Title:

Do Climate Change Interventions Impact the Determinants of Health for Pacific Island Peoples?

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Do Climate Change Interventions Impact the Determinants of Health for Pacific Island Peoples?

Pacific island peoples are increasingly voicing their concerns about the impacts of climate change on their health, including the effects of mean global atmospheric temperature rise, sea-level rise, and intensified (but not necessarily increased frequency of) weather events such as heatwaves and tropical cyclones (IPCC 2014; Steiner 2015; Tiatia-Seath and others 2020; Watts and others 2021). Central to Pacific island peoples' actions to address their concerns are maintaining livelihoods and health, especially since Pacific island peoples are often said to be at the forefront of these climate change impacts (Tisdell 2008; Regmi 2015; Steiner 2015), although others give the same messages for many other regions (Dulal 2019,12-24; Falardeau and Bennett 2019,1-23). Meanwhile, the Pacific regional policy level has highlighted both health and climate change as being issues of high importance (Forum Secretariat 2017, 2018; Leslie and Wild 2018; Tarte 2014; WHO 2015), demonstrating the need for deeper understanding regarding the usefulness and relevance, or otherwise, of available policies for Pacific island peoples.

Much such research adopts a small island developing states (SIDS) perspective, but this approach has been highly critiqued. First, different lists provide different SIDS, so the numbers range from around three dozen to almost five dozen. Second, non-island countries such as Belize and Guyana are included along with part-island countries such as Timor-Leste and Haiti. Third, their commonalities are said to be their small land areas and population sizes alongside high dependence on coastal and marine livelihoods, but Cuba, the Dominican Republic, and Papua New Guinea (PNG) are examples not matching these characteristics. Consequently, the SIDS grouping is more political than geographic and does not necessarily represent Pacific island peoples.

Instead, this paper places Pacific island peoples, rather than that Pacific SIDS or the Pacific region, at the center of framing and analyzing the literature. With no claim that Pacific island peoples are homogenous—in contrast, they represent exceptional and important diversity—for many Pacific island peoples, climate change's impacts on their environment, and therefore on their health show some similarities. Rainfall variability, sea surface temperatures, and sea-level rise will likely affect the quantity and salinity of fresh groundwater (Murphy 2015,380-397; Nunn 2009,211-231; Korauaba 2015,232-238; White and others 2007,581-590). The changing morphology of reefs and atolls in the Pacific demonstrates the structural stability some of these islands under sea-level rise (Masselink and others 2020, McLean and Kench 2015,445-463; Cornell 2015, 1-36, Tuck and others 2019). Nevertheless, when combined with increased weather intensity—especially droughts, storms, and heat-humidity combinations—severe impacts including through coral bleaching might be seen, thereby impacting food, freshwater, and infrastructure (IPCC 2014). Meanwhile, ocean acidification (the increase in acidity of the ocean caused by absorbing carbon dioxide from the atmosphere) is likely to affect coastlines and fisheries (Doney and others 2020; IPCC 2014).

Beyond these impacts, climate change affects human health in other ways (Costello and others 2009; Watts and others 2021). Health impacts are widely unequal and inequitable, with many of the most vulnerable populations seeing the greatest health impacts from climate change (Patz and others 2007). These health inequities exist because of the conditions in which people are born, grow, live, work, and age (e.g. education, work, housing, and social supports) and the systems dealing with illness (e.g. healthcare quality and access). The conditions directly impacting health, coined the social determinants of health, are, in turn, shaped by the social and political organization of society (e.g. political context, public policies, and social constructs), and

generate a stratification of the population into a hierarchy of socioeconomic positions, indirectly impacting livelihoods and health. Together, these circumstances constitute the structural and social determinants of health and are responsible for a major part of health inequities within and between countries (WHO 2008), including determining which population groups are particularly vulnerable to the health impacts of climate change (Costello and others 2009; Patz and others 2007; Watts and others 2021). The connections between climate change and health are complex, context-specific, and dynamic (Costello and others 2009; Hudson 2016; Watts and others 2021). Direct impacts of climate change on mortality and morbidity, alongside impacts on the structural and social determinants of health, indirectly exacerbate health inequities (Friel and others 2008).

Pacific island peoples experience the unequal and inequitable distribution of adverse health impacts from climate change (Tisdell 2008; Regmi 2015). Among Pacific island peoples, climate change's impacts on material and natural resources seem likely to impose pressures on population health (McIver and others 2017; Tiatia-Seath and others 2020). Since many Pacific social and livelihood activities are concentrated on the coasts, and some islands are entirely coastlines, impacts could be severe (Tisdell 2008). Reduced agriculture and fisheries, alongside damaged infrastructure, have a high probability of affecting food and livelihoods (IPCC 2014). While health impacts are difficult to project since they also depend on people's responses to climate change, which create and use opportunities for health-related improvements, climate change is currently projected to increase health risks overall in the absence of appropriate action (Ahern and others 2005; Fouillet and others 2006; Schewe and others 2014; Tiatia-Seath and others 2020; Watts and others 2021; WHO 2016).

Climate change is frequently depicted as an external threat to Pacific island peoples with external interventions frequently being assumed to be the primary response, but in contrast, the

direct health impacts of climate change typically occur in tandem with other underlying challenges, including poverty, and many actions must start locally (Steiner 2015; Tiatia-Seath and others 2020; Tisdell 2008). Pacific island peoples often face challenges such as rapid urbanization lacking sufficient services, rapid population growth, inadequate formal education, reduced consumption of local foods, increased reliance on imports, and livelihood opportunities heavily depending on external influences (Campbell 2009; Harris and others 2011; Savage and others 2020). These underlying developmental factors mean that climate change impacts on health cannot be considered in isolation from the structural and social determinants of health, particularly local perspectives and actions (Gaillard 2012). Thus, strategies for reducing the impacts of climate change without tackling the root causes of its uneven burden distribution are likely to be insufficient, suggesting the need to understand better how climate change interventions might impact the structural and social determinants of health.

This article places climate change interventions (at all scales, from local to global) in the context of underlying structural and social determinants of Pacific island peoples' health through an analytical literature review. Human health is inherently people-centered (by definition), hence this paper places Pacific island peoples, rather than Pacific SIDS or the Pacific region, at the center of the framing and analysis of the literature. We attempt to capture how interventions for climate change may or may not impact these social determinants of health, shedding light on opportunities and challenges within major categories of climate change interventions. The following sections will evaluate the impacts of diverse interventions through the analytic lens of the structural and social determinants of health, as presented in the World Health Organization's framework, detailed in figure 1 (which also captures all scales).

<figure 1 about here>.

Opportunities for Pacific Island Peoples

Climate change interventions are separated into overlapping categories of mitigation and adaptation. Mitigation reduces greenhouse gas emissions and increases the sinks and reservoirs which remove greenhouse gases from the atmosphere; that is, mitigation serves to control the anthropogenic causes of climate change (IPCC 2014). Adaptation refers to adjustments made to address climate change impacts by reducing harm and exploiting beneficial opportunities from climate change (IPCC 2014).

Previous work highlights that addressing climate change typically means addressing issues relating to one or more specific determinants of health, as outlined within the Structural and Social Determinants of Health framework (WHO 2008). Through analyzing potential impacts of climate change interventions on these determinants, we found three recurrent themes, suggesting that from the perspectives of Pacific island peoples, climate change interventions can and should:

Be planned and led by and with island peoples (Harris 2014,77-96; Korauaba 2015,232-238; Alley 1999,137-151; Mercer 2010,247-264; Okano and others 2015,394-406; Regmi 2015,319-335; Richmond and Sovacool 2012,843-848; Nunn 2009,211-231; Daly and others 2010,265-281; Iese and others 2014,166-193; Steiner 2015);

Be sensitive to local cultural diversity among Pacific island peoples (Aswani and others 2015,1487-1501; Frankland and others 2012,46-51; Kuruppu 2009,799-809; Leon and others 2015,424-438; Magee and others 2016,1091-1105; Daly and others 2010,265-281; Iese and others 2014,166-193; Donner and Webber 2014,331-345);

Be integrated within broader and larger developmental goals (Mercer 2010,247-264; Storey and Hunter 2010,167-181; Webber 2012,2717-2733; Gero and others 2011,310-327; Ensor and others 2018) including gender equity (Alley 1999,137-151; Lane and McNaught 2009,67-80) and targeted education (Magee and others 2016,1091-1105; Daly and others 2010,265-281).

Some work uses phrases involving "empowerment" or variations thereof which, to a large extent, is what these points refer to and highlight. "Empowering" potentially has a connotation that external permission is required "to allow" Pacific island peoples to be empowered, or that someone else confers empowerment on people, which is the opposite of what the interventions are promoting.

Climate change interventions adhering to these three points could enhance trust of and participation in projects, thereby improving governance (Lynch and Brunner 2010; McIver and others 2017; Tiatia-Seath and others 2020). Governance, defined as the process by which actions, norms, and rules are structured, sustained, and held accountable (Peters and Pierre 1998; Rosenau and Czempiel 1992), is a structural determinant of health, which controls the distribution of resources and the socioeconomic context of individuals and communities (WHO 2008). Part of governance is considering how peoples experience the environment, since the culture/nature divide hardly exists in reality (Emde and others 2020). Pacific island peoples (as with everyone else) respond to experiences of environmental changes in their own creative, local, and varied ways, according to their needs, interests, worldviews, and ontological principles. Cultural awareness, local knowledge, and an understanding of the diverse ways of knowing and experiencing the environment (and its connection between people and place) are

essential—but are not a panacea and should not operate in isolation (Tibby and others 2007)—for developing sustainable strategies among Pacific island peoples.

Sustainable development also has the potential to improve the structural and social determinants of health at many levels. For instance, promoting equity can improve the socioeconomic position of some groups (Lane and McNaught 2009; WHO 2010) and fostering education can reduce marginalization and improve awareness of climate change and developmental issues (Harris 2014). Lastly, external aid is sometimes stated as having generally positive repercussions on the availability of financial resources, helping to maintain social services of quality and basic material needs; yet external aid can negatively impact governance by undermining the legitimacy of peoples' priorities and mechanisms (Gaillard 2012; Stojanov and others 2019). Leadership from Pacific island peoples combined with fostering sustainability and development through diverse culturally sensitive approaches should be a hallmark of climate change interventions. Pacific island peoples would reduce climate change's detrimental health impacts while positively influencing the structural and social determinants of health.

Migration as a Mixed Opportunity

Many Pacific island peoples depend on sea and coastal resources for livelihoods (Regmi 2015; Nunn 2009) with a key concern being that the impacts of climate change and especially sea-level rise and ocean acidification could surpass abilities to cope with the changes and to sustain current livelihoods (Murphy 2015,380-397; Birk 2012,81-109). Populations living in coastal zones of Pacific islands with large interiors or higher elevations might have possibilities for relocating internally, although land tenure considerations and other hazards could impede this approach. Meanwhile, populations living on low-lying islands have few internal options for

relocation and might have to migrate across international borders (McIver and others 2016; Nunn 2009).

Mobility in and around the Pacific is not new, instead being an integral part of local life and livelihood, both forced and voluntary (Dun and Klocker 2017; Tabe 2019). Moreover, the relationship between climate change, migration, and health is not a direct causal one. Other determinants play an important role in decisions to relocate or to stay and thus on subsequent health impacts. Examples are the growing population and development pressures on resources; weak infrastructure; economic and political marginalization; and the status of health systems, as well as seeking external opportunities and reuniting family ties (Watts and others 2021; Donner 2015; Fiddian-Qasmiyeh 2020; Tabe 2019).

Nonetheless, as climate change impacts on Pacific island peoples increase, mobility might be an adaptation strategy (Murphy 2015; Birk 2012; Stojanov 2014) with both positive and negative consequences on the structural and social determinants of health. Tables 1 and 2 synthetize the positive and negative impacts, respectively, that migration can have on the determinants of health.

<Table 1. Positive impacts of migration on the structural and social determinants of health>

<Table 2. Negative impacts of migration on the structural and social determinants of health>

As observed in table 1, migration as an adaptation strategy to climate change can have positive impacts on various structural and social determinants of health. Migration has the potential to alleviate problems of population density, resource pressure, food insecurity, poverty, and exposure to environmental change, all of which could be positive for health (Birk 2012; Fiddian-Qasmiyeh 2020). Planning for migration, through investments in education and upskilling of the workforce, can improve social and public policies serving Pacific island peoples (Tabe 2019). Resettlement can also create livelihood opportunities for both the migrants and those who stay behind, such as through remittances, thereby improving socioeconomic positions and material circumstances on the islands (Birk and Rasmussen 2014,1-13; Connell and Lutkehaus 2017,79-95; Gibson and McKenzie 2014,229-243; Weber 2017,1089-1101; Birk 2012,81-109). Furthermore, scenarios of large-scale collective migration, can be perceived as opportunities for Pacific island peoples, which has been articulated and deconstructed for Kiribati (Gagaeolo and others 2020; Hermann and Kempf 2017). These positive outcomes on local material circumstances, socioeconomic positions, and social, public, and macroeconomic policies as structural and social determinants of health have the potential to decrease health inequities while also decreasing underlying vulnerabilities to climate change.

Though increased migration can bring some benefits to Pacific island peoples who both migrate or stay behind, the literature shows that it could have negative consequences as well for the determinants of health of both groups. As shown in table 2, migration does not come without challenges. Widespread nationalistic and populist opinions have made the task of planning effective international migration projects more difficult and relocated populations can face issues of political representation, being at the mercy of international governance of political, legal, and civil rights support (Connell and Lutkehaus 2017; Donner 2015). This impact of resettlement on

governance in turn can impact how social and public policies respond to the needs of Pacific island peoples. Negative impacts on these structural determinants include issues around land rights. In some cases, lack of housing or poor quality abodes leads to the creation of informal settlements, as well as lack of social support, inequitable opportunities, and degraded living circumstances such as with respect to food and potable water alongside poor sanitary and hygiene conditions (Craven 2015; Birk, 2012; Remling 2020; Oakes 2019; Savage and others 2020). In addition, migration can lead to the erosion of cultural identity and societal values, directly impacting social cohesion and detrimentally affecting mental and physical health of Pacific island peoples (Tabe 2019; Tiatia-Seath and others 2020).

People who stay behind can face various challenges. In the context of Pacific island peoples, migration can benefit those who stay behind at first, by improving financial capital, reducing resource pressure, and reducing exposure to hazards, which can support positive health outcomes. Past a certain threshold of migration, the benefits can begin to be offset because it might not be desirable or feasible to provide full-scale health systems and services, which could inhibit positive health outcomes and contribute to health inequities (Remling 2020; Oakes 2019). Likewise, in higher-elevation islands, where coastal livelihoods might be threatened, coastal peoples might own few (if any) inland areas and could encounter difficulties in sustaining their livelihoods in non-coastal areas (Nunn 2009). Despite the potential to alleviate problems of resource pressure, lack of food and potable water, poverty, and exposure to environmental change (Birk 2012), migration can create problems through increased vulnerability and increasingly poor social determinants of health of resettled people (Craven 2015; Donner 2015).

While migration shows potential to positively impact the structural and social determinants of health in some ways, it can also have negative consequences. Some people,

including whole communities, might refuse to relocate while sometimes the choice is given as either migrate or invest in local development, a false dichotomy (Fiddian-Qasmiyeh 2020; Abubakar and others 2018; Roberts and Andrei 2015). If not planned by or with the people affected, then migration could exacerbate vulnerability to climate change's health consequences (Craven 2015,223-236). Meanwhile, scenarios of planned, large-scale, collective migration can be perceived as opportunities for peoples to preserve cultural identity and social cohesion while also improving the structural and social determinants of health of people who stay behind (Abubakar and others 2018; Hermann and Kempf 2017; Birk and Rasmussen 2014; Connell and Lutkehaus 2017; Gibson and McKenzie 2014; Weber 2017).

People-Based Solutions for Improved Determinants of Health

People-based interventions on climate change include ecosystem-based management, community-based adaptation (CBA), and adaptation of the tourism industry and of the health sector. Each of these interventions could impact the structural and social determinants of health in a variety of ways, thereby influencing the underlying developmental challenges that create and maintain vulnerabilities of Pacific island peoples in the face of the health impacts of climate change.

In response to climate change, ecosystem-based management gave rise to ecosystem-based adaptation, in which Pacific island peoples and their ecosystems address climate change and its impacts, with benefits beyond climate change (Lebot 2013; Wongbusarakum and others 2015). The literature discusses three major ecosystem-based management strategies—fisheries, natural resources management, and coastal planning—considered to be both adaptation and mitigation measures. These strategies have the potential to improve the structural and social

determinants of health at various levels (table 3). Localized management approaches can improve local governance and leadership, especially when the most vulnerable communities are fully involved in the process (Davies 2016; Chong 2014; Wongbusarakum and others 2015).

<Table 3. Positive impacts of ecosystem-based management strategies on the structural and social determinants of health>

Agriculture crop adaptation, aquaculture, fish aggregating devices, and natural resource management can promote local livelihoods and economies, reducing dependence on imports while increasing food security and improving household socioeconomic conditions (Campbell 2009; Dey and others 2016; Lebot 2013; Rosegrant and others 2016; Andréfouët and others 2017). Mangrove restoration and protection can promote better living conditions through coastal and habitat protection from sea-level rise and storm surge, as well as providing forestry products, food, and medicinal plants (Menéndez and others 2020; Pedersen Zari and others 2019). By accepting local governance, local leadership, and local participation, ecosystem-based management has the potential to improve the structural and social determinants and health in the face of climate change.

CBA concentrates on integrating local needs, knowledge, resources, and capacities while involving and providing options to the most vulnerable communities (Crick and others 2013), thereby providing important benefits for the structural and social determinants of health (table 4). CBA can improve civil participation in governance; establish trust among people at all governance scales; and increase the capacity and resources of people, communities, and governments (Nunn and others 2014; Webb and others 2015). Additionally, CBA has the

potential to improve access for vulnerable communities to microfinance schemes, credits, external resources, and training for implementation (Chandra and others 2016; Dumaru 2010; Ensor and others 2018; Chong 2014). CBA thus improves social cohesion through supporting local leadership, expanding social networks, accessing information, and promoting local human, financial, and technical resources (Crick and others 2013; Cvitanovic and others 2016; Dumaru 2010).

<Table 4. Positive impacts of community-based adaptation on the structural and social determinants of health>

CBA approaches nonetheless need to account for local power structures that can influence who leads discussions and actions within communities. While no single CBA activity can address the breath of health determinants (Ensor and others 2018), the variety of CBA interventions can, together with wider approaches to development and livelihoods, tackle vulnerabilities across several structural and social determinants of health.

Tourism contributes substantially to Pacific island peoples' livelihoods and quality of life, thus supporting health (Becken and Clapcott 2011; Hampton and Jeyacheya 2020; Huebner and Milne 2012; Klint and others 2012; Puig-Cabrera and Foronda-Robles 2019; Wong and others 2013a, 2013b). Climate change can significantly affect an unprepared or maladapted tourism industry through impacting infrastructure and services, such as damaging facilities, reducing freshwater, and interrupting food and energy supplies. In parallel, climate change might decrease the appeal of tourist attractions such as through coral bleaching and shoreline erosion (Becken 2005; Hafezi and others 2020; Wong and others 2013a, 2013b; Wong and others 2012),

while recognizing that these processes are also created and exacerbated by human activities beyond climate change (Cortés and Reyes-Bonilla 2017; Komugabe-Dixson and others 2019). As a result, interventions for and by the tourism industry for climate change adaptation and mitigation are described to impact positively the structural and social determinants of health, as highlighted in table 5. More work would be useful to examine documented and possible negative health impacts of tourism, especially as climate change affects the industry, given discussions for some Pacific island peoples on drawbacks such as livelihood reliability (Puig-Cabrera and Foronda-Robles 2019) and the poor relationship between tourism income and happiness (Matatolu 2019).

<Table 5. Positive impacts of strategies for tourism industry on the structural and social determinants of health>

Training of this sector and education on the risks and opportunities improve governance by increasing Pacific island peoples' participation in and influence on policy and practice (Becken and Clapcott 2011; Wong and others 2013a, 2013b; Wong and others 2012), provided that negative health impacts from tourism do not manifest and ultimately hoping for expanded local leadership and control. Furthermore, at a macroeconomic and socioeconomic level, promotion of an adaptive tourism industry can create employment, self-sufficiency, and advance gender equity (Huebner and Milne 2012; Jiang and others 2012), while keeping in mind the potential negative impacts (Matatolu 2019; Puig-Cabrera and Foronda-Robles 2019). Adaptation and mitigation strategies revolving around building sustainable structures, restoring local ecosystems with local species, and controlling pollution and human impact on the environment

can improve local living and livelihood conditions while supporting ecosystems experiencing climate change's impacts and improving self-sufficiency in water storage and energy supplies (Becken 2005; Wong and others 2012). Development of renewable energy can reduce fossil fuel dependency, provide more opportunities for local livelihoods, and improve living conditions (Singh 2020). The tourism industry thus has the potential for improving the structural and social determinants of health, but negative consequences are never too far away and need to be carefully monitored to ensure that Pacific island peoples are not losing control of their communities and opportunities.

Strategies aimed at improving health systems functioning in the face of climate change can have positive impacts on the structural and social determinants of health, as well as directly on health outcomes. Studies include strategies targeted directly at Pacific island peoples' health systems, such as increasing human skills and abilities, as well as equipment resources, while improving health data collection and monitoring (Spickett and Katscherian 2014; Spickett and others 2013). Another suggested approach is improving health systems to deal with routine needs as well as disasters (Cauchi and others 2019; Mahany and Keim 2012), noting that improving abilities to deal with routine needs improves prevention of and response to disasters (Lewis 1999, 2009).

Promoting Pacific island peoples' health and the health sector to deal with climate change includes fostering education through local and school-based education programs (Cauchi and others 2020; Hausia Havea and others 2020; Spickett and Katscherian 2014; Spickett and others 2013) without neglecting informal education and learning. The need is recognized for local cross-sectoral collaborations of the health system with water, hygiene, sanitation, agriculture, fisheries, and food to address the underlying causes of climate change's health impacts, rather

than focusing on only the symptoms as seen through climate change impacts (Cauchi and others 2020; Morrow and Bowen 2014; Spickett and Katscherian 2014; Spickett and others 2013; McIver and others 2016). As such, improvements of and by Pacific island peoples for the health sector and systems means improved responses to climate change's impacts simultaneously with local leadership to address problems in the structural and social determinants of health.

Conclusion

Overall, for Pacific island peoples, climate change is suggested as exacerbating pressures on the structural and social determinants of health, thereby perpetuating and exacerbating climate change related vulnerabilities and poor health outcomes. Interventions across all scales, from local to global, show opportunities not only to address the direct impacts of climate change, but also to contribute positively to the structural and social determinants of health of Pacific island peoples by impacting the conditions in which people are born, grow, live, work, and age, and the social and political organization of societies.

As such, climate change interventions have the potential to positively influence the structural and social determinants of health of Pacific island peoples, such as migration sometimes positively impacting many of the determinants of health for both resettled populations and those who stay behind. Other interventions on climate change, such as ecosystem-based management, community-based adaptation, and adaptation of the tourism industry and of the health sector, can impact the structural and social determinants of health in a variety of ways. These impacts can influence the underlying development challenges creating increased vulnerability of Pacific island peoples in the face of the health impacts of climate change.

Careful planning for these interventions, coming mainly from Pacific island peoples, is necessary to avoid adverse effects on the structural and social determinants of health.

Even though many climate change interventions have the potential to impact positively the structural and social determinants of health, a scarcity of empirical data still exists regarding these impacts. Specific, measurable, verifiable indicators relevant to, developed by, and accepted by Pacific island peoples could be useful to evaluate quantitatively and qualitatively the magnitude of the reported impacts, while understanding their exact processes and mechanisms, alongside the connections between climate change and health (e.g. Watts and others 2021). Such work would provide essential guidance with, by, and for Pacific island peoples to design and implement future climate change interventions that improve the structural and social determinants of health, while ensuring that climate change and health work remains people-centered. In this way, Pacific island peoples could decrease their vulnerabilities to the health impacts of climate change while promoting better health outcomes irrespective of climate change.

References

Abubakar, Ibrahim, Robert W Aldridge, Delan Devakumar, Miriam Orcutt, Rachel Burns, Mauricio L Barreto, Poonam Dhavan, Fouad M Fouad, Nora Groce, Yan Guo, Sally Hargreaves, Michael Knipper, Jaime J Miranda, Nyovani Madise, Bernadette Kumar, Davide Mosca, Terry McGovern, Loenard Rubenstein, Peter Sammonds, Susan M Sawyer, Kabir Sheikh, Stephen Tollman, Paul Spiegel, and Cathy Zimmerman

2018 The UCL-Lancet Commission on Migration and Health: the health of a world on the move. *The Lancet* 392: 2606–2654.

Agrawala, Shardul, Simone Gigli, Vivian Raksakulthai, Andreas Hemp, Annett Moehner, Declan Conway, Mohamed El Raey, Ahsan Uddin Ahmed, James Risbey, Walter Baethgen, and Daniel Martino

2005 Climate Change and Natural Resource Management: Key Themes from Case Studies. In *Bridge Over Troubled Waters: Linking Climate Change and Development*, edited by Shardul Agrawala, 85–132. Paris: Organisation for Economic Cooperation and Development (OECD).

Ahern, Mike, R Sari Kovats, Paul Wilkinson, Roger Few, and Franziska Matthies

2005 Global Health Impacts of Floods: Epidemiologic Evidence. *Epidemiologic Reviews* 27:36–46.

Alley, Roderic

1999 The South Pacific's Environmental Policy Tensions. *Public Administration & Development* 19:137–151.

Andréfouët, Serge, Simon Van Wynsberg, Lina Kabbadj, Colette C C Wabnitz, Christophe Menkes, Thierry Tamata, Michel Pahuatini, Iotefa Tetairekie, Iosua Teaka, Teiki Ah Scha, Taihopu Teaka, and Georges Remoissenet

2017 Adaptive Management for the Sustainable Exploitation of Lagoon Resources in Remote Islands: Lessons From a Massive El Niño-Induced Giant Clam Bleaching Event in the Tuamotu Atolls (French Polynesia). *Environmental* Conservation 45:30–40.

Aswani, Shankar, Ismael Vaccaro, Kirsten Abernethy, Simon Albert, and Javier Fernandez-Lopez de Pablo

2015 Can Perceptions of Environmental and Climate Change in Island Communities Assist in Adaptation Planning Locally? *Environmental Management* 56:1487–501.

Becken, Susanne

2005 Harmonising Climate Change Adaptation and Mitigation: The Case of Tourist Resorts in Fiji. *Global Environmental Change* 15:381–393.

Becken, Susanne, and Ross Clapcott

2011 National Tourism Policy for Climate Change. *Journal of Policy Research in Tourism, Leisure and Events* 3:1–17.

Birk, Thomas

2012 Relocation of Reef and Atoll Island Communities as an Adaptation to Climate Change: Learning from Experience in Solomon Islands. *Climate Change and Human Mobility: Global Challenges to the Social Sciences* edited by Kirsten Hastrup and Karen Fog Olwig, 81–109. Cambridge: Cambridge University Press.

Birk, Thomas and Kjeld Rasmussen

2014 Migration from Atolls as Climate Change Adaptation: Current Practices, Barriers and Options in Solomon Islands. *Natural Resources Forum* 38:1–13.

Campbell, John

2009 Islandness: Vulnerability and Resilience in Oceania. *Shima* 3:85–97.

Cauchi, John Paul, Ignacio Correa-Velez, and Hilary Bambrick

2019 Climate Change, Food Security and Health in Kiribati: a narrative review of the literature. *Global Health Action* 12:1603683.

Cauchi, John Paul, Stefano Moncada, Hilary Bambrick, and Ignacio Correa-Velez

2020 Coping with Environmental Hazards and Shocks in Kiribati: Experiences of climate change by Atoll Communities in the Equatorial Pacific. *Environmental Development* 100549.

Chandra, Alvin, Paul Dargusch, and Karen E McNamara

2016 How Might Adaptation to Climate Change by Smallholder Farming Communities Contribute to Climate Change Mitigation Outcomes? A Case Study from Timor-Leste, Southeast Asia. *Sustainability Science* 11:477–492.

Chong, Joanne

2014 Ecosystem-based Approaches to Climate Change Adaptation: Progress and Challenges. *International Environmental Agreements: Politics, Law and Economics* 14:391–405.

Connell, John

2015 Vulnerable Islands: Climate Change, Tectonic Change, and Changing Livelihoods in the Western Pacific. *The Contemporary Pacific* 27:1–36.

Connell, John and Nancy Lutkehaus

2017 Environmental Refugees? A Tale of Two Resettlement Projects in Coastal Papua New Guinea. *Australian Geographer* 48:79–95.

Cortés, Jorge and Héctor Reyes-Bonilla

2017 Human Influences on Eastern Tropical Pacific Coral Communities and Coral Reefs. In *Coral Reefs of the World*, edited by Peter W Glynn, Derek P Manzello, and Ian C Enochs, 549–563. Dordrecht: Springer.

Costello, Anthony, Mustafa Abbas, Adriana Allen, Sarah Ball, Sarah Bell, Richard Bellamy, Sharon Friel, Nora Groce, Anne Johnson, Maria Kett, Maria Lee, Caren Levy, Mark Maslin, David McCoy, Bill McGuire, Hugh Montgomery, David Napier, Christina Pagel, Jinesh Patel, Jose Antonio Puppim de Oliveira, Nanneke Redclift, Hannah Rees, Daniel Rogger, Joanne Scott, Judith Stephenson, John Twigg, Jonathan Wolff, and Craig Patterson

2009 Managing the Health Effects of Climate Change: Lancet and University College London Institute for Global Health Commission. *The Lancet* 373:1693–1733.

Craven, Luke K

2015 Migration-Affected Change and Vulnerability in Rural Vanuatu. *Asia Pacific Viewpoint* 56:223–236.

Crick, Florence, Johanna Wandel, Nic Maclellan, and Katharine Vincent

2013 Climate Change Adaptation Pathways: Insights from Case Studies in South Africa, Canada and the Pacific Islands. In *Climate Adaptation Futures*, edited by Jean P Palutikof, Sarah L. Boulter, Andrew J Ash, Mark Stafford Smith, Martin Parry, Marie Waschka, and Daniela Guitart, 242–253. Hoboken, NJ: John Wiley and Sons.

Cvitanovic, Christopher, S Crimp, A Fleming, J Bell, M Howden, A J Hobday, M Taylor, and R Cunningham

2016 Linking Adaptation Science to Action to Build Food Secure Pacific Island Communities. *Climate Risk Management* 11:53–62.

Daly, Michele, Namouta Poutasi, Filomena Nelson, and Jude Kohlhase

2010 Reducing the Climate Vulnerability of Coastal Communities in Samoa. *Journal of International Development* 22:265–281.

Davies, Kirsten

2016 Changing Tides - A South Pacific Study. *Journal of South Pacific Law* 2016: 147–159.

Deya, Madan Mohan, Kamal Gosh, Rowena Valmonte-Santos, Mark W Rosegrant, and Oai Li Chen

2016 Economic Impact of Climate Change and Climate Change Adaptation Strategies for Fisheries Sector in Fiji. *Marine Policy* 67:164–170.

Doney, Scott C, Busch, D. Shallin, Cooley, Sarah R, and Kroeker, Kristy J

2020 The Impacts of Ocean Acidification on Marine Ecosystems and Reliant Human Communities. *Annual Review of Environment and Resources* 45:83–112.

Donner, Simon D

2015 The Legacy of Migration in Response to Climate Stress: Learning from the Gilbertese Resettlement in the Solomon Islands. *Natural Resources Forum* 39:191–201.

Donner, Simon D and Sophie Webber

2014 Obstacles to Climate Change Adaptation Decisions: A Case Study of Sea-Level Rise and Coastal Protection Measures in Kiribati. *Sustainability Science* 9:331–345.

Dulal, Hari Bansha

2019 Cities in Asia: How are they Adapting to Climate Change? *Journal of Environmental Studies and Sciences* 9:13–24.

Dumaru, Patrina

2010 Community-Based Adaptation: Enhancing Community Adaptive Capacity in Druadrua Island, Fiji. *Wiley Interdisciplinary Reviews: Climate Change* 1:751–763.

Dun, Olivia and Natascha Klocker, editors

2017 Labour and Environmental Migration in the Asia-Pacific: in memory of Graeme Hugo. *Australian Geographer* 48:1–119.

Emde, Sina, Eveline Dürr, and Philipp Schorch

2020 Experiencing Pacific Environments: Pasts, Presents, Futures. *The Contemporary Pacific* 32:1–20.

Ensor, Jon E, S E Park, S J Attwood, A M Kaminski, and J E Johnson

2018 Can Community-Based Adaptation Increase Resilience? *Climate and Development* 10:134–151.

Falardeau, Marianne and Elena M Bennett

2019 Towards Integrated Knowledge of Climate Change in Arctic Marine Systems: A Systematic Literature Review of Multidisciplinary Research. *Arctic Science* 6:1–23.

Fiddian-Qasmiyeh, Elena, editor

2020 *Refuge in a Moving World: Tracing refugee and migrant journeys across disciplines*. London: UCL Press.

Forum Secretariat

2017 *2017 Forum Foreign Ministers Meeting Outcomes*. Suva: Pacific Islands Forum Secretariat.

Forum Secretariat

2018 *Boe Declaration on Regional Security*. Suva: Pacific Islands Forum Secretariat.

Fouillet, A, G Rey, F Laurent, G Pavillon, S Belle, C Guihenneuc-Jouyaux, J Clavel, E Jougla, and Denis Hemon

2006 Excess Mortality Related to the August 2003 Heat Wave in France. *International Archives of Occupational and Environmental Health* 80:16–24.

Frankland, Richard, Lisa Hardwick, and Samuel Watkin

2012 Climate Change Adaptation in a Small Pacific Island Nation. *Proceedings of the Institution of Civil Engineers: Civil Engineering* 165:46–51.

Friel, Sharon, Michael Marmot, Anthony J. McMichael, Tord Kjellstrom, and Denny Vagero

2008 Global Health Equity and Climate Stabilisation: A Common Agenda. *The Lancet* 372:1677–1683.

Gagaeolo, Fetalai, Sarah Hemstock, and Connor Price

2020 Christianity, Kiribati and Climate Change-induced Migration. In *Science, Faith and the Climate Crisis*, edited by Sally Myers, Sarah Hemstock, and Edward Hanna, 1–14. Bingley: Emerald.

Gaillard, JC

2012 The climate gap. *Climate and Development* 4:261–264.

Gero, Anna, Kirstie Meheux, and Dale Dominey-Howes

2011 Integrating Disaster Risk Reduction and Climate Change Adaptation in the Pacific. *Climate and Development* 3:310–327.

Gibson, John, and David McKenzie

2014 The Development Impact of a Best Practice Seasonal Worker Policy. *Review of Economics and Statistics* 96:229–243.

Hafezi, M, O Sahin, R A Stewart, R M Connolly, B Mackey, and D Ware

2020 Adaptation Strategies for Coral Reef Ecosystems in Small Island Developing States: Integrated Modelling of Local Pressures and Long-Term Climate Changes. *Journal of Cleaner Production* 253:119864.

Hampton, Mark P, and Julia Jeyacheya

2020 Tourism-Dependent Small Islands, Inclusive Growth, and the Blue Economy. *One Earth* 2:8–10.

Harris, Patrick, Jan Ritchie, Graham Tabi, and Tony Lower

2011 Addressing the social Determinants of Alcohol Use and Abuse with Adolescents in a Pacific Island Country (Vanuatu). In *Social Determinants Approaches to Public Health: From Concept to Practice*, edited by E. Blas, J. Sommerfeld and A. S. Kurup. Geneva: WHO Press.

Harris, Usha Sundar

2014 Communicating Climate Change in the Pacific Using a Bottom-Up Approach. *Pacific Journalism Review* 20:77–96.

Hausia Havea, Peni, Amelia Siga, Titilia Rabuatoka, Apenisa Tagivetaua Tamani, Priya Devi, Ruci Senikula, Sarah L Hemstock, and Helene Jacot des Combes

2020 Using Vocational Education to Support Development Solutions in the Pacific: An Emphasis on Climate Change and Health. *Applied Environmental Education & Communication* 19:171–186.

Hermann, Elfriede, and Wolfgang Kempf

2017 Climate Change and the Imagining of Migration: Emerging Discourses on Kiribati's Land Purchase in Fiji. *The Contemporary Pacific* 29:231–263.

Hudson, Samantha W

2016 Insights in Public Health: Climate Change: A Public Health Challenge and Opportunity for Hawai'i. *Hawai'i Journal of Medicine & Public Health: A Journal of Asia Pacific Medicine & Public Health* 75:245–250.

Huebner, Anna, and Simon Milne

2012 Donor Funding and Climate Change. In *Knowledge Management in Tourism: Policy and Governance Applications* edited by Eduardo Fayos-solà 193–208. Bingley: Emerald.

Iese, Viliamu, Elizabeth Holland, Joseph Maeke, Morgan Wairiu, and Sumeet Naidu

2014 Farming Adaptations to the Impacts of Climate Change and Extreme Events in Pacific Island Countries: Case Study of Bellona Atoll, Solomon Islands. In *Impacts of Climate Change on Food Security in Small Island Developing States* edited by Mehdi Khosrow-Pour, 852–875. Hershey: IGI Global.

IPCC

2014 *Fifth Assessment Report*. Geneva: IPCC (Intergovernmental Panel on Climate Change).

Jiang, Minn, Emma Wong, Louise M Klint, Terry DeLacy, and Dale Dominey-Howes

2012 Tourism Adaptation to Climate Change-Analysing the Policy Environment of Fiji. *International Journal of Tourism Policy* 4:238–260.

Klint, Louise M, Emma Wong, Min Jiang, Terry Delacy, David Harrison, and Dale Dominey-Howes

2012 Climate Change Adaptation in the Pacific Island Tourism Sector: Analysing the Policy Environment in Vanuatu. *Current Issues in Tourism* 15:247–274.

Komugabe-Dixson, Aimée F, Naomi S E de Ville, Alexei Trundle, and Darren McEvoy

2019 Environmental Change, Urbanisation, and Socio-Ecological Resilience in the Pacific: Community Narratives from Port Vila, Vanuatu. *Ecosystem Services* 39:100973.

Korauaba, Taberannang

2015 KIRIBATI. *The Contemporary Pacific* 27:232–238.

Kuruppu, Natasha

2009 Adapting Water Resources to Climate Change in Kiribati: The Importance of Cultural Values and Meanings. *Environmental Science and Policy* 12:799–809.

Lane, Ruth, and Rebecca McNaught

2009 Building Gendered Approaches to Adaptation in the Pacific. *Gender and Development* 17:67–80.

Lebot, Vincent

2013 Coping with Insularity: The Need for Crop Genetic Improvement to Strengthen Adaptation to Climatic Change and Food Security in the Pacific. *Environment, Development and Sustainability* 15:1405–1423.

Leon, Javier X., James Hardcastle, Robyn James, Simon Albert, Jimmy Kereseka, and Colin D. Woodroffe

2015 Supporting Local and Traditional Knowledge with Science for Adaptation to Climate Change: Lessons Learned from Participatory Three-Dimensional Modeling in BoeBoe, Solomon Islands. *Coastal Management* 43:424–438.

Leslie, Helen and Kirsty Wild

2018 Post-hegemonic Regionalism in Oceania: Examining the Development Potential of the New Framework for Pacific Regionalism. *The Pacific Review* 31:20–37.

Lewis, James

1999 *Development in disaster-prone places: Studies of vulnerability*. London: Intermediate Technology Publications.

Lewis, James

2009 An Island Characteristic: Derivative Vulnerabilities to Indigenous and Exogenous Hazards. *Shima* 3:3–15.

Lynch, Amanda H and Ronald D Brunner

2010 Learning from Climate Variability: Adaptive Governance and the Pacific ENSO Applications Center. *Weather, Climate, and Society* 2:311–319.

Magee, Andrew D, Danielle C Verdon-Kidd, A S Kiem, and S A Royle

2016 Tropical Cyclone Perceptions, Impacts and Adaptation in the Southwest Pacific: An Urban Perspective from Fiji, Vanuatu and Tonga. *Natural Hazards and Earth System Sciences* 16:1091–1105.

Mahany, Mollie J and Mark E Keim

2012 Challenges and Strategies for Climate Change Adaptation Among Pacific Island Nations. *Disaster Medicine and Public Health Preparedness* 6:415–423.

Masselink, Gerd, Eddie Beetham, and Paul Kench

2020 Coral Reef Islands Can Accrete Vertically in Response to Sea Level Rise. *Science Advances* 6:eaay3656.

Matatolu, Ilisapeci

2019 Tourism and Residents' Quality of Life: A Critical Examination. *The Journal of Pacific Studies*, 39:128–164.

McIver, Lachlan, Kathryn Bowen, Elizabeth Hanna, and Steven Iddings

2017 A 'Healthy Islands' Framework for Climate Change in the Pacific. *Health Promotion International* 32:549–557.

McIver, Lachlan, Rokho Kim, Alistair Woodward, Simon Hales, Jeffrey Spickett, Dianne Katscherian, Masahiro Hashizume, Yasushi Honda, Ho Kim, Steven Iddings, Jyotishma Naicker, Hilary Bambrick, Anthony J. McMichael, and Kristie L. Ebi

2016 Health Impacts of Climate Change in Pacific Island Countries: A Regional Assessment of Vulnerabilities and Adaptation Priorities. *Environmental Health Perspectives* 124:1707–1714.

McLean, Roger, and Paul Kench

2015 Destruction or Persistence of Coral Atoll Islands in the Face of 20th and 21st Century Sea-Level Rise? *Wiley Interdisciplinary Reviews: Climate Change* 6:445–463.

Menéndez, Pelayo, Iñigo J. Losada, Saul Torres-Ortega, Siddharth Narayan, and Michael W Beck

2020 The Global Flood Protection Benefits of Mangroves. *Scientific Reports* 10:4404.

Mercer, Jessica

2010 Disaster Risk Reduction or Climate Change Adaptation: Are We Reinventing the Wheel? *Journal of International Development* 22:247–264.

Morrow, Georgina, and Kathryn Bowen

2014 Accounting for Health in Climate Change Policies: A Case Study of Fiji. *Global Health Action* 7:23550.

Murphy, Daniel W A

2015 Theorizing Climate Change, (Im)mobility and Socio-Ecological Systems Resilience in Low-Elevation Coastal Zones. *Climate and Development* 7:380–397.

Nunn, Patrick D

2009 Responding to the Challenges of Climate Change in the Pacific Islands: Management and Technological Imperatives. *Climate Research* 40:211–231.

Nunn, Patrick D, William Aalbersberg, Shalini Lata, and Marion Gwilliam

2014 Beyond the Core: Community Governance for Climate-Change Adaptation in Peripheral Parts of Pacific Island Countries. *Regional Environmental Change* 14:221–235.

Oakes, Robert

2019 Culture, Climate Change and Mobility Decisions in Pacific Small Island Developing States. *Population and Environment* 40:480–503.

Okano, Dana, Rebecca Skeele, and Robert Greene

2015 Climate Adaptation Planning in the Northern Mariana Islands: Adapting Guidance for a Locally Appropriate Approach. *Coastal Management* 43:394–406.

Patz, Jonathan A, Holly K Gibbs, Jonathan A Foley, Jamesine V Rogers, and Kirk R Smith

2007 Climate Change and Global Health: Quantifying a Growing Ethical Crisis. *EcoHealth* 4:397–405.

Pedersen Zari, Maibritt, Gabriel Luke Kiddle, Paul Blaschke, Steve Gawler, and David Loubser

2019 Utilising Nature-Based Solutions to Increase Resilience in Pacific Ocean Cities. *Ecosystem Services* 38:100968.

Peters, B Guy, and John Pierre

1998 Governance Without Government? Rethinking Public Administration. *Journal of Public Administration Research and Theory* 8:223–243.

Puig-Cabrera, Miguel and Concepción Foronda-Robles

2019 Tourism, Smallness and Insularity: A Suitable Combination for Quality Of Life in Small Island Developing States (SIDS)? *Island Studies Journal*, 14:61–80.

Regmi, Sabrina

2015 Gender and Health Adaptation Measures to Climate Change in the Pacific: A Case Study of Papua New Guinea. In *Handbook of Climate Change Adaptation*, edited by Walter Leal Filho, 319–335 Berlin, Heidelberg: Springer.

Remling, Elise

2020 Migration as Climate Adaptation? Exploring Discourses Amongst Development Actors in the Pacific Island Region. *Regional Environmental Change* 20:3.

Richmond, Noah and Benjamin K Sovacool

2012 Bolstering Resilience in the Coconut Kingdom: Improving Adaptive Capacity to Climate Change in Vanuatu. *Energy Policy* 50:843–848.

Roberts, Erin, and Stephanie Andrei

2015 The Rising Tide: Migration as a Response to Loss and Damage from Sea Level Rise in Vulnerable Communities. *International Journal of Global Warming* 8:258–273.

Rosegrant, Mark W, Madan Mohan Dey, Rowena Valmonte-Santos, and Oai Li Chen

2016 Economic Impacts of Climate Change and Climate Change Adaptation Strategies in Vanuatu and Timor-Leste. *Marine Policy* 67:179–188.

Rosenau, James N and Ernst-Otto Czempiel, editors

1992 *Governance without Government: Order and Change in World Politics*. Cambridge: Cambridge University Press.

Savage, Amy, Lisa Schubert, Corey Huber, Hilary Bambrick, Nina Hall, and Bill Bellotti

2020 Adaptation to the Climate Crisis: Opportunities for Food and Nutrition Security and Health in a Pacific Small Island State. *Weather, Climate and Society*, 12:745–758.

Schewe, Jacob, Jens Heinke, Dieter Gerten, Ingjerd Haddeland, Nigel W Arnell, Douglas B Clark, Rutger Dankers, Stephanie Eisner, Balázs M Fekete, Felipe J Colón-González, Simon N Gosling, Hyungjun Kim, Xingcai Liu, Yoshimitsu Masaki, Felix T Portmann, Yusuke Satoh, Tobias Stacke, Qiuhong Tang, Yoshihide Wada, Dominik Wisser, Torsten Albrecht, Katja Frieler, Franziska Piontek, Lila Warszawski, and Pavel Kabatt

2014 Multimodel Assessment of Water Scarcity Under Climate Change. *PNAS* 111:3245–3250.

Singh, Anirudh, editor

2020 *Translating the Paris Agreement into Action in the Pacific*. Cham: Springer.

Spickett, Jeffery T and Dianne Katscherian

2014 Health Impacts of Climate Change in the Solomon Islands: An Assessment and Adaptation Action Plan. *Global Journal of Health Science* 6:261–273.

Spickett, Jeffery T, Dianne Katscherian, and Lachlan McIver

2013 Health Impacts Of Climate Change in Vanuatu: An Assessment And Adaptation Action Plan. *Global Journal of Health Science* 5:42–53.

Steiner, Candice Elanna

2015 A Sea of Warriors: Performing an Identity of Resilience and Empowerment in the Face of Climate Change in the Pacific. *The Contemporary Pacific* 27:147–180.

Stojanov, Robert, editor

2014 Migration as Adaptation? Population Dynamics in the Age of Climate Variability. Brno: Global Change Research Centre, Academy of the Sciences of the Czech Republic.

Stojanov, Robert, Daniel Němec, and Libor Žídek

2019 Evaluation of the Long-Term Stability and Impact of Remittances and Development Aid on Sustainable Economic Growth in Developing Countries. *Sustainability* 11:1538.

Storey, Donovan, and Shawn Hunter

2010 Kiribati: An Environmental 'Perfect Storm'. *Australian Geographer* 41:167–181.

Tabe, Tammy

2019 Climate Change Migration and Displacement: Learning from Past Relocations in the Pacific. *Social Sciences* 8:218.

Tarte, Sandra

2014 Regionalism and Changing Regional Order in the Pacific Islands. *Asia and the Pacific Policy Studies* 1:312–324.

Tiatia-Seath, Jemaima, Trish Tupou, and Tan Fookes

2020 Climate Change, Mental Health, and Well-Being for Pacific Peoples: A Literature Review. *The Contemporary Pacific* 32:399–430.

Tibby, John, Marcus B Lane, and Peter A Gell

2007 Local knowledge and environmental management: a cautionary tale from Lake Ainsworth, New South Wales, Australia. *Environmental Conservation*, 34:334–341.

Tisdell, Clem

2008 Global Warming and the Future of Pacific Island Countries. *International Journal of Social Economics* 35:889–903.

Tuck, Megan E, Paul S Kench, Murray R Ford, and Gerd Masselink

2019 Physical Modelling of the Response of Reef Islands to Sea-Level Rise. *Geology* 47:803–806.

Watts, Nick, Markus Amann, Nigel Arnell, Sonja Ayeb-Karlsson, Jessica Beagley, Kristine Belesova, Maxwell Boykoff, Peter Byass, Wenjia Cai, Diarmid Campbell-Lendrum, Stuart Capstick, Jonathan Chambers, Samantha Coleman, Carole Dalin, Meaghan Daly, Niheer Dasandi, Shouro Dasgupta, Michael Davies, Claudia Di Napoli, Paula Dominguez-Salas, Paul Drummond, Robert Dubrow, Kristie L Ebi, Matthew Eckelman, Paul Ekins, Luis E Escobar, Lucien Georgeson, Su Golder, Delia Grace, Hilary Graham, Paul Haggar, Ian Hamilton, Stella Hartinger, Jeremy Hess, Shih-Che Hsu, Nick Hughes, Slava Jankin Mikhaylov, Marcia P Jimenez, Ilan Kelman, Harry Kennard, Gregor Kiesewetter, Patrick L Kinney, Tord Kjellstrom, Dominic Kniveton, Pete Lampard, Bruno Lemke, Yang Liu, Zhao Liu, Melissa Lott, Rachel Lowe, Jaime Martinez-Urtaza, Mark Maslin, Lucy McAllister, Alice McGushin, Celia

McMichael, James Milner, Maziar Moradi-Lakeh, Karyn Morrissey, Simon Munzert, Kris A Murray, Tara Neville, Maria Nilsson, Maquins Odhiambo Sewe, Tadj Oreszczyn, Matthias Otto, Fereidoon Owfi, Olivia Pearman, David Pencheon, Ruth Quinn, Mahnaz Rabbaniha, Elizabeth Robinson, Joacim Rocklöv, Marina Romanello, Jan C Semenza, Jodi Sherman, Liuhua Shi, Marco Springmann, Meisam Tabatabaei, Jonathon Taylor, Joaquin Triñanes, Joy Shumake-Guillemot, Bryan Vu, Paul Wilkinson, Matthew Winning, Peng Gong, Hugh Montgomery, and Anthony Costello

2021 The 2020 Report of The Lancet Countdown on Health and Climate Change: Responding to Converging Crises. *The Lancet*, 397:129–170.

Webb, Julie, Daniel Vorbach, Edward Boydell, Rebecca Mcnaught, and Charlotte Sterrett

2015 Tools for CBA: Lessons from NGO Collaboration in Vanuatu. *Coastal Management* 43:407–423.

Weber, Eberhard

2017 Trade Agreements, Labour Mobility and Climate Change in the Pacific Islands. *Regional Environmental Change* 17:1089–1101.

Webber, Sophie

2012 Performative Vulnerability: Climate Change Adaptation Policies and Financing in Kiribati. *Environment and Planning A* 45:2717–2733.

White, I., T. Falkland, T. Metutera, E. Metai, M. Overmars, P. Perez, and A. Dray

2007 Climatic and Human Influences on Groundwater in Low Atolls. *Vadose Zone Journal* 6:581–590.

WHO

2008 *Closing the Gap in a Generation: Health Equity Through Action on the Social Determinants of Health - Commission on the Social Determinants of Health*. Geneva: World Health Organization.

2010 *A Conceptual Framework for Action on the Social Determinants of Health*. Geneva: World Health Organization.

2015 *Climate Change and Health in the Western Pacific Region Synthesis of Evidence, Profiles of Selected Countries and Policy Direction*. Manila: World Health Regional Office for the Western Pacific.

2016 *Global Monitoring of Action on the Social Determinants of Health: A Proposed Framework and Basket of Core Indicators. Consultation Paper.* Geneva: World Health Organization.

Wong, Emma, Min Jiang, Louise M Klint, Dale Dominey-Howes, and Terry Delacy

2013a Evaluation of Policy Environment for Climate Change Adaptation in Tourism. *Tourism and Hospitality Research* 13:201–225.

Wong, Emma, Min Jiang, Louise Klint, Terry DeLacy, David Harrison, and Dale Dominey-Howes

2013b Policy Environment for the Tourism Sector's Adaptation to Climate Change in the South Pacific - The Case of Samoa. *Asia Pacific Journal of Tourism Research* 18:52–71.

Wong, Emma P Y, Terry DeLacy, and Min Jiang

2012 Climate Change Adaptation in Tourism in the South Pacific - Potential contribution of public-private partnerships. *Tourism Management Perspectives* 4:136–144.

Wongbusarakum, Supin, Meghan Gombos, Bitt-Anne A. Parker, Catherine A. Courtney, Scott Atkinson, and Willy Kostka

2015 The Local Early Action Planning (LEAP) Tool: Enhancing Community-Based Planning for a Changing Climate. *Coastal Management* 43:383–393.

Abstract

Climate change impacts are widely unequal and inequitable, especially on health. For Pacific island peoples, climate change is suggested as exacerbating pressures on the structural and social determinants of health, perpetuating and exacerbating climate change related vulnerabilities and poor health outcomes.

How might climate change interventions impact the structural and social determinants of health for Pacific island peoples? In this article, we connect climate change interventions to the underlying structural and social determinants of health of Pacific island peoples. We attempt to capture how interventions on climate change may or may not impact these determinants, shedding light on opportunities and challenges. Through the analytic lens of the structural and social determinants of health, we evaluate the diverse impacts of common climate change interventions including migration, ecosystem-based management, community-based adaptation, and adaptation of the tourism industry and of the health sector.

This analytical literature review revealed that climate change interventions around the Pacific show opportunities to not only address the direct impacts of climate change, but also, with careful planning, to positively impact the structural and social determinants of health of Pacific island peoples through local leadership and action. By intentionally designing and leading climate change interventions that improve these determinants of health, Pacific island peoples could decrease their vulnerabilities to the health impacts of climate change while promoting better health outcomes irrespective of climate change.

Key Words: Climate change; Adaptation; Mitigation; Social Determinants; Health

Figure 1. The Social Determinants of Health Framework (WHO 2008)

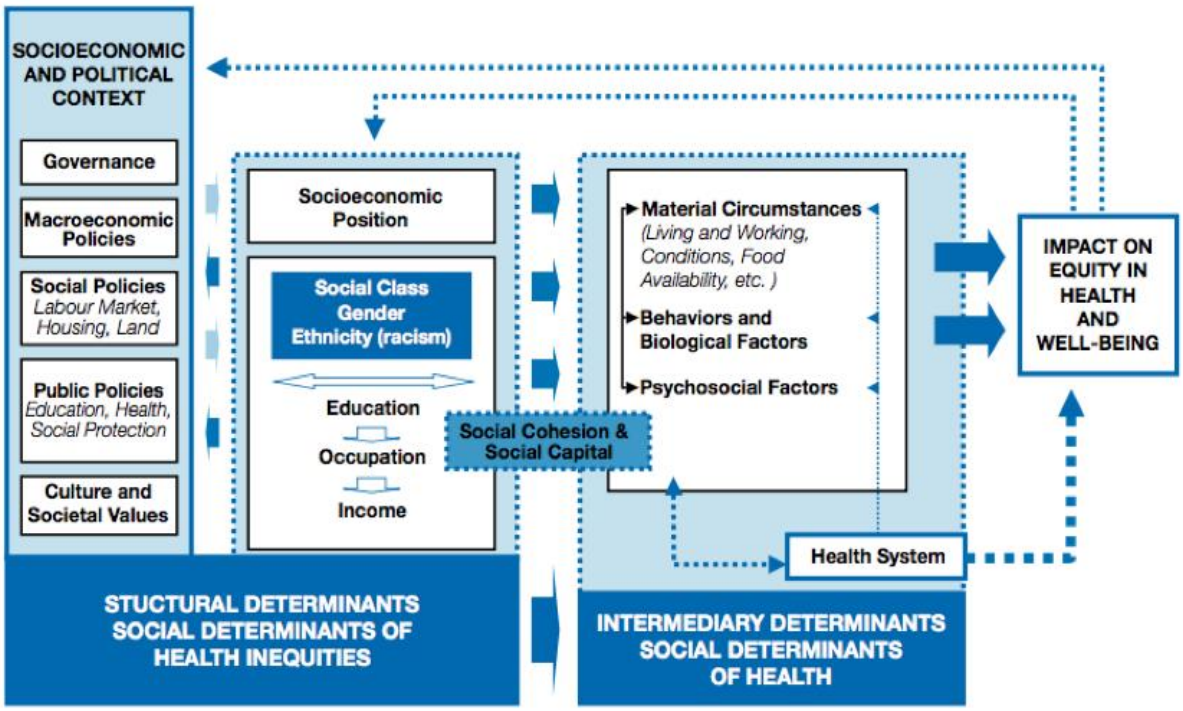
SOCIOECONOMIC AND POLITICAL CONTEXT
Governance
Macroeconomic Policies
Social Policies
Labour Market, Housing, Land
Public Policies
Education, Health, Social Protection
Culture and Societal Values
Socioeconomic Position
Social Class
Gender
Ethnicity (racism)
Education
Occupation
Income
Social Cohesion & Social Capital
Material Circumstances
(Living and Working, Conditions, Food Availability, etc.)
Behaviors and Biological Factors
Psychosocial Factors
Health System
IMPACT ON EQUITY IN HEALTH AND WELL-BEING
STUCTURAL DETERMINANTS SOCIAL DETERMINANTS OF HEALTH INEQUITIES
INTERMEDIARY DETERMINANTS SOCIAL DETERMINANTS OF HEALTH

Table 1. Positive impacts of migration on the structural and social determinants of health

Structural & Social Determinants of Health	Positive Impacts	Locations	References
Social policies	Planning for migration can guarantee international employment opportunities (International labor programs with NZ and Australia), access to land resources (Purchase of land in Fiji).	Kiribati, Tuvalu, and around the Pacific	Hermann and Kempf 2017,231-263
Public policies	Planning for migration can lead to investments in education, training, English skills, and up skilling the workforce.	Kiribati	Hermann and Kempf 2017,231-263
Macroeconomic policies	Balances labor shortages, transfer skills.	Around the Pacific	Weber 2017,1089-1101
Socioeconomic position	Improves access to financial capital, remittances as main source of income, alleviates poverty, and potentially improves child schooling.	Solomon Islands, Papua New Guinea, Vanuatu, and around	Birk and Rasmussen 2014,1-13; Connell and Lutkehaus 2017,79-95; Gibson and

		the Pacific, Tonga	McKenzie 2014, 229-243; Weber 2017,1089-1101
Culture and societal values	Collective resettlement can provide common land and preserve cultural solidarity and social cohesion	Kiribati	Hermann and Kempf 2017,231-263
Material circumstances	Improves food security through remittances and reduced pressure on resources.	Solomon Islands	Birk 2012,81-109

Table 2. Negative impacts of migration on the structural and social determinants of health

Structural & Social Determinants of Health	Negative Impacts	Locations	References
Governance	Issues of political representation of the resettled population. Low lying atolls are at the mercy of international governance in terms of political, legal, civil rights supports given or not to communities; outdated local political institutions not adapted to smaller populations (no competition for elections, imbalanced power and communities perceive governments as corrupt).	Solomon Islands, Kiribati, Papua New Guinea, Niue, Tonga	Roberts and Andrei 2015,258-273; Donner 2015,191-201; Connell and Lutkehaus 2017,79-95
Macroeconomic Policies	Reduced population size locally leads to distortion of markets (reduced demand, no competition, excessive prices).	Niue, Papua New Guinea	Connell and Lutkehaus 2017, 79-95
Social policies	Issues around land rights (esp. for international migration), unequal entitlements, in some cases lack of housing provision leading to creation of informal settlements, straining on the provision of services such as sewerage and water supplies.	Solomon Islands; Niue, Papua New Guinea, Kiribati	Birk 2012,81-109; Connell and Lutkehaus 2017, 79-95; Donner 2015,191-201

Public policies	Lack of social support, unequal opportunities.	Papua New Guinea, Solomon Islands	Birk 2012,81-109; Connell and Lutkehaus 2017, 79-95
Culture and societal values	Erosion of community structure and cultural identity.	Solomon Islands, Niue, Kiribati	Birk 2012,81-109; Donner 2015,191-201; Roberts and Andrei 2015,258-273; Connell and Lutkehaus 2017, 79-95
Socioeconomic position	Immediate benefits from remittances limit the ability for long term economic development. Relocated populations face challenges to access education and employment.	Vanuatu, Solomon Islands, Kiribati	Craven 2015,223-236; Donner 2015,191-201
Social cohesion	Discrimination and hostilities from the host community to the resettled population. For the local population, pressure on markets create mistrust in social relations.	Solomon Islands, Niue, Kiribati	Donner 2015,191-201
Material circumstances	Migration can challenge food and potable water security through labour loss. Poor sanitary conditions in informal resettlements.	Vanuatu, Kiribati	Cauchi and others 2020;

			Craven 2015,223-236
Psychosocial factors	Mental health impacts from loss of cultural identity for the resettled communities.	Kiribati, Tuvalu	Cauchi and others 2020; Tiatia-Seath and others 2020
Health system	Poor hosting conditions and poverty create stress on local health facilities.	Kiribati	Cauchi and others 2020

Table 3. Positive impacts of ecosystem-based management strategies on the structural and social determinants of health

Structural & Social Determinants of Health	Impacts	Interventions	Locations	References
Governance	Better enforcement and monitoring capacity through community participation (education, consultation, involvement). Creates more inclusive policies for the rural poor and vulnerable populations.	Local Early Action Planning tool Conservation of marine ecosystems through localized management approaches	Tonga, Marshall Islands, Samoa, and around the Pacific	Davies 2016,104-146; Chong 2014,391-405; Wongbusarakum and others 2015,383-392
Macroeconomic and social policies	Net financial gain for the country's economy, promotes self-sufficiency and reduces imports.	Aquaculture Natural resource management Fish aggregating devices Agriculture crop adaptation	Solomon Islands, Fiji, Timor-Leste	Dey and others 2016, 164-170; Lebot 2013,1405-1423; Rosegrant and others 2016,179-188

Socioeconomic position	Provide employments and incomes.	Fish Aggregating Devices Aquaculture Natural resource management	Solomon Islands, Fiji, Vanuatu	Dey and others 2016,164-170; Rosegrant and others 2016,179-188
Material circumstances	Coastal and habitat protection from sea level rise and storm surge. Provide forestry products, food, medicinal plants.	Mangroves restoration and protection	Fiji	Agrawala and others 2005
Food security	Increase local production of coastal and oceanic fish, reduces pressure of overfishing. Increase productivity for a sustainable nutrition source.	Fish aggregating devices Aquaculture Natural resource management Agriculture crop adaptation	Solomon Islands, Fiji, Vanuatu, French Polynesia	Dey and others 2016,164-170; Agrawala and others 2005; Lebot 2013,1405-1423; Rosegrant and others 2016,179-188; Andréfouët and others 2017,1-11

Table 4. Positive impacts of community-based adaptation on the structural and social determinants of health

Structural & Social Determinants of Health	Positive Impacts	Locations	References
Governance	Improved civil participation in governance using government, donors and NGOs capacity: multiscalar governance. Encourage adaptive management of socio-political context. Establish trust between the communities and the government. Increase government capacity and resources, improves coherence across policies.	Vanuatu, Timor-Leste, Solomon Islands, Cook Islands, Kiribati, Fiji, and around the Pacific	Chandra and others 2016,477-492; Nunn and others 2014,221-235; Webb and others 2015,407-423
Macroeconomic policies	Improve access for vulnerable communities to microfinance schemes, credits, training for programme implementation.	Timor-Leste, Fiji	Chandra and others 2016,477-492; Dumaru 2010,751-763
Social policies	Can increase communities' access to external resources and enable/promote community participation.	Fiji, Timor-Leste, Solomon Islands,	Crick and others 2013,241-

		Samoa, and around the Pacific	253; Dumaru 2010,751-763 Chong 2014,391-405
Socioeconomic position	Benefit social relations: Can provide options to vulnerable groups to take part in local decision making processes. Include adequate training and upskilling for communities to participate.	Timor-Leste and around the Pacific	Chandra and others 2016,477-492; Crick and others 2013,241-253
Social cohesion	Can promote and expand (local and national) social networks, improving access to information, human and technical resources.	Fiji and around the Pacific	Crick and others 2013,241-253; Cvitanovic et al. 2016,53-62; Dumaru 2010,751-763
Material circumstances	Bolster agricultural and livelihood resilience and diversification for all community members.	Timor-Leste, Papua New Guinea	Chandra et al. 2016,477-492

Table 5. Positive impacts of strategies for tourism industry on the structural and social determinants of health

Structural & Social Determinants of Health	Impacts	Interventions	Locations	References
Governance	Increased participation of all stakeholders in policy making: leadership for action.	Training and education in climate change	Fiji, Samoa, Vanuatu	Becken 2005,381-393; Becken and Clapcott 2011,1-17; Wong et al. 2013a, 2013b; Wong et al. 2012,136-144
Macroeconomic policies	Create employment. Can assist in promoting further independence from donor aids.	Adaptation	Kiribati, Tuvalu	Huebner and Milne 2012,193-208
Socioeconomic position	Advance gender equality.	Fostering female employment	Kiribati, Tuvalu	Huebner and Milne 2012,193-208
Material circumstances	Improved infrastructures and strengthen ecosystem to resist climate related hazards, improve self-sufficiency in water	Adaptation and mitigation (building structures, replanting trees/mangroves, pollution control)	Fiji, Samoa	Becken 2005,381-393; Wong et al. 2012,136-144

storage and energy

supplies.