The effect of Marine Protected Areas on marine resource governance and community empowerment in the Philippines: A systematic review protocol

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Abstract

Marine Protected Areas (MPAs) have become an important tool in resource and biodiversity conservation, fisheries management and social goals. In spite of the efforts and resources spent for MPAs globally, some can still be far behind success. There is a growing body of evidence on their social impacts, many of which have not yet been fully systematically reviewed. Moreover, evidence on governance and empowerment has not been systematically reviewed to investigate opportunities and shortcomings for their establishment, operation and implementation. The proposed systematic review will attempt to understand the impact of the MPAs on marine resource governance and community empowerment in the Philippines.

Keywords

marine protected area, marine management, governance, ownership, community empowerment, human development

Background

The establishment of marine protected areas (MPAs) is a widely used strategy for coastal and marine resource management. It is a known, used and an achievable mode of protection particularly in the Philippines [1]–[3]. MPAs have been practiced in the country over the last four decades with the first marine sanctuary established in 1974. As of 2020, the Philippine MPA Database (http://www.mpa.msi.upd.edu.ph/) has listed information for a total of 1,923 MPAs. However, many of these are still "paper parks" that are not actively managed.

Based on the legal framework of protected areas in the Philippines, the governance structure is a mixture of centralized and decentralized site management[4]. Governance of MPAs in the Philippines is usually categorized into two levels: nationally managed under the National Integrated Protected Areas System (NIPAS) Act of 1992, and locally managed under the Local Government Code (LGC) of 1991 and the Fisheries Code of 1998 [1], [5]. Most of the MPAs in the Philippines were established through municipal and city ordinance. These are co-managed through the municipal or city governments, the local community and other sectors in the locality (e.g., NGOs, private organizations, etc.). Considering the

amount of effort put towards MPAs, the country has both successful implementations as well as those that are far behind target [6], [7]. Some MPAs have emerged as a well-documented success stories due to community based management approach [8]–[11].

Empowerment-oriented MPA interventions strengthen wellbeing while aiming to relieve problems, provide opportunities, and connect with experts as collaborators instead of authority figures [12]. Empowerment has been defined in many ways. Perkins and Zimmerman simplified various definitions and defined empowerment as "a process by which people gain control over their lives, democratic participation in the life of their community, and a critical understanding of their environment" [12]–[14]. However, according to Perkins, [15] empowerment is not just the process, it can also be the outcome of the process.

While MPAs limit human interference in marine resources to ensure the wellbeing of the ecological system, at the same time they support the social systems [5], [16]. Although often viewed in an ecological and biophysical context, marine resource management is a socially driven approach where decisions for the management rely on both ecological and social elements [17]–[19]. There is growing recognition that stakeholder participation, community acceptance, harmony and ownership are essential elements of the success of conservation initiatives [20]–[22]. However, evaluation on the impact of MPAs has primarily paid attention to economic and conservation specific objectives. The proposed systematic review will attempt to assess the impact of MPAs in the Philippines with focus placed on its effect on governance and empowerment. This aims to capture and understand the opportunities and shortcomings in governance and empowerment that MPAs bring to managers and communities.

Identification of review topic

A systematic map developed by Eales et al (2021)[23] identified studies on marine conservation and management interventions that have impact on the health and well-being of coastal communities in Southeast Asia. A total of 281 studies were identified as relevant. The map provides a database of relevant studies but does not synthesize reported results, it only gives overview of the evidence base[24].

Out of the nine human health and well-being subcategories identified, the top three well-represented outcomes were "Economic living standards", "Governance and Empowerment" and "Social relations" with the highest frequency of interaction with the marine conservation intervention "Site protection"[23], which includes MPAs. The prevalence of "Site protection" is likely due the its popularity in conservation initiatives as observed in previous evidence reviews [25]. Frequency of the "Economic living standard" outcome was expected due to its easily measurable nature [26]. Relatively high representation of outcomes "Governance and Empowerment" and "Social relations" suggests the increasing recognition in the implementation processes and social harmony as essential features for conservation initiative [20]–[22].

The review topic was selected through internal discussion of Blue Communities Philippines. The team identified the need to widen the knowledge of how site protection affects governance and empowerment; such impacts could be negative or positive and would vary within and among communities [21], [27], [28]. Furthermore, site protection is one of the most commonly investigated intervention in the Philippines

indicating the call for assessment of its impacts[23], [25]. This review will address this need by capturing the effects of MPAs on marine resource governance and community empowerment.

Stakeholder engagement

This review will be conducted with the engagement of the Palawan Council for Sustainable Development Staff (PCSDS) and the Office of the Provincial Agriculturist (OPA). PCSDS and OPA are oversight agencies for Palawan's Marine Protected Areas Network. Stakeholder will be asked to provide grey literatures and reports that might be used in the review. They will also provide advice and comments on various parts of the review as it progresses.

Research questions:

This systematic review aims to answer the following question:

"What is the effect of the Marine Protected Areas on marine resource governance and empowerment in the Philippines?"

The components of the question according to "PICO" structure are listed below:

Population: Coastal in the Philippines (including communities living within 5km of the coastline & on islands)

Intervention: Marine Protected Area

Comparator: geographical (non MPA sites including sites with an alternative intervention), temporal (sites before MPA designation), or no comparator.

Outcomes: Marine resource governance and community empowerment

Methods

Searching for studies

Studies identified by the systematic map

The systematic map [23] provides a library of 281 studies that deal with the interaction between marine conservation management and the health and well-being of coastal communities in Southeast Asia. Specifically, 34 documents that describe the link between site protection and governance and empowerment in the Philippines would be the primary materials to be used in this study, and include peer reviewed studies and grey literature. Since the last evidence search in June 2019, additional studies are expected to be available and update searches, outlined below, will be undertaken.

Bibliographic Database Searches

Supplemental searches will be initiated following methods similar to those used for the systematic map to uncover additional documents that were made available after the latest search conducted for the systematic map. We will search for studies from June 2019 to the present in 4 databases, Medline (via Ovid), Web of Science Core Collection, SCOPUS and Environment Complete. Although Global Health via

Ovid was included in the original systematic map searches, we will not use it here because it is unlikely to include relevant information on our outcome of interest.

Since majority of research in the Philippines is published in English, the language to be used for database searches will be English.

Strategies used together with the date of the search will be recorded. The information for each search will be collated in an Appendix for the systematic review report.

We used scoping to test the search strategy for sensitivity and specificity, using Scopus and Web of Science Core Collections.

Search string

Target dates of literature search (June 2019-present)

Search String
(conservation OR conservancy OR management OR polic* OR regulat* OR protect* OR "sustainable use*" OR enforcement OR certification OR improvement* OR mpa OR "marine refuge" OR sanctuar* OR reserv* OR "no$take$zone") **AND (coast* OR marine* OR beach* OR Fisheries OR seas OR sea OR reef* OR ocean* OR mangrove* OR seagrass* OR estuar* OR fishing OR shore*)** **AND (wellbeing OR "well$being" OR empower* OR participat* OR educat* OR identity OR Stewardship OR Co-management OR Governance OR resilience OR recover)** **AND (communit* OR people* OR human* OR fisher* OR village*)**

Supplementary searching methods

Google Scholar search

We will search Google Scholar using the Advanced search to identify additional literature. We will incorporate the first 1000 hits with those retrieved bibliographic database searches for title and abstract screening. We will adapt the search string from the database searches to reflect the search functionality (limited number of characters) for Google Scholar. Search strategies will be recorded in an Appendix to the final report.

Organizational websites and online catalogues

An additional 11 international and 11 Philippine-specific organizational websites and topical catalogues listed in Box 1 and 2 will be searched for any relevant evidence. These websites were identified in the systematic map by researchers in the UK and SE Asia region (including Western Philippines University) and other stakeholders. The search strings for each website will be adapted from database searches to reflect the search functionality of each website. The information for each search will be collated in an Appendix for the systematic review report.

Box 1. List of websites to search for relevant studies

- Biodiversity Support Program (USAID)
- Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- International Pole and Line Foundation
- RAMSAR
- UNEP – World Conservation Monitoring Center (UNEP-WCMC)
- UNESCO
- United Nations Development Programme (UNDP)
- United Nations Environment Programme (UNEP)
- United States Agency for International Development (USAID)
- USAID Development Experience Clearinghouse
- World Bank

For Philippine-specific organizational websites and catalogues, language used for database searches will be expanded to English and Filipino.

Box 2. Organisational websites to search for relevant studies

- Carlos P. Romulo Library - Foreign Service Institute
- Coral triangle initiative
- Malampaya Foundation
- Palawan Council for Sustainable Development
- Philippine Commission on Women
- Philippine Institute for Development Studies
- Pilipinas Shell Foundation
- Western Philippines University Reports
- The Palawan Scientist
- Palawan State University
- Socio-Economic Research portal for the Philippines (SERP)

We will search 10 scholarly sites in Box 3, for relevant evidence, particularly theses and reports. The search string from the database searches will be adapted to reflect the search functionality of on each website. We will not search the "Cybertesis" respository that was searched for the Systematic map, because this repository has recently been dissolved into separate resources, and from our scoping, the theses are focused on areas around the South American continent, therefore with low likelihood of relevance to our review. We added the "Erasmus thesis repository" because during scoping, it was found to contain some potentially relevant articles.

Box 3. List of academic thesis databases searched for relevant studies:

- DART-Europe
- DiVA
- Ethos

- NARCIS
- National ETD
- National Library of Australia Trove Service
- NDLTD
- Proquest Dissertations and Theses Global
- Repositorio Cientifico de Acesso Aberto de Portugal
- Theses Canada
- Erasmus thesis repository

Worksheets (Excel) will be created to record information on every methodological step taken including search date, search string used, source organization, website page, and publication date. The purpose of this is to create a transparent record of the search methods so they are clear and repeatable.

We will use Endnote or a similar reference management software to manage, store and collate the results from all the search methods. Using the same software, search results will be deduplicated ready for screening.

Article screening and study inclusion criteria

Screening process

Initial screening of the studies will be undertaken based on the information contained in their titles and abstract, against the study inclusion criteria described below. Next, the full text of potentially relevant articles will be evaluated based on the inclusion criteria. Each article will be assessed by at least one trained reviewer from a pool of up to six reviewers. In each stage of this screening, the reviewers will be instructed to lean towards inclusion when they are uncertain whether it should be included or not e.g. when the abstract is deficient, unavailable or where there is missing information. A second reviewer will double screen a subset of articles (c. 10%) and carry out a consistency check to maximize the consistency of applying the inclusion criteria. Any disagreement in a study's relevance will be resolved via team discussion until a consensus for inclusion is reached. We will use Cohen's kappa coefficient and percentage agreements to measure the level of agreement between reviewers [29]. Where necessary, additional details and notes will be added to the inclusion criteria to avoid future conflicts. A training set containing several studies (10%) that fulfil the inclusion criteria will be used as a study sample for the reviewers to discuss any relevant issues before proceeding with the rest of the retrieved studies from the screening. A list of studies excluded based on full-text assessment will be provided in an appendix of the final systematic review report together with the reasons for exclusion, for transparency. A record of the whole screening process will be presented in the systematic review report.

Relevant studies and grey literature will be extracted from a recent systematic map of the evidence documenting the effect of marine or coastal nature conservation or natural resource management activities on human well-being in the Philippines. We will use the categorization of interventions and

outcomes of the studies that was provided by the systematic map to filter those relevant to our systematic review.
Bibliographies of relevant papers or reviews will be checked for further relevant studies, if time and resources allow.

Inclusion criteria

Each article found by any of the search methods described above will be assessed for relevance against the inclusion criteria from a subset of those used for the systematic map.

Table 1. Inclusion criteria

<table>
<tr><td>Relevant population</td><td colspan="2">Individuals, households or communities, living or working within coastal areas in the Philippines.

“Coastal areas” is defined here as those adjacent to and heavily dependent on or impacted by the sea, in economic, socio-cultural or ecological terms. Studies must clearly state a focus on the relevant population.</td></tr>
<tr><td rowspan="4">Relevant intervention</td><td colspan="2">Establishment, adoption, or implementation of Marine Protected Areas.

We define “MPA” according to the World Conservation Union (IUCN 1994) as any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.

Classifications of interventions are based upon the International Union for Conservation of Nature (IUCN) typology of protected areas [30].</td></tr>
<tr><td>Categories</td><td>Definition</td></tr>
<tr><td>Ia. Strict nature reserve</td><td>Strictly protected for biodiversity and also possibly geological/ geomorphological features, where human visitation, use and impacts are controlled and limited to ensure protection of the conservation values</td></tr>
<tr><td>Ib. Wilderness area</td><td>Usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent</td></tr>
</table>

		or significant human habitation, protected and managed to preserve their natural condition
	II. National park	Large natural or near-natural areas protecting large-scale ecological processes with characteristic species and ecosystems, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities
	III. Natural monument or feature	Areas set aside to protect a specific natural monument, which can be a landform, sea mount, marine cavern, geological feature such as a cave, or a living feature such as an ancient grove
	IV. Habitat / species management area	Areas to protect particular species or habitats, where management reflects this priority. Many will need regular, active interventions to meet the needs of particular species or habitats, but this is not a requirement of the category
	V. Protected seascape	Where the interaction of people and nature over time has produced a distinct character with significant ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values
	VI. Protected areas with sustainable use of natural resources:	Areas which conserve ecosystems, together with associated cultural values and traditional natural resource management systems. Generally large, mainly in a natural

<table>
<tr><td></td><td></td><td>condition, with a proportion under sustainable natural resource management and where low-level non-industrial natural resource use compatible with nature conservation is seen as one of the main aims</td></tr>
<tr><td>Relevant comparator</td><td colspan="2">Absence of intervention between sites, and/or over time, or comparison with another intervention.

Studies both with and without comparators are eligible.</td></tr>
<tr><td>Relevant outcome</td><td colspan="2">Marine resource governance and empowerment.

Structures and processes for decision making including both formal and informal rules; includes participation and control in decision making, accountability, justice, transparency of governance.

Classifications of outcome are based upon the International Union for Conservation of Nature (IUCN) typology of governance types [31].</td></tr>
<tr><td></td><td>Categories</td><td>Definition</td></tr>
<tr><td></td><td>Governance by government</td><td>Federal or national ministry/agency in charge; sub-national ministry/agency in charge; government-delegated management (e.g. to NGO)</td></tr>
<tr><td></td><td>Shared governance</td><td>Collaborative management (various degrees of influence); joint management (pluralist management board; transboundary management (various levels across international borders)</td></tr>
<tr><td></td><td>Private governance</td><td>By individual owner; by non-profit organisations (NGOs, universities, cooperatives); by for-profit organisations (individuals or corporate)</td></tr>
<tr><td></td><td>Governance by indigenous peoples and local communities</td><td>Indigenous peoples’ conserved areas and territories; community conserved areas – declared and run by local communities</td></tr>
<tr><td>Relevant types of study design</td><td colspan="2">Primary research study measuring effects of a program, activity or policy using observational or experimental data collected for the study.</td></tr>
</table>

	Quantitative studies will be eligible. Where studies contain qualitative and quantitative data, and quantitative data is provided separately to the qualitative data, these studies will be eligible. Systematic reviews and other reviews of evidence are not eligible. Theoretical articles, commentaries, editorials are not eligible.

Quality Assessment Appraisal

Studies that have passed relevance assessment described above will be subjected to critical appraisal using quality assessment criteria adapted from the Joanna Briggs Institute (Appendix 1). Based on these criteria, studies will be categorized as with high, moderate, low validity or unclear. We will assess the overall validity of each study and make an overall appraisal into one of the four categories. Full details of this for each study will be available in the final report. Each study will be appraised by two reviewers. Any disagreement will be resolved via discussion with a third reviewer until a consensus is reached.

Data Extraction Strategy

Data will be extracted from relevant studies into a spreadsheet. Data to be extracted includes the following domains: Identification of the study, Methodological characteristics, Findings and Conclusions. Information will be coded for the following categories:

- Bibliographic information
- Geographical location
- Intervention, according to classifications in Table 1
- Outcome, according to classifications in Table 1
- Comparator type
- Data type

Extracting free textual information from the studies will also be an option, where additional details relating to each of the above coding is deemed useful. We will also extract the outcome data for each study. For studies containing both qualitative and quantitative data, we will extract only the quantitative data. The proposed data extraction sheet shown in Appendix 2, though it may be subject to alteration as evidence searches progress, and it may become necessary to, for example, complete additional data fields. A record of all data extraction will be kept and be provided as an appendix to the systematic review report. Data will be extracted by a single reviewer and a subset (minimum 10%) checked by a second reviewer. Any discrepancies will be resolved by a discussion in the manner described for the screening process.

Potential effect modifiers and reasons for heterogeneity

For each study, any factor which might distort the outcome, which may be mistaken for an impact of the MPA will be recorded. For this information, we rely on each study report. Several potential effect modifiers that may contribute to heterogeneity in the outcome of marine resource governance and community empowerment will be considered and recorded for all the studies included in this review. Some effect modifiers are listed below:

- The income of the country (GDP)
- Types of fisheries of the locality
- Recent geological and meteorological hazards of the local community (e.g. typhoon, volcanic eruption)
- Surrounding Land Use
- Territorial Challenges /Sharing across multiple user groups
- Political Background

The list is not exhaustive and we expect to record more types of effect modifiers as we examine the studies.

Data synthesis and presentation

Following the data extraction processes, we will synthesize available quantitative evidence that measures governance and empowerment outcomes. Where data allow, we will undertake meta-analyses. Meta-analyses will be undertaken according to standard methodologies, as described in Borenstein et al 2011, and using random-effects models [32]. We will summarize findings across studies in a narrative synthesis, using a series of summary tables and figures.

Declaration

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and material

Not applicable

Competing interests

The authors declare no conflict of interest.

Funding

This systematic review protocol is part of a research programme Blue Communities, funded by the UK Research and Innovation's Global Challenges Research Fund under grant agreement reference NE/P021107/1.

Authors' contributions

LJG and LC conceptualized the review. The manuscript was drafted by LJG and JE. All authors read and approved the final manuscript.

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APPENDIX 1. CRITICAL APPRAISAL CHECKLIST FOR QUANTITATIVE STUDIES

Reviewer: Date:

Author: Year & Record number:

	Yes	Partly	No	Unclear	Not applicable
1. Were the study sites/populations included in any comparisons similar at baseline in all aspects apart from the intervention?	□	□	□	□	□
2. Was the intervention applied in the same way across study sites/populations?	□	□	□	□	□
3. Did the study include a “before” measure and “comparison” site or population? *	□	□	□	□	□
4. Were the outcomes measured in a standardised and reliable way?	□	□	□	□	□
5. Were the measurements of the outcomes provided for all study sites/populations? If not, was there any detailed explanation provided as to why not?	□	□	□	□	□
6. Were there any external/confounding factors that may have affected the outcome?	□	□	□	□	□
7. Was appropriate statistical analysis used by the authors?	□	□	□	□	□

*”Yes” if both a before and comparison (BACI design); “Partly” if either a before OR comparison

Overall appraisal: High validity □ Moderate validity □ Low validity □ Unclear □

Appendix 2. Data extraction form

Article ID
Reviewers name
Source
Access date
Publication Type
Citation
Study location
Latitude N
Longitude E
Population type
Population size
Intervention type
Establishing body
Duration of Intervention
Comparator type
Outcome type
Data type
Hyperlink
LINKED RECORDS
Notes