

Global Assessment of Perceptions of Procedural Equity in Marine Protected Areas

By
Tasneem Ahsanullah
Dr. David Gill
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Executive Summary

Marine Protected Areas (MPAs) can have benefits for local communities but they can also have negative social impacts especially when communities are not equitably included in decision making processes i.e. procedural equity. As equity is becoming more prominent with targets like “30 by 30” calling for “equitable governance” of MPAs, it is important to think about what equity means in practice and to identify what MPA managers are doing to govern equitably. We analyzed global survey results from the Management Effectiveness Tracking Tool (METT) and the World Bank Scorecard (WBSD) to assess MPA managers/stakeholders perceptions of local community involvement in MPA management decisions. The specific questions we analyzed from the surveys were: “Do local communities resident or near the protected area have input to management decisions?”, “Do indigenous and traditional peoples resident or regularly using the protected area have input to management decisions?” (Stolton et al., 2007) and “Do stakeholders have meaningful input to management decisions?” (Staub & Hatziolos, 2004). These questions included quantitative data where managers/stakeholders answered the questions using a Likert scale (0-3) and qualitative data which includes comments explaining the quantitative assessments. We used the quantitative data to create a global map of procedural equity which had 367 MPAs and a graph of procedural equity by governance type. We used the qualitative data to find what activities and strategies managers were using to improve inclusive decision making as well as what barriers and enablers managers were facing when trying to include local communities in decision making.

Our findings indicated that there were some countries that had groups of MPAs with no clear patterns of equity while other countries/areas had patterns of low and high procedural equity. Many of the groups of MPAs with high/low equity were managed by the same agencies which may explain why they had similar patterns of equity. The countries with lower equity can be targets for funding/governing agencies that are interested in improving procedural equity in MPAs through programs that give locals resources and agency to participate in decision making processes. Our findings for governance type showed that it had no significant effect on procedural equity, however, there were many more state governed MPAs (170) than any other governance type (<50) which made them hard to compare. For the qualitative results, respondents cited advisory bodies and consultative meetings as the most common activities associated with inclusive decision making. Pre-existing social context was the category with the most barriers to inclusive decision making. Insufficient communication was a common barrier to inclusive decision making but open, transparent communication was also cited as an enabler which shows that communication could be a good starting point to improve inclusive decision making. Inclusion of locals in the design/creation of the MPA was not cited often which can't be changed for existing MPAs but could be considered for new MPAs. The most cited strategy to address the barriers or enhance the enablers was improving the relationship between communities and management.

There is currently not much research on how MPA managers are incorporating procedural equity in MPAs. Our research provides a baseline of what some of the main activities managers are carrying out/strategies they are planning to improve inclusive decision making and the main barriers they are facing/enablers they are leveraging in the process. These results highlight areas for further research and potential barriers managers might face when pursuing inclusive decision making as well as enablers they can leverage. NGOs, funding agencies and governing agencies can use these results to identify areas that they could prioritize for equity interventions and effective ways to improve equity in those regions.

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Abstract:

Marine Protected Areas (MPAs) can benefit local communities but they can also have negative social impacts especially when communities are not equitably included in decision making processes i.e. procedural equity. As equity is becoming more prominent with targets like “30 by 30” calling for “equitable governance” of MPAs, it is important to think about what equity means in practice and to identify what MPA managers are doing to govern equitably. We analyzed global survey results from the Management Effectiveness Tracking Tool and the World Bank Scorecard to assess MPA managers/stakeholders perceptions of local community involvement in MPA management decisions. We created a global map of procedural equity for 367 MPAs and found some countries had groups of MPAs that had high or low equity while other countries had no distinct equity patterns. Our findings also showed that governance type had no significant effect on procedural equity, however, there were many more state governed MPAs (170) than any other governance type (<50). Respondents cited advisory bodies and consultative meetings as the most common activities associated with inclusive decision making. Pre-existing social context was the category with the most barriers to inclusive decision making. Insufficient communication was a common barrier to inclusive decision making but open, transparent communication was also cited as an enabler which shows that communication could be a good starting point to improve inclusive decision making. The most cited strategy to address the barriers or enhance the enablers to inclusive decision making was improving the relationship between communities and management. This research will help elucidate areas that potentially need equity interventions and what is currently being done/could be done to include local people in decision making.

Introduction:

The creation of Marine Protected Areas (MPAs) will likely increase in the coming years with goals like “30 by 30” calling for 30% of global oceans to be protected by 2030 (Jones et al., 2020). The Global South is expected to be targeted since many areas in the Global South have high biodiversity (Woodley et al., 2019). Most MPAs exist in nearshore waters so they will have social, environmental, and political impacts on local communities (UNEP-WCMC, 2021). MPAs can have benefits for the environment (e.g., increased fish biomass, genetic diversity, habitat protection, ecosystem resilience, larval export, coastal protection) and local communities (increased catch, material wealth) especially with adequate capacity (Gill et al., 2017; Grorud-Colvert et al., 2021). However, the creation of MPAs have also led to disenfranchisement and displacement of local and indigenous communities (Gill et al., 2023).

While local communities may experience benefits in some cases, marginalized communities that are most dependent on the marine environment for subsistence or their livelihoods are also more vulnerable to potentially bearing more costs of MPAs (Grorud-Colvert et al., 2021; Zafra-Calvo et al., 2019; Sowman & Sunde, 2018). This can occur due to limited capacity and resources of these groups to gain justice (Zafra-Calvo et al., 2019). Since they are dependent on the environment for food and resources, they may also be likely to not follow MPA rules so they can survive (Grorud-Colvert et al., 2021, Dawson et al., 2018). This creates the grounds for ‘paper parks’ where an MPA is established but the rules aren’t followed or enforced (Relano & Pauly, 2023).

It is important to pursue equity and include local communities in the decision-making processes around creating and managing MPAs to prevent ‘paper parks’ but also for ethical reasons, so people are not disenfranchised and are treated fairly (Gurney et al., 2021; Law et al., 2018). According to Law et al. (2018) equity is the “fair or just treatment of individuals or groups”. Fairness is a universal, although subjective, concept and when something is perceived as unfair that can lead to conflict (Haidt, 2012; Pinker, 2002; Prilleltensky, 2012; Gurney et al., 2021). Particularly, when a policy is perceived as unfair community members are less likely to follow it which limits policy effectiveness (Gurney et al., 2014; Gurney et al., 2021). This becomes more complex when you consider that equity is multidimensional so improving equity in one aspect may lead to an increase or decrease of equity in another aspect. For example, an increase in food security from an MPA is often associated with an increase in income but an increase in income can also lead to conflict over resource rights (McDermott et al., 2013; Law et al., 2018; Gill et al., 2019). Also, equity for one person or group could hinder the equity of another group so it is important to identify who is most vulnerable in a community (Crosman et al., 2022; Gill et al., 2019). Despite the complexity of equity, many authors have created detailed frameworks for identifying and measuring equity.

Procedural Equity & MPAs:

A common framework of equity includes the dimensions distribution, recognition and procedure which are all dependent on context/enabling conditions (McDermott et al., 2013; IIED, 2016). Distributional equity is “how costs and benefits are shared among stakeholders” (McDermott et al., 2013; IIED, 2016). Recognition means “acknowledging and respecting the legitimacy of rights, values, interests, priorities and human dignity” (IIED, 2016). Procedural equity refers to inclusion of all actors in decision making processes (McDermott et al., 2013; IIED, 2016). Distribution, procedural and recognition are interrelated and impact each other (McDermott et al., 2013; IIED, 2016; Ruano-Chamorro et al., 2022).

Recognition is critical to procedural equity because if all stakeholder groups are not recognized then they will not be included in making decisions (Ruano-Chamorro et al., 2022; McDermott et al., 2013). Procedural equity, in turn, can improve distributional equity by giving people agency over decisions that determine how resources are distributed (McDermott et al., 2013; IIED, 2016). Procedural equity is particularly relevant but often ignored regarding coastal and marine conservation projects (Blythe et al., 2023). Procedural equity should be considered from a project's conception through each step of the decision-making process because, for example, if locals do not like how an MPA was made then it may be harder to include them in management decisions if they are opposed to the existence of the MPA (IIED, 2016; McDermott et al., 2013, Law et al., 2018). This can be done at a basic level of including everyone equally or it can be done more comprehensively by recognizing whose voices have been marginalized in a community and giving them more agency (McDermott et al., 2013, Ruano-Chamorro et al., 2022). Identifying who is most vulnerable in a community and building their capacity to participate in decision making is critical to effective procedural justice (Suiseeya & Caplow, 2013; Ruano-Chamorro et al., 2022; Gill et al., 2019). If groups are allowed to participate but their opinions are not actually considered this can lead to a “legitimacy paradox”, where the more they participate, the less legitimate they view decisions that are made (Fudge, 2018; Ruano-Chamorro et al., 2022).

In this study, we are particularly interested in procedural equity and how local communities are involved in the management of MPAs since historically procedural equity has

been ignored in marine conservation (Blythe et al., 2023). Ruano-Chamorro et al (2022) posits a framework of procedural justice that includes 11 criteria grouped under 3 dimensions, all of which are underpinned by recognition. The first dimension is ‘decision-making process properties’ which includes the criteria: transparency, accountability, neutrality, correctability, ethicality and trustworthiness. The second dimension is ‘agency’ which includes the criteria: voice, decision and capabilities (Ruano-Chamorro et al., 2022). The third dimension is ‘interpersonal treatment’ which includes the criteria: respect and politeness (Ruano-Chamorro et al., 2022). This framework is useful when thinking about procedural equity because it identifies properties which can make decisions more equitable and what is needed for people to not just have a say in decisions but actual agency over decisions.

Social Impacts of Marine Protected Areas:

Currently 80% of MPAs globally are state managed and only 51% had ‘inclusive decision-making arrangements’ (Gill et al., 2017). This may have wide ranging social impacts on local communities because it can affect the ability of communities to have agency in decisions about how the MPA is managed.

Most MPAs do not just have positive or negative social impacts; they normally have synergies and tradeoffs (Gill et al., 2019). For example, increased income can often be associated with improved food security while loss of fishing grounds was associated with lower food security (Gill et al., 2019). A common tradeoff in MPA outcomes that Gill et al (2019) found was the increased agency through the political empowerment of one group can often lead to increased conflict with other community groups. Another study in Kenya showed that MPAs displaced local fishers but they also had higher catch because of an adjacent MPA (Cinner et al., 2014, Gill et al., 2019). Marginalized communities that depend on the marine environment for subsistence are vulnerable to bearing more negative social impacts of the MPA (Grorud-Colvert et al., 2021; Zafra-Calvo et al., 2019; Sowman & Sunde, 2018). This can occur due to limited capacity and resources of these groups to gain justice (Zafra-Calvo et al., 2019). Since they are dependent on the environment for food and resources, they are also likely to not follow MPA rules so they can survive (Grorud-Colvert et al., 2021, Dawson et al., 2018). This creates the grounds for ‘paper parks’ where an MPA is established but the rules aren’t followed or enforced (Relano & Pauly, 2023). Gill et al (2019) suggests using a vulnerability framework when pursuing equity with the goal of promoting positive synergies for marginalized groups and creating tradeoffs that redistribute power to more vulnerable groups. Also, “no-take” MPAs can lead to more conflict and negative socioeconomic impacts especially when peoples’ livelihoods depend on fishing while sustainable use MPAs (allows fishing but with limits depending on fish stock statuses), are more likely to lead to positive socioeconomic impacts (Oldekop et al., 2016, Sowman & Sunde, 2018, Bennett and Dearden, 2014).

Issues of environmental justice and inequity have mostly been studied for terrestrial systems with a gap in studies on marine systems (Blythe et al., 2023). While there is some research on the socioeconomic and governance impacts of MPAs, most of these studies examine just one MPA instead of more detailed, global studies (Sowman & Sunde, 2018; Ban et al., 2019). There have been a few global assessments of equity in marine conservation (Blythe et al., 2023; Gill et al., 2023; Zafra-Calvo et al., 2019), but more specific global assessments on procedural equity in marine systems are needed.

In this study, the main goals were to address some of these gaps by: (1) *assessing the level of procedural equity in MPAs globally, primarily in the Global South*, (2) *examining the relationship between MPA procedural equity and governance type (e.g. state, co-managed, community managed)*, (3) *identifying what current activities or actions MPA managers associate with/create to facilitate local involvement in decision making*, (4) *identifying pre-existing social, environmental or governmental barriers and enablers to local involvement in decision making and*, (5) *identifying strategies MPA managers are considering to address barriers and leverage enablers to local involvement in decision making*.

Methods:

We used global data from the Management Effectiveness Tracking Tool (METT) and the World Bank Scorecard (WBSD) to assess local involvement in MPAs. The METT is a management assessment survey given to protected areas that receive funding from the Global Environment Facility (GEF) and other donors (Coad et al., 2015). The WBSD is similar except it includes only marine protected areas (Staub & Hatzios, 2004). Data was assessed from three different versions of the METT – METT 1, METT 1.3 and METT 3 (data ranged from 2004-2017) which were sourced from the Global Database for Protected Area Management Effectiveness. (Coad et al., 2015; Stolton et al., 2007). We also assessed an additional METT 3 survey that was sourced by Conservation International.

The METT survey includes 30 questions given to protected area managers/stakeholders about how the protected area is managed and the WBSD has 34 questions about how MPAs are managed (Stolton et al., 2007; Staub & Hatzios, 2004). Each survey has a question about stakeholder/community engagement: “Do local communities resident or near the protected area have input to management decisions?”, “Do indigenous and traditional peoples resident or regularly using the protected area have input to management decisions?” and “Do stakeholders have meaningful input to management decisions?” (Stolton et al., 2007, Staub & Hatzios, 2004, Table 1). These questions included quantitative data where managers/stakeholders answered the questions using a Likert scale (0-3) and qualitative data which includes comments explaining the quantitative assessments as shown in Table 1 (Stolton et al., 2007). A score of “0” means that there is “no input” of locals/indigenous groups/stakeholders (depending on the question) in MPA management decisions, “1” means there is “some input... but no direct role/involvement in management”, “2” means communities “directly contribute to some (management) decisions” and “3” means communities “directly participate in all relevant (management) decisions” (Table 1). We also looked at the responses to additional points 24a, 24b and 24c but we only included the responses that directly related to our research questions so 24a was included often but 24b and 24c were less relevant (Table 1).

Table 1: Management Effectiveness Track Tool (METT) and MPA World Bank Scorecard (WBSD) survey questions- *Question 23, 24 are from METT while question 15 is from WBSD*

Issue	Criteria	Score: Tick only one box per question	Comment/Explanation	Next steps
24. Local communities Do local communities resident or near the protected area have input to management decisions? <i>Process</i>	Local communities have no input into decisions relating to the management of the protected area	0		
	Local communities have some input into discussions relating to management but no direct role in management	1		
	Local communities directly contribute to some relevant decisions relating to management but their involvement could be improved	2		
	Local communities directly participate in all relevant decisions relating to management, e.g. co-management	3		
<i>Additional points Local communities/indigenous people</i>				
24 a. Impact on communities	There is open communication and trust between local and/or indigenous people, stakeholders and protected area managers	+1		
24b. Impact on communities	Programmes to enhance community welfare, while conserving protected area resources, are being implemented	+1		
24c. Impact on communities	Local and/or indigenous people actively support the protected area	+1		
23. Indigenous people Do indigenous and traditional peoples resident or regularly using the protected area have input to management decisions? <i>Process</i>	Indigenous and traditional peoples have no input into decisions relating to the management of the protected area	0		
	Indigenous and traditional peoples have some input into discussions relating to management but no direct role in management	1		
	Indigenous and traditional peoples directly contribute to some relevant decisions relating to management but their involvement could be improved	2		
	Indigenous and traditional peoples directly participate in all relevant decisions relating to management, e.g. co-management	3		
15. Stakeholder involvement and participation – Do stakeholders have meaningful input to management decisions?			Your Score	Comments
Stakeholders have no input into decisions relating to the management of the protected area		0		
Stakeholders have some input into discussions relating to management but no direct involvement in the resulting decisions		1		
Stakeholders directly contribute to some decisions management		2		
Stakeholders directly participate in making decisions relating to management		3		
Additional Point a. There are clear financial contributions / agreements between MPA and tourism operators to recover MPA resources rents for local benefits		+1		

Combining Datasets & Spatial MPA Data:

Each version of the METT survey had similar questions but in different orders with different column names. We standardized all the column names in each dataset to match the column names in METT 3 and any that didn't match to METT 3 were matched to METT 1. Once each dataset was standardized and aligned, we combined all the datasets into one dataset with a column identifying which dataset each entry was from. To identify which entries were MPAs, we joined the combined dataset to the World Database on Protected Areas (WDPA) (March 2024 version), using the WDPA ID column and the Marine Protected Areas spatial database created by Gill et al 2017. The WDPA database has a marine column with values, "0 (100% terrestrial PA), 1 (coastal: marine and terrestrial PA) and 2 (100% marine PA)" (UNEP-WCMC, 2016). We filtered the data to only include 1 and 2 - coastal and marine protected areas (UNEP-WCMC, 2016).

We pulled spatial data (shapefiles) from the WDPA that matched the WDPA IDs from the MPAs in our combined database using the `wpar` function in R. We joined the spatial data (WDPA and Gill et al., 2017) with the combined database using the most recent assessments for

each MPA to create a shapefile of our combined data. The shapefile was then imported into ArcGIS Pro and symbolized with a graduated color scheme.

Governance Type Statistics:

The METT surveys had information about the management authority for each MPA. Respondents could check the following options: state (national government), community, substate (local government), private and NGO. We put any responses that were true for both state and another management authority in its own column called “shared” to denote shared management. We compared procedural equity between state (state, sub-state) and non-state (community, shared, private, NGO) authorities using a Mann-Whitney U test which is a non-parametric test for two groups. This test determines the probability that procedural equity distribution for state authorities is the same as for procedural equity distribution for non-state authorities as the null hypothesis.

Thematic Coding of Procedural Equity Data:

Once the data was filtered to only include coastal and marine protected areas, there were 890 responses although not all of them had the “Comments” and “Next steps” sections filled out. We were interested in coding for 4 questions: 1) What actions/activities do respondents (e.g. MPA managers) associate with/carry out to facilitate local involvement in decision making?, 2) What are some of the barriers to local involvement in decision making?, 3) What are some of the enablers to local involvement in decision making? and, 4) What strategies are respondents considering or applying to address barriers (or to leverage enablers)? We created subcategories for question 2 and 3 of “endogenous” and “exogenous”. “Endogenous” referred to barriers/enablers that were attributes or processes of the MPA including its management and “exogenous” referred to factors that were beyond the control of or pre-dated the MPA.

We used both inductive and deductive thematic coding to analyze our data. Inductive coding refers to reading through the data first and then coming up with themes while deductive coding relies on pre-existing knowledge/frameworks to come up with themes (Naeem et al., 2023). Since we already had our 4 research questions defined, we started by using a deductive coding approach. A collaborator and I independently identified quotes from each response that answered our research questions. For the responses that we coded differently, a third collaborator was the tiebreaker. For example, if one person coded a response as an activity but the other person coded it as an enabler then the third person would decide whether it was an activity or enabler. After we finalized which responses answered our questions, we used an inductive coding approach to read through the quotes we selected from the responses and identified common themes for each question. An example of a theme we found for activities was “Existence of advisory/consultative body” (Table 2). Then, we read through the quotes again and coded the responses based on our identified themes (Table 2, 3, 4, 5). These themes were further grouped into broader categories for each question (Table 2, 3, 4, 5). For example, the themes “Lack of capacity”, “Insufficient communication” and “No official management plan” were all grouped into the category MPA management (Table 3). For barriers and enablers to inclusive decision making, the endogenous categories (within MPA) were “MPA design”, “MPA management”, “MPA governance” and “Relationship” (Table 3, 4). The exogenous categories (outside of MPA) were “Political context” and “Social context” (Table 3, 4). Some of the categories for activities and strategies were analogous i.e. “Advisory bodies” and “Planned advisory bodies” but others were not i.e. “Design” and “Relationship Improvement” (Table 2, 5).

The strategies for inclusive decision making addressed some of the barriers to inclusive decision making, for example, the “Relationship Improvement” category has the theme “Increasing communication & relationship building” which helps address the barrier “Insufficient communication. (Table 3, 5).

Table 2: Actions & activities associated with/created to facilitate local involvement in decision making

Category	Description	Theme	Examples
Advisory bodies	Includes councils, boards, committees, representatives, and liasons that are involved in some form of governing body over decision-making. These bodies and representatives usually have a direct say in the decision-making process.	Existence of advisory/consultative body Representatives/liasons	"Advisory councils have been considered the platform for participation and decision making"; "Local communities participate in management decisions through their representatives."
Consultative activities	Refers to planned meetings, forums, and direct communication with local/indigenous/traditional peoples. Often labeled as "consultations" within the METT responses	Consultative activities Community engagement	"indigenous communities have participated in the PORU workshops and public consultations that have been carried out at the regional level and have contributed opinions on the activities to be carried out."
Joint management	Decisions are made in collaboration between MPA and local/indigenous/traditional stakeholders. Differs from co-management in that it is on a decision-by-decision basis rather than a governance structure built around being dually managed at all times.	Joint management decisions	"The indigenous communities of the overlapping Reservations, through their representative organizations, have a great possibility, and obligation, to actively participate in decision-making for the joint management of the Overlap Area."
Design	The community is either directly involved in the design of the MPA through activities such as boundary delimitation, or they directly contribute to the formulation of the management plan for how the MPA is to be operated.	Communities included in park design Communities included in formulation of management plan	"Input received via Park Forum & input into the Park Management Plan"
Decentralized governance	The governance of the MPA is either shared between state and non-state actors or is operated solely by non-state actors	Locally run MPA Co-management	"LMMA process to provide for community-based co-management of site"

Table 3: Pre-existing social, environmental or governmental barriers to local involvement in decision making in MPAs

Category	Description	Theme	Examples
MPA Design	Structural, tenure and other legal attributes of the MPA	No official PA designation Private land ownership	"Management as an official MPA hasn't started yet as it is still being developed." "No communication or direct participation is taking place today since it is (privately) owned by a foreigner."
MPA Management	"Resources, plans, and actions that result from the functioning of governance" (Bennett and Satterfield, 2018; Lockwood, 2010)	Lack of capacity (staff, funds) Insufficient communication No official management plan	"Lack of funds causes management activities to lack consistency and be sporadic." "Regular and structured communication is not occurring." "Though local communities participated in the draft management plan, no communication or direct participation is taking place today since no management plan is underway."
MPA Governance	Institutions and processes that determine who makes decisions and how decisions are made (Bennett and Satterfield, 2018)	Lack of participatory advisory body/ representation Decisions made by locals are not binding Lack of framework/ process for engaging community	"There is no management committee made up of the communities adjacent to the protected area." "They contribute to the management decisions, but their input is not binding." "No legal platform for providing input of local communities to PA management."
Relationship	Relationship between MPA managers and local community	Lack of trust & negative perceptions with management Conflict between community and management Lack of education/ awareness/ connection to MPA Lack of interest from local authorities to include communities	"Lack of recognition by local communities of the role of DRNR in the forest reserve's management."; "Protected areas as a national level have negative opinion of local people because management constraints" "Some indigenous needs compete with needs of protected area."; "Some oppose restrictions on the use of natural resources." "Lack of education to make decisions."; "Lack of connection with monument." "Local authorities have shown lack of interest on park issues."
Political context	Political environment inclusive of regulatory frameworks that impact MPA governance	Centralized or exclusive governance structure Lack of legal framework Existing legal, regulatory and policy framework Government infringement on culture/heritage	"Decisions are made at ministerial level."; "Command and control system of governance hinders traditional/local involvement." "There is no legal platform for providing input of local communities to PA management" "The last draft of the Organic Law for the Galapagos weakens the capacity of stakeholders to participate directly into the decision making process. Community participation is going to disappear by law." "Local communities have not yet understand the importance and challenges of the creation of parks. Moreover, they say that the Government has taken their heritage."
Social context	Social and physical attributes of local communities	Conflicting priorities within community Existing community characteristics Lack of trust between community and government	"There are family clans with problems and conflicts between sectors (transporters with other sectors)." "The descendants of the indigenous population are inconspicuous."; "Unfortunately the very commercial nature of the community led to the abandonment of the committee"; "The nearest local community lives 11km away on the North coast of Mauritius." "Locals still do not fully trust the government departments, despite the community engagement forum that was developed with the project support and is operational."

Table 4: Pre-existing social, environmental or governmental enablers to local involvement in decision making in MPAs

Category	Description	Theme	Examples
MPA Design	The structure of the MPA and its ownership	Local ownership of land/resources (through MPA)	"There has been work with local communities to insure the local empowerment and ownership of the area and its resources."
MPA Management	Resources, plans, and actions that result from the functioning of governance (Bennett and Satterfield, 2018; Lockwood, 2010)	Pre-existing management agreement	"Existing management agreement between the communities and TFS (Tanzania Forest Service)/FBD (Forest and Beekeeping Division)."
		Open communication/transparency	"There is constant communication between the environmental authority of the protected area and the local population."; "Total transparency; The UC is available to take all possible measures to involve the community."
		Park staff are community members	"Park staff are members of the community."
		Systematizing needs (ex. surveys)	"By systematizing needs, UC management enables better management of the area. For example, a survey carried out in communities detected the great demand for issuing the General Fisheries Registry/SEAP, as a result of which UC management articulated."
MPA Governance	Institutions and processes that determine who makes decisions and how decisions are made (Bennett and Satterfield, 2018)	Decentralized governance arrangements	"All management decisions are validated by local communities. The Locally Managed Marine Areas inside the MPA are managed under the local communities decisions."
		Relationship	Relationship between MPA managers and local community
Political Context	Political environment inclusive of regulatory frameworks that impact MPA governance	Existing enabling legal, regulatory and policy framework	"The law on PAs and regulation requires public participation and values community opinion."
		Traditional management of resources	"Customary law requires local tribe clan and family involvement in all resource management decisions."
		Local ownership of land/resources (through government)	"Following the successful land claim in 2001, the Dwesa-Cwebe Land Trust are direct stakeholders in the reserve and input directly into reserve management, although the level at which this intervention should be made is under dispute."
Social Context	Structural, tenure and other legal attributes of the MPA	External programs (NGO)	"GEF (Global Environment Fund) project worked to build local CBO capacity and effectiveness of site management committee with some success."
		Local concerns about the depletion of natural resources	"Local users have some input into decisions and its creation was, in part due to their concerns on the depletion of natural resources."
		Pre-existing organizations which represent communities	"Bird Island trust has representation from communities. Additionally contact is maintained through the tourism bureau."

Table 5: Strategies to address barriers or leverage enablers to local involvement in decision making

Category	Description	Theme	Examples
Planned advisory body	Creating councils, committees, and other advisory bodies that facilitate the inclusion of local/indigenous/traditional in the decision-making process.	Planned advisory body, committee, cooperative	"Establishment of an MPA management committee; Representatives of local communities must be part of the MPA management committee."
Relationship improvement	Create and cultivate relationships with local/indigenous/traditional peoples through education, socialization, increased/better communication, and support financially. This is especially useful to address barriers that center on lack of education or inability to participate in management due to prioritizing survival.	Education Socialization Process Increasing communication and relationship building Increased support	"Encourage and promote stakeholder participation in decision-making in all partner agencies"; "To change this perception through trainings for top management, the program of work with local communities was developed"
Governance change	A shift in the current governance structure towards a more inclusive option. This could mean co-managing, providing opportunities for joint management, or the introduction of a governance structure in an MPA that previously lacked one.	Decentralized governance Introduction of governance structure	"As part of this process a governance structure is going to be proposed to formalize access to decision making."
Management plan change	Revisiting the existing management plan to favor more inclusive decision-making. This could be in the form of building a new management plan or amending a previously existing one.	Building management plan Amending Management Plan	"Agreement on level of strategic and/or operational management control to be reached"
Other programs	Miscellaneous programs implemented by managers or outside authorities with a focus on improving inclusive decision-making. These programs include mechanisms that monitor local involvement in MPA management decision-making, introductions of MPAs, non-governmental schemes, and PES schemes	Non-governmental scheme PES scheme Introduction of MPA Monitoring mechanism for involvement	"Development of monitoring mechanism for contribution to decision-making from local people "

Results:

Global Procedural Equity:

Figure 1 shows a map of the 367 MPAs with the light yellow/pink representing lower procedural equity scores and the darker pinks representing higher scores. There were 72 MPAs with a score of 0 (no local input into management decisions), 132 MPAs with a score of 1 (some local input into discussions relating to management), 113 MPAs with a score of 2 (locals “directly contribute to some decisions relating to management”) and 50 MPAs with a score of 3 (locals directly participate in all relevant management decisions) (Table 1, Figure 1). Thus, there were more MPAs with mid-range scores (1, 2) where there is “some involvement” of locals in decision making than the more extreme scores (0, 3). In Russia, eastern Europe and part of the middle east (Turkmenistan, Azerbaijan, Iran), most of the MPAs had low procedural equity with scores of 0 and 1. In the Caribbean, the MPAs around Cuba also had low procedural equity with scores of 0 and 1 while the MPAs around Jamaica had higher procedural equity with scores of 2 and 3. In Southeast Asia, Indonesia had variable scores with most areas having lower procedural equity with some spots of high procedural equity. Around West Papua, the MPAs had high procedural equity with scores of 3.

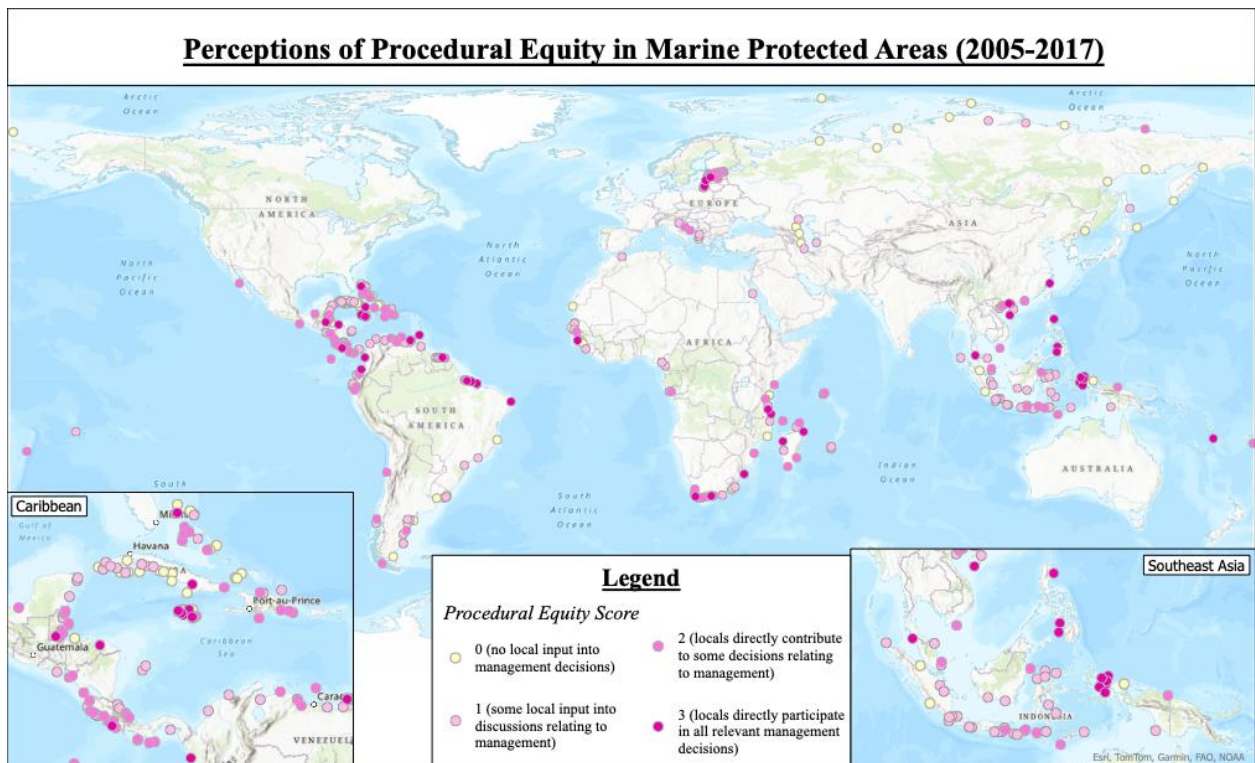


Figure 1: Map of Perceptions of Procedural equity in Marine Protected Areas

MPA Governance & Procedural Equity:

170 MPAs were state (national government) managed, 8 had shared management, 15 were community managed, 28 were managed through local governments (sub-state), 2 were privately managed and 14 were managed by an NGO (Figure 2). We compared state (state, sub-state) to non-state governance (shared, community, private, NGO) through a Mann-Whitney U test and got a p-value of 0.286. This shows there is no significant difference between state and non-state governance of MPAs (Figure 3).

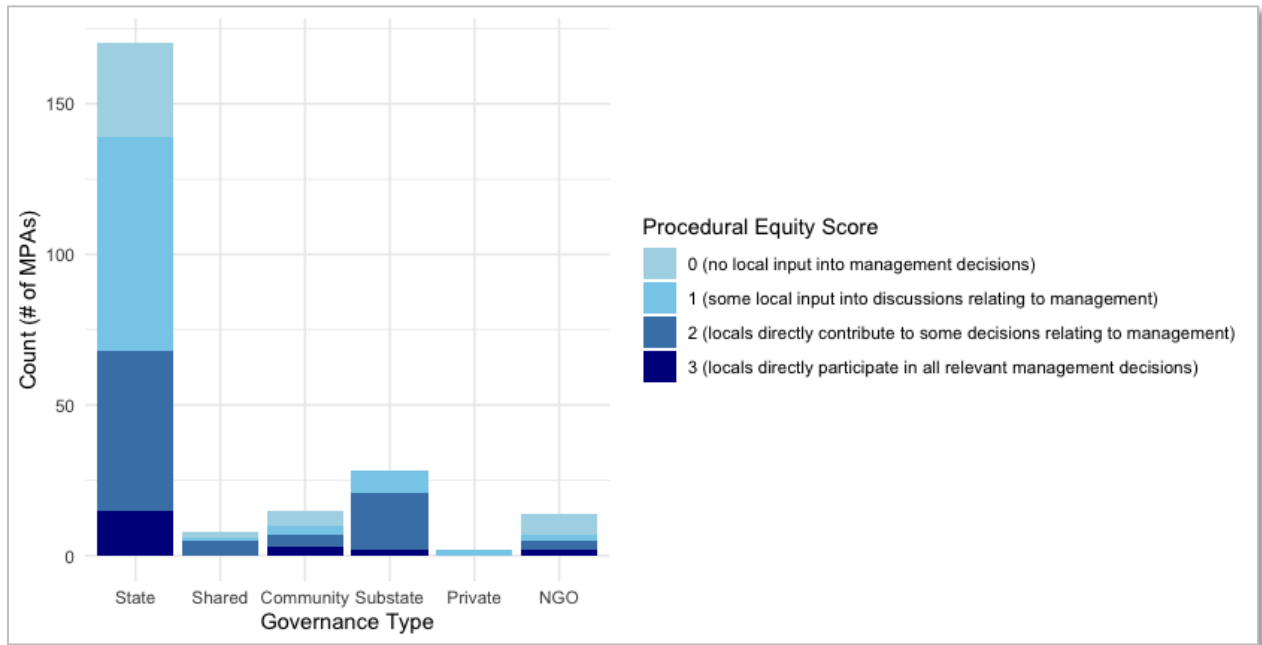


Figure 2: Procedural equity scores in MPAs by Governance type

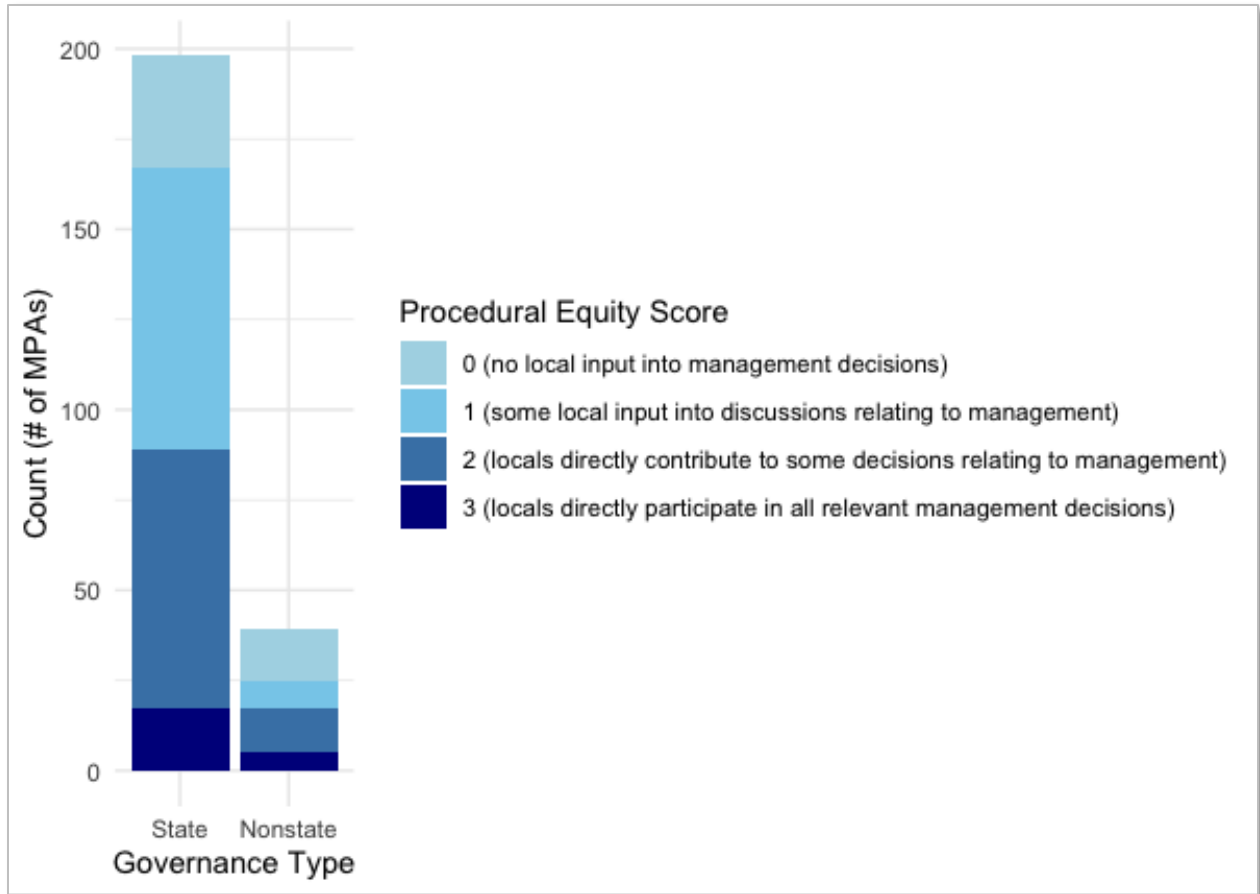


Figure 3: Procedural equity scores for state vs. non-state governed MPAs

Activities, Barriers, Enabler and Strategies related to Procedural Equity:

We found 306 responses related to our research questions with 143 responses coded for activities, 141 coded for barriers, 62 coded for enablers and 114 coded for strategies. For activities that managers associated with inclusive decision making, we found 5 broader level categories with multiple themes. The main categories were advisory bodies, consultative activities, joint management, design and decentralized governance (Table 2). Advisory body, which refers to councils or committees that have local representation, was the most common theme cited by respondents for activities carried out to improve inclusive decision making (46% of total responses for activities) (Figure 4). Consultative activities which refer to meetings and direct communications with locals were the next most cited making up 31% of total responses for activities (Figure 4). Design (park design, management plan), decentralized governance (co-management, locally run MPA) and joint management (certain decisions made between government and local community) were the least cited at 10%, 9% and 4% respectively (Figure 4).

Based on the survey responses, the categories we found for barriers and enablers to inclusive decision making were MPA design, MPA management, MPA governance, relationship, political context and social context (Table 3, 4). The most cited barriers were related to pre-existing social context (23%) e.g. conflicting priorities within the community, existing community characteristics, and lack of trust between the community and government (Table 3, Figure 5). MPA management (20%) and pre-existing political context (20%) were the categories with the next most cited barriers. Barriers to inclusive decision making in the MPA management category included lack of capacity (ex. staff, funds), insufficient communication (complete lack of communication or infrequent, unstructured communication) and no official management plan (Table 3).

The most cited enablers to inclusive decision making were in the categories MPA management (32%) and pre-existing political context (29%) (Figure 6). The enablers for the MPA management category included having a pre-existing management agreement, open communication/transparency, community members as park staff, systematizing needs (through surveys) and education/awareness programs for the MPA (Table 4). The enablers related to pre-existing political context included having an existing enabling legal, regulatory and policy framework (e.g. laws that enable inclusive decision making), traditional management of resources and local ownership of land/resources (through government) (Table 4). The least cited enablers were in the MPA design category (3%) and the relationship (between the local community and management) category (3%) (Figure 6). The enablers to the MPA design category included local ownership of land/resources (through MPA) and the enablers to the relationship category included good relations between management and community (Table 4).

The categories for strategies that respondents are considering to address barriers or leverage enablers to inclusive decision making were planned advisory body, relationship improvement, governance change, management plan change and other programs (Table 5). The category relationship improvement (50%), which refers to improving the relationship between locals and MPA management, had the most cited strategies (Table 5, Figure 7). The strategies for relationship improvement included education about the park, socialization processes (allows communities to have rights and responsibilities relating the MPA), increasing communication/relationship building, increasing support for locals (financial, social), encouraging participation/involvement of locals in management and increasing representation of local communities in management decisions (Table 5). The categories with the fewest cited

strategies were governance change (7%) and other programs (5%) (Figure 7). The strategies for governance change included decentralized governance and the introduction of a governance structure (Table 5). The strategies for other programs included non-governmental schemes, payment for ecosystem services schemes, introduction/establishment of the MPA, and monitoring mechanisms for involvement (Table 5).

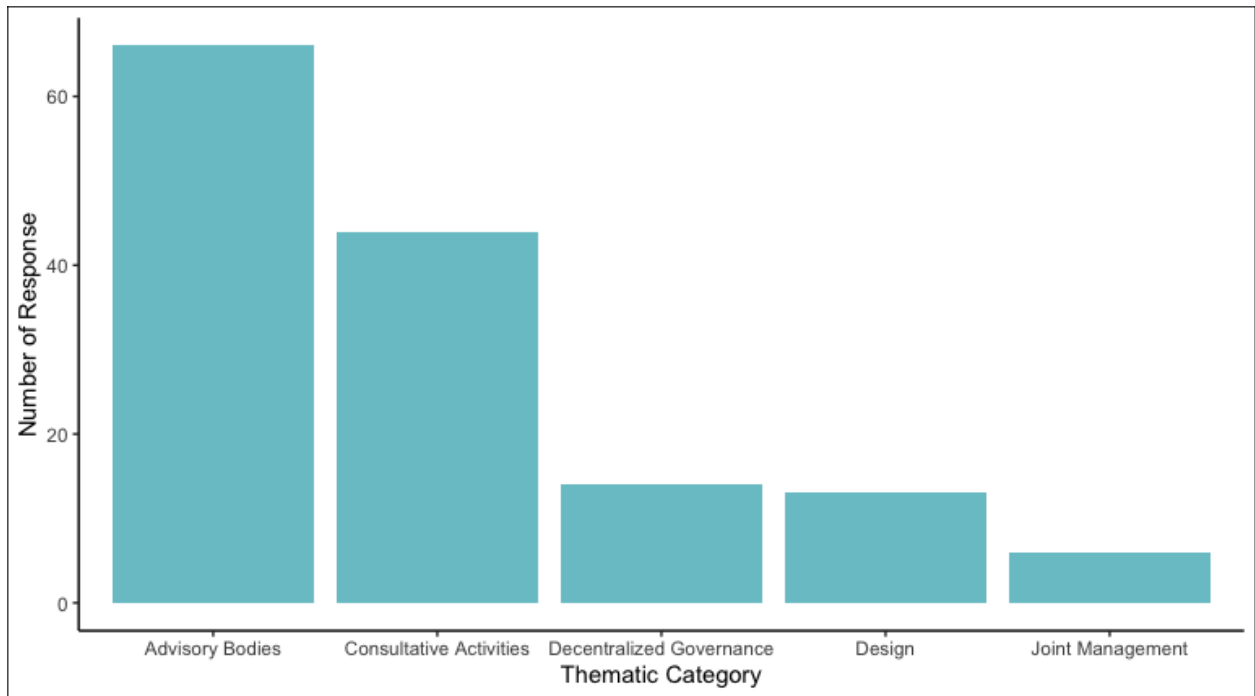


Figure 4: Number of responses for actions & activities associated with/created to facilitate local involvement in decision making as reported by survey respondents (n= 143)

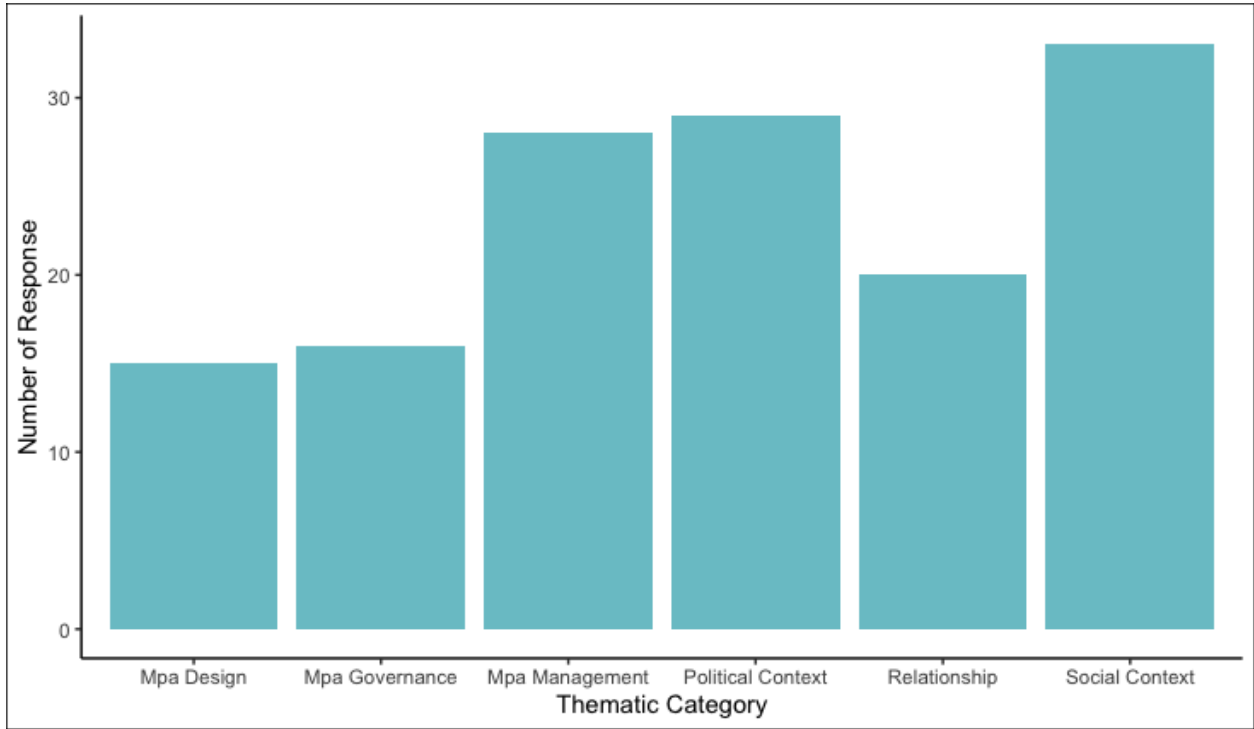


Figure 5: Number of responses for barriers to local involvement in decision making in MPAs as reported by survey respondents (n= 62)

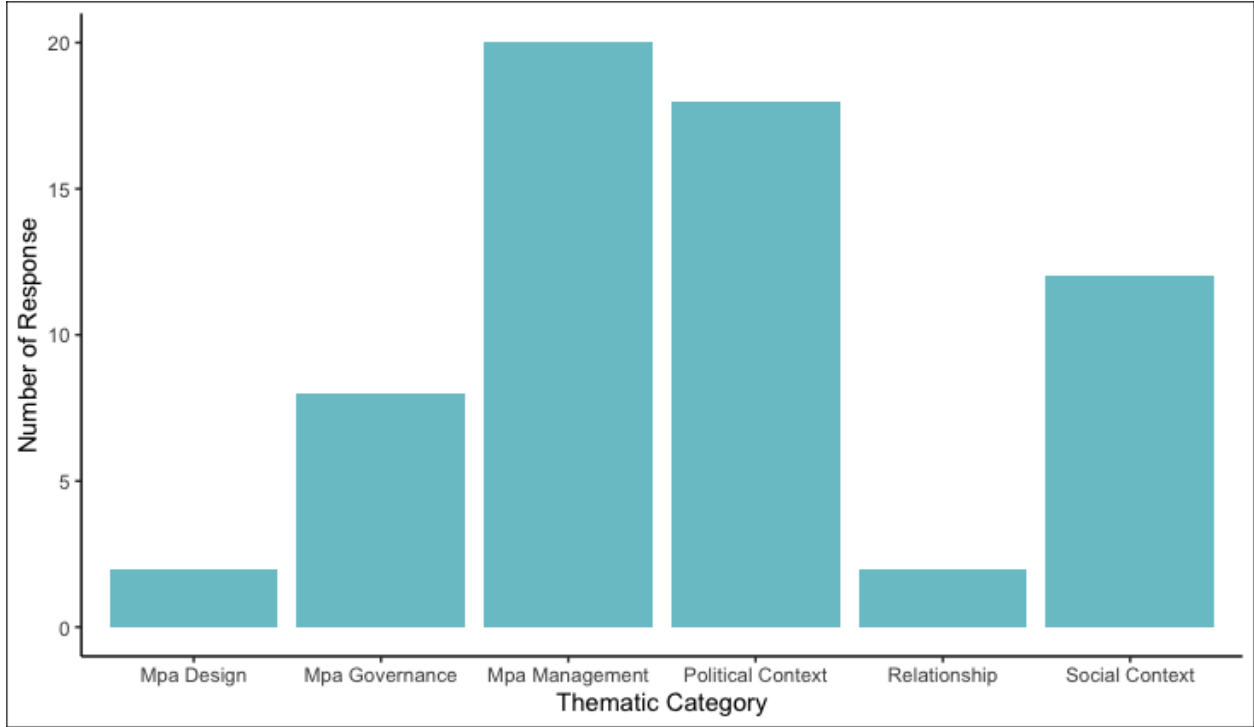


Figure 6: Number of responses for enablers to local involvement in decision making in MPAs as reported by survey respondents (n= 114)

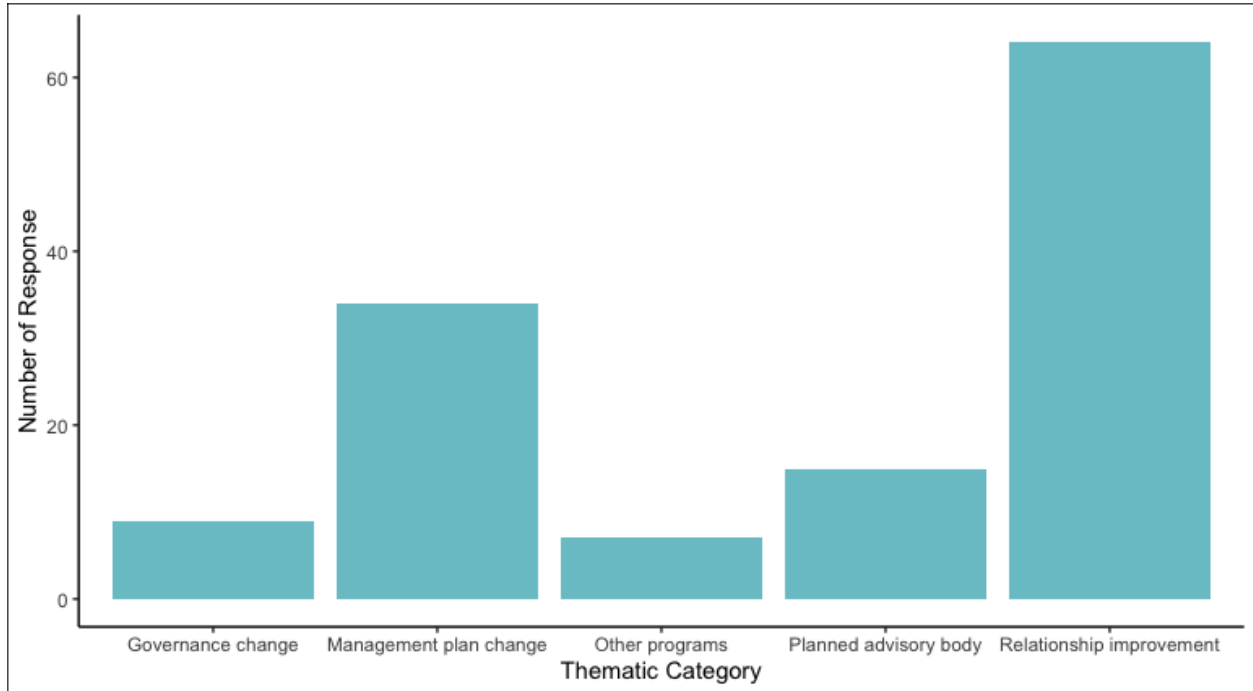


Figure 7: Number of responses for strategies to address barriers or leverage enablers to local involvement in decision making as reported by survey respondents (n= 141)

Discussion:

Our findings indicated that there were some countries that had groups of MPAs with no clear patterns of equity while other countries had patterns of low and high procedural equity. Many of the groups of MPAs with high/low equity were managed by the same agencies which may explain why they had similar patterns of equity. The countries with lower equity like Cuba can be targets for NGOs, funding agencies and governing agencies that are interested in improving procedural equity in MPAs through programs that give locals resources and agency to participate in decision making processes relating to the MPA. A limitation to our dataset was that only countries that were receiving funding from the GEF (and a few other funding agencies) had an incentive to take the surveys so countries like the United States, Canada and Australia had little to no data.

Although no significant difference was found in procedural equity between different governance types, a limitation was that there was not a lot of data for governance types other than state governed so it was difficult to compare the different governance types. There were fewer shared and community-based governance compared to state governance of MPAs. The reason for more state governed MPAs could be because governments are often the ones that are called on to create MPAs (targets like 30 by 30) and for marine spaces governments often have jurisdiction. Other factors that could influence MPA governance could be funding from NGOs, especially if they are deciding who will be governing and managing the MPA. While governments/NGOs may be hesitant to give some of their power to local/other actors, this could ultimately benefit them because community members are more likely to follow policies if they are part of decision-making processes (Gurney et al., 2014).

However, being included in the decision-making process is not always enough. Although advisory bodies and consultative activities were highly cited, this does not necessarily mean that those activities effectively facilitated decision making. For example, a respondent from Coiba National Park in Panama said, “The representative of fishermen in the Park Board indicated that it is difficult for them to influence decisions as he is only one.” This shows the need for local communities to not only be consulted but effectively included in a way that truly influences decisions. Similarly, one of the most cited strategies was relationship improvement and while this is a good start it doesn’t necessarily give communities agency over decisions or ensure that their opinions are incorporated in the final decision. For both activities and strategies, decentralizing governance (making community members co-managers) was one of the least cited themes. While the impacts of decentralizing governance on procedural equity in MPAs is still being studied, it has the potential to improve procedural equity by giving communities more power and agency to influence decisions especially if communities are leading decisions (Bennett et al., 2021). Future research should be done on the impacts of decentralization on procedural equity especially in the context of MPAs.

The most cited barriers to inclusive decision making were related to the pre-existing social context of the regions the MPAs were in. One theme within the social context category included conflicting priorities within a community - a potential way for managers to address this is through conflict resolution workshops. Another theme within social context was existing community characteristics which included factors like communities (ex. indigenous groups) being hard to reach. For example, the respondent from Bay Island Park in Honduras said, “The descendants of the indigenous population are inconspicuous” and the respondent from Ilot Gabriel and Flat Island Park in Mauritius said, “The nearest local community lives 11km away on the North coast of Mauritius.” These barriers could be addressed by having better capacity (funds, staff) especially since lack of capacity is one of the main barriers to MPA management (Gill et al., 2017). If there is more staff and funding, then managers would have more resources to reach out to these local communities that are harder to access.

The MPA management category had a relatively high percentage of barriers (20%) and enablers (32%) (Figure 5). Insufficient communication (none, low frequency) was a barrier within the MPA management category and open communication/transparency was an enabler (Table 4). Improving communication is relatively more within managements’ control so this is a great place for managers to start improving inclusive decision making. One of the main strategies was improving relationships with locals by increasing communication so many managers already are considering this and if done properly, better communication can lead to more trust which would provide a good foundation for more inclusive decision making.

The least cited enablers were in the MPA design (3%) and relationship (between communities and managers) (3%) categories (Figure 6). This low percentage of enablers in the relationship category further emphasizes the need for managers to take active steps to improve their relations with communities. The low percent of enablers (3%) and activities (9%) in the MPA design category does not necessarily mean that there is less inclusion of communities in the creation and delineation of MPAs (Figure 4, 6). However, it does warrant further research and questions for MPA managers/stakeholders to clarify if/how locals are included in decisions related to MPA design. Also, while inclusion of locals in the design of an MPA can’t be changed for existing MPAs, it can be considered for new MPAs that have not been developed yet. While inclusion of locals in management is important, it is critical to include communities in the actual

creation of the MPA because if communities are unhappy with the existence/creation of the MPA then it will likely be more difficult to include them in management.

Conclusion:

There is currently not much research on how MPA managers are incorporating procedural equity in their management. Our research provides a baseline of what some of the main activities managers are carrying out/strategies they are planning to improve decision making and the main barriers they are facing/enablers they are leveraging for inclusive decision making. Our research found that state governed MPAs were most common while decentralized governance was least common and that pre-existing existing social context had the most barriers to inclusive decision making. These results highlight areas for further research and potential barriers managers might face when pursuing inclusive decision making as well as enablers they can leverage. NGOs, funding agencies and governing agencies can use these results to identify areas that they could prioritize for equity interventions and effective ways to improve equity in those regions.

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