

Doing marine spatial zoning in coastal marine tropics: Palawan's Environmental Critical Areas Network (ECAN)

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ARTICLE INFO

Keywords:

Marine spatial planning
Marine zoning
Political economy
Participation

ABSTRACT

Zoning is an important tool in marine spatial planning (MSP) for balancing the multi-uses of the marine environment. Whilst mainly developed conceptually and implemented in Europe and North America, marine zoning is becoming a popular tool for addressing diverse coastal marine issues in the tropics. However, we know little about how it is being implemented in practice in that context. In this study, we analysed the factors and strategies that enable and hinder the establishment of marine zoning in the low-income tropics through a case study of the 26-year history of the development of the Environmental Critical Areas Network (ECAN) in Palawan, Philippines. We employed two participatory methods: Innovation Histories to investigate how implementation barriers and opportunities change over time, and the Net-Map method to reveal the social relations and power distributions that enabled, blocked, and stalled its implementation. We found that MSP can be durable in these contexts when institutionalised in national law and adopted by local co-coordinative bodies, yet it remains an externally-driven agenda. Our study shows that the scaling up of zoning does not necessarily help resolve conflicts around marine and coastal space, and highlights the importance and influence of the political economy on MSP implementation and outcomes. We conclude that MSP's insensitivity to contextual power relations and politics raises concerns over social inclusivity, equity and justice. Moving forward, MSP implemented in the tropics needs to make conflicts, trade-offs and power distributions explicit at the outset through participatory decision-making that involves and empowers all stakeholders from the early stages of initiatives.

1. Introduction

Finding governance solutions that promote the sustainable use of marine resources by multiple users, enhance the wellbeing and alleviate the poverty of coastal communities, and protect marine ecosystems is an important global imperative, embodied in goal 14 (Life under Water) of the global Sustainable Development Goals (UN, 2018). One potential solution is Marine Spatial Planning (MSP): a process to bring together multiple users and governors of the ocean (and adjacent coastlines) – including fisheries, tourism and recreation, aquaculture, energy, shipping, conservation, industry and government – to make informed and coordinated decisions about how to use marine resources sustainably and fairly through the management of marine space and ecosystems [11, 12,38]. Zoning marine areas for specific uses and management rules is a

common approach to operationalising MSP.

MSP is under development in over 70 countries worldwide, mainly in the Global North, especially in Europe and North America, but increasingly in low- and middle-income contexts in the tropics of Africa, the Americas, Oceania, and Asia [44]. Part of the motivation for developing MSP in the low-income tropics is to address the shortcomings of small marine protected areas, such as their failure to address degradation in surrounding areas [1]. However, in most cases MSP in low-income tropics is only in the pre-planning or plan development stage, providing few examples that have been implemented and sustained over time and at relatively large scales. MSP in high-income countries is data- and resource-heavy and often implemented from the top down by a single management authority (e.g., the Great Barrier Reef). Studies of the implementation of ecosystem-based management in

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<https://doi.org/10.1016/j.marpol.2022.105207>

Received 25 November 2021; Received in revised form 5 July 2022; Accepted 10 July 2022

Available online 1 September 2022

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the tropics provide lessons for MSP by demonstrating the need to adapt institutions and management to situations where there is poor data availability, financial and technical constraints, poverty alleviation and economic development priorities, and institutional legacies of, for example, small community and co-managed marine protected areas [4, 8,7]. Indeed, it is critical that MSP and zoning be based on an in-depth understanding of the history and structures of existing governance systems [32]. There is a lack of literature, however, on how marine zoning can work institutionally in low-income tropical settings [2].

This article presents our research on a coastal marine zoning process for the entire province of Palawan in the Philippines – a UNESCO Man and Biosphere Reserve – to analyse the factors, strategies and challenges to initiating and sustaining MSP in the low-income tropics. While MSP has been developed at the municipal level in the rest of the Philippines, it is implemented at the provincial level in Palawan under the auspices of the Strategic Environmental Plan (SEP) for Palawan law (Republic Act 7611 (1992)). The SEP aims to conserve and protect the unique ecology of Palawan and promote sustainable development. The Environmental Critical Areas Network (ECAN), a network of terrestrial and marine spatial zones, was established as the main strategy for implementation of the SEP. ECAN provides an important case study of *doing* marine zoning, and MSP more widely, over an extended period of time in a low-income, decentralised tropical setting, providing lessons for its implementation elsewhere.

First, the article describes the case study and participatory qualitative methods used to analyse the history of ECAN's emergence and evolution and the actor network and power relations involved in

developing, implementing or influencing ECAN. Second, it presents results on the governance arrangements and history of ECAN, and the factors and strategies that have supported and contained ECAN's successful implementation. Lastly, it discusses and concludes that scaling up to marine zones does not necessarily resolve conflicts between stakeholders, and MSP must navigate the political economy, which can be especially complex in post-colonial tropical contexts.

2. Materials and methods

2.1. Case study: Environmental Critical Areas Network, Palawan, Philippines

Palawan is a narrow archipelagic province of 1780 islands and 2000 km of coastline, located in the southwest Philippines (Fig. 1). Palawan was designated as a UNESCO Man and Biosphere Reserve in 1990, owing to its diverse and globally significant biodiversity: It is estimated to host 40% of coral reefs in the Philippines [29] and 105 of the 475 threatened species, of which 67 are endemic to Palawan. The islands have a population of 1.2 million (Philippine Standard Geographic Code (PSGC), 2021) with a young (46% are 18 years old or younger) and ethnically diverse demography, including several indigenous peoples (PSA, 2018b).

The coastal population is mainly composed of migrant settlers from across the Philippines, and most coastal households are engaged in marine-based activities, including capture fisheries, seaweed farming, gleaning, aquaculture, pearl farm labouring, fish processing and fish

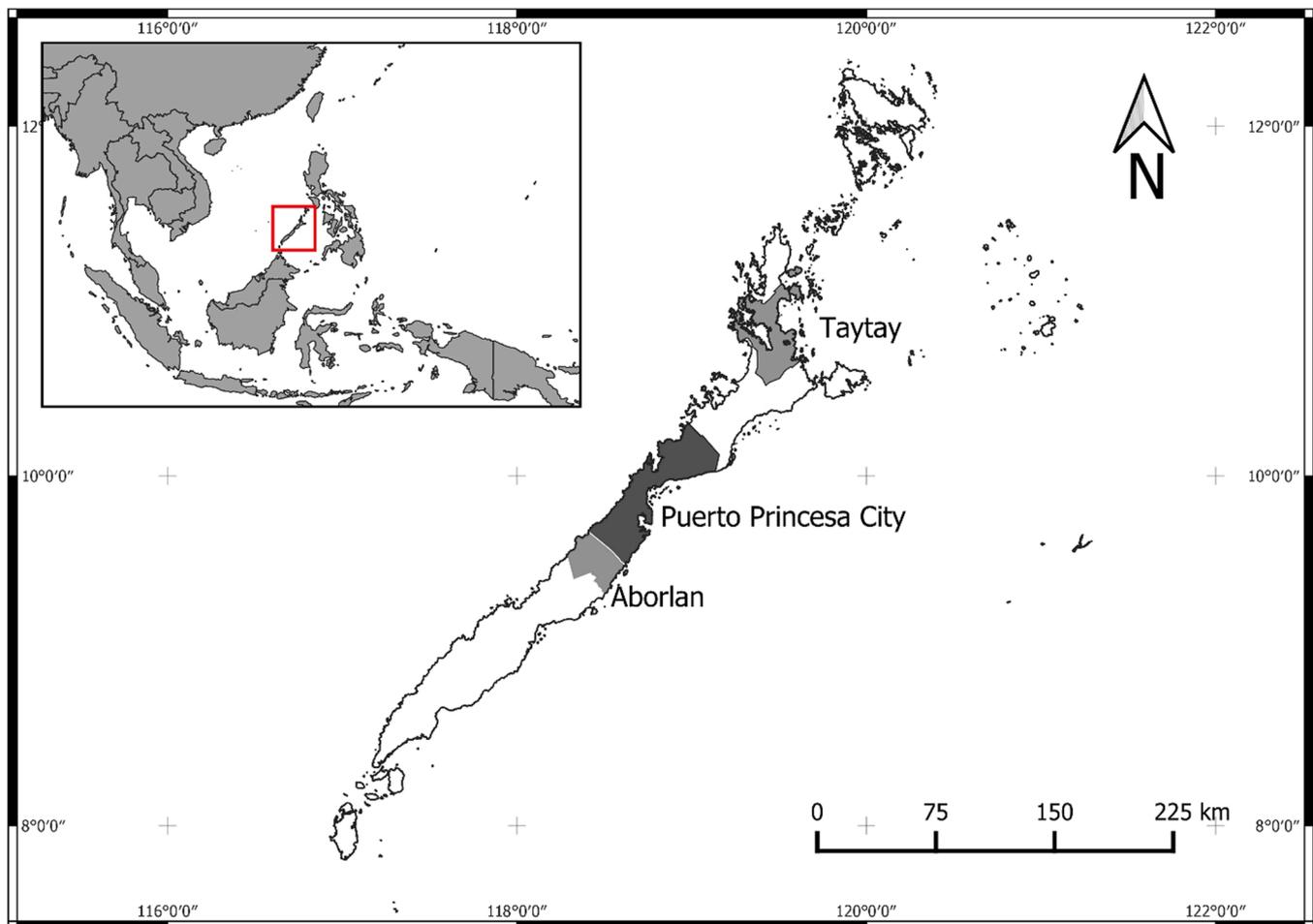


Fig. 1. Map of Palawan
Source: (Sumeldan et al., [42]).

trading [20]. The province's fishing grounds are major sources of the Philippines' annual total fishery production; the live reef fish trade (LRFT) accounts for 55% of the Philippines' total export of the commodity [35]. Until the recent slowdown in tourism due to the Covid-19 pandemic, Palawan was the fastest-growing tourist destination in the Philippines; about 875,000 tourists visited the province in 2015, up by almost 70% compared to 2008. Palawan is categorised as a province in the highest income class in the Philippines, yet 11.2% (PSA, 2018a) of the population remains in poverty (national average 12.1%) (PSA, 2019).

Local governance in the province is guided by the Local Government Code of 1991 where basic services including environmental management are devolved into the three-tier decentralised system: provinces, municipalities and barangay (villages). The province of Palawan comprises 23 municipalities and one independent city, Puerto Princesa, each led by a mayor and containing multiple barangay, the smallest administrative division. The local chief executives (provincial governors, municipal mayors and barangay captains) and the respective legislative council bodies of the tiers are elected every three years, while the executive branch of government is composed of tenured and non-tenured civil service employees.

The SEP law provides for the principles, strategies, and mechanisms for stakeholders and government, including the barangay, municipal, and provincial government units, to collaborate, plan, strategise and monitor sustainable resource utilisation and development initiatives in Palawan. Under the auspices of SEP, ECAN delineates critical core zones for strict protection, ancestral zones to preserve cultural values, and multiple-use zones for sustainable development activities in both marine and terrestrial environments. ECAN guidelines (PCSD Res. No. 05–250) prescribe the processes, criteria and methodologies for delineating these zones and the roles and responsibilities of key institutions, summarised in Table 1.

The initial ECAN maps are reviewed by ECAN boards, before being approved by municipal legislative councils and the Palawan Council for Sustainable Development (Table 1), and then finally adopted as a municipal ordinance. During the three decades of ECAN, efforts have concentrated on zonation of terrestrial areas. Zoning regulation on coastal marine waters was mentioned in the first Implementing Rules and Regulations (IRR) of ECAN in 1994, however, real progress was made in 1999 when the new IRR detailed its zoning parameters. Today, zoning of municipal coastal waters is at various stages of development and implementation.

2.2. Data collection and analysis

A Participatory Marine Governance Analysis (PMGA) [19] was used to explore the process of governance change over time at multiple levels, and the network of social relations among actors influencing the development and implementation of ECAN in coastal and marine environments in Palawan. The PMGA involved the use of three tools: desk-based policy and institutional analysis, Innovation Histories, and Net-Map.

The institutional analysis involved desk-based mapping of organisations and their roles related to marine governance in Palawan, and policy analysis to identify key national and provincial legislation and policies pertinent to ECAN development and implementation. The Innovation Histories method, originally developed by Douthwaite and Ashby [10], was applied to record the history of the start-up and evolution of ECAN from 1992 to 2018. Put simply, at workshops, research participants co-created timelines of important events, such as critical decisions, changes in relationships, policy changes, new learnings, and unexpected events (e.g. natural hazards). Participants then identified and discussed the most critical events for the evolution of ECAN, and reflected on the key barriers and enablers to making progress. Semi-structured interviews (n = 8) were later held with key informants to discuss themes from the workshops in more depth and fill data gaps.

Table 1

Key institutions involved in the implementation of ECAN.

Institution	ECAN role
Palawan Council for Sustainable Development (PCSD)	Mandated for the governance, implementation, and policy direction of the SEP law, including ECAN. Comprises representatives of national government agencies (see below), Presidents of League of Municipalities and Barangays, Non-Government Organisations (NGOs), private entities, military, and religious and tribal groups. It oversees and reviews ECAN guidelines and zoning criteria, approves maps, and issues certificates for entities to undertake activities in the zones. The PCSD also supports ECAN implementation by convening sub-groups on environmental monitoring, research and education, such as the Palawan Knowledge Platform.
PCSD Staff (PCSDS)	Provides professional support to the PCSD and administration of ECAN implementation, including proposing policies, implementing programmes and activities as required by the PCSD, and establishing and managing partnerships with stakeholders.
PCSD Scientific Advisory Panel (SAP)	Provide science-based opinions, advice, and supplemental technical information prior to PCSD decisions.
National government agencies	Support ECAN implementation with their technical resources, such as sitting as members of the PCSD, providing data, advice, and direction to ECAN. Key national government agencies for coastal marine management include the Department for Environment and Natural Resources (DENR); the Department of Agriculture - Bureau of Fisheries and Aquatic Resources (DA-BFAR); and the National Economic Development Authority (NEDA). DA-BFAR, the national fisheries agency, are responsible for management of waters and marine resources beyond 15 km of the coastline.
Municipal Local Government Unit (MLGU)	Responsible for management of their coastal areas out to 15 km, and therefore oversee the mapping, establishment and enforcement of MPAs and fisheries ordinances. Recommends projects through the ECAN Board for approval by the PCSD. Headed by the Municipal Mayor, the LGU comprises executive municipal offices (e.g. agriculture, environment) that oversee the devolved services of national government agencies.
ECAN Board	Multi-sectoral advisory body at the municipal level, tasked to lead the local implementation of ECAN (PCSD Resolution 05–250), including the compatibility of proposed activities with ECAN zone rules, and to facilitate compliance monitoring of coastal marine-related projects.

Source: Authors

At the same workshops, participants created a Net-Map [39] to analyse the relationships and power relations amongst actors/stakeholders involved in, or affected by, the implementation of ECAN. The participatory process involved participants: (i) writing each stakeholder of ECAN on an actor card; (ii) drawing lines between the actor cards on flip chart paper to represent different types of relation (i.e., sharing of advice, information, resources, and lines of authority); (iii) creating 'influence towers' out of stacked chips to represent the perceived influence of the actor on the successful implementation of ECAN; and (iv) identifying critical relationships and discussing how the differential influence of actors enabled and blocked ECAN progress. By capturing the perceived influence of actors within a social network, we revealed power relations and how they affected the ability of actors to enable, shape, and inhibit ECAN implementation. Adapting their use by Fortnam [18], the methods recorded the lived experience of actors involved in, influencing, or being influenced by ECAN, and facilitated

learning among participants to support the future improvement of ECAN implementation in Palawan.

The Innovation Histories and Net-Map were implemented at eight workshops between October 2018 and February 2019 with participants working at (i) the national, regional and provincial level, (ii) municipal level, and (iii) village (barangay) level. Participants (totalling 60) were purposefully selected based on their relevant knowledge, current or past involvement in ECAN, and to represent the levels of governance. They included representatives from key institutions (Table 1), conservation and development NGOs, academia, municipal and barangay (village) LGUs, and community-based organisations (Peoples Organisations). National/provincial workshops were held in Puerto Princesa City, while municipal and barangay level workshops were held in the Municipalities of Taytay and Aborlan (Fig. 1). Six barangays within their jurisdictions were selected to represent different geographic areas with different types of marine ecosystem and resource use.

The workshop facilitation team included both researchers and PCSD staff to increase ownership and capture 'insider' reflections on findings. Workshop data were recorded by note-takers, who wrote up their detailed notes on analysis forms (templates in PMGA guidelines) immediately after each workshop. Photographs of workshop outputs (e. g. Innovation Histories timeline and the drawn Net-Map) were also inserted into the analysis forms. Note-takers later referred to audio recordings of the workshop to verify notes and include additional details as necessary. A narrative report was then derived from these analysis forms that synthesised the history of ECAN, key actor relations, justifications for influence scores, and key analytical themes related to ECAN implementation. The report also, for each actor, included aggregated influence scores (total number of chips in each influence tower normalised by total number of chips used, and mean average influence score for each actor then calculated from all workshop Net-Maps). These scores were interpreted using the qualitative justifications for the scores provided by participants and recorded on analysis forms. The analytical themes presented in the narrative report provided the basis for the results section of this article. For further information on the PMGA methodology used in this study, please refer to Fortnam et al. [19].

3. Results

The Innovation History and Net-Map analyses identified three broad themes that drove and facilitated the establishment of ECAN and its durability over 26 years, but which have also generated barriers to realising its aims and coverage: agents and drivers of change; learning and adaptation; and power and influence in practice.

3.1. Drivers and agents of change

The Innovation History (key events summarised in Fig. 2) showed that international donor programmes and associated implementing NGOs, politicians, and government agencies played a critical role in ECAN establishment and implementation. First, programmes diagnosed

problems and interlinkages between environment and poverty and introduced new concepts, including spatial zoning. In 1981, Palawan was the 26th poorest province in the Philippines and had lagging development and exponential population rates. At this time, the use of environmentally degrading practices was widespread – in the coastal marine context these included the rampant use of destructive illegal fishing practices, such as dynamite, cyanide, muro-ami methods, and the clearance of mangroves for logging, fishponds, and settlement expansion. Building on lessons learnt from development programmes in the 1970s, the European Union, then the European Economic Community (EEC), partly funded the Palawan Integrated Area Development Project (PIADP, 1982–1989). This included the Integrated Environment Programme (IEP) that promoted the identification of ecological zones as a practical solution for conservation and sustainable development, which led to the SEP law being proposed and the subsequent creation of ECAN.

Second, the institutional framework for ECAN was established as a consequence of lobbying, political leadership, and other political processes at the local and national level. The first draft of the SEP Bill was completed in 1988, with the high-level sponsorship of influential national and provincial politicians. However, there were delays to the submission of the first draft caused by demands to extend the jurisdiction of the SEP beyond the mainland to island municipalities, and the nationwide political upheaval of the ousting of President Ferdinand Marcos in the 'People Power Revolution' and national election in 1986. Further delays were caused through campaigns by environmentalists to include the prohibition of logging in the law, which were eventually successful. During this period, the primary donor, the EEC, made the release of additional funding for development in Palawan contingent on the passing of the law, putting pressure on politicians to pass the bill. Thus, the passing of the SEP law in 1992, which led to ECAN implementation, was the result of a deeply political process, with political leadership and coercion from donors required to overcome divergent interests and institutional barriers.

Third, the continuation of ECAN implementation since 1994 has been aided by its institutions being enshrined in law and the continued provision of financial and technical assistance. The SEP law and establishment of ECAN guidelines in 1994 (revised in 1999) established the institutional framework for ECAN, including the creation of the PCSD, PCSD Staff, and ECAN boards (Table 1). These institutions provided the foci for national government and international donor programmes to maintain funding and technical support for the zoning process. Our Net-Map data showed how the primary recipients of funding, such as the PCSD, channelled resources to other implementing agencies, such as LGUs, NGOs, peoples organisations, and research organisations; and bridged actors and expanded the network working on ECAN. The funded organisations remained operational in Palawan between projects, thus bridging efforts across time and providing institutional memory. Notably, the international NGO, WWF, has had a long-term presence in Palawan from 2000 until today, providing technical assistance to the LGUs on the demarcation and marking of zone boundaries, coastal resource assessments, the identification of prescribed activities for each

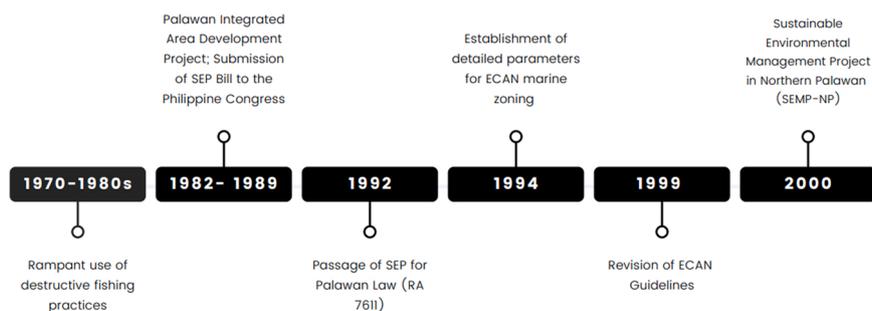


Fig. 2. Innovation history timeline of key events, Source: authors.

zone, and enforcement of regulatory measures in Aborlan and Taytay.

In sum, successive donor programmes diagnosed the problems, introduced the concept of marine zoning, engaged local and national government agencies and political leadership to pass legislation that led to the zoning, and supported zoning implementation with technical and financial resources. Political will and strategy were required to overcome resistance to the establishment of the institutional framework (laws, regulations and organisations), which has enabled continued stakeholder participation and zoning to be progressed across multiple donor and NGO projects. Thus, coalitions of international, national, and local agents of change played a critical role in influencing the design and establishment of MSP in Palawan. The history of its establishment has determined how marine zoning is implemented in Palawan and what and who has been empowered to make decisions and influence its implementation. The data therefore highlight the importance of coalitions of international, national, and local actors in introducing and defining marine zoning concepts, driving the establishment of institutions responsible for zoning, maintaining its implementation, and navigating the local political economy.

3.2. Learning and adaptation

The Innovation History identified multiple adaptations to the SEP law and ECAN protocols to accommodate new knowledge, lessons learned, and stakeholder concerns. Baseline studies, coastal resource assessments, and evaluations of donor projects generated learning that was integrated into ECAN planning processes. For example, the JICA SEMP-NP project evaluation (JICA, [27]) recommended reorganising and strengthening the LGUs to implement ECAN zoning regulations, updating satellite image information for mapping zones, and establishing a support system for the LGUs to comply with the guidelines on sustainable tourism development.

Palawan-based, national and international research organisations and collaborations have informed policymaking and programming throughout ECAN's history by sharing new knowledge and policy advice through conferences and participation in the PCSD Scientific Advisory Panel. ECAN guidelines have also been revised three times (Fig. 1). For example, in response to the concerns of LGUs, the guidelines were amended in 1999 to permit navigation across core zones for local fishermen and emergency situations when alternative routes are not available.

The evolution of SEP and ECAN implementation was also influenced by the shifting institutional framework of the Philippines. This mainly involved harmonising rules and regulations of SEP with new and amended national and municipal laws. For example, the ECAN boards ensure rules for ECAN zones are harmonised with national laws, and ECAN core zones are often identified as existing MPAs designated by municipal ordinances.

In sum, ECAN protocols have adapted over time through learning and in response to changing external factors, especially shifting institutional frameworks. Stakeholders involved in this research saw this flexibility as important to the longevity of ECAN. The adaptations enabled improvements to ECAN to be made and increased the social acceptability of the zones. The data therefore indicate that being adaptive, rather than sticking to a rigid plan, is important for maintaining the process of marine zoning over time.

3.3. Power and influence

Net-Map and Innovation History data pointed to the role of power and political influence in both driving and stalling the implementation of ECAN at provincial, municipal, and village levels.

3.3.1. Provincial political tussles

The SEP law created an institutional framework that has afforded the provincial level significantly more influence than is typical in the

Philippines. Most provinces in the Philippines have little responsibility for coastal marine management since coastal waters are the jurisdiction of municipal LGUs out to 15 km. In Palawan, the SEP law has provided a legal mandate for the PCSD to coordinate province-wide coastal marine management to achieve the sustainable development goals of the SEP. In Net-Maps, the PCSD was considered one of the most influential actors concerning the implementation of ECAN (Table 2) because of its capacity to formulate and review policies and guidelines, set the direction of ECAN, and issue or deny permits to institutions and individuals for activities in the zones. ECAN zone maps are developed by the PCSD Staff in consultation with municipal governments in a predominantly top-down manner.

The PCSD goals and annual plans, as well as amendments to ECAN policies, aim to align with the agendas of national government agencies (Table 1) and so are influenced by national and provincial political dynamics and events. The PCSD provides the fora for conflicts, contestations, and power dynamics to manifest amongst its membership (Table 1). Our data from Net-Map indicated that past decision-making by the PCSD has been strongly influenced by the sitting Chair and lobbying from those resistant to ECAN, including developers, investors, miners, and fish traders. Similarly, there were claims that the PCSD was placed under the administration of the Department for Environment and Natural Resources (DENR), a national government agency, during the administration of President Gloria Macapagal-Arroyo, in response to lobbying from mining companies in the 1990s in reaction to the PCSD's objection to mining development. These strategies were regarded by some as resistance to what was perceived as the pro-environment biases of the PCSD, driven by donor agencies, that inadequately considered the 'daily survival' of the population in a context of endemic poverty. The PCSD, therefore, provides an arena for political struggles amongst national and provincial political and economic interests.

The power asymmetries within the PCSD membership also enable provincial politicians to influence ECAN implementation. The chair of the council is often occupied by the provincial governor or congressman "selected out of courtesy" instead of being elected every three years from

Table 2
Ten perceived most influential actors regarding ECAN implementation.
Data: Perception influence scores agreed at provincial, municipal, and village focus groups were normalised and averaged.

Actors	Average	Provincial	Municipal	Barangay/ Village
Municipal Local Government Unit (Mayor)	12	7.3	13.7	14
Palawan Council for Sustainable Development	10	15	9.3	6
Academia	8	7	5	11
Palawan Council for Sustainable Development Staff	5	13	3.3	0
Barangay [village] Fisheries and Aquatic Resources Management Council (BFARMC)	5	0.3	4.3	11
Department of Environment and Natural Resources	5	4.7	6.7	3
Barangay Local Government Unit	5	2.3	0.7	11
Other national government agencies	5	3.3	1.5	9
Donor agencies and NGOs	4	5	2	6
Department of Agriculture-Bureau of Fisheries and Aquatic Resources	4	4.7	5.7	2

any one of its members (as is stipulated in Section 16 of the SEP law). Various amendments were made over the ECAN history under different chairmanships. According to some provincial-level research participants, these changes were generally politically motivated and incongruent with the sustainable development principles of the SEP. Moreover, some provincial-level participants alleged that the scientific information of the PCSD Scientific Advisory Panel is "not recognized within the [PCSD] body because of its nature as highly politicised and selective".

3.3.2. Municipal autonomy and political will

The municipal mayors were ranked as the most influential actor on Net-Maps at municipal and village level focus groups (Table 2), owing to municipal governments possessing legal responsibility for the management of coastal marine resources. Although the LGU have legislative and executive branches constitutionally, Net-Map participants pointed out that municipal mayors often have de facto control of LGU budgets and staff, the ECAN Board, and marine enforcement (through their command of the local Philippines National Police). All of which were said to be critical resources for the implementation of ECAN in municipal coastal waters.

While PCSD and PCSD Staff were considered amongst the most influential for ECAN implementation (Table 2), some participants said that ultimately municipal governments decide whether to implement and enforce ECAN rules and zones because of their legal rights and responsibilities. The PCSD has a limited annual budget allocated to ECAN Zone management, according to provincial workshop participants, which is stretched over one city and 23 municipalities. For example, PCSD can only assess each municipality's coastal resources roughly every 10 years. This means that the PCSD is highly dependent on municipal LGU resources and political will to operationalise ECAN at the municipal level.

Where there is a pro-environment municipal mayor, the influence of municipal government has enabled PCSD and NGO projects to work with the municipal staff and stakeholders to progress ECAN implementation without needing higher-level political support. These tend to be municipalities where there have also been successive donor projects and long-term engagement by conservation NGOs. However, in other municipalities, dependence on the political will of municipal mayors was said to have resulted in slow implementation because of the low political prioritisation afforded to ECAN. An evaluation of a donor project (JICA, [27]) concluded that many provincial guidelines are not adopted by the LGUs, that ECAN zoning is weakly implemented by municipalities, and there is an absence of sanctions for non-compliance. ECAN zoning must compete for limited LGU budgets with many other local priorities, and there were concerns that LGUs could not afford ECAN activities without financial support. A municipal LGU participant at the Taytay workshop said: "If you just rely on the LGU for money, your policy will not work after downloading it to the LGU. The policy is nice but the LGU can't afford it without [external] money."

3.3.3. Community participation and resistance

The influence of communities and individuals on the implementation of ECAN was contested. While community participation has been promoted in ECAN zoning guidelines since 1994, grievances were shared by village focus-group participants that ECAN had not engaged them in the zoning process early enough and that some were not even aware of ECAN:

"...it should also be clear for us before its implementation. All of us should know"; "We are angry about [the zoning]...implementation will be better... should the community have been involved in the earlier process."

Some municipal participants said that members of the public only heard about ECAN when their development activities in zones required permission from the ECAN board.

In addition to issues of participation, village focus-group participants

took issue with the livelihood costs of displacement by the zones: "...the residents will mostly be negatively affected since there will be less fishing areas, less food to eat too...". Most fishers, especially live reef fishers, were said to continue to operate in zones where fishing is prohibited, claiming it essential for their livelihood and food security, and there is little enforcement of the zones to force compliance. Because of their capacity for non-compliance, fishers were scored as the most influential actor (influence score = 6) at one village-level focus group, in stark contrast to municipal-level Net-Maps that regarded the fishers as having little or no influence (influence score = 1). Thus, while village communities and resource users have had little influence or participation in the ECAN zoning process itself, they (especially live reef fishers and traders) can obstruct operations and the achievement of ECAN objectives.

3.3.4. Lack of cross-level coordination and conflict resolution mechanisms

The data, therefore, show that power relations and politics determine whose priorities and interests at the provincial, municipal, and village levels are taken into account in ECAN decision-making, but there is also a lack of mechanisms for mediating these relations across levels. The PCSD represents multiple actors and sectoral interests, but participants said there are no efforts to align goals, and the plans of the PCSD and those of LGUs, with local interests often diverging from those of the PCSD. In short, the PCSD aims to co-ordinate a multi-scale governance system across terrestrial and marine systems in Palawan and, in so doing, shifts emphasis and influence to the provincial level without fully resolving the integration of and tensions among multiple, often competing marine uses, whilst disenfranchising communities due to a lack of genuine participation opportunities. Nevertheless, the PCSD has endured for over 26 years and continues to learn and adapt, navigating changing power dynamics and priorities across the province in its efforts to reconcile conservation and sustainable development challenges in Palawan.

4. Discussion

We analysed the 26-year history of, and social relations influencing, marine zoning in the province of Palawan in the Philippines to add to a dearth of literature on MSP and marine zoning implementation in low- and middle-income countries. The findings provide important insights into the drivers initiating and sustaining MSP in low-income tropical contexts, the challenges to achieving the idealised aims of integration and conflict reduction through MSP, and the ways that MSP must navigate the political economy, which can be especially complex in post-colonial tropical contexts.

The durability of ECAN is unusual and interesting. Our study shows that MSP innovations remain an externally-driven agenda. NGOs and donors influenced how problems were diagnosed and potential solutions were framed around zoning, and provided technical and (essential) financial resources for its implementation. This supports literature showing that international donor agencies and NGOs drive MSP innovation at regional levels in the tropics [31]; NGO leadership, or institutional entrepreneurship, is important for initiating marine governance transitions [18,36]; and that external funding is often used to set up MSP in the low-income tropics [34]. Yet, importantly, the establishment of a dedicated co-ordinating body and incorporation of MSP into national law has allowed the PCSD to bridge and leverage numerous donor and NGO projects over time. In our study, external actors effectively enrolled national and local actors as agents of change and leveraged political support for organisational and institutional change. The SEP law and ECAN regulations institutionalised zoning as a long-term planning process, while a multi-sector collaborative institution, the PCSD, provides for continued stakeholder participation in implementation and for learning lessons and adapting policies and strategies. Our study adds support to claims that it is important for MSP to be implemented through state structures and processes [37] and build on existing management

regimes (e.g., community-based or co-management initiatives) [1]. In this respect, the ability of ECAN to adapt and respond to institutional and political change was key to its endurance. Grip and Blomqvist [21] argue that such adaptation of marine zoning plans in response to institutional and political change, and to resistance from those whose interests are affected, can improve the social acceptability of rules and thereby helps to underpin persistent planning processes.

Despite success in developing an enduring, large-scale and multi-level MSP initiative, our study shows that scaling up zoning does not necessarily help resolve conflicts around marine and coastal space. MSP seeks to integrate horizontally between sectors and disciplines and vertically between levels of governance [41] to, in theory, co-ordinate and reconcile competing interests. However, our study shows that this scaling up and improved integration is challenging to achieve in practice. In the decentralised context of Palawan, there is a lack of incentives for horizontal integration across municipal waters, despite provisions in national law for the formation of inter-municipal alliances to manage shared marine resources [24] and the PCSD lacks the authority to oblige municipalities to cooperate. Furthermore, weak vertical integration and a lack of incentives for implementing MSP mean implementation is subject to competing priorities across levels: barangay, municipality and province. Our study showed that while introducing more diverse sectors and actors can in some instances work towards sustainability, often, sectors and their associated government agencies pursue their own, rather than collective, interests as a priority. Scaling up can mean more interests and influences to reconcile. In this sense, MSP does not automatically overcome the challenges that have faced MPA implementation and the scaling up of MPA networks. The lack of dedicated resources allocated to MSP at local levels is common to other contexts (e.g., Taiwan [30]), leading some authors to suggest that bottom-up approaches to MSP need to be balanced with top-down obligations and devolution of resources to ensure plans are implemented and enforced locally [14,28]. It is not that the shortcomings of zoning in Palawan result from MSP being incongruent with community-based decentralised contexts, but that MSP needs to be adapted to fit the governance context (hierarchical or decentralised) each and every time it is operationalised, and this is not a simple task.

Of particular note in our study was the importance and influence of the wider political economy on MSP implementation and outcomes. The study shows how MSP stakeholders have diverse goals and motivations. Politics pervade each level, and across levels, of governance, with each stakeholder pursuing their interests: from conservation-leaning motivations and aims of NGOs and PCSD Staff to municipal politicians' interests in re-election, and resource users and communities' concerns for their livelihoods and food security. The findings, however, demonstrate how unequal power relations play out through MSP to favour dominant actors in decision-making [43,9]. For instance, donor agency funding initially drove the development of rules and maps, but political change (e.g. of the provincial governor) and the desire to appease powerful private sector interests or the electorate later led to the alteration of ECAN rules and plans. Lobbying by the private sector has also been shown to have influenced marine plans in Germany [25]. By participating in MSP, dominant actors can therefore shape and reconfigure MSP through their power relations [13]. In the case of ECAN, the predominantly top-down design of ECAN zones and lack of genuine participation led to community perspectives being marginalised in formal institutions. Given the Philippines' rich history of community-based coastal marine resource management [3], this raises concerns about how scaling up management in MSP could inadvertently disempower marine resource users. At the same time, our case also shows that those marginalised marine resource users can resort to 'weapons of the weak' [40], such as non-compliance with rules, to resist and undermine MSP in their own way.

The apolitical and asocial conceptualisation and implementation of MSP has been a major critique of its application in high-income contexts [15,43,9]. The influence of power and politics may be even more

pronounced in low-income tropical contexts. In the Philippines, pre-colonial and postcolonial relations have left a legacy of entrenched power relations that have engendered poverty, extreme inequality, and a weak and corrupt state [23,7]. Set within this context, decentralisation has empowered municipal governments, and mayors in particular, to take uncoordinated actions and decide whether or not, and to what extent, to implement marine zoning [18]. The findings suggest that political economy and governance contextual factors, if not causing marine zoning initiatives to collapse entirely, can prolong implementation processes, create variable intensities of implementation and enforcement of plans, and inhibit integrated planning across jurisdictions. Moreover, MSP implemented without due regard to power relations risks excluding marginalised stakeholders [26], such as poor fishers, who depend on access to marine resources for their livelihood and wellbeing.

Indeed, while MSP is often considered a mechanism to increase participation and to provide an entry point for diverse voices and conflict to be reduced [33], opportunities for community members to participate in ECAN were perceived to be inadequate and too late in the planning cycle. This may point to how MSP may inadvertently exclude or disempower communities by shifting decision-making to higher levels of governance to plan larger marine spaces. In contexts like the Philippines with a rich recent history of community-based marine protected areas, upscaling management could risk undermining long-standing participatory processes or encourage non-compliance with rules, as was said to be the case in Palawan. Insufficient and too-late engagement of stakeholders has pervaded MSP case studies from the Caribbean, Seychelles, Maldives and elsewhere [1,28]. However, rather than MSP being incompatible with effective stakeholder engagement, the issue may be remedied through procedurally just engagement of stakeholders from the outset and throughout MSP planning processes. In addition, in Palawan (and other contexts [17]), there is little analysis of the social impacts and trade-offs that may arise from implementing marine zones and plans, with a reliance on stakeholders to voice their concerns during consultations. MSP has been critiqued for not engaging all stakeholders at the beginning of the process, tokenistic participation, not valuing the knowledge of resource users, and not identifying or acknowledging adverse trade-offs and social impacts [6]. Our findings further emphasise the importance of designing MSP processes to provide opportunities for marginalised actors to intervene in and influence planning from the outset [13], rather than creating zoning maps for later consultation with communities who by then have only a limited range of choices. Careful stakeholder analysis and processes that provide for meaningful participation are especially pertinent in contexts with wide inequalities and democratic deficits to avoid MSP simply "*repackage [ing] power dynamics in the rhetoric of participation to legitimise the agendas of dominant actors*" ([16], p32) and facilitating 'ocean grabbing' of marine spaces and resources from marginalised resource users [5]. MSP insensitive to politics, power and inclusivity raises substantial concerns over social equity and justice given high dependence of coastal communities on small-scale fisheries for food and livelihood security [22].

Moving forward, MSP should make conflicts and power distributions explicit at the outset of MSP initiatives, for instance, through stakeholder mapping (using toolkits such as Participatory Marine Governance Analysis - [19]) and participatory decision-making involving all stakeholders in the early stages of initiatives. More inclusive planning can reveal and consider a plurality of perspectives, distributions of social impacts and benefits (or trade-offs), and explore alternative futures and how harm could be mitigated or minimised. Understanding conflicts upfront could open up dialogue about solutions before conflict and resistance strategies become a response to MSP. This would require the empowerment of traditionally marginalised stakeholders to produce and use their knowledge and to have the capacity to meaningfully engage in planning processes.

5. Conclusion

Reflecting critiques of MSP in high-income contexts [28,43], our study shows there remains a large gap between how MSP is conceptualised and practised in a low-income tropical context, which leads to challenges with the approach reforming marine governance to address pressing issues of marine resource declines and entrenched poverty. MSP rationality makes it appealing, but the study shows it is a complex socio-political and power-laden approach. MSP should therefore not only be a technical process of optimising the use and management of marine space, but also a process of negotiating multi-scalar and dynamic interactions amongst diverse actors with diverse interests. While socio-political and power relations may appear beyond the scope of MSP, it will be essential to understand how problems and outcomes are defined and shaped by powerful interests and the socio-political specificities of context if the lofty ambitions of MSP to navigate conflict over marine spaces is to be achievable. Taking account of these factors requires MSP to take different forms in different contexts.

CRedit authorship contribution statement

Karen Madarcos: Conceptualization, Methodology, Validation, Formal analysis, Investigation, data curation, Writing - original draft, Writing - review & editing, Visualization, Supervision, Project administration, **Matt Fortnam:** Conceptualization, Methodology, Investigation, Writing - original draft, Writing - review & editing, Supervision, **Lea Janine Gajardo:** Validation, Formal analysis, Data curation, Writing - original draft, Writing - review & editing, **Tomas Chaigneau:** Conceptualization, methodology, review and editing, supervision, project administration, **Ronel Judd Manucan:** Validation, Formal analysis, Investigation, Data curation, Writing - original draft, **Glenda Cadigal:** Validation, Investigation, Writing - review & editing, **Josephine Matulac:** Investigation, Writing - review & editing, **Lota Creencia:** Conceptualization, Methodology, Validation, Investigation, Writing - review & editing, Supervision, Project administration, Funding acquisition, **Benjamin Gonzales:** Conceptualization, Methodology, Validation, Investigation, Supervision, **Louisa Evans:** Conceptualization, Methodology, Writing - review & editing, Supervision, Project administration, Resources.

Declaration of Competing Interest

The authors have no competing interests.

Acknowledgments (including funding sources)

This article is a result of the *Critical analysis of marine planning model applications* Project, a subsidiary project of the Global Challenges Research Fund (GCRF), Blue Communities Programme. The research was funded by the Global Challenges Research Fund (GCRF), United Kingdom Research and Innovation (UKRI), under grant agreement NE/P021107/1. We are deeply grateful to the: a) former and present members of the Blue Communities – Philippines Team, especially to Dr. Jean Beth Jontila, Ms. Theresa Marie Ermeje, Mr. John Roderick Madarcos, and Ms. Kaycel Dalumpines for assisting during the data collection process, and to Mr. Joel Sumeldan for providing Figure 1; b) Palawan Council for Sustainable Development Staff for letting us review ECAN and for providing secondary data used to verify the events in this study; c) local and municipal leaders of the Municipalities of Taytay and Aborlan, Palawan, Philippines, for trusting the team with their insights and data; and d) administration of the Western Philippines University for the utilisation of university resources during the course of the study.

References

- [1] T. Agardy, G.N. Di Sciara, P. Christie, Mind the gap: addressing the shortcomings of marine protected areas through large scale marine spatial planning, *Mar. Policy* 35 (2011) 226–232.
- [2] R. Albotoush, A.T. Shau-Hwai, An authority for marine spatial planning (MSP): a systemic review, *Ocean Coast. Manag.* 205 (2021), 105551.
- [3] A.C. Alcala, G.R. Russ, No-take marine reserves and reef fisheries management in the Philippines: a new people power revolution, *AMBIO J. Hum. Environ.* 35 (2006) 245–254.
- [4] S. Aswani, P. Christie, N.A. Muthiga, R. Mahon, J.H. Primavera, L.A. Cramer, E. B. Barbier, E.F. Granek, C.J. Kennedy, E. Wolanski, The way forward with ecosystem-based management in tropical contexts: reconciling with existing management systems, *Mar. Policy* 36 (2012) 1–10.
- [5] N.J. Bennett, H. Govan, T. Satterfield, Ocean grabbing, *Mar. Policy* 57 (2015) 61–68.
- [6] N.J. Bennett, J. Blythe, C.S. White, C. Campero, Blue growth and blue justice: ten risks and solutions for the ocean economy, *Mar. Policy* 125 (2021), 104387.
- [7] P. Christie, R.B. Pollnac, E.G. Oracion, A. Sabonsolin, R. Diaz, D. Pietri, Back to basics: an empirical study demonstrating the importance of local-level dynamics for the success of tropical marine ecosystem-based management, *Coast. Manag.* 37 (2009) 349–373.
- [8] P. Christie, R.B. Pollnac, D.L. Fluharty, M.A. Hixon, G.K. Lowry, R. Mahon, D. Pietri, B.N. Tissot, A.T. White, N. Armada, R.-L. Eisma-Osorio, Tropical marine EBM feasibility: a synthesis of case studies and comparative analyses, *Coast. Manag.* 37 (2009) 374–385, <https://doi.org/10.1080/08920750902937994>.
- [9] J. Clarke, W. Flannery, The post-political nature of marine spatial planning and modalities for its re-politicisation, *J. Environ. Policy Plan.* 22 (2020) 170–183.
- [10] Douthwaite, B., Ashby, J., 2005. Innovation histories: A method for learning from experience. *Institutional Learning and Change (ILAC)*.
- [11] F. Douvère, The importance of marine spatial planning in advancing ecosystem-based sea use management, *Mar. Policy* 32 (2008) 762–771, <https://doi.org/10.1016/j.marpol.2008.03.021>.
- [12] Ehler, C., Douvère, F., 2009. Marine spatial planning, a step-by-step approach towards ecosystem-based management.
- [13] L. Fairbanks, N. Boucquey, L.M. Campbell, S. Wise, Remaking oceans governance: critical perspectives on marine spatial planning, *Environ. Soc.* 10 (2019) 122–140.
- [14] W. Flannery, M. Ó Cinnéide, Marine spatial planning from the perspective of a small seaside community in Ireland, *Mar. Policy* 32 (2008) 980–987, <https://doi.org/10.1016/j.marpol.2008.02.001>.
- [15] W. Flannery, B. McAteer, Assessing marine spatial planning governmentality, *Marit. Stud.* 19 (2020) 269–284, <https://doi.org/10.1007/s40152-020-00174-2>.
- [16] W. Flannery, N. Healy, M. Luna, Exclusion and non-participation in marine spatial planning, *Mar. Policy* 88 (2018) 32–40.
- [17] W. Flannery, G. Ellis, G. Ellis, W. Flannery, M. Nursey-Bray, J.P. van Tatenhove, K. Kelly, S. Coffen-Smout, R. Fairgrieve, M. Knol, Exploring the winners and losers of marine environmental governance/Marine spatial planning: Cui bono?/“More than fishy business”: epistemology, integration and conflict in marine spatial planning/Marine spatial planning: power and scaping/Surely not all planning is evil?/Marine spatial planning: a Canadian perspective/Maritime spatial planning—“ad utilitatem omnium”/Marine spatial planning: “it is better to be on the train than being hit by it”/Reflections from the perspective of recreational anglers and boats for hire/Maritime spatial planning and marine renewable energy, *Plan. Theory Pr.* 17 (2016) 121–151, <https://doi.org/10.1080/14649357.2015.1131482>.
- [18] M. Fortnam, Forces opposing sustainability transformations: institutionalization of ecosystem-based approaches to fisheries management, *Ecol. Soc.* (2019) 24.
- [19] M. Fortnam, L. Evans, T. Chaigneau, *Participatory Marine Governance Analysis Handbook*, GCRF Blue Communities Programme, Exeter UK, 2022.
- [20] L.R. Garces, M.L. Perez, A.C. Alolod, I.L.J. Buendia, L.S. Callanta, L.B. Santos III, P. J.B. Ramirez, M.D. Pido, Operationalizing the ecosystem approach to small-scale fisheries management in the philippines: the iligan bay alliance of misamis occidental, *Asian J. Agric. Dev.* (2013) 10.
- [21] K. Grip, S. Blomqvist, Marine spatial planning: coordinating divergent marine interests, *Ambio* 50 (2021) 1172–1183.
- [22] S.J. Hall, R. Hilborn, N.L. Andrew, E.H. Allison, Innovations in capture fisheries are an imperative for nutrition security in the developing world, *Proc. Natl. Acad. Sci.* 110 (2013) 8393, <https://doi.org/10.1073/pnas.1208067110>.
- [23] E.-L.E. Hedman, *In the Name Of Civil Society: From Free Election Movements To People Power in the Philippines*, University of Hawaii Press, 2006.
- [24] V. Horigue, M. Fabinji, R.L. Pressey, S. Foale, P.M. Aliño, Influence of governance context on the management performance of marine protected area networks, *Coast. Manag.* 44 (2016) 71–91.
- [25] S. Jay, T. Klenke, F. Ahlhorn, H. Ritchie, Early European experience in marine spatial planning: planning the German exclusive economic zone, *Eur. Plan. Stud.* 20 (2012) 2013–2031.
- [26] S. Jentoft, M. Knol, Marine spatial planning: risk or opportunity for fisheries in the North Sea? *Marit. Stud.* 12 (2014) 13, <https://doi.org/10.1186/2212-9790-12-13>.
- [27] JICA, 2012. Ex-Post Evaluation of Japanese ODA Loan Project “Sustainable environmental conservation project in northern Palawan.”, Global Group 1, Japan International Cooperation Agency, Japan. URL https://www2.jica.go.jp/en/evaluation/pdf/2011_PH-P225_4_f.pdf.
- [28] P.J.S. Jones, L.M. Lieberknecht, W. Qiu, Marine spatial planning in reality: Introduction to case studies and discussion of findings, *Mar. Policy* 71 (2016) 256–264, <https://doi.org/10.1016/j.marpol.2016.04.026>.

- [29] M.W.M. Kuijper, Marine and coastal environmental awareness building within the context of UNESCO's activities in Asia and the Pacific, *Mar. Pollut. Bull.* 47 (2003) 265–272, [https://doi.org/10.1016/S0025-326X\(02\)00469-1](https://doi.org/10.1016/S0025-326X(02)00469-1).
- [30] W.-H. Liu, C.-C. Wu, H.-T. Jhan, C.-H. Ho, The role of local Government in marine spatial planning and management in Taiwan, *Mar. Policy* 35 (2011) 105–115, <https://doi.org/10.1016/j.marpol.2010.08.006>.
- [31] A. Merrie, P. Olsson, An innovation and agency perspective on the emergence and spread of marine spatial planning, *Mar. Policy* 44 (2014) 366–374.
- [32] E. Olsen, D. Fluharty, A.H. Hoel, K. Hostens, F. Maes, E. Pecceu, Integration at the round table: marine spatial planning in multi-stakeholder settings, *PloS One* 9 (2014), e109964.
- [33] R. Pomeroy, F. Douvère, The engagement of stakeholders in the marine spatial planning process, *Mar. Policy* 32 (2008) 816–822.
- [34] R.S. Pomeroy, K. Baldwin, P. McCONNERY, Marine Spatial Planning in Asia and the Caribbean: application and implications for fisheries and marine resource management, *Desenvolv. E Meio Ambient.* 32 (2014) 151–164.
- [35] R.S. Pomeroy, M.D. Pido, J.F.A. Pontillas, B.S. Francisco, A.T. White, E.M.C.P. De Leon, G.T. Silvestre, Evaluation of policy options for the live reef food fish trade in the province of Palawan, Western Philippines, *Mar. Policy* 32 (2008) 55–65.
- [36] F. Rosen, P. Olsson, Institutional entrepreneurs, global networks, and the emergence of international institutions for ecosystem-based management: The Coral Triangle Initiative, *Mar. Policy* 38 (2013) 195–204.
- [37] Santos, C.F., Agardy, T., Andrade, F., Crowder, L.B., Ehler, C.N., Orbach, M.K., 2018. Major challenges in developing marine spatial planning. *Mar. Policy*.
- [38] C.F. Santos, C.N. Ehler, T. Agardy, F. Andrade, M.K. Orbach, L.B. Crowder, Marine spatial planning, in: *World Seas: An Environmental Evaluation*, Elsevier, 2019, pp. 571–592.
- [39] E. Schiffer, J. Hauck, Net-Map: Collecting social network data and facilitating network learning through participatory influence network mapping, *Field Methods* 22 (2010) 231–249.
- [40] J.C. Scott, *Weapons of the Weak*, Yale University Press, 2008.
- [41] T.C. Smythe, J. McCann, Achieving integration in marine governance through marine spatial planning: findings from practice in the United States, *Ocean Coast. Manag.* 167 (2019) 197–207, <https://doi.org/10.1016/j.ocecoaman.2018.10.006>.
- [42] J.D.C. Sumeldan, I. Richter, A.L. Avillanosa, H.P. Bacosa, L.A. Creencia, S. Pahl, Ask the Locals: A Community-Informed Analysis of Perceived Marine Environment Quality Over Time in Palawan, Philippines, *Front. Psychol.* 12 (2021), <https://doi.org/10.3389/fpsyg.2021.661810>.
- [43] R.V. Tafon, Taking power to sea: towards a post-structuralist discourse theoretical critique of marine spatial planning, *Environ. Plan. C. Polit. Space* 36 (2018) 258–273.
- [44] UNESCO, 2021. World Applications: MSP around the globe. URL (<http://msp.ioc-unesco.org/world-applications/>) (accessed 6.16.21).