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Disaster Risk Governance for Pacific Island Communities

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Editor's Note:

This is the first article in a three-part special issue on "Pacific Islands, Extreme Environments" edited by Andrea E. Murray. Kelman explores case studies from particularly vulnerable Small Island Developing States (SIDS), including Samoa, Tonga, and the Solomon Islands, to articulate a new theory of disaster risk governance that accounts for the disproportionate climate change-related consequences suffered by these low-lying island countries.

Summary

This article examines disaster risk governance for island case studies, focusing on Pacific Small Island Developing States (SIDS). SIDS examples are used to examine two main areas in line with this special issue's themes: power and knowledge in disaster risk governance. The interactions between those themes are explored for three SIDS governance scales: regional, national, and sub-national. Linking the theoretical discussion with empirical examples demonstrates how bypassing government can be suitable for disaster risk governance.

Key words

Disaster, Risk, Governance, SIDS, Pacific Islands

Islands and disaster risk

Islands are often portrayed in myths and stories as romantic, exciting, exquisite, and alluring. On occasion, reality mirrors parts of this image of ideals, yet even so, governing islands and island communities brings immense challenges.[1] One particular governance challenge is disasters. A disaster is defined by the United Nations Office for Disaster Risk Reduction (UNISDR)[2] as "A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources". Pacific island communities are among the most risk-prone in the world.

Dealing with disasters entails post-disaster activities such as response, recovery, and reconstruction along with pre-disaster activities termed "disaster risk reduction". Disaster risk reduction is defined as "The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events".[3] Disaster risk reduction includes preparation, planning and mitigation.

This article examines disaster risk governance for island communities—before, during, and after disasters. Two main areas are highlighted in line with this issue's themes: power and knowledge in governance. The discussion demonstrates how demonstrates how nongovernmental actions can support (or supplement) official disaster risk governance. The ideas presented are possibilities which policy makers should consider for enacting disaster risk reduction—as along as they carefully examine both the advantages and

disadvantages of the pathways and are clear regarding the potential positive and detrimental consequences. As such, this article offers not so much a policy agenda or policy recommendations as policy options, which those involved in island governance—not just island government—could and should have on the table.

The differentiation between governance and government is key.[4] Governance refers to actions, processes, and systems creating, evolving, and monitoring rules and regulations (e.g. administration, markets, and networks) by which people function within society. Government refers to the bodies that are charged with formalising and enforcing governance.

The subset of islands for this article is the Small Island Developing States (SIDS), comprising several dozen countries and territories in the tropics and low-latitude subtropics,[5] out of which the Pacific SIDS are the focus of this paper. Examples of sovereign Pacific SIDS are Kiribati and Tonga, while representative non-sovereign Pacific SIDS include Guam and New Caledonia. Pacific SIDS and their communities recognise that they face common governance challenges, including severe disaster risk, as well as similar governance solutions, such as tight and trusted kinship networks moving quickly in times of crisis. This article contributes to this literature by exploring more specifically how government can sometimes be effectively bypassed or supplemented by disaster risk governance.

An example of disaster risk reduction and disaster response from a Pacific SIDS comes from the Solomon Islands. Tsunamis were generated following an earthquake on 1 April 2007. Traditional building techniques prevented numerous earthquake casualties, while traditional knowledge dictated seeking higher ground after an earthquake. Consequently, only 52 people were killed despite the tsunami destroying thousands of buildings whose occupants could have been killed if the buildings had collapsed in the earthquake or if the occupants had not known to evacuate post-earthquake.[6]

Many of the disaster risk governance challenges for Pacific SIDS emerge due to the inherent island characteristics of isolation, restricted land area, small populations, and limited domestic land-based livelihoods.[7] These traits restrict evacuation opportunities, limit resources available for disaster-related activities, and inhibit outside assistance. Yet these same island characteristics frequently offer disaster risk governance opportunities.[8] Small, isolated populations form tight kinship networks, a strong sense of identity, and an intimate connection with the natural environment, both on land and in the sea, all of which contribute positively to disaster risk reduction on islands.[9]

Pacific SIDS possess millennia of experience in dealing with environmental and social changes in isolation—with varying degrees of success and failure. This experience provides the islanders with a solid baseline and extensive traditional knowledge to adjust their disaster risk governance for addressing more recent social and environmental changes.[10] In contemporary times, opportunities to address disaster-related challenges and opportunities locally are often boosted by remittances from islanders overseas and by development or humanitarian aid, providing an external source of support to governance at all scales on an island or in an island community.[11] When people obtain external sources of funding directly, they can choose to bypass all levels of government to make their own decisions. In fact, post-disaster remittances in Samoa (tsunami in 2009, Cyclone Evan in 2012) exceeded foreign aid in terms of swiftness, usefulness, and effectiveness.[12]

An old tree felled in Samoa during a cyclone (Image credit: Ilan Kelman)

Despite the large hurdles for disaster risk governance in Pacific SIDS, these settings can also present impressive advantages for disaster risk governance—if those advantages are used appropriately and if lessons from the past are learned and applied. Nevertheless, the history of disaster research reveals a limited focus on, and limited acceptance of, island governance case studies. Only one main research group explicitly recognised the advantages of studying island disaster risk governance: the Bradford Disaster Research Unit (BDRU) in the 1970s.[13] This research unit was founded at the Project Planning Centre of the University of Bradford in the UK by the head of the Project Planning Centre, Michael Gane, and James Lewis supported by the Leverhulme Trust. With work in the Pacific and the Caribbean, BDRU paved the way for exploring disaster risk governance in the context of island communities with a focus on SIDS.

This highlighting of BDRU does not denigrate the numerous island, disaster, and governance studies that exist alongside this work. Plenty of mono-disciplinary perspectives have yielded important insights into the topic. For example, in the 1950s, disasters on islands across the Pacific were investigated in Papua New Guinea (PNG), the Solomon Islands, and the Federated States of Micronesia.[14] Although not formally governance studies, such work reveals successful and unsuccessful governance approaches influencing how island communities and island governments were and were not able to deal with disaster risk.

In contemporary development terminology, these studies demonstrated disaster risk reduction because hazards were accepted as being a part of regular life, rather than as external extremes to be addressed with protective measures.[15] "Disaster" was rarely a cultural concept within the communities, because people knew how to survive many forms of extremes, and anything that needed to be rebuilt afterwards was simply rebuilt.[16] Often, "disaster risk governance" meant that communities dealt with a disaster as best as they could, without assistance from the outside world—or without the outside world's knowledge about what was happening on the island.

When the media, expatriates, or other governments were aware of the situation and wished to respond, leading to attempts at externally governing an island community's disaster risk, the effort sometimes supported and sometimes inhibited an island community. Niua Fo'ou is an outer island of Tonga where, in 1946, after the island's volcano started erupting, its population requested outside assistance for a complete evacuation and temporary resettlement.[17] The external support facilitated evacuation and resettlement. At other times, the outside intervention created more of a disaster than was posed by the initial hazard. Frosts in 1972 in PNG's highlands led to a massive relief operation, which undermined local coping mechanisms that had worked for centuries, creating longer-term aid dependency within a previously self-sufficient population.[18]

Other aspects of island community characteristics within disaster risk governance on Pacific SIDS are revealed by case studies

focusing on the island characteristics of the place investigated, as in post-hurricane action in Fiji following Tropical Cyclone Bebe in 1972.[19] Drawing on such work, the focus of more recent disaster risk governance studies in island settings has been from a participatory development perspective. "Participatory development research" means active collaboration with the people and communities who are the research participants. The research process can support action on the people's own terms to deal with any identified concerns. The populations are not just research subjects, but become active participants in governing the research and in implementing the recommendations, which is particularly important when researchers depart after the end of a project.

As demonstrated in the examples throughout this article, participatory development research forms a key governance technique for addressing Pacific SIDS' disaster risk beyond government. Disaster risk governance becomes relevant for day-to-day community life to ensure that external regional resources are requested by the affected communities and do not undermine communities' traditional coping mechanisms. This topic is now explored in more detail in terms of power and knowledge.

Power

Disaster risk governance is imbued with power relations.[20] For Pacific SIDS, one prominent example is dealing with the hazard driver of climate change. Historically, affluent countries such as in North America and Europe have consumed most fossil fuels leading to most greenhouse gas emissions. Meanwhile, deforestation in less affluent countries occurs predominantly for commercial industrial-scale agriculture serving distant markets in more affluent countries.[21] SIDS have contributed negligible carbon emissions from either fossil fuel use or land use changes, in absolute terms and on a per capita basis.[22] Climate change related contributions still emerge across Pacific SIDS, such as forest destruction in PNG,[23] heavy reliance on diesel and oil in Samoa,[24] and fossil fuel extraction by Timor-Leste.[25]

Yet SIDS are expected to experience disproportionate consequences from climate change.[26] Changing precipitation regimes affecting freshwater resources, coral reefs dying from bleaching induced by warmer seas and increased ocean acidity, and sea-level rise changing island geomorphology are all contributing to major changes across SIDS. The worst-case scenario, which is currently being debated by several Pacific SIDS, is the evacuation of their entire countries and settlement elsewhere (such as Australia or New Zealand) due to climate change making their islands uninhabitable.[27]

Pacific SIDS have little power to stop climate change, yet must deal with a problem caused by other countries. Those who caused the problem—namely the larger, more affluent, more powerful countries such as the U.K. and the U.S.A., but now including larger, less affluent but also powerful countries such as Brazil, China, and India—are also generally unwilling to provide the resources necessary for Pacific SIDS to deal with the challenges on their own terms.

Is it possible to change the power relations to achieve the action needed by SIDS now? There have been numerous theories of power throughout the centuries[28] as power has been theorised and debated for different governance scales[29] and for levels of dependency.[30] The challenge is determining how much baseline theories are really applicable in practice.

Within theories of social change, three ways are proposed in which a major change of a social order could occur,[31] interpreted here for Pacific SIDS and climate change. First, those with power use that power to change the current situation. For climate change, that

seems to be unlikely until those with the power are directly affected, which is likely to be too late for Pacific SIDS.

Second, those who hold power change, so that new leaders implement the changes that were previously avoided. To some degree, that is happening as those who have been educated with an environmental consciousness gradually assume power within the multinational corporations and big-country governments that have so far blocked progress on climate change. Nevertheless, in the face of growing awareness of climate crisis in both corporate and government quarters, can we anticipate significant changes among those that have so far blocked progress on climate change? The new generation might also assume power over those groups, as consumers for multinational corporations and as electorates of governments. This process is slow, possibly too slow for Pacific SIDS, and has no guarantee of success.

Third, small changes can aggregate to the large transformation sought, which is the theory behind local environmental movements achieving significant local successes but whose wider-scale effect is so far limited. In the case of climate change affecting Pacific SIDS, this form of disaster risk governance seems unlikely to yield substantial results. The reason is small changes happening through local governance, such as developing coconut biodiesel in the Solomon Islands, would need to be aggregated up to larger governance scales without causing more problems, such as replacing all crops with coconut palms to make money from biodiesel fuel.[32] This aggregation would need to continue at the regional and international levels, requiring support beyond the Pacific SIDS, but as discussed above, to date, those most responsible for causing climate change are not yet willing to undertake significant action regarding it.

Could regionally produced biodiesel wean Tonga off diesel for electricity generation?

An example of a proactive approach for overcoming power imbalances for disaster risk governance comes from Samoa implementing local coastal management within a national framework.[33] Facilitated by external funding, external consultants worked with the national government to develop a coastal management plan for the entire country. National staff were trained in local participatory development processes which they in turn implemented with local leaders. Traditional Samoan consultation and decision procedures led coastal villages to develop their own coastal management plans. With the local leaders, those plans were integrated at the district level to avoid actions in one locale creating or exacerbating problems in another place. Similarly, the district plans were integrated into a national coastal management plan and strategy. The national strategy was returned to each participating district and community along with the local and district maps that had been produced by the process. As such, all three governance scales were directly involved and connected.

Results included increased links amongst villages within districts for environment and sustainability topics (horizontal governance) along with increased connections amongst the national, district, and local levels (vertical governance). In this instance, national and local

governments were included, not bypassed, to effect successful disaster risk governance.

In contrast, a volcanic eruption on Vanuatu showed how trust for disaster risk reduction can be eroded by top-down disaster risk governance and power imbalances. On Ambae Island, Vanuatu, a volcanic crisis in 1995 led emergency managers to implement top-down approaches with limited community consultation, fomenting distrust between the local islanders and those from the capital, Port Vila, and outside of Vanuatu.[34] By working with the community on the community's terms, and by respecting and combining different knowledge forms for disaster risk governance, researchers in Vanuatu overcame the established power imbalances and mistrust. They implemented participatory techniques for developing guidelines and an alert system to deal with future volcanic eruptions, which were accepted by the community and national emergency managers. The community was able to help themselves based on local knowledge, while respecting and accepting external support when needed—effectively linking the regional and local governance scales with more limited input from national governance.

From climate change to coastal management to a volcanic eruption, challenges and solutions regarding power relations are demonstrated for disaster risk governance. In the case of climate change, larger countries with the greatest power seem to be the least likely to engage in climate change risk governance for Pacific SIDS. For coastal management and volcanic eruption, governance scales were connected to seek a power balance, although the role of governments varied in scope. Governments have a role to play within the power relations of disaster risk governance, but governments are not necessarily the main, effective governing bodies.

Knowledge

A prominent form of power is access or lack of access to knowledge.[35] Different knowledge types can play key roles in overcoming or creating power imbalances in order to govern disaster risk, such as the division of knowledge into being internal or external to a community. Internal knowledge might be traditional, vernacular, indigenous or come from local scientific investigations. External knowledge also involves scientific investigations, sometimes with contributions that could not be made through traditional or local knowledge. Examples are remote-sensed data and geological investigations beyond the millennial time scale. External knowledge can incorporate traditional, vernacular, and indigenous knowledge from other locations that is deemed transferable to the location being investigated. External knowledge lacks the contextualisation and depth which internal knowledge proffers after having been built up over generations of living in the same place while observing the environment and society.

The applicability of knowledge forms, and different combinations of knowledge, to a specific situation varies. Sometimes, one type of knowledge supersedes other types. For example, in vernacular architecture on some Pacific SIDS such as the Solomon Islands[36] and Tonga,[37] wood was frequently used while walls and roofs were joined with vines. One result was comparatively high earthquake and cyclone resistance, well embedded in traditional knowledge. Wood is more flexible than masonry in earthquakes and high winds, making it safer for smaller structures, but rarely being able to scale up structure size. Tying roofs to walls and tying walls to the foundation prevents uplift during cyclones. This literature does not always give full details on whether those architectural and engineering approaches were selected due to experiences with hazards, for other reasons such as material availability and cost, or for a combination of reasons.

Today, some Pacific SIDS peoples observe

other forms of construction, namely masonry, and equate that with a modern, affluent, aesthetically improved lifestyle. Aside from being more expensive and therefore demonstrating affluence, the implementation of modern masonry is not embedded in traditional, local skills. A danger exists of the dwellings being more vulnerable to earthquakes and cyclones than traditional dwellings. Even if built correctly by masons or engineers from outside the community, no guarantee exists that the structure will be maintained properly. Meanwhile, masonry buildings tend to be less suited to a tropical climate than timber buildings. Even with that knowledge regarding practicalities, the knowledge of what represents power, modernisation, and affluence can be a powerful driver towards increasing disaster vulnerability in Pacific SIDS.

In other cases, none of the various traditional or contemporary knowledge forms available appear to be fully applicable owing to unknowns and uncertainties. Climate change is an example. The currently projected environmental changes will take the Pacific SIDS into a climatic regime which humanity has not before experienced.[38] Traditional knowledge, in effect, is expected to become partly out-dated because it is based on conditions which the people have already experienced and passing those experiences down through generations. Traditional knowledge nonetheless remains important for responding to climate change. It provides an anchor from which the Pacific SIDS peoples can base their observations of ongoing, rapid changes. It remains pertinent in other ways, such as drawing on kinship links and existing community support networks and structures for responding to short-term and long-term changes.

Furthermore, large-scale climate changes are not new to the Pacific. The literature[39] describes the 'A.D. 1300 Event' referring to a major environmental shift around the Pacific in the fourteenth century, which they then link to cultural changes. The environmental changes are highlighted by the region's climate cooling, the sea level falling which in turn exposed—and potentially precipitated the mortality of—coral reefs, and El Niño events increasing in frequency, which likely led to more erratic weather including a short-term increase in precipitation.

Simultaneously around the Pacific region, living and cultural patterns appear to have changed suddenly. Settlements had principally been in coastal locations, making them accessible and allowing access to the tidal and marine zones for livelihoods. This pattern shifted towards locations permitting fortification and a dramatic decrease in accessibility for the communities, supporting indications of increased conflict. The latter might be linked to resource scarcity, with evidence pointing towards decreased food availability. Contact with other communities decreased as long, oceanic voyages became less frequently attempted and/or less successful. This literature[40] correlates the environmental and social changes, further arguing that social changes were directly caused by environmental changes.

The fourteenth century experiences and knowledge available for responding to environmental changes are different from experiences and knowledge today. The fourteenth century responses appear to have been mainly reactive. Today's Pacific SIDS communities can learn from this prior experience while combining traditional knowledge and scientific knowledge (from history and archaeology to climate modelling and ecology) in order to identify gaps to be filled for addressing contemporary climate change. Where sub-national governance could not achieve this goal, then national or regional governance could be asked to support the process.

A similar situation applies to volcanoes. Tafahi is a volcano and island of Tonga, situated near Samoa. Scientific knowledge suggests that an eruption occurred in recent centuries, but the volcano has not been studied in detail meaning that the time of past eruptions and the exact volcanic phenomena produced are not pinpointed.[41] Tafahi is understudied from a physical volcanology perspective[42] and no publications were found on the social volcanology of the area. Traditional knowledge provides stories that might suggest an ash cloud occurred in the past,[43] but the literature does not indicate whether local people were able to deal with the impacts. Just over 1,700 people live within 30 kilometres of the volcano.[44] Depending on the wind's direction, they could be severely affected by a future tephra-producing eruption. A settlement of 60 people sits on Tafahi Island[45] which could be affected by pyroclastic flows.

Based on these references, and the absence of further material, the islanders appear to have little concept that phenomena such as tephra and pyroclastic flows are possible because their internal knowledge contains the stories focusing on a dark period (possibly caused by ash blocking the sun), but not including details of particulates, the presence of eruptive columns, or the implications of the dark period. Meanwhile, contemporary scientific approaches are unable to develop predictive scenarios for a potential eruption[46] with a high degree of accuracy because the geological knowledge needed for the models has not yet been collected.[4748]

The knowledge gaps do not preclude action now to consider and prepare for a Tafahi eruption. Other examples[49] could be analysed for their transferability to Tafahi, including potential action to take regarding health[50] and relocation.[51] Scientific publications also describe local knowledge regarding disaster risk governance around Tafahi.[52] Traditional knowledge needs to be examined further to determine how the islanders living around the volcano could govern themselves with respect to disaster risk. Possibilities include preparing for evacuating the island and dealing with a widespread ashfall. Notably, these approaches encompass regional and local governance, but not national governance; national government is effectively bypassed to achieve the desired disaster risk governance, partly because the capital, Nuku'alofa, is so far away.

Bringing together the climate and volcano examples, the lesson is that both limitations to and advantages of all forms of knowledge are evident. A single knowledge type cannot provide the entire picture for disaster risk governance. Instead, knowledge types must be melded and balanced to draw on the strengths of each while overcoming each type's limitations. While this approach can be hard to implement in the midst of an ongoing crisis, disaster risk reduction can be used to bring together people with different knowledge forms in order to combine the knowledges and to generate collaboration amongst the different groups.

This approach has been completed for the Pacific SIDS of PNG.[53] A simple framework was developed and tested for combining knowledge internal and external to three indigenous communities experiencing hazards such as floods, landslides, and a volcanic eruption. The governance approach involved participatory development work but aimed to overcome power imbalances within the communities by enacting full consultation with, and sharing knowledge amongst, all groups. Although PNG's national government had agreed to the work, neither they nor regional governance structures were directly involved. The framework was developed and implemented factoring in local governance aspects such as livelihoods, traditions, and poor access routes to the villages. Using the lessons from disaster risk governance in PNG, the framework was then adjusted to apply specifically to climate

change for all SIDS.[54]

A wider approach to combining different knowledge forms for governing climate change action as part of disaster risk reduction for Arctic and SIDS peoples is epitomised by the Many Strong Voices programme. The programme works with and supports all three levels of governance—regional, national, and sub-national—aiming to bring local voices and knowledge to the forefront. Promoting Pacific SIDS' peoples' own knowledge for their own action on disaster risk governance gives them significant power in overcoming the climate change challenges that have been imposed on them. As noted above, climate change is making many aspects of traditional knowledge of diminished relevance due to the changing environment. Even past scientific knowledge about a location might not be fully applicable to envisioning and planning for the future. The environmental (and social) baselines are changing, so the past is not necessarily a full guide to the future.

The low-lying coastline of Tongatapu, Tonga. A combination of an earth embankment and vegetation might stave off erosion in the short-term. (Image credit: Ilan Kelman)

In atoll communities on PNG and Tuvalu, for instance, communities are experiencing sea floods where neither scientific investigations nor traditional knowledge suggest that such floods have occurred before. In trying to project into the future, large uncertainties remain and the ultimate outcome could depend as much on human action at the local level as on climate change's impacts. For example, in response to increasing sea flooding, some coastal property owners on PNG, Tonga, and Tuvalu have built a sea wall in front of their property. The sea walls change shoreline dynamics as much as sea-level rise changes them, because the sea walls reflect wave energy without giving the waves a chance to slow down and drop their sediment, replenishing the beach. Traditional knowledge has not been aware of the impact of sea walls, but scientific knowledge informed the communities, such as on PNG's atoll of Takuu where, at the community's request, external donors brought in external experts to work with the local community.[55] The regional and local governance scales were connected, irrespective of the national governance scale (cf. Murray's review of "There Once Was an Island" in this issue).

Consequently, traditional and local knowledge forms need to be combined with contemporary scientific and contemporary knowledge forms. Climate change adaptation measures, a necessary component of disaster risk reduction, would not only be based in community traditions but would also factor in available knowledge regarding the impact of measures undertaken and what the community's environment could be in the future. Other climate change impacts that might require adjustments beyond the SIDS communities' traditional experiences are a climate amenable to different food sources, changing freshwater regimes, coral reefs that are more sensitive to external use, and tropical cyclones encroaching into locations with limited prior experience.[56]

Numerous layered changes at different governance scales impact Pacific SIDS communities when they implement disaster risk

governance for volcanic eruptions and climate change. Different knowledge forms are needed to inform governance actions, but not all knowledge emerges from government or "expert" sources-- nor do government or "expert" sources necessarily respect all knowledge forms. Pacific SIDS case studies as described here demonstrate that multiple knowledge types assist by (i) being able to triangulate information and action proposals; (ii) drawing from a range of data and experiences to reduce the likelihood of overlooking evidence or options; and (iii) reducing knowledge-related power imbalances by accepting, sharing, and combining all knowledge forms on equitable terms.

Power and knowledge interacting in disaster risk governance

For disaster risk governance in Pacific SIDS, this article has presented a discussion of power and knowledge. This section now suggests some knowledge-power interactions, some of which were alluded to the previous section. The discussion provides options and opportunities for policy makers to ensure that they fully consider the range of possibilities which they have available for disaster risk reduction governance, including but not limited to governance.

Pooled governance is one method by which Pacific SIDS implement disaster risk governance using their knowledge and power. Multilateral organisations can take the lead in disaster risk governance in their own right, even when they comprise governments. The Alliance of Small Island States (AOSIS) is a SIDS intergovernmental organisation that lobbies and negotiates on behalf of SIDS regarding climate change topics. This form of pooled governance helps to overcome the limitations of each SIDS' government's small size—scaling up from the national governance scale to the regional governance scale. By creating regional pools of resources supporting supra-national agencies, SIDS create a focal point for donors while developing in-house technical capability that supports all SIDS governments in dealing with their disaster risk governance responsibilities. Power is created through pooling resources and knowledge.

For example, Tuvalu is a party to numerous international environmental treaties with relevance to disaster risk governance, most of which are highly technical including the Convention on Biological Diversity, the Kyoto Protocol to the United Nations Framework Convention on Climate Change, and the United Nations Convention to Combat Desertification. Larger countries have groups of Masters-level or PhD-level experts trained in each treaty to implement and monitor it. Tuvalu's population could not produce a similar level of experts for every single treaty to which they are party. Should Tuvalu avoid signing the treaties? Then, it would seem as if the country were not committed to the goals and priorities in the agreements.

Instead, Tuvalu's national government recognises that, at times, it must be bypassed for appropriate treaty implementation which pools resources to create multilateral organisations such as AOSIS, and others mentioned below. The multilateral cooperation overcomes governmental knowledge deficiencies, combines knowledge from around the region, provides each SIDS with approximately the same power, and generates a power base for a SIDS region or for all SIDS. These processes represent knowledge-based technical effectiveness with an even balance of power. Diverse people, geographies, and circumstances of the SIDS national governments capture the experiences and skills from all SIDS. Rather than a single national outlook, pooling resources creates the advantage of being able to draw on multiple perspectives and approaches while achieving efficiency and effectiveness in disaster risk governance.

For disaster risk reduction in the Pacific, the main multilateral focal point is the Secretariat of the Pacific Community's Applied Geoscience and Technology Division (SPC SOPAC), which runs its Disaster Reduction Programme providing technical and policy advice. For the specific hazard driver of climate change, the Pacific SIDS have the Secretariat of the Pacific Regional Environment Programme (SPREP). SPREP provides information and advice to Pacific SIDS governments and communities regarding what should be done regarding climate change, at policy, technical, and operational levels. The Caribbean SIDS have parallel multilateral organisations, one for all disaster risk reduction and one for climate change only, but other SIDS do not have similar regional organisations for dealing with any form of disaster risk governance. They are not fully represented in regional governance.

In addition to these pooled multinational efforts, non-governmental initiatives exist that include, but extend beyond, Pacific SIDS governments to deal with disasters. Many Strong Voices, mentioned earlier, is an example. Such initiatives engage with and are supported by Pacific SIDS governments, even though the governments are only one player amongst many, because they realise that pooling is needed to overcome the limitations of small government and to enhance the advantages of different countries with similar challenges.

Non-sovereign Pacific SIDS are involved too. Several are members of SPC SOPAC and SPREP, bypassing the SIDS' governing state for disaster risk governance. The non-sovereign Pacific SIDS nonetheless retain connections to their governing state, despite options for independence, permitting them to employ a specific power and knowledge strategy: the assumption (often without evidence) that the SIDS' governing state will assist in times of need by always providing appropriate interventions.[57] Consequently, many non-sovereign SIDS actively oppose the power which sovereignty would bring them, because they have enough political and legal powers to be satisfied while being able to retain a direct connection to their governing state for requesting assistance when needed.[58] The non-sovereign SIDS gain a psychological governance crutch in assuming that they can rely on the governing state for disaster risk reduction and post-disaster help—even where previous patterns demonstrate a regular lack of support from the governing state.

In fact, Pacific SIDS' communities have been accused of succumbing to the 'handout mentality', inhibiting local disaster risk reduction.[59] The problem of focusing on post-disaster actions in order to obtain handouts in the form of aid, rather than implementing disaster risk reduction, is illustrated. Many Pacific SIDS experience different governance desires between those trying to take local control of disaster risk reduction in order to avoid a disaster and those who are content to rely on handouts, from the governing state and elsewhere. Disagreements and frustration can emerge where aid is requested from the SIDS' government or governing state, but is not forthcoming. The fundamental issue is often power: politicians can garner support through handing out relief supplies or through blaming someone else for a disaster or lack of disaster aid, but credit is rarely available for individuals who are responsible for averting disasters due to disaster risk reduction. It can be a double-edged sword: if disaster response is seen to be incompetent or if blaming others is seen as neglecting duties, then a politician or government could be politically damaged.

Tikopia and Anuta, small islands in the far eastern Solomon Islands, are a disaster aid example with intertwined elements of power, knowledge, ethnic tension, and remoteness. The islands have neither airstrips, nor jetties, nor reliable off-island communication systems. On 28 December 2002, Category 5 Cyclone Zoë

struck Tikopia and Anuta.[60] No one on the two islands died immediately, because the populations had retreated to higher ground to avoid the cyclone-related flooding while being somewhat sheltered from the high winds. Bypassing government for disaster risk governance is exemplified since the population saved themselves by using their own warning and response systems.

The flipside was that little food and water survived the storm, and many houses completely disappeared, leaving the islanders needing emergency assistance. Their radios used for off-island communication had not worked before the storm, so no means were available of communicating their situation. The outside world including the Solomon Islands' government did little to assist until a journalist hired a helicopter in nearby Vanuatu, landed on one of the islands, and brought the story to the world by selling an exclusive to an Australian newspaper. An international aid response resulted, eventually joined by the Solomon Islands' government—which was hindered by its own financial difficulties as well as ethnic differences feeding into ongoing conflict between the affected islands and the island with the Solomon Islands' capital city. Even where post-disaster assistance was needed and requested, it was more effective to bypass government. Individual decision-making is highlighted, with a "wild card" at the regional governance level in the form of an external journalist connecting directly with the communities affected, leading to a regional response with the national government eventually joining.

Should the residents of Tikopia and Anuta have done more for disaster risk reduction at the national level prior to the cyclone? Aside from the logistical difficulties of doing so, given the islands' isolation, challenging the established power systems can yield positive, longer-term results by gaining knowledge and shifting the power balance. If the people on Ambae had accepted the top-down interventions without complaint, then their obsequiousness would have perpetuated the knowledge and power imbalances supporting the vulnerability, which led to the disaster and the lack of post-disaster aid. Creating a conflict-ridden situation over power and knowledge contributed towards identifying problems and then rebalancing power and knowledge in order to try to resolve the identified problems.

For Ambae, Samoa, and the PNG villages, knowledge delivery and combining different knowledge forms led to a re-balancing of power, permitting the communities to govern disaster risk irrespective of the national government's support or lack thereof. Frameworks exist to support this work as applied in PNG.[61] The combination of frameworks was then tested for disaster risk reduction including climate change adaptation in Timor-Leste.[62] As expected, the lessons from Timor-Leste included some aspects being transferable from PNG and some aspects not being transferable from PNG.

Due to the high degree of localisation and contextualisation necessary, developing fixed guidelines for pooled approaches in all locations, for all topics, and for all circumstances would not be possible since much depends on the local circumstances and the specific disaster risk context. Different interpretations of governance, power, knowledge, participation, and consultation would create different outcomes amongst the various parties involved in each case study. Instead, the most successful approach would be having a general framework[63] to be adjusted locally as part of the process of involving communities in disaster risk governance. Enacting the process of developing a locally specific framework further assists in determining the power relations amongst different community sectors and putting forward the different knowledge forms which exist in the community in order to bring them

together for disaster risk governance. Pacific SIDS case studies illustrate the power-knowledge interconnections occurring for disaster risk reduction governance at all governance scales.

Conclusions: Supranational and local governance

The lessons emerging from this article focus on comparing and connecting different governance scales for disaster risk for Pacific SIDS, especially for knowledge and power. It is particularly telling how much is necessarily completed at the supra-national and sub-national (mainly community) levels, thereby bypassing government (national and local) in order to be successful in disaster risk governance.[64] Some cautions are needed for a full interpretation.

Pacific SIDS' governments should not be blamed for any deficiencies in national governance due to challenges of small scale, notably with regards to personnel, and limited resources. With some Pacific SIDS having populations in the tens of thousands, it is unrealistic to expect to find a civil servant conversant in every disaster-related topic. Hence, the need for pooled governance as part of acquiring and applying knowledge alongside self-empowerment.

Yet Pacific SIDS' governments are flawed in ways that go beyond a lack of resources and small scale. Nauru squandered its phosphate wealth, partly through internal mistakes and partly through external exploitation.[65] Tonga took its first major step towards representative democracy in 2010 but still invests significant power in its monarchy.[66] While supra-national governance can contribute to avoiding some of these national problems, supra-national entities—even with their extensive checks and balances—can be prone to corruption, incompetence, naivety, abuses of power, ignorance, and exploitation.[67] SPC SOPAC and SPREP are continually stretched regarding demands on their resources and time, because they depend on international donors for their operations.

Meanwhile, at the local level, many Pacific SIDS communities are run by a formal governance structure that is not government per se. For example, outer atolls in some Pacific SIDS have hereditary chiefs but relatively communal decision-making.[68] In cases such as Savo in the Solomon Islands, a mixture of governmental and non-governmental governance structures leads the communities, a variation of interactive governance.[69] A system of "Bigmen" (chiefs) and elders govern alongside decision-making from democratically elected representatives who sit in the provincial parliament.[70] Consequently, bypassing government for governance might never be feasible in some SIDS.

Local approaches are not a panacea. In addition to advantages, they also have disadvantages. Two examples are detailed here: (i) causing disaster risk governance problems for others and (ii) engraining cultural aspects that are detrimental to disaster risk governance over the long-term.

If a local approach implements governance without due regard to considerations beyond the local context, then problems might emerge elsewhere. This situation represents the classic upstream/downstream problem in environmental management and development.[71] One community solves its waste problem by dumping it downstream in the river, yet further downstream sits another community that receives the waste from the upstream community. For disaster risk governance, flood management measures upstream, such as building a dam or other forms of river engineering, impact the ability of communities downstream to govern their own flood and drought regimes.[72]

The Samoa case study[73] demonstrates how this problem could be overcome without sacrificing local governance by integrating the sub-national, national, and regional governance scales. Using an externally driven approach with the support of the national level, solutions were developed at the local level and then brought together at the district level to identify any upstream/downstream problems that could result through local implementation. Next, integrating district-level approaches through further upscaling produced a national strategy, including monitoring at all scales. While the potential still exists for problems to emerge, a useful balance was struck between the need for local empowerment through using local knowledge and the need for larger-scale coherence and overviews of disaster risk governance.

The second example is local attitudes and engrained cultural practices that might not support the desired long-term outcome, with examples being gender and ethnic inequalities. A local majority might decide that discrimination due to gender, ethnicity, religion, sexuality, disability, or culture is appropriate, even though that tends to perpetuate disaster risk.[74] Participatory development approaches mean that all members of a community must be treated with respect and must contribute to disaster risk governance through knowledge and power sharing. Where local preferences interfere with such principles, it might be appropriate to enact non-local approaches to ensure that discrimination is not perpetuated.

Rather than assuming that one governance approach for disaster risk would be universally successful, a balance is needed. Achieving this balance means recognising and accepting the roles of both governmental and non-governmental governance at the three scales. Achieving this balance further means recognising and accepting the connections amongst different governance scales. Some aspects of government can be bypassed at times to achieve successful disaster risk governance. Other governmental aspects are essential, depending on the context. Pacific SIDS case studies have demonstrated the wide range of contexts, factoring in knowledge, power, and the interactions between power and knowledge.

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