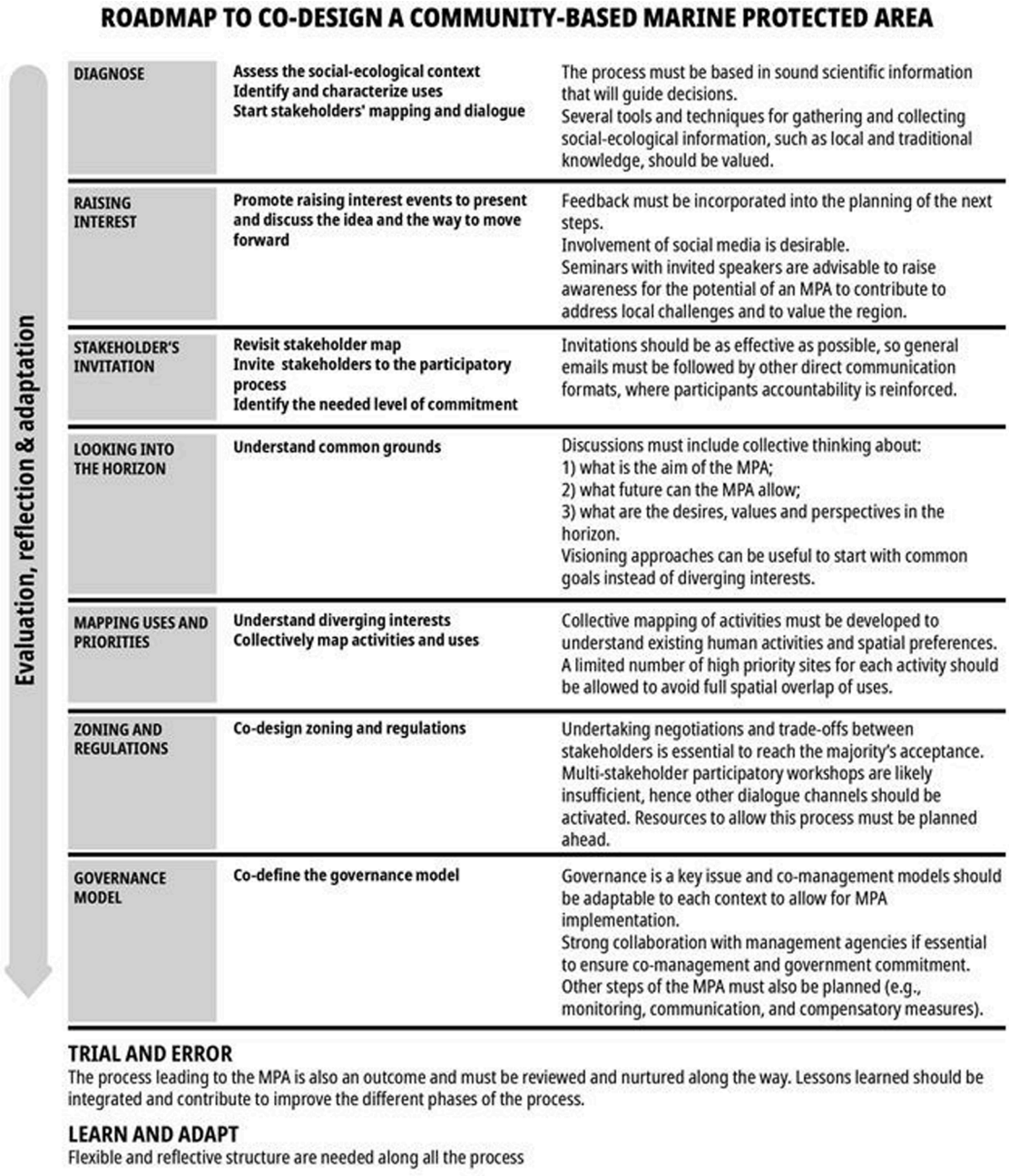

Fig. 4. Conceptual roadmap to co-design a community-based MPA.

6. Discussion

The present case study describes a participatory process conceived to co-design a community-based MPA in a Portuguese marine biodiversity, fishing, and tourism hotspot. Key characteristics of this process include a unique, sound scientific foundation focused both on the natural and socio-economic values of the area, a comprehensive effort to bring the stakeholders into the design process of this MPA, and the use of integration experts and expertise [28]. The main lessons learned from this process include:

– Starting the process with a solid systematization of the social-ecological context

The present participatory process was based on solid scientific studies, including an extensive ecological and biological characterization of the area, habitat mapping, socioeconomic valuation and mapping of the main industries supported by this ecosystem ([54,57,58], see Suplementary Material 1 for more references). Such a knowledge base was fundamental for raising interest in a process dedicated to protecting the values and associated uses. It also highlighted the current threats and pressures that menaced ecosystem resilience and integrity [4]. Nonetheless, all the choices were a result of the discussions held during the participatory approach, resulting in co-constructed decisions that included the pre-existing scientific information, as well as views and information inputs from all participants. As referred in Huang et al. [34], participatory workshops were essential to identify, discuss and define problems in zoning options, monitoring strategies, or enforcement strategies. It is however fair to infer that, concrete data influences negotiations, as it substantiates or challenges pre-existing notions. In our case, e.g., having species and habitat mapping encouraged the participants in setting aside the most sensitive areas only for no-extractive use. Ultimately, scientific data also opens the opportunity to integrate local and traditional knowledge.

The effort of systematization and integration of descriptive, normative, and practical knowledge induces higher levels of trust and credibility [26]. Experiential knowledge can challenge prevailing scientific expertise and authority, which can transform how researchers shape their inquiries and amplify the range of perspectives, ultimately elevating the quality and credibility of the analysis and results. Further, as Hansson and Polk [26] argue, credibility is established not only through the scientific analysis of experiences and practice-based expertise, but also through recognizing stakeholders' equal stake in the process, valuing their practice-based needs as highly as the scientific requirements of the researchers. Consequently, the capacity of scientific knowledge to grasp and interpret practice-based knowledge becomes vital; the co-design of this MPA supports such arguments.

– Engaging different stakeholders since the beginning, in an inclusive participatory process, recognizing the need to work together for a sustainable future

Although time and resource consuming, participatory processes are a fair and efficient investment contributing to move beyond the common standards and achieve successful outcomes. They promote social equity by allowing the accommodation of all interests, the incorporation of local people's perspectives and interests, and the discussion of locally grounded and suitable solutions [10,30,34,43,47,55,65,6,37]. Therefore, adopting a truly collaborative and adequately prepared participatory approach when planning, identifying, and managing MPAs, is essential for involving stakeholders at different stages of the process [43,44,65]. This effective involvement is central for legitimation, appropriation and people support, as advocated by the code of conduct for marine conservation proposed by Bennett et al. [7] and should become the norm if MPAs are established to succeed and meet their goals in the long term [42,43,44]. Engaging and involving stakeholders since the early stages of an MPA design is rare [37], although globally recognized as a key factor for achieving the MPA effectiveness [12,17,22,35,4], promoting trust and resulting in better and more consistent decisions [10,15,3,4,56]. Hence, the importance of engaging, incorporating and empowering stakeholders was set as an objective since the early stages of this MPA initiative, which is recently still uncommon while designing MPAs [37].

The large number of stakeholders involved in the process resulted from the effort of the promoters' group to be as inclusive and broad as possible. Also, incorporating additional key stakeholders in the promoter's group was a turning point in the process, as they embraced the role of engaging non-represented minorities and process opposers. This example highlights the critical need to ensure that the process maintains its open, inclusive, and dynamic prerequisites.

Moreover, an inclusive participatory process is not just about the number and diversity of stakeholders involved. Implementing methodologies that integrate a wide array of perspectives related to the issue is fundamental. As such, during the co-creation of an MPA, the participatory approach should start by securing time and space to share interests, values, and perceptions. A possible approach to secure this is to start the MPA design process with the collective development of a common vision (details in [25]). A vision gives a horizon to the process of sharing common interests and opportunities rather than potential conflicts, which may be dealt with later in the participatory process [18,2].

Another key aspect regarding stakeholders' participation is the fact that some stakeholders might deliberately choose not to participate, even though they are invited and included in every action. This happened in our case, and, e.g., in Rasheed and Abdulla (2020), and is described as a common problem in such processes, as referred to by Heck et al. [27] and Marques et al. [40]. Such situation is an important signal that implies careful consideration and negotiation capacity. In our case, the development of a concrete proposal for compensatory measures was the solution advanced to deal with such issue. Other negotiation strategies can be suitable in other contexts, but it is important to highlight that implementing a participatory process does not secure consensus and solves all the challenges of an MPA design and future implementation, once it not always results in the support of local users towards the creation of a protected area, as described in Oyanedel et al. [47]. As argued by Michel et al. [43], participatory processes should acknowledge that local visions are not always aligned with the objectives of protected areas, and residents may perceive those restrictions are being imposed by outsiders. Accepting and incorporating this openness to failure in a participatory process is a key aspect of strengthening the process itself, by respecting and incorporating dissidents, and re-evaluating nature conservation measures [43].

– Targeting compromises instead of consensus for a co-produced MPA proposal

It was clear from the beginning that the goal of this process should be set on compromises rather than consensus. The fact that the proposal delivered to the government included 51 position statements of stakeholders, 49 in favour of the MPA, and only two conditioned to compensatory measures, demonstrates the success of achieving compromises. Our strategy included both multi-stakeholder workshops and targeted stakeholders' engagement meetings, once the promoters' group felt that, at a certain point, the best way to move forward was to establish bilateral meetings with specific stakeholders. This approach is key to signalling and dealing with stakeholders that choose to remain silent, as pointed out by Day [10]. Bilateral meetings provide a useful setting where stakeholders' concerns can be comprehensively dealt with while compromises are found.

Achieving compromises rather than consensus is a key aspect in such multi-use complex planning tasks [10,11,59], and was clear during the zoning and regulation phase, where divergent interests were brought to the discussions [11,41]. In this case, a strong ecological scientific input informed the design of the zoning proposals while combining with other sources of information, such as LEK (Local Ecological Knowledge) or views and concerns arisen from the participatory process; i.e., the design of the most protected zones (no-take areas) took into account not only the natural values, but also the socioeconomic factors, aiming to maximise conservation efforts while minimising costs for key stakeholders. The multiple opportunities to discuss the zoning proposal, and the significant change in the location and shape of the no-take zones between the first and the following proposals, as well as further adjustments in regulations (see details in [33]), signalled that there was not a rigid pre-defined zoning, and that the objective was to achieve a compromise that everyone could live with. Further, it reinforced that an iterative and flexible process was valued to stimulate inputs throughout the process [10,17,30]. The final MPA zoning plan was substantially different from the initially proposed, but it addressed most of the possible interests [33] and the achieved compromises empowered and committed the stakeholders. This allowed to meet conservation goals while promoting the well-being of local communities and their livelihoods after establishing the MPA.

Marine Protected Areas are important tools for conservation, but their effectiveness in fulfilling the proposed objectives depends on the users' acceptance and compliance with regulations, which is not always the case, as referred by Michel et al. [43]. Acceptance and compliance can only be achieved if rules are developed with those that need to respect them, and if the negotiation is multilaterally serious and transparent [42,46]. That was our aim in the process described here. In fact, although it is widely documented that users of the marine system tend to perceive MPAs as having an overall negative effect on their activity [29,8], that might not be the case if the process leading to a MPA accommodates broad interests prior to its definition and enforcement [13,4], as accomplished in this case study [33].

After the formal implementation of the MPA in January 2024, a dialogue was initiated with the government to guarantee that the established compromises were kept. By the end of 2024 most licences had been issued, and compensatory measures had been paid to fishers. These were important actions showing the governmental willingness to honour decisions made during the participatory process, a step towards

effectiveness, acceptance and compliance for this MPA.

– Securing all expertise needed in the promoters' team

Designing and implementing an MPA is a complex process that requires a multidisciplinary team with expertise ranging from social sciences and humanities to natural sciences. It goes beyond merely having these skills aligned towards a shared goal; it also requires the ability to integrate contributions, manage conflicts, and facilitate cooperation. In this case, the promoters' group comprised a diverse array of experts, including those specialized in integration (as highlighte by Hoffmet al. [28], Pohl et al. [49] and Von Wehrden et al. [64]). These roles are frequently assumed informally by various team members. In fact, it is important to formally ensure that a promoter group possesses the essential abilities to lead, administer, manage, monitor, assess, and integrate activities associated with complex challenges like co-designing an MPA.

7. Final remarks

Although solutions are context-dependent and cannot be one-size-fits-all, this experience represents a paradigm shift in marine decision-making processes and will make a valuable contribution to dedicated literature. It is also important to point out that part of this process was conducted during the COVID-19 pandemic lockdown, showing that despite the restrictions, on-going initiatives to successfully engage stakeholders and to reach compromises between conservation and other societal needs can be achieved. This process culminated with 96 % of stakeholders validating the final MPA proposal that was submitted to the Portuguese government. No one can predict the future and guarantee that this MPA will achieve all its proposed ecological and social objectives; however, we believe that being co-constructed, in this way by its users, is a first and solid step towards success.

Author statement

This study was designed by MR, BHC, MHG, AR and JMSG. All authors contributed to the participatory process (particularly, MR, BHC, MHG, AR, PM, FO, LB, NSH, AC, AJC, VL, EG, TPC and JMSG). MR wrote the manuscript with BHC, MHG, AR and JMSG. FO and PM produced the figures. All authors contributed to the article and approved the final version.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.marpol.2025.106695.

Data availability

Data will be made available on request.

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