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Climate Change, Population Mobility and Relocation in Oceania

Part I: Background and Concepts

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Introduction

The issue of migration triggered or driven by climate change has become the focus of a massive increase in research and publications over the last decade or so. Initially it was an issue that was largely ignored in the mainstream climate change adaptation literature and treated in simplistic ways that framed migration in negative terms and 'climate refugees' as threats to the security of receiving countries. Recently, much more nuanced, but as yet not fully developed, understandings of the links between climate change and human population mobility have emerged.

There is considerable divergence among those who write about climate change migration ranging from those, often with a demography/social science background, who struggle to see a clear link between environmental degradation and mobility. For them, social and economic factors are the key motivations, notwithstanding the negative social and economic effects of environmental degradation. This perspective is perhaps also rooted in a healthy scepticism about the environmental determinism that underlies the particularly extreme predictions of mass relocations and millions of environmental refugees. On the other hand, it appears that some of the strongest supporters of climate change as a migration driver come from biological and physical scientists working on climate change who have deep concerns about the magnitude of environmental disruption that is occurring because of, and will result from, global warming.

Piguet et al. (2011) observed that after separation between the two extremes there was a convergence of views, and this trend has continued. Between these two perspectives lies a growing group who struggle with relatively inflexible positions on the issue. Some see the problems as being highly localised with no one size fits all explanation of the links between climate change and mobility or likely responses to it, if indeed it is even a problem. Some see migration including individual moves or community relocation as appropriate adaptation strategies; others consider migration, particularly community relocation, as highly problematic, disrupting communities (both at origin and destination) and for many indigenous people snapping the critical bond that unites people and their land as one. From this perspective 'forced' community relocation may be considered to represent adaptation failure. In some of the most 'at risk' communities on low lying atolls, in-depth social research has shown that many people do not want to move under any circumstances and are prepared to die rather than break their connection with the land.

In this report, the objective is to review the literature on climate change and human mobility, with reference to Pacific Island Countries and Territories (PICTs). The review will briefly outline the types of environmentally influenced migration, discuss the various 'theories' on climate change and mobility, review the importance of land in relation to mobility in PICTs before examining historical and contemporary cases of climate change mobility.

A second Policy Brief, linked to this one, considers which places are most likely to be sources of climate change migrants and their probable destinations, the demands of some people for a 'right to stay' notwithstanding. It will then focus on community relocation throughout the region but with particular focus on Fiji where several government-supported

relocations have already been initiated. A third Policy Brief will examine the role and trends of migration from atolls, particularly from atoll nations, that are often labelled as being at the frontline of exposure to climate change. It is hoped that these reports will serve as useful background for research on climate change migration, human security and possible conflict in the Pacific region.

Pacific Island Countries and Territories

The Pacific Islands region comprises 22 individual political entities with a range of political status from fully independent nations, through those in Free Association with a former colonial country, to territories that remain as colonies. The estimated total population of the region in 2020 was 12.3 million people (SPC, 2021) or just 0.16 per cent of the global population. Figure 1 shows the PICTs and situates them within the three 'culture regions' of Micronesia, Polynesia and Melanesia. While such regional classifications are often contested as colonial constructions, they are identified as political groupings by the countries that comprise them and are useful delimitators for different parts of the wider region. Nevertheless, it should be noted that these regions do not exclude people from other 'regions' such as Polynesian outliers in both Melanesia and Micronesia, and often boundaries between the regions are blurred.

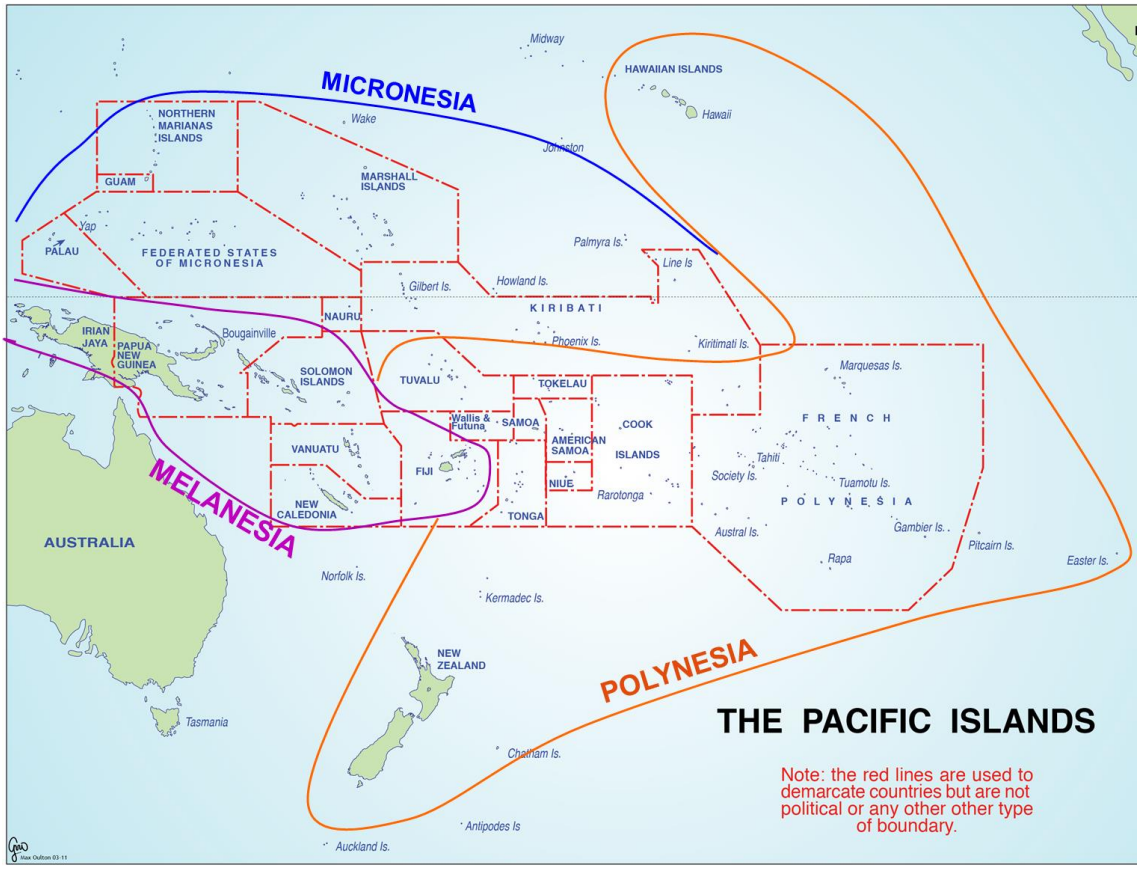


Figure 1. Pacific Island Countries and Territories showing the three 'culture regions'

Table 1 lists the PICTs and shows some basic physical characteristics and summary population statistics. As the table shows, there is great variation among the PICTs in terms of land area, elevation above sea level and population size. Papua New Guinea dominates both land and population measures accounting for over 80 percent of the regional totals. The highest growth rates are found in the three Melanesian countries of Solomon Islands (2.0 per cent per annum) and Papua New Guinea and Vanuatu (both 1.7 per cent) (SPC 2021a). The table shows projected populations for mid-century. Again, Papua New Guinea and the Melanesian countries dominate. By 2050 the regional population is projected to be 19.6 million people.

As the table shows, PICTs display a wide range of population densities ranging from just 6.2 persons/km^2 in Niue to 557.1 persons/km^2 in Nauru. Overall, the region has a relatively low average population density (22.4 persons/km^2), although this is somewhat skewed by the large land areas of the Melanesian PICTs. Despite their high growth rates and total population numbers, these countries have relatively low population densities (average = 20.6 persons/km^2). In comparison the three sovereign atoll nations are much higher, averaging 180 persons/km^2. Tuvalu has a crude population density of over 400 persons/km^2. As will be shown later in this report, the atoll states are subject to a dominating discourse about their 'vulnerability' and widespread assumptions, that are contested, that their people will be required to leave their lands. With the exception of Tonga (which was closely tied to the UK as a protectorate) all of the PICTS have been, or currently still are, colonies of larger 'powers.' Colonial histories and current arrangements strongly influence migration flows in the region.

Pacific Islands are also highly varied from a physical perspective. In the west, the plate boundary islands of Melanesia, formed by subduction at the boundary between the Oceanic Pacific tectonic plate and those of Australia and Asia, are the largest in the region, characterised by high elevations, well developed river systems with fertile flood plains and deltas, and greater biodiversity than other Pacific islands. At the other extreme are atolls, consisting of small islands situated on coral reefs with very low elevations, little soil, limited freshwater, and low levels of terrestrial biodiversity. Between these two extremes are volcanic high islands created by volcanoes forming over hot spots in the earth's crust. These islands are often characterised by steep slopes and a range of biodiversity, and exist in different stages of development from relatively recently formed islands with existing volcanoes (e.g., Savaii) through to heavily eroded and subsiding islands with barrier reefs (e.g., Aitutaki and Chuuk). Eventually the volcanoes erode away just leaving the reefs upon which the atolls form. A fourth category is raised limestone islands (e.g., Niue and Nauru) which are atolls created when sea levels were higher and then left stranded when sea level fell during different glacial periods. The different islands are likely to be affected differently by climate change and be characterised by different adaptations to the changes that take place. Generally, despite the differences, communities have made the different islands their homes and adapted successfully to them. A critical concern in coming years and decades is how well communities will be able to adjust their socio-natures to accommodate the rapid changes that anthropogenic climate change will bring.

Table 1. Some characteristics of Pacific Island Countries and Territories

Region/Country	Land Area[a] (km^2)	Highest elevation[b] (m)	Main Island Type[b]	Population Estimates[a]		Crude Population Density (persons/km^2)	
				2020	2050	2020	2050
Melanesia	540,248			11,109,800	18,217,400	20.6	33.7
Fiji	18,272	1,324	P-B	895,000	948,300	48.8	51.7
New Caledonia	18,576	1,628	P-B	273,000	325,300	14.7	17.5
PNG	462,840	4,509	P-B	8,935,000	15,102,100	19.3	32.6
Solomon Islands	28,370	2,447	P-B	712,100	1,333,600	25.2	47.2
Vanuatu	12,190	1,879	P-B	294,700	508,100	24	41.4
Micronesia	3,156			541,700	629,700	171.6	199.5
FSM	701	791	V & A	105,500	98,700	150.5	140.8
Guam	541	406	V	176,700	208,600	326.6	385.6
Kiribati	811	81	A	118,700	181,800	146.4	224.2
Marshall Islands	181	10	A	54,600	52,500	301.7	290.1
Nauru	21	61	RL	11,700	14,400	557.1	685.7
N. Mariana Is.	457	965	V	56,600	57,300	123.9	125.4
Palau	444	242	V	17,900	16,400	40.3	36.9
Polynesia	7,981			674,600	716,350	83	88.2
American Samoa	199	964	V	56,800	57,700	285.4	289.9
Cook Islands	237	652	V & A	15,300	15,800	64.6	66.7
French Polynesia	3,521	2,241	V & A	278,900	293,800	79.2	83.4
Niue	259	68	RL	1,600	1,400	6.2	5.4
Samoa	2,935	1,857	V	198,700	231,400	67.7	78.9
Tokelau	12	5	A	1,500	1,350	125	112.5
Tonga	650	1,033	V	99,800	93,300	133.2	124.6
Tuvalu	26	5	A	10,600	11,800	407.7	453.8
Wallis and Futuna	142	765	V	11,400	9,800	80.3	69
Total	551,385			12,326,100	19,563,450	22.4	35.5

P-B refers to plate boundary islands; V to volcanic high islands, A to atolls and RL to raised limestone islands.

Sources: [a] Secretariat of the Pacific Community (SPC) (2021a); [b] Barnett & Campbell (2010)

Climate Change in Oceania

PICs[1], through the Pacific Island Forum, have indicated at various Conferences of the Parties (COPs) to the United Nations Framework Convention on Climate Change (UNFCCC) that a global commitment to stop warming increasing beyond 1.5°C was critically important. However, the Intergovernmental Panel on Climate Change (IPCC) in its latest assessment (AR6) has indicated that only the lowest global greenhouse gas (GHG) emissions scenario (which is well below current rates) would not result in the 1.5°C threshold being crossed by 2040, and even then, it was considered 'more likely than not to be reached' although it would decline to below 1.5°C before century's end (IPCC, 2021, p. 18). Such a scenario, however, seems unlikely. In the lead up to COP26 in December 2021, the United Nations Environment Programme (UNEP, 2021) warned that the existing pledges from countries to reduce GHG emissions would result in global warming of 2.7°C by 2100. By the end of COP26, several countries had committed to reduce emissions, but others had not, and several had made pledges that were unlikely to be achieved. From this perspective, it is anticipated that PICTs will be exposed to high levels of loss and damage. Countries at COP26 did commit to return in 2022 with stronger targets. It remains to be seen what level of commitment will eventually unfold.

Despite limited research into the impacts of climate change in island settings, PICTs are widely reported to be highly exposed to many of the effects of climate change (IPCC, AR6, WGII)[2]. This reflects the focus of attention on sea level rise and its likely effects on small islands, especially low-lying ones such as atolls. According to the IPCC, AR6, WGI (2021), since the beginning of the twentieth century sea levels have risen by 20cm with the rise becoming more rapid in recent decades. During the current century under a very low GHG emission scenario, a rise between 0.28m and 0.55m by 2100 is projected. Under a worst-case emissions scenario, the increase may reach 1.01m although a larger rise of 2m could not be dismissed because of uncertainties related to ice sheets (IPCC, AR6, 2021).

Popular understandings of the effects of sea level rise often give rise to notions of islands, particularly atolls, 'sinking beneath the rising sea' or becoming completely inundated. However, the effects are likely to be much more complex. McLean and Kench (2015) and Kench et al. (2018), for example, show that atoll islands may increase in size or even increase in elevation as sea levels rise, but the manner in which these geomorphological changes take place such as the deposition of sediments as storm surges wash over the land would render many places difficult to physically live on let alone grow crops or have access to potable water (Duvat et al., 2021; Storlazzi et al., 2018). Many atolls already report loss of land to coastal erosion. Other factors are also important. Sustaining the precious but precarious freshwater Ghyben-Herzberg lenses on atolls subject to storm surges and the likely severe effects of king tides exacerbated by sea level rise may become exceedingly difficult. Equally important, salinization of the freshwater lens may inhibit the growth of

[1] The term PIC refers to independent Pacific Island Countries excluding the colonial territories.

[2] The terminology for IPCC reports refers to Assessment Reports (AR) and Working Groups (WG). AR6 reports were published in 2021 and 2022. WGI reports on 'The Physical Science Basis' and WGII on 'Impacts, Vulnerability and Adaptation'. WGIII which has not yet published its findings reports on mitigation is not referred to in this report.

cultivars such as the giant swamp taro (Cyrtosperma sp.), one of the few root crops that can grow in atoll conditions.

Sea level rise is also of concern for those communities located near the ocean on high islands. As Table 2 indicates, except for Papua New Guinea, Pacific people are heavily concentrated in coastal areas with well over half (57 per cent) living within a kilometre of the sea and all but a few within 10 km (over 96 per cent) (SPC, 2021b). Many villages are adjacent to the coast, reflecting in some countries the early colonial push by administrators and missionaries to bring communities from interior locations to the sea (Nunn & Campbell, 2020). Many of these communities are also likely to be exposed to similar risks of coastal erosion, inundation, and salinization as are the atolls, although they may be backed by higher hinterlands. However, as we will see later in this report, the physical existence of nearby land does not guarantee rights to its use.

The focus on sea level rise and the postulated 'sinking' of 'titanic states' tends to divert attention from other very serious likely effects of climate change in PICTs. These include increasing temperatures on land and ocean surface waters, including extreme warm events; increases in both heavy rainfall (and river flooding) events and droughts; increasing tropical cyclone intensity but a decrease in overall frequency; impacts on water supplies from droughts and salinization; coral reef degradation resulting from sea level rise, ocean acidification and warming; and possible changes in disease vectors such as dengue fever, malaria and ciguatera. Accordingly, serious impacts of climate change are not restricted to atolls and coastal communities, who, of course, will also experience these changes. So, in addition to atolls and coastal locations, areas that are likely to be most exposed to climate change include river flood plains and deltas, both of which are mostly found on larger islands, especially the inter-plate islands of Melanesia; and elevated areas on the interior of large islands that are affected by ENSO generated droughts, such as the Papua New Guinea Highlands. Generally, all of these areas tend to have relatively high population densities (for further discussion see section 'Hot Spots' in Part II).

Table 2. Populations of Pacific Island Countries and Territories showing proximity to the coast

Pacific Island Countries and territories	< 1 km from coast		< 10 km from coast	
	Population	% of Total	Population	% of Total
Melanesia				
Fiji	244,635	27	819,343	91
New Caledonia	156,432	57	258,321	94
Papua New Guinea	729,840	8	2,723,214	30
Solomon Islands	473,663	65	710,422	98
Vanuatu	193,070	64	297,649	99
Micronesia				
Guam	53,955	30	178,306	100
Kiribati	120,740	100	120,740	100
Marshall Islands	54,516	100	54,516	100
Micronesia (Federated States of)	93,635	89	105,754	100
Nauru	10,953	93	11,832	100
Northern Mariana Islands	39,261	69	56,801	100
Palau	16,786	93	17,957	100
Polynesia				
American Samoa	34,484	61	56,951	100
Cook Islands	13,921	91	15,342	100
French Polynesia	220,273	79	279,890	100
Niue	382	25	1,549	100
Samoa	122,190	61	199,733	100
Tokelau	1,501	100	1,501	100
Tonga	83,886	84	99,532	100
Tuvalu	10,679	100	10,679	100
Wallis and Futuna	7,672	67	11,369	100

Source: Secretariat of the Pacific Community (2021b) Coastal Population 2021 (1, 5 and 10km from coast). https://stats.pacificdata.org/vis?lc=en&df[ds]=SPC2&df[id]=DF_POP_COAST&df[ag]=SPC&df[vs]=2.0&pd=2021%2C2021&dq=A...&ly[rw]=GEO_PICT&ly[cl]=RANGE%2CINDICATOR

Climate change effects

Climate change effects are complex processes and typically involve many levels of 'impact', from direct effects where there are physical changes in an environment such as coastal erosion, more intense tropical cyclones, through to *n*th order indirect effects which are typically in the realms of the human dimensions of climate change and, as discussed later, mediated by political economic and other social processes. This is illustrated in Figure 2 which shows climate change in a simple cause and effect model. The focus of this paper is on the right-hand side of the diagram, although, most critically, action needs to be taken to reduce the causes of the problems that lead to increased emissions of greenhouse gases, which are illustrated on the left. As the figure shows, people adapt to the effects of climate change at a range of levels. Building sea walls, for example, attempts to reduce the direct effects of sea level rise. On the other hand, climate change migration may be seen as a response to the cumulative effects of impacts from the direct through to a range of negative social and economic outcomes such as reduced subsistence and commercial food and commodity production, increased incidence of diseases related to climate change, loss of land on which to live and increased exposure to extreme environmental events. Where environmentally driven community relocation has taken place in PICTs, it has often been after extreme climate events such as tropical cyclones which can cause devastating damage to settlements. But it is not necessarily the disaster alone that drives the relocation: it is often however, the 'last straw' or trigger. Individuals and family migration may also increase after disaster events.

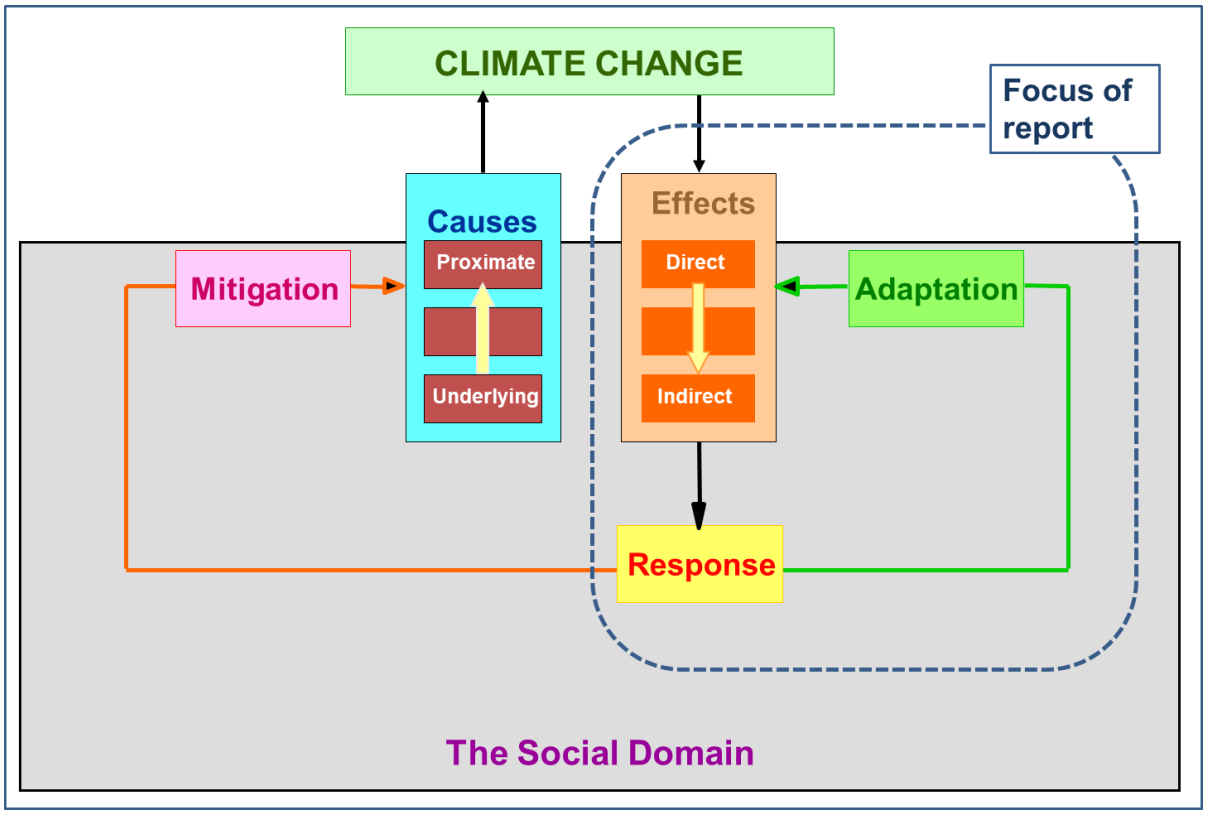


Figure 2. Simple cause and effect model of climate change showing response options

Vulnerability to the effects of climate change

Thus far the discussion has been about exposure to the physical effects of climate change. Exposure is defined by the IPCC as the "presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected" by climate change (IPCC, AR5, WG 2, p. 1765). Whether they are adversely affected or not depends upon their vulnerability. There is a growing literature in which vulnerability is identified as a social, political and economic phenomenon. Wisner et al. (2004) describe vulnerability as a sequential political economic process in which the root causes lying in macro-processes such as a history of colonisation, the expansion of neo-liberal economic ideologies and globalisation, are converted through a number of 'dynamic pressures' (e.g., growth of commercial agriculture at the expense of subsistence food security, or urbanisation and unemployment in the Pacific context) into unsafe conditions at the local level. This process, outlined in Figure 3, was developed to explain vulnerability to disasters which from this perspective are 'unnatural' events (O'Keefe et al., 1976).

Figure 3A shows in abbreviated form the key elements of the pressure and release model (Wisner et al., 2004) in which root causes such as colonialism and neoliberal economics are converted through a series of dynamic pressures such as population growth and urbanisation into unsafe (or vulnerable) local communities. Figure 3B shows the model applied to urban communities in PICTs which are becoming, because of these complex political economic processes, increasingly vulnerable (Campbell, 2019b). Put simply, disasters are not natural but only occur when a vulnerable entity is exposed to a 'natural hazard' or extreme natural event. It also serves to help explain vulnerability to climate change, much of which, as discussed above, will be manifested in changing patterns of natural extremes (or 'natural hazards' from the perspective of Wisner et al.). From this perspective, understanding vulnerability to climate change requires understanding of the political economic processes at work in PICTs. While islands may be exposed to the effects of climate change, it does not automatically follow that they are vulnerable to them. Islands, especially Pacific Islands, are discursively constructed as intrinsically vulnerable in many contexts including IPCC and UNFCCC reports, but the reality is that islands, while very exposed to climate change, are not automatically any more vulnerable than any other areas of land of similar size, and nor are their inhabitants. Having stated this, processes of colonialism, the spread of capitalism and globalisation have reduced many aspects of traditional resilience thereby creating vulnerability. If exposure to hazards is increased by climate change, it follows that greater losses can be expected.

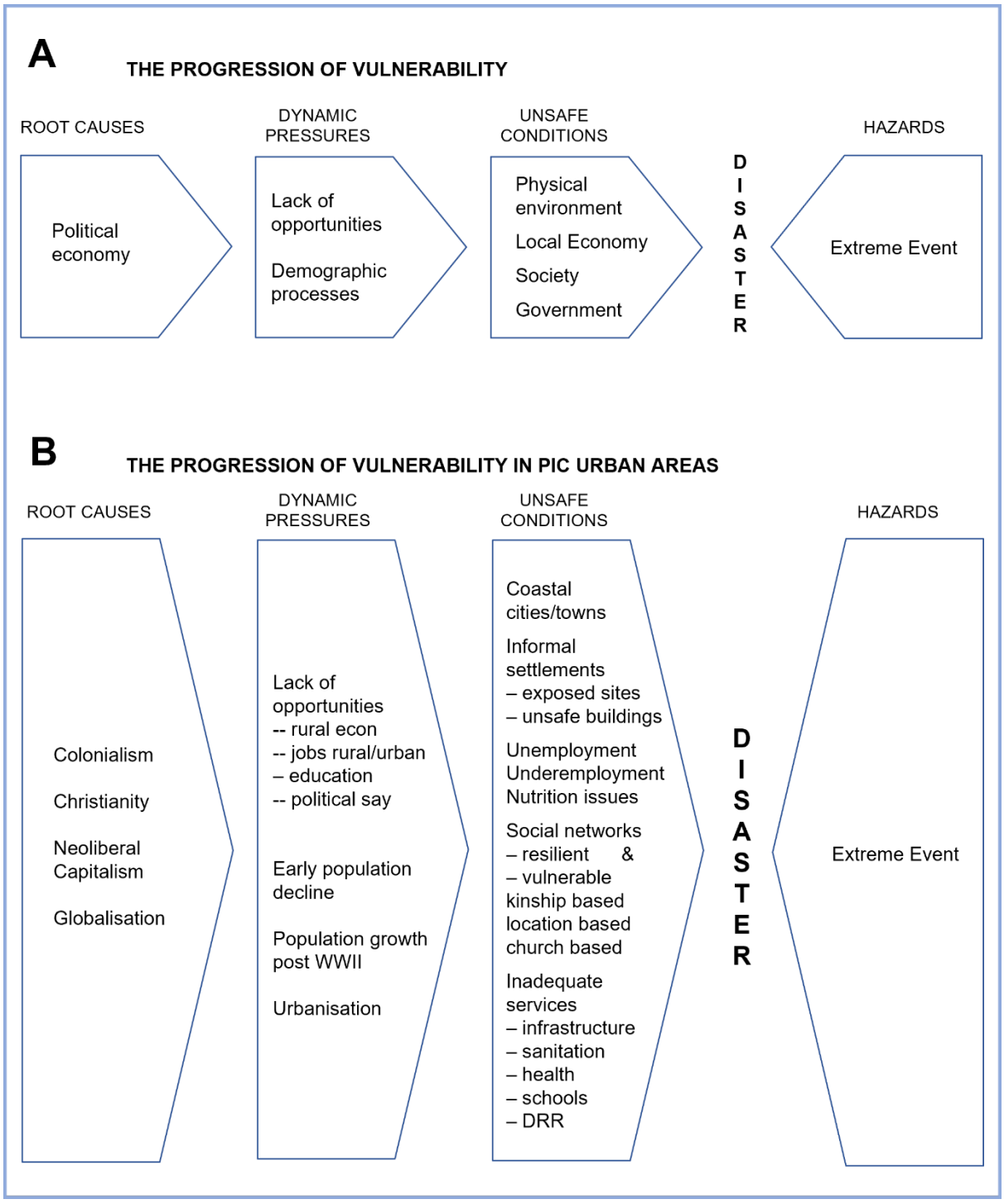


Figure 3. The progression of vulnerability (After Wisner et al., 2004 and Campbell 2019a).

Vulnerability and insecurity

Of key concern in this report is to identify the places in the Pacific Islands region that are exposed to climate change but more important is to identify those people who may be affected by these changes and, among these, identify those who may be most vulnerable to them. The terms vulnerable and vulnerability are widely used in relation to climate change

but have been subject to only limited critical examination. As discussed above, disasters only occur when an environmental event (usually, but not always, an extreme) affects vulnerable people. But what exactly is vulnerable and who are 'vulnerable people' in the context of climate change?

Robert Chambers (2006, first published 1989) who was an early theorist on vulnerability wrote that

> Vulnerability … refers to exposure to contingencies and stress, and difficulty in coping with them. Vulnerability has thus two sides: an external side of risks, shocks, and stress to which an individual or household is subject; and an internal side which is defencelessness, meaning a lack of means to cope without damaging loss. Loss can take many forms – becoming or being physically weaker, economically impoverished, socially dependent, humiliated or psychologically harmed.

In relation to this report, climate change belongs to the external side of the definition. On the other, internal, side are Pasifika people, communities and countries. This report then is about the internal side and the things people have done, are doing and may do reduce the impacts of risks, shocks and stresses, and lessen, or better cope with, losses. Chambers likens vulnerability to insecurity but cautions about the use of these terms when he points out that the terms are 'ours' not 'theirs'. They are typically assigned to 'others' by development planners, policy analysts and researchers. His observations from the 1980s can be easily applied to much of the climate change adaptation research of the 21st Century. Indeed, several years ago at a regional meeting of 'disaster managers' I asked if they could translate the term 'vulnerable' or 'vulnerability' into their own languages. None thought it was possible other than using the words such as those which translated into 'weak'.

It is very important that we use terms like vulnerability with considerable care. As indicated above, Pacific Islands and their people are not inherently vulnerable. Instead, they have a long tradition of resilience in challenging (to external observers) environments that only declined under the processes of colonialism, development and globalisation (Campbell, 2006; 2009). Resilience is often used as the opposite of vulnerability but, like vulnerability itself, is a contentious term (Cannon & Müller-Mahn, 2010). IPCC (AR5, WG2, p. 1772) defines resilience as:

> The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation.

An important concept in this report is that of security. As noted above, Chambers cautiously associated insecurity with vulnerability. Security may then be seen as the opposite of vulnerability. The IPCC defined human security in the context of climate change:

> … as a condition that exists when the vital core of human lives is protected, and when people have the freedom and capacity to live with dignity … the vital core of

> human lives includes the universal and culturally specific, material and non-material elements necessary for people to act on behalf of their interests. (Adger et al., 2014, p. 759)

It thus follows that vulnerability to climate change would place that capacity to live with dignity at risk.

In this report I follow the definition of Adger et al. and accord as much importance to non-material security as I do to material security. To date, research and policy development in relation to climate change has until recently overwhelmingly focused on material security – the access of people to physical and biological life support systems including land to live on, livelihoods including food, water and in some cases employment, and health and physical safety. Of course, these are critical features and where such 'necessities of life' are unavailable it is not unlikely that people will need to seek a 'safer' environment. However, there are important spiritual and relational aspects of life that are often neglected when habitability of places in the Pacific region is assessed (Vaai, 2019). In particular, land throughout the region has a special relationship with people and they are considered to be mutually constituted, one not being able to properly exist without the other. Land plays a crucial role in sustaining the ontological security of Pasifika people (Campbell, 2010, 2019a; Farbotko, 2019; Boege, 2022a, 2022b). The English term 'land' fails to capture this essential unity of place and people. In most of Polynesia, terms such as *whenua*, *fenua*, *fanua* and *honua* stand for both land and the umbilical cord or placenta representing the nurturing role of the land. In Fiji and parts of Vanuatu, the equivalent term is *vanua*. Elsewhere in Micronesia and Melanesia a range of words exist but all with similar meaning. Suliman et al. (2019) apply the Austronesian term **banua* for this concept across the region. The essential importance of **banua* does not preclude the possibilities of migration and mobility as long as some people remain on the land ensuring the bond remains unbroken and most migrants return (or intend to do so). Relocation of an entire community beyond customary lands would snap this connection, meaning that while material security is maintained in a new environment people are likely to face ontological insecurity (Boege, 2022a,b; Campbell, 2019a; Farbotko, 2019). The importance of the **banua* is referred to in many of the following sections.

Types of Climate Change Mobility

> As with other elements of human security, the dynamics of the interaction of mobility with climate change are multifaceted and direct causation is difficult to establish. (Adger et al., 2014, p. 767 (IPCC, AR5, WG2))

Keeping in mind this caveat from the IPCC, a number of categories of environmental migration have emerged. Several of the terms describing population mobility in the context of climate change, are used interchangeably and as a result sometimes causing substantial confusion. In this section, these terms are outlined and an attempt is made to distinguish the differences among them. Mobilities of all types can occur at any temporal and spatial scale. Often, but not always, community relocation is to proximate locations and is usually intended to be permanent. Generally, relocation requires careful planning and can take some time between the decision to move, the identification of a suitable site and the actual

construction of new community facilities and residences. On the other hand, evacuation is often very short-term, taking place during and immediately after an environmental extreme but with return to homes usually soon after conditions have returned to 'normal'. It too is usually to nearby locations. Displacement tends to be similar to evacuation, but sometimes operates at a wider spatial scale and on occasions can become permanent. Migration, usually by individuals and families, can be initiated more rapidly than community relocation so tends to occur more quickly after a triggering event. Often individual migration decisions may be made pro-actively, reflecting concerns about exposure to extreme events along with other social, economic and environmental factors.

There are some key elements of mobility that help us distinguish the different types. These are:

1) the distance of the move from place of origin to destination(s),

2) the duration of the mobility – is it permanent (or perhaps more accurately long-term) or is it short term with the intention of return,

3) what boundaries (land tenure, local government, international) are crossed,

4) what population numbers are concerned (from individual persons and/or households to entire communities) and,

5) the characteristics of the environmental influences on migration such as whether people feel compelled to move or not.

In contrast to climate influenced mobility, it is also important to consider those people who wish to remain on their customary lands (sometimes referred to as voluntary immobility) and those who have no choice but to remain because options for migration are limited through lack of resources, lack of alternative settlement sites or lack of political support (sometimes referred to as forced immobility or 'trapped' populations (Mallick & Schanze, 2020). It is important to note that the types of mobility identified here are not solely defined by their scalar properties and there are other substantive differences among them. These various issues are discussed in the remainder of this section.

Migration and mobility

'Migration', 'migrant' and 'mobility' are widely used terms with many connotations, especially in popular discourse. In this report, the United Nations definition of a migrant is used. It states that a migrant is any person:

> who moves away from his or her place of usual residence, whether within a country or across an international border, temporarily or permanently, and for a variety of reasons. (IOM, 2019, p. 132)

The Pacific Islands region has a lengthy history of both mobility and migration studies and it has long been recognised that PICT people are, and have always been, highly mobile and migratory including long-distance ocean voyaging (e.g., Bonnemaison, 1985; Diaz, 2011; Finney, 1977, 1991). Their existence, particularly in the remote and small island parts of the region, is testimony to their intrepid journeying capabilities. But even since the end of

the great migrations, perhaps brought on by the adverse conditions of the little ice age (Nunn, 2007), perhaps a form of climate generated immobility, there has remained considerable mobility and migratory behaviour across the region. After the islands were settled, trade networks emerged and other connections based on kinship and political alliances were also established. Colonialism placed barriers in the form of international borders that restricted the ambit of people's mobility and the cash economies introduced to the region marginalised traditional trade. Customary, including spiritual, motivations for mobility were often proscribed by missionaries. But new patterns of migration emerged from the indentured plantation workers of the 'blackbirding' era through to urban migration to the new colonial capitals. With independence, migration steadily grew as people were attracted to the towns in increasing numbers and, where possible, internal migration expanded to those former colonial countries which provided immigration access (Bedford & Hugo, 2012).

As noted, migration and mobility are often used interchangeably although in the past two decades social scientists, while recognising the strong links between the two concepts, also make some distinctions. Migration is traditionally thought of as a spatial process with a research focus on movement between locations, the reasons for such movement, the numbers involved and so on. Much migration research has its roots in classical economics. Mobility research also has interests in these issues but in addition tends to place a greater emphasis on cultural processes, the role of power and discursive representations of mobile and non-mobile people, the importance of place, and the mundane, everyday movements that tend to be excluded in migration studies as well as the exceptional cases which also are often ignored, at least in the academic literature (see Brown & Gilmartin, 2020; Sheller, 2017; Sheller & Urry, 2006). An important early contribution to mobility studies in PICTs is the collection *Mobility and Identity in the Island* Pacific edited by Murray Chapman (1985). Mobility studies are often qualitative in nature and involve in-depth consideration of people's motivations, pressures and reasons for their mobility or lack of it. The notion of climate change (im)mobility has arisen mostly from this kind of work. One way of illustrating how such approaches may differ is that migration experts might study the relocation of a community from one site to another because of environmental degradation, whereas mobility researchers may be interested in the new quotidian mobility requirements of the new site (typically upslope away from coasts and flood plains in Pacific Islands) such as daily water collection necessitating walking downslope and then upslope with laden containers or walks down to the coast for fishing and returning uphill (e.g. Cagilaba, 2005). Often these mobilities are highly gendered with women often being more significantly impacted by relocation than men. The discussion of immobility by Carol Farbotko and others (Farbotko, 2018; Farbotko & McMichael, 2019, Farbotko et al., 2020; McMichael et al., 2021; Piggot-McKellar et al., 2021) reflects this theoretical turn. The mobilities approach is much more than is encapsulated in the IOM definition of mobility as "[a] generic term covering all the different forms of movements of persons" (IOM, 2019, p. 93). This report is informed by both migration and mobility approaches.

Climate, weather and migration

Before continuing with our discussion of climate change and migration, it is important to clarify the differences between climate and weather. While often conflated in everyday discourse, climate differs from weather in many ways. Put simply, weather refers to short-term atmospheric conditions such as rain, high temperatures and wind at a particular place and time. Climate on the other hand generally refers to average weather conditions, typically measured over a thirty-year period (IPCC, 2018). Accordingly, when a tropical cyclone occurs in a PICT it is a weather event. Often before, during and after such events, people may be evacuated or displaced, often temporarily, until the extreme conditions subside and their homeplace becomes liveable again, even if accommodation is temporary and people rely on food relief until gardens are rehabilitated. Short-term mobility was a common response to weather related 'disasters' in traditional PICT societies (Campbell, 1984, 1990, 2006; Jacka, 2020; Jacka & Posner, 2022; Waddell, 1975). Such mobility is not climate change migration, it is a response to a single weather event. Where mobility is part of long-term arrangements to respond to extreme weather events it may be termed climate migration, as it is a measure to cope with average or expected climate conditions. But, even here, it is not climate change mobility.

However, the distinction is not straightforward. If tropical cyclones become more severe, recovery may be more difficult and take longer with the possibility that the next event causes more and greater loss and damage. If over time tropical cyclones become more severe, that is an indication of climate change. At some point displaced communities may decide not to return only to be badly affected again and seek to live elsewhere. In this case the move can be called climate change migration or mobility. The weather event may be seen as the trigger, but awareness of deteriorating conditions is the long-term driver.

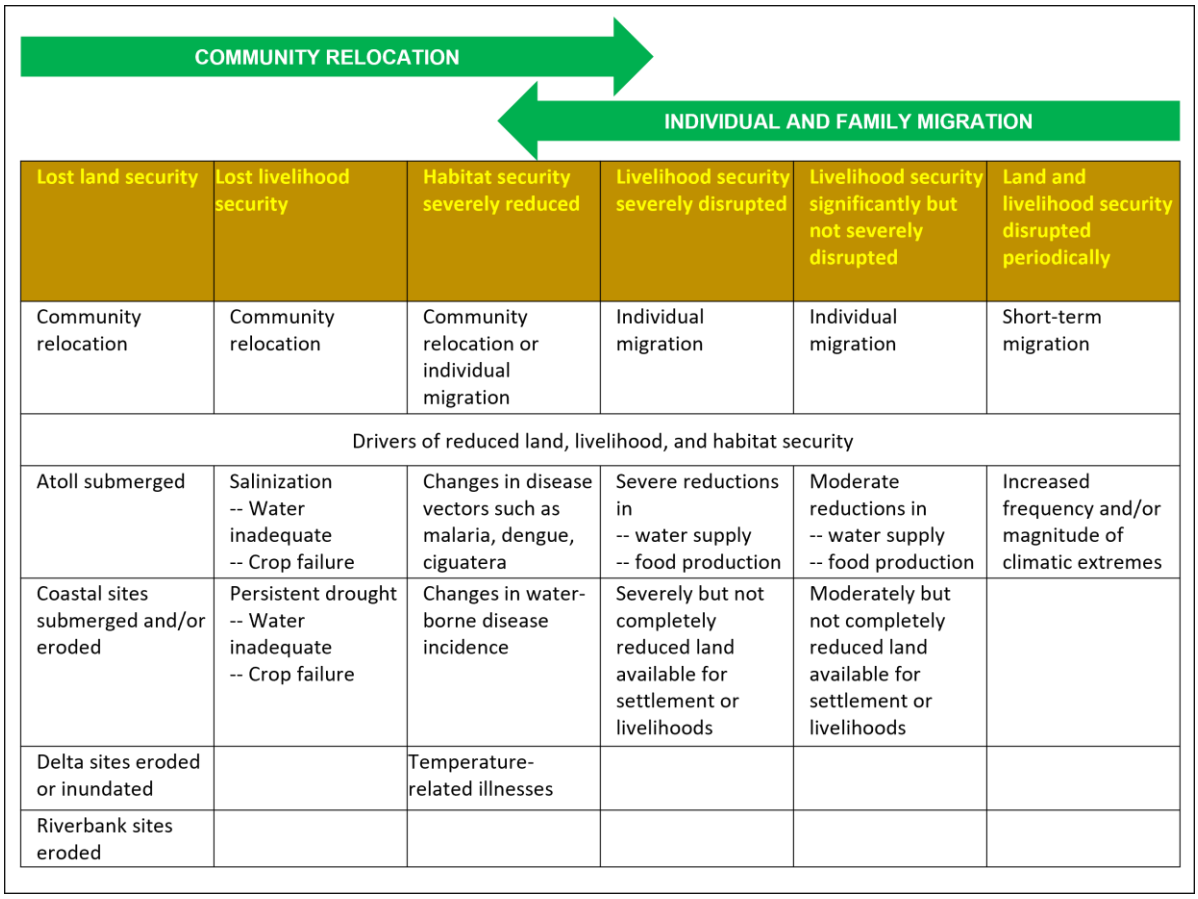
It follows, then, that care needs to be taken with "historical analogues" that examine migratory responses to single extreme events which often indicate that migration is temporary as displaced or evacuated populations typically return to their homes, either because they wish to or have no other suitable options. This can lead to conclusions that climate change does not lead to permanent or long-term migration. As noted, such events are typically part of the climate of a place but do not constitute climate change. One key aspect of climate change is that the patterns of climate extremes including tropical cyclones, floods and droughts, and extreme heat events are anticipated to change in either frequency of occurrence or magnitude (intensity), and in some case both (IPCC, AR6, SPM). Where these changes occur over time they can be referred to as climate change. Studies that examine responses to extreme events over a period of time, where the intensity and/or the frequency of events increase, however, would provide useful indications of the links between climate change, extreme events and migration (other than temporary forms). Unfortunately, such historical approaches to the study of migratory responses to environmental change are rare (Ballard et al., 2020).

Despite this cautionary perspective, it is nevertheless envisaged that much anticipated climate change migration and relocation may follow extreme events as they will be triggers creating the conditions for relocation to be implemented. For example, villages may be devastated by storm surge during cyclones, a phenomenon that has been experienced

across the region through time. However, with climate change, the storm surge events are taking place on a backdrop of rising sea levels. Thus, not only with tropical cyclones of greater intensity, and higher storm surge, but the elevation of the surge will be further increased by sea level rise. At some point, villagers displaced or evacuated before, during or after such events may indeed, instead of returning, relocate to higher ground or areas that are perceived to be safer, their attachment to their **banua* notwithstanding.

Environmental drivers of migration and mobility

Most migration and mobility happen for a variety of reasons such as economic, social, cultural, educational, and environmental processes and usually result from complex combinations of these (Warner et al., 2010). Rarely is environmental degradation a sole driver, though where a location becomes uninhabitable environmental drivers cannot be disregarded. Campbell (2014) puts forward a typology of three environmental factors contributing to migration by reducing the 'life-support systems' on some islands. First, he identifies impacts on the physical existence of space upon which to build and sustain dwellings which may reduce land insecurity. Second, the effects of climate change may reduce land and ocean resources causing decreases in cash and subsistence livelihood (particularly food) security. Third, climate change may modify island environments in ways such as changed disease vectors, degraded water supply and increased exposure to high magnitude extreme events that reduce habitat security. These material reductions in overall human security may be sufficiently destructive to make continued habitation difficult, resulting in wholesale relocation or causing sufficient degradation that some residents may elect to migrate to reduce pressure on the degrading environment and boost the livelihoods of those who remain through remittances. This is illustrated in Figure 4. A very important issue is where these thresholds for 'forced' and 'induced' mobility may lie and who determines them. It is at this point that the distinction becomes problematic. A key requirement is that individuals and communities, rather than external 'experts', determine what constitutes (in)habitability and if or when migration and, most particularly, community relocation are necessary. A tension is likely to arise where successful relocation is likely to require long-term planning and negotiation with possible host communities, but communities committed to immobility might defer engaging in such activities until the last minute. If community relocation is needed, and is reactive rather than proactive, problems are almost certain to emerge and be persistent. Finding durable ways to ensure immobility as long as possible, and eventually community relocation that is sustainable, is likely to be a contested and difficult process (Campbell, 2019a).



Lost land security	Lost livelihood security	Habitat security severely reduced	Livelihood security severely disrupted	Livelihood security significantly but not severely disrupted	Land and livelihood security disrupted periodically
Community relocation	Community relocation	Community relocation or individual migration	Individual migration	Individual migration	Short-term migration
Drivers of reduced land, livelihood, and habitat security					
Atoll submerged	Salinization -- Water inadequate -- Crop failure	Changes in disease vectors such as malaria, dengue, ciguatera	Severe reductions in -- water supply -- food production	Moderate reductions in -- water supply -- food production	Increased frequency and/or magnitude of climatic extremes
Coastal sites submerged and/or eroded	Persistent drought -- Water inadequate -- Crop failure	Changes in water-borne disease incidence	Severely but not completely reduced land available for settlement or livelihoods	Moderately but not completely reduced land available for settlement or livelihoods	
Delta sites eroded or inundated		Temperature-related illnesses			
Riverbank sites eroded					

Figure 4. Material drivers of individual and family migration and community relocation (after Campbell & Warrick, 2014)

Migration as adaptation

Climate change adaptation (CCA) is the second of the two broad categories of climate change response after mitigation (see Figure 2). The less effective mitigation is, and to date it has been very weak, the more important—and the more difficult—CCA becomes. The IPCC defines adaptation as:

> The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects. (IPCC, AR5, WGII, p. 1758)

Adaptation can take place at many levels and with a range from 'unplanned' (often called autonomous adaptation), through ecosystem-based projects such as planting mangroves to increase coastal stability, to large heavily funded engineering projects such as building seawalls to 'protect' coastal areas from sea level rise. Adaptation may also include things like changing agricultural practices and crops, improving security of water supply and improving disaster risk reduction and medical services. A key consideration for adaptation is at what point in the impact process, from direct impacts to *nth* degree indirect impacts, adaptive interventions should take place. To date, support for adaptation is heavily underfunded and lack of progress on adaptation is increasing exposure and vulnerability of

PICT communities to the effects of climate change. Migration can be seen as an adaptation to the full range of effects upon a community, especially in the event that other adaptation options are insufficiently effective. But, as has been outlined, migration (with perhaps the exception of full community relocation) also often has numerous other drivers as well.

Migration is considered by many to be a useful form of adaptation that people have engaged in for centuries if not millennia when affected by adverse environmental events. From this perspective, migration as adaptation can be beneficial although there may be limitations to its effectiveness (Barnett & Webber, 2010). A general theme has emerged in which environmental degradation reduces livelihood security inducing some community members to migrate in order to: 1) reduce pressure on a degrading resource base, 2) create further opportunities for themselves while, 3) sending remittances 'home' to help offset the losses being experienced at the place of origin. Yamamoto and Estaban (2017) make the case for enabling greater levels of migration from atoll countries in response to environmental degradation resulting from climate change. Vinke et al. (2020) also note the usefulness of migration as adaptation but also point out that not all climate change migration may be successful with new vulnerabilities emerging as a result. As the discussion below on urban migration in response to climate change indicates, new and even greater vulnerabilities for migrants in PICTs may be created. As noted earlier, it is difficult to discern the environmental triggers or drivers of migration from social, political, cultural and economic factors and indeed these factors are affected by environmental processes as well as having environmental outcomes. Following the initial focus on the plight and threats of environmental refugees, discourse shifted to a more moderate view of migration in which participants had agency in migration decision making (Bettini, 2014, 2017; Bettini & Gioli, 2016). As Bettini (2014) observes, however, the migration as adaptation discourse is not without problems, particularly its focus on human agency in the context of a neo-liberal world. Just how successful international migration is for PICT people, the trials and tribulations they face in their destinations from racism, insufficient and inequitable housing, unemployment and underemployment and low wages, needs to be carefully examined. In Cambodia, Jacobson et al. (2019) found that migration was in fact maladaptive, with few benefits for those who were left behind and employment shortages leading to increased poverty for migrants. Craven and Gartaula (2015) also found that migration does not necessarily increase food security at the place of origin through the provision of remittances. Moreover, there are some concerns among diaspora that while they will support their kin and country people who do migrate as adaptation, it will place significant pressures on them as does the obligation to provide remittances (McLeod, 2010).

Migration as adaptation raises questions as to who pays? When individuals or families migrate as an economic or social strategy, they bear the costs or share them with other members of their kin group. In comparison, migration as climate adaptation infers that the movement is not fully voluntary or desired and has some element of inducement. This brings up the costs of migration as adaptation and who should pay. There is a body of thought that considers high GHG emitting states should bear the costs of adaptation, especially in places where the contribution to greenhouse gas emissions is minuscule even on a per capita basis. For climate change migrants, costs include airfares, accommodation and daily living expenses, especially in the early stages when employment may be difficult to find. While migration issues have gained greater attention in the context of the UNFCCC,

there has been little headway in decisions about who should cover the costs of climate change migrants.

Forced, induced and voluntary mobility

The words 'forced', 'induced' and 'voluntary' have been used in much of the preceding discussion, often as modifiers of the terms: 'migration' and 'relocation'. These three terms exist in something of a continuum but, as Figure 4 indicates, there is considerable overlap at the centre with 'induced' mobility quite often linked to voluntary migration but also implying an element of compunction. At one extreme is the notion of 'forced migration' where the effects of climate change are so severe that the material human security of inhabitants of a place is no longer viable, notwithstanding the complexities of '(un)inhabitability'. At the other end of the spectrum is 'voluntary migration' which in the context of climate change suggests that migrants have the choice of whether or not to migrate or remain in place. Between these two terms is 'induced migration' which suggests an element of coercion in the migration decision but perhaps not a pressing disruption of local living conditions. In this case, some migrants may opt to leave (perhaps feeling pressure from environmental degradation) and others may opt to stay, suggesting that there is an element of choice in the migrant decision making. These terms are used in this report for want of a better classification of types of climate change migration and mobility. It should be noted that the use of the term 'forced' for climate change driven migration does not mean that such migrants are refugees in the political sense (though some may be).

Evacuation, displacement, and temporary migration

> Evacuation: Facilitation or organization of transfer of individuals or groups from one area/locality to another in order to ensure their security, safety and well-being (International Organisation for Migration, 2019, p. 65)

Evacuation is a common response to some extreme events in PICTs such as tropical cyclones and volcanic eruptions. Some of the most notable evacuations in recent times have been in response to volcanic eruptions on the islands of Manam (Connell & Lutkehaus, 2017a; Connell & Lutkehaus, 2017b; International Organisation for Migration (IOM) 2021; Mercer & Kelman, 2010) and Ambae in Vanuatu (Rovins et al., 2020; Clissold & McNamara, 2021; Clissold et al., 2021). People involved in both evacuations experienced a number of problems associated with tensions over land, psychological disruption and uncertainty over return. In both cases, some have returned but others remain evacuated. Most notably, many Manam evacuees have been located in 'care centres' on the Papua New Guinea mainland since the first evacuations in 2004-2005 when 9000 people were displaced. Historical evacuations following volcanic eruptions include the displacement of Orokaiva people by the 1951 eruption of Mt Lamington in Papua New Guinea which killed around 4,000 people on the upper slopes while about 3,000 people on the mountains flanks below fled the area (Schwimmer, 1977). By 1966 when Schwimmer was in the area most people had returned. A second case involved the evacuation of the population from Ambrym (Vanuatu), after a period of volcanic eruptions in 1950-1951, to the nearby island of Epi. Within a few weeks, Epi was struck by a tropical cyclone and 48 of the evacuated people perished. Most returned to Ambrym but the population of the village of Maat from southeast Ambrym relocated to a

site on Efate, not far from Port Vila and close to the existing village of Mele (Tonkinson, 1977). Mele Maat is today a thriving peri-urban village close to the national capital. In addition to their placement on Efate, they still maintain their cultural identity as Ambrymese (Tonkinson, 1985). In this case, an evacuation eventually became a relocation over an unusually long distance.

Typically, however, the term evacuation is used for short-term and relatively short-distance movements during extreme weather events such as tropical cyclones. In many cases, people will move to an evacuation centre (often a church or village hall in PICTs) or to nearby structures (usually houses) that are still standing (Senimoli et al., 2020). In many cases, people may move from house to house as structures fail (Fauolo, 1993). After winds subside, people then move back, make emergency 'repairs' or temporary accommodation (e.g. tents) on their home sites. Increasingly, governments are designating and strengthening community buildings as evacuation centres (Senimoli et al., 2020). The degree to which evacuation is proactive or reactive seems to vary. McNamara and Prasad (2014) found that communities in Fiji and Vanuatu took elderly people to evacuation centres in advance of recent tropical cyclones while Senimoli et al. report that people procrastinated on hearing meteorological service warnings and people were evacuated from their homes during the event.

In the most severe events where whole villages, or large portions of them, are destroyed, more distant evacuation may be necessary. On these occasions some communities, such as that from Maat, may decide whether to return to their exposed site or seek an alternative location, if one is available. Accordingly, it is anticipated that triggers of most climate change migration or relocation will be extreme weather events associated with tropical cyclones (including storm surge and flooding) and perhaps to a lesser extent, droughts. In particular, the impacts of storm surge are likely to become increasingly significant on a backdrop of sea level rise. Several villages in Fiji, for example, have been relocated away from the coast following recent tropical cyclones that generated devastating storm surges (see section on community relocation). Extreme events also often trigger individual migration as local livelihoods are disrupted by losses and need to be offset by remittances.

Community relocation

Community relocation in this report is defined as:

> … the permanent (or long-term) movement of a community (or a significant part of it) from one location to another. This is distinct from the movement of individuals away from an origin to a variety of destinations. It infers that the community stays together at the destination in a social form that has some similarities to the community of origin. (Campbell et al., 2007, p. 12)

In the Pacific context, the community, particularly if it is rural, is likely to be a village, and in most cases located on customary lands. But other communities do exist such as settlements, informal settlements, some small towns and urban communities (Nichols, 2019). To date most attention, including government projects and research publications, has been focused on rural villages.

Most recent research has tended to focus on 'planned relocation' which refers to the "systematic relocation of people and assets to areas of lower environmental risk." (Barnett & McMichael, 2018). The term also implies that 'planned' relocation is a formal process involving governments (often supported by international agencies and in bilateral arrangements). Two countries (Fiji and Vanuatu) have produced official guidelines or policies for planned community relocation and others are being prepared (Ministry of Economy Republic of Fiji, 2018; Vanuatu National Disaster Management Office, 2018). The government of Fiji uses the following definition:

> PLANNED RELOCATION is understood as a solutions-oriented measure, involving the State, in which a community (as distinct from an individual/household) is physically moved to another location and resettled there. Under this schematic approach, evacuation is distinct from planned relocation and does not fall within its scope. Planned relocation may, of course, play a role following evacuations in circumstances where places of origin are no longer habitable and continued presence in the place of evacuation is not feasible. (Ministry of Economy Republic of Fiji, 2018, p. 7)

The possibility that communities may 'plan' their own relocation seems to have been elided from the discourse, despite the fact that many, almost certainly the great majority, of the communities have relocated at some time(s) in the history of their existence with little 'formal' external influence. It is also difficult to imagine any significant local response to climate change not having at least some level of planning. This would particularly be the case in relation to relocation given the importance of the **banua*. It also sets up a binary between government planners and villagers that may result in less than successful relocation outcomes (Anisi, 2020). In addition, the term tends to elevate 'formal' governmental types of planning above local and indigenous forms of planning. Nevertheless, with land boundaries increasingly rigid under colonial and then post-colonial legal systems, the possibility of litigation, and the costs of relocation now being very high, government involvement is increasingly important. Equitable levels in planning participation would seem to be a basic requirement for durable outcomes. In relation to unplanned relocation from coastal areas, Piggott-McKellar et al. (2019) use the term autonomous retreat.

Not all 'community relocation' includes whole communities. Based on research among coastal communities in Fiji, Piggott-McKellar and McMichael (2021) found a continuum of relocation types from voluntary immobility, through immobility due to restricted relocation options, incremental relocation, partial relocation, to full community relocation. They show how, in addition to the characteristics of environmental disruption, the major influences on the degree of relocation include community experience of adaptation, intra-community social, cultural and political factors such as leadership, availability of **banua* and institutional (governmental and funding) factors. Relocation is often staggered (Gharbaoui & Blocher, 2017) or stepwise, and not uncommonly is partial with only households closest to the coast being moved. There are reasons for staggered or stepwise relocation. These include costs and logistical issues; often only part of a community suffers disaster damage, and these are the first to move. Sometimes several disasters (typically tropical cyclones and often accompanying storm surges or river floods) may be the catalysts for further relocation until the whole community is back together again in the new site. Two examples of such

relocation are mentioned below: Biausevu (on Viti Levu) and Vatulele (on Koro). These are examples of a successful process that took place over an extended period and were both characterised by effective leadership. There are drawbacks as well. A 'split community' can emerge, reducing community cohesion and even creating tension and conflict. In some cases, only a proportion of the community are willing, at least initially, to abandon their customary ancestral *dela ni yavu* (home site) as outlined by Cagilaba in the case of Solodamu. Moreover, the terrain of the new site made establishing new *yavu* (house mounds) difficult. Cagilaba (2005, p84) described these differences between the sites as causing 'subtle division' in the community.

Using examples from two villages, Karoko (Vanua Levu) and Vidawa (Taveuni) in Cakaudrove province in Fiji, Pigott-McKellar et al. (2021) show that different age groups had different views towards relocating away from coastal hazards. Young adults (in their 20s) preferred the option of inland retreat but keeping connections with their village by relocating within 'community boundaries' while older community members (in their 50s and above) preferred to remain where they were. It seems that the 'middle aged' population in between these groups had more ambivalent attitudes: some keen to stay and others to move but encouraging younger people to take the step. They observed that exposure to coastal hazards was in some cases a less likely indicator of willingness to relocate than age (youth). They used the term 'generational retreat' to describe these differences. Nunn and Kumar (2019) also report that Navunievu village in Bua Province has a local law requiring all new houses (mostly belonging to newly married people) to be built behind the village on elevated land, which through time will see an increasing proportion of the village move in what they termed iterative relocation. Like the two cases presented by Piggott-McKellar et al., the process in Navunievu was autonomous without central government involvement.

Typically, community relocation is seen as a 'last resort measure'. However, it is not often clear, in cases where planned community relocation takes place, what other *in situ* adaptation options have been considered or the criteria used to choose relocation over other possibilities which would enable communities to remain in place. Does last resort mean there are no other options or other options would be too costly for 'donors', a misleading term for bilateral 'assistance' from major GHG emitters? Moreover, proactive planning before a community is required to move, typically after devastation from a tropical cyclone, would appear to be less disruptive than unplanned resettlement at the last minute. On the other hand, as has been stressed in this paper, most communities resist moving, or even considering the possibility because of their place in their **banua*.

Immobility

Immobility is being increasingly recognised in the climate change literature from two main perspectives. The first of these is the concept of voluntary immobility (Farbotko, 2018; 2019; Farbotko & McMichael, 2019; Farbotko et al., 2020) where people wish to stay on their island homes. Immobility may be seen as a manifestation of people's attachment to place and as a response to the hegemonic discourse of climate and migration or even climate refugees. It may be argued from this perspective that all options for adaptation, *in situ*, are not accounted for perhaps because of technological limitations (in the eyes of adaptation

experts) or financial restrictions (in the eyes of funders), reflecting the failure of greenhouse gas polluters to pay for the losses and damage that they have caused.

The second type of immobility referred to in the literature is 'forced' immobility which refers to people who may be 'trapped' (Ayeb-Karlsson, 2020; Ayeb-Karlsson et al., 2020) in places severely degraded by climate change but without financial or political resources to find alternative sites for relocation. McMichael et al. (2021) point out that factors that result in people remaining immobile are complex and care needs to be taken to avoid binaries. They note that "[i]t is possible for people, households, and communities to simultaneously face barriers to mobility and to want to remain in places of belonging." Moreover, it is not clear if, or how many, communities exist in a condition of 'forced immobility' in the region, though the costs of migration and relocation are high and to date there has been very little international funding support to assist those people who wish to migrate or relocate. As is shown in Part II of this Policy Brief, while several PICTs have migration access to so-called metropolitan countries, a large number do not, including countries that are considered 'hot spots' such as the atoll states of Tuvalu and Kiribati. There is potential for involuntary immobility to be a problem for people living in these countries who wish to migrate or are facing environmental degradation, making continued occupation of their homes increasingly marginal.

It's not all push

It is important to note that, while this report is about climate change and mobility, reasons for migration are not likely to be linked only to local environmental degradation and associated social and economic challenges at mobility origins. For migrants, the appeal of possible destinations must also be taken into account. It is likely that the large Pasifika diaspora around the world to date (or at least until relatively recently) has been attracted by social and economic possibilities in international destinations rather than driven (at least solely) by environmental degradation. Furthermore, it is likely that individual or household migrants may go to destinations of their choice to join family, kin and/or community members. If the numbers of climate change migrants become large (a possibility that as yet has insufficient evidence), the choice of destination may be denied climate change migrants as destination countries restrict numbers of climate change immigrants.

Conclusions

It is likely that climate change will play a role in some people deciding to migrate or some communities relocating. Indeed, communities have begun relocating already and it is difficult to determine to what extent climate change may have influenced recent rates of individual and family migration. The extent to which this will continue to happen, or increase, is very difficult to foresee. It will depend upon the resilience of communities affected by climate change and sea level rise, their conceptions of (un)inhabitability, the existence of suitable destinations, the technical feasibility of *in situ* adaptation, and the financial willingness of greenhouse gas emitters to pay for it.

The possibility of 'forced' relocation perhaps causes by far the most concern among people in PICTs, especially those living on atolls where there is no elevated hinterland to move to. In their case, relocation may be particularly harsh, cutting off people's ties to their **banua* and leaving it unprotected. For those living in atoll only states, the fear is even greater as people's identity, while strongly defined by their **banua*, is also linked to their sense of belonging to a nation. There is a fear that culture, customs and language will be lost, especially if communities cannot be relocated in destinations within their own country or in a single destination. In such cases, communities may become significantly fragmented and possibly spread across several nations.

So, what are the implications for communities at such risk. As many writers have observed, there is a pressing need for control of knowledge, planning and decision making to be placed in the hands of those who have most at stake, the atoll dwellers themselves. This is problematic in the current CCA environment where support for adaptation is represented more as aid than compensation, where 'concrete' adaptation actions are most likely to be funded and where perceptions of vulnerability and the inevitability of mobility are likely to dissuade funding agencies and bilateral funders from supporting adaptations that they believe will not be sufficiently sustainable.

A cause of tension lies in the desire to exercise their right to stay, and the development of a contingency plan to facilitate a least disruptive, and possibly more peaceful, relocation if this becomes necessary. Unplanned, last-minute relocations are typically extremely precarious and often fail, with conflict between newcomers and members of host communities, difficulties in accessing land and establishing durable livelihoods. While it does not fit in contemporary funding or planning timeframes, building connections between communities over decades in which mutual exchange, visits and interaction may smooth the way for greater understanding between hosts and relocatees, would be beneficial even if relocation was not necessary. Taking such proactive steps does not need to set an inevitable path to relocation but may help if it does become necessary.

Climate change has already proved to be a problem for PICTs and impacts are likely to become more disruptive and persistent if reductions in GHGs are not quickly achieved. While we must address issues of adaptation, and this will be necessary for decades to come if not longer, it is also critically important that the globe as a whole and the high emitting countries in particular implement effective mitigation as soon as possible.

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