

Research

Evolving adaptive governance: challenging assumptions through an examination of fisheries law in Solomon Islands

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ABSTRACT. Unprecedented, rapid social-ecological change threatens marine ecosystems and the livelihoods of communities who depend on them. Governance scholars have identified adaptive governance principles that enable managers and decision makers to respond flexibly to such change. However, much of this work is the result of case studies undertaken in the Global North, primarily in democratic countries. Despite this research bias, governance actors (e.g., government officials, nongovernmental organization professionals) in countries with other types of governing systems are increasingly applying adaptive governance principles normatively to policy. This expansion in the implementation of adaptive governance requires that governance scholars account for substantial variation across legal systems and sociocultural norms around decision-making in different geographies. Governance scholars must closely examine areas where adaptive governance principles need to evolve to better suit a wide variety of governance contexts. Here, we conduct such an examination through an empirical case study of a fisheries law developed in a country in the Global South: the Solomon Islands *Fisheries Management Act* (2015). We analyze the content of the Act along with data from interviews with governance actors and fishing village residents. We show how the Act realizes several adaptive governance principles through novel provisions that formally incorporate local communities and their practices into national fisheries management. We then illustrate four challenges for implementation that require critical reflection on approaches to institutionalizing adaptive governance in diverse contexts. We illustrate how these challenges are rooted in three assumptions underlying adaptive governance theory. These assumptions relate to: (1) the role of the state, (2) the role of democratic ideals in enforcement, and (3) the role of Western science, compared to other epistemologies, in decision-making. We conclude with suggestions for evolving these assumptions to improve the institutionalization of adaptive governance in countries with a wide variety of legal systems and governing norms.

Key Words: *adaptive governance; co-management; fisheries policy; Global South; inshore fisheries; Pacific Islands; social-ecological systems*

INTRODUCTION

Approaches to environmental governance that enable efficient and creative responses to rapid, unprecedented change in social-ecological systems are needed around the world (O'Brien and Leichenko 2000, Pauly et al. 2005, Rockström et al. 2009, Jupiter et al. 2014b). Environmental governance scholars have identified a range of processes that characterize “flexible, responsive, and innovative” governance of natural resources (e.g., public participation, adaptive management; DeCaro et al. 2017), referred to as adaptive governance (Dietz et al. 2003, Folke et al. 2005, Chaffin et al. 2014). Though adaptive governance often first emerges as informal practices, formalizing such approaches into policy and practice holds the promise of increasing the capacity of natural resource managers, stakeholders, and government decision-makers (henceforth “governance actors”) to respond to the uncertainty and change across local to global scales (Chaffin and Gunderson 2016, DeCaro et al. 2017). Initial research primarily conducted in democratic nations in the Global North (e.g., United States, Sweden) outlines changes to existing laws and administrative procedures that have potential to increase the flexibility of governance actors (Cosens et al. 2017, DeCaro et al. 2017) and discusses challenges with implementing these changes in law, policy, and on-the-ground administration (Cosens 2013, Garmestani et al. 2019). That research emphasizes the importance of integrating adaptive governance processes with existing norms, laws, and administrative procedures (Cosens et al. 2017,

Garmestani et al. 2019), for example, through sunset provisions and opportunities for public participation (DeCaro et al. 2017). However, little empirical research has investigated how adaptive governance approaches might align with the governing norms of countries and cultures beyond the Global North (Karpouzoglou et al. 2016, DeCaro et al. 2017, Yasmin et al. 2020).

Exploring pathways to the institutionalization of adaptive governance in the diverse contexts of the Global South is critical given that communities in these places disproportionately bear the costs of human-induced environmental change (Pelling and Uitto 2001, Leichenko and O'Brien 2002, Mertz et al. 2009). For example, sea level rise affects those living on low-elevation islands, and fisheries declines affect livelihoods across the Pacific (Rockström et al. 2009, Österblom and Folke 2013, Jupiter et al. 2014c). Norms around governance across the Global South can differ sharply from those in the Global North, and thus, there is no approach panacea for institutionalizing adaptive governance (Ostrom 2007, DeCaro et al. 2017). We use the terms “Global North” and “Global South” rather than other dichotomies (e.g., “developed” and “developing”) to emphasize complex geopolitical power relations and inequalities, following Dados and Connell (2012). Empirical investigations in diverse Global South geographies are essential for developing context-sensitive approaches to institutionalizing adaptive governance (Karpouzoglou et al. 2016). Past studies of the institutionalization of adaptive

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Table 1. Principles of adaptive governance.

Adaptive governance principle	Description	Reference [†]
Nested polycentricity	The use of multiple, nested centers of decision-making authority for natural resource management	1, 2, 3, 4
Inclusive participation	Diverse actors that are affected by decisions about natural resources are invited to participate in those decisions in a meaningful way	1, 2, 3, 4
Adaptive management [‡]	An iterative approach to managing resources that embraces uncertainty and encourages experimentation via a structured cycle of goal-setting, monitoring, and revising goals	5, 6
Interweaving knowledge types	Include diverse types of knowledge in decision-making, including local knowledge, practice-based knowledge, traditional ecological knowledge, and science	7, 8
Social-ecological fit	Seek to align formal and informal institutions to the biogeographic scale appropriate for social-environmental challenges	2
Clear boundaries	Political, institutional, and ecological boundaries of a social-environmental challenge are well defined, and legal and institutional jurisdiction are clear	3, 4
Internal and external enforcement	Organizations or collectives (e.g., communities) have internal means to monitor and enforce rules, in addition to external mechanisms	3, 4
Internal conflict resolution mechanism	Internal means for neutral and transparent conflict resolution	3, 4

[†]References: 1 = Folke et al. (2005), 2 = Huitema et al. (2009), 3 = Ostrom (1990), 4 = DeCaro et al. (2017), 5 = Gunderson and Light (2006), 6 = Allen et al. (2011), 7 = Berkes et al. (2000), 8 = Tengö et al. (2014).

[‡]Adaptive management is not adaptive governance; adaptive governance refers to the broader social and political context that enables adaptive management (Gunderson and Light 2006, Allen et al. 2011, Chaffin et al. 2014, Hasselman 2017).

governance principles tended to focus on barriers to implementation as challenges to be overcome (e.g., Chaffin and Gunderson 2016, Yasmin et al. 2020), but in Global South contexts, we suggest that some barriers can be interpreted as indicators of when the adaptive governance principles themselves need fundamental rethinking to suit the context in which they are applied.

We empirically investigated the institutionalization of adaptive governance in Solomon Islands, part of the Global South. This Pacific Island nation is characterized by the following governance institutions: (1) tribal resource ownership, rather than ownership by government; (2) Western democratic systems of legislative rule-making and judicial enforcement existing alongside customary systems of rule-making and enforcement, referred to as “legal pluralism” (Rohe et al. 2019); and (3) reliance on local “traditional” knowledge more than science in natural resource decision-making (Aswani et al. 2007). We examined the creation of the Solomon Islands *Fisheries Management Act* (FMA), a law that incorporates adaptive governance principles such as community-based resource management (CBRM) and adaptive management. We leveraged this example to illustrate tensions between theory and practice that arise during the institutionalization of adaptive governance in a Global South nation with a legal pluralist rather than purely democratic approach to governance. We discuss implications of our findings for adjusting approaches to adaptive governance in diverse contexts.

THEORETICAL FRAMEWORK: ADAPTIVE GOVERNANCE

Adaptive governance includes the decision-making processes and structures that provide flexibility for governance actors to respond effectively to disturbances and to strive to transform a system from a degraded state to a state that is more desirable to actors within the system (Folke et al. 2005, Olsson et al. 2006). Adaptive governance is considered an approach that balances the benefits of top-down and bottom-up approaches (e.g., CBRM; Chaffin

et al. 2014). Adaptive governance researchers embrace inclusive participation while attending to the institutional structures that facilitate coordination and fast responses to disturbance (Folke et al. 2005, Huitema et al. 2009, Chaffin et al. 2014). Adaptive governance is also expected to enable adaptive management, an approach to experimentation and learning as a management strategy for unpredictable ecosystems (Gunderson 1999, Folke et al. 2005, Gunderson and Light 2006, Chaffin et al. 2014). Collectively, scholars have proposed principles that generally characterize adaptive governance arrangements (structures and processes) while recognizing variance across contexts (Table 1). Adaptive governance emerges organically from self-organization of resource users in a system (Ostrom 1990, Chaffin et al. 2014), often influenced by government agencies or nongovernmental organizations (NGOs), but is liable to remain transient or to be considered illegitimate unless linked to more permanent institutional change (Engle et al. 2011, Chaffin and Gunderson 2016, Cosens et al. 2017). For additional discussion of adaptive governance principles, see comprehensive reviews by Folke et al. (2005), Chaffin et al. (2014), and Karpouzoglou et al. (2016).

Recent scholarship has focused on practical means for incorporating adaptive governance principles into law and institutional design (e.g., Cosens et al. 2017, DeCaro et al. 2017), which are included among the adaptive governance principles considered here (Table 1). DeCaro et al. (2017) propose several institutional design principles that support adaptive governance, based on previous scholarship by Ostrom (1990, 2007). These principles include calls for the establishment of clear boundaries and for communities to have internal mechanisms for conflict resolution and enforcement (e.g., community council) alongside external mechanisms (e.g., federal courts). DeCaro et al. (2017) suggest that these ideas be tested in a range of contrasting governance contexts, echoing calls by others to evolve adaptive governance scholarship to fit the diverse contexts of the Global South (e.g., Karpouzoglou et al. 2016, Yasmin et al. 2020). Thus, we examine how principles of adaptive governance within a fisheries law interact with the legal pluralist context of Solomon

Islands. We provide an in-depth discussion of the implications of this case for evolving the application of adaptive governance principles in the Global South.

METHODS

We employed a qualitative case study approach that combined document analysis and semi-structured interviews to build an in-depth, contextualized understanding of the Solomon Islands FMA (Yin 2009). The FMA presents a unique opportunity to explore a national law that incorporates key elements of adaptive governance in a nation in the Global South with a legal pluralist system of governance. Our results are most relevant to other nations where customary systems have a strong presence.

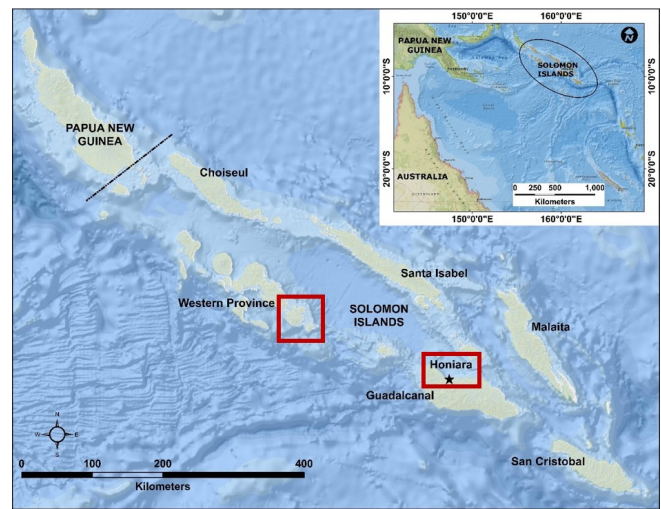
Data collection

The lead author first reviewed documents relevant to Solomon Islands fisheries legislation, regulations, and NGO reports. Document analysis involved deductive coding for adaptive governance principles (Table 1) appearing in parts of the FMA relevant to inshore fisheries in customary areas, particularly Sections 17 and 18 and the Second Schedule of the FMA. We reviewed additional government documents to build a contextual understanding of the respective roles and responsibilities of tribes, provincial governments, and the national government regarding inshore fisheries management. These documents included the two previous iterations of the national fisheries law (the *Fisheries Management Act* of 1998 and of 1972), the *Protected Areas Act* (2010), the *Provincial Government Act* (1997), the Western Province Fisheries Ordinance (2011), and the Solomon Islands National Inshore Fisheries Strategy (2010). We also reviewed relevant peer-reviewed articles on the FMA (Schwarz et al. 2020), as well as reports from NGOs, funding organizations, and regional collaborations between NGOs and governments (Hviding and Ruddle 1991, Kuemlangan 2004, Boso et al. 2010, Govan et al. 2011a, Goby et al. 2012, Conservation and Community Investment Forum 2013, Schwarz et al. 2020). These reports were included because NGOs are key actors, alongside government, in the governance of marine resources in this region (Cohen et al. 2012, Walter and Hamilton 2014).

Semi-structured interviews were conducted with practitioners and researchers familiar with the development and content of the FMA, as well as with community members (primarily fishers) in a village in the Western Province. The majority of interviews were conducted in person in the capital of Solomon Islands, Honiara, and in the Western Province (Fig. 1); a few interviews were conducted via videoconference with key informants based in Australia and Europe. We used a purposive sampling approach to identify interview participants familiar with the FMA. Key informants provided an initial list of interview participants, and a snowball sampling procedure was used to expand this list. At the national level, many participants were directly involved in development of the Act through writing, editing, or participating in workshops and meetings. At the local level, participants were fishers and community leaders aware of the option to register fisheries areas at the national level under the FMA or *Protected Areas Act* (2010), and most had recently attended a government-led workshop held in their village on the topic of registering community fisheries areas. The village is located in the Western Province and is not named to ensure interview confidentiality. This village is not intended to be representative of all villages

across the nation, given the sociocultural differences across the archipelago; however, these participants provided some general insights regarding perceived potential barriers and opportunities for local-level implementation of the FMA.

Fig. 1. Map of Solomon Islands showing the study areas of Honiara and a fishing village in the Western Province (red squares).



Interviews were conducted with 16 professionals: eight professionals representing every major environmental NGO operating in Solomon Islands; five government professionals representing the Ministry of Fisheries and Marine Resources and Ministry of Environment, Climate Change, Disaster Management and Meteorology; and two researchers and one consultant with extensive experience in Solomon Islands and familiarity with the FMA. Fifteen additional interviews were conducted with community members in the Western Province. Community participants were all subsistence fishers; three were also community leaders. Four women and 11 men were interviewed. Three participants were 18–30 years old, and 12 were > 30 years old. Younger participants and women were much less likely to agree to be interviewed despite the efforts of the lead author to include them. Interview questions were provided in English, and responses were in English or Solomon Islands Pijin. The lead author translated Pijin responses to English, asking clarifying questions of participants when needed.

Interviews were transcribed and coded deductively using the adaptive governance principles (Table 1) to organize key features of the FMA and opportunities and challenges for implementing the FMA. We also coded inductively to detect additional opportunities and challenges. Document analysis and semi-structured interviews were supplemented with participant observation at one regional conference (Pacific Islands Roundtable for Nature Conservation, held August 2017) and one national conference (National Resource Management Symposium: Connecting People to Nature, held October 2017), both in Honiara. These observations provided additional insight into current conservation and marine management projects and debates related to inshore fisheries, among other related topics.

This research was conducted after obtaining a research permit from the Solomon Islands Government and written permission from the village leader following local and national protocols. Ethics approval for research involving human subjects was obtained from the Institutional Review Board at the University of Montana, Missoula, Montana, USA, and the Human Research Ethics Committee at the Australian National University, Canberra, Australia.

Study location: Solomon Islands

Solomon Islands is a part of Melanesia, located northeast of Australia (Fig. 1). The islands rank sixth in the world for biocultural diversity, with the variety of species found in this region rivaled only by the diversity of cultures and languages (~70) across the country (Tryon and Hackman 1983, Loh and Harmon 2005). The reef ecosystems of Solomon Islands are unusually intact compared to those of other Pacific islands (Bell et al. 2013, Denley et al. 2020). However, the impending effects of climate change in this region include rising sea levels and declining coral reef fisheries (Green et al. 2006, Carpenter et al. 2008, Bell et al. 2013). Simultaneously, globalization and the growth of a market-based economy in the Pacific is increasing reliance on extractive industries such as offshore fishing and logging (Macintyre and Foale 2004, Lauer et al. 2013, Albert et al. 2014, Jupiter et al. 2014c, Katovai et al. 2015). Pressure on inshore fisheries is also growing, posing a threat to food security given that Solomon Islanders depend on fish as a key source of protein (Bell et al. 2009, Roeger et al. 2016). Responding effectively to social and biophysical change is critical for mitigating potentially severe local impacts on ecosystems and on the livelihoods of highly resource-dependent Pacific communities (Hughes et al. 2005, Lauer et al. 2013, Österblom and Folke 2013, Jupiter et al. 2014c). Improving the governance of inshore fisheries is critical to securing biodiversity and food security for Solomon Islands (Cohen et al. 2015, Rohe et al. 2019).

Solomon Islands has a legal pluralist pattern of governance in which customary marine tenure (CMT) interact with government systems based on English common law (Rohe et al. 2019). Governance of inshore fisheries in Solomon Islands consists of a multiscale, complex mix of customary systems, NGO support, national and provincial government laws and policies, and international conventions and initiatives (Ruddle et al. 1992, Pulea 1993, Foale et al. 2011, Walter and Hamilton 2014). Customary rights holders have primary responsibility for inshore fisheries at the local level (SIMFMR 2019), though the structure and strength of these long-standing CMT systems varies across the archipelago (Ruddle et al. 1992, Aswani 1999, Foale et al. 2011). The national Ministry of Fisheries and Marine Resources and the provincial governments play a support role in local fisheries management (SIMFMR 2019). Government funding and staff capacity is chronically lacking, though these institutions are beginning to strengthen (Govan et al. 2013, Rohe et al. 2019). NGOs and research institutions link most directly with communities and serve a bridging role in connecting communities with the government (Cohen et al. 2012, Rohe et al. 2019).

The presence of CMT differentiates this case study from most other locations where adaptive governance is studied. Extensive anthropological research has described CMT and the adaptive traits such systems possess (Hviding and Ruddle 1991, Johannes

2002, Aswani et al. 2007, Foale et al. 2011). Here, we briefly highlight some key traits of CMT relevant to our study. Approximately 83% of land (including reefs and lagoons) is owned by kinship groups in Solomon Islands (Rohe et al. 2019). We use the term “community” loosely to refer to groups of people residing in villages, although these groups are not homogenous and include multiple kinship groups with varying rights over natural resources (Hviding and Baines 1994, Orirana et al. 2016). Chiefs or other traditional authorities have the ability to direct how resources are accessed and by whom (Hviding 1998). These individuals may open and close certain fisheries and fishing areas and tighten or loosen access within these fishing areas based on community needs (Hviding 1998, Aswani et al. 2007, Foale et al. 2011). Boundaries are typically indicated by landmarks such as river mouths (Hviding 1998). Closures and new rules are shared verbally and sometimes indicated by subtle signs such as bending coconut leaves or planting sticks in shallow areas, which are removed when the rules are no longer relevant (e.g., a fishing area is reopened; Hviding 1998; local fishers, *personal communication*). Environmental NGOs and local communities often partner on projects through CBRM approaches that are increasingly founded on these customary systems (Govan 2009, Govan et al. 2011a, Abernethy et al. 2014, Jupiter et al. 2014a, Walter and Hamilton 2014). We further discuss these key traits of CMT systems in relation to adaptive governance principles in our results.

INSTITUTIONALIZING ADAPTIVE GOVERNANCE OF SOLOMON ISLANDS FISHERIES

A shift toward explicit approaches to community-based conservation is prevalent across the Pacific region, in addition to the growing adoption of ecosystem-based and integrated island management approaches, which resonate with adaptive governance principles (Cinner and Aswani 2007, Govan 2009, Govan et al. 2011a, Jupiter et al. 2014b). These approaches are exemplified by efforts such as the Locally Managed Marine Area Network and the Nouméa Strategy (Jupiter et al. 2014a, Song et al. 2017). The spread of these approaches has been largely bottom-up and informal, relying on the support of NGOs and the engagement of local communities, rather than on more formal, government-driven laws and policies (Govan 2009). The institutionalization of these approaches has begun to occur across Pacific Island countries and territories, including Solomon Islands.

The Solomon Islands Inshore Fisheries Strategy (2010), National Plan of Action (2010), and *Protected Areas Act* (2010) incorporate elements of CBRM processes. For example, the Ministry of Fisheries and Marine Resources recently created a “CBRM Section” responsible for coordinating CBRM efforts (SIMFMR 2012). It is within this context that the revised FMA emerged in 2015. The FMA not only aligns with past policies in recognizing customary rights, but also calls for the participation of rights holders in a novel provision that is the first to explicitly support a CBRM approach within Solomon Islands national fisheries legislation. Section 18 of the FMA specifies a pathway for local communities to exert their existing customary management rights supported by formal government enforcement mechanisms (e.g., police power and the national court system). Customary rights holders can do this by registering their marine area via a community fisheries management plan (henceforth, “community

Table 2. Provisions of the Solomon Islands *Fisheries Management Act* (FMA) relevant to adaptive governance principles.

Relevant principle(s)	Provisions of the FMA	Reference
Nested polycentricity	Each Provincial Government shall have primary responsibility for the conservation, management, development, and sustainable use of fisheries resources within its provincial waters	FMA Part 3 Sec. 14 (1)
Nested polycentricity; inclusive participation	Local committees of customary rights holders create and sign off on plans	FMA Part 4 Sec. 18 (1)
Nested polycentricity	Submitted community plans are to be approved by provincial- and national-level government officials, in addition to local rights holders	FMA Second Schedule, 1 (a-c)
Internal and external enforcement; nested polycentricity	Approved community plans become by-laws recognized at the provincial and national levels, enforced by police and national courts	FMA Part 4 Sec. 18 (7); Schwarz et al. (2020)
Clear boundaries	Community plans include the boundaries of the relevant fisheries management area	Second Schedule, 3 (a)
Internal and external enforcement; nested polycentricity	Plans may include local enforcement by communities and customary courts	Second Schedule, 8; Schwarz et al. (2020)
Adaptive management; nested polycentricity	Allows for revision by national or provincial government or customary rights holders	Part 4 Sec. 18 (8); Second Schedule, 14-15
Inclusive participation; interweaving knowledge types	Community plans include any relevant customary rights	Second Schedule, 3 (f)
Adaptive management; (interweaving knowledge types [†])	Community plans include indicators to assess effectiveness, and regular monitoring and revision	Second Schedule, 6-7

[†]The FMA does not specify what types of knowledge may be used for monitoring and assessment, leaving open the possibility of interweaving multiple types of knowledge, which ultimately depends on how the FMA is interpreted in practice.

plan”) submitted to the Ministry of Fisheries and Marine Resources. Here, we outline how the specific provisions of the FMA align with adaptive governance principles.

Provisions of the *Fisheries Management Act* related to adaptive governance

Analysis of interviews, the FMA, relevant policies, and relevant NGO reports indicates that many principles of adaptive governance are directly or indirectly addressed in Section 18 of the FMA (Table 2). Although the FMA aligns with adaptive governance, it would be misleading to portray the Act as an intentional attempt to design in formal law the specific principles as conceptualized in Table 2. However, policy makers and other key actors involved with the creation of the FMA were undoubtedly influenced by CBRM and adaptive management strategies employed by NGOs and government in Solomon Islands and by scholarship on the value of CMT approaches (e.g., Ruddle et al. 1992). Examining the FMA therefore presents an opportunity to understand one pathway for the institutionalization of adaptive governance principles. Here, we illustrate how the provisions of the FMA align with adaptive governance principles (Table 2). We then supplement the analysis of the FMA with interviews to situate the act in context and to understand how it will be implemented.

Polycentricity

The principle of polycentricity describes multiple, overlapping centers of decision-making power nested across levels of society (Huitema et al. 2009, Ostrom 2010). Adaptive governance researchers propose that performance of polycentric arrangements is enhanced when applied using the concept of subsidiarity, i.e., devolving power to the lowest level practical, while also retaining some level of centralized coordination (Marshall 2008, Cosens et al. 2017; Marshall, *unpublished manuscript* <http://dx.doi.org/10.13140/RG.2.2.31625.65125>). The Solomon Islands government operates closer to the centralized side of that balance, with most staff capacity and decision-making occurring at the national level. However, the country appears to be inching toward more nested

and localized decision-making based on provisions in the FMA supporting decision-making at the local and provincial levels, the recent creation of the CBRM unit, and prioritization of CBRM in a recent national fisheries policy meant to accompany the 2015 FMA (SIMFMR 2019).

Interview participants from the national government indicated an interest in expanding the CBRM unit and the role of the Ministry of Fisheries and Marine Resources as a coordinating body for CBRM projects led by government and NGOs:

We have been also expanded, our scope in the ministry, in creating a CBRM unit...it's also our long-term plan that we also continue to strengthen our network of partners [i.e., NGOs] in having a role with the CBRM unit...like actually coordinating our partners. (Government professional 3).

The FMA aligns with this vision of expanding the role of the Ministry of Fisheries and Marine Resources in implementing CBRM by supporting a shift toward nested centers of decision-making authority explicitly to include the provinces and villages. It achieves this vision by formalizing the role of customary rights holders in decisions about community plans for the first time within the common law-based legal system in Solomon Islands (Part 4 Section 18 [1]). Plans will still need to be approved at the national level, indicating that a degree of central coordination is retained, but the primary responsibility to approve and manage plans will rest with the provinces (Part 3 Section 14 [1]). Schwarz et al. (2020) further emphasize a shift toward provincial governments leading the implementation of the FMA, a sentiment echoed in the most recent fisheries policy (SIMFMR 2019).

Public participation

The emphasis on the role of customary rights holders in designing, approving, enforcing, and revising community plans indicates that a value for participatory approaches to managing marine

resources is present at the national level (Part 4 Section 18 [1, 8]; Second Schedule 15). Some national-level participants even expressed hope that the community plans might support the many communities where customary systems are weakening. Recognition of customary rights is unsurprising, given that it is essentially mandatory under the Solomon Islands Constitution, but explicit attention to including local governance structure and the need for consultation during both plan creation and revision suggests intentional emphasis on participation beyond a cursory recognition of customary rights. This intention was emphasized by participants, and by Schwarz et al. (2020) in their discussion of the values motivating Section 18 of the FMA.

Adaptive management

Adaptive management is a common approach used by NGOs in Solomon Islands, where it is considered to be compatible with the flexible nature of CMT systems (Aswani et al. 2007). The Ministry of Fisheries and Marine Resources adopts a similar principle in the FMA, which requires periodic review of management plans and allows for the amendment of plans by national government in consultation with communities (Part 4 Section 18 [7]). The FMA also requires communities to detail indicators (e.g., catch per unit effort) for management goals and a strategy for monitoring those indicators within their plans, implying an adaptive management approach (Second Schedule, 6-7). The inclusion of a monitoring strategy appears similar to what NGO participants described as a common aspect of CBRM efforts in Solomon Islands, suggesting the FMA may align well with existing efforts. The FMA thus clearly has potential to support adaptive management, but the details of how the revision process will work and how long it may take were still being worked out at the time of our research.

Interweaving of knowledge types

The adaptive governance principle of interweaving different types of knowledge in decision-making originates from research in a myriad of places, including Solomon Islands, and illustrates the value of interweaving science with local, indigenous, and practice-based knowledge for informing management decisions (Aswani and Hamilton 2004, Folke et al. 2005, Tengö et al. 2014). Government and NGO participants, in addition to Schwarz et al. (2020), pointed out that identifying the boundaries of managed areas and the relevant customary rights holders in community plans will rely entirely on the local knowledge of community members (Second Schedule, 3 [f]). At the same time, the scientific method of analyzing collected data is still supported through the provision that community plans require monitoring (Second Schedule, 6-7). Government and NGO professionals generally expressed widespread agreement that combining science with local knowledge is useful for decision-making. One NGO professional described this process as follows:

In science and ecological knowledge ... I make them run parallel, so they ... cross each other through ground-truthing, or through maps, or like I might conduct a survey, that's local ecological knowledge. Do you have dugongs [South Pacific sea cow species] here? ... And then ... you run a ground-truthing survey. Or you look at sat[ellite] images. That's when you know that, yah the same dugong, which they said they saw, around this time ... scientifically that's when it does its breeding. (NGO interview 4).

Given that these professionals are likely to be involved in the creation of community plans, this practice of combining different types of knowledge can be expected to continue as the FMA is implemented.

Diversifying enforcement mechanisms

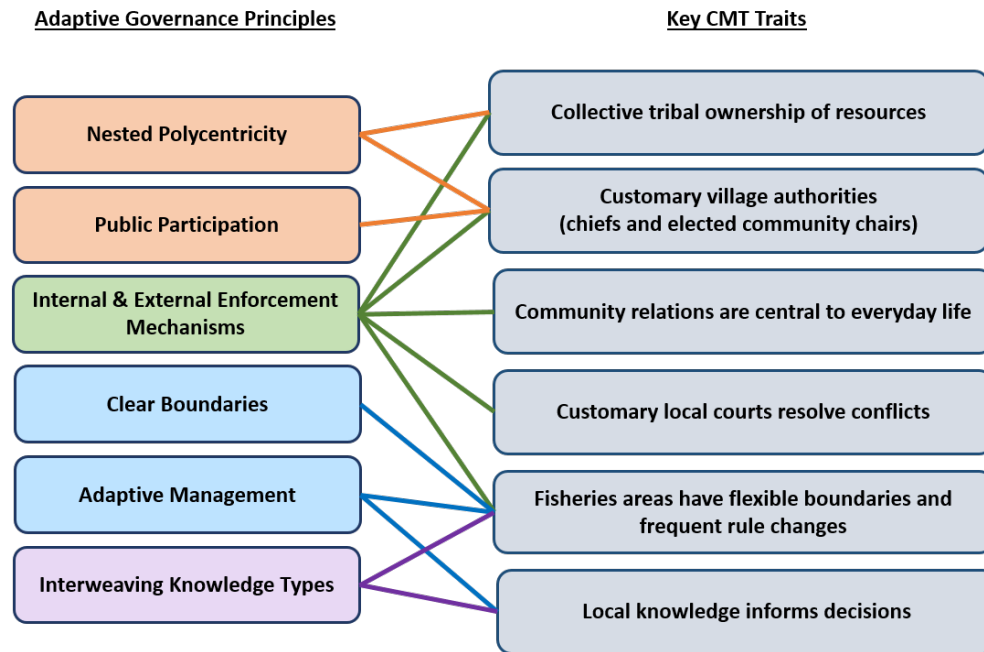
The FMA creates a mechanism for enforcement of fisheries rules that is external to the community, which aligns with DeCaro et al.'s (2017) recommendation for internal and external enforcement. This enforcement will be carried out by national and provincial governance mechanisms (e.g., police, courts) in communities that traditionally operate using customary systems (Part 4 Section 18 [7]; Schwarz et al. 2020). According to Schwarz et al. (2020), communities will still rely on customary mechanisms for resolving conflict (e.g., local customary courts), but they now have the external enforcement option to call the provincial police or take offenders to courts based on common law at the national level if they violate fisheries rules included in community plans registered under the FMA. Specific authorities for enforcement are included in each community plan (Second Schedule, 8). Section 18 thus aligns with the adaptive governance principle of providing both internal and external mechanisms for enforcement. To operationalize this principle, the FMA requires all community plans to outline penalties and enforcement strategies. The plans must also identify boundaries for the marine areas where fisheries rules will be applied, aligning with the adaptive governance principle of clear boundaries (Second Schedule, 3 [a]).

Limitations of the *Fisheries Management Act* as adaptive governance

Although the FMA reflects many adaptive governance principles, participants mentioned several practical limitations to the implementation of the act that must be considered when assessing the degree of potential institutionalization of adaptive governance. First, several NGOs and government participants expressed concern that the government would not have the money or personnel necessary to carry out enforcement in the sprawling, rural provinces. However, some local fishers interviewed seemed to trust that external police would respond if called, based on past experience with a community member arrest for other reasons. Although they also expressed hesitation to call the police, this confidence that police would actually show up suggests the threat of government enforcement is perceived as very real in this community. It is therefore possible that local fishers' assumptions about the government's enforcement ability may indeed be enough for the FMA to improve compliance. However, this aspect warrants further investigation in other communities, as the low capacity of police in most rural areas suggests that this experience may be unique to this community.

Second, government participants indicated that introducing the additional threat of enforcement by the national and provincial governments is intended to strengthen compliance in places where customary practices are weakening. However, based on their experience with writing plans similar to those required by the FMA, NGO and government participants suggested that writing plans works only in communities with consensus on the need for management and agreed-upon goals. One researcher stated, "We've really focused on communities that have a strong desire to manage. We haven't wasted our time ... with places that clearly aren't motivated," (Researcher 2). Given that past efforts at

Fig. 2. Tensions between adaptive governance principals and customary marine tenure (CMT). Colored lines and boxes illustrate four tensions related to: (1) marine tenure (orange), (2) legitimate enforcement (green), (3) flexible customary practices (blue), and (4) reliance on different knowledge types (purple). These four tensions are discussed in the section *Four Considerations for Institutionalizing Adaptive Governance in Diverse Contexts*.



CBRM have succeeded primarily in communities with strong governance and consensus on the need for management (Abernethy et al. 2014), it is likely that only these communities will be able to manage the process of creating and registering a formal community plan. Although the FMA brings a slight shift toward inclusive participation within the Western legal approach at the national level, communities with stronger existing governance are most likely to benefit from the FMA.

Given the low capacity for actual enforcement and the fact that many communities with weak governance may be left out, it is likely that other options outside of the FMA will need to be developed to support communities. Along these lines, one national-level participant emphasized that the community plans are therefore just one option to help communities: “This is one tool... it’s *one* option, it’s one avenue for communities... you don’t need this to do CBRM,” (Government professional 2; emphasis by participant).

FOUR CONSIDERATIONS FOR INSTITUTIONALIZING ADAPTIVE GOVERNANCE IN DIVERSE CONTEXTS

Beyond logistical limitations, participants at the local and national levels also discussed challenges with implementing the FMA that point to tensions with the specific context of Solomon Islands. Here, we examine how these challenges illuminate deep-seated tensions between assumptions underlying adaptive governance principles and the sociocultural context in which these principles are being applied. These assumptions are the result of building adaptive governance theory from case studies primarily

in democratic nations belonging to the Global North and are therefore exposed when investigating adaptive governance principles applied to a legal pluralist nation of the Global South. We specifically discuss four ways in which the governance context of Solomon Islands comes into tension with the institutionalization of adaptive governance principles (Fig. 2).

Marine tenure: Who owns the resource?

The adaptive governance principles of participation and polycentricity are promoted as means to develop power sharing arrangements between the state and local decision makers to improve social and ecological management outcomes (Folke et al. 2005, Jupiter et al. 2014a). Such arrangements are realized in the FMA through community plans, as described earlier. However, a few local-level participants expressed discomfort with the perceived possible impacts of government involvement on rights to access resources.

Local fishers expressed concerns that submitting a community plan would amount to a partial loss of access rights to the national government. One community leader and fisher expressed fears over the possible loss of marine tenure rights to the state.

If I want to fishing, I go and ... get that fish and eat. ... But when we register, we have to stop, hard for me to go ... get these things. Because these things already bylaw ... somebody get this, make this law, and get out my right ... so my [normal] culture before ... was stop now. (Community member 6).

This participant assumed that the registration process under the FMA would essentially remove their customary rights, based on their interpretation of an earlier effort toward an NGO-supported marine protected area in the village. While both the text of the FMA and participants from government confirmed that the legislation in no way infringes upon or removes customary rights, the presence of this sentiment does make it clear that the FMA creates a role for the state in governing fisheries where none previously existed, and public perceptions of this change present a challenge for implementation.

Though the FMA is unlikely to usurp customary rights in practice, the discomfort of community members with the new role for the national government brings to light an assumption about rights to access resources that underlies the principles of polycentricity and public participation. A shift toward adaptive governance in the context of democratic, Western nations is typically a shift from centralized, command-and-control approaches led by the state toward intentional engagement with local constituents and a decreased authoritative role of the state (e.g., via co-management; Olsson et al. 2004, Folke et al. 2005). This situation assumes that resources are state owned or the state has primary authority to grant rights to access resources. The CMT systems in Solomon Islands and many countries across the South Pacific sharply contrast with this assumption in that rights to access resources are primarily under the jurisdiction of tribal communities, rather than the state. Thus, the emergence of adaptive governance within the CMT system appears as a shift toward a more centrally coordinated approach, with an increasing role for the state as coordinator and enforcer; simultaneously, within the Western legal system, this same legislative change toward diffusion of decision-making authority might still be recognized as an increased role for communities and sharing of power with the state. In other words, it cannot be assumed that a shift to adaptive governance always involves a decreased role of the state: Viewed from the customary systems angle, it appears to be the opposite.

Legitimate enforcement: Who makes and implements the rules?

The new option to call on state police and use national courts is intended to support communities in situations when customary mechanisms falter. This approach institutionalizes a new external enforcement mechanism, aligning with recommendations by DeCaro et al. (2017). However, the success of enforcement is highly dependent on resource users' perceptions that those who claim authority are legitimate and effective (Dietz et al. 2003). In addition to concern over a perceived loss of access rights, local fishers expressed mixed views of the legitimacy of the national government as an enforcer of local rules.

Older fishers frequently placed blame on younger fishers for overharvesting fish, but also suggested that this generation may have more respect for national laws (e.g., the FMA) than they do for current community rules. One older local leader stated, "... hard time today, our new generation ... maybe the law can guide them," (Community member 1). Additional interviews, beyond the two fishers < 30 years old included in this study, would be needed to confirm or dismiss this claim, but this statement illustrates that some see a positive role for government law enforcement.

Other community members expressed hesitation about the new role for government in enforcing fisheries rules. One local fisher

contemplated the possibility of social backlash within the community against anyone who calls the police:

Community member 14: *Sometimes I think they will call the police ... sometimes they won't ... 'cause they are their blood ... their family.*

Interviewer: *So even if there's a rule, maybe no one's calling the police.*

Community member 14: *Yeah just like now ... I mean people so naughty in the village ... break rules ... call the police. If those people know them [i.e., who called the police], they will come and [harm] them.*

Here, the participant considered that someone who calls the police for a fishing rule violation may face disapproval or even violence from family members of the accused. This participant based this concern on past experience with trying to enforce other community rules. Another leader in the community extended concerns about relationships to intercommunity interactions:

We need to register our community and we register our area. If someone come and breach our rules, we will take that guy to the court ... but if we community, we can settle the problem. Easy to settle the problem. Talk about it ... talk to the [outsider] guy, oh you don't do it again, yah? So for me, it's okay ... [if we use courts] our relationship here with the villages, will not really [be as good]. (Community member 1)

This leader expresses that they would rather settle the conflict themselves than take a violator from another community to court, suggesting a desire to maintain good relationships with neighboring communities. This response resonates with anthropological research and NGO and government experiences noting the importance of interpersonal systems in this context (Hviding and Baines 1994, The WorldFish Centre 2010).

Overall, many participants recognized that the potential of the FMA to improve enforcement may be complicated by the social dynamics of transitioning from customary to national court-based enforcement. For adaptive governance to succeed, adaptive governance processes must be perceived as legitimate and government enforcement must be trusted, which scholars suggest can be achieved through laws and policies that resonate with the ideals of democratic nations (e.g., transparency; Cosens 2013, Craig et al. 2017). However, this idea is based on the assumption that adaptive governance is implemented in a democratic nation, as was the case in most early case studies of adaptive governance (e.g., Olsson et al. 2006). Processes for achieving legitimacy in non-democratic or legally pluralistic contexts should therefore be explored further by adaptive governance scholars.

Flexible practices: How do existing management systems operate?

Participants at both the national (e.g., NGOs) and local (i.e., fishers) levels identified a tension between the flexibility of existing CMT processes and the transparency required by national courts responsible for enforcing community plans. Three-quarters of interview participants discussed the requirement for boundaries, usually in terms of the potential barrier it will pose for communities, and occasionally with regard to how it will help with reporting on national progress toward

international conservation commitments. Clear boundaries are necessary for courts to determine whether a forbidden activity occurred within the jurisdiction of a fisheries area.

However, numerous NGO participants and a few government participants emphasized that writing boundaries into past plans has caused delays and sometimes insurmountable barriers to creating managed areas because boundaries in CMT systems tend to be fluid and contested. Two participants described this problem.

Normally for sorting out the landownership, we put it back to them, there is a dispute, we just, we don't involve in dispute. We just sit back and, ask them to sort it out between them, then we can go back and help them. (NGO professional 7).

If there's a conflict going on in the community or with another community, you have to stand back and say look we can't work. (NGO professional 1).

These responses resonate with the lessons learned cited in reports on community-based approaches in Solomon Islands (e.g., Boso et al. 2010). Participants noted that in some cases, NGOs have chosen to leave exact boundaries out of plans altogether, but that will not be an option under the FMA. The adaptive principle of establishing external enforcement through explicit boundaries is thus in tension with a sociocultural context in which customary rights holders are able to allow fluid boundaries when managing fisheries.

Many participants at the national level also expressed concern that once rules are written into community plans, the process for revising community plans may be slow and arduous. This idea was captured in response to a question about how to change plans.

[Changing plans] is also a concern for us. But it didn't really specify in the Act that a management plan should be for five years, or six years, but we are hoping that will be captured in the regulations... (Government 1).

This participant elaborated that they were concerned over the timeline for changing plans because of the difficulty of taking a plan through to legal recognition in the Gazette, and noted that is something they would not be keen to repeat when revising the plan. This response suggests that the requirement to approve plans at the national level may make management of registered areas less responsive than management by communities and NGOs based on verbal rules within CMT systems, which are widely recognized for their flexibility (Hviding 1998). The need to approve changes at the national level will inevitably slow revisions to plans, given the rural location of most communities and the limited capacity of the government to support the process.

Participants' concerns over the conflicts and delays caused by writing down rules and boundaries to achieve transparency and legitimacy within Western legal systems (e.g., courts) risks rigidifying the flexibility of active customary systems. There is a trade-off here between the responsiveness of informal management and the increased enforceability provided by national courts. Studies of institutionalization of adaptive governance principles (e.g., adaptive management) in Western democratic nations similarly raise questions about whether this

process can be institutionalized without limiting actors' flexibility and capacity for self-organization (Medema et al. 2008, Engle et al. 2011). We argue that this idea is perhaps even more critical to examine in Global South, legal pluralist contexts with long-standing CMT systems.

Legitimate knowledge: Whose knowledge informs decisions?

The FMA does not explicitly define "monitoring" or "indicators" (Second Schedule, 6-7), leaving them up to interpretation by the Ministry of Fisheries. This approach presents an opportunity to realize the adaptive governance principle of interweaving multiple types of knowledge but could also lead to the institutionalization of a priority role for science over other knowledge types. National-level participants that will be involved in approving community plans offered mixed perspectives on the relative roles of science and experiential knowledge. Although participants expressed widespread support for interweaving knowledge types, their comments at times implied reliance on Western science. For example, a government professional offered the following interpretation of the role of the CBRM unit.

Communities still have to be guided ... ensuring [a community plan] is in line with ... the Act itself, the Second Schedule. It needs fisheries officers ... on the ground... We need to guide them... we do baseline surveys for them ... those baselines ... are in the Act, the Second Schedule ... we learned that [communities] think a lot of things will disturb their resources, but in that specific context, might not even [be true]. (Government 15).

That participant next described examples wherein scientific surveys had corrected local fishers' understanding of their marine area. A science-based approach to adaptive management was further indicated by NGO and government professionals' concerns over communities' capacity for monitoring. For example, NGO professional 5 articulated that communities that have their plans approved will then need training on how to monitor progress. Collectively, these comments illustrate an underlying assumption that science is essential to community-based work, including within community plans under the FMA. This role for science is in tension with the reality that the majority of communities in CMT-dominant systems rely on experiential and historic local knowledge to inform management decisions, and do not follow Western-style scientific protocols (Govan et al. 2011b). Although adaptive co-management in the Pacific frequently incorporates local knowledge into CBRM efforts, with some authors even arguing for "data-less" management (Johannes 1998, Govan et al. 2011b, Cohen et al. 2015), the extent to which implementers of the FMA will adopt that approach was unclear. If the Ministry of Fisheries and Marine Resources firmly interprets the monitoring requirement to mean *scientific* monitoring in community plans, that may have the unintended effect of excluding many communities. Notably, the CBRM unit was rapidly evolving at the time of interviews, and the ultimate interpretation of the Second Schedule was yet to be decided. Regardless, the tension over the legitimacy of different types of knowledge evident in interviews reflects a critical unanswered question in adaptive governance research: What should the relative role of science and other types of knowledge be when institutionalizing adaptive management?

This question is not only relevant to the contexts where CMT is present, but also to the rapidly expanding range of localities in both developed and developing nations where the principle of interweaving knowledge types is applied (Tengö et al. 2014). Much of resilience-based adaptive governance scholarship in democratic, Western countries evolved around the goal of institutionalizing iterative, science-based adaptive management (e.g., Gunderson and Light 2006, Williams et al. 2009). The process of institutionalizing the principle of adaptive management demands concrete answers to how law and policy will reconcile this often science-based approach with the principle of interweaving knowledge types.

CONCLUSION AND FUTURE DIRECTIONS

The institutionalization of adaptive governance in aspects of the Solomon Islands FMA provides an empirical case to investigate the challenges of applying adaptive governance theory to legal pluralist governance contexts. This case specifically illustrates tensions that arise in a shift toward adaptive governance in resource governance contexts that rely on CMT. Three major assumptions that underlie adaptive governance scholarship in democratic contexts in the Global North require reexamination before extending the theory to other contexts: (1) the state generally controls rights and access to shared resources; (2) social acceptability of resource use enforcement is guided by democratic ideals; and (3) science is the primary knowledge that should inform adaptive management. When adaptive governance is institutionalized in governance contexts that do not align with these assumptions, a number of important questions arise.

First, how do power dynamics between the state and communities shift when introducing legislation or formal rules for co-management in areas where the government does not have jurisdiction over resources and access? To address this question, researchers should specifically examine whether shifts in power increase or decrease the adaptability of governance actors (at multiple levels) in contexts where the state does not own or control access to resources.

Second, what legal and other processes of legitimizing adaptive governance can achieve social acceptance in legal pluralist nations? Although researchers in democratic nations of the Global North have rigorously examined laws and legal processes needed to establish social legitimacy when institutionalizing adaptive governance (Cosens 2013, Cosens et al. 2017, DeCaro et al. 2017, Garmestani et al. 2019), a parallel line of research is needed to identify governing norms and process that align with adaptive governance in other contexts.

Third, scholars engaged with customary marine tenure in Solomon Islands and elsewhere have long expressed concern over the weakening of customary systems (e.g., Johannes 1978) and hope that adaptive co-management can strengthen customary tenure and improve conservation outcomes (e.g., Ruddle 1998, Boso et al. 2010, Jupiter et al. 2014a). Although there is concern that policies to codify customary tenure within contemporary systems based on English common law risk rigidifying these systems (e.g., Johannes 1978, Ruddle 1998), several authors argue that some level of codification of customary rights and rules is necessary to sustain customary tenure in contemporary resource management (Ruddle 1998, Kuemlangan 2004, Schwarz et al.

2020). Cross-pollination between this line of research and adaptive governance scholarship could foster a strong basis for empirically investigating trade-offs between adaptive governance principles during institutionalization.

Finally, if adaptive governance scholars consider experiential knowledge as a valid monitoring approach, how is it balanced with the role of science in adaptive governance? The case of the FMA illustrates that this question is not merely a theoretical problem. Institutionalization requires concrete decisions on the degree to which different types of knowledge are accepted, which will have a tangible effect on which communities can use the benefits of a fisheries law intended to support them. These tensions are often front of mind for many working in places such as Solomon Islands, yet attention to this issue is lacking in broader discussions of how to institutionalize adaptive governance. We suggest that scholarship on institutionalizing adaptive governance requires more explicit attention to reconciling the role of science in adaptive management with the principle of interweaving knowledge types, which might be accomplished by engaging more deeply with research on multiple ways of knowing (e.g., Berkes et al. 2000, Tengö et al. 2014).

There are immediate steps that can be taken to address these concerns in case studies of the institutionalization of adaptive governance. Scholars and practitioners can ask the following questions when analyzing or implementing adaptive governance: What is the role of the state, if any, in controlling or enforcing rights to access and use resources? What are the governing norms and legal system(s) relevant to the geography in question? What processes of enforcement will be viewed as socially legitimate? How will institutionalizing adaptive governance affect the balance of power between the government and communities in all relevant legal systems? How feasible is a scientific approach, and what other sources of knowledge are already accepted in this geography? Explicitly addressing these questions is a useful step toward rethinking the application of adaptive governance in the Global South and beyond. Adaptive governance scholars might also collectively examine shared and divergent normative commitments regarding the role of the state, democracy, and different types of knowledge. Evolving adaptive governance in the directions proposed here expands the potential for diverse actors to navigate change in a manner appropriate to their specific contexts.

Responses to this article can be read online at:
<https://www.ecologyandsociety.org/issues/responses.php/13251>

Author Contributions:

Amber Datta proposed this research, secured funding, collected data, analyzed data, produced figures and tables, and wrote the manuscript. This research was conducted for her Master of Science degree. Brian Chaffin was the primary advisor for this research at all stages, assisted with securing funding, and contributed substantially to editing the final manuscript.

Acknowledgments:

We extend our thanks foremost to the interview participants who made this study possible. We also thank Dr. Lorrae Van Kerkhoff for hosting the lead author as a summer research fellow at the Australian National University and providing substantial advice on the design of the project. We additionally extend our gratitude to Dr. Anna Schwarz for her advice and provision of relevant information to assist with this research. We thank the National Science Foundation for funding received through the East Asia and Pacific Summer Institutes fellowship awarded to the lead author. We thank the Solomon Islands Government and the community chair in the Western Province of Solomon Islands for permission to conduct this research. We finally thank two anonymous reviewers and the subject editor for their time and thoughtful insights, which greatly improved this paper.

Data Availability:

Anonymized data that support the findings of this study are available on request from the corresponding author, AD. Data are not publicly available because of information that could compromise the privacy of research participants. Ethical approval for this research study was granted by the University of Montana Institutional Review Board (#97-17).

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