A Research Framework for Examining the Characteristics of Networks that Determine Resilience and Adaptability in Marine Resource Governance in the English Speaking Eastern Caribbean

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ABSTRACT

Small-scale fisheries in the eastern Caribbean are examples of complex adaptive social-ecological systems. However, there is an urgent need to strengthen capacity and networks for adaptation and resilience in order to facilitate fishery sustainability through present and planned marine resource governance initiatives. This takes into account organizations and institutions of governance operating at different scales and levels. Conventional governance perspectives and approaches are inadequate. Using a conceptual framework of complex adaptive system and social-ecological system perspectives, and using cross-scale network analysis (organizational and social), this research focuses on examining the characteristics of networks that determine resilience and adaptability in marine resource governance in the eastern Caribbean at trans-boundary to local levels. The results will be applied to enable present and planned marine and coastal resource governance initiatives to become more adaptive and resilient for the benefit of diverse fisheries stakeholders at various scales in the eastern Caribbean.

KEY WORDS: Adaptability, complexity, governance, networks, resilience, resource, systems

Marco Investigativo para Examiner las Caracteristicas de Redes que Determinan Resiliencia y Adaptabilidad en la Gobernabilidad de Recursos Marinos en el Caribe Oriental Anglo Parlante

La pesca a pequeña escala del Caribe Oriental son ejemplos de complejos sistemas socio-ecológicos adaptables. Sin embargo, existe una urgente necesidad de fortalecer capacidades y redes para la adaptación y resiliencia a fin de facilitar la sostenibilidad de la pesca a través de iniciativas planificadas de gobernabilidad de los recursos marinos. Esto toma en cuenta organizaciones e instituciones de gobernabilidad operando a diferentes escalas y niveles. Las perspectivas y enfoques de gobernabilidad convencional son inadecuados. Utilizando un marco conceptual de perspectivas de sistemas adaptables complejos y sistemas socio-ecológicos, y utilizando análisis de cruce de escala de red (organizacional y social), esta investigación se enfoca en examinar las características de las redes que determinan resiliencia y adaptabilidad en la gobernabilidad de los recursos marinos en el Caribe oriental partiendo de niveles transfronterizos a locales. Los resultados serán aplicables a fin de permitir que iniciativas de gobernabilidad de recursos marinos y costeros actuales y futuras sean más adaptables y con mayor resiliencia en beneficio de diversas personas de interés de la pesca a varias escalas en el Caribe Oriental.

PALABRAS CLAVES: Adaptabilidad, complejos, gobernabilidad, recursos, redes, resiliencia, sistemas

INTRODUCTION

This paper and its accompanying poster describe the early stages of governance research. The research questions address marine resource governance in the eastern Caribbean at trans-boundary, national, and local levels. This action research uses concepts from complex adaptive systems (CAS) and social-ecological systems (SES). Social network analysis (SNA) is the main methodological approach, and the plan is to construct and compare case studies. In order to share outputs widely and produce beneficial outcomes that engage and influence policy, there is considerable emphasis on communication.

Small-scale fisheries (SSF) in the eastern Caribbean are threatened by many of the factors that affect fisheries worldwide. These include fish stocks declining due to overfishing, pollution, and habitat degradation. Most Caribbean fisheries remain open access. Management efforts, where they occur, mainly take the conventional command and control regulatory approach. Only recently have more participatory approaches been tried, going as far as local or community-based management in some situations. There is a range of governance arrangements available for investigation.

Governance is the whole of public as well as private interactions taken to solve societal problems and create societal opportunities. It includes the formulation and application of principles guiding those interactions and care for institutions that enable them (Kooiman *et al.* 2005). Adaptive governance is about learning and evolving with and for positive change (Folke *et al*. 2005). In the context of SES it involves dynamic institutional and governance structures and processes that permit key management interventions at the appropriate scales and times (Anderies *et al* 2006).

Fisheries governance provides a broader perspective on the sustainable use of marine resources than fisheries management (Bavinck *et al*. 2005, Kooiman *et al*. 2005, Wilson 2006). Conventional, top-down, centralised, command-and-control styles of management have fallen into disrepute due to conspicuous repeated failures in major fisheries (Berkes *et al*. 2001). More attention is being paid to bottom-up, decentralised, participatory, collaborative approaches, especially in the governance of SSF due to their complexity and the challenges that they pose to being managed successfully (Mahon *et al*. 2005, Fanning *et al*. 2007). The concepts and approaches of SES perspectives

and especially interactive governance have been promoted as being particularly suited to these fisheries (Bavinck *et al.* 2005), but they need to be tested by practical application in order to truly prove their worth (Mahon *et al.* 2008).

Where there is complexity in the fisheries (social-ecological) systems, but little previous attention to fisheries governance, it may be especially enlightening to investigate governance. Much literature describes regional fisheries situations and interventions (e.g. Singh-Renton *et al.* 2003, Haughton *et al.* 2004, Mahon and McConney 2004b), but is not organized into case studies using these conceptual perspectives on governance. The research needs to go much further and deeper in order to make recommendations that can influence policy and management practices.

In March 2007 the Centre for Resource Management and Environmental Studies (CERMES) initiated a four-year project on 'Marine Resource Governance in the Eastern Caribbean' (the MarGov project), funded mainly by a grant from the International Development Research Centre (IDRC) of Canada (CERMES 2007). The decision to pursue this project was based on several observations. We observed that many people in the Caribbean depend on policies that should enable the good governance of marine resources. Such policies can facilitate livelihoods and assist development to be sustainable, especially in coastal communities. In the eastern Caribbean SSF appear to lack the interactions among stakeholders needed to sustain fisheries management (Chakalall *et al.* 1998, 2007).

Perhaps weak institutions, poor leadership, inadequate information, limited capacity, and other deficiencies contribute to low levels of government and non-governmental stakeholder engagement in fisheries and other marine resource governance. It could also be that at national and local levels small, low status government fisheries units have tenuous upward and lateral links to public sector policy and weak downward links to resource users. Trans-boundary linkages may be no better developed and are critical for scaling up governance (CLME 2007). This combination of factors, and others, may be allowing SSF to become marginalised rather than become adaptive and resilient. These governance issues may be researched from network and institutional perspectives. They can also be addressed, at least in part, by building institutional capacity and adaptive learning, along with strengthening networks and policies for improving governance.

CONCEPTUAL FRAMEWORK

The project's first challenge is to discover whether a research framework for marine resource governance in the eastern Caribbean, can be constructed from the current literature on resource governance from CAS and SES perspectives. This would use small-scale fisheries as the primary SES of interest, but not ignoring marine protected areas (MPAs) and coastal management. This question may seem somewhat hypothetical, but it needs to be posed. Indeed, answering it has proven to be quite challenging. Resilience and governance research worldwide has shown that context and specific situations need to be taken into account when constructing conceptual frameworks for application to a particular SES. In addition, views on the concept of governance differ, as do approaches to investigating it. There is not much existing literature on marine resource governance specific to the eastern Caribbean which draws upon these concepts.

Only very recent Caribbean studies recognize fisheries as CAS and SES where fishery resources and ecosystems interact inextricably with human social and institutional systems. Much research in the region has addressed typical best practice e.g. integrated coastal management, co-management, sustainable livelihoods, etc. However, it has not been situated within a conceptual framework of CAS and SES. Knowledge and experience gained from research around the world using concepts such as resilience and adaptability in CAS and SES to evaluate the governance of natural resources (e.g. in the Resilience Alliance literature) should be applicable to the region. However, the literature on governance and networks is quite diverse, and very little of it derives from situations similar to those in the eastern Caribbean. From this body of work, we have selected concepts that we believe are key to understanding and improving marine resource governance in the eastern Caribbean.

Scale is a concept common to most disciplines although used with slightly different meanings. Ecological scale is primarily spatial and temporal. Sociological scale adds features of human organization and interaction such as jurisdictions, institutions, and networks, among many. Combining them, SES function at multiple scales, creating more complex and dynamic social-ecological interactions and feedback loops among both the human and ecological components (Cumming *et al.* 2006).

Interactions may occur within one scale (i.e. cross-level) or across different scales (i.e. cross-scale). Cash *et al.* (2006) suggest that the dynamics of cross-level and cross-scale interactions are affected by the interplay between institutions at multiple levels and scales. They suggest that co-management and other types of cross-scale governance facilitate solutions to complex system problems. Berkes (2001, 2006) also addresses the importance of cross-scale governance. He notes that co-management institutions provide ways in which to approach scale-related questions and deal with linkages in complex adaptive systems. He observes that community-based resource management confronts multiple levels of governance and external drivers of change.

Cumming *et al.* (2006) note that scale mismatches occur when the scale of environmental variation and the scale of social organization responsible for management cause disruptions in SES functions, inefficiencies occur, and/or important components of the system are lost. They

suggest that, in natural resource management systems, SES scale mismatches result in losses of adaptive capacity and resilience.

Resilience is the capacity of a system to experience shocks or perturbations while retaining essentially the same function, structure, feedbacks, and therefore identity. The more resilient a system is, the larger the disturbance it can absorb without shifting into an alternate regime (Berkes and Folke 1998). Such a shift may be reversible or irreversible either absolutely or relative to the time scale of interest. Whether a particular regime is 'good' or 'bad' is largely a value judgment that may vary with perspective or outlook, hence encompassing a number of variables. Resilience may not be desirable if a governance regime is undesirable, so knowing what increases or reduces resilience is important for adaptive governance (Walker *et al*. 2006). In SES, ecosystem services interact with a collection of users having different technologies, interests, and levels of power (Lebel *et al.* 2006). Interventions that aim to alter resilience in SES soon confront governance issues.

In the eastern Caribbean SSF literature, there is very little that speaks to the concept of resilience unless it is interpreted as being embedded in terms such as sustainable use and development. It appears to often be assumed, especially by resource users, that the abundance of marine resources will fluctuate widely regardless of human interventions to either deplete or manage them. Overfishing has depleted several inshore resources, perhaps irreversibly, and will continue to do so unless more drastic policy and management interventions are implemented. Differences in culture, beliefs, and norms among stakeholders need to be investigated in relation to risk and uncertainty if resilience is to be understood in the context of coping strategies, attitudes, and other behavior (Berkes *et al.* 2001).

Networks consist of nodes and links that represent components and the relations between components in a given SES. Institutions are mechanisms of social structure governing the actions of individuals and groups through systems of rules and norms that shape human behavior. The features of the SES partly determine network structure and influence institutional analysis. Features include trust, power, information, funds and many others. It has been argued that studies on resilience in SES lack a clear analytical framework, and that a network perspective with emphasis on dynamic and heterogeneous systems might serve this purpose (Janssen *et al*. 2006). This is because network analysis focuses on how the structure of interactions between SES components and the ways in which the structure of nodes and links, and the flows contained within, affects the performance of the system at a variety of scales. Network analysis has been applied to both social systems and ecological systems, combining qualitative and quantitative information, but seldom to integrated SES and governance (Bodin 2006).

Janssen *et al.* (2006) recommend that network analysis be used to compare case studies relevant to resilience using the typology of nodes, links, ties, and other network properties. In their analyses they focus on connectivity (link density and reachability) and centrality, making the point that there is no 'right' depiction of SES networks, only models that are more or less useful from a particular perspective or for analyzing a specific problem. They also warn that network architecture or structure is of little value unless the flows through the network are also known. Finally, they conclude that there is no simple relationship between network properties and resilience. For example, a dense network may be good for the rapid diffusion of a beneficial innovation, but it may also spread unwanted practices such as irresponsible fishing and constrain individual managers from experimentation for adaptation if close-knit cliques are formed.

Network studies on marine resource governance in the Caribbean are not common, but there are a few examples. Tompkins *et al.* (2002) used institutional network analysis to investigate coastal management in Trinidad and Tobago. Adger *et al.* (2005) examined cross-scale networks for resource co-management in Tobago, concluding that the structure of cross-scale interactions via networks is relevant to the resilience of SES. McConney (1997) used qualitative social network analysis to examine strategies for coping with uncertainty in fisheries management planning in Barbados. Mahon and others have undertaken unpublished network studies of the numerous small NGOs and CBOs in the Grenadines islands in relation to marine biodiversity and sustainable development, using a CAS perspective to look closely at how social and organizational network and institutional arrangements affect the capacities of these organizations. This research investigates their ability to self-organize and whether the policy environment enables or constrains this ability as power is exercised in governance interactions.

Folke *et al.* (2002) identify critical components of adaptive capacity and resilience that interact across temporal and spatial scales during periods of change and reorganization. These include learning to live with change and uncertainty; nurturing diversity for resilience; combining different types of knowledge for learning; and creating opportunity for self-organization towards achieving social-ecological sustainability. Lebel *et al.* (2006) found partial evidence that characteristics such as participation, trust, accountability, polycentric and multilayered institutions support resilience, self-organization and adaptability among institutions and vulnerable groups.

Adaptive capacity reflects learning and the ability to experiment and foster innovative solutions in complex social and ecological systems (Armitage 2005). To learn and innovate in the process of self-organization and adaptation, systems must be open to and tolerant of failure (Anderies *et al.* 2006). Yet, in the political reality of most governance arrangements, experimental policy (with the

risk of failure) is seen as being prohibitively costly in many respects. However, adaptive network governance and strengthening adaptive capacity to manage resilience are critical to sustainable development (Lebel *et al*. 2006; Carlsson and Sandström 2006). Lebel *et al.* (2006) argue that strengthening adaptive capacity to manage resilience is critical to sustainable development. Armitage (2005) identifies factors that influence adaptive capacity at the local level and that are relevant to co-management.

The term co-management refers to a continuum of arrangements that rely on various degrees of power and responsibility sharing between governments and stakeholders who are often organized in local community groups (Pinkerton 1989, Pomeroy *et al*. 2004). A wide range of studies has illuminated the advantages and challenges of co-management as a strategy to improve the understanding of complex multi-interest problems and their potential solutions in SES (Pomeroy *et al.* 2001, Cash *et al.* 2006). Co-management is adaptive where ecological knowledge and institutional arrangements are tested and revised in a dynamic, ongoing, self-organized process of learning-by-doing (Folke *et al.* 2002).

Adaptive co-management has features such as:

i) Vision, leadership, and trust,
ii) Enabling legislation for ecosystem management,
iii) Funds for responding to environmental change and for remedial action,
iv) Capacity for monitoring and responding to feedback,
v) Information flow through social networks,
vi) Combined sources of information and knowledge, and
vii) Arenas for collaborative learning (Olsson *et al* 2004).

These processes involve cross-scale linkages among diverse stakeholders. Such governance can be at the level of the ecosystem in cases of resource management on a large scale, and may help to build resilience in SES (Olsson *et al*. 2004).

In the next few sections we describe how the concepts introduced above are relevant to the research plan for addressing the MarGov project's three guiding research questions. These are ideas and ingredients for a dynamic plan of action to be implemented mainly through graduate student research and communication.

TRANS-BOUNDARY GOVERNANCE

At a scale of investigation encompassing the entire eastern Caribbean sub-region the MarGov project poses the question: At levels ranging from trans-boundary to local, what characteristics of networks determine resilience and adaptability of marine resource governance in the eastern Caribbean? This question focuses on the analysis of networks (organizational and social) across different scales (spatial, jurisdictional, institutional, etc.) to determine attributes that assist with (or have the potential to assist) resilience and adaptability in marine resource governance in the eastern Caribbean.

Acknowledging that marine resources governance is broader than fisheries governance, and that networks can extend to powerful actors outside of the sub-regional study area, this investigation will focus both on integrated coastal management and international fisheries management. The intention is to use fisheries for shallow-shelf reef fish and for large pelagics as the two cases for study in selected countries. These two fisheries comprise different networks of stakeholders with different interests, and sources of power, operating at different levels and scales. For example, management of tunas in the Atlantic is coordinated through a network of institutions and organizations at different levels (international, regional, national, and local) in which industrial fishing and international trade are major conservation concerns. In contrast, reef fisheries are much more oriented towards biodiversity, conservation, and protection of critical habitat for multiple purposes. The cases of these two fisheries will have some network nodes (e.g. fisheries officers and authorities) and ties (e.g. information, funding, etc.) in common, but we also expect to find differences that will inform us about governance networks.

One of the first steps is to characterize the study fisheries and identify the ways in which they meet the criteria for CAS and SES as derived from the literature. This means paying attention to both the resource ecosystems and human social systems. Within the latter, stakeholder analyses will assist in revealing the important actors (nodes) at various levels and supply preliminary information on ties among them that relate to networks. Without going to the extent of constructing complete numeric models of how the ecological and social factors are intertwined, it is necessary to construct at least conceptual models. These models should illustrate, for example, how the migration of adult tunas or suspected larval dispersion of reef fish has consequences for trans-boundary governance. Ecological features inevitably influence some aspects of social systems.

Network analysis focuses on the structure of interactions between SES components and the ways in which the nodes and links, and the flows contained within, affect the performance of the system at a variety of scales and levels. Network analysis has been applied to both social systems and ecological systems, combining qualitative and quantitative information, but seldom to integrated SES. As noted previously, Janssen *et al.* (2006) recommend that network analysis be used to compare case studies relevant to resilience using network properties. Berkes (2006) argued that some aspects of Caribbean fisheries governance at the international, regional, national and community levels are mismatched and poorly linked.

How network structure and content enhance or undermine resilience and adaptive capacity of fishery

systems involves iterations of investigation and interpretation. Social network interviews with key actors derived from the stakeholder analysis and processed through the software will reveal patterns of density, centrality, structural holes, and other network metrics. Yet interpreting what these metrics mean for fishery system characteristics such as resilience and adaptive capacity is not straightforward. There will likely be iterations between analysis and interpretation until robust results are obtained. The iterative process reflects the state-of-the art in this emerging area of study where few 'recipes' are available.

The analysis does not end here. The final challenge is to discover what similarities and/or differences exist in the social-ecological system networks in the fisheries for large pelagics and shallow reef fish in the eastern Caribbean that concern governance such that recommendation on policy can be made. This is the challenge of research influencing policy, which is one of the objectives of the MarGov project designed to promote the sustainability of interest in the research process and products. To accomplish this there will be a parallel project component addressing both communication and communication research concerning a wide range of audiences in a communication strategy, but ultimately having policy-makers and advisers as the most critical strategic targets.

Many of the above steps and considerations are also pertinent to the remaining project research questions. These recurrent points will not be covered again in the descriptions below which deal with the research at national and local levels.

NATIONAL ENABLING POLICY

At the national level, we consider what kinds of interventions and governance structures are effective for enhancing adaptive capacity and enabling self-organization that contributes to resilience. This focuses on national level interventions and institutional arrangements that stem from policy and management decisions or inaction. The intention is to take a closer look at the notions of adaptive capacity and self-organization which are prominently featured in the literature. The investigation of supra-national layers of governance covered by the trans-boundary question will provide some direction and context for this analysis, but the national analysis is not dependent upon the trans-boundary research.

The experience of CERMES and other agencies involved in marine governance in the Caribbean is that command and control interventions have not succeeded. The failure of current management efforts in the Caribbean suggest the need to shift focus to understand how human institutions and social organization function as adaptive systems that promote social learning and resilience building (Berkes *et al*. 2005). In the eastern Caribbean, building capacity to manage natural resources is a typical aim of many research and development governance interventions. These interventions have focused more on enhancing organizational and individual human, physical, financial, social, and institutional assets. There is a pattern in which capacity, in terms of assets, has been built and then quickly become eroded or irrelevant. Building the capacity to adapt explicitly using network resources has received relatively little attention.

For any fishery system, management inputs from national responsible agencies should place emphasis on enabling self-organization and adaptive capacity through empowerment, learning and response systems, and promoting positive, equitable, transparent interaction among stakeholders as a foundation for fishery governance. Enabling inputs such as stakeholder analysis and mobilization, co-management, sustainable livelihoods, traditional knowledge, etc. make it possible for stakeholders to self-organize and adapt to change through internal interactions and activities. Learning-by-doing becomes critically important and requires an emphasis on 'people' skills (Mahon and McConney 2004a) and new processes that allow space for self-organization that follows a positive path towards good governance and meeting national management goals and objectives.

As practical examples we can ask which national policy environments and authorities, in which fisheries systems, facilitate the desirable characteristics of good governance, and which do not. By good governance we mean features such as participation, accountability, transparency, equity, justice, effectiveness, efficiency, and others. We can try to explain the reasons for similarities and differences. It may be that the national level governance in fisheries or fisheries authorities with more global connections (e.g. for large pelagics) is very different to governance of smaller regional fisheries (e.g. for flying-fish), but that the latter has stronger national institutions for enhancing adaptive capacity and enabling self-organization due to the regional focus. Of course, it is also possible that the national institutions related to governance over regional fisheries are weaker due to the many ills that plague small island fisheries authorities.

In this analysis, the MarGov will select two countries that appear to be different in their governance structures at the national level based on criteria derived from the literature. A north-south contrast and comparison, such as between Barbados and the federated state of St. Kitts and Nevis, could for example, be informative. In order to set this in a regional context, and facilitate the application of findings to other places, the national analyses could be conducted within the framework of the ongoing development of an agreement on establishing a Common Fisheries Policy and Regime (CFP&R). A sub-analysis in this should be to determine patterns in stakeholder (and particularly fisherfolk) participation in matters related to policy. Seeing how well prepared, or not, national governance systems are to engage in this regional thrust in ways that involve fisherfolk would have immediate relevance to policy.

Steps in the investigation would include selecting specific fishery cases or institutional arrangements and fully analyzing the SES and governance networks at primarily the national level. For example, one could examine how Barbados has tackled the ongoing fishing-related dispute with Trinidad and Tobago in which there were several interactions with the fishing industry. The Barbados Fisheries Advisory Committee, whish has recently been documented (McConney *et al.* 2003b), but not from a network perspective, could add value to existing research findings. In St. Kitts and Nevis, an area of interest would be the relations between the two sets of state entities as they relate to public sector fisheries policy and national agenda-setting and implementation. The next level is the local level.

LOCAL CO-MANAGEMENT

At the local level we will seek to discover what the formal and informal processes and conditions are for establishing and sustaining the adaptive co-management of small-scale fisheries. This drills down further into the jurisdictional scale by examining local characteristics and focusing more on the fisheries sector at specific locations, sub-nationally. Adaptive co-management was selected as the main theme here due to previous and ongoing regional and international research on the topic, coupled with the likelihood that some type of co-management will continue to be attempted in several fisheries in the eastern Caribbean. In particular, it moves the research into community-based management where studies outside of the rather sparse Caribbean co-management literature can also be drawn upon.

Over the last decade, research done at various locations around the world has documented many cases of co-management and community-based management in fisheries and other natural resource systems, including an analysis of the Caribbean (Pomeroy *et al.* 2004, Ostrom 2005, Pinkerton 1989). From the results, certain conditions are emerging as central to the chances of developing and sustaining successful co-management arrangements (Pomeroy *et al*. 2001). These conditions are neither absolute nor exhaustive. Co-management can occur without meeting all of them, but they are not strong in the region (McConney *et al.* 2003a). Still, researchers have found that the more of these conditions that are satisfied in a situation or system, the greater is the chance for successful co-management.

Scenarios of community-based co-management of sea urchin fisheries in Barbados and St. Lucia have been much studied (Smith and Berkes 1991, George and Joseph 1999; McConney *et al*. 2003c, Mahon *et al*. 2003). Initiatives in St. Lucia started first and were more comprehensively community-based that the experiments in Barbados. In both countries the fisheries authorities set up systems for collaborating with fishers to monitor urchin abundance and then use these observations to advise policy-makers on if and when the fishery should be opened. The initiatives have faltered, rather than strengthened, in both countries, but remnants of the co-management institutions remain. It is not clear why the systems did not adapt to become sustainable, but within them were networks of resource users, management authorities and other interested stakeholders.

The intention is to better understand the sets of rights, rules, and processes which allow groups of fishers and government agents to organize local level governance, co-management, and resource use via collective action, learning, and formal or informal agreement to share power and responsibility. The candidate fisheries and countries for this are the sea urchin fisheries of Barbados and St. Lucia have never been studied from a network governance perspective. The researcher will investigate what networks were involved in these governance initiatives and how they functioned or failed, with special attention to if or how they learned and adapted. This information will be useful for future co-management initiatives.

CONCLUSIONS

Fisheries governance arrangements in the eastern Caribbean can be depicted from an SES perspective as networks of people and organizations connected by ecosystems. Fisheries, fisheries authorities, and coastal management are components of regional and sub-regional fisheries governance. The MarGov project aims to investigate marine resource governance from a network perspective. Its goal is to understand marine resource governance related to small-scale fisheries and coastal management in the eastern Caribbean using complex adaptive system and social-ecological system concepts with the following objectives:

i) Construct a conceptual framework for applied research on marine resources governance in the Caribbean using CAS and SES perspectives,
ii) Investigate governance in the context of small scale fisheries in the eastern Caribbean primarily using cross-scale network analyses with emphasis on features that enhance resilience and adaptation,
iii) Increase the capacities of partners to undertake their own research and use the results by involving them in the participatory applied research,
iv) Facilitate through outreach and information, the incorporation of the research results into initiatives related to marine resource governance for fisheries, and
v) Establish applied research into marine resource governance as a new demand-driven programme.

Reports of progress and research results will be shared at future meetings of the Gulf and Caribbean Fisheries Institute.

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