A Methodological Approach to Systematically Assess Stakeholder Perspectives in Fisheries Management

Un Enfoque Metodológico para Evaluar Sistemáticamente las Perspectivas de las Partes Interesadas en la Gestión de la Pesca

Une Approche Méthodologique pour Évaluer Systématiquement les Perspectives des Parties Prenantes dans la Gestion des Pêches

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EXTENDED ABSTRACT

Introduction

Fisheries management is an inherently complex process, and ultimately requires the managing of people who are either directly or indirectly affected by the resources (Fulton and Adelman 2003). Given the complexity of fisheries management, managers and policy-makers must consider the diversity of values, motivations, and perspectives that each stakeholder possesses. The consideration of this diversity of perspectives is not very straightforward and policymakers must consider innovative ways to capture this diversity fo views.

The Caribbean is no exception to these issues, which are confounded by lack of institutional and governance arrangements, limited financial and human resources, and historically ineffective management approaches (Brown and Pomeroy 1999, Salas et al. 2007). Current approaches in the region to effectively capture these approaches have not been able to fully capture the diverse issues. Indeed, this lack of ability to capture these perspectives may lead to a misalignment of stakeholder views and the policies put in place by managers. Given the complexity of stakeholders in fisheries management in the Caribbean, confounded by the lack of capacity to capture perspectives, there exists a need for the introduction of new ways that not only allow practitioners to systematically engage with stakeholders but also approaches that are simple to implement(Chakalall et al. 2007).

Current approaches to measure values, motivations, and perspectives largely surround, open-ended interviews, structured surveys, or community consultations (Bernard 2006). These approaches have key advantages in that they can capture rich and detailed quantitative and qualitative information from fishers. However, there is the possibility of the processes being biased by leading questions by the interviewing and also response bias where the respondent is simply trying to respond in a way they believe the interviewer wants. Considering both the limitations and advantages of current approaches in the region, the introduction of a new social data collection tool that can capture the nuances of participants' perspectives is needed. Here, I introduce cognitive mapping. Cognitive mapping provides for the exploration of the underlying values and motivations that influences people's behaviors around resource use, highlighting potential areas of similarity and conflict in managers and resource users' perception of the management of the resource. Cognitive mapping because of its ease of administration, has been used in a variety of ways which includes identifying similarities and differences across managers and resource users, evaluating social learning programs, and investigating the perceptions of new fisheries policies. In this paper, I start by providing the theoretical foundation for cognitive mapping, followed by outlining four different approaches to cognitive mapping. I then transition to providing an overview of two case studies involving cognitive mapping in the Caribbean region and close by discussing the potential for its application in the region.

An Introduction Mental Models and Cognitive Mapping

Mental models are representations of how people perceive and organize information concerning a specific topic (Kearney and Kaplan 1997, Kaplan and Kaplan 2003). Indeed, everyone holds specific mental models about a diversity of topics, influenced by their experiences, values, and social networks. These mental models are comprised of facts, assumptions, and beliefs, that act as filters through which a person interprets and judges any new information (Kolkman et al. 2005). For example, a fishers' willingness to adapt to new fisheries will largely depend on what they know about the new species and how it is incorporated into their existing mental models. Indeed, the mental models act as a computer simulation, constantly running different combinations to identify if new information will fit within the existing structures. This illustrates the uniqueness of mental models ad highlights that mental models are dynamic and flexible. It is important to note that mental models may not be the complete picture of the topic; instead, it contains only enough information to be able to navigate through daily decision-making (Jones et al. 2014). Indeed, mental models are key determinants of behavior and motivations and can be useful in identifying areas of mutual understanding and potential conflict, which can enable interventions.

Cognitive mapping is a tool that is used to turn mental models into data. It can take many approaches, whereby each approach can be tailored to a specific context. Further, cognitive mapping ranges from simple such as free-listing to more

complex approaches such as fuzzy cognitive mapping. In the free-listing activity, the main objective is to simply identify all the concepts and ideas related to a topic. In this approach, the aim is not to identify relationships between concepts, but simply to obtain an overview of a participant's knowledge. In comparison, the fuzzy cognitive mapping elucidates not only a participant's knowledge of a topic but also illustrates the relationship and strengths of those relationships. Table 1 compares the four main approaches to cognitive mapping, including their description, elicitation, and potential analyses.

Measuring Organizational Sense of Place in Bocas Del Toro, Panama (*Free-listing*)

In this free-listing exercise, the main objective was to understand how natural resource education, management, and business organizations describe the contribution of a specific place. In this approach, we ask respondents to identify the words that they believed best described why Bocas Del Toro is important to their organizations. This activity took less than 5 minutes. To analyze this data, we identified the most frequent concepts and compared these concepts between and across organizational types. The results indicated that despite varying missions, organizations still shared similar themes on their dependence on Bocas Del Toro. This similarity across organizations provides an opportunity for greater collaboration between organizations.

Understanding Stakeholder's Mental Models in Response to Belize's Managed Access Program (*Conceptual Content Cognitive Mapping*)

The objective of this study was to understand and explore potential similarities and objectives in stakeholders' perceptions of Belize's new fisheries policy (Wade and Biedenweg 2019). To accomplish this, we completed both a free-listing and card-sorting activity. The free-listing activity was used to collect concepts for the card-sorting component. Ninety participants completed the full mapping exercise including managers and fishers. Each participant was presented with 30 cards and asked, "When you think of Managed Access and you had to explain it to someone unfamiliar with the program, what words/phrases/concepts would you used to describe it? After selecting the cards, participants were asked to group the concepts based on their perceived relationship between the concepts and then ranked the groups based on importance. We found that fishers and managers were equally knowledgeable of the new fisheries regulations, but their different perspectives in the industry in the industry resulted in different interpretations of the policy. By clarifying the key points in stakeholders' mental models, this approach directly responds to increased calls for an understanding of the factors that can influence the sustainability of a given policy.

Concluding Remarks

The complexity of fisheries management calls for new approaches to capture the nuances of actors' perceptions and behaviors. The cognitive mapping approach, which captures the social norms, values, and attitudes of actors, provides an opportunity for participants to express which of these different cognitive constructs affect their mental models around marine consideration (Vaske and Donnelly 1999, Wynveen et al. 2015). This process reduces the probability of data collection bias in that participants can freely express their understanding with limited control and direction by researchers. An additional advantage of cognitive mapping is that participants frequently acknowledge the approach as more engaging than other data collection methods. The approaches I have outlined ranged from simple to complex. The flexibility of cognitive mapping allows it to be executed across a diversity of contexts. The simplicity of execution and analysis of the results allows for the ease of interpretation, which can produce results that foster the easily digestible and wide distribution of the results. Given cognitive mappings

Table 1. Comparison of 4 different cognitive mapping approaches and description.

Cognitive Mapping Approach	Description	Elicitation	Potential Analyses
Free-listing	Investigates all ideas participants hold about a topic	List of concepts that come to mind about a topic	Frequencies and salience of identified concepts
Q-Sort	Mental objects are organized in a forced normal curve	Card sort concepts into a normal curve based on the relative importance	The relative importance of identified concepts
Conceptual Content Cognitive Mapping	Spatial/visual representation of mental models.	Card sort concepts into groups based on perceived similarity and importance	Emergent clusters of related concepts; cultural consensus of mental model structure
Fuzzy Cognitive Mapping	Participants illustrate connections using arrows and indicate the strength of interactions between connections.	Diagrammatic representations with causal and strength relationships	Interactions between concepts; may identify decision rules for agent-based modeling

diverse approaches, I believe its broad applicability can promote greater discussion and collaboration across stakeholders.

KEYWORDS: Fisheries management, cognitive mapping, mental models, methods

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