Sea Change: Island Communities and Climate Change*

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Keywords

vulnerability, resilience, adaptation, migration, justice, sea of islands

Abstract

Island communities stand to be among the first and most adversely affected by the impacts of global climate change. Rising sea levels, changing precipitation and storm patterns, and increasing air and sea-surface temperatures stress already limited island resources while climate change policies circumscribe local decision making. Anthropologists make important contributions to understanding island-based knowledge, global causes of vulnerability, local perceptions of risk, and islander agency channeled into adaptive capacity and resilience. A conceptual framework that recognizes both the complexity of the causes of island vulnerability and the constraints and opportunities available to islanders offers an analytical approach to understanding islander responses to climate change, including migration. The framework is used to show that island communities are not merely isolated, small, and impoverished but that they are often deeply globally connected in ways that reject such simple descriptions and will be essential to just and equitable climate solutions.

INTRODUCTION

Migration: population mobility that is temporary, circular, or permanent over the short or long term

Vulnerability: susceptibility of people to damage or harm from exposure to stresses and the inability to adapt to the change

Resilience: ability to absorb or recover from exposure to stresses

Adaptation and adaptive capacity: anticipatory, reactive, spontaneous, or planned changes people make to reduce potential harm and their capacity to do so

Agency: capacity of individuals and groups to act freely in ways that may be culturally informed

Island communities face unique challenges as anthropogenic influences transform the nature of our global climate (Mimura et al. 2007). Rising sea levels, changing precipitation and storm patterns, and increasing air and sea-surface temperatures stress already limited island resources while climate change policies circumscribe local decision making. Contemporary climate change is not a distant specter but an immediate, lived reality that islanders endeavor to understand and address. From resource management to migration options, island communities must find creative and culturally coherent responses to contemporary global climate change. As demonstrated in this review, an anthropology of island communities shows that these islands are not merely isolated, small, and impoverished but that they are often deeply globally connected in ways that reject such simple descriptions (Hau'ofa 1993, 1994, 1998; Shea 2003; Kelman 2010). Selected anthropological work on the vulnerability, resilience, and adaptations of island communities and the interactions between these themes is presented here, with an emphasis on understanding how the connectivity and agency of islanders may improve outcomes in the face of climate change.

Climate change intersects with other cultural, social, political, economic, and environmental processes within the purview of anthropology. This review brings together anthropology of weather and climate change (e.g., Strauss & Orlove 2003, Crate & Nuttall 2009a, Crate 2011); disaster anthropology (e.g., Oliver-Smith 1996, Oliver-Smith & Hoffman 1999, Hoffman & Oliver-Smith 2002, Button 2010); and the vast body of island anthropology that draws on early work such as that of Malinowski (1922), Mead (1928), Rappaport (1968), and Gladwin (1970), which has informed more-recent treatment of fisheries (e.g., Johannes 1981, Ruddle & Satria 2010), conservation (e.g., Aswani & Lauer 2006, West 2006, Jacka 2010), tourism (e.g., Kahn 2011), health (e.g., Littleton & Park 2009), oil production (e.g., Hughes 2011), nuclear testing (e.g., Kahn 2000, Barker 2004), and many other topics relevant to islands. Because climate change interacts with all aspects of human life, Crate & Nuttall (2009b, p. 13) presented a mission for the discipline: "As anthropologists, we need to look closely at the cultural implications of the changes global warming has and is bringing."

The study of climate change in island communities is a shifting target. The effects of and responses to climate change are rapidly gaining momentum as is the body of research that addresses them [see other overviews of islands and climate change by Kelman & West (2009), Barnett & Campbell (2010), Kelman (2011), Rudiak-Gould (2011), Barnett & O'Neill (2012)]. This review is not exhaustive. However, examples from different regions illustrate some of the challenges faced by island communities around the world, and selected research demonstrates the different approaches anthropologists are taking to study them. Anthropologists concerned with climate change work with island communities across the world's oceans, including the North, Central, and South Pacific as well as the Caribbean Sea and the Indian and Atlantic oceans. The review reflects the diversity bundled into the category of island, which encompasses a variety of geographic and political units. I focus on Pacific Island communities because those are the ones I know best, but I also include examples from other areas ranging from tropical to arctic regions in an attempt to illustrate the similarities and differences faced by island communities around the world.

The article is organized around key themes in the anthropological treatment of climate change in island contexts. It begins with a short orientation to islands and the anthropology of island communities. Then there is an overview of climate observations and projections and their effects on island ecologies and societies. Next a conceptual framework for understanding local responses to global processes is presented. Following are sections that detail findings in the anthropological literature on ways of knowing about environmental changes, vulnerability and risk, adaptation, resilience and responses, migration, and justice. Building on

the conceptual framework and the reviewed literature, a way forward for anthropology of climate change in island communities is proposed. Finally, major issues are synthesized and recommendations are presented for research to fill critical gaps in the knowledge needed to improve outcomes for island communities in the context of social and cultural as well as climate-driven environmental change.

ISLAND COMMUNITIES

Islands are home to one-tenth of the global population and, together with their exclusive economic zones, cover one-sixth of Earth's surface (Baldacchino 2006). Island communities inhabit land that is surrounded by water and may be large or small in terms of land area, single islands or archipelagos, and varying distances from other land masses. The distinctions between land and sea, between islands and communities, and between islands and continents are sometimes reified in island studies (Stratford et al. 2011). From the perspective of islanders—and importantly also in the context of climate change with its complex interconnections and feedbacks among ocean, atmosphere, and land—the distinctions break down. In Tuvalu, for example, the Polynesian word *fenua* refers both to the physical island and to the people who call it home.

Many islands are politically independent, accounting for one-quarter of the world's sovereign states (Baldacchino 2006) (e.g., the Republic of Trinidad and Tobago, the Republic of Madagascar, and Samoa). Many others are attached to sovereign states (e.g., the Torres Strait, Hong Kong, and Manhattan), or they have different political statuses such as Niue's free association with New Zealand, American Samoa as an unincorporated territory of the United States, and the Cayman Islands as a British Overseas Territory. Kelman (2010) discussed the implications of these different levels of political sovereignty for decision making and availability of resources to implement responses to climate change. A collection of 52 island states and territories with the least financial and political resources belong to a group designated by the United Nations (UN) as Small Island Developing States (SIDS). The SIDS have a voice at the UN through the Alliance of Small Island States (AOSIS), which was formed at the Second World Climate Conference in 1990.

Globally, human populations are concentrated along coasts and, thus, share some of the same concerns and opportunities of island communities. For example, Finnan (2009) identified many of the same issues concerning sea-level rise that are raised in island contexts in his work in Bangladesh. Two-thirds of the world's coastal disasters recorded annually are associated with extreme weather events, which are likely to increase in intensity as a result of climate change (Adger et al. 2005, Morss et al. 2011).

Islands play a significant discursive role in global perspectives. Throughout history, non-islanders have considered islands to be microcosms (Kirch 1997) that mirror continental dwellers' anxieties about environmental change (Grove 1995, Greenhough 2004); to be the homes of "noble savages" (e.g., as presented in Defoe's *Robinson Crusoe*); to represent paradise (e.g., the theoretical work of Rousseau and Gauguin's paintings); and to be sites of potential scientific discoveries (Greenhough 2006). Many island communities have been labeled the world's first climate refugees. In popular climate change discourse, islands are referred to as the planet's barometers of change, litmus tests, and canaries in a coal mine (Kelman & West 2009, McAdam & Loughry 2009, McNamara & Gibson 2009, Farbotko 2010). Islands are appropriate sites to study climate change and human responses because of their place in global imaginations, because they stand to be imminently and heavily affected by climate impacts, and because they complicate easy notions of scale that can obfuscate particular places and people (Magistro & Roncoli 2001).

ENVIRONMENTAL CHANGES ON ISLANDS

Owing to global increases in greenhouse gas emissions and land-use changes that contribute

Justice: moral grounds for ensuring ethical and equal power relations

UN: United Nations

SIDS: Small Island Developing States

AOSIS: Alliance of Small Island States

to contemporary climate change, the picture of island futures painted by the Intergovernmental Panel on Climate Change is deeply troubling. Over the twentieth century, temperature increases in the Pacific and Caribbean oceans exceeded the global mean temperature rise of around 0.6°C (Mimura et al. 2007). Seasonality and decadal oscillations that determine variability in timing, distribution, and amount of precipitation are shifting (Mimura et al. 2007). Hurricane intensity and frequency may be affected by warmer ocean conditions (Pielke et al. 2005). Upward trends in sea levels, driven by thermal expansion and land-ice melt, stand out against a dynamic background of tectonic movement and regular climate variability and leading to increased frequency of extreme sea-level events (Hunter 2010). Rising global sea level is likely to accelerate through the twenty-first century with a rise of 18–59 cm above 1990 levels projected by the end of the century (Meehl et al. 2007). Relative sea level means the increases could be greater in locations that have also experienced subsidence (Nicholls 2011). Climate change impacts accentuate other processes; for example, tsunamis may be higher under the influences of sea-level rise. Thus, these impacts contribute to cascading and cumulative disasters, for example, limiting the time and resources available to recover from one storm before another arrives.

These climate signals indicate significant changes in islands and herald corresponding changes in the ways in which people are accustomed to living on them. Human safety and food, water, and national security will be affected. The concerns are highest at the lowest elevations above sea level (Lewis 1990, Mimura et al. 2007). Low-lying islands and coastal areas such as the Maldives; the Marshall Islands; the Federated States of Micronesia, Kiribati, and Tuvalu; and many arctic islands such as Shishmaref (Marino & Schwietzer 2009) and the small islands in Nunavut (Ford et al. 2006) may be rendered uninhabitable as sea levels rise and freshwater resources are reduced. However, coastal hydrology is complex and local effects may range from significant erosion and loss of land to accretion of sand in new areas as has been observed in Tuvalu (Webb 2006). Change in timing and amount of rain will affect freshwater resources—a limiting factor for island living—and the activities dependent on them such as agriculture (Meehl 1996, Lazrus 2012). Changes in ocean temperatures, acidity levels, and currents will affect both subsistence and industrial fisheries (Glantz 1992). Arctic islands will experience melting of permafrost and less-stable lands (Forbes 2005, Instanes et al. 2005). Invasive species, vector-borne diseases, and heat-related illnesses will be imported into new places, causing diseases such as dengue fever and malaria and increasing cases of ciguatera poisoning, diarrhea, respiratory problems, and heat stroke (Shea 2001, Wilkie 2002, Littleton & Park 2009). Storm tracks may move into places that have no or little previous hurricane experience (Mirza 2003). Climate change will be experienced primarily through such extremes (Barnett & Campbell 2010, Morss et al. 2011). Specific islands will be affected in very different ways, yet islands, especially those that will be most impacted by sea-level rise, are often too small to register in the computer models of globally projected changes.

Islands are environmentally dynamic; coastlines and plant and animal species shift over geological timescales. Contemporary climate change is not the first or only force of change buffeting islands, and it will accelerate and exacerbate existing social, economic, political, and, especially, environmental trends. Understanding climate change is helped by a deeper temporal perspective (Fagan 2008, Wilmshurst et al. 2011). Geological records and archeological insight show that sea levels have changed over time and humans have adapted and responded by migrating and shifting resource bases (Nunn & Britton 2001, Nunn et al. 2007).

Climate change impacts also overlay contemporary social processes and interactions with the landscape that will increase environmental pressures. Waste management, coastal mining, and pollution and fragmentation of lands available for subsistence practices are just

a few of these. Connell (2003) described how coastal flooding in Tuvalu is the outcome of sand mining, paving of surface areas, and manipulation of coastlines in addition to high seas caused by meteorological and climatological forces. Having a deeper temporal perspective is complemented by a wider spatial perspective. Activities such as consumption of packaged goods and coastal mining are often outcomes of global processes such as the need for a market for certain goods and a lack of options for local building materials that satisfy the desire for symbolically prestigious Western-style concrete buildings. Importantly, Kelman (2010, p. 611) has asserted that "[e]ven where local practices are identified as contributing to... problems, they cannot absolve external forces from the contribution of global climate change." Indeed, the causes and consequences of climate change on islands are inextricably embedded in global environmental and social processes across time and space.

CONCEPTUALIZING ISLAND COMMUNITIES AND CONNECTIONS

Islands are often seen as isolated microcosms, but the processes and connections that extend beyond islands shape their vulnerability as well as their resilience and capacity to adapt to change. Two decades ago, Hau'ofa (1993, 1994, 1998) offered a reconceptualization of the Pacific Islands as a "sea of islands" in contrast to the notion of vulnerable, isolated, and small "islands in a far sea." According to Hau'ofa (1993, p. 6), "the idea of smallness is relative; it depends on what is included and excluded in any calculation of size." The sea of islands thesis, therefore, reflects what Hau'ofa calls "world enlargement"—the practices and processes in legend and past, present, and future social life that extend beyond the physical bounds of islands, including the flows of people, materials, and goods that have always made island living possible. The thesis is relevant to island communities beyond the Pacific region. In the context of climate change, the thesis is about the resilience and adaptive capacities of island communities that leverage global networks in the face of local environmental devastation.[1]

Sea of islands: proposal that island communities are not isolated, small, and dependent, but are resourceful and deeply globally connected

Hau'ofa's proposal has been criticized for romanticizing island communities and neglecting systemic problems of dependency and marginalization (Chandra 1993, Naidu 1993). By combining the sea of islands thesis with the concept of social vulnerability, a conceptual framework that both promotes islander resilience and adaptive capacity and acknowledges the power differentials that give rise to islander vulnerability can be built. Oliver-Smith (2004, p. 10) has explained vulnerability as the "nexus that links the relationship that people have with their environment to social forces and institutions and the cultural values that sustain or contest them." Clearly, island communities are embedded in forces and institutions that extend beyond their geographic boundaries.

Both the sea of islands approach to resilience and the concept of vulnerability emphasize the totality of relationships that provide opportunities and constraints in the face of climate change—namely, the political and economic scaffolding erected through processes of colonialism and engagement with market globalization. As Hau'ofa (1993, p. 7) explained, the focus on a sea of islands is a "more holistic perspective in which things are seen in the totality of their relationships." And according to Oliver-Smith (2004, p. 11), "the concept of social vulnerability expresses the multidimensionality of disasters by focusing attention on the totality of relationships in a given social situation which constitute a condition that, in combination with environmental forces, produces a disaster." The shared emphasis on "the totality of relationships" links these two ideas together and lends analytical power to this conceptual framework for how we think about the causes, consequences, and cures of climate change and island communities.

[1] Hau'ofa's proposal has been used previously in the context of climate change to present adaptive capacity (Barnett 2002), critique discourses of "sinking islands" (Farbotko 2010), and present alternative views of environmental refugees (Kempf 2009).

ANTHROPOLOGICAL APPROACHES TO CLIMATE CHANGE AND ISLAND COMMUNITIES

Traditional environmental knowledge (TEK): cultural knowledge, practice, and beliefs concerning the environment and peoples' relationship to other living and nonliving entities

Anthropological studies of climate change in island communities should not be artificially divided from other anthropological pursuits. Much work that does not explicitly foreground climate change is relevant to issues of a changing natural and political environment. What distinguishes the work included here is an explicit focus on the environmental and policy changes that attend climate change. Although presented separately, the material in each section is, in fact, overlapping and deeply interconnected. Any one theme alone would provide an incomplete and partial perspective on climate impacts and responses in island communities. Knowledge and alternative ways of knowing about climate change are important for understanding risk and vulnerability in locally and culturally specific ways. Assessing vulnerability and risk is essential for guiding adaptation decisions and promoting resilience. Migration connects to knowledge, risk and vulnerability assessments, adaptation decisions, and resilience in complex ways. Imperative issues of justice are woven through each of these themes.

Ways of Knowing

Anthropologists examine alternative epistemologies of nature and different ways of knowing about climate change within the communities in which they work (e.g., Riedlinger & Berkes 2001, Huntington 2011). Traditional environmental knowledge (TEK), also referred to as local environmental/ecological knowledge, indigenous knowledge, and island-based knowledge, is described as "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment" (Berkes 1999, p. 8). Therefore, it is borne of lifetimes of interacting with and observing the environment. Importantly, TEK embodies a sense of place and worldviews that may be challenged by climate change (e.g., Basso 1996, Crate 2011), may enhance adaptive capacity to environmental changes (e.g., Campbell 2006, Kelman et al. 2012), or, alternatively, may be maladapted to contemporary types or rates of environmental change (e.g., Tibby et al. 2007).

Island ways of knowing about climate change include observations of directions and degrees of change and are sensitive to the complexities of ecological shifts. Island-based knowledge about the world and how it works does not necessarily distinguish between terrestrial and marine spheres, as described in Gladwin's (1970) account of ocean navigation on Puluwat Atoll in the Caroline Islands. On islands, knowledge is often a hybrid of island-based and scientifically derived insight (Baldacchino 2008). For example, observations of fish behavior, species composition, and related changes in marine ecosystems rely on both traditional resource management and the work of fisheries scientists (Lazrus 2009b). Floods that occur in specific places and times of the year may be altered as seasons, precipitation patterns, and coastlines shift, for example, as experienced by Torres Strait islanders (Green 2009). Lefale (2010, p. 317) has described the ability and knowledge of some Samoans to forecast the onset of extreme weather and climate events by observing local environmental changes, emphasizing that these are "vital tools that should be incorporated in the formulation of human induced climate change adaptation strategies."

Because TEK embodies elements of spiritual, cosmological, and moral practices that condition people's relationship to the environment, it is an important part of island adaptation. Nuttall (2009) has described Greenland Inuit responses to changes in sea ice as "expecting the unexpected" and, thus, expands the definition of adaptation to include how surprise can be taken in collective stride. Advocates for engaging TEK in environmental management and disaster preparedness argue that it can complement, even enhance, the conventional

scientific and management processes (Sillitoe 2001; Berkes 2002; Gaillard 2007; Mercer et al. 2007; Kelman et al. 2009, 2012). Others caution against employing TEK as a panacea that justifies limiting or rescinding development aid on the basis that local capacities are adequate without external assistance (Bankoff 2004). There is also important debate about the intellectual property rights of local knowledge that is being carefully navigated by communities who seek to retain control of whether and how traditional knowledge insights are used in new applications and venues (e.g., Posey 2002). One formal mechanism that has potential for coproducing adaptation priorities is the National Adaptation Programs of Action (NAPAs). This is the primary climate change initiative facilitated by the UN that builds on TEK and local environmental observations in developing countries, including islands.

Vulnerability and Risk

Following Oliver-Smith's (2004) explanation of vulnerability presented above, island vulnerability to climate change impacts is inseparable from the degree of political and economic marginalization that many islands, especially the SIDS, experience (e.g., Fairburn 1999, Lewis 1999, Pelling & Uitto 2001, Kelman & West 2009, Kelman 2010). Social change—colonialism's legacy, market expansion, privatization of communal resources, and penetration of the state into traditional leadership and relationships of reciprocity—affected by globalization can erode local coping mechanisms based on traditional knowledge and management systems (Watts 1983, Clark & Thaman 1993, Pelling & Uitto 2001). For example, traditional coping mechanisms and agricultural practices are undermined by the enhanced role of the market in Western Samoa (Paulinson 1993), Fiji (Benson 1997), and Tuvalu (Lazrus 2009a). However, Jacka (2010) has found in the case of conservation and conversion to Christianity in the highlands of Papua New Guinea that nonlocal influences combine with traditional practices in complex ways that have not reduced local conservation efforts. This finding is commensurate with the sea of islands proposal, which holds that nonlocal influences are not linear forces of change but are subject to local interpretation (Hau'ofa 1993).

Vulnerability expresses the state of susceptibility and sensitivity to damage or harm from exposure to stresses arising from environmental or social change and the inability to adapt to the change (Adger 2006). Islanders are specifically vulnerable to the ways in which the environmental impacts presented above will adversely affect livelihoods, well-being, and security. In addition, vulnerability to climate change impacts are compounded by and may accentuate other cases of environmental destruction, for example, nuclear testing in the Marshall Islands (Barker 2004) and French Polynesia (Kahn 2000), phosphate mining in Nauru (Teaiwa 2005), coastal mining in Tuvalu (Connell 2003, Webb 2006), and overfishing in all the world's oceans (Glantz 1992). Failing to recognize the global causes of climate change and sources of vulnerability—for example, the results of resource extraction perpetrated in the interest of distant countries—"puts the burden of adjustment on the recipients rather than the producers of risk" (Pelling & Uitto 2001, p. 52).

In line with Hau'ofa's sea of islands proposal, vulnerability to climate impacts must also be examined in concert with alternative perceptions of risk, including views about susceptibilities, anxieties, and needs as well as views that challenge "the deterministic notion of presumably vulnerable groups as passive victims by highlighting people's skills, strategic responses, and agency" (Tschakert 2007, p. 382). In islands, it is particularly apparent that "perception of risk and vulnerability, and even impact, is clearly mediated through linguistic and cultural grids, accounting for greater variability in assessments and understandings of disaster" (Oliver-Smith 2004, p. 17). In coastal Papua New Guinea, for example, rising seas and the prospect of resettlement are perceived as emasculating male community leaders and decision makers with the result that risk perceptions and ways in which people are vulnerable are directly linked with

NAPAs: National Adaptation Programs of Action

Risk perception: culturally situated understanding about the danger posed by a threat to society or the environment

cultural meanings and gendered social relations within the community (Lipset 2011). In low-lying Tuvalu where population mobility is culturally inherent, vulnerability is seen to arise less from potential loss of land and more from the disruption of cultural integrity and national identity that relocation would generate (Lazrus 2009b).

Adaptation and Resilience

"While island populations are not in a position to control the fossil fuel addictions of developed nations, they are not passive victims without agency on the climate change issue" (Barker 2008). Islander agency channeled into adaptive capacity and resilience is at the heart of Hau'ofa's sea of islands proposal. According to the sea of islands thesis, islanders' agency in the face of climate change is evident at household, community, national, regional, and international levels. Specifically in the context of coastal areas, resilience is the capacity of the linked social and ecological systems to "absorb recurrent disturbances such as hurricanes or floods so as to retain essential structures, processes, and feedbacks" (Adger et al. 2005, p. 1036).

Adaptations and adaptive capacity enhance resilience. Smit & Wandel (2006, p. 281) summarized that "based on their timing, adaptations can be anticipatory or reactive, and depending on their degree of spontaneity they can be autonomous or planned." Household and community efforts in islands tend to be autonomous, in line with traditional practices, and informed by local perceptions of risk and vulnerability, for example, planting mangroves, erecting sea walls, and community-initiated relocation planning (Rakova 2009). Campbell (2006) examined traditional practices through which Pacific islanders have adapted to their environments, including resilient agriculture, "famine foods," food storage and preservation, and cooperation through ceremony and interisland networks. Inspired by Hau'ofa's thesis, Barnett (2002) argued that such practices should be promoted as part of enhancing islanders' adaptive capacities and "world enlargement."

At the national level, adaptation planning and policy are influenced by the constraints as well as opportunities of international development, such as the NAPAs. Resources to carry out research (including education and training) and implement adaptation measures are limited and ear-marked, and they come with strict deadlines—all factors that can challenge national sovereignty and the autonomy of island leaders (Barnett & Campbell 2010). The systemic, political, and economic processes that give rise to vulnerability may be most evident at the national level. Tuvalu's ambassador to the UN explained, for instance, that the small country of just 11,000 had to compete with capacities of larger developing nations such as Bangladesh for the Global Environmental Facility funds to enable the NAPA (A. Pita, personal communication). According to Kempf (2009, p. 196), however, there should also be opportunity in smallness: "Precisely in view of the fact that many islands are at acute risk from climate change and rising sea levels, smallness should be seen . . . as constituting one of the most important argumentative resources in the political discourse of those . . . societies that find themselves facing the prospect of forced migration and resettlement."

In evident fulfillment of Hau'ofa's sea of islands thesis, regional alliances and networks of island communities allow them to harness this argumentative resource by having a significant presence in international climate arenas. At the UN, SIDS is represented by AOSIS, which is comprised of island governments advocating and negotiating on behalf of SIDS around the world for climate solutions. AOSIS includes members from around the world but is dominated by Pacific members. Members of AOSIS have pushed for decreased greenhouse gas emissions and adaptation measures that will be necessary for island communities to deal with the level of change that is now inevitable. Other regional efforts include the Secretariat of the Pacific Community, the Secretariat of the Pacific Regional Environment

Programme, the Caribbean Community Secretariat, the Caribbean Climate Change Center, Organisation of Eastern Caribbean States, and a network known as Many Strong Voices that represents both small islands and arctic communities (see Kelman 2010).

Migration and Resettlement

Migration as a response to climate change impacts is a critical issue at the heart of much climate discourse and debate within and concerning island communities: Will islands become uninhabitable as a result of the effects of climate change? Where and when will people go? How will relocation be financed? Who should make relocation decisions? How will the cadre of citizenship rights be configured for people relocated across national borders? How will cultural continuity and integrity be impacted? These are imperative questions that must be addressed primarily by islanders but also by people from multiple disciplines working together including anthropologists, international lawyers, and natural scientists with expertise in areas such as sea-level rise and coastal hydrology. Limited investigations of island migration in the context of contemporary climate change indicate it is neither a highly salient nor favored future (McAdam & Loughry 2009, McNamara & Gibson 2009, Lilomaiava-Doktor 2009, Mortreux & Barnett 2009, Rakova 2009, Kuruppu & Liverman 2011).

Population mobility is inherent in islands where, by definition, islanders traverse large and small distances to pursue jobs, education, and healthcare and to maintain extended-family networks (Munro 1990, McCall 1994, Hugo & Young 2008, Tacoli 2009). Migration has also long been an adaptive response to ecological duress (Hugo 1996). However, in the context of climate change, migration is considered a failure to adapt (Oliver-Smith 2010). This is encapsulated in the notion of "climate refugees"—an adaption of "environmental refugees" that refers to those who flee environmental crises in their homelands (Black 2001, Dun & Gemenne 2008, Biermann & Boas 2010). These terms have been found both politically and analytically lacking as they do not offer protection under the Geneva Refugee Convention of 1951 (Castles 2002) and they obfuscate the social, political, and economic factors that combine with environmental pressures to give rise to vulnerability and motivate mobility (Black 2001, Castles 2002, Hartmann 2010, Raleigh & Jordan 2010).

To the extent that climate-related changes motivate migration—owing to loss of land area, freshwater resources, and the compounding effects of climate change—such migration is expected to occur primarily within national boundaries (Warner et al. 2009). Low-lying islands and countries without higher elevations are clear exceptions, raising issues of national sovereignty and individual citizenship (McNamara & Gibson 2009, Biermann & Boas 2010, McAdam 2011). Projections about the effects of climate change put the "physical basis of national sovereignty . . . at risk" (Barnett & Adger 2003, p. 327) and raise unprecedented questions about the relationship of citizenship and territorial sovereignty (Yamamoto & Esteban 2010). The loss of sovereignty and citizenship rights poses a secondary disaster of equal or greater scope than the physical impacts of climate change (Lazrus 2009a). Farbotko & Lazrus (2012) conclude as follows:

> Climate change related migration is likely to be a reality, but it need not be a refugee crisis . . . . We posit that islander perspectives and practices offer alternatives for equitable and effective policy to address climate vulnerability . . . . Land-based adaptation strategies, defined by existing national and subnational boundaries, are important, but so too is an injection into adaptation debates of different possibilities for, and experiences of, migration across these boundaries. (p. 388)

Whether managed or spontaneous, migration in response to climate change that follows existing migration patterns in subnational and international networks is commiserate with

Hau'ofa's sea of islands theory and the process of "world enlargement." However, migration planning must be on the terms of those migrating, as well as the host communities, and proceed with utmost caution to avoid being maladaptive (Barnett & O'Neill 2012).

Justice, Equity, and Power

A web of justice, equity, and power issues are central to the climate change challenges faced by island communities. The rights of islanders to retain their homelands put the international community under an obligation to do all it possibly can to avoid a future mass displacement of island people (Farbotko & Lazrus 2012). Displacement would qualify as having surpassed "dangerous" levels of climate change and, therefore, constitutes an infringement of the UN Framework Convention on Climate Change,[2] the leading international framework for dealing with climate change (Barnett & Adger 2003).

Though islands and island communities stand to be among the first and most adversely affected by climate change impacts, their contributions to global levels of greenhouse gas emissions are relatively negligible. Deforestation, large-scale agriculture, and other land-use activities that contribute to climate change are significant parts of the economies of some islands, such as the Solomon Islands and Papua New Guinea. However, they are relatively insignificant globally as contributors to climate change and are driven by the larger economies of distant consumers (Kelman 2010). Although relatively small consumers of fossil fuels, island communities are dependent on fossil fuels because of a limited local alternative energy infrastructure and resources and because of the need to transport people and materials across the distances that define islands. The dependence on fossil fuels leaves islanders vulnerable not only to the effects of climate change, but also to the volatility of oil prices for both consumers and suppliers, for example, the oil-producing countries of Bahrain (Clarke 1990), East Timor (Steele 2002), and Trinidad and Tobago, whose government views their vulnerability to climate change as primarily resulting from the global transition to renewable energies (Hughes 2011).

Climate refugees and sinking islands have become popular tropes in climate discourse. While highlighting the plights of islanders, such metaphors do more harm by removing agency from these people. Bravo (2009) and Farbotko (2010) described how climate discourses about sinking islands position islanders as victims as a result of the climate crisis they name. Farbotko (2010, p. 48) explained that "only after they disappear will the islands become an absolute truth of the urgency of climate change, and thus act as a prompt towards saving the rest of the planet." These discourses also serve to remove the effects of climate change from economic and decision-making centers: "Climate change is something happening somewhere else, tropical islands or arctic ice, but not here. The result could be a reduction rather than increase in concern among Western audiences" (P. Rudiak-Gould, personal communication).

The complexity reflects Hau'ofa's (1993) concerns that islands are often not represented and islanders are not given a voice in these debates. In response, and from the perspective of justice in the face of climate change's challenges, Kelman (2010, p. 610) proposed that "[j]ustice would be advanced if [islanders] were supported now to make thought-through decisions on their own terms, rather than waiting for an acute crisis, so that decisions must be made on emergency terms, usually controlled by external parties." A further challenge is the cross-cultural communication of climate change and what is understood to be its cause or consequence. For example, the non-English words used to describe climate change may encompass ideas not intended by translators such as change not only in the global climate, but in the environment, cosmos, and local

[2]Article 2 states the Framework's primary objective is "to stabilize greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system."

culture—such as social transition and waning traditions—in general (Rudiak-Gould 2012).

MOVING FORWARD WITH CLIMATE RESEARCH AND POLICY IN ISLAND COMMUNITIES

How can we operationalize the conceptual framework that combines the totality of relationships inherent in the sea of islands proposal and used to explain vulnerability? The unique challenges faced by island communities as they negotiate the effects of a changing climate require revised methods for the production of knowledge and policy. Calls have been made for more integrated research that combines island-based and scientific knowledge about disasters and climate change (e.g., Mercer et al. 2007; Kelman et al. 2009, 2012; Lefale 2010). Coproduction of knowledge ideally overcomes the binary of traditional versus scientific knowledge (Agrawal 1995), and research methods must be calibrated so that islanders retain control over what and how island-based knowledge is incorporated into planning for the future (Posey 2002, Nadasdy 2005, Smith 2012). Educational efforts in island communities that combine island-based and scientific learning can empower a new generation to move more fluently between local and international circles (e.g., Addison & Kalolo 2009).

Kelman & Gaillard (2009, p. 130) proposed an anthropology without borders that they describe as anthropologists "willing to work anywhere under any circumstances with people from all disciplinary and cultural backgrounds." Crate (2011, p. 185) has called for a "climate ethnography" to emphasize the urgency and reflexivity necessary to advance our methods to address climate change." Both proposals emphasize the need for interdisciplinary, multimethodological (qualitative and quantitative) approaches, but they grapple with the deep epistemological and methodological difficulties that arise from the fact that the insider/outsider distinction breaks down in islands and hybridity is the norm (Baldacchino 2008). Such proposals will hopefully go some way toward addressing the problems that arise when "academic and consultancy experts tend to overlook or misinterpret grassroots activities because these do not fit in with prevailing views about the nature of [island] society and its developments" (Hau'ofa 1993, p. 2).

CONCLUSION

Islands and island communities face critical challenges from climate change impacts. However, the challenges are not insurmountable. Barnett & Campbell (2010, p. 184) have articulated the challenge for island communities to "adapt to sustain their needs, rights, and values" and the challenge for the international community to reduce greenhouse gas emissions and support island communities to adapt in the ways those communities see fit. The authors conclude as follows: "This is possible, and anything less is unacceptable." Anthropology can play an important role in facilitating these transitions (e.g., Kelman & Gaillard 2009, Crate 2011).

Anthropological attention to climate change's challenges was prompted more than three decades ago by Margaret Mead (1980) following a conference she convened on the topic:

> We are facing a period when society must make decisions on a planetary scale.... Today's natural catastrophes and environmental interventions affect the whole of human society—interconnected as it is in reality though not yet politically capable of acting in concert.... [W]e have a long way to go before we can demonstrate that we are willing to act vigorously when nameless throngs are endangered. (pp. xvii–xxii)

The conceptual framework based on Hau'ofa's sea of islands proposal and the theory of social vulnerability addresses Mead's appeal by focusing on the totality of relationships that constrain and support the agency of islanders to navigate climate change. Agency in the form of adaptive capacity and

resilience harnesses local ways of knowing and traditional practices, responds to culturally specific ways of perceiving risk and assessing vulnerability, and accesses local and regional networks that support regional organizations representing islanders' interests in international forums as well as current forms of migration.

SUMMARY POINTS

1. Islands stand to be among the first and most adversely affected by climate change impacts, including extreme events.
2. Rather than small, isolated, and dependent entities, island communities are deeply connected in ways that both facilitate and constrain islanders' abilities to respond in their own terms to climate change's challenges.
3. The agency of islanders is evident in TEK and alternative ways of knowing about and perceiving risk and vulnerability, local adaptation strategies, and resilience demonstrated at household, community, national, and regional levels.
4. Issues of justice, equity, and power are central to the challenges of climate change in island communities.
5. Responding to climate change in island communities necessitates a sea change in research and policy methodologies that are based on coproduction of knowledge and supporting island communities to retain control over their futures.

FUTURE ISSUES

1. What are (*a*) the primary sources of vulnerability and (*b*) the key barriers to adaptation in island contexts and how could they be addressed?
2. What is the relationship between climate change impacts, adaptation, and migration in island contexts?
3. How could islander migration in the face of climate change be managed and facilitated to prevent a secondary disaster from loss of culture, rights, and citizenship?
4. How do island diaspora who are living away from their homelands perceive the challenges of climate change, maintain cultural integrity, and navigate political and social relationships with the host country?
5. How can seeing the "totality of relationships" in island representations effectively inform island responses to climate change?

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