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REFLECTING ON CLIMATE CHANGE AND GOVERNANCE IN A COASTAL-MARINE CONTEXT: THE CASE OF ST. LUCIA

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Governance Research Stream

Introduction

Coastal-marine systems in small island developing states of the Caribbean are highly vulnerable to both current and future environmental change, including climate change (Pelling and Uitto 2001; CARSEA 2007; IPCC 2007). Increased storm intensity, sea level rise, coastal erosion, ocean acidification, coral bleaching, and declining marine fisheries are particular sources of vulnerability (McWilliams *et al.* 2005; Emanuel 2006; Oxenford *et al.* 2008; Pulwarty et al. 2010; Nicholls and Cazenave 2010; Bellard et al. 2013). Furthermore, the multiple drivers of change (e.g. climate change, urbanization, tourism development, and marine resource exploitation) are producing cumulative effects and conflicts that are complex, emergent, and cross-scale (CARSEA 2007).

This working paper seeks to examine the relationship between institutional adaptive capacity and governance fit for climate change using a case study of the Soufriere Marine Management Area (SMMA) in St. Lucia. This is a relationship that has not been sufficiently investigated. However, projected climate changes signal the importance of careful consideration of this issue. Accordingly, we offer an empirical assessment of the SMMA with specific reference to opportunities for analytical deliberation, institutional variety, nesting of institutions, and the role of networks. Our analysis is aimed at understanding how governance systems can achieve fit for climate and other drivers of change, not as a singular outcome but as a dynamic process of building institutional adaptive capacity.

Institutional adaptive capacity and governance 'fit'

Institutional adaptive capacity is a relatively recent concept with roots in the extensive literature on adaptive capacity (Gupta et al. 2010). Institutional adaptive capacity is related to the specific institutional characteristics that contribute to adaptive capacity, either through enabling actors to adapt or increasing capabilities to change institutions when needed (Gupta et al. 2010). Institutions are structural elements of society that reduce uncertainties in human behavior (North 1990). They are produced, reproduced and changed based on the actions of agents that either serve to reinforce or modify existing institutions (Giddens 1984). However, institutional change can be difficult. Institutions are "agreements following long debate" (Gupta et al. 2010:460) and are particularly sensitive to the biases and power relations of the regimes that created them, causing them to be path dependent (Garud et al. 2007).

One particular challenge associated with institutional path dependency is the "problem of fit". The "problem of fit" between institutions and ecological dynamics has been well developed in the literature (Folke et al. 2007). Fit refers to the degree of coherence between governance and the multi- and cross-scalar dynamics of socio-ecological systems (Cash et al. 2006; Folke et al. 2007). There are many scales across which fit can be relevant (e.g., spatial, temporal, functional – Galaz et al. 2008). Achieving fit across one or more of these scales is typically associated with improved potential for sustainable outcomes (Folke et al. 2007; Galaz et al. 2008); however, recent studies suggest that emphasizing fit as a singular end point is problematic (Moss 2012; Clement 2012; Haller et al. 2013). New evidence demonstrates how the process of achieving fit,

which plays out through a series of institutional adaptations laden with power relations, can significantly influence the capacity of governance systems, even those that appear fit (Moss 2012; Haller et al. 2013). More recently, scholars have recognized that problems of fit extend beyond institutions to entire governance systems (Galaz et al. 2008). This scholarship highlights the role of governance, especially adaptive governance, in fostering the prerequisite capacities for institutional change needed to address issues of fit (Olsson et al. 2008; Boyd and Folke 2012). As such, institutional adaptive capacity can be related to the degree to which the requirements of adaptive governance are present within a governance system.

Dietz et al. (2003:616) have provided an overview of "strategies [to meet] the requirements of adaptive governance": analytic deliberation, institutional variety and nesting. Analytic deliberation between multiple stakeholders allows decisions to be well-informed when based on appropriate monitoring systems, builds social capital and enables action towards effective change (Dietz et al. 2003). Institutional variety involves employing a diversity of incentives (e.g., economic, behavioral) and rule-based solutions to achieve desired outcomes so that it is difficult for actors to evade the rules (Dietz et al. 2003; Gupta et al. 2010). Nesting involves adding redundancy and complexity to governance by ensuring institutional arrangements are structurally embedded across multiple levels (Dietz et al. 2003). More recently, social networks have emerged as a crucial component of adaptive governance given the links to social capital and collective action. For example, Crona et al. (2011) show how examining social networks can help understand many features of adaptive governance, such as social learning and influence, which allow actors in governance systems to effectively respond to change. We use a networks lens to understand nesting.

In our view, these four factors – analytic deliberation, institutional variety, nesting and networks – contribute to the institutional adaptive capacity of governance systems. Each factor influences the ability of actors to modify underlying institutions or decision making processes and to adapt governance systems to better fit the scope, scale and speed of coastal-marine change, including projected changes in climate. Our analysis of fit for climate change is premised on two assumptions. The first is that the institutional adaptive capacity present within the governance system to deal with past challenges can be leveraged to deal with future climate change. And the second is that this institutional adaptive capacity is observable in the ability of the governance system to meet the requirements of adaptive governance when dealing with current and past challenges.

Research Context

Soufriere is located on the southwest coast of St. Lucia, a small island developing state in the Eastern Caribbean (Figure 1). This community, centered on Soufriere Bay, is surrounded by diverse, rich landscapes, coastlines and coral reefs. Fishing and tourism are two major sectors of Soufriere's economy. For the purposes of this research, we consider the community of Soufriere to include surrounding settlements; most notably, this includes the settlements of Baron's Drive and Palmiste, where a number of low-income individuals engaged in the fisheries

and tourism sectors reside (Figure 2). Soufriere's tourism boom began in the 1980s, and brought with it a wave of resort development, beach tourists, recreational divers and yachts-people. The activities and attitudes of Soufriere's new visitors and residents were typically at odds with those of the traditional fisherfolk community that had occupied Soufriere previously. By the early 1990s, conflict and competition over coastal-marine resources between the fisheries and tourism sectors was quickly degrading the remaining resources, and it was feared that escalated conflict and resource collapse would result.

Before the remaining resources collapsed, a process was initiated by various actors to address these conflicts. This process eventually led to the creation of the SMMA and occurred in three main phases. The first was initiated in 1986 by the St. Lucia Department of Fisheries (DoFish). The DoFish used a top-down, regulatory approach that did not engage, consult or consider the different stakeholder groups relevant to the initiative. This first approach was largely ineffective (Pierre-Nathaniel 2003), but it sparked a more participatory second phase. The second phase was much more collaborative than the first, and it resulted in the demarcation and establishment of marine zoning guided by the participation of multiple stakeholders. However, the second phase suffered from the lack of a clear vision and local empowerment, which eventually led, once again, to concerns over conflict. These concerns initiated a resurgence of participatory ideals, which became embodied in the creation and empowerment of the Soufriere Marine Management Association (SMMAssoc) for managing the marine reserve. The SMMAssoc, steered by a multi-stakeholder board, developed the following mission statement:

> *The mission of the Soufriere Marine Management Area is to contribute to national and local development, particularly in the fisheries and tourism sectors through management of the Soufriere coastal zone based on the principles of sustainable use, cooperation among resource users, institutional collaboration, active and enlightened participation, and equitable sharing of benefits and responsibilities among stakeholders (SMMA 2012).*

The SMMAssoc was originally focused on managing conflict between marine resource users. However, its focus has evolved to include environmental issues as well. One respondent noted that the SMMA has "…grown out of being purely a conflict resolution and management agency [and is] becoming…an environmental management agency." As an environmental agency, it deals with a number of issues, many of which are interrelated. Climate change is in the mix of issues.

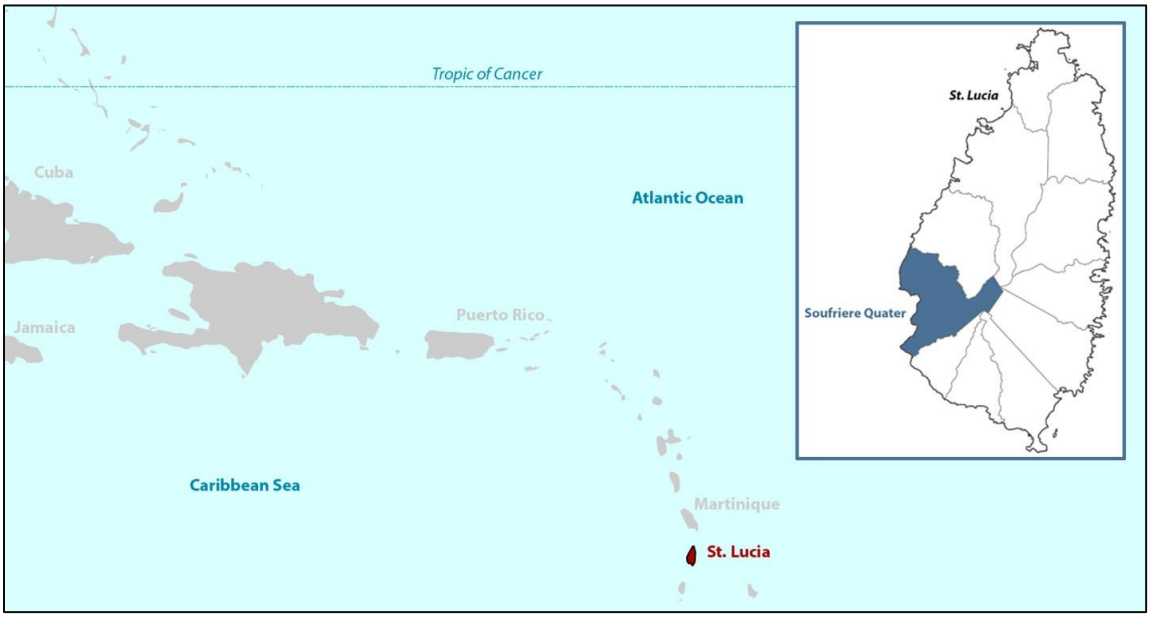

Figure 1. Map of the Caribbean, St. Lucia and the Soufriere Quarter.

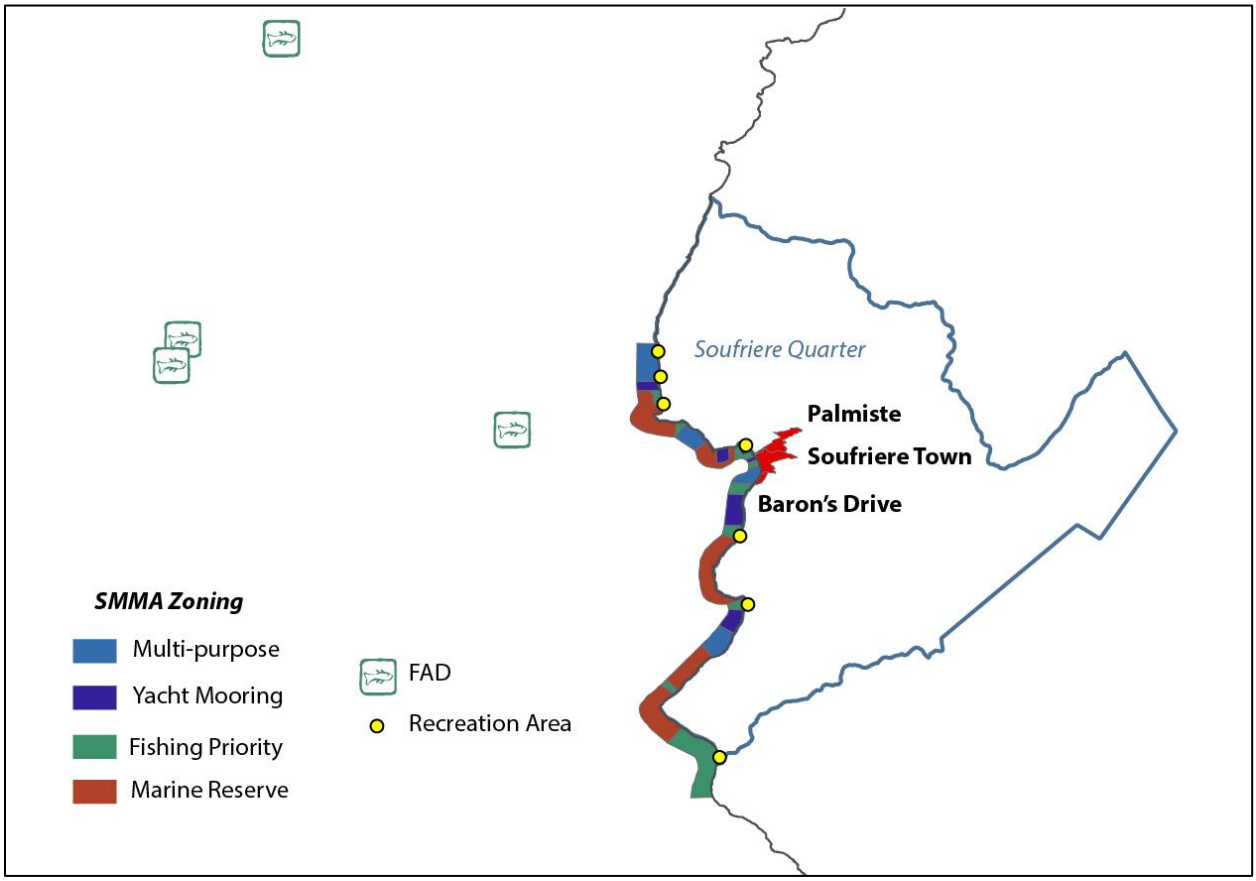

Figure 2. Map of Soufriere and the SMMA.

Methods

We used a qualitative, case-study based approach (Yin 2003) to examine the relationship between institutional adaptive capacity and governance fit for climate change in the case of the SMMA. Thirty-six semi-structured interviews with key informants involved with coastal-marine governance in relation to the SMMA were conducted during a five week field program in July and August 2012. Interviews lasted 30-90 minutes and were usually undertaken at the respondents' office (two interviews were undertaken in a public place).

The interview guide contained open-ended questions designed to cover the main factors related to institutional adaptive capacity - analytic deliberation, institutional variety, nesting and networks – and gather information related to governance fit. Network data was gathered by asking respondents to recall key organizations that they collaborate with when addressing challenges related to coastal-marine sustainability. Collaboration was taken to mean sharing of information, coordinating action or strategies, and formally partnering on projects or initiatives (Osterblöm and Bodin 2012; Galaz et al. 2012).

Results

Nesting

Complexity of institutional arrangements

The coastal-marine governance system in this case study can be represented as a network of collaborating and coordinating organizational actors[1]. Bodin and Crona (2009) and Österblom and Bodin (2012) have shown the importance of networks for effective coordination and collaboration, and they provide some insights into how the structure of networks affects the efficacy of coordination and collaboration.

Österblom and Bodin (2012) showed how central organizations can improve the effectiveness of coordination. The two central organizations in this case – the SMMAssoc and the DoFish – are both important, each with a similar yet distinct role in coordinating the network. The SMMAssoc is the main bridging organization at the community-level, and moderates access of community-level actors to information and resources. Collaboration and coordination between the SMMAssoc and the DoFish is the main conduit through which community-level actors are able to connect with national-level organizations, although some exceptions do exist. The DoFish also works directly with the SFC. However, both the SFC and the DoFish mostly coordinate with other community-level actors through the SMMA Board. As such, the SMMAssoc is the main actor playing a critical role in bridging community-level organizations and providing linkages with national-level actors.

The DoFish plays a key role in coordinating actors at the national-level. This role is especially important when working at the intersection of fisheries sustainability and large, tourism-related

[1] A network diagram will be produced.

developments. The DoFish works with the St. Lucia Development Control Authority (DCA), the St. Lucia National Trust (SLNT) and the St Lucia Ministry of Tourism, Heritage and the Creative Industries (MoT) when assessing the impacts of large developments on coastal-marine resources. The specific role of the DoFish is largely advisory in this regard, but the organization does moderate information flow between actors in the community of Soufriere and the national-level actors responsible for reviewing and approving these large developments (i.e., DCA); but again there are some exceptions. For example, the SMMAssoc and the DCA are also connected directly in the network. However, the relationship between the DoFish and the DCA is qualitatively better-developed than the relationship between the SMMAssoc and the DCA based on the interviews.

Since both the SMMAssoc and the DoFish have different roles in bridging, both are necessary for effective coordination. Their roles are somewhat nested and redundant, since there are examples where each can bypass the other to reach actors at the community- or national-levels. However, this redundancy does not mean that one could replace the other in the network. Both have necessary roles, which are essential to maintaining the network. But this redundancy does possibly improve the capacity of the network to adaptively navigate social-ecological change, since it increases the network's density (Ernston et al. 2008).

Redundancy

Nesting has led to cross-level redundancy in two main areas. First, there is some informal redundancy with the Marine Police in enforcement of SMMA rules. Marine Police and SMMAssoc both patrol nearshore areas. Although both have different formal mandates (i.e., SMMAssoc enforces zoning of the SMMA and Marine Police monitor criminal activities in the nearshore areas), in some cases they collaborate and support each other in meeting these mandates. This collaboration has built a small level of informal redundancy into the enforcement of rules.

Second, there are redundant roles in fisheries extension between the SMMAssoc, DoFish and SFC. All these groups actively implement training or awareness-raising programs with the fishing community. They partner on programs in some, but not all cases. For example, these organizations recently partnered on a program to train local fisherfolk in fishing techniques and practices more appropriate for offshore fishing around the FADs, such as the use of long drop lines with multiple hooks, Global Positioning Systems (GPS) and boat safety. Even when not partnering, however, the three organizations have fairly similar intentions (e.g., resource conservation, livelihood security) with their programs. Similar nesting is planned for the national FADs program. In St. Lucia, FADs are publicly owned. The FAD program was initiated by the DoFish, but has been implemented collaboratively with local fisherfolk associations. As the program matures, DoFish is hoping the local fisherfolk associations will take ownership of the program; however, the program will still be supported by DoFish.

Analytic deliberation

Opportunities for multi-stakeholder interaction

There are many opportunities for multi-stakeholder interaction associated with governing the SMMA. Decision making within the SMMAssoc is a deliberative and participatory process involving multiple actors with sometimes competing interests. As noted above, decisions are made by a 12-member Board of Directors (SMMA Board) consisting of the District Representative for Soufriere (elected official), a cabinet-appointed chairperson, and 10 additional individuals representing the interests of five government organizations and five non-governmental organizations. Decision-making follows strict protocols that include active engagement of board members with the intent of achieving consensus. Representatives from organizations, whether governmental or non-governmental, are expected to consult within their respective organizations and, if applicable, with their membership or the broader community. These consultations are typically part of existing protocols within each organization, but in some cases the SMMA Board may request consultations on special topics. Some examples of issues that have triggered such consultations are decisions to increase user fees within the SMMA and observations of increasing reef degradation from economic activities. In addition, the Stakeholder Committee, which engages stakeholder groups beyond those represented on the SMMA Board, meets at least once per year and identifies any issues requiring the SMMA Board's attention.

Inclusiveness of participation

Adding new stakeholder groups to the SMMA Board in relation to changing needs or challenges appears to be difficult. Stakeholder Committee membership is much more flexible and adaptable, and new stakeholder groups can easily participate in the Stakeholder Committee's annual forums, but official membership on the SMMA Board for emerging stakeholders is not common. For example, in 1998 the Canaries/Anse-la-Raye Marine Management Area (CAMMA) was established just north of the SMMA. CAMMA was modeled after the SMMA, and was an attempt to be proactive in addressing tourism/fisheries conflict in two communities similar to Soufriere that were experiencing a recent growth in tourism (i.e., Canaries and Anse-la-Raye). CAMMA was set up as a Local Fisheries Management Area, again under the *Fisheries Act* no. 10 of 1984, and different marine reserves and use areas were delineated. The SMMAssoc, although located in a different community, was given responsibility for management and enforcement of CAMMA. However, SMMA Board membership was not expanded to include stakeholders from Canaries and Anse-la-Raye. As such, decisions affecting these communities are made by stakeholders with interests in Soufriere, and CAMMA has largely been ineffective.

Institutional variety

Multiplicity of rules

The core instrument used to establish the SMMA is the delimitation and enforcement of restricted and priority use zones in nearshore areas (see Figure 2). One particular formal zoning

mechanism was the establishment of marine reserves. These are areas where fishing and yacht-mooring are not permitted. Some recreational activities, such as diving and snorkeling, are allowed on a pay-per-use basis. Marine reserves were situated to conserve coral reefs, and have contributed significantly to the recovery of many reef-fish species (Roberts et al. 2001).

Conservation objectives have also been pursued through the banning of seine or gill nets in the SMMA. These nets are notorious for damaging coral reefs and are not selective in their catch. The SMMAssoc used a combination of regulations and economic incentives to control seine fishing. First, it was made illegal to seine fish within the SMMA. Second, fishers were given the opportunity to sell their seine nets to the SMMAssoc and receive a monthly stipend for a year to aid them in their livelihood transition. The combination of approaches ultimately improved the outcomes of the program, and seine nets are no longer used in the SMMA.

Conservation objectives are supported by additional programs beyond the SMMA as well. For example, the placement of fish aggregating devices (FADs) in offshore areas has encouraged fisherfolk to reduce fishing effort in the nearshore, which in turn helps conserve nearshore resources. FADs are desirable to fisherfolk since they reduce the uncertainties associated with fishing by improving the likelihood of abundant catch. FAD fishing inevitably involves burning more fuel, but this added expense can be offset by increased catch. In addition, fisherfolk associations, such as the Soufriere Fishermen's Cooperative (SFC), subsidize fuel costs for members through government programs and actively participate in programs to both build FADs and educate fisherfolk on how to use them.

Many efforts to conserve nearshore fisheries – such as marine reserves and FADs – have distributional socioeconomic impacts to the fisherfolk community. For example, older fisherfolk are sometimes incapable of fishing in offshore areas due to the added physical challenges (e.g., longer trips) of offshore fishing. As such, any efforts to constrain nearshore fisheries threaten the ability of older fisherfolk to sustain their livelihoods. However, the SMMA has demonstrated considerable flexibility in this regard by allowing older fisherfolk to set pots in the marine reserve:

> *"We have a group of elderly fishermen who were, back in 1998, given permission,…to fish, pot fish, in one of the marine reserves and that was granted on the basis that those fishermen no longer go out to sea, they don't go deep sea fishing, they only do nearshore fishing and the prime fishing grounds were what were closed off to make for the marine reserves so in consideration of them continuing their livelihoods…" – Respondent.*

However, this flexibility has also facilitated rule evasion:

> *"Some accommodation was made for the older fisherman to set his pots but that fell through, or it's not 100% complied with because sometimes the older fisher sends a younger fisherman to set his pots. But if you send a younger person, that person should go where is not in the marine reserve. Not because it's for an older person that you set it in the marine reserve. The older person is supposed to set it themselves." – Respondent.*

Linking IAC and governance fit

Research findings point to considerable institutional adaptive capacity within the governance system responsible for navigating social-ecological change in the case of the SMMA. This institutional adaptive capacity is exemplified by the ability of actors within the governance system to change its underlying rules and processes in relation to different stressors (e.g., creating the SMMA and modifying rules so older fisherfolk could fish in the reserves). The capacity to make these changes is supported by the strict adherence to protocols regarding analytical deliberation in decision-making, the existence of multiple institutions that promote coastal-marine sustainability, a degree of nesting of authority and institutions across different levels, and a network structure that includes multiple bridging organizations.

But what does the presence of this institutional adaptive capacity mean for governance fit? In this context, governance fit can be conceptualized as a relationship between the governance system and the coastal-marine system, which includes the community of Soufriere and the coastal-marine resources on which it depends. Fit is a particular character of this relationship that indicates mirroring, coherence, attunement or correspondence between the governance system and dynamics in the coastal-marine system (Mahon et al. 2005; Galaz et al. 2008; Kooiman 2013). Institutional adaptive capacity allows governance systems to build fit by adjusting institutions, processes or actors engaged in decision making in relation to recognized issues or challenges associated with misfit.

There are four main ways that our analysis of institutional adaptive capacity offers insights about fit. The first is related to the formation of the SMMA, which was undertaken to address issues related to coastal-marine resource degradation. The formation of the SMMA was the result of different governance strategies that occurred in three main phases. These phases show a progression from top-down management to participatory governance, with each subsequent phase improving fit in relation to the one preceding it. For example, the second phase is characterized by a substantial shift towards community participation, which allowed for different interest groups to be included in decision making. Significant progress was made towards coastal-marine conservation during this phase, as compared to the first phase; however, a lack of clear vision and responsibility at the community-level reduced the success of the governance arrangements developed under this phase. The third phase once again strengthened community participation but also community empowerment, as more authority and responsibility to develop and deliver on a specific mandate were awarded to the SMMAssoc, a newly created community-level organization. This empowerment allowed the SMMAssoc to effectively bridge actors at the community-level and provide linkages to national-level actors – a key feature of governance fit for complexity and uncertainty in social-ecological systems (Olsson et al. 2004; Berkes 2009).

Second, the presence of multiple types of rules and incentives to promote coastal-marine sustainability helps improve fit. The SMMA encompasses multiple zones for different uses, including marine reserves, fishing- and tourism-priority areas, which help ensure secure access

to ecosystem services by key user-groups in the fisheries and tourism sectors but also moderate this use and allow for resource conservation. In addition, different programs exist to help fisherfolk affected by the marine reserves fish further offshore, such as training, FADs and fuel subsidies for cooperative members. Combining these approaches, the governance system has been somewhat beneficial in terms of maintaining ecosystem services, as demonstrated by the following quote. However, it would be erroneous to assume the benefits of the marine reserves are not contested within the fishing community. Within the community, the marine reserves are seen as contributing to sustainable fish populations, but they are also seen as a mechanism used to secure access to marine resources for the tourism industry and separate the fishers from their traditional and most productive fishing areas.

The tensions between marine reserves as a tool for conservation, but also as a means of moderating flows of ecosystem services and controlling how these services are distributed raise some interesting questions regarding the concept of governance fit. There is evidence to suggest that fish populations have improved since the designation of the SMMA and marine reserves (see Roberts et al. 2001) and, thus, that fit has improved to some degree. However, the distributional effects of strategies to improve fit, marine reserves in this case, and inequitable flows of the associated benefits bring into question whether the overall condition of the social-ecological system has actually improved or if the strategies simply help support and maintain deeply engrained inequalities. These sorts of questions have not been dealt with extensively in the fit literature, and further research on these topics is required.

Third, the rules and institutions referred to above can be modified to better match local social-ecological circumstances. For example, allowing older fisherfolk to set pots in the marine reserve since they are unable to participate in offshore fishing demonstrates the flexibility of SMMA rules. Also, this demonstrates the ability of the governance system to accommodate socioeconomic realities and marginalized perspectives in dominant coastal-marine sustainability discourses, which is an important yet often overlooked element of social-ecological fit (Clement 2012). However, there are also possible deficiencies in institutional adaptive capacity in this regard. For example, SMMA Board membership has not been modified in relation to emerging risks or issues. This deficiency is most apparent in relation to the management of CAMMA. Even though the SMMAssoc is responsible for managing CAMMA, there are no stakeholders from the communities of Canaries or Anse-la-raye with membership on the SMMA Board. This means that it is unlikely the governance system can be matched to the needs of these communities and these communities' interests are likely to be neglected in decision-making.

The fourth relates to nested arrangements and the somewhat redundant roles of the SMMAssoc and DoFish in bridging different actors across levels. Nested, multilevel governance can promote fit or match to the complex, cross-scale dynamics of social-ecological systems (Cash et al. 2006; Armitage 2008). The DoFish and SMMAssoc work simultaneously to moderate the flow of information and resources within and across community- and national-levels. These multi- and cross-level interactions help facilitate nested arrangements for programs, such as

fisheries extension, FAD development and coastal-marine conservation. Also, it allows for challenges to be addressed at the most appropriate level in relation to the scale of problem. For example, the direction and magnitude of future tourism developments is largely controlled by national-level policies and decisions. Community-level actors do not always have resources or capacity to affect national-level development trajectories. However, the DoFish is better situated to influence national-level decision making and it is more likely that community interests will be included if the DoFish has significant connections to community-level actors – which it does.

Conclusions

Our analysis of the SMMA offers insights into ways of building institutional adaptive capacity to foster fit in coastal-marine systems experiencing changing climates. Although the specific examples above are not directly related to climate adaptation, climate change is expected to exacerbate or amplify many of the challenges discussed above, such as conflict over and degradation of coastal-marine resources and distributional social vulnerabilities (CARSEA 2007).

As such, this case study suggests that building fit for climate change requires institutional adaptive capacity in a number of forms. First, analytical deliberative decision making processes that include multiple actors from a variety of levels are beneficial for promoting fit. However, these processes must be able to identify and include new stakeholders in a timely and effective manner. Second, institutional variety is required to promote sustainability. However, the suite of institutions must also be sufficiently flexible to address distributional socioeconomic vulnerabilities. Third, bridging organizations can work within and facilitate the development of nested arrangements and dense, centralized networks to help match governance strategies to problem scales. However, this case study shows how multiple bridging organizations at different scales could be beneficial, assuming they collaborate with each other and their endeavors are mostly synergistic.

Building fit for climate change will mean applying institutional adaptive capacity in relation to observed and anticipated changes in social-ecological systems. Fit will help maintain ecosystems services and human wellbeing as social-ecological systems adapt to climate change. In this regard, achieving fit for climate change is not an end point, but a process that is significantly dependent on institutional adaptive capacity.

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