

## Systematic Review Protocol

### Title

Do power-sensitive stakeholder participation processes in biodiversity conservation lead to effective outcomes ? A systematic review

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### Keywords

Participation; Power; Biodiversity; Transdisciplinarity; Stakeholder

### Background

Biodiversity conservation approaches increasingly prioritize stakeholder engagement through participation to mitigate conflict, build trust, and facilitate learning, attaining ownership and implementation of decisions and improving biodiversity outcomes (1, 2). Whilst many known aspects impede participation (e.g. poor design, lack of resources, different understandings and expectations of processes and outcomes), one emerging but still poorly understood aspect is the importance of power dynamics in shaping participation processes and outcomes. The conceptualization of power in the biodiversity conservation literature is often unidimensional (3), failing to consider the extent to which stakeholder participation is embedded in wider social and political contexts (also see 4, 5, 6). Recent calls advocate for a nuanced understanding of the multidimensions of power from across natural, social and political literatures to better capture its complexity and diversity and its influence in participation for biodiversity conservation (6,7). Moreover, there remains a need to better understand when, where, and how power dynamics can be considered in participatory processes regarding biodiversity and how they affect the outcomes (2, 6). To develop the systematic review, we firstly adopt a multidimensional conceptualization of power, based on theories from social and political sciences, to move beyond a single or partly contrasting interpretation of power (8, fig1). Secondly, we construct the participatory processes between different core units of analysis, as proposed by the analytical scheme SCAPE (9, fig2). By systematically reviewing the evidence and context of individual case studies, this review maps the key dimensions of power in different contexts of stakeholder participation to better design future biodiversity conservation projects that can harness the positive potential of power in stakeholder participation. It will benefit researchers studying participatory processes and outcomes, institutional actors initiating such processes and often implementing their solutions, and facilitators designing and implementing participatory processes.

### Theory of change or causal model

In the theory of change (Fig3), we propose how a participatory process could be considered as power sensitive at each step and what would be the outcome of a power sensitive participatory

process.

### **Stakeholder engagement**

This protocol and associated codebook were developed from discussions held at three scoping workshops on power in participatory processes regarding biodiversity (thereafter, PPB) with experts through the CESAB (Centre for the Synthesis and Analysis of Biodiversity). A panel comprising 16 practitioners and researchers will be engaged to contribute grey literature and reports that could be utilized in the review. Additionally, they will offer guidance and feedback on different sections of the review as it develops.

### **Objectives and review question**

Do power-sensitive stakeholder participation processes in biodiversity conservation lead to conservation improves outcomes? To answer our primary research question, we will address a series of secondary research questions: • How are the multiple dimensions of power considered in stakeholder participation processes (including design and implementation) in biodiversity conservation ? • Through which mechanisms does the consideration of power in stakeholder participation process bring changes for biodiversity and social outcomes? • Which types of participatory processes in biodiversity conservation are more effective in amplifying access, voice, influence, for marginalized and beyond human voices?

### **Definitions of the question components**

Population : Biodiversity conservation efforts with stakeholder participation (an actor, actor group, or policy orientation: To preserve, protect or restore the natural environment and ecosystems largely independently of their instrumental value to humankind). Intervention : PPB (define as a decision-making process involving participation by non-state actors, who have some degree of input or are given some degree of process control and/or decision control where one axis of the discussion is about biodiversity) that correspond to a two-way dialogue (which implies more than just extensive communication and/or consultation and requires responsive on-going interaction, and exchange of relevant information). Comparator : Difference in power sensitivity according to the multidimension of power (see Fig2). Outcomes : Measure social outcomes (change in behavior of the actors affected by the output of the PPB) and social and biodiversity impact (actual changes in the environment typically as an effect of output of the PPB).

### **Search strategy**

Due to the timeframe and task force dedicated to the systematic review, only published literature will be systematically searched for this review, with bibliographic databases that allow search strings with Boolean operators. While we are aware of the limited access to grey literature, we have used this to develop the framework and the code book for the systematic review. Furthermore, we will undertake citation checking of primary studies identified as relevant to our systematic review to identify potential additional sources of grey literature that will be integrated in our systematic review. The research will be conducted in English only. The search string was developed in different sub-strings of intervention and outcome terms. Intervention: ( participat\* OR collaborat\* OR deliberat\* ) AND Intervention qualifiers: ( power\* OR empower\* ) ) AND Outcome: ( biolog\* OR biodiv\* OR ecosyst\* OR ecolog\* OR species\* OR natur\* OR wildlife\* OR fish\* OR marin\* OR forest\*) AND ( conservat\* OR preservat\* OR restorat\* OR protect\* OR park\* OR reserv\*)

### **Bibliographic databases**

Databases used: Web of Science Core Collection, SCOPUS. We will not impose any date cut-offs. Searches will be undertaken for "Title, Abstract and key word" rather than "full text", to limit the number of irrelevant retrieved hits. All searches will be conducted in the English language. However, references, and records of non-English studies will be retained for potential use in future

studies. Citations, including search dates, will be stored in systematic review management software CADIMA.

### **Web-based search engines**

Due to time and task force restrictions, we will not use web-based search engines as they do not allow search strings that allow to use substring of research. For example, with simple Boolean operators in google scholar with an adapted search string (participation AND power AND biodiversity) we hit 512 000 results.

### **Organisational websites**

We tested some key organizational websites to explore the possibility of using organizational websites using the simplified search string of "participation, power, biodiversity".

<https://www.unep.org/resources> : 7340 (only in their publications)

<https://documents.worldbank.org/en/publication/documents-reports> : 1310 (document and reports)

<https://portals.iucn.org/library> : 8 Due to time and task force restriction, we decided to not use organizational websites for the systematic review and will try to cover grey literature and report during other actions carried out by the project.

### **Comprehensiveness of the search**

A first attempt at the search string was developed during an expert workshop, where the group tried to decide on keywords and searching strategies. Furthermore, eight key research papers that are relevant to the participatory processes regarding biodiversity and power were identified by the expert group during the workshops and through previous literature searches on Google Scholar. These studies (Table 1) were used as benchmark studies when the search strings were developed. Initial scoping performed in Scopus with the search string during the expert's workshop resulted in about 2300 potentially relevant articles. Changes were made in order to include the benchmark studies, such as enlarging from the keyword nature\* to natur\*, and adding keywords relative to marine ecosystems and forest ecosystems that did not appear through the first search string (fish\* OR marin\* OR forest\*).

### **Search update**

If our resources permit, we will conduct updated searches closer to the publication of our comprehensive systematic review report.

### **Screening strategy**

During Stage 1, three reviewers will review the titles and abstracts to determine which papers should be included or excluded. They will assess the abstracts and reject those that do not meet the eligibility criteria below, while documenting their decisions. Moving to Stage 2, reviewer one will retrieve the full papers of the included abstracts. These papers will be distributed among reviewer two and reviewer three for a thorough full-text screening based on the eligibility criteria in Table 2. To facilitate the process and provide learning resources, several studies that meet the "PICO" inclusion criteria will be shared with the reviewers prior to conducting the screenings. A list of studies rejected after the full-text assessment will be included in the full report's appendix, accompanied by the reasons for exclusion. Consistency checks will be performed at both stages 1 and 2.

### **Eligibility criteria**

Relevant subject The studies should mention the issue and it should have a direct repercussion on biodiversity. The included studies must also focus on one or multiple participatory processes that aim at policy decisions or action on the ground (not only collecting scientific data and developing research). The participatory process must occur at the local, regional, national, or transboundary

scale in any country (not international). Relevant intervention Because of the objective to analyze the multidimension of power, we will only analyze participatory processes that correspond to a two-way dialogue with a high level of power delegation, representation and communication (Newig, 2013) or corresponding to the citizen control, delegated power, partnership typology of Arnstein (1969) or deliberative or coproductive mode (Rowe & Frewer 2004; Rowe et al. 2005). They should explicitly mention a link with power. Relevant comparator We expect different possibilities for comparator in the studies. Comparator might be included in the studies and include reported or perceived change, or discuss an alternative intervention in quantitative or qualitative way. However, we expect many studies to not have explicit comparator and propose to include in our coding book counterfactual scenarios. Relevant outcomes We will include studies which discuss social outcomes, including forms of empowerment, both during the participatory process and in the outcomes of an intervention. We will include studies which measure or describe biodiversity outcomes, spanning from actual improvement of environmental condition but also behavioral changes.

### **Consistency checking**

During stage 1, approximately 10% of the titles and abstracts will undergo double screening. Any discrepancies between the two reviewers will be discussed and resolved. If consensus cannot be reached, the paper will proceed to the next stage. Reviewers will include a study when there is uncertainty about its relevance, such as when the abstract lacks information or is incomplete. If the inter-rater agreement falls below 80%, an additional 10% of the articles will undergo double screening and consistency checks. Once an interrater agreement of at least 80% is reached, the remaining titles and abstracts will be divided for single screening in stage 1. In stage 2, at least 10% of the full texts will be screened by all reviewers. Any discrepancies will be discussed and resolved by the entire reviewer group. If the inter-rater agreement is below 80%, another 10% of the articles will undergo double screening and consistency checks. Once an interrater agreement of at least 80% is achieved, the remaining full texts will be divided among the three reviewers for single screening.

### **Reporting screening outcomes**

The eligible articles will be organized in tables, and the screening outcomes will be visually presented in a ROSES diagram. Any articles that do not meet the criteria at the full-text stage will be excluded, and a list of these articles will be provided along with the specific reasons for their exclusion.

### **Study validity assessment**

We will use the Joanna Briggs Institute Critical Appraisal tools to assess the study validity. They propose for example, a specific checklist for qualitative research which we expect will be the majority of our studies – that explore for example the congruity between the research methodology and the research question or objectives (see attached).

### **Consistency checking**

Through our double review, the critical appraisal of study validity will be carried out by two reviewers. In case of conflict in the rating of the checklist, discussion between the two reviewers will happen in order to reach common understanding and agreement on the appraisal of study validity.

### **Data extraction strategy**

Data from the included studies will be extracted and summarized in a series of summary tables that will describe the expression of power in the context, design, implementation, output and outcomes of participatory processes regarding biodiversity. More specifically, the extracted information will be based on the codebook developed by the expert group for the systematic review and from the existing analytical scheme SCAPE (Supp material 1). SCAPE normally focus on the key analytical unit of the public decision-making process (that account for non-participatory processes). We have

adapted it here to use it on the key analytical unit of a participatory process, selecting the variables that are relevant to look at power dynamics. According to the work with the expert group and in relation to our framework of the multidimension of power, some variables were also added to the list.

### **Meta-data extraction and coding strategy**

Information will be coded for the following categories: General information; Context; Process design; Process implementation; Outputs and social outcomes; Substantive outcomes and environmental impact (see code book; Supp material 1). A web-based data entry form will be used to capture the data. The data extraction sheet is subject to potential alterations as the evidence searches progress, including the addition of data fields if necessary. A thorough record of all data extraction will be maintained and included as an appendix to the systematic review report.

### **Consistency checking**

Data extraction will be initially conducted by a single reviewer, and a subset of the extracted data (minimum 10%) will be independently checked by a second reviewer. In case of any discrepancies, a discussion will be held following the same procedure as the screening process to reach a consensus.

### **Potential effect modifiers/reasons for heterogeneity**

The codebook, that was developed according to expert consultation and literature review, includes a long list of variables that are considered as reasons for heterogeneity. While including variables directly related to measure the power sensitivity of the participatory process, it also includes variables regarding the location of the PPB, the issue at stake, the actors involved etc.

### **Type of synthesis**

Once the data extraction processes are complete, we will synthesize the available qualitative and quantitative evidence related to the multidimension of power in PPB and its effect on social and environmental outcomes. Considering that we anticipate a predominant presence of qualitative evidence, our plan is to conduct a narrative summary and review of the qualitative evidence. This approach will allow us to provide a comprehensive analysis and interpretation of the findings. We also expect to be able to gather sufficient quantitative data through our extensive codebook to be able to propose quantitative synthesis.

### **Narrative synthesis methods**

To determine the potential impacts of power on social and environmental outcome of PPB, we will employ a narrative synthesis approach. This will involve tabulating relevant information and utilizing visualizations to describe trends, the different group identified (according to the different issue, design, implementation format) and outcomes. We will conduct a narrative investigation of the identified effect modifiers to better understand their influence. A knowledge gap and knowledge cluster will be identified according to the amount of data present in each section of the codebook. Sankey diagrams will be used to visually represent the link between the amount of data found in the different steps and the link they have with the multidimension of power.

### **Quantitative synthesis methods**

While we will conduct analysis based on qualitative evidence, we acknowledge the possibility of encountering data suitable for quantitative synthesis (e.g., number of participants, time spend between participants during the PPB (in hours or days), level of trust among participants from 0 to 4, number of hectares of land protected or restored as an outcome of the PPB - see more in the codebook in Supp Mat 1). In such cases, we will employ meta-analysis following standard methodologies, utilizing random-effects models. We will summarize the findings across studies using a narrative synthesis approach, presenting the results through a series of summary tables and

figures. Our aim is to provide a comprehensive overview of the available evidence and present a coherent narrative that incorporates both qualitative and quantitative findings.

### **Qualitative synthesis methods**

N/A

### **Other synthesis methods**

N/A

### **Assessment of risk of publication bias**

In a quantitative synthesis, we will assess publication bias using funnel plots. Funnel plots are graphical representations that help evaluate the presence of publication bias by examining the relationship between study precision (typically represented by sample size or standard error) and effect size (such as the standardized mean difference or odds ratio). The funnel plot allows us to visually inspect the distribution of study results and assess if there is any asymmetry, which could indicate potential publication bias.

### **Knowledge gap identification strategy**

Our categorization of the variables according to the step of the participatory process but also in line with the different power dimension should allow us to identify knowledge gaps, on the basis of relative amount of evidence. We plan to visualize the relationships between variables in the different steps of the PPB process and the power dimension using a Sankey diagram. The Sankey diagram will illustrate the flow of data and information between the variables, highlighting the quantity of data available for each variable. This visualization will also help identify knowledge gaps where data may be lacking or insufficient. By presenting the information in a Sankey diagram, we can provide a clear and comprehensive overview of the relationships and data availability regarding the different steps in a PPB and power dimension, facilitating a better understanding of the research landscape.

### **Demonstrating procedural independence**

To ensure objectivity and minimize bias, authors of the systematic review who have authored articles included in the review will not participate in the decision-making process regarding their own work.

### **Competing interests**

The authors declare no conflict of interest.

### **Funding information**

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### **Author's contributions**

All authors contributed to the thinking and development of the framework and of the codebook. LL first authored this protocol with JY and JB reading and approving the final version.

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