SAMOA: EXPLORING THE LINKAGES BETWEEN CLIMATE CHANGE AND POPULATION MOVEMENTS

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A thesis submitted to

Auckland University of Technology

in the fulfilment of the requirements for the degree of

Doctor of Philosophy in Public Policy

2016

Auckland University of Technology

Abstract

Samoa, like other Pacific Island Countries and Territories (PICTs), is already experiencing the adverse impacts of climate change and natural disasters, and future projections indicate that these impacts will get worse. While there is clear evidence that climate change is stimulating population movements, the relationship between climate change and mobility has not yet been addressed comprehensively in both research and policy.

Much of the research has concentrated on the atoll territories, such as Kiribati as the poster child of the climate change debate with less attention on the impacts in middle-sized Pacific nations, such as Samoa. Furthermore, policies have focused on the physical and technical aspects of climate change with less recognition of the social, economic and cultural impacts. Notably, people's voices of their experiences have been missing in both research and policy debates.

This Samoa study explores people's experiences and understandings of climate change, including whether and how climate-related factors have been influencing mobility patterns during a period of 30 years (1985 – 2015). The theoretical framework is interdisciplinary combining a Samoan worldview which acknowledges the place of traditional knowledge, values, beliefs and practices in people's responses to climate change, and Western-based perspectives and disciplinary insights to set the knowledge base. Data about people's experiences on climate-induced mobility was gained from a village-based study in Lotofaga. Over a period of one year, village observations and interviews (*talanoa*) were conducted with village-based family members, those who now largely live in the capital Apia, and those who have migrated to New Zealand. In order to contextualise the study, a comprehensive document review of the main economic, social and environmental characteristic of Samoa was carried out backed by interviews with key informants in Samoa and New Zealand. Findings from the village study were used as a lens to identify critical issues at the national level as a base for policy recommendations.

Main study findings are: first, despite the fact that climate change is affecting people's lives, families are demonstrating great strength and resilience in ameliorating the impacts of climate-related events. More particularly, they are using a mix of traditional and Western-based modern technical knowledge, drawing on their family and village

social support systems, utilising their customary land tenure entitlements, and using population movements to enhance their adaptive capacity. Second, population movements now play an integral part of people's adaptation strategies to climate change, as seen in cases of displacement and relocation from coastal areas to inland customary lands, temporary and permanent migration to Apia, and overseas migration is becoming more prominent. A third main finding is that climate change tends to exacerbate differences among groups. Families and groups with limited access to resources and support systems have fewer adaptation options, are more vulnerable to the impacts of climate change and are less able to use mobility as an adaptive mechanism. It is necessary to give greater attention to the specific needs of women, youth, elders and other vulnerable groups.

Two implications for policy design have been identified in this study. First, the voices of people affected by climate change must be incorporated in both research and policy. Not only are they the ones affected by changes, but also their knowledge and aspirations have a central place in understanding and addressing climate change challenges. Second, climate-induced mobility must be studied within specific social and cultural contexts (place and time) so that tailored interventions can be put in place. In sum, the design of any climate change adaptation initiative must be conducted in consultation with communities so as to ensure that their priorities are taken into account.

Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Signed _____   Date _30/09/2016_____

Acknowledgements

Firstly, I would like to thank the people of Lotofaga, those living in the village, Apia and Auckland. Thank you for your support. Your insightful knowledge, wisdom and experiences have been a source of inspiration throughout my research journey. I would like to extend my gratitude to their families for encompassing warm-heartedness towards me and for making me feel welcome. Fa'afetai tele. I'd also like to express my gratitude to the key informants of this research for sharing with me your knowledge in a wide-array of fields.

I am most grateful to the Honourable Fiame Naomi Mata'afa for your guidance, encouragement, hospitality and time. Thank you for your acts of kindness. You have inspired me in so many ways and given me the incredible opportunity to witness and experience the heart of the Samoan culture.

I wish to extend my heartfelt gratitude to my Supervisor Professor Tagaloatele Peggy Fairbairn-Dunlop. Thank you for your unfaltering support, intellectual guidance, patience and dedication. You gave me strength to persevere with this study and have instilled profound knowledge within me. Thank you also to my Second Supervisor Dr Fa'alāva'au Juliet Boon Nanai, for your genuine interest, attention to detail and constructive feedback which has been an encouragement at all stages of my work.

I would like to thank my family. To my mother, Sachita, and my father, Oscar, for your unconditional love, support and example of service to others. To my sisters Patricia, Karen and Katty, thank you for your good wishes and keeping me focused with your enthusiasm. A special thanks to my daughter Cloe, my sunshine, for supporting me during this journey, we have learned and shared a lot. I hope that you treasure our wonderful experiences in this part of the world. This study is dedicated to you.

I would like to gratefully acknowledge the funding I received towards my PhD from AUT Vice Chancellor's Doctoral Scholarships and through the New Zealand Aid program for postgraduate field research. I am extremely honoured to be a recipient of these funding which have given me to provision to take this research one step further.

I would very much like to acknowledge the support of colleagues and friends who helped me to stay focus. A special thank you also goes to the staff of the University of Samoa, Ministry of Natural Resources and Environment and UNDP for providing me support during my stays in Samoa.

I am grateful for the professional editing, proofreading and comments of Margi Keys and David Parker and Sue Knox for assisting me with the formatting.

Ethics Approval

The ethical approval No 12/207 for this research was granted by the Auckland University of Technology Ethics Committee (AUTEC) at its meeting held on 31 August 2012.

Abbreviations and Acronyms

ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Centre
CBD	Convention on Biological Diversity 1992
CDCRM	Community Disaster and Climate Risk Management Programme
CEHZ	Coastal Erosion Hazard Zone
CFHZ	Coastal Flood Hazard Zone
CIF	Climate Investment Funds
CIM Plans	Coastal Infrastructure Management Plans
DMO	Disaster Management Office
DRR	Disaster Risk Reduction
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
FDC	Foundation for Development Cooperation
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFDRR	Global Facility for Disaster Reduction and Recovery
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit
GNI	Gross National Income
HRC	Health Research Council of New Zealand
IASC	Inter-Agency Standing Committee
ICHCAP	International Information and Networking Centre for Intangible Cultural Heritage in the Asia - Pacific Region
ICSU	Internal Council of Science
IDMC	Internal Displacement Monitoring Centre
IFAD	International Fund for Agricultural Development
IFRC	International Federation of Red Cross and Red Crescent Societies
ILO	International Labour Organization
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
LSE	London School of Economics
MDGs	UN Millennium Development Goals
MFAT	New Zealand Ministry of Foreign Affairs and Trade
MNRE	Ministry of Natural Resources and Environment of Samoa
MOF	Ministry of Finance of Samoa
MOH	Ministry of Health of Samoa
MWCSD	Ministry of Women Community and Social Development of Samoa

MWTI	Ministry of Works Transport and Infrastructure of Samoa
NAPA	National Adaptation Programme of Action for Climate Change
NCP	National Climate Policy
NGHGAS	National Green House Gas Abatement Scheme
NGO	Non-Governmental Organisation
ODA	Official Development Assistance
ODI	Overseas Development Institute
OHCHR	Office of the High Commissioner for Human Rights
PICTs	Pacific Island Countries and Territories
PIDF	Pacific Islands Development Forum
PIFS	Pacific Island Forum Secretariat
SIDS	Small Island Developing States
SOPAC	South Pacific Applied Geoscience Commission
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UN-Habitat	United Nations Human Settlements Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNISDR	United Nations Office for Disaster Risk Reduction
UNU-EHS	United Nations University Institute for Environment and Human Security
UNU-GCM	United Nations University Institute on Globalization, Culture and Mobility
WHO	World Health Organisation

Samoan Terms

'aiga	extended family
alofa	love, caring, charity, sacrifice and commitment
aso gafua	Monday
ato	food baskets made of coconut palm fronds
ava niu kini	*paraderris montana* is a climbing shrub. A source of the insecticide derris. The roots are harvested from wild and cultivated plants are used as a fish poison and insecticide
fa'aaloalo	reciprocal respect and involves honouring others, especially elders or those of senior status
fa'a Samoa	according to Samoan customs and traditions. In the manners of the Samoans
fa'alavelave	occasion such as wedding or funeral, when family assistance should be given, in the form of labour or goods
fa'a matai	chiefly system of Samoa, central to the organisation of Samoan society
fa'avae I Le Atua Samoa	Samoa is founded on God
fesui'aiga o le tau	climate change
fale	Samoan house with thatched roof and poles
fetau	tree (*Calophyllum*)
fono o matai	council of chiefs, a meeting
i'e toga	fine mats
keke puaa	pork buns
komiti	committee
kosokoso	fishing pulling method
laulau	a small plaited mat on which food is carried
lava lava	single rectangular cloth worn as a skirt
lotu	Church. Religious observance, as in family prayers or church services
malae	central gathering place of a *nu'u*
malaga	to visit. Short-term movements / circular mobility
matai	chief
maumaga	taro patch
nu'u	village: political and administrative unit in Samoa
ola	baskets
palagi	used to describe foreigners or anything that does not belong to Samoan culture
palusami	Samoan dish made with coconut cream and taro leaves
pisupo	corned beef

pola	house blinds
pou	post
pulenu'u	village mayor
seuseu	fishing method using lures
siapo	bark cloth, tapa
sugale	fish
tautua	serving others
vā	relationship / relational space

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Chapter 1 - Introduction

Background to the study

The 2014 report of the Intergovernmental Panel on Climate Change (IPCC) states emphatically that the human influence on climate is clear and growing, with impacts seen on all continents and in the oceans. The report notes that without significant reductions in greenhouse gas emissions, these changes will continue over the decades and centuries to come, and will have severe, widespread and irreversible impacts (Intergovernmental Panel on Climate Change [IPCC], 2014a). The adoption of the Paris Agreement at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015 represents a significant turning point in the global climate change debate. All countries recognised the urgency of addressing climate change through a deep reduction of global emissions and adaptation actions (United Nations Framework Convention on Climate Change [UNFCCC], 2015a).

Vulnerability

Climate change is one of the most serious global problems. However, there is compelling evidence that the Pacific Island Countries and Territories (PICTs) are particularly vulnerable because of their unique geophysical features (Barnett, 2001; Barnett & Campbell, 2010; Climate and Development Knowledge Network [CDKN], 2014; IPCC, 2007, 2014a; Secretariat of the Pacific Regional Environment Programme [SPREP], 2015a). As well reported, Pacific communities are already experiencing the effects of climate change on their water supplies, marine and terrestrial ecosystems, fisheries, agriculture and infrastructure which, in turn, are impacting on people's lives and livelihoods (Asian Development Bank [ADB], 2010a, 2011a; Elisara, 2011; Hay et al., 2003; Mimura et al., 2007; SPREP & United Nations Development Programme [UNDP], 2013). Moreover, technical reports indicate that the impacts of climate change will further intensify over time (IPCC, 2014b; Pacific Islands Forum Secretariat (PIFS), 2015).

Climate-related risks for PICTs include increasing air- and sea-surface temperatures, changing rainfall patterns, sea-level rise, increasing intensity of tropical cyclones, severe storm surge, higher king tides, ocean acidification, coral bleaching, saltwater intrusions, coastal erosion, and land inundation (IPCC, 2014a; SPREP, 2015a). These

drivers of climate change have varying impacts on PICTs, depending on the magnitude, frequency and extent of the event. Furthermore, responses to climate change impacts and adaptation strategies vary across PICTs depending on each country' specific geographic and socio-economic conditions.

It is clear that climate change poses an existential threat for most of the PICTs as they are geographically dispersed and remote, are prone to natural hazards and external shocks, have fragile environments and have small and scattered populations. More than 50 per cent of the PICT population live within 1.5 km of the shoreline, and many islands are less than a few metres above sea level. Therefore, an increase of as small as half a metre, along with increased storm surges, would inundate many critical areas and threaten their populations (ADB, 2010b).

Although the impacts of sea-level rise differ between low-lying atolls and high volcanic islands, both are equally vulnerable to sea-level rise, due to the concentration of human activity in coastal areas (ADB, 2011). For instance, the atoll countries of Kiribati, Tuvalu, the northern Cook Islands and the Marshall Islands are most at risk with extreme limitations on the availability of land for settlement (United Nations Population Fund [UNFPA], 2013). These countries face the possibility of being submerged in the coming decades by rising seas and extreme weather (Small Island Developing States [SIDS], 2014). The prospects for other small island countries in the Pacific are also serious because the majority of their populations live in coastal areas where agricultural land and areas suitable for settlements are limited, and terrestrial and marine resources are vulnerable to environmental degradation (World Bank, 2013).

A number of reports predict that for most countries it will be difficult to adapt to these changing conditions, and the impacts will be felt for many generations because of the countries' low adaptive capacity, high sensitivity to external shocks and high vulnerability to natural disasters (ADB, 2010a; IPCC, 2010; Secretariat of the Pacific Community [SPC], 2010a). In addition, in a time of global economic crisis, climate change has the potential to reverse hard-won development gains in the region and even to undermine efforts to achieve sustainable development (Pacific Islands Development Forum [PIDF], 2015).

Thus, there is a growing concern at the national, regional and global level about the need to reduce PICTs' vulnerability to climate change and manage the risks posed by

extreme events and long-term changes. Failure to adapt to climate change now could lead to high social and economic costs in the future. For the low-lying atolls, the economic disruption could be catastrophic, even to the extent of requiring population relocation to other islands or increasing the number of people emigrating from the islands to larger countries like Australia and New Zealand (Connell, 2011; Government of Australia, 2009; SIDS, 2014; SPREP, 2015a).

Not so well documented in climate change debate is the differential impact of climate change on vulnerable and socially marginalised groups, such as the poor, children, women, the elderly, indigenous groups and, in some cases, migrants who may bear the brunt of environmental impacts. Having fewer resources and less options for adaptation *in situ*, these groups tend to experience the greatest out-migration pressures as a result of environmental, economic and social impacts of climate change (Aguilar, Granat, & Owren, 2015; Kelkar, 2009; SPC, 2010b; UN Women, 2015). Pacific women's experiences are particularly significant to this study, given the commonly held view that rural villages are the "villages of women and children" and women are responsible for family wellbeing (Fairbairn-Dunlop, 1991).

Resilience

In a number of studies and press statements, Pacific people are being portrayed as the "miner's canary" of global climate change, despite the reality that they are not even responsible for it. The French environmentalist Jean-Michel Cousteau (2014), for instance, referring to the impacts of climate change in PICTs said:

> Ten million people of the Pacific Island Nations are calling – and we have yet to answer their plea. Like the canary in the coalmine, thousands of drowning islands in the Pacific are telling us that something dangerous is happening. As ocean levels continue to rise higher onto their low-lying lands, millions of people are facing a reality that threatens their homes, their families, their economies and their entire way of life. It is a reality they aren't even responsible for – the very real effects of climate change. (p. 1)

These and other images consistently describe Pacific peoples as passive and helpless victims of climate change. These global narratives, in turn, set Pacific communities in unequal power relations and as unable to decide their own future (Farbotko, 2005, 2010a, 2010b; Farbotko & Lazrus, 2012; McNamara & Gibson, 2009; Paton & Fairbairn-Dunlop, 2010). Pacific peoples' long history of resilience and adaptation, in the face of hostile climatic conditions, is glaringly missing in the majority of these

accounts. These predominantly semi-subsistence and family-based economies have combined and adapted traditional and modern practices (and taken considerable risks) to reduce vulnerability to climatic extremes and variability (Nakashima, Galloway McLean, Thulstrup, Ramos Castillo, & Rubis, 2012).

Over time, Pacific traditional farming systems have been adapted to changes in agro-ecological conditions while agreed to social and community values, rules and practices have ensured the sustainable management of resources not only for the use of present but also for future generations (United Nations Educational, Scientific and Cultural Organisation [UNESCO] & International Information and Networking Centre for Intangible Cultural Heritage in the Asia - Pacific Region [ICHCAP], 2013). This is also seen in certain kinds of marine management of resources where fishing activities and sanctions have ensured sustainable harvests of local near-shore fish and other species (Levine & Sauafea-Leau, 2013). Traditional Pacific knowledge extends to other areas such as forestry, biodiversity conservation, navigation, architecture and traditional support systems as vital mechanisms for resilience.

Traditional knowledge is intrinsically associated with land. Between 80 and 90 per cent of land in PICTs is still held in traditional customary tenure under the stewardship of the family chiefs and for the use of family members (Campbell & Bedford, 2014; Crocombe, 1995; Fairbairn-Dunlop, 1991; Sutton, 2005). For Pacific peoples, land is fundamental not only as a source of livelihoods but also for identity and cultural security. Land has a profound spiritual value and provides a sense of connectedness and belonging for Pacific communities, including those living abroad (Fairbairn-Dunlop & Makisi, 2003).

Climate-induced migration

Environmental factors have always had an impact on migration flows; through history, people have left places with harsh or deteriorating conditions (Black, 2001; International Organisation for Migration [IOM], 2016). However, the accelerated and combined impacts of climate change have become so serious that the scale of movement is increasing and having unprecedented impacts on people's lives and livelihoods (Brookings, 2014; IOM, 2011a; IPCC, 2007; United Nations Environmental Programme [UNEP], 2012).

In PICTs, mobility within and away from villages – into urban areas or overseas migration – due to environmental change has not been so prominently examined. Anecdotal reports suggest that in earlier days (and before the introduction of the cash economy); mobility as a result of environmental factors was largely within and between the family customary land holdings (Smith & Jones, 2007). The environment has always influenced the distribution of the population across the region. However, climate change and natural disasters are now becoming key drivers of internal and international movements. In the urban areas of PICTs, rapid population growth resulting in both natural increases and internal migration has created many challenges, especially in housing, sanitation, water supply and employment. Some islands are overcrowded, and little land is left for agricultural purposes (ADB, 2012a).

Although there are no reliable global estimates linking migration and climate change, there is evidence that sudden and gradual environmental changes are having impacts on population movements. The Internal Displacement Monitoring Centre (IDMC), in its annual report for 2015, *Global Estimates of People Displaced by Disasters*, estimates that almost 20 million people were newly displaced by sudden-onset disasters in 100 countries in 2014. Since 2008, an average of 26.4 million people have been displaced by disasters every year, equivalent to one person every second (Ginnetti, 2015; IDMC & Norwegian Refugee Council, 2015). In addition, gradual changes in the environment are likely to have a greater impact on population movements than extreme events. For instance, in the last thirty years twice as many people (1.6 billion) have been affected by droughts as by storms (718 million) (IOM, 2015a).

In PICTs, based on evidence related to past disaster-induced displacement events, approximately 13,000 people are at risk of being displaced by climate-related events each year (Lavell & Ginnetti, 2014). In 2015 alone, 81,700 people were displaced due to sudden-onset events in the region. At least 2,500 were displaced in Kiribati, 6,800 in the Federated States of Micronesia, 1,000 in Samoa, 1,000 in the Solomon Islands, 5,400 in Tuvalu, and 65,000 in Vanuatu (IDMC, 2016).

Data on mobility due to slow-onset events is very scarce in the region. While the effects of catastrophic events are highly visible, it is also necessary to identify, document and understand any linkage between population movements due to both sudden-onset events such as natural disasters, and less visible slow-onset events such sea-level rise. This

information is essential to understand the effects of climate change and natural disasters on people's lives and communities, and in terms of national policies.

Focus of the research

This research focuses on the interaction between climate change and population movements. Over the past decades, human mobility associated with climate change and natural disasters has been gaining increasing attention in the academic and policy arenas. However, this relatively new topic is still little understood (Nansen Initiative, 2013a, 2015). Disentangling climate from other migration drivers is very difficult because the reasons to migrate are multifaceted. Ferris (2015) sets the research challenge in this way:

> Can we even talk of 'climate-change-induced displacement or migration'? We know that decisions to move are rarely mono-causal and that the line between 'voluntary' and 'forced' is often quite blurry… While we can say that climate change acts as a force multiplier, intensifying the effects of natural disasters, it is difficult to say that a particular storm was the result of climate change, much less to assess the role of climate change in prolonging drought. It is of course more difficult to determine the role played by climate change in a specific situation given the interplay of political, social, demographic and economic factors. It may be, for example, that global warming makes an area uninhabitable for a given population, but could perhaps support a smaller population. (p. 2)

Contemporary research in climate change has tended to give prominence to physical phenomena and technological interventions, with less attention to any economic, social and cultural implications. For instance, there is little research on people's experiences of the influence of climate change on their lives, livelihoods, social systems, and decision-making processes that include population movements. The knowledge and experience people bring to the debate is hardly considered either. Moreover, in the literature, Pacific peoples are represented as vulnerable, with less recognition to their resilience in the face of external pressures and forces.

Therefore, I saw the need to explore Pacific people's voices of their experiences to add meaning to the many technical reports and political discourses on environmental migration. Climate change impacts are measurable; it is possible to measure changes in temperatures, sea levels and soils. Climate change cannot be argued about; it is already happening. Similarly, population movement can be measured with census data, unused land, empty houses, enrolments at school, and other variables. However, how people

respond to the impacts of climate change, which is the focus of my research, is another matter. Responses are deeply steeped in people's ideals about the meaning of life, values and beliefs, and also in the opportunities available. For example, do they have access to another land they could move to? Will someone in New Zealand send them a ticket and will they get a visa to travel?

Research on environmental migration is also necessary to designing better policies and initiatives to address internal and international movements. Research can also highlight lessons that need to be learned from existing government responses and local initiatives in order to reduce people's vulnerability, and also help understand how human mobility might be used as part of adaptation strategies (Burson, 2010; Corendea, Bello, & Bryar, 2015).

Country selection

Climate change is a challenge for all PICTs. However, I saw the importance of carrying out an in-depth study in a single country. I decided to make Samoa my study focus because while extensive research has been conducted in highly vulnerable atoll territories such as Kiribati and Tuvalu, there has been little empirical research on the influences of climate change on middle-sized Pacific nations such as Samoa (Mortreux & Barnett, 2009; Paton & Fairbairn-Dunlop; 2010). The Samoan context offered the opportunity to isolate the research topic from other external factors. The country presents political stability, steady economic growth and good social progress. The analysis covers the period 1985 to 2015.

Research aim and questions

The aim of this research was to explore and understand how climate change is stimulating internal and international population movements. More specifically, how climate-related factors are influencing Samoan people's mobility patterns.

The research questions were:

1. How do people perceive and manage the impacts of climate change?
2. How have climate change impacts played a role in people's decisions to move internally and internationally?
3. Based on the findings of a village study, what key issues associated with environmental migration should be addressed at the national level?

Another aim was that this research informs policy design and practices related to climate-induced mobility, through recognising the unique natural and cultural assets of Samoan communities, their close ties to their customary land tenure systems, the role of extended families as a mechanism for resilience, and the decision-making processes of local communities.

Three patterns of mobility linked to climate change were identified in Samoa, namely movements inland within the villages and migration to Apia and overseas. Furthermore, displacement has occurred after natural disasters.

Research design

The research design includes three complementary approaches, namely the exploratory, qualitative and interdisciplinary.

Exploratory approach

Although there is clear evidence that climate change is stimulating population movements in Samoa, the interactions between climate change and human mobility are still little understood (Nansen Initiative, 2013a, 2015). Thus, the study opted for a qualitative exploration of environmental migration in one selected village in Samoa. The findings from the village-level study were not extrapolated to explain the situation at the national level, but they were used as lenses to look at the phenomenon in a wider national context.

Qualitative approach

This approach considers people's voices at the centre of the study. It was important to give prominence to the experiences of people who are on the front line of climate change, and to learn how they negotiate these challenges. Learning from their adaptation strategies, experiences and knowledge, including population movements, was necessary. As Paton and Fairbairn-Dunlop (2010) wrote "the voices of academics, scientists, politicians and development practitioners dominate the climate change debate, yet local knowledge and beliefs, local realities, as well as local voices and actions are essential elements of navigating the way forward" (p. 687).

While listening to the people's voices may serve a political purpose, and be seen to be a right to be engaged, axiomatic also is that the voices carry considerable knowledge (traditional and other) which must be counted and which can valuably inform future

initiatives. In line with this, listening to the community voice is essential if we are to understand the whole picture of climate-induced migration and design policies and initiatives that respect traditional practices. In addition, a comprehensive literature review of different disciplinary insights relating to climate change and mobility, and the government policies and practices in the country, was undertaken to contextualise the study.

Interdisciplinary approach

The research required an interdisciplinary approach which was underpinned by both a Samoan perspective and a Western-based one. The Samoan perspective recognises and acknowledges the importance of traditional knowledge, values, beliefs, practices and the ways these cultural factors affect people's lives. A Samoan worldview helps understand what is important in life and how this should be achieved. The Western-based perspective provides the disciplinary insights to framing the knowledge base on environmental migration. Using modern technical information on climate change and human mobility has helped me understand how the interplay of different socio-economic, cultural and environmental factors affect people's decisions to move.

It was not the intention of this study to compare traditional and Western-based modern knowledge systems but to explore and document views and information which can provide a basis to inform the discussion of policy design and practices related to environmental migration in Samoa. The urgent challenge today is to find ways to combine both traditional and modern Western-based knowledge, not only from an academic perspective but also at the policy level, in order to design and implement more responsive and effective policies.

Significance of the study

Environmental migration is a cross-cutting issue that touches on key policy areas such as sustainable development, humanitarian action, poverty alleviation, sovereignty and security. Thus, the research findings can inform emerging theories and practices of environmental migration. Most importantly, the topic is relevant to the village communities and the country as a whole, as well as to Samoan communities living overseas. The findings are also relevant to the promotion of discussion on environmental migration at the regional and international level.

Importance of the research topic for village communities in Samoa

Given the localised nature of climate impacts, decision-making should take place at the village-level to ensure relevant and effective responses. Samoan families need to have access to different knowledge systems to assist them make informed decisions about whether to stay in their villages or move elsewhere. The inclusion of vulnerable groups and a gender-sensitive approach are essential to ensure that adaptation plans (including relocation inland) respond to different vulnerabilities and priorities. Similarly, people who decide to migrate to urban areas or abroad need to be included in policy proposals along with those who stay.

Importance of environmental migration for Samoa

In Samoa, climate change is a priority for the government and civil society. One of the goals of the *National Strategy for the Development of Samoa 2008 – 2012,* was to address environmental sustainability and disaster risk reduction (Ministry of Finance of Samoa [MOF], 2008). The current *Strategy for the Development of Samoa 2012 - 2016*, also recognises "the importance of integrating climate change and disaster risk management into core national and sector plan policies" (MOF, 2012, p. 20).

Importance of environmental migration for PICTs

Consideration of the regional context is crucial to understanding how the region positions itself to negotiate in the international arena, and what the policy implications are at a regional and national level.

The 39th Pacific Island Forum, held in Niue in 2008, endorsed the first climate change declaration for the region. Pacific leaders expressed concern about the serious current impacts of and growing threat posed by climate change to the economic, social, cultural and environmental wellbeing, and security of Pacific peoples. The importance of retaining the Pacific's social and cultural identity and the desire of Pacific peoples to continue to live in their own country, on their customary lands where possible, was also highlighted (PIFS, 2008). This declaration has been ratified in successive fora.

In a regional consultation on human mobility, natural disasters and climate change in the Pacific, organised by the Nansen Initiative in 2013, it was also highlighted that forced migration related to climate change is an option of last resort. David Sheppard, General Director General of SPREP said:

> There is, in general, a strong sense among Pacific Islanders of belonging to one's island and a wish to remain. Any movement must therefore be voluntary, and the affected people and communities, including churches and civil society, should be in the driving seat at all stages of the planning and response. This is a sensitive issue, and it is entirely up to each country to decide what response they wish to take to a changing climate. (Nansen Initiative, 2013b, p. 13)

Importance of environmental migration for the international community

Environmental migration is a global issue, so global responses from the international community are urgent. Contributions from researchers, regional and international organisations, governments, non-governmental organisations and local groups are essential to guide their future responses. The UN Secretary-General Ban Ki-moon, during his visit to Kiribati in September 2011, said: "I have seen for myself the real threats that are impacting on people… I was so surprised to see the impact of these high tides, inundating these villages and roads. That can be prevented if we act now" ("UN chief and Kiribati leader," 2011, para. 16-17). In his visit to New Zealand, the same month, he reiterated the urgency to act against climate change. He said: "Climate change is not about tomorrow, it is lapping at our feet, quite literally in Kiribati and elsewhere" (Ki-Moon, 2011, p. 1).

Importance of Samoa for New Zealand

There is a long historical relationship between New Zealand and Samoa (Ministry of Foreign Affairs and Trade of New Zealand [MFAT], 2015). New Zealand is a strategic partner of Samoa, and it is likely to be a host country for some environmental migrants, also considering that Samoans are by far the largest Pacific group in New Zealand.

My place in this research

I am bringing to this study my cultural background, my work experience on development issues in different regions across the world, my understanding of people-centred approaches, and my experience in conducting cross-cultural research. For my study of people's responses to environmental migration, my starting point has been my knowledge and understanding of how climate change has affected my family and homeland in Bolivia. I have witnessed the movement of families affected by droughts, water scarcity, floods and other phenomena directly associated with climate change. At the same time, I have witnessed people's resilience to adversity and the use of traditional knowledge to preserve their livelihoods, culture and ways of life. I was born in Bolivia, one of the most culturally diverse countries in Latin America. I have

witnessed how indigenous people can be agents of change, advancing profound social and economic transformations (Albó & Suvelza, 2007; Rivera Cusicanqui, 2012). Those experiences have inspired my research and professional work and have motivated me to put in practice theoretical discourses about decolonisation and revitalisation of indigenous knowledge systems.

I also bring my work experience in various developing countries. For over two decades, I have worked for different governmental organisations and international agencies that promote poverty reduction and sustainable development. I have had the opportunity and privilege of developing programmes aimed at promoting sustainable development, while respecting cultural diversity in different countries. I am aware that although there are similarities among indigenous peoples around the world, there are, of course, specificities that need to be highlighted and taken account of. I am also bringing my experience in promoting people-centred approaches. There is an urgent need to learn from people's knowledge and experiences. As a development practitioner and researcher in the area of sustainable development and climate change, I have witnessed how top-down approaches, most of the time, fail to achieve their goals because people's voices are not taken into consideration. In some cases, solutions are determined outside the small villages and communities without the involvement of people who are dealing daily with climate change. So, my aim was to capture people's voices to understand the impacts of these changes.

This study offers an opportunity for cross-cultural fertilisation of knowledge and ideas. Many Pacific researchers consider that only Pacific people can or should examine Pacific issues because they argue that Pacific research must be responsive to changing Pacific contexts (Smith, 1999; Thaman, 2003). I agree, in principle, with the position that indigenous research design, methods and approaches should be informed by indigenous worldviews, values, beliefs and practices. However, I also believe that there is room for cross-cultural fertilisation, as in my case. I knew that my research journey needed dedication. The time I have devoted to this learning process has helped me to consolidate the basis for this cross-cultural study. In my research journey, I have had the privilege of being guided by two Samoan supervisors and many Samoan people in Samoa and New Zealand; I treasure the lessons I have learned.

Thesis organisation

The thesis is organised into nine chapters including this one that has introduced the background to the study, research focus, country selection, research aim and questions, research design, significance of the study, and my place in this research. This chapter also includes the main definitions used in the study.

Chapter 2 - Country overview and description of the village study (Lotofaga)

This chapter sets the context for the study. It is divided into three parts. The first one presents a general overview of the PICTs to situate Samoa in relation to the Pacific region. The second part is dedicated to Samoa and includes a review of: (a) People and land. (b) Socio-economic context. (c) Environment and climate change. The third part sets out the context of the village study (Lotofaga) with a description of the main social, cultural, economic, environmental and political aspects.

Chapter 3 - Literature Review

This chapter reviews the literature on environmental migration, a development cross-cutting issue that requires interdisciplinary understanding. This chapter includes the following sections: (a) Review of the knowledge base on migration associated with climate change and natural disasters. (b) Typologies of environmental migration – displacement, voluntary migration and relocation. (c) Discussion of the research topic in academic spheres and policy debate at the national and international level. (d) Review of the phenomenon of environmental migration in the PICTs. (e) Needs, gaps and opportunities for research into these issues.

Chapter 4 - Research Framework

This chapter presents the theoretical and methodological framework of this study which is underpinned by a Samoan perspective and a Western-based one. First, the philosophical worldview assumptions are discussed. Second, the exploratory, interdisciplinary, and qualitative approaches that underpinned the research design are described. Third, the qualitative methods are presented, including: (a) Western-based (a comprehensive document review and semi-structured interviews with key informants), and (b) Pacific/Samoan-based (the conversational method of *talanoa* which is congruent with Samoan knowledge and worldviews). Fourth, the thematic data analysis process selected to integrate the findings of the two knowledge systems is presented. Fifth, the

ethical considerations for the research and reflections on the research process are discussed.

Chapters 5 and 6 - Findings of the Village Study

In chapters 5 and 6, I present the voices of the Lotofaga people to understand the linkages between climate change and population movements. Chapter 5 includes: (a) Land and sea resources. (b) Knowledge about climate change. (c) Observation of climate change effects. (d) Impacts of climate change and natural disasters on the quality of life. (c) Knowledge base to adapt to climate change.

Chapter 6 includes: (a) Overview of population movements in Lotofaga; highlighting the fact that people's mobility has a profound impact on the *'aiga* as a whole. In brief, mobility is not only an individual affair but a family effort. (b) Environmental migration is analysed within the broader socio-economic and cultural context. (c) A discussion of population movements as risk-management strategies to climate change and natural disasters.

Chapter 7 - Discussion of Results

This chapter discusses the findings presented in Chapter 5 (Climate Change in Lotofaga) and Chapter 6 (Impacts of Climate Change and Natural Disasters on Population Movements in Lotofaga) and highlights their significance in relation to existing literature about environmental migration. Although 'outside' the village study, the voices of key informants (representatives from national and international development agencies and research centres) have also been included in this discussion. In this Chapter, the main findings of the village study (questions 1 and 2) are discussed in three sections of: (a) Resilience in the context of climate-induced mobility. (b) Human mobility as a risk-management strategy. (c) Implications of environmental migration.

Chapter 8 - Policy Discussion

In this chapter, I set the village findings within the national context and use these as a lens to review the topic of environmental migration at the national level (question 3). The village findings are not extrapolated to explain the national level situation, but to identify critical issues and outline some policy recommendations. This chapter is in two parts: (a) Based on the village findings, climate-induced mobility is examined within the

national Samoan context. (b) Policy recommendations to address climate-induced mobility at the village, national, regional and international level are presented.

Chapter 9 - Conclusions

This chapter summarises the findings that emerged from the research and its contribution to the knowledge base on environmental migration. It also presents the limitations of the study, and some areas of further research are suggested.

Definitions for this study

The main definitions used in this study are presented in this section. They are grouped in three broad areas: climate and environment, population movements, and knowledge systems.

Climate and environment

Adaptation –Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (UNFCCC, 2014). The broader concept of adaptation also applies to non-climatic factors such as soil erosion or surface subsidence. Adaptation can occur in autonomous ways, for example through market changes, or as a result of intentional adaptation policies and plans. Many disaster risk reduction measures can directly contribute to better adaptation (United Nations Office for Disaster Risk Reduction [UNISDR], 2009).

Climate change – As defined by UNFCCC in Article 1: "Climate change is a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (UNFCCC, 1992, p. 7). The UNFCCC makes a clear distinction between climate change (attributed to human activities altering the atmospheric composition), and climate variability (attributed to natural causes).

Climate variability – This term refers to variations in the mean state and other statistics of climate on all temporal and spatial scales beyond that of individual weather events. Variability may result from natural internal processes within the climate systems or to variations in natural or anthropogenic external forcing (IPCC, 2007).

Climate extreme (extreme weather or climate event) – The occurrence of a value of a weather or climate variable above or below a threshold value near the upper or lower ends of the range of observed values of the variable. For simplicity, both extreme weather events and extreme climate events are referred to collectively as 'climate extremes" (IPCC, 2012).

Disaster – Severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs that may require external support for recovery (IPCC, 2012).

Environmental change – Changes in the physical and biogeochemical (chemical, geological, and biological) environment, on a large scale, either caused naturally or influenced by human activities (Foresight, 2011). Environmental change includes both environmental degradation and climate change (Migration, Environment and Climate Change: Evidence for Policy [MECLEP], 2014).

Environmental degradation – The term is defined by the reduction in the capacity of the environment to meet social and ecological objectives and needs. Degradation of the environment can alter the frequency and intensity of natural hazards and increase the vulnerability of communities. The types of human-induced degradation are varied and include land misuse, soil erosion and loss, desertification, bush fires, loss of biodiversity, deforestation, mangrove destruction, land, water and air pollution, climate change, sea- level rise and ozone depletion (UNISDR, 2009).

Hazard – The potential occurrence of a natural or human-induced physical event that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resources (IPCC, 2012).

Mitigation (of climate change) – A human intervention to reduce the sources or enhance the sinks of greenhouse gases (IPCC, 2012).

Resilience – The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change (IPCC, 2007).

Slow-onset events – Relate to environmental degradation processes such as droughts and desertification, increased salinisation, rising sea levels and thawing of permafrost (Nansen Initiative, 2013a).

Sudden-onset events – Comprise hydrometeorological hazards such as flooding, windstorms and mudslides, and geophysical hazards including earthquakes, tsunamis and volcano eruptions (Nansen Initiative, 2013a).

Vulnerability – The degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity (IPCC, 2007).

Population movements

Circular migration – This term involves the fluid and repeated movement of people between countries of origin and destination, or between national, rural and urban areas including internal cross-country migration. This includes temporary or long-term movements which may be beneficial to all involved, if occurring voluntarily and linked to labour needs (IOM, 2011b).

Displacement – A forced removal of a person from his or her home or country, often due to armed conflict or natural disasters (IOM, 2011b).

Diaspora – Diaspora is broadly defined as individuals and members of networks, associations and communities who have left their country of origin, and maintain links with their homelands. This concept covers more settled expatriate communities such as migrant workers temporarily based abroad, expatriates with the citizenship of the host country, dual citizens, and second-third-generation migrants (IOM, 2011b).

Forced migration – A migratory movement in which there is an element of coercion, including threats to life and livelihood, whether arising from natural or man-made causes. For example, movements of refugees and internally displaced persons, as well as people displaced by natural/environmental disasters, chemical/nuclear disasters, famine or development projects (IOM, 2011b).

Human mobility – In this study is the umbrella term used to refer to all aspects of the movement of people. It encompasses involuntary internal and cross-border displacement of populations, voluntary internal and cross-border migration and planned and consented relocation (United Nations High Commissioner for Refugees [UNHCR], 2015). In this study, the term "human mobility" is used interchangeably with the term "population movements".

Internal migration – Movement of people from one area another within the same country, for the purpose or with the effect of establishing a new residence. This type of migration may be temporary or permanent. Internal migrants move but remain within their country of origin (e.g. rural to urban migration) (IOM, 2011b).

International migration – This concept is concerned with the movement of persons who leave their country of origin, or the country of habitual residence, to establish themselves either permanently or temporarily in another country. An international frontier is therefore crossed (IOM, 2011b).

Migration – A process of moving, either across an international border or within a state. It is a population movement, encompassing any kind of movement of people, whatever its length, composition and cause; it includes migration of refugees, displaced persons, uprooted people, and economic migrants (IOM, 2011b).

Relocation – This is defined as a process whereby a community's housing, assets, and public infrastructure are rebuilt in another location. Relocation is sometimes perceived to be the best option after a disaster, for one or more of the following reasons: (a) people have already been displaced by disaster, (b) their current location is judged to be uninhabitable, or (c) relocation is considered the best option to reduce vulnerability to the risk of future disasters (World Bank, 2010a).

Resettlement – The relocation and integration of people (refugees, internally displaced persons, etc.) into another geographical area and environment, usually in another country (IOM, 2011b). In the context of environmental and climate change, resettlement is about the movement of individuals or communities to a designated site (MECLEP, 2014).

Forced resettlement/relocation – Involuntary transfer of individuals or groups within the jurisdiction of a country or state, away from their normal residence as part of a government policy (IOM, 2011b).

Remittances – Monies earned or acquired by non-nationals that are transferred back to their country of origin (IOM, 2015b). The International Monetary Fund (IMF) defines remittances as the sum of personal transfers and compensation of employees. Personal transfers include all current transfers in cash or in kind between resident and non-resident individuals, independent of the source of income of the sender and the relationship between the households. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by non-resident entities (IMF, 2009).

Return migration – The movement of a person returning to his/her country of origin or habitual residence, usually after at least one year in another country. The return may or may not be voluntary (IOM, 2015b).

Knowledge systems

Traditional knowledge – In this thesis the term traditional knowledge is used to refer to a cumulative body of knowledge, know-how, practices and representations maintained and developed by peoples with extended histories of interaction with the natural environment. These sophisticated sets of understandings, interpretations and meanings are part and parcel of a cultural complex that encompasses language, naming and classification systems, resource use practices, ritual, spirituality and worldviews (Internal Council for Science [ICSU] & UNESCO 2002).

Modern scientific and technical knowledge in the context of climate change – Western-based scientific and technological activities are concerned with the generation, advancement, dissemination, and application of scientific and technical knowledge in all fields of science and technology that is the natural sciences, engineering and technology, the medical and the agricultural sciences, as well the social sciences and humanities (UNESCO, 1978).

Technology transfer – Encompasses the broad set of processes that cover the flows of knowledge, experience, and equipment for mitigating and adapting to climate change among different stakeholders. These include governments, international organisations,

private sector entities, financial institutions, NGOs and research and/or education institutions. It comprises the process of learning to understand, utilise, and replicate the technology, including the capacity to choose it, adapt it to local conditions, and integrate it with indigenous technologies (IPCC, 2000).

Chapter 2 - Samoa: Country Overview and Description of the Village Study (Lotofaga)

This chapter sets the study context in three parts. First is a brief review of the Pacific region to situate the research topic. This is followed by an overview of the study country of Samoa, and includes a description of the main social, economic and environmental characteristics. The third part sets out the context of the village study of Lotofaga with a description of the main social, cultural, economic, environmental and political aspects.

The Pacific Island Countries and Territories (PICTs)

The independent nation of Samoa is one of the 22 countries and territories known as the PICTs (Figure 1). This region comprises a land area estimated as 551,312 square kilometres spread over 30 million square kilometres of the Pacific Ocean and stretching from the Commonwealth of the Northern Marianas in the northwest to Pitcairn Islands in the southeast (Haberkorn, 2008).
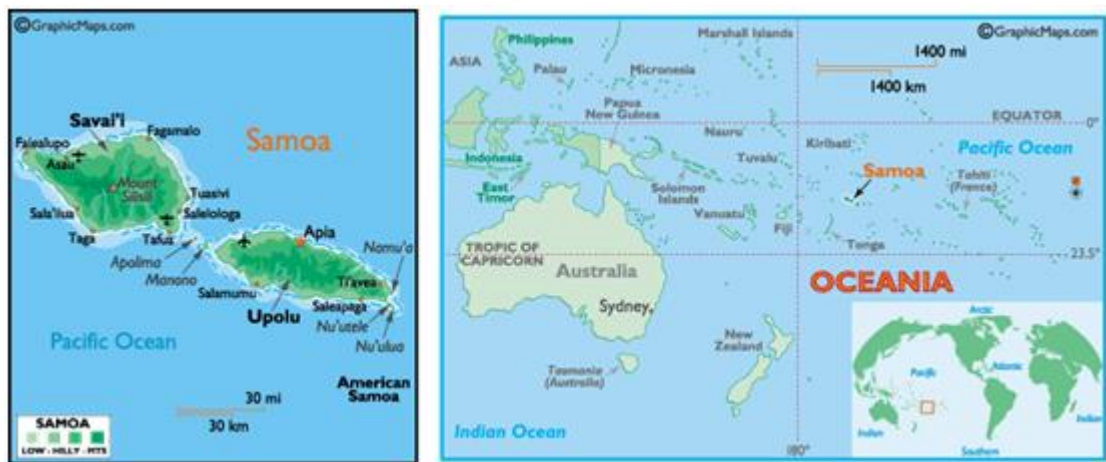
Figure 1: Map of Samoa and its Geographical Location in the Pacific Region
Source: http://www.worldatlas.com/webimage/countrys/oceania/ws.htm

The PICTs are extremely diverse in physical geography, sizes, cultures, languages, socio-political organisations, economic base and natural resources endowment. Notwithstanding this diversity, most of the PICTs experience a number of common development challenges due to their small size, isolation from major trade routes and markets, narrow resource and export base, human capacity and a lack of formal sector jobs to absorb educated young people (Haberkorn, 2008; Opeskin & MacDermott, 2010).

The PICTs have a population of about 10,566,300 people, with Papua New Guinea accounting for almost 67 per cent, and the eight smallest PICTs – Cook Islands, Nauru, Niue, Pitcairn Islands, Palau, Tokelau, Tuvalu and Wallis and Futuna – accounting together for less than one per cent. Population growth varies greatly from country to country. For instance, in the period 2002 to 2012, only Papua New Guinea, the Solomon Islands and Vanuatu had a population increase greater than 2 per cent annually. Conversely, the rest of nations registered population growth below 2 per cent (SPC, 2013). (Appendix B)

All the PICTs are experiencing the effects of rapid urbanisation linked to migration from smaller outer islands to larger islands and from rural areas to towns, especially to national capitals. Studies indicate that the scale of urban drift is associated with a decline in agricultural commodity prices and livelihood opportunities, and insufficient land in rural areas and outer islands (ADB, 2012a; Bedford, 2007; Bedford & Hugo, 2008). People move to urban areas because they are attracted to the prospect of employment and the availability of public services, such as health, education, and social opportunities. Most new jobs have been created in towns, and the urban economy is the major contributor to economic diversification and growth in the region. This urban drift is creating new problems, such as the provision of public infrastructure and services, a proliferation of informal settlements, worsening environmental conditions and increasing social problems associated with unemployment and underemployment, specially for young people (Habitat for Humanity, 2009; Russell, 2009; UNFPA, 2014).

Migration abroad, "in search of a better life", has been a way of life for Pacific people for thousands of years (Crocombe, 2001; Hau'ofa, 1994, 1998; Macpherson C. & Macpherson L., 2009). However, the high levels of out migration in the last 50 years are having a profound impact on the demographics of the region (Bedford & Hugo, 2012; Campbell & Bedford, 2014; International Migration Institute. University of Oxford & National Institute of Demographic and Economic Analysis. University of Waikato, 2013). Current estimates are that 16,000 Pacific Islanders leave their countries annually (UNFPA, 2014). For instance, the Pacific population makes up almost 7 per cent of the total New Zealand population (Statistics New Zealand, 2013). On the other hand, remittances back to Pacific homelands are significant in terms of cash, goods and other forms as families settled abroad maintain close links with their relatives, villages and churches.

According to information provided by PIFS (2015) for 14 countries (Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu), the achievement of the UN Millennium Development Goals (MDGs) has had mixed results. Only two countries achieved the goals (Cook Islands and Niue), three countries achieved at least half (Fiji, Palau and Tonga), while the rest of the countries achieved less than half, with three countries not achieving any of the MDGs (Kiribati, Papua New Guinea and Solomon Islands) (p. 8).

In the 1980s Bertram and Watters (1985) coined the acronym MIRAB (Migration, Remittances, Aid, Bureaucracy) to describe the economies of some Pacific island countries. In addition, in order to highlight the importance of migration and overseas remittance, two concepts were included in the analysis. The first one is 'transnational corporation of kin'. Within the framework of the MIRAB model, Bertram and Watters (1985) argued that migration from the Pacific was shaped by the collective decision making of family units to maximise benefits to the whole group. Drawing on earlier work on Tonga by George Marcus (1974, 1981) they used the term 'transnational corporation of kin' to describe this process (Bertram and Watters, 1985, p. 499). They argue that remittances are sustainable as long as 'kin corporations' continue to operate and there is a continuing flow of new migrants. The second concept is transnationalism that has been used to explain migrants' ties to their homelands. Transnationalism involves the multidirectional movement of people, money, goods of many different kinds, artefacts, ideas and symbols, and involves individuals, families, groups and institutions (Lee, 2009, p. 1).

While still widely defined as MIRAB economies, over the last decades the PICTs have made considerable efforts to diversify their economies (Bertram, 1999; Bertram & Watters, 1985; Tisdell, 2014). As well reported, social and cultural factors such as traditional knowledge, traditional production systems and management of natural resources, customary land tenure and strong social systems have been the means to achieving basic needs. These means have sustained the development in these island nations. Tisdell (2014) said that to understand the economic situation of PICTs, it is necessary to adopt a holistic approach which takes account of historical, cultural and environmental factors.

Highlighting the importance of the natural resources base as a critical factor to face the challenges of globalisation, Bertram (1999) argued that "indigenous [Pacific] populations now maximize their material wellbeing by management of the globalisation process" (p. 107). He also noted the importance of customary land holdings to family subsistence production acting as insurance floor for living standards, such as food security, basic needs and modest cash. In addition, Bertram referred to mobility as a strategy to diversify livelihoods. He said: "It is the release of family members and family savings from village agriculture and fishing and their outward movement to other sectors, other islands and other countries that opens the ways to secure higher incomes" (p. 107). Not taken account of by Bertram is the impact of climate change and natural disasters on people's decisions to move, nor the social consequences as in threats to family social support mechanisms.

Although the MIRAB model is still used to explain the development processes in the PICTs, the region is now facing additional development challenges, such as those associated with climate change that have the potential to compromise the medium-to-long-term economic perspectives seriously.

Samoa

The independent nation of Samoa is located between latitudes 13^0 and 15^0 south and longitudes 168^0 and 173^0 west (Figure 1). Compared with the other PICTs, Samoa is quite compact, with the total land area being 2,935 square kilometres. Its exclusive economic zone is 98,500 square kilometres, which is the smallest in the Pacific. Samoa consists of two main islands, Upolu (1,100 square kilometres), where the capital Apia is located, and Savai'i (1,700 square kilometres), plus eight smaller ones (Ministry of Natural Resources and Environment of Samoa [MNRE], 2005).

Due to Samoa's relatively high performance in economic and social development, in 2014 the country moved from having the least developed country status to the lower middle-income country group (Government of Samoa, 2014a, 2014b). Internationally Samoa has a reputation for political stability which is a necessary framework for national development. However, life in the country is not always easy. As part of its place in the global economy, the country faces key sustainable development challenges as a result of its small size, remoteness from major markets, narrow resource and export base and high dependency on imported fossil fuels. As noted, climate change and natural disasters are a continuing threat to social and economic development and

national efforts to achieve sustainable development (Adelman, Ivaschenko, Packard, & Suri, 2015; MNRE, 2005).

People and land

The estimated total population of Samoa in 2015 was 193,483 (Samoa Bureau of Statistics, 2015a). While 20 per cent of the population live in Apia, which is the administrative, commercial, education and government centre, the majority live in rural areas and in small villages dotted mainly around the coastlines of Upolu and Savai'i. It is important to note that between 70 and 80 per cent of the population live beside or within a kilometre of the coast, and approximately 70 per cent of the major physical and social infrastructure is located in low-lying coastal areas (United Nations Human Settlements Programme [UN-Habitat], 2014). This fact highlights very compellingly Samoa's vulnerability to the effects of climate change and natural disasters.

Almost 96 per cent of Samoa's population is of Polynesian ethnicity with the remaining 4 per cent made up of small minorities of Chinese, European or other Pacific descent. Samoan is the major language of communication followed by English (Macpherson, C., 1999; Samoa Bureau of Statistics, 2011).

Fa'a Samoa

Samoa is a very cohesive and structured society where culture and tradition are strongly maintained. The country was administered by New Zealand under a League of Nations Mandate and as a United Nations trusteeship country until 1962 when independence was gained. The national motto is *Fa'avae I Le Atua Samoa* (Samoa is founded on God) (Lay, Tamua, Murrow, & Meleisea, 2000). Samoa is a parliamentary democracy based on the *fa'a matai* (the traditional chiefly systems of rule) and the *fa'a Samoa* (Samoan values and beliefs and practices). While universal suffrage is practised, only *matai* (chiefs) can stand for election. Furthermore, local government is the responsibility of the *fono o matai* (village council of chiefs) on which every family is represented. The *fono o matai* are responsible for tasks such as maintaining peace in the village, settling disputes and also overseeing village land use. The family-based chiefly governance systems are organised alongside and link into national government systems through the *pulenu'u* (the equivalent of village mayor) (Fairnbairn-Dunlop, 1991; Meleisea, 1987).

Fa'a Samoa sets the cultural, social and economic guiding principles to life within Samoan society. The core values of *fa'a Samoa* are *alofa*, *fa'aaloalo*, and *tautua*. *Alofa*

encompasses love, caring, charity, sacrifice and commitment. *Fa'aaloalo* is the value of reciprocal respect and involves honouring others, especially elders or those of senior status. *Tautua* is the value placed on serving others: in the *'aiga* (extended family), *lotu* (church), and *nu'u* (village) (Ministry of Education of New Zealand, 1996).

The *fa'a Samoa* provides the ideological platform of relationships between the creator God (spiritual), the social (family systems), and the sustainable use of natural resources "for the use of those to come". Thus, *fa'a Samoa* revolves around the *'aiga, nu'u* and *lotu*. The *'aiga* is the main institution in the chiefly form of government – the *fa'a matai*. The family chief is elected by family members and charged with maintaining the family good, including the best use of the family resources such as customary lands for the benefit of all family members. Every person has a place and role in the *fa'a matai* system and this is determined by factors such as gender, age and status. In the *nu'u,* rules guide social behaviour between village families and with other villages. The rules also apply to the use of the village assets and resources. The *lotu* or churches are part of the village. Christian teachings were integrated into the *fa'a Samoa* systems in the post contact period and today the churches play a key role in village and national governance as well (Lay et al., 2000; Meleisea, 1987; Va'a, 2007).

The importance of land

The Samoan Constitution recognises three types of land tenure: freehold, public and customary. Of the total area, over 81 per cent remains in customary tenure under the stewardship of the family *matai* for the use of family members, 15 per cent is public land, and 4 per cent is freehold land. The customary land includes agricultural lands, natural forestland and other natural ecosystems (such as wetlands) (Samoa Bureau of Statistics, 2011). Customary land is fundamental to Samoan society and its value cannot be assessed only in economic terms because of its symbolic and cultural value. Land and sea are the major resources in every Samoan village – as the source of food security and livelihoods. Less well documented is that the family land represents identity, belonging, family history, culture, community, family prestige and pride, even for migrant communities where names and titles signify location and identity (Fairbairn-Dunlop, 1991). Customary land cannot be sold, but is passed from generation to generation through the family systems. All family members have entitlement to the family lands (Corrin, 2008).

Socio-economic context

The current governmental framework for economic and social development is the *Strategy for the Development of Samoa 2012 – 2016*. The strategy has identified key development priorities including: sustained macroeconomic stability, enabling tourism and business development, health, education and improved access to essential social services, sustainability for key infrastructure such as water, sanitation and transport, and the implementation of environmental protection (MOF, 2012).

By all accounts the quality of life indicators for Samoa are high compared with the economic picture. A significant amount of the national budget is directed to promoting social development in both urban and rural areas. This is in line with the former Prime Minister Tofilau Eti Alesana's words that "what is good for Apia is also good for Savai'i" (Human Rights Protection Party, n.d.). To set the discussion, a summary of the main social and economic information is provided in Table 1.

Table 1: Samoa - Main Socio-economic Indicators

Social indicators			
Population [a] [b] [c] [d] [e]	**Total**	**Male**	**Female**
Total population (2015). Estimated	193,483		
Total population (2011 Census)	**187,820**	96,990	90,830
Percentage of age 0-14 over total population	38.3		
Percentage of age 15-29 over total population	25.2		
Percentage of age 30-64 over total population	31.5		
Percentage of age 65+ over total population	5.0		
Median age	20.7		
Total fertility rate per woman	4.7		
Growth rate (%) of total population, 2006 - 2011	0.4		
Net migration rate (2010-2015) [f]	-13.4 migrants/1,000 inhabitants		
Percentage of urban population (Apia)	20		
Percentage of rural population	80		
Population density (number people/km²)	67		
Average household size	6.8 persons		

Education [b] [d] [e] **and health** [b] [d] **(2011)**	**Total**	**Male**	**Female**
Percentage aged 6-14 attending school	96.2	95.6	97.0
Literacy rate for persons aged 15-24	97.9	97.2	98.7
Infant mortality rate/1000	15.6	17.0	14.0
Under five mortality/1000	19.4	20.6	18.0
Average life expectancy at birth	74.2	72.7	75.6

Economic indicators	**Year**				
Gross Domestic Product (GDP)	**2010**	**2011**	**2012**	**2013**	**2014**
GDP at current prices (SAT$ billion) [e]	1.69	1.82	1.83	1.86	1.92
GDP at current prices (US$ million) [g]	656.8	762.1	804.3	795.9	800.6
GDP per capita (SAT$) at current prices [e]	9,067	9,715	9,754	9,875	10,185
GNI per capita (US$) at current prices [g]	3,220	3,590	3,860	3,960	4,050
GDP growth constant prices (%) [g]	0.5	5.8	0.4	-1.9	1.2
Remittances (current US$ in millions) [g]	122,1	139,1	157,8	158,0	n/a
Remittances as a percentage of GDP [g]	18,6	18,3	19,6	19.9	n/a
ODA as a percentage of GNI [g]	23.1	13.9	15.7	15.5	12

Employment (2011) [b] [e]	**Total**	**Male**	**Female**
Employed population	45,161	32,939	12,222
Percentage of employed in subsistence work	35.6	46.0	7.6
Percentage employed in non subsistence work	64.4	54.0	92.4
Percentage of unemployed population	5.7	67.1	32.9

Source: a: Samoa Bureau of Statistics, 2015a; b: Samoa Bureau of Statistics, 2011; c: Samoa Bureau of Statistics, 2015b; d: Samoa Bureau of Statistics, 2015c; e: Samoa Bureau of Statistics, 2014; f: UN. Population Division, 2016; g: World Bank, 2015a.
SAT$: Samoan *Tala* (national currency). n/a: not available. ODA: Official Development Assistance.

Social context

Demographic profile

As seen in Table 1, Samoa's demographic profile is characterised by a youthful population, a net population growth rate of just under one per cent per annum, emigration, the dominant influence of urban Apia, and population growth in Northwest Upolu.

The 2011 census registered 38.3 per cent of young people under the age of 14 years, 25.2 percent of people aged between 15 and 29 years, 31.5 percent of people between 30 and 64 years and only 5 per cent aged 65 years and over (Appendix C). The median age in the country was 20.7. Despite the high total fertility rate of 4.7 children per woman, the net population growth rate, in the intercensal period 2006-2011 was 0.4 per cent (Samoa Bureau of Statistics, 2011). The slow population growth can be explained by high rates of emigration which for the period 2010-2015 was -13.4 migrants/1,000 inhabitants (IOM, 2015c). During the 1960s, extensive overseas migration, especially to New Zealand, began to accelerate. In 1976, estimates were that more than 27,000 Samoan people were living in New Zealand. By 2006, this figure had grown to over 131,100 people (Statistics New Zealand, 2006). In the New Zealand's 2013 census, Samoans were the largest Pacific group, comprising 144,138 people or 48.7 per cent of the Pacific population (Statistics New Zealand, 2013). Australia and the United States are two other main destinations of Samoan migrants (Samoa Bureau of Statistics, 2011).

Another characteristic of the demographic profile is the rapid urbanisation. The 2011 Samoan census showed that Apia's urban area constituted one fifth of the Samoan population. However, this area showed a decreasing rate each year (-0.5 in the intercensal period of 2001-2006 and -0.6 in the intercensal period of 2006-2011), while the Northwest Upolu region, a peri-urban area, doubled its growth rate from 1.3 per cent to 2.2 per cent per annum in the same intercensal periods (Samoa Bureau of Statistics, 2014). The most significant characteristic of urbanisation is the increase in the number of people residing in the North West Upolu area (33.2 per cent). Together with the designated Apia Urban Area, North West Upolu is now home to 52.8 per cent of Samoan residents. This fact has major social and economic implications in both urban and rural areas. It also indicates that a significant number of people may be residing outside the traditional village administration and social governance.

The population density in Samoa is 67 people per square kilometre. However, the differences between urban and rural areas are evident. In the Apia urban area, the population density is 612 people and in the North West Upolu the density is 249 people. In contrast, in Savai'i, the population density is just 26 people per square kilometre.

In Samoa, the mean household size is 6.8 people. Rural households, with a mean of 7 members, are larger than those in the urban areas, with a mean of 6.2 members. Households are predominantly headed by males (79 per cent). Female-headed households are more common in the urban areas (25 per cent) than in the rural areas (20 per cent) (Samoa Bureau of Statistics, 2014).

Education and health

In Samoa, education is universal and literacy rates are high. According to the 2011 census, the percentage of children aged 6 to 14 years old attending school was 96.2 per cent. However, when analysing the data for secondary and tertiary education institutions, there are differences by gender and location (rural, urban). For example, 27 per cent of females completed secondary school and 13 per cent of this group entered tertiary education. In contrast, only 23 per cent of men have completed secondary education. Among them, 12 per cent have participated in tertiary education (Samoa Bureau of Statistics, 2011, 2015c). The significant differences in urban-rural educational achievement are also a factor in urban drift. For instance, 36 per cent of females residing in urban areas have completed secondary school and higher education compared with 25 per cent of female rural residents. Among males, the corresponding values are 35 per cent of those living in urban areas and 20 per cent of those in rural areas (Samoa Bureau of Statistics, 2015c).

In Samoa, health indicators have improved significantly over the last decades. For instance, the infant mortality rate has decreased from 33 per 1,000 in 1990 to 15.6 per 1,000 in 2011 and the under-five mortality rate has decreased from 42 per 1,000 in 1990 to 19.4 per 1,000 in 2011. Life expectancy at birth is among the highest in the PICTs; it increased from 68.4 in 1996 to 74.2 in 2011 (71.9 years to 75.6 years for women, and 65.4 years to 72.7 years for men) (Samoa Bureau of Statistics, 2011, 2015c). The greatest health threat to Samoa is the ongoing increase in non-communicable diseases which are now the leading underlying causes of death recorded from 2011 to 2014 (World Health Organisation [WHO], 2015a).

Water, sanitation and electricity

At least 98 per cent of Samoa's population have access to improved drinking water sources. Metred water is the main source of drinking water reported by 62 per cent of the households, and most villages have access to springs (Samoa Bureau of Statistics, 2011). Ninety-four per cent of the population have access to improved sanitation facilities (WHO, 2012). One hundred per cent of urban households and 97 per cent in rural areas have access to electricity. However, wood is the main source of cooking fuel for approximately 65 per cent of households (Samoa Bureau of Statistics, 2011, 2015c).

Infrastructure and communications

Samoa is well served with roads, an airport network and ports. Villages on Upolu and Savai'i are connected by a first-class tar-sealed road. In addition, a network of inland unsealed roads has been developed as part of the government's inland road project which aims to increase agriculture development through giving families better access to inland plantation lands (Ministry of Works Transport and Infrastructure of Samoa [MWTI], 2014). The villages are responsible for maintaining these roads. Notably, and of importance to this study, inland road development accelerated after the 2009 tsunami. Maritime transportation services include three major wharves: Matautu in Apia, Mulifanua in the far west of Upolu and Salelologa in Savai'i. The Faleolo International Airport is the main port of entry for air travel and freight, Fagalii Airport is used mainly for international flights and freight to American Samoa, and there are two smaller airports on Savai'i - Asau and Maota.

As regards access to information and communication technologies (ICT), Samoa has one of the highest rates of mobile phone coverage and access in the Pacific region. At the end of 2014, over 95 per cent of the population had access to mobile networks. Following the entry of mobile operators and launch of GSM networks, landlines declined rapidly. By 2011, only one fifth of households had a fixed line, less than the level ten years earlier. Samoa relies on a submarine cable and satellite service for its international internet connectivity. However, internet access is still limited due to expensive bandwidth and poor fixed-line infrastructure. In order to strengthen Samoa's communication links to the world, the Samoan government launched a $US49-million submarine fibre optic cable project (from Samoa to Fiji) in 2015. This aims to improve the quality and lower the price of internet access in the country (ADB, 2015a; World Bank, 2015b).

Economic context

Samoa's small open economy is highly dependent on a narrow resource base that is limited to agriculture, tourism, small-scale manufacturing and fisheries. As seen in Table 1, the Gross Domestic Product (GDP) is around SAT$ 1.92 billion in current prices, equivalent to US$ 800.6 million, and SAT$ 1.71 billion in constant prices. The GDP per capita was estimated at SAT$ 10,185 (at current prices) equivalent to US$4,050. The figures were estimated for 2014 (Samoa Bureau of Statistics, 2014; World Bank, 2015a). In the period 2010 to 2014, the economy grew at a moderate rate, with an average annual growth of 1.2 per cent in constant prices (World Bank, 2015a). Samoa is reliant on imports and has a large trade deficit. Tourism and exports from agriculture, fisheries and forestry products are the major contributors of the GDP as well as small-scale manufacturing. However, the importance of agriculture and fishing has declined, both at the village-level and in terms of its contribution to the GDP. In the last decade or so, the share of the primary sector in GDP has declined from around 20 per cent in 1998 and 1999 to 9.4 per cent in 2014 (Samoa Bureau of Statistics, 2014).

The majority of households in Samoa are remittance recipients (Foundation for Development Cooperation [FDC], 2007). In fact, the country is one of the highest recipients of remittances in the world as a proportion of GDP. In the period 2010 to 2014, remittances were around 18 to 20 per cent of GDP (World Bank, 2015a). New Zealand is the main source of remittances, followed by Australia and the United States (Connell & Brown, 2004, 2005). Remittances support national development, supplement family income, contribute to diversifying livelihoods, and assist families to fulfil their cultural obligations, such as *fa'lavelave* and church obligations. Remittances received in response to natural disasters and climate change are also highly significant.

Foreign development assistance, in the form of loans, grants and direct aid, is an important component of the economy. For the period 2010-2014, the official development assistance (ODA) averaged 16 per cent of the Gross National Income (GNI) (World Bank, 2015a). Along with New Zealand, donors include Australia, the European Union, Japan and China. Aid is also channelled through multilateral organisations such as the World Bank, Asian Development Bank (ADB) and several United Nations agencies.

As regards employed population, by 2011, around 35.6 per cent of the labour force was absorbed by semi-subsistence village agriculture, and 64.4 per cent was engaged in non

subsistance work as employers, employees, self-employees, street vendors and manufacturers of goods (Samoa Bureau of Statistics, 2011). The data disaggregated by sex showed that men were more likely to be employed than women. This means that 16,085 men or 94 per cent and 931 women or 6 per cent were engaged in subsistence activities. Moreover, the data showed that 32,939 men or 73 per cent, and 12,222 of women or 27 per cent were engaged in non-subsistence work. This information suggests that women are undercounted in the statistics. Regarding unemployment, about 6 per cent of the economically active population was unemployed at the time of the census (Samoa Bureau of Statistics, 2011). Youth unemployment is particularly high; it is estimated to be around 16 per cent (International Labour Organisation [ILO], 2015a, 2015b). Rural to urban drift of young people further adds to the overall unemployment rate; this remains a critical challenge in Samoa.

Prospects for sustainable development

Samoa has met several of the Millennium Development Goals (MDGs) (Appendix D) due to well-targeted public expenditure in high priority areas such as health, education, infrastructure and other social services (MOF, 2012; UNDP, 2015a, 2015b; WHO, 2012, 2015b). However, there are challenges in sustaining and improving these achievements and in addressing the uneven distribution of development benefits, especially between urban and rural areas and between Upolu and the other islands (PIFS, 2015; UNDP, 2014a). While extreme poverty and hunger largely do not exist in Samoa, many families struggle to meet their basic needs. Using global poverty measures (the appropriateness of which is widely debated in PICTs) estimates are that 27 per cent of the Samoa population lives below the national basic needs poverty line (OXFAM New Zealand, 2015). Other studies indicate that many rural communities suffer from poverty of opportunities and unequal distribution of benefits as compared with urban areas (UNDP, 2014a).

Although Samoa's prospects for sustainable development are positive, in the short and medium term, reports note that climate change and natural disasters are expected to continue affecting all development sectors (MNRE, 2005; MOF, 2012). Nonetheless, remittances and external aid are expected to remain key drivers of development, although grant aid is declining and post-cyclone reconstruction projects are being wound down (World Bank, 2014a, 2014b). Other sectors such as tourism, agriculture, fisheries and small-scale manufacturing are showing signs of improvement. Tourism is

one of the most promising avenues for economic growth and development. The agricultural sector is slowly recovering from the effects of the 2012 cyclone (World Bank, 2014c).

Traditional exports such as fish, coconut oil and cream, copra, taro, beer, nonu and other fruit products are expected to continue growing slowly (Economist Intelligence Unit, 2014; World Bank, 2014a). On the other hand, the manufacturing sector is facing challenges. The Samoa's largest employer Yazaki, a car wire assembling company, is projecting the closure of their factory in 2017. This would result in a loss of about 1,000 jobs and Samoa's main source of re-exports (ADB, 2015b). There is potential to open up niches and international markets, especially for organic products, "cultural industries" that recover traditional practices such as traditional *siapo* (tapa cloth) and fine mats, and other income-generating activities that are based on Samoan culture and traditions.

Environmental and climate change

Physical features

The Samoan islands are of volcanic origin, clearly visible in the form of several dormant volcanoes and lava fields. Beyond the narrow coastal plains, the mountain ranges rise steeply to a maximum of 1,859 m on Savai'i and 1,100 m on Upolu, and are intersected by fertile valleys. Savai'i is regarded as still volcanically active, with its most recent eruption producing lava flows between 1905 and 1911. A large percentage of Samoan soils are porous, shallow and clay in texture and, though fertile, are vulnerable to erosion (Government of Samoa, 2010a). Around 46 per cent of Upolu and 70 per cent of Savai'i's total land areas are covered by forest. Most settlements and agricultural activities on the two main islands occur between the coastline and 1,000 m above sea level (Government of Samoa, 2010a).

Samoa's climate is typical of small tropical islands geographically isolated from big landmasses, with two distinctive seasons: a wet season (November to April) and a dry season (May to October). Temperatures are quite uniform throughout the year, the average monthly temperature ranging between 22^0C and 30^0C. Average temperatures are coolest in July when the cool, dry south-east trade winds are strongest. Severe tropical cyclones occur during the summer months (December to February) (MNRE, Australian Bureau of Meteorology, & Commonwealth Scientific and Industrial Research Organisation [CSIRO], 2011).

Samoa's rainfall is greatly influenced by the position and strength of the South Pacific Convergence Zone. Annual rainfall averages 3,000 mm, which varies by latitude and location. Samoa's climate varies considerably from year to year due to the El Niño Southern Oscillation. There are two extreme phases: El Niño and La Niña. In Samoa, El Niño events tend to bring wet seasons that are drier than normal, while La Niña events usually bring wetter- and cooler-than-normal conditions (Government of Samoa, 2010a; MNRE, 2005).

The environment

The *2013 State of Environment Report,* prepared by the Ministry of Natural Resources and Environment of Samoa (MNRE, 2013a) notes that environmental degradation in Samoa is due to both human activities and natural causes. This situation has been confirmed by other reports that highlight the following issues:

- Upland habitats: Largely intact from human activities, with a high percentage of forest cover for both Upolu and Savai'i. The forests in the lowland areas are predominantly of non-native species and a host of other light-demanding and fast-growing species that invade open spaces created by cyclones, wind throws and abandoned agricultural sites. Logging and agriculture have damaged much of the forest on the lower slopes (MNRE, 2013a).

- Coastal habitats: Mangrove areas show signs of damage due to human activities (harvesting for firewood, land reclamation and waste disposal). Siltation from land-based activities and change in land use near rivers and mangrove areas are contributing factors to the damage in these ecosystems (Boon, 2001; MNRE, 2013a).

- Coastlines: Samoa's coastlines are exposed to deep ocean waves. Approximately 80 per cent of Samoa's 403-kilometre coastline is sensitive or highly sensitive to erosion, flooding or landslips (Climate Investment Funds [CIF], 2011). Most of the coast is protected by fringing coral reefs. However, significant coastal erosion is occurring as a result of sand mining for construction and by natural causes (MNRE, 2013a).

- The health of coral and coral reefs is variable. The least healthy coral reefs are along the northern coast of Upolu from the Manono – Apolima Strait to the Fagaloa coast. Ocean acidification, which is increasing in Samoa's waters, will increase and threaten coral reef ecosystems (MNRE, 2013a). The 2009 tsunami

and recent cyclones have also contributed to the damage of the coral reefs (McAdoo et al., 2011).

- Rivers and streams: River flow rates are being impacted by sanitation and waste management practices on underground water sources. River flow and discharge rates are dependent on seasonal fluctuations in precipitation, making waterways highly vulnerable to climate change. The declining trend in river flow rates has implications for agriculture, drinking water, hydropower generation and biodiversity conservation (MNRE, 2013a).

- Land: Degradation is mainly associated with deforestation, land pollution, loss of soil fertility, and inappropriate agricultural practices and land use. The use of pesticides and the expansion of cattle farming are causing pollution of land and water (UNDP, 2013).

- Protected areas: The *Samoan Fourth National Report to the Convention on Biological Diversity (CBD)* in 2009, listed 22 terrestrial reserves, five national parks, two marine protected areas (MPA), one marine reserve and 71 village fisheries reserves. The national parks and reserves are managed by the Government through MNRE, while the two MPAs and the fisheries reserves are managed by villages, and, in the case of the MPAs, by two districts (Government of Samoa, 2009). In 2003, Samoa also formally designated its entire exclusive economic zone (EEZ) as a sanctuary for whales, dolphins, turtles and sharks (Government of Samoa, 2014c). The government is working on securing legal status for all protected areas proposed, as well as developing management plans.

Climate change

Samoa is particularly vulnerable to the adverse impacts of climate change. The Samoa Meteorology Division of the Ministry of Natural Resources and Environment (MNRE et al., 2011) sums up the current and future changes of Samoa's climate in these terms:

a) Temperatures have warmed and will continue to warm with more hot days in the future.
b) Rainfall shows no clear trend since 1950. Rainfall patterns are projected to change over the course of this century, with more extreme rainfall days expected.
c) The number of tropical cyclones will decline by the end of this century. However, projections indicate a possible shift towards more intense categories.
d) Sea level near Samoa has risen and will continue to rise throughout this century.

e) Ocean acidification has been increasing in Samoa's waters. It will continue to increase and threaten coral reef ecosystems. (MNRE et al., 2011, p. 8)

The *2005 National Adaptation Programme of Action (NAPA)* highlighted the country's major vulnerabilities to climate change (Table 2). The nine sectors considered highly vulnerable are agriculture and food security, water, biological diversity, health, forestry, coastal infrastructure and environment, tourism, urban settlements, and village communities (MNRE, 2005).

Table 2: Samoa - Vulnerability to Climate Change

Sector	Major Vulnerabilities
Agriculture and food security	Instability of food production levels to meet higher demands from climate-induced disasters, affecting income-generating activities for communities and the country at large.
Water	The water sector is facing a compromise in quality (a major problem), accessibility and availability of water with direct impact on communities' livelihoods. Drought is the most obvious and hard-felt impact. There is no strategy for adapting to the adverse effects of flooding. Sea-level rise increases the possibilities of sea-water intrusion into underground water aquifers, already experienced by many coastal communities.
Biological diversity	Samoa's biodiversity is highly prone to tropical cyclones, drought, temperature fluctuation and changes in precipitation patterns, leading to changes in habitat. The status of wildlife in Samoa shows that many forest birds have declined in number to the extent that some bird species populations have been decimated. The intense wave activity of storms has overturned much of the coral near the shore and severely damaged corals to a depth of up to 10 metres.
Health	Evidence of growth in vector-borne and water-borne diseases reconfirms the already changing climate and the impact it has on the health sector. The conditions for the occurrence and spread of these diseases are favoured by the changes in climate.
Forestry	Forests and trees, and their role in watershed management, environmental protection, provision of wood and non-timber resources, and as a reserve of biodiversity are highly vulnerable to drought, facing increasing risk of forest fires. Samoa experienced four major forest fires from the dry periods of 1982-83, 1997-98, 2001-02 and 2002-03.
Coastal infrastructure and environment	Infrastructure assets will be the most vulnerable sector, given the costs for construction and maintenance. Coastal and Infrastructure Management (CIM) plans already exist but the coastal infrastructure assets remain highly vulnerable without critical management and implementation of the CIM plans, as well as extension of the plans to accommodate inland flooding and watershed management in light of the impacts on infrastructure and works.
Tourism	Tourism is a major economic sector in Samoa and the impacts of climate change and climate variability include loss of beaches, inundation, and degradation of coastal ecosystems, saline intrusion and damage to critical infrastructure and the loss of attractiveness of coral due to bleaching. In addition, higher temperatures and humidity can contribute to heat stress.
Urban settlement	Climate change will have a significant impact on urban settlements, especially in the face of increasing population and continual urban migration. Poor drainage systems, no strategic planning, and an increasing urban population will only exacerbate the impacts of climate change on urban settlements.
Village communities	The livelihood of village communities is threatened by the impacts of climate change, including damage to homes and properties; unreliable water supply and quality; damage to plantations for subsistence and commercial purposes; coastal erosion; flooding of low-lying areas; and damage to cultural and heritage assets.

Source: MNRE, 2005.

Natural disasters

Samoa is vulnerable to natural disasters with tropical storms and cyclones as the main hazards (Kreft & Eckstein, 2014). Cyclones are associated with damaging winds, rainfall, flooding, swells, storm surges, and even tornadoes. Samoa has been affected by devastating cyclones numerous times in the last few decades. Its tropical cyclone risk is rated as extreme. As regards floods, Samoa, in particular the urban area of Apia, suffers greatly from the effects of flooding (MNRE, 2015). While Samoa lies in a relatively less-active seismic area, it is surrounded by the Pacific ring of fire. Around the boundaries of the tectonic plates are extremely seismically active areas, so earthquakes are not unusual. In some cases, earthquakes have generated tsunamis, such as the one that hit the country in 2009 (MNRE, 2015).

In the last thirty years, Samoa has been affected by a number of devastating cyclones which have caused considerable damage. The most serious were Ofa (1990), Val (1991), and Heta (2004). Recently, the country faced two major natural disasters, a tsunami in September 2009 and Cyclone Evan in December 2012. The tsunami killed 143 people and injured 310. Over 12,000 people were affected by waves that wiped out large stretches of the south and south-east coasts of the main island of Upolu. The total costs following the 2009 tsunami were assessed at US$124 million (equivalent to more than 22 per cent of Samoa's GDP) (IMF, 2015; World Bank, 2010a; 2015c). Cyclone Evan killed 12 people and displaced thousands (Bradshaw, 2015; Office of the High Commissioner for Human Rights [OHCHR], 2011). The World Bank estimated the total damage and losses from Cyclone Evan at US$210.4 million – equivalent to 30 per cent of GDP – making it one of Samoa's most expensive natural disasters (World Bank, 2015c).

National actions related to climate change and natural disasters

Climate change policies

Samoa has a remarkable record in pursuing and ratifying global and regional conventions relating to climate change and natural disasters and has worked assiduously to put in place community-focused measures to address these challenges. Generally, disaster risk reduction is viewed as an integral component of adaptation to climate change policies and plans (Kenny, 2012; SPC et al., 2015).

Briefly, Samoa has ratified a number of the major international conventions relating to climate change, including:

- The United Nations Framework Convention on Climate Change 1992 (UNFCCC) was ratified on 29 November 1994.
- The Convention on Biological Diversity 1992 (CBD) was ratified on 9 February 1994.
- The United Nations Convention to Combat Desertification 1994 (UNCCD) was ratified on 21 August 1998.
- The Kyoto Protocol 1997 was ratified on 27 November 2000.
- The Paris Agreement 2015 was ratified on 22 April 2016.

Samoa released its *First National Communication to the UNFCCC* in 1999 and its *Second National Communication to the UNFCCC* in 2010. Both documents highlighted the steps Samoa has taken to implement the Convention on Climate Change (Government of Samoa, 1999, 2010a).

To address these commitments, Samoa has prepared a *National Adaptation Programme of Action (NAPA) 2005* which prioritises the most urgent and immediate needs for adapting to the adverse effects of climate change (MNRE, 2005). These are:

- Securing community water resources.
- Reforestation, rehabilitation and community forest fire prevention programme.
- Climate health cooperation programme.
- Early warning system.
- Agriculture and food security.
- Zoning and strategic management planning.
- Implementing the CIM plans for highly vulnerable districts.
- Establishing conservation programmes in highly vulnerable marine and terrestrial areas.
- Sustainable tourism adaptation programme.

In 2007, Samoa also approved the *National Policy on Combating Climate Change*. The aims of this framework are to mitigate and adapt to the effects of climate change and, in doing so, support national sustainable development (MNRE, 2007a). The objectives are:

- Promote public awareness and improve stakeholder understanding of the causes and effects of climate change.
- Strengthen the management of climate change information.

- Build capacity on effective national response to climate change.
- Implement mitigation measures to reduce greenhouse gas emissions causing climate change.
- Implement adaptation measures to protect Samoa from the impacts of climate change.
- Establish a regulatory framework to facilitate the national response to climate change.

Natural disasters

Policies and legal frameworks directed at disaster reduction include the following:

- Disaster and Emergency Management Act (2007).
- National Disaster Management Plan (2011).
- National Action Plan for Disaster Risk Management (2011 – 2016).
- Fire and Emergency Service Act 2007.
- Red Cross Response Plan.

Mitigation

As is well reported, Samoa is only responsible for an insignificant amount of global greenhouse gas emissions (GHG). However, the country is committed to reducing its GHG emissions from the electricity subsector through the adoption of a 100 per cent renewable energy target for electricity generation through to the year 2025 (Government of Samoa, 2015).

Lotofaga - the village study

Location

Lotofaga village is situated on the south coast of Upolu (Figure 2), and is part of the Lotofaga Electoral Constituency (Faipule) which also includes the villages of Vavau and Matatufu.

Figure 2: Map of Upolu Showing the Location of Lotofaga

Source: http://www.mappery.com/Upolu-Island-Map

Lotofaga is characterised by south-facing hills gently sloping to the sea. Some streams dissect the village, generally running north-south. These can carry significant volumes of water after heavy rain. The coastline comprises outcrops of volcanic rock interspersed with pockets of coral sand beaches. A reef lies between 100 and 500 metres offshore (Figure 3) (MNRE, 2007b). There is significant cultural evidence of ancient settlements in the village, and important tourist attractions include the To Sua Ocean Trench (a turquoise swimming hole) and two waterfalls (Fuipisia and Sopoaga).

Figure 3: Aerial View of Lotofaga

Source: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community, 2016.

Lotofaga has a strong reputation as a centre of political influence. It was the electoral constituency of Fiame Mata'afa Faumuina Mulinu'u II, who was a paramount chief and the first Prime Minister of Samoa (1959-1970 and 1973-1975). After his death in 1975, his wife Laulu Featauimalemau Mata'afa won the seat and became the second woman in Samoa to become a Member of Parliament. In 1975 their daughter, Fiame Naomi Mata'afa was elected into parliament and became the youngest Cabinet minister ever. Fiame Naomi is a senior member of Cabinet in the Legislative Assembly of Samoa, and in 2016 became the Deputy Prime Minister of the country – again a first time for a woman (Fairbairn-Dunlop, 1998; Tapaleao, 2016). Both Laulu Featauimalemau Mata'afa and Fiame Naomi Mata'afa have made an enormous contribution in promoting gender issues not only in the village but also in the country and at international level.

Village setting

In earlier times, Lotofaga village followed a common configuration and land use pattern of a Samoan coastal village, with its main coastline settlement around the *malae* with a belt of inland coconut and other plantations. The village *malae* or the meeting place for the *fono o matai* is still at the coastal site. However, much of the village settlement has extended into the hills largely due to the introduction of cash cropping, supported in turn by government economic development schemes which have promoted the building of inland plantation road projects and, more recently, as a response to climate change and natural disaster (Figure 4). Nowadays, homes are a combination of traditional Samoan houses *(fale)* and modern style houses *(palagi* house). Interestingly, in the newer settlement, families have built their houses further apart.
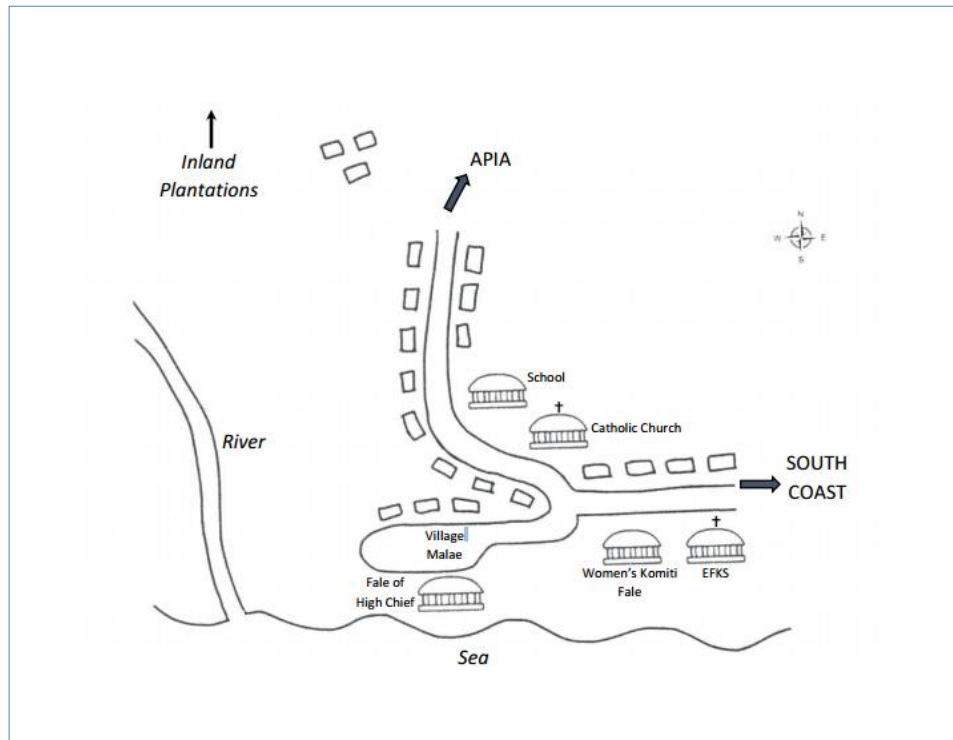
Figure 4: Sketch Map of Lotofaga

People and land

The 2011 census recorded Lotofaga's population as 1,055 people (554 males and 501 females) living in 153 households. This was a slight decrease from the 2006 census that registered 1,089 people. Moreover, the census indicated more males than females, a characteristic that is also observed at the national level (Appendix E) (Samoa Bureau of Statistics, 2011). The 2011 population pyramid of Lotofaga (Figure 5) depicts the youthfulness of the population with 52.2 per cent in the 0-19 age range. Moreover, the smaller number in the 20 to 54 year age range suggests significant levels of out-migration, with more females than males moving away from the village. When it comes to the age group 55 years and over (10.7 per cent of the total population), females dominate (49 males and 64 females) (Samoa Bureau of Statistics, 2011).
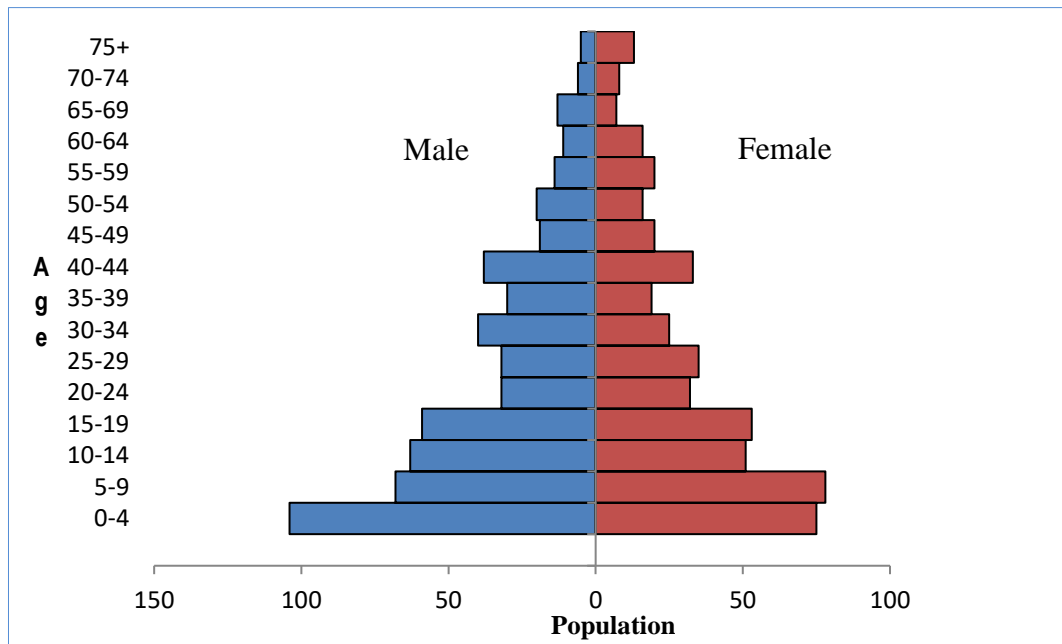
Figure 5: Population Pyramid of Lotofaga in 2011

Source: Based on Census 2011.

As in the rest of the rural areas, land in Lotofaga is not only the main asset but also the main source of sustenance, livelihoods and food security. In addition, land provides a sense of pride, identity and belonging, and it represents family history, culture and community. All Lotofaga families have rights to land; it is accessed through their family systems – and the village *fono o matai* (Samoa Bureau of Statistics, 2011).

Social infrastructure

The 2011 census registered that Lotofaga, like other rural villages, has a wide range of social infrastructure including education and health services, access roads, water supply and electricity (Table 3) (Samoa Bureau of Statistics, 2011).

Table 3: Lotofaga - Social Infrastructure

Sector	
Education	
Village school:	Lotofaga Primary School (public school, founded in 1930)
Number of students:	221 (118 males, 103 females)
Number of staff:	7 (3 males, 4 females)
Health	
Nearest public health centre:	Lalomanu District Hospital (10 km from Lotofaga)
Number of staff:	10 nurses (1 male, 9 females)
Traditional healers:	3 females
Traditional birth attendants:	3 females
Sources Water Supply	**Number of families**
Metred water	3
Rain water	71
Purified water	2
Non-metred	77
Water tanks	6
Electricity	
With electricity	100% of families
Roads	
Access roads	2 tar-sealed
Number of families in Lotofaga: 153	

Source: Ministry of Women Community and Social Development of Samoa (MWCSD), 2013; Samoa Bureau of Statistics, 2011.

The main educational centre in the village is a primary school which offers grades one to eight. At the time of the 2011 census, the school had seven teachers for 221 students. There was once a vigorous health centre in Lotofaga; it was organised by the women's committee and supported by the government who provided a qualified nurse. At the time of the study, the health centre was closed and families travelled to the Lalomanu District Hospital 10 km away. However, as in the past, traditional healers and birth attendants provide basic care for Lotofaga families.

Lotofaga faces problems with access to quality water for household consumption and domestic use, with periods of water shortage. According to the 2011 census, out of 153 households, only three families obtained drinking water from metred taps, 77 families from non-metred taps, and 71 families from stored rain water. Two families have purified water, and six families have tanks. The village has electricity: television and radio reception are reasonable and most families have radios. Few families have a landline phone; however, almost all the families have mobile phones.

The main national road connects Lotofaga with Apia and other villages, and a secondary road goes inland. Buses serve the village with at least three return trips to Apia daily, and some families also own cars to transport their produce to the markets. There are two main churches in the village: The Congregational Christian Church and the Catholic Church, both are magnificent buildings. The nearest police station is located in Lalomanu and the nearest post office is in Malaemalu (MWCSD, 2013).

Economy

Despite some shortcomings in defining and enumerating 'economic activity', the national census (Table 4) reinforces compellingly the continuing importance of the semi-subsistence economy and hence Lotofaga's reliance on its environment and natural resources for food security, basic needs (e.g. housing, canoes and utensils), and goods used in ceremonials and daily life exchanges.

Table 4: Lotofaga - Economic Activity by Sex (15 years and over)

Main activity	Total	Male	Female
Total	616	319	297
Economically active population (disaggregated by economic activity)			
Total	271	254	17
Produce subsistence	227	226	1
Employee	32	19	13
Self-employed	8	7	1
Make/manufacture goods for sale	1	1	0
Street vendors	1	1	0
Look for a job	2	0	2
Economically inactive population			
Total	345	65	280
Domestic duties	244	16	228
Attend school	81	41	40
Disabled	20	8	12

Source: Samoa Bureau of Statistics, 2011.

Regarding the working age population of 15 years and over, the census showed that 271 people were economically active, and 345 people were economically inactive. The data disaggregated by sex showed that 6 per cent of Lotofaga women were in the category "economically active", this percentage equates to 17 women out of a total of 271. The other 280 women, or 94 per cent, were classified as "economically inactive", with 228 women dedicated only to domestic duties (Samoa Bureau of Statistics, 2011).

Information on the main economic activities showed that 84 per cent (227 people) of the economically active population were engaged in semi-subsistence activities, a combination of farming, livestock, fishing and use of natural resources. Only one woman was classified as engaged in these activities. Despite this shortcoming of statistics in the undercounting of women, during my field work I witnessed the extensive participation of women in production, in both farming and other income-generating activities.

With respect to village livelihoods, all families had plantations (Table 5), and although the 2011 census reported that only four families had gardens, in my visits to the village, I noted that most of the families had gardens producing vegetables. Almost all households raised backyard poultry (chicken) and pigs, and 37 per cent households owned cattle. Some families also had horses which were used for transportation.

Table 5: Lotofaga - Economic Activities

Activity	Number of families	Number of animals
Farming Agriculture		
Plantation	All	
Vegetables garden	4	
Livestock		
Cattle farms	57	496
Piggery farms	111	1609
Poultry farms	130	2570
Fishing		
Fishing tools	46	
Boat/Canoe	2	
Local business		
Retail shop	4	
Small markets	3	
Food stalls	5	
Number of families in Lotofaga:	**153**	

Source: Samoa Bureau of Statistics, 2011.

Very few families had fishing equipment. Of the 153 households, 46 families had fishing tools, and only two families had a boat or canoe. These figures suggest that traditional fishing practices might still be practised. Apart from semi-subsistence agricultural and fishing activities, local schools, shops and just a few family businesses provide employment and income (Samoa Bureau of Statistics, 2011).

Vulnerability to climate change

As seen in Figure 6, the coastal area of Lotofaga has been classified by the Ministry of Natural Resources and Environment (MNRE) as a Coastal Erosion Hazard Zone (CEHZ) and a Coastal Flood Hazard Zone (CFHZ) (MNRE, 2007b). The government has made concrete recommendations to relocate village assets outside CEHZ and CFHZ when buildings require replacement, or to ensure investment within the hazard zones to prevent and mitigate damage from coastal erosion and flooding. Other recommendations include continuing to plant trees and other vegetation in coastal areas, and identify alternative sources of sand for domestic use (MNRE, 2007b, 2007c). Furthermore, Lotofaga could be threatened by inappropriate land use practices such as deforestation, cattle farming and agriculture. These activities have increased the rate of inland erosion and the supply of silt to the coast (MNRE, 2007c).

Figure 6: Lotofaga Village - CIM Plan Recommendations
Source: MNRE, 2007c.

Strategies to address village development

Notably, the village does not have a comprehensive development plan. Implemented initiatives are, in general, stand-alone projects or *ad hoc* initiatives not connected to one another, and the majority of them are donor-oriented. A number of planning and strategy-related documents were found. Some are part of generic-type programmes such

as the national CIM plans, and some are particular to Lotofaga. Some were carried out through community consultation, yet others do not appear to be. While there was evidence that a lot of planning has taken place, there was less evidence that the plans had been implemented. The following three were the most significant areas found:

Coastal Infrastructure Management (CIM)

In 2007, MNRE prepared the CIM Plan for the District of Lotofaga which includes the villages of Lotofaga, Vavau and Matatufu. This initiative was under the framework of a World Bank-funded project titled *Samoa Infrastructure Asset Management (SIAM) 2001-2007*. The aims of the CIM Plan for the District of Lotofaga were to: (a) Improve the community's awareness of coastal hazard risks. (b) Enable the community and infrastructure providers to reduce coastal hazard risks in villages. (c) Enable the community and infrastructure providers to better adapt to, respond to and recover from cyclones and other emergency events (MNRE, 2007b, p. i).

The CIM Plan has not been implemented; however, it has been used as a reference for other village initiatives (MNRE, 2007b, 2007c). For example, the aims of a new World Bank-funded project called *Enhancing the Climate Resilience of Coastal Resources and Communities Project for Samoa 2013-2018* are to develop a methodology for reviewing and updating existing CIM Plans and the implementation of identified priorities (World Bank, 2013).

Village Sustainable Development Plan

As part of the *Community Sector Plan 2010-2015,* the Ministry of Women, Community and Social Development (MWCSD) has prepared a number of sustainable village plans. These plans aim to be the framework for implementing social, environmental, economic and cultural initiatives in the village *(*MWCSD, 2015). The village plan for Lotofaga has not been prepared yet.

Socio-economic development and adaptation to climate change initiatives

As part of the government's sectoral programmes of agriculture, health, education, water supply and infrastructure, a number of initiatives have been implemented in Lotofaga. These small projects have been funded by the government, international cooperation, NGOs and churches. For instance, the MWCSD has funded several community development initiatives, including skills building for women, training in agriculture and other income-generating activities. In terms of natural disasters and

climate change adaptation, sectoral agricultural and environmental planning initiatives have included the village. Most of these projects are associated with rehabilitation of assets and infrastructure damaged by natural disasters. Table 6 sets out some of these initiatives plus the lead and funding agencies.

Table 6: Lotofaga. Development External Assistance

Area	Development Project	Lead Agency	Funding Agency	Year	Project Status
Agriculture	Village Based Development Project	US Peace Corps, MWCSD	US Peace Corps Office	2009	One off
	Organ. farm (6) Microfinance project (1) Handicrafts (1) Disaster (3)	Women in Business Inc	NZAID, Oxfam	2007 2008 2010 2011	One off
	Agriculture Demonstration centre	Samoa China Agric. Dev. Project (SCADCP)	SCADCP	2011	Completed
Environment	Coastal Infrastructure Management Plan	MNRE	SIAM-2	2007	Completed
	CERP Small Scale Resilience Strengthening Small Grants Scheme	MNRE	World Bank / Government	2009	One off
Disaster Relief	Agriculture Sector Recovery Aid (Seeds & Tools)	Agriculture Sector	Samoa Government	2009	Completed
	Housing Recovery (4)	Samoa Government	Samoa Government	2009	Completed

Source: MWCSD, 2013.

Chapter summary

This chapter has framed the context for this study. The first section provided an overview of the Pacific region to situate the study country. The sea of islands that is the Pacific presents enormous diversity in terms of geography, natural resources endowment, culture, and social and economic aspects. However, as a region, the inhabitants share similar challenges and opportunities in the globalised world.

In the second part, the country overview described the main socio-economic aspects and the physical features. Special consideration was dedicated to climate change as it has become one of the main challenges facing the country today. The development process of Samoa demonstrates that culture and tradition can go hand in hand with the challenges of a globalised world. Over the last decades, Samoa has made significant progress on social and economic development, while preserving relatively well its natural resources endowment. However, the country faces the challenges of slow growth and high volatility arising from exogenous economic shocks, climate change and natural disasters. Slow population growth due to emigration is another issue that has implications for the country's development. In contrast, the influx of remittances has been crucial at the micro and macro levels.

The third part of this chapter was dedicated to Lotofaga, the village selected to carry out the study. In this case, the review of the main socio-economic aspects and the physical characteristics were focused at the micro level. As a semi-subsistence economy, the village depends greatly on its natural resources that are carefully managed by a strong governance system or *fa'amatai*. However, as in the rest of the country, the village faces enormous development challenges aggravated by the effects of climate change and natural disasters.

Chapter 3 - Literature Review

Environmental migration is a relatively new research field. Despite the fact that there is ongoing work and debate on terminologies, conceptualisation and their applicability in different situations, there is no agreement yet on the definitions that could lead to the formulation of theories for understanding the relationship between climate change and human mobility. Moreover, there is a debate on the applicability of these concepts in research and policy design.

This chapter reviews the literature on environmental migration, a cross-cutting development issue that requires interdisciplinary understanding. This chapter is divided into five parts. The first part reviews the knowledge base. The second part focuses on the typologies of environmental migration, and the third, presents the current research topics. The fourth part is dedicated to the study of the phenomenon of environmental migration in the PICTs. The fifth part identifies the needs, gaps and opportunities for research into these issues. The chapter concludes with a summary of the main topics covered.

For the purpose of this study, the terms environmental migration and climate-induced mobility are used interchangeably as umbrella terms encompassing various types of movement associated with climate change.

Framing the knowledge base on environmental migration

While both researchers and policy makers have already been addressing many aspects of natural disasters, climate change and human mobility, my thesis standpoint is that advancing discussions and developing a comprehensive theoretical framework and policy response requires reviewing these phenomena from a range of different knowledge systems and perceptions. In this section, I present the current debate on environmental migration to highlight the challenges in building consensus over concepts and definitions. Then, the terms environmental migration, environmental migrants, and climate change refugees are discussed. Finally, the concept of migration as an adaptation strategy in the context of climate change is also presented.

Understanding human mobility in the context of climate change

Over the last decades, there has been a growing recognition that environmental and climate changes are fundamental drivers of migration. Policy makers and research

centres have been actively advocating the incorporation of migration into climate change debates. However, understanding the linkages between climate change and population movements presents many challenges (Burson & Bedford, 2013; Campbell, 2010a; Foresight, 2011; IOM, 2009a; Laczko & Aghazarm, 2009; Martin, 2010a, 2010b; Mawby, 2015).

While environment and climate change can exacerbate population movements, and it is very likely that weather events contribute to an increased level of mobility and changing migration patterns, disentangling climate change from other migration drivers is not an easy task (Laczko & Aghazarm, 2009; Laczko & Piguet, 2014). Usually, a complex combination of causes determines whether or not people move. Therefore, given the multiple causes of migration, it is not straightforward to draw a clear line between voluntary and forced movements (Hugo, 1996; Laczko & Piguet, 2014; Morton, Boncour, & Laczko, 2008).

Stephenson, Newman, and Mayhew (2010) argue that:

> The reasons for which people migrate or seek refuge are complex, making it hard to forecast how climate change will affect the future of migration. Nonetheless, climate change seems likely to become a major force for future population movements, probably mostly through internal displacement but also to some extent through international migration, particularly for small island states. (p. 153)

Dun and Gemenne (2008) make a distinction between slow- and sudden- onset events:

> Aside from clear cases where sudden-onset environmental changes such as those resulting from tsunamis, earthquakes or floods lead to forced displacement, the problem is that environmental migration commonly presents itself where there is a slow-onset environmental change or degradation processes (such as desertification or increasing sea level) affecting people who are directly dependent on the environment for their livelihoods. (p. 10)

Views are that the complexity of current migration patterns and the challenges of isolating environmental factors from other migration drivers have inhibited the development of robust theoretical frameworks (Dun & Gemenne, 2008; IOM, 2009a). One criticism of much of the literature on environmental migration is that climate-related terms linked to human mobility are not clearly defined. Terms such as "environmental migration", "climate-induced migration", "migration associated with climate change", "migration induced by slow-onset and sudden-onset events", "forced migration associated with natural disasters", and "displacement linked to natural

disasters" do not fully explain the linkages between human mobility and climate change, natural disasters or environmental degradation, or even a combination of these phenomena (Ferris, 2015; Morrissey, 2012). Furthermore, the absence of an adequate characterisation of "the people who migrate because they are affected by climate change" presents also a challenge for statistics gathering, policy responses and legal frameworks.

Another area of debate concerns the disciplinary domains used. For example, there is still a lack of consensus among researchers as to whether or not environmental migration is a distinct form of migration or an economic or an environmental issue. Is it a cross-cutting issue or a development issue? Is it a local, national or global problem? Despite effort to clarify terms, concepts and research process, research on climate-change-induced migration remains dispersed and poorly coordinated. Empirical studies are seldom comparable and often use different methodologies that make it difficult to relate them to each other (MECLEP, 2015a). Ferris (2015) explains these challenges in this way:

> The field of climate change and mobility is in a state of formation... I don't sense yet that there is a common paradigm for understanding the relationship between climate change and mobility or even a common vocabulary. It feels like the chaos of a 'field in formation' or perhaps we are on the verge of a paradigm shift. (p. 1-2)

Definition of environmental migration

Environmental migration may take many forms: forced or voluntary, temporary or permanent, internal or international (IOM, 2011b). Burson (2010) argues that "while it might be tempting to characterize climate change [in the context of human mobility] as a new and self-standing phenomenon, it is more correct that it be seen as a set of interrelated factors affecting human security and development" (p. v). Therefore, migration is better characterised by a multi-causality of factors, and climate change would be an additional factor driving migration in an array of existing drivers (ADB, 2011; Ferris, 2015).

The last IPCC Report includes a definition of environmental migration, and for the purpose of this study this will be used (IPCC, 2014b). The IPCC definition states that:

> Environmental migration refers to human migration where environmental risks or environmental change plays a significant role in influencing the migration decision and destination. Migration may involve distinct categories such as

direct, involuntary and temporary displacement due to weather-related disasters; voluntary relocation as settlements and economies become less viable; or planned resettlement encouraged by government actions or incentives. All migration decisions are multi-causal, and hence it is not meaningful to describe any migrant flow as being solely for environmental reasons. (p. 179)

Definitions and typologies do matter, and not only for the scholarly debate. Without a clear definition, it is not possible to identify which populations are of concern and require assistance, nor can accurate estimates be made of the number of people displaced or prompted to migrate because of environmental factors (ADB, 2012b).

Environmental migrants and environmental refugees

Over the last decades, researchers and policy makers have been debating how to classify and name individuals and families who have moved as a result of environment degradation, climate change and natural disasters. Various terms have been suggested, such as environmental migrant, climate change refugee, environmental refugee, eco-migrant, environmentally induced forced migrant, and others; yet there is no agreement on definitions (Piguet, 2008; Schmelz, von Oswald, & Hillmann, 2011). Two terms, "environmental migrant" and "environmental refugee" are the most frequently mentioned. The term "environmental migrant" has been under discussion for over forty years, yet it remains poorly defined and without any legally binding mechanisms of protection or support (Lehman, 2009).

In the 1970s, the linkages between environmental changes and migration started to be mentioned in the academic literature. This emergence was linked, to a great extent, to the growing importance of the environment in public policies and international agendas. Following a first mention by William Vogt in 1948, the concept of environmental refugee was used by environmentalist Lester Brown in the 1970s, and was the subject of a report by El Hinnawi for the United Nations Environment Programme (UNEP) in 1985 (Gemenne, 2008; Kolmannskog, 2008). El Hinnawi defined environmental refugees as:

> Those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life. By 'environmental disruption' in this definition is meant any physical, chemical, and/or biological changes in the ecosystem (or resource base) that render it, temporarily or permanently,

unsuitable to support human life. (El Hinnawi, 1985, as cited in Bates, 2002, p. 466)

In 1990, the first report of the United Nations Intergovernmental Panel on Climate Change (IPCC) made a specific link between migration and climate change, arguing that its effects could displace millions of people (Brown, 2008). Also in the nineties, the British environmentalist Norman Myers defined environmental refugees as:

> Persons who can no longer gain a secure livelihood in their traditional homelands because of environmental factors of unusual scope, notably drought, desertification, deforestation, soil erosion, water shortages and climate change, also natural disasters… and who "feel they have no alternative but to seek sustenance elsewhere". (Myers, 1995, as cited in Castles, 2002, p. 1)

Today the IOM working definition of environmental migrants is widely accepted, and for the purpose of this study it will be used. It states:

> Environmental migrants are persons or groups of persons who, predominantly for reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move within their country or abroad. (IOM, 2007, p. 1-2)

This definition encompasses various types of population movement, whether temporary or permanent, internally or across borders, voluntary or forced, or due to sudden-onset or gradual changes to the climate.

In terms of legislation, there is an ongoing debate about whether or not international law should protect people displaced by environmental disasters or those who need to be relocated as a result of climate change and natural disasters. Current law protects those displaced on the basis of race, religion, nationality, or because of their social status or political affiliation, not if they have moved from the devastating effects of environmental disasters (Gemenne, 2015; McAdam, 2011).

People displaced by climate change and other environmental problems are currently not recognised by the 1951 Geneva Convention on the Status of Refugees, and the term environmental refugee or other similar terms are not recognised either. Some scholars and advocacy groups argue that international status should be granted to environmental migrants, either through a new international convention or an amendment to the Geneva Convention. Such a status would, however, be difficult to implement, since most people displaced by environmental changes tend to remain within the borders of their countries,

and thus become internally displaced people who would not benefit from an international status (Biermann & Boas, 2008; Environmental Justice Foundation, 2008; Martin, 2010a, 2010b).

While some researchers and policy makers call for a better conceptualisation of the term climate refugee, there are others who do not agree with this position. For instance, Gemenne, (2015) argues that it is necessary to de-politicise and re-visit the term climate refugee to avoid significant protection gaps in both policy and legislation. He says:

> A central element in the concept of 'refugee' is persecution: in order to qualify as a refugee, you need to be fleeing persecution, or to fear persecution. Forgoing the term 'climate refugee' is also, in a way, forgoing the idea that climate change is a form of persecution against the most vulnerable and that climate-induced migration is a very political matter, rather than an environmental one. (p. 71)

On the other hand, McAdam and Limon (2015) say there is widespread agreement in the scientific and legal literature that the use of the term climate refugee is scientifically and legally problematic. They go on to say that:

> The concept [of climate refugee] is 'erroneous as a matter of law and conceptually inaccurate'. The reasons are threefold. First, most migration and climate studies point to the environment as a trigger and not the cause of migration decisions. Second, some studies focus on the negative geopolitical implications of changing the Geneva Convention on refugees to include environmental migrants as well as the lack of global instruments to handle internal displaced peoples or international migrants. Third, many Small Island Developing States (SIDS) are reluctant themselves to have their international migrants designated as being victims of climate change. (p. 16)

IOM (2015b) recommends avoiding the use of the terms climate or environmental refugees because people migrating for environmental reasons do not fall into any one particular category provided by the existing international legal framework. They state:

> Terms such as "environmental refugee" or "climate change refugee" have no legal basis in international refugee law. There is a growing consensus among concerned agencies, including the United Nations High Commissioner for Refugees (UNHCR), that their use is to be avoided. These terms are misleading and could potentially undermine the international legal regime for the protection of refugees. All persons moving for environmental reasons are protected by international human rights law. In addition, persons displaced within their country due to natural or human-made disasters are covered by provisions laid out in the Guiding Principles on Internal Displacement. (para. 4-5)

It is highly significant that leaders of the Pacific island countries have rejected the term "climate refugee". They have suggested calling the international movements of people due to climate change as "migration with dignity" (Office of the President of the Republic of Kiribati, 2015). That, migrants should not be perceived as helpless or resourceless or victims of climate change, but rather as resourceful agents of their own adaptation (Gemenne, 2015; UNFCCC, 2015b, 2015c).

Migration as an adaptation strategy

One aspect that should be considered when analysing migration associated with climate change is the concept of "migration as an adaptation strategy". According to the Nansen Initiative (2013a), in the context of slow-onset environmental degradation due to climate change, migration as adaptation refers to a primarily voluntary decision to avoid or adjust to deteriorating environmental changes that may result in a humanitarian crisis in the future. Such migratory movement can be temporary, circular or permanent (p. 10).

However, there is some controversy about this concept. For instance, migration can be seen in some cases as a result of failed adaptation or maladaptation, and in other situations as an effective adaptation strategy to worsening conditions (Barnett & O'Neill, 2012). Migration can even be seen positively as when migrants contribute back to the development of the country of origin and thereby reduce forced migration. There are also concerns for the status of vulnerable people left behind. For instance, those who may be unable to travel due to physical, social or financial conditions (ADB, 2012b; Barnett & O'Neill, 2010). In each case, the challenge remains to address both adaptation *in situ* and migration as an adaptation option.

Typologies of environmental migration

There is no consensus among researchers regarding typologies of human mobility associated with climate change. In the mid-eighties, definitions of human mobility often did not even distinguish between internal and international, voluntary and forced, or short-term and long-term mobility. In many cases, all of these categories were referred to as "migration" (Warner et al., 2013). Nowadays, there is still an ongoing debate, and there is no agreement on how to typify different population movements. IOM (2008) suggests considering human mobility in the context of climate change as a continuum:

> Population mobility is probably best viewed as being arranged along a continuum ranging from totally voluntary migration, in which the choice and will of the migrants is the overwhelmingly decisive element encouraging people to move, to totally forced migration, where the migrants are faced with death if they remain in their present place of residence. The extremes in fact rarely occur, and most mobility is located along the continuum. Environmentally induced migration is concerned with moves toward the forced end of this continuum. (p. 16)

For the purpose of this study, three categories of population movements are considered, namely displacement, migration and relocation. These categories were defined in Chapter 1; however, they will now be contextualised within the framework of the Cancun Outcome Agreement for the UN Framework Convention on Climate Change (UNFCCC, 2010). Paragraph 14(f) calls upon States to enhance their action on adaptation by pursuing a range of measures, including "to enhance understanding, coordination and cooperation with regard to climate-change-induced displacement, migration and planned relocation, where appropriate, at the national, regional and international levels" (UNFCCC, 2010, p. 5).

Displacement

Displacement in the context of climate change refers to the involuntary or forced movement, evacuation or relocation of individuals or groups of people from their homes or places of habitual residence. Many factors contribute to people becoming displaced; a natural hazard may be the most immediate and obvious trigger (IDMC & Norwegian Refugee Council, 2015). Displacement may take place over both short and long distances, and includes complex patterns of movement beyond initial flight (Brookings, 2014). Referring specifically to natural disasters, the Nansen Initiative (2013a) highlights the fact that in the context of natural disasters:

> Displaced people may leave to save their lives in the context of a sudden-onset disaster or because the environment has deteriorated to such an extent that it is no longer possible for people to live there. Displacement may take the form of spontaneous flight, or an evacuation ordered or enforced by authorities. Displacement can occur within national borders or across international boundaries. (p. 9)

Migration

It should be noted that within the wider literature, the term "migration" is used as an umbrella term which incorporates two types of movement: voluntary migration and involuntary displacement. However, the distinction between these two terms is

necessary with respect to policy challenges, opportunities and responses, in the context of environmental change (Foresight, 2011). Thus, for the purpose of this study, migration in the context of climate change refers to the voluntary movements of people. These movements can be internal and across borders, and can be temporary, circular or permanent.

Relocation

Campbell (2010b) defines relocation as:

> Permanent (or long-term) movement of a community (or a significant part of it) from one location to another, in which important characteristics of the original community, including its social structures, legal and political systems, cultural characteristics and worldviews are retained: the community stays together at the destination in a social form that is similar to the community of origin (p. 58-59).

This broad concept encompasses both voluntary and planned relocation. In this study, relocation refers to permanent voluntary movement, with an emphasis on re-building livelihoods in another place (MECLEP, 2014). Regarding planned relocation, in the Operational Guidelines on the Protection of Persons in the Context of Natural Disasters of the Inter-Agency Standing Committee (IASC), relocation is defined as follows:

> (a) Temporary relocation: The act of moving evacuated people to a place where they stay until return or settlement elsewhere in the country becomes possible. (b) Permanent relocation: The act of moving people to another location in the country and settling them there when they no longer can return to their homes or place of habitual residence (Brookings, 2011, p. 58).

The term resettlement has also been used in relation to climate change. According to IOM (2011b), resettlement refers to:

> The relocation and integration of people (refugees, internally displaced persons, etc.) into another geographical area and environment, usually in a third country. The durable settlement of refugees in a country other than the country of refuge. This term generally covers that part of the process which starts with the selection of the refugees for resettlement and which ends with the placement of refugees in a community in the resettlement country. (p. 55)

In other cases, resettlements occur when development projects cause people to lose land or other assets, or access to resources. de Sherbinin, Castro, and Gemenne (2010) assert that:

> Resettlement is a population movement planned directly by a government or private developers, where an area is chosen in order to relocate population. The

choice can be made after discussion with the affected populations, but can also be imposed upon them. Resettlements can also involve the payment of some compensation for the affected populations. (p. 1)

Resettlement under the auspices of the United Nations High Commissioner for Refugees (UNHCR) involves:

The selection and transfer of refugees from a State in which they have sought protection to a third State that has agreed to admit them - as refugees - with permanent residence status. The status provided by the resettlement State ensures protection against *refoulement* [the forcible return of refugees or asylum seekers to a country where they are liable to be subjected to persecution] and provides a resettled refugee and his/her family or dependents with access to civil, political, economic, social and cultural rights similar to those enjoyed by nationals. Resettlement also carries with it the opportunity to eventually become a naturalized citizen of the resettlement country. (UNHCR, 2016, para. 1)

Ferris (2014) clarifies the definitions of relocation, resettlement and evacuation, as these terms have created some confusion. She says:

Relocations are defined as the physical movement of people instigated, supervised and carried out by state authorities (whether national or local). Relocations may be temporary or permanent. When they are temporary (or intended to be temporary), they are known as evacuations. When they are permanent (or intended to be permanent), they generally include provisions for adaptation to the new environment, known as resettlement by those in the development community. Generally, the requirements on authorities are higher for planning when the relocation is intended to be permanent. For example, if people are relocated temporarily because of a flood, the expectations of government service (e.g. to provide for livelihoods) are generally lower than when people are relocated on what is expected to be a permanent basis. (p. 6)

Current research into environmental migration

The literature on environmental migration has been growing over the last decades with the emergence of academic research and policy debate at the national and international level, as well as operational responses to a phenomenon that cuts across many different thematic and policy areas (Jäger, Frühmann, Günberger, & Vag, 2009; Martin, 2015; Warner, Erhart, de Sherbinin, Adamo, & Chai-Onn, 2009). Conceptual and empirical work has examined broad relationships between environmental factors and human mobility in different situations.

Academic research

Researchers from different disciplines and backgrounds have been working on conceptual and empirical studies of environmental migration, and also on policies and legal frameworks. Empirical research relating environmental change to human mobility has found out that environmental factors can play a role in migration. In some cases, there might be a direct correlation, particularly between a sudden-onset event and displacement, and in cases of slow-onset events the relationship might be more nuanced. In terms of "migration as adaptation to climate change", scholarly literature ranges across a number of climatic stressors and locations, making it difficult to explain whether migration is a form of adaptation or an indicator of the limits to adaptation.

In most cases, theoretical and methodological underpinnings to climate-induced migration have been developed *ad hoc* to meet specific research needs. Piguet (2010) identified six methods that have been used to assess the weight of environmental drivers of migration: ecological inferences, individual sample surveys, time series, multilevel analysis, agent-based modelling and ethnographic methods (Piguet, 2010, as cited in Lackzo & Piguet, 2014). Obokata, Veronis, and McLeman, (2014) found that most empirical studies on environmental migration have focused on relatively short time periods, offering only partial snapshots of the human-environment interactions that may have unfolded over many years or decades. The authors also found that the use of quantitative techniques were best able to identify actual and potential population movements in broad terms and at fairly large spatial scales. In contrast, the empirical studies that employ qualitative methods, such as interviews, appear to be most successful in identifying migrants' motivations, the role of environmental factors within those motivations, and the interplay of environment with non-environmental factors in causality (p. 127).

Felli (2015) identified seven different types of studies in the field of climate change and migration: (a) quantified estimates of existing or future climate or environmental refugees, (b) conceptual clarifications, typologies and literature reviews, (c) empirical quantitative studies, (d) empirical case studies of specific places and regions, (e) normative, legal and institutional questions, (f) discursive analyses, and (g) phenomenological analyses.

Laczko and Piguet (2014), when examining the state of research on environmental migration in different regions of the world, found that there are common global features

as regards the relationship between migration and the environment. They also differentiated regional challenges and characteristics that require specific policy approaches. The authors highlighted the following aspects taken from different studies:

> (a) Multi-causality: Migration is rarely explained by one single driver, be it environmental or not. It is the product of a set of livelihood options, framed by a mix of biophysical conditions and social, political and economic contexts. (b) Migration as a response to environmental stress: Migration is often seen as a last-resort option, once a certain threshold of stress is reached. Although this may be true for some, migration also represents a potential means of reducing the burden of the environment on the sending household. Migration may therefore be a coping mechanism as well as a consequence of environmental change. (p. 16)

Despite the fact that research on environmental migration is growing, a number of scholars agree that more empirical studies are needed. The different methodological approaches employed so far have their strengths and limitations. Therefore, there is a need for large-scale survey studies that include time series data. At the same time, more research using quantitative methods and mixed research methods is needed (Laczko & Aghazarm, 2009; Lackzo & Piguet, 2014; Obokata et al., 2014).

I have selected three high-profile studies to illustrate how different theoretical and methodological frameworks have helped explain the interactions between environmental changes and population movements in various geographical contexts. The selected studies are: (a) *Environmental Change and Forced Migration Scenarios Project*, (b) *Where the Rain Falls Project,* and (c) *Climate Change, Vulnerability and Human Mobility: Perspectives of Refugees from the East and Horn of Africa Project*.

Environmental Change and Forced Migration Scenarios Project (EACH – FOR). European Commission. (2007 – 2009)

The EACH – FOR project carried out 23 case studies in Europe, Sub-Saharan Africa, North Africa and the Middle East, Asia and the Pacific, and Latin America and the Caribbean (Jäger et al., 2009). The aim of the study was twofold: (a) To explore and describe the causes of forced migration in relation to environmental change. (b) To provide plausible future scenarios of environmentally induced forced migration. Case studies were prepared using various methodological tools including expert interviews, a survey of migrants, and a related survey of non-migrants living in areas with documented environmental degradation, and modelling to develop future scenarios. The sample varied from case to case.

The main findings were: (a) Climate change is not the only potential environmental trigger for migration. Numerous environmental problems are faced by migrants, potential migrants and non-migrants in study areas. (b) The magnitude and frequency of many environmental hazards are increasing, so pressures to migrate are increasing. (c) Migration is a traditional coping mechanism, but in some areas, these traditional patterns have changed in recent decades due to rapidly changing socio-economic and environmental conditions. (d) Longer term or permanent migration, in contrast to seasonal or temporary migration, is becoming more common, particularly among younger generations. (e) Migration decisions are complex, reflecting the interconnectedness of environmental factors with economic, social and political factors (EACH-FOR Project, 2009).

Where the Rain Falls Project. CARE International and the United Nations University Institute for Environment and Human Security (UNU-EHS). (2011 – 2013)

The aim of the study was to improve understanding, amongst academics, practitioners and policymakers, about how rainfall variability affects food and livelihood security, and how these factors interact with household decisions about mobility/migration amongst groups of people particularly vulnerable to the impacts of climate change (Warner et al., 2012; Warner & Afifi, 2013a). The research was carried out in diverse districts of eight countries in Asia, Africa and Latin America. Field research methods included: (a) Participatory research approach (range of mapping, diagrams, focus group discussions and other group exercises). (b) Household survey (more than 1,300 surveys completed across the eight countries). (c) Interviews with experts from governmental and non-governmental organisations, scholars and other experts, as well as interviews with experts on the topics of rainfall variability, food and livelihood security, and human mobility.

Teams of national and international researchers gathered a large volume of quantitative and qualitative data on historical rainfall patterns, household food security conditions, and human mobility patterns. The key findings were that rural people perceived that climate change is happening today in the form of rainfall variability. The changes in timing, quality, quantity and overall predictability of rainfall affected households' risk-management decisions, including migration. Thus, climatic factors affected migration via impacts on the household economy (food production) and household food security (food consumption). The research results showed that resilient and vulnerable households use migration in different ways when faced with climatic stressors. Some

households use migration as a successful means of increasing their resilience. For others, it is the last resort that perpetuates the negative cycle of poverty and hunger or – worse – erodes their resilience to current and future climatic stressors. For other households, particularly the most vulnerable populations, migration is not a feasible option either for increasing resilience or for avoiding the worst consequences of food insecurity (Warner & Afifi, 2013b).

Climate Change, Vulnerability and Human Mobility: Perspectives of Refugees from the East and Horn of Africa Project. United Nations University (UNU) in partnership with the United Nations High Commissioner for Refugees (UNHCR), the London School of Economics (LSE) and the University of Bonn. (2010 – 2012)

The aim of the project was to examine the experiences of people who have become refugees or internally displaced persons in the East and Horn of Africa, to better understand: (a) People's perceptions of climate change in their areas of origin. (b) The ways in which environmental stressors interact with other factors affecting their lives. (c) The impacts of climate change in people's decisions to migrate (Afifi, Govil, Sakdapolrak, & Warner, 2012). The methods used were: (a) Desk review of literature. (b) Interviews with key informants (Government representatives). (c) Individual, group and expert interviews in UNHCR refugee camps. (d) Debriefing sessions to discuss the main observations and findings with the informants, including UNHCR staff. (e) Analysis and validation of findings with academic experts.

The key findings of the study were: (a) Over the past 10 to 15 years, many of the refugees interviewed had perceived evident shifts in the weather in their home countries. (b) Movement away from people's homelands were responses to the worsening impacts of climatic variability, and such movement was only taken as a measure of last resort and only after all efforts to adapt to the changing conditions had been exhausted. (c) Where movement away from homelands did take place, in most cases it was internal, circular and temporary in nature, rather than cross-border and permanent. Many refugees described several stages of localised, in-country migration before fleeing across a border (usually as a consequence of experiencing the threat of political violence). (d) Violent conflicts, state failure as well as state repression reduced the adaptive capacity of those exposed to extreme weather events, and accelerated their vulnerability to other more acute political factors.

These three selected projects have provided a broad perspective of the linkages between climate change and population movements through the use of different typologies of

mobility, contexts, countries and even regions. In terms of methodologies, these studies used both qualitative and quantitative methods, as well as more sophisticated tools, such as modelling to design future mobility scenarios. The studies have shown that environmental factors do play a role in human mobility and emphasise that people who are more exposed to environmental stressors – particularly farmers, pastoralists, fishermen and others who rely on natural resources and the weather for their livelihoods – may be the least able to move very far away, if at all (Warner et al., 2013).

Policy debate

There have been remarkable advances at the national, regional and global level to incorporate environmental migration at the policy level. However, much more needs to be done in terms of policy design and implementation of initiatives that address multifaceted issues linked to environment change and human mobility (IOM, 2012).

Two international initiatives which have included the Pacific region are discussed. The first is the *Enhancing the Capacity of Pacific Island Countries to Address the Impacts of Climate Change on Migration Project* and the second is the *Migration, Environment and Climate Change: Evidence for Policy Project (MECLEP)*.

Enhancing the Capacity of Pacific Island Countries to Address the Impacts of Climate Change on Migration Project. Funded by the European Union and implemented by United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), (ILO) and UNDP. (2013 – 2016)

The project has three objectives: (a) To build a knowledge base on migration flows, policies and practices in the region, and the projected impacts of climate change on migration, including labour migration. (b) To enhance national capacities to address the impacts of climate change on migration in the Pacific island countries most vulnerable to the impacts of climate change. (c) To improve regional knowledge-sharing and cooperation on the issue of climate-change-induced migration and labour migration (UNESCAP, 2015).

Under the project's framework, a comprehensive report titled *Climate Change and Migration Issues in the Pacific*, authored by Campbell and Warrick (2014), was published in 2014. This report outlines the climate change implications for the Pacific, a synthesis of key analytical documents on climate change and migration in the region, and policy recommendations. As regards research methodologies, the authors found that there was a scarcity of data on both climate change and migration in PICTs (trends, and

economic and social characteristics of migrants and vulnerable populations). In terms of collecting household-level information on migration decision-making, Campbell and Warrick (2014), note:

> The lack of a common methodology to evaluate environmental migration in the region makes it particularly difficult to obtain comparable data from across countries. However, these household-level surveys have had some success in providing information for decision-making, particularly when applied at the community level. Recent approaches using methodologies that have emerged in the region (see, for example, Talanoa (Vaioleti (2006) and Storian (Warrick, 2009) have had considerable success in providing insights into local concerns and understandings. (p. 31)

Migration, Environment and Climate Change: Evidence for Policy (MECLEP) Project. Funded by the European Union and implemented by IOM. (2014 – 2016)

The aim of this initiative is to contribute to the global knowledge base on the relationship between migration and environmental change, including climate change. The activities of the project include research, capacity building and policy dialogue (MECLEP, 2015b). A study called *Assessing the Evidence: Migration, Environment and Climate Change in Papua New Guinea* was conducted in 2015. The aim was to analyse the relationships between migration, environment and climate change, and to examine the existing policy framework on environmental migration. The descriptive study presents an analysis of climate change in the country and the main migration patterns. It also includes two case studies of resettlement of Carteret and Manam Islanders (Naser, 2015).

The report noted that while the country experiences a significant amount of displacement caused by environmental and climate-change-related effects, there is no policy framework that specifically deals with people displaced for environmental reasons. In addition, there is a lack of data on internal and cross-border migration patterns. However, migration issues have recently been taken up more prominently in policies, and *ad hoc* institutions have been created in response to the critical displacement situation in Madang Province, associated with a volcanic eruption and in Bougainville Province, linked to sea-level rise, land loss, salt water inundation and growing food insecurity.

In addition to these two cases mentioned, there are other initiatives that have included the Pacific region. A comprehensive report by Foresight in 2011 was titled *Migration and Global Environmental Change. Future Challenges and Opportunities*. The authors

noted that the challenges of migration in the context of environmental change require a new strategic approach to policy at the national and global level. Policy-makers must take action to reduce the impact of environmental change on communities, yet simultaneously plan for migration (Foresight, 2011).

The Asian Development Bank (ADB) project titled *Addressing Climate Change and Migration in Asia and the Pacific* recommended improving data collection, modelling and analysis of both climate change and migration at the country level (ADB, 2012b). The study of Campbell and Bedford (2014) titled *Migration and Climate Change in Oceania* asserts that the impacts of climate change in PICTs are likely to reduce the suitability of some islands, or parts of islands, for human settlement in a number of direct and indirect ways. They introduce the notion of "community security" as a means of considering the ways in which climate change may induce migration. They identified three elements of community security: land security (locational and cultural), habitat security (biological, health and safety), and livelihood security (subsistence and commercial).

A recently published report titled *Promoting Human Security and Minimizing Conflict Associated with Forced Migration in the Pacific Region* is a joint research project between the Pacific Islands Forum Secretariat (PIFS) and the United Nations University Institute on Globalization, Culture and Mobility (UNU-GCM), and the United Nations University Institute for Environment and Human Security. This report recognises the importance of environmental migration in the PICTs and includes policy recommendations in order to promote human security, and minimise conflict associated with forced migration in the Pacific region (Corendea et al., 2015).

In December 2015, the United Nations University Institute for Environment and Human Security (UNU-EHS) and UNESCAP presented the findings of a household survey on climate change and migration in Kiribati, Nauru and Tuvalu. The survey found that more than 70 per cent of households in Kiribati and Tuvalu and 35 per cent of households in Nauru reported family members would migrate if climate stressors, such as droughts, sea-level rise or floods worsened. However, only about a quarter of households have the financial means to support migration, leaving many households "trapped" in worsening environmental conditions. A total of 6,852 individuals in the three islands participated in the study, representing 852 households in Kiribati, Nauru and Tuvalu. Of those surveyed, almost 100 per cent in Tuvalu and Kiribati, and nearly

80 per cent in Nauru are already experiencing the impacts of climate change, either droughts and irregular rain, sea-level rise, cyclone, saltwater intrusion, storm surge or flooding. It also says that 10 per cent of people in Nauru and 15 per cent of those in Tuvalu have already migrated overseas for the 10 years between 2005 and 2015. If the impacts of climate change worsen in these islands, international migration for Kiribati and Tuvalu will increase by 35 per cent and 100 per cent respectively (UNU-EHS & UNESCAP, 2015).

Finally, a special mention is made to the Nansen Initiative (2012 – 2015), a consultative process funded by the Governments of Switzerland and Norway. This initiative was intended to build consensus on the development of a protection agenda addressing the needs of people displaced across international borders, in the context of disasters and the effects of climate change (Nansen Initiative, 2015). Under this initiative, five regional consultations were conducted in the Pacific, Central America, East Africa, Southeast Asia and South Asia between 2013 and 2014. Those consultations included representatives from governments, international organisations, NGOs, civil society, think tanks and other key actors working on issues related to displacement, natural disasters and climate change (Nansen Initiative, 2015).

The Pacific consultation was held in Rarotonga, in the Cook Islands in May 2013. Participants from ten Pacific countries, as well as representatives from regional and international organisations, civil society, and academia, participated in a consultation called "Human Mobility, Natural Disasters and Climate Change in the Pacific" (Nansen Initiative, 2013a, 2013b, 2013c, 2013d, 2013e). The following issues were highlighted:

> a) Participants reaffirmed the "2008 Niue Declaration on Climate Change", in which Pacific leaders emphasised "the importance of retaining the Pacific's social and cultural identity, and the desire of the Pacific peoples to continue to live in their own countries, where possible" (Nansen Initiative, 2013e; PIFS, 2008).

> b) Participants stressed that having to leave one's own country is the least preferred option and expressed concern that cross-border relocation may negatively impact on nationhood, control over land and sea territory, sovereignty, culture and livelihoods (Nansen Initiative, 2013e).

> c) Participants stressed the importance of climate change mitigation and adaption measures to prevent displacement and avoid the need for relocation. Planning within the region for population movement must be seen as complementary to these efforts. While recognising the need to strengthen

mitigation and adaptation efforts, which, if effective, would allow people to stay in their homes, participants agreed that in the context of natural disasters and climate change these developments require action and resource mobilisation to be taken at community, national, regional and international levels (Nansen Initiative, 2013e).

The initiatives promoted by the Nansen Initiative in the Pacific have had good repercussions. For instance, issues related to environmental migration have started to be discussed in different fora. In October 2015, after three years of consultations, the Nansen Initiative organised a final global consultation in Geneva, Switzerland. Representatives of 100 countries adopted a "Protection Agenda" with three priority areas for action: (a) Collecting data and enhancing knowledge. (b) Improving humanitarian protection measures. (c) Dealing better with the risk of disaster back in the home countries.

Environmental migration in the PICTs

Although there is no reliable data on population movements in the Pacific, it is clear that there is already considerable internal mobility in the region. Most Pacific urban areas are already experiencing significant environmental and social stress. Climate change will add to this stress and contribute to pressure for opportunities to move to other places. There is also considerable movement overseas, especially in Polynesia and Micronesia. Climate change will add to the push factors that contribute to the decision to move long before conditions become more difficult (ADB, 2010b; Bedford & Hugo, 2012).

Typologies of environmental migration in the PICTs

In order to illustrate the nexus between climate change and human mobility in the PICTs, the typology proposed by the UNFCCC (2010), namely displacement, migration and planned relocation will be followed.

Displacement

The PICTs have not experienced a significant level of cross-border displacement due to natural disasters, nor does the region have a high level of refugee movements. Displacement in the region is mainly internal, following sudden-onset disasters, with people generally able to return to their homes relatively soon after the disaster, although displacement may last months or years pending a durable solution (Campbell & Bedford, 2014; Nansen Initiative, 2013a).

Recent examples of displacement associated with natural disasters that reflect the vulnerability of the Pacific region include the following: (a) In 1997, virtually the entire island population of Manihiki in the Cook Islands was evacuated in the aftermath of Cyclone Martin which claimed 19 lives. (b) A volcanic eruption on Manam Island in Papua New Guinea displaced at least 10,000 people in 2004. (c) In 2008, unusually high sea levels and swells resulted in the displacement of people in Kiribati, the Solomon Islands, the Marshall Islands and the Federated States of Micronesia (United Nations Office for Coordination of Humanitarian Affairs [UNOCHA], 2008, as cited in Boncour & Burson, 2009). (d) The tsunami that hit Samoa in 2009 displaced around 5,000 people who fled to higher ground. (e) Also in 2009, at least 400 people on Gaua Island in Vanuatu were evacuated because of volcanic eruptions. (f) In 2012, at least 7,500 people were displaced by Cyclone Evan in Samoa (Bradshaw, 2015). (g) In February 2013, an earthquake and tsunami in the Solomon Islands displaced around 2,400 people, with some 1,670 people seeking shelter in 11 camps (Nansen Initiative, 2013a). (h) In March 2015, Cyclone Pam, one of the strongest cyclones ever recorded in the South Pacific, brought devastation to Vanuatu and other Pacific countries. An estimated 188,000 people in Vanuatu, more than 70 per cent of the total population were affected by the disaster and up to 90 per cent of houses were damaged (Bradshaw, 2015). (i) In February 2016, Cyclone Winston brought widespread damage to numerous Fijian islands leaving thousands homeless and living in evacuation shelters in the devastating aftermath. According to the Government of Fiji, 44 people were killed and an estimated 32,000 homes were left damaged or destroyed. It was estimated that at least 350,000 people (40 per cent of the nation's population) were affected in some way by the cyclone (International Federation of Red Cross and Red Crescent Societies [IFRC], 2016).

Voluntary migration

Climate change issues have become increasingly important in the debate on migration in the PICTs (Barnett 2001; Barnett & Campbell, 2010; Campbell, 2010a; Campbell & Barnett, 2010; Connell, 2011; Hugo, 1996, 2008). Recent studies highlight the fact that rapid urban growth has been creating challenges, especially in housing, sanitation, water supply and jobs. As a consequence, most Pacific urban areas are already experiencing severe environmental and social stress. Climate change may add pressure on residents to move elsewhere (ADB, 2012a). While international migration is still driven by economic factors and is voluntary in character, this is increasingly linked to climate

change, natural disasters and environmental degradation. The multi-faceted decision to migrate may also be influenced by people's perceptions, understanding of potential hazards, and the extent to which they perceive that they are vulnerable based on their own adaptive capacity, and the capacities of their communities and countries (Campbell & Bedford, 2014; Nansen Initiative, 2013b).

Planned relocation

Planned relocation might be seen as a failure to adapt to changes in the environment. Some authors say that relocation of communities should be a strategy of last resort. For instance, Barnet and Webber (2010) pointed out that "even in the case of highly exposed populations whose livelihoods are sensitive to climate change, and which have low levels of adaptive capacity, such as those living on low-lying atolls, community relocation would be a premature measure" (p. 27). In another document, Barnett and O'Neill (2012) further state:

> Resettlement of island inhabitants to reduce their exposure to climate change may be maladaptive because evidence on resettlement shows that these people face problems of landlessness, unemployment, homelessness, social marginalization, food insecurity, reduced access to common-property resources and increased morbidity. (p. 9)

Although the literature on climate change and population movements is generally very negative about planned relocation as a result of climate change, there is evidence that relocation in the PICTs, both internal and cross-border is not a new phenomenon. There are some examples of internal and international relocation in the region. For instance, within the context of colonialism, cross-border relocation due to natural disasters, environmental degradation and land scarcity took place in the Pacific region.

Campbell (2010) made a synthesis of the most symbolic cases:

> A typhoon in 1907 prompted the German colonial administration to relocate approximately 300 persons from Woleai (Federated States of Micronesia) to a new settlement in Saipan (Marianna Islands). In the 1940s, the people of Banaba Island (Gilbert Islands, now Kiribati) were brought to Rabi Island (Fiji) to escape the environmental destruction caused by phosphate mining and to allow for mining to continue. In 1947, 35 people from Vaitupu (Ellice Islands, now Tuvalu), relocated to Kioa Island, in northern Fiji, because of concerns about land scarcity. The island was purchased the previous year, before resettlement began. This was a community-initiated and managed process, with assistance from the local colonial administration. In 1966, the New Zealand Department of Maori and Island Affairs established a temporary scheme to permanently resettle approximately half of the Tokelauan population after a

severe hurricane devastated Tokelau's three atolls (Campbell, 2010, as cited in Nansen Initiative, 2013a, p. 7-8).

Another case worth mentioning is the relocation of I-Kiribati to the Solomon Islands by the British colonial administration. In the late 1930's people from the Southern Gilbert Islands were relocated to Phoenix Islands (within the colony) due to increasing population pressure on small atolls and reef islands, and frequent droughts. From the mid 1950's to early 1960's, people were resettled again to the Solomon Islands as a response to recurring and severe droughts (Bruce & Bedford, 2013; Tabe, 2011).

As regards recent internal relocation, a case that is mentioned frequently is that of the Carteret Islands in Papua New Guinea. Since the late 1960s, there have been multiple attempts to relocate people from the low-lying Carteret Islands to the much larger island of Bougainville in the same country. By 1984, ten families were resettled, but the conditions for these families were very unfamiliar. For example, people who used to fish found themselves in land-locked locations in the middle of the bush, far from the sea. They felt adrift because their traditional marine skills were of little help in subsistence gardening of unfamiliar crops. Children had to walk 6 km to school, a long way for people used to living on small atolls. After what they described as a culture shock, two families decided to go back to their home atolls (Campbell, 2010b).

In 2006, after a period of inaction, the Carteret Council of Elders founded the local NGO "Tulele Peisa" which means "sailing the waves on our own". People organised themselves to find independent and self-determined solutions for resettlement plans (Tulele Peisa, n.d.). The Catholic Church provided 80 ha of resettlement land in the relatively safe northern part of Bougainville. In April 2009, the first settlers from the Carteret arrived on Bougainville, comprising the heads of five families, with around 100 family members who followed. However, problems such as arguments with landowners and a lack of gardens, food supplies, and appropriate housing soon prompted many who had relocated to return home (Naser, 2015). The resettlement process continues, although it has been an extremely difficult venture for the people. For Tulele Peisa, some of the main challenges are related to land, governance, funding and differences with the host environment and community. The current 80 hectares of land acquired by Tulele Peisa from the Catholic Church are not sufficient, as at least 1,500 hectares are needed to provide housing and food gardens for all of the families who intend to relocate (Naser, 2015).

A recent case of internal relocation in Fiji has been reported. In early 2014, the government of Fiji organised the relocation of residents of Vunidogoloa village to reduce their vulnerability to sea-level rise and inundation events that regularly devastate the community. The village relocated to a new site within the customary land boundaries of the community. Villagers made the decision on where to relocate and designed their new village which included their desire for neighbours to remain the same (McNamara & Jacot Des Combes, 2015, p. 316).

As regards recent international relocation, the Government of Kiribati, aware that climate change threatens the long-term survival of the country, has decided to prepare for future relocation. Two strategies have been envisaged: the first offers training to citizens who want to migrate, and the second is the purchase of land elsewhere. For the first initiative, the government is providing vocational training to citizens to ensure they are competitive on the global labour market if they choose to migrate. The relocation strategy is based on the concept of "migration with dignity". I-Kiribati views are that migrants should be sought after by the countries to which they wish to relocate. For that relocation to occur, people must be in a position to provide the skills that are needed in the receiving countries (Office of the President of the Republic of Kiribati, 2015).

This relocation strategy has two components. Firstly, opportunities must be created to enable the migration of those who wish to do so now and in the coming years. This will assist in establishing expatriate communities of I-Kiribati, who will be able to absorb and support greater numbers of migrants in the longer term. It will also have benefit for those who remain by lifting the levels of remittances. Secondly, aims are to raise the levels of qualifications in Kiribati similarly to those in countries such as Australia and New Zealand. This will make qualified I-Kiribati more attractive as migrants, but will also improve the standard of services available locally (Office of the President of the Republic of Kiribati, 2015).

The second measure suggested by the government of Kiribati is purchase land elsewhere. In 2014, the Government of Kiribati purchased 2,210 hectares of land in Fiji, specifically on Vanua Levu Island. The Former President of Kiribati, Anote Tong, said that the 2,210-hectare property marks a new milestone in the Government's development plans to address economic and food security issues resulting from climate change. He said that he was glad the country had completed this contract with Fiji and hopes developed countries can engage with frontline countries like Kiribati, as a matter

of taking simple actions rather than negotiating climate change issues where common ground is far from reach. The Kiribati Government intends exploring options of commercial, industrial and agricultural development of the estate. This could involve fish canning, beef and poultry farming, fruit and vegetable cultivation, to name a few (Wiseman, 2014).

It is important to note that the government of Fiji is the only country in the region that has indicated that it will accept Pacific islanders from other PICTs whose islands become uninhabitable as a result of sea level rise.

Environmental migrants in the PICTs

The cases of two asylum seekers in New Zealand that have captured media attention deserve a special mention. Mr Ioane Teitiota, an I-Kiribati national, lost his asylum appeal in New Zealand in May 2014 in a case that would have made him the world's first-ever climate change refugee. Mr Teitiota moved to New Zealand in 2007 with his family, claiming his island home was sinking and becoming too dangerous to live on. His lawyers argued that Mr Teitiota was being "persecuted passively by the circumstances in which he's living, which the Kiribati Government has no ability to ameliorate" ("World's first climate change refugee", 2013, para. 12). New Zealand's Court of Appeal ruled that while climate change is a major and growing concern for the international community, the phenomenon and its effect on countries like Kiribati is not appropriately addressed under the Refugee Convention. Rejecting his submissions, the Court of Appeal called them "novel" but "unconvincing", and noted that millions of other people in low-lying countries were in a similar situation. In September 2015, Immigration New Zealand confirmed Mr Teitiota's deportation (Baker & Bonnett, 2015).

Another case refers to a Tuvaluan family that won New Zealand residency appeal. The family was granted New Zealand residency after claiming it would be affected by climate change if it returned home (Maas, 2014, para. 1). It was the first successful application for residency on humanitarian grounds in which climate change has featured. The Immigration and Protection Tribunal said this family had strong ties to New Zealand. The Tuvaluan family moved to New Zealand in 2007 but has had no legal status in the country since 2009. In November 2012, the family lodged claims for refugee and protected person status. In March 2013, their claims were dismissed, and the tribunal turned down their appeals because they did not meet the requirements of the

Refugee Convention. After that, the family successfully appealed that decision on humanitarian grounds. In a decision issued in 2014, the tribunal found "exceptional circumstances... which would make it unjust and unduly harsh" for the family to return to Tuvalu (Maas, 2014, para. 14).

The two cases illustrate how the lack of robust theoretical, legal and policy frameworks has limited the solution of real problems. A number of scholars, including Gemenne (2015), McNamara (2008), and Su (2016) have questioned what they call a progressive abandonment of the concept of climate refugees. They argue that the concept is valid, and it is useful to recognise people displaced by climate-related impacts and design mechanisms of protection. On the other hand, the use of more "neutral" terms such as environmental migrants has conceptual and practical implications, particularly for people who are forced to cross borders. Su (2016) pointed out that the concept of environmental migrant makes reference to "adaptable subjects" to the impacts of climate change. This concept shifts the burden of adaptation on to the "refugees". In this case, there are no legal responsibilities for the wellbeing and protection of these people either in the place of origin or the destination of displacement. In the case of those internally displaced by climate change, governments have the responsibility to provide assistance and protection in their countries. This debate suggests that the discursive disappearance of the term refugee responds to growing concerns around national security and the increase of restrictive asylum policies in Western countries (Macklin, 2005).

Prospects for environmental migration in the PICTs

While Pacific people have expressed their desire to remain in their homes for as long as possible, it is recognised that environmental challenges and the impacts of climate change may induce or force internal and external mobility responses. Campbell (2010a) produced a classification of climate-induced mobility types that are likely to emerge in the Pacific region (Table 7). He makes a distinction between induced and forced mobility, considering both internal and external movements. He identifies three main possibilities for internal relocation: (a) To move inland and up to nearby locations within the individuals' or communities' customary lands. (b) To move to nearby locations that are outside the individuals' or communities' customary lands. (c) To move greater distances (either within one's own island or province, or further afield) away from the local area to lands that belong to other customary groups. Such

relocation can be rural-rural or rural-urban migration. As regards external migration, two possibilities were identified: (a) Migration to other PICTs. (b) Migration to other countries (e.g. Australia, New Zealand, United States of America).

Table 7: Summary of Climate Migration Options in Pacific Countries

	Type of mobility	
	Induced	**Forced**
Migration	Individual and families migrate	Communities relocate
Internal		
Proximate (own lands)	Not likely	Least disruptive
Proximate (others' lands)	Not likely	Land can be problematic
Distant (mostly rural→urban)	Most likely	Difficult to sustain community
External		
Regional (other Pacific Island countries)	Possible	Possible to sustain community and lifestyle but land problematic
International	Most likely	Very unlikely to sustain community and lifestyle

Source: Campbell (2010a, p. 34).

Of course, it is not easy to predict the patterns of where climate-change-induced migrants will move. Current research indicates that human mobility associated with climate change is likely to take place within national borders and that those most vulnerable will often not be in a position to migrate internationally, or will travel only as far as their resources will allow ("Should international refugee law," 2014).

In the case of PICTs, there is a lack of data on the projected effects of climate change, and information is limited as to how much and whether such effects will reduce the land, livelihood and habitat security to induce or force mobility (Campbell & Bedford, 2014). Laczko and Piguet (2014) identified three areas of concern that can trigger population movements:

> (a) All but a few Pacific countries are located either fully or partially in areas of tropical cyclones, which are the most frequently reported triggers of disaster in the region. Torrential rains and flood events are associated with tropical cyclones. (b) Droughts are relatively common and affect fresh water availability and quality. (c) Sea-level rise has been identified as one of the most disruptive of climate change effects, the greatest risk to PICTs and the most likely to trigger migration (p. 14).

Campbell and Warrick (2014) identify five potential hotspots where the impacts of climate change are evident and where human mobility can occur. These include: (a)

Urban areas. (b) Urban atolls. (c) Non-urban atolls. (d) Coastal, delta and riverine communities. (e) Communities prone to drought. They argue that these areas require more research on climate change impacts, *in situ* adaptation responses, demographic processes and community security. According to the authors, climate change is likely to increase the demand for both internal and international migration opportunities (p. 2).

While internal mobility, particularly rural-urban migration, might attenuate the pressures caused by climate change in rural areas, increased urbanisation may aggravate existing problems. Urban growth can place considerable pressure on land resources, infrastructure and employment opportunities. With only a few exceptions, the urban areas are in coastal locations and are likely to be exposed to the effects of sea- level rise, as well as other climate-change effects (Campbell & Warrick, 2014).

Regarding relocation of entire populations overseas in response to climate change and natural disasters, this would likely be a measure of last resort. Pacific communities have proved to be extraordinarily resistant to abandoning their islands completely, even when offered the chance to do so after major natural disasters. In general, Pacific communities remain attached to their lands, especially those who were raised in the islands. Even in the face of very severe environmental challenges, people will fight for the right to stay at home (Elliott & Fagan, 2010; Pacific Climate Warriors, n.d.). This fact has been made clear in various declarations of Pacific leaders and civil society organisations (Caritas Aotearoa New Zealand, 2014; Lew, 2015; Nansen Initiative, 2013d; Pacific Climate Warriors, n.d.; PIFS, 2008).

However, even though the Pacific people have strong ties to their islands, customary lands and social systems, some studies anticipate an increase in the occurrence of international migration. The Asian Development Bank, for instance, indicates that it is likely that during the next 30 to 50 years significant migration will be induced by climate change to other countries from the Pacific islands, especially to Australia, New Zealand and the United States (ADB, 2012b). Other authors are more cautious. Bedford and Hugo (2012), for instance, recalled that:

> The 'drowning islands' of Kiribati, Marshall Islands, Tokelau and Tuvalu, along with various scattered atolls and reef islands in the region, have captured the public imagination. But these islands house only 2 per cent of people in the Pacific and occupy only about 2 per cent of the region's land area. Most Pacific peoples live on 'high' islands—with land that will not be swamped if sea levels

> rise and coastal zones become more vulnerable to storm surge and saline fresh water. (p. 45)

Bedford and Hugo (2012) recognise that while there are options for relocation of coastal communities inland if their low-lying communities become uninhabitable, in practice, this would not be a straightforward solution. There is a great concern that policies associated with human mobility (internal or international) in the context of climate change must be carefully planned, and programmes aimed at a better integration of migrants in the places of destination. In situations where human mobility is inevitable, national and regional policies must ensure that if people must move, they can do so in safety and dignity (Loughry & McAdam, 2008). In addition, more participatory initiatives should be promoted and include proposals for alternative and sustainable livelihoods for those households or individuals who have to move as well as for those who stay. Social and cultural cohesion and human rights must be considered (Barker, 2008).

Needs, gaps and opportunities for research on environmental migration

Needs

The study of environmental migration is gaining momentum not only in the academic sphere but most importantly in the policy debate at national, regional and global level. There has been remarkable progress in improving not only data collection and analysis but also in integrating environmental migration issues into policy making. However, many uncertainties remain today about how populations in particular locations will respond to climate change and natural disasters. Academics, governments and international organisations are calling for more theoretical and empirical research, and for improving dialogue between academics, policy makers and affected communities.

Gaps and opportunities

Five critical gaps have been identified in both research and policy as regards environmental migration: (a) People's voices should be considered. (b) More consideration of people's traditional knowledge. (c) Gender issues. (d) Indigenous theoretical and methodological frameworks to support the knowledge base on environmental migration. (e) More interdisciplinary research.

People's voices should be considered

This literature review has confirmed that climate change discussions have largely been the domain of scientists, academics, politicians and development practitioners. That, the voices of the people directly exposed to climate change have, in most cases, been neglected. There is an urgent need to emphasise the human face of climate change and population movements (Paton & Fairbairn-Dunlop, 2010). Over the last decade, civil society organisations have been requesting action in the fight against climate change. Most groups point to the huge gap between political negotiations at the national, regional and global level and the realities that people are facing daily in small rural villages and communities as well as urban areas, particularly in developing countries. Civil society organisations and community-level groups are often best placed to guarantee that responses to climate change benefit those most in need.

A number of seminal moments demonstrate that it is possible to make peoples' voices heard. In September 2014, people across the world marched calling for 100 per cent clean energy from policy makers and business (Wagstaff, 2014). In October 2014, a group of climate warriors from the Pacific islands travelled to Australia to raise awareness about the impact of the fossil fuel industry on their homes and livelihoods. With the campaign slogan "we are not drowning, we are fighting" they used traditional handmade canoes to paddle out into the harbour of the world's largest coal- handling port to stop exports for a day. The Pacific climate warriors then joined Australians in peaceful occupations of fossil fuel company premises. The message that the islanders are no longer content to sit and wait as the canary in the coal mine for climate change was made very clear. They said that the time for talk is over and the time for action is now (Pacific Climate Warriors, n.d.; 350 pacific, n.d.).

Although it is difficult to assess the tangible impact of such protests, these events are seminal moments in the climate change movement. The protests made the front page of many news outlets around the world, increasing pressure on politicians and decision-makers worldwide. While I agree with such events, I consider that the voices of the people affected by the impacts of climate change have to be represented in a more articulated way. Civil society and community-level actors must play an integral role in the planning and implementation of initiatives that affect their lives.

Consideration of traditional knowledge

Indigenous peoples around the world have an identity and culture that depends upon their natural environment. Their rich and detailed traditional knowledge embodies a cultural and spiritual relationship with the land, ocean and wildlife (Galloway McLean, 2010; Tui Atua, 2005; Va'a, 2011). Indigenous peoples have become an early-warning system for the rest of humanity because climate change is already altering their environment, their economies, and their cultures ("Our entire survival is at stake,", 2014; Tauli Corpuz, 2015).

While significant contributions towards climate change adaptation and mitigation are being made by Pacific people, their concerns, knowledge and aspirations continue to be marginalised in global climate policy and decision-making, due in part to the extent of the challenge and the lack of methodologies to bring together diverse knowledge systems and worldviews (UNESCO, 2015).

In general, policy responses to climate change are underpinned by top-down approaches that do not consider the traditional knowledge, worldviews, values, beliefs and practices of people affected by climate change. In addition, modern technical information generated mainly in Western spheres is not made available, in an accessible way, to communities in developing countries; these communities would need to incorporate the information into their knowledge systems. In the specific case of environmental migration in PICTs, the consideration of traditional knowledge is essential as it is extremely important for adaptation *in situ.* However, the erosion of traditional knowledge can also be attributed to migration.

Gender issues

The linkages between gender and environmental migration must be explored. Women and girls, men and boys, have different roles and responsibilities within their families and communities. As a result, each of these groups is differently affected by, and has different abilities to adapt to, the effects of climate change; they have different skills and knowledge to contribute (SPC, SPREP, UNDP, UN Women, & Deutsche Gesellschaft fur Internationale Zusammenarbeit [GIZ], 2013; UN Women, 2015).

Indigenous theoretical and methodological frameworks

Not yet explored is the consideration of indigenous theoretical and methodological frameworks in the area of environmental migration. The use of indigenous frameworks

alone or in combination with another knowledge system must be studied. Many scholars in various parts of the world have questioned approaches and methodological frameworks originated in Western countries and its ahistorical and uncontextualised application to different regions of the world (Battiste, 2000; Chilisa, 2012; Smith, 1999). In some cases, Western methodologies have failed to understand marginalised and indigenous cultural values, ontologies and epistemologies. Critical writings of Albert Memmi, Franz Fanon, Edward Said, Paulo Freire, Jacques Derrida, among others, who protested against what they called intellectual colonisation by the West, have been inspirational for researchers around the world (Chilisa, 2012; de Sousa Santos, Nunes, & Meneses, 2007; Freire, 2003; Mignolo, 2007a, 2007b).

As a result of these questionings, new concepts such as decolonisation of research and emancipation, among others, have been discussed by researchers, and new theoretical and methodological approaches that are more critical and sensitive to the worldviews and needs of indigenous peoples and marginalised populations have been developed. More interestingly, the new concepts have been put forward by researchers who recognise and claim their own identities as indigenous or as members of minority groups.

Pacific researchers have also called for the decolonisation of research methodologies. However, the term "decolonisation of research" is not widely used. Instead, Pacific researchers prefer to talk about a revalorisation and revitalisation of Pacific-based research (Baba, Mahina, Williams, & Nabobo-Baba, 2004; Gegeo & Watson-Gegeo, 2001; Nabobo-Baba, 2008; Thaman, 1993, 2003, 2007; Tui Atua, 2003; Tupuola, 2007; Vaioleti, 2006). The revalorisation of Pacific or indigenous Oceanic perspectives, knowledge and wisdom emphasises the need for culturally appropriate methods for research within Pacific communities (Health Research Council of New Zealand [HRC], 2014).

Pacific researchers are calling for more authentic and grounded research practices that promote not only the capacity of Pacific people to theorise their own lives but also to reconnect with past and future generations (Anae, Coxon, Mara, Wendt-Samu, & Finau, 2001; Gegeo & Watson-Gegeo, 2001; Nabobo-Baba, 2008; Thaman, 2003, 2007). Taufeulungaki (2000) said:

> The role of Pacific research is not only to identify and promote a Pacific worldview, which should begin by identifying Pacific values in the way in

which Pacific societies create meaning, structure and construct reality, but complementary to this is the need to also interrogate the assumptions that underpin Western structures and institutions that we as Pacific peoples have adopted without much questioning. (Taufeulungaki, 2000, as cited in Anae et al., 2001, p. 7)

Although Pacific research is country specific, some characteristics are shared with other indigenous research approaches conceived in other regions: (a) Pacific research recognises and acknowledges the importance of Pacific people's knowledge, worldviews, values and beliefs, ethics and protocols as well as their historical, political, environmental and socio-economic contexts. (b) Pacific methodologies tend to approach cultural protocols, values and behaviours as an integral part of the methodology. (c) Pacific research praxis requires a reflective and contextual framework to better inform the Pacific research agenda (Bishop, 1998; Porsanger, 2004; Smith, 1999). As Guba and Lincoln (2005) said:

> We stand at the threshold of a history marked by multivocality, contested meanings, paradigmatic controversies, and new textual forms. At some distance down this conjectural path, when its history is written, we will find that this has been the era of emancipation: emancipation from what Hannah Arendt calls the "coerciveness of Truth", emancipation from hearing only the voices of Western Europe, emancipation from generations of silence, and emancipation from seeing the world in one colour. (Guba & Lincoln, 2005, as cited in Chilisa, 2012, p. 159)

Interdisciplinary research

Another area of attention refers to the need for more interdisciplinary research on environmental migration as there is still a tendency to work in disciplinary silos. The topic of environmental migration must be considered as a development issue. Therefore, the contribution of different disciplines is important. Holistic research is also needed where people are at the centre of the analysis. In the case of environmental migration, the voices of people who stay are as important as the voices of those who migrate.

Chapter summary

In this chapter, I presented a review of the recent literature on environmental migration, a relatively new field of research that presents many challenges and opportunities. Over the last three decades, empirical and theoretical studies on the nexus between population movements and environmental and climate change have proliferated. The literature review highlights the fact that disentangling environment from other migration drivers is not an easy task. For instance, environmental degradation is often caused by

unsustainable development practices that may be exacerbated by climate change. Thus, environmental degradation can be a push factor of migration. Identifying the linkages between climate change and migration is complex. Migration can be a coping strategy which contributes to diversifying income and enhances the capacity of households and communities to adapt to climate change. It also can be a long-term adaptation strategy, especially in responding to slow-onset climate change events and environmental degradation.

From the literature review, it is evident that despite the fact that there is an ongoing debate in academic and policy circles about the conceptualisation and theoretical frameworks, there is no agreement yet on the definitions that could lead to the formulation of theories for understanding the relationship between climate change and human mobility. As regards the PICTs, over the last decade there has been an increase in research. The perception that large numbers of people may be forced to migrate due to the effects of climate change and natural disasters has fuelled interest in the topic of migration and climate change in the region, particularly the study of atoll countries. However, theoretical frameworks and methodologies used across studies differ from one another, and they have not been linked to policy interventions.

Finally, there are some gaps in research that are particularly relevant for the PICTs. These refer to the lack of consideration of the voices of people affected by climate change. Gender, age and socio-economic status are factors that need to be considered as well, in order to understand the differentiated effects of climate change and the responses to it. Furthermore, there are opportunities to study environmental migration from the point of view of Pacific people, using their theoretical and methodological frameworks. Opportunities also exist to combine different knowledge systems, and use interdisciplinary approaches.

Chapter 4 - Research Framework

In the available research about the linkages between climate change and population movements, there is limited understanding about the value of interdisciplinary research that combines different knowledge systems. Instead, research has largely been based on Western-based assumptions. In my view, Western epistemologies and ontologies only tell part of the story about climate change and people's adaptation strategies, including population movements. Gaining a true picture of peoples' experiences requires drawing on indigenous theoretical frameworks and methodologies. In the case of PICTs, an increasing body of research based on Pacific knowledge is challenging Western-based research models, and emphasising other knowledge and ways of knowing (Gegeo, 1998; Gegeo & Watson-Gegeo, 2002; Nabobo-Baba, 2008). While Pacific research on climate change must take account of Pacific positioning and worldviews, it must also strive to build epistemological bridges between Pacific and Western-based modern technical knowledge, including how the two unique knowledge systems may complement each other to create new knowledge. This view echoes a Samoan perspective reflected in the words of Tui Atua Tupua Tamasese Efi, Head of State of Samoa. During the UN Conference on Small Island Developing States (SIDS) held in Samoa in September 2014, in his opening remarks on *Indigenous Responses to Disaster Risk Reduction,* he said:

> There is much in our Pacific indigenous references that can inform an ethics and methodology for environmental sustainability and disaster preparedness, not only for our region but for the world… indigenous knowledge and traditions offer a unique orientation (a worldview, paradigm, or consciousness) for protecting our environment, i.e. for protecting all living things living in the air or on land and sea… this knowledge can co-exist alongside other knowledges; that indeed there exists in human society a natural plurality of knowledges that can and do live together in harmony. (Office of the Head of State of Samoa, 2014, para. 5-7)

In this chapter, I introduce the elements of my research framework. First, I present the philosophical worldview assumptions and their meaning for the research. I have chosen to use the term worldview which, as defined by Guba (1990), is "a basic set of beliefs that guide action" (p. 17). This section outlines the values and beliefs underpinning the Samoan holistic worldview and the *fonofale* research model which encapsulates these views. This is necessary to demonstrate how the Samoan worldview differs from the often taken-for-granted scientific goals which underpin Western research. *Talanoa* as a

methodology for knowledge sharing is also included because it is the way knowledge exchange takes place in the Pacific. Second, are the three approaches that underpinned my research design, namely, exploratory, interdisciplinary and qualitative. Third, I explain the criteria for the selection of the village study. Fourth, I present the research design for the village study. Fifth, I present the research strategy approach (Creswell, 2003) or research methodology (Mertens, 2010). For this study, I selected a qualitative approach to data collection that takes account of both Western-based and Pacific/Samoan methods. The Western-based qualitative methods have been chosen to contextualise and explain the research topic. This is a comprehensive document review and a series of semi-structured interviews with key informants working in the field of climate change and population movements in Samoa. The Pacific *talanoa* conversational method was selected to capture people's knowledge and experiences about climate change and mobility from a family- and village-based perspective. *Talanoa* is congruent with Samoan knowledge and worldviews.

Sixth, the qualitative thematic data analysis selected for the study is outlined, along with the way this would be used to integrate the knowledge gained from the two knowledge systems to form a new interdisciplinary understanding. Seventh, the chapter outlines the ethical considerations for the research and presents some reflections on the research process and the rationale to mix both types of information in a synergy of knowledge systems. The chapter concludes with a summary.

Philosophical worldview assumptions

Samoan worldviews

As noted, it is necessary to outline the values and beliefs underpinning the Samoan worldview because these understandings will influence people's responses and experiences of climate change. The Samoan worldview has similarities with other indigenous worldviews across the world, in the sense that they are dynamic, holistic and integrate the past, present and future through the layering of knowledge and lived experiences. They are not static, but ever-changing, shifting from the traditional to the contemporary spread of ideas, values and beliefs (Meleisea, 1987; Natanielu, 2011; Tupuola, 2007). Ortiz (2005) says:

> Worldviews provide people with a distinctive set of values, an identity, a feeling of rootedness, of belonging to a time and a place, and a felt sense of continuity with tradition which transcends the experience of a single lifetime, a

tradition which may be said to transcend even time. (Ortiz, 2005, as cited in Bell et al., 2010, p. 53)

A Samoan worldview encompasses three inter-connected and inter-dependent spheres:

- Spiritual: Samoan people see their place in the world as connected to God the creator.

- Social: The extended family, under the chiefly leadership system, is the main institution in Samoan communities. Maintaining family wellbeing is a communal rather than an individual responsibility.

- Physical: The importance of the natural resources endowment, as a legacy from the creator God to the family ancestors and as a source of life and wellbeing. As highlighted in Chapter 2, at least 81 per cent of land in Samoa is held in customary tenure under the stewardship of the family *matai* (chief) for the use of family members.

People's behaviours, expectations and practices are aimed at ensuring balance and harmony between these spheres so as to achieve the wellbeing of families and communities (Fairbairn-Dunlop, Nanai, & Ahio, 2014). The relationship that family members have with their land, sea and environment, and the spirituality that binds them together, are the basis for the wellbeing and resilience of Samoans and their culture. This holistic approach to life and the complex yet harmonious relationships have sustained Samoa's way of life over generations. The Samoan Head of State, Tui Atua Tupua Tamasese Efi (2014) explained the worldview using these words:

> In ancient Samoa, protocols were developed to ensure that the environment was preserved. During times of re-growth certain trees and plants were prohibited from being cut or picked. These protocols and the *tapu* associated with them provided a conservation plan that dictated what man could take from the environment, when and how much. Such a plan prioritised need rather than profit. In this context, the taking of natural resources was never to go beyond what nature herself could not sustain in terms of natural re-growth. Tasks associated with fishing, planting, harvesting and building were therefore coordinated in accordance with predetermined cosmic and environmental timings. Here the harmony between man and the environment is most pronounced. (para. 7)

Fonofale model - A Samoan holistic worldview

For this study, I selected the Samoan *fonofale* model because this encapsulates the holistic nature of the Samoan worldview and also the research topic. The *fonofale* was developed by Fuimaono Karl Pulotu-Endemann, in the mid-1980s, as a general model of health research grounded upon Pacific knowledge and cultural values and beliefs (Pulotu-Endemann, 2001). The model explains the concept of good health and wellbeing, and incorporates the spiritual, social and physical dimensions of the Samoan worldview, against a context of changing times and places (Figure 7).
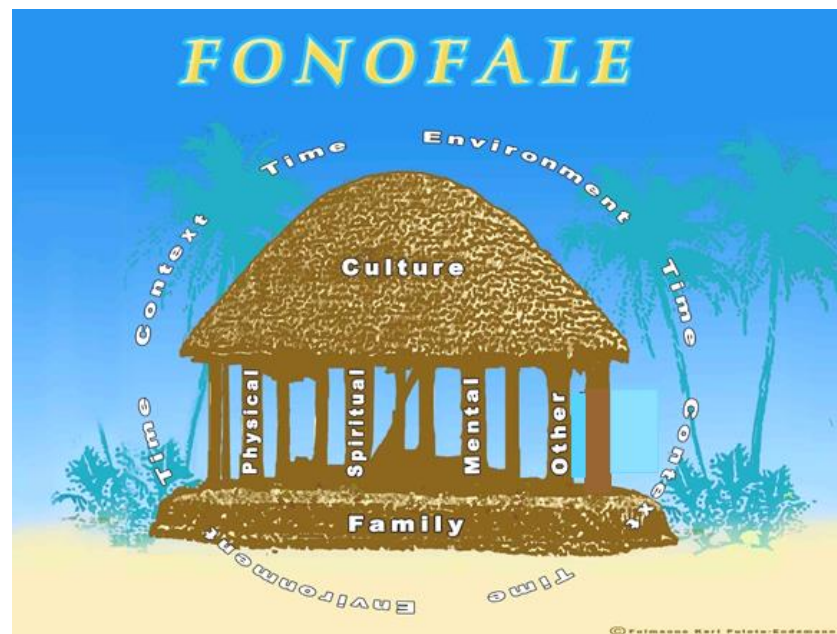
Figure 7: The *Fonofale* Model
Source: Pulotu-Endemann, 2001.

The model uses the metaphor of a Samoan house (*fale*). Each part of the house (floor, posts and roof) has a particular meaning. The middle post of the *fale* represents the individual who does not stand alone. He or she is supported by the extended family ('*aiga*). The foundation, or floor, represents the '*aiga* which is the centre of social organisation. The '*aiga* incorporates communal ties with the gods, ancestors, and the divine heritages: sea, land and sky. The roof represents cultural values and beliefs that shelter the family for life. Culture is dynamic, and therefore constantly evolving and adapting.

Between the roof and the foundation are the four posts (*pou*) that signify the relationship between culture and the family, and the ways they interact with one another. The posts are:

- Physical. A dimension that relates to biological or physical wellbeing.
- Spiritual. A dimension that stems from a belief system that includes either Christianity or traditional spirituality relating to nature, spirits, language, ancestors and history, or a combination of both.
- Mental. A dimension that relates to the wellbeing or the health of the mind which involves thinking and emotions as well as the behaviours expressed.
- Other. It includes other variables that can directly or indirectly affect the wellbeing such as gender, age and socio-economic status.

The *fale* is encapsulated by the changing environment, plus context and time, dimensions that have a direct or indirect influence on one another:

- Environment. A dimension that addresses the relationships and uniqueness of Samoan people to their physical environment.
- Time. A dimension that relates to the past, present and future.
- Context. A dimension that relates to the specific location of the village and socio-economic and political factors that influence wellbeing.

In the Samoan worldview, the relationship between each of these factors is integral to wellbeing. Everything is related and connected in dynamic, interactive and reciprocal relationships. The shared elements of individual and family wellbeing are harmony, peace and balance. Each family member understands and fulfils his or her roles and responsibilities within extended families and communities.

Talanoa – sharing knowledge

In order to listen to the people's voices, I selected *talanoa* because it is the way knowledge exchange takes place in most Pacific communities. Founded on Pacific values, *talanoa* is described as "a holistic and embodied amalgamation of the emotions, knowledge, interests, and experiences between researcher and participants" (Farrelly & Nabobo-Baba, 2012). Halapua (2000) explains that Pacific island societies have, throughout their histories, relied upon the *talanoa* process because "it helps build better understanding and cooperation within and across our human relationships. It advances knowledge about our social identities, extended families, our villages, our ethnic and tribal communities, our religious beliefs and our moral, economic, and political interests" (p. 1).

Vaioleti (2006) defines *talanoa* "as a personal encounter where people tell their stories, their issues, their realities and aspirations in a more authentic way" (p. 14). The author further explains that:

> *Talanoa* can be referred to as a conversation, a talk, an exchange of ideas or thinking, whether formal or informal. It is almost always carried out face-to-face. *Tala* means to inform, tell, relate and command, as well as to ask or apply. *Noa* means of any kind, ordinary, nothing in particular, purely imaginary or void. (p. 23)

Thus, in Pacific-based research, *talanoa* allows for the co-production of knowledge. Participants' knowledge and experiences are presented in a more authentic way because *talanoa* allows people to tell their stories and incorporate emotion and spirituality. As a researcher, it is essential to be aware, not only of participants' cultural values and beliefs in sharing and giving, but also to have in-depth knowledge of the norms, practices and custom of the Pacific societies. Vailoti (2006) says that "a cultural synthesis of the information, stories, emotions and theorising made available by *talanoa* will produce relevant knowledge and possibilities for addressing Pacific issues" (p. 21).

Research design

In this study, the research design is underpinned by three complementary approaches, namely, exploratory, interdisciplinary and qualitative.

Exploratory research approach

The study is exploratory because there is little empirical research on the linkages between climate change and human mobility in Samoa. Exploratory research can be defined as research conducted to gain new insights, discover new ideas, and to increase knowledge of a phenomenon (Burns & Groove, 2001). When explored from different perspectives, a topic's findings are often unexpected. Thus, new angles can come from fresh ways of looking at things, either from a theoretical perspective or a new approach to evaluating ideas (Stebbins, 2001). In exploratory research, methods used with a small sample can help explore some phenomena in depth, before studying them in a wider context (Creswell, 2002, 2003). The results can provide rich information that will help set the groundwork that will lead to future studies, or to determine if what is being observed might be explained by a currently existing theory (Stebbins, 2001).

Interdisciplinary research approach

Different stakeholders now recognise climate change as a crisis that questions the very foundation of Western approaches to development. However, even those who see climate change as an urgent issue lack a framework for coherently integrating the findings of distinct sciences, and integrating those findings into political discourse and action (Bhaskar, Frank, Høyer, Næss, & Parker, 2010). In a world characterised by rapid change, uncertainty and increasing interconnection, new research approaches are needed to contribute to the solution of complex problems, such as those associated with climate change. However, progress in finding and implementing solutions to these problems has been very slow, and the increase in availability of technical knowledge has not been reflected in concrete actions (Hirsch-Hadorn et al., 2008).

Nowadays, climate change is considered to be an interdisciplinary field of research (IPCC, 2014a; Stern, 2007; Stern & Calderon, 2014). Researchers working on environment and climate change are increasingly organising themselves into interdisciplinary centres and networks, while research funding organisations are calling for more and better collaboration between natural and social scientists (Olsen, Borlaug, Klitkou, Lyall, & Yearley, 2013). Despite the enthusiastic calls for interdisciplinary research, the practice is not straightforward. Thinking collectively about complex problems requires crossing boundaries both horizontally (across disciplines) and vertically (across experts, policymakers, practitioners, and the public) (Klein, 2004).

Interdisciplinary interactions in the case of climate change have moved gradually from understanding climate change within disciplinary silos, towards generating interdisciplinary knowledge for action (Cornell, 2010). However, global climate models are primarily focused on natural systems, with less attention on the social, cultural and economic aspects. In the particular case of the human dimensions of climate change research, various authors advocate for the application of interdisciplinary approaches in order to understand the issue in a more integrative way. For instance, Bhaskar et al., (2010) pointed out that "there is recognition that effective and coherent interdisciplinarity is necessary to deal with the issue of climate change and the multitude of linked phenomena which both constitute and connect to it" (p. i).

Clark et al. (2011) emphasised that "interdisciplinarity can improve our empirical and analytic inputs to understand and address complex problems, including environmental and sustainability problems" (p. 3). Lyall and Fletcher (2013) said that

"interdisciplinary research is increasingly called upon to generate innovative solutions to complex, multidimensional, policy-related problems" (p. 1). A recognised definition of interdisciplinary research is the one advanced by Klein and Newell (1997):

> [Interdisciplinary research is] a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession... and draws on disciplinary perspectives and integrates their insights through construction of a more comprehensive perspective (Klein & Newell, 1997, as cited in Repko, 2007, p. 2-3).

While this definition is useful for integrating the findings from distinct scientific-focused studies, people's voices are missing. Thus, although progress has been made in interdisciplinary approaches associated with the human dimensions of climate change, there is still a need to undertake more integrated or holistic research that combines natural and social sciences.

Recognising the need to incorporate non-disciplinary knowledge into cross-disciplinary collaboration, other authors go further and claim that there is a need to solve real world problems in a 'transdisciplinary way" (Hirsch-Hadorn et al., 2008; Knierim, Siart, Toussaint, Müller, &Wiggering, 2010). Wiesmann et al. (2008) argue that transdisciplinary research "includes cooperation within the scientific community and a debate between research and the society at large" (p. 435). Even though a transdisciplinary approach promotes heterogeneity among participants in joint research projects, the praxis is not straightforward because there are different interpretations of the term transdisciplinarity. It requires a common understanding of how the disciplinary collaboration with non-scientists can happen (Olsen et al., 2013).

I purposely did not select a transdisciplinary approach that would have allowed me to integrate the voices of Samoan people into what I saw as a Western-based analysis. In my view, Pacific research approaches and methodologies are robust enough to stand by themselves, and they do not need to be simply integrated into Western-based research. As Chilisa (2012) said: "integrating indigenous perspectives into dominant research paradigms may not be the best strategy to legitimize indigenous people's histories, worldviews, ways of knowing and experiences" (p. 39).

For the purpose of this study, I use the term "interdisciplinary research" which is understood as the process of answering questions to understand the topic of

environmental migration in Samoa. Grounded in Samoan worldviews, it draws on both the voices of people affected by climate change and forced to move, and selected insights of Western-based modern technical knowledge. Both sources of knowledge are integrated to create an interdisciplinary understanding. This definition is in line with Pacific research guidelines as it adheres to the following requirements: (a) It is conducted in accordance with appropriate Samoan ethical standards. (b) It is informed by and embedded within the continuum of Samoan worldviews, knowledge, practices and values. (c) It comprises a range of disciplines and disciplinary research practices. (d) It includes Pacific research methods for data collection and analysis (Tertiary Education Commission, 2012).

Interdisciplinary research is not new in the Pacific region. For instance, Hviding (2003), referring to interdisciplinary research in the Pacific and the need for reclaiming a plurality of knowledge, said:

> Approaching the diversity of Pacific worlds from an appreciation of human creativity requires an interdisciplinary inclusiveness that extends beyond academic disciplines in the humanities, social sciences, and natural sciences into local worldviews and indigenous epistemologies, taking these on board as partners in dialogue and collaboration toward a plurality of knowledges (p. 43).

Qualitative research approach

The qualitative approach in this study is based on what I term as two knowledge systems: Samoan traditional knowledge and a Western-based one.

Traditional knowledge

The participants' voices are the core element in this study. These voices signify people's traditional knowledge accumulated and maintained through practice over generations. Samoan traditional knowledge systems incorporate technical insights and detailed observations of natural, social and spiritual phenomena, which, in turn, are used to validate what is important in life, what sustains people and what connects them to particular places and spaces. These are crucial elements for defining identities (Du Plessis & Fairbairn-Dunlop, 2009; Va'a, 2011). These aspects are essential for understanding how environment- and climate change-related problems affect people's livelihoods and social structures, as well as how they might be altering people's sense of connectedness to the land where they belong.

When discussing traditional knowledge associated with environmental and climate change, these two ideas must be considered: (a) Traditional knowledge is alive, although nowadays many traditional knowledge systems are at risk of becoming extinct because of rapid changes in natural environments and other economic, political and cultural changes on a global scale. (b) Traditional knowledge is dynamic. Therefore, it is important to understand how and why cultures adapt and change. In the case of Samoa, where migration is a significant factor, it is necessary to also consider the role of communities living abroad in knowledge transfer and the spread of new ideas.

Western-based technical knowledge

In this inquiry, selected economic, social, cultural, environmental and political disciplinary insights help explain the context in which population movements related to climate change are taking place, and the implications of environmental migration on people's lives and livelihoods.

My rationale to underpin the study with a Western-based perspective and a Samoan one is based on the fact that a considerable amount of technical information on climate change has been generated over the last few decades, such as forecasting and weather monitoring, protective planting, crop diversification, water harvesting, irrigation and water reservoirs, management and conservations of natural resources, climate change adaptation methods and disaster risk reduction practices. However, most of this information has not been made accessible to the most affected communities. Therefore, these families and communities lack this critical information which they might incorporate into their own knowledge systems, so assisting them to adapt to climate change *in situ,* and to make informed decisions regarding mobility associated with climate change.

Thus, as part of the exploratory research, it was necessary to bring forward this information not only to contextualise the study but also to contribute to increasing the knowledge base. This decision is in line with Pacific research praxis that requires a reflective and contextual framework to better inform the Pacific research agenda (HRC, 2014; University of Otago, 2011).

Selection of the village study

While climate change is affecting all the coastal villages in Samoa, it was necessary to explore and understand patterns and dynamics of population movements (internal and

international) associated with climate change in one selected village in Samoa. Two criteria were established to select the village study: (a) A rural village with lowland coastal areas and sites ranked highly vulnerable to extreme events and adverse impact of climate change. (b) Evidence of internal movements and migration to New Zealand associated in some way with climate change. After analysing various options, the village of Lotofaga on the south coast of Upolu was selected because the established criteria were met. Lotofaga has been facing serious climate-related problems (sudden- and slow-onset events), and there is evidence that different types of population movements have been occurring in the village.

To study mobility patterns due to climate change, it was decided that the research would be conducted in both the origin of migration and in the destination areas. The preliminary studies for this research, based on an extensive literature review, suggested that there could be population movements associated with climate change within the village, and there could also be evidence of migration to the main urban settlements and abroad. Drawing on this, Lotofaga was considered as the origin of migration. Apia was selected as the main receiver of rural-urban migration in Samoa (Samoa Bureau of Statistics, 2006, 2011), and New Zealand was identified as a host country because it is the prime destination for Samoans migrating abroad. Auckland was selected as the New Zealand site because it is the place where the majority of Samoan migrants have settled (Statistics New Zealand, 2006, 2013). The village study served primarily as a means of exploring the connectivity between the spiritual, social and cultural dimensions of Samoan worldviews in relation to environmental migration.

Building a research design for the village study

Human mobility is a complex interplay of multiple economic, social, cultural, environmental and political factors. Disentangling environment and climate change from other migration drivers is very difficult. Slow-onset events often add to other migration drivers, and can be the triggering element for migration. In the case of migration prompted by sudden-onset events, migration drivers can be isolated, but even in those cases migration patterns are heavily determined by other factors. In any case, it is not easy to attribute any specific event exclusively to climate change, which is often best understood as an aggravating factor to other environmental changes (ADB, 2012b, Ferris, 2015).

Considering the complexity of isolating different migration drivers, population movements due to environmental degradation, climate change and natural disasters should be examined in a way that is context specific in time and place. Thus, an exploratory research helps determine the best research design. In this village study, three complementary approaches were used to frame the knowledge base, namely exploratory, interdisciplinary and qualitative (Figure 8).
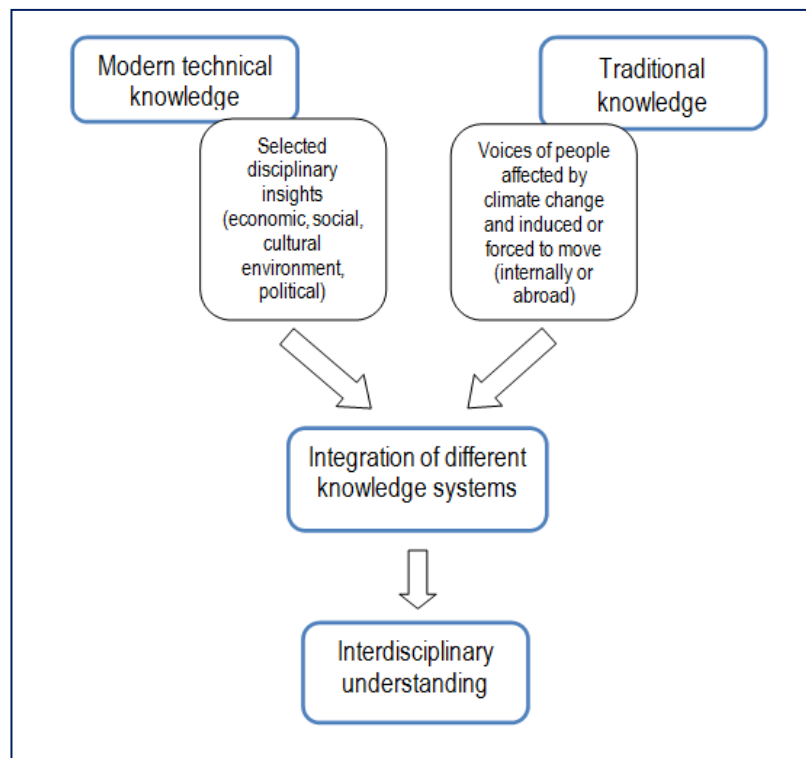
Figure 8: Lotofaga: Exploratory, Interdisciplinary, Qualitative Research Design

The research design has the following characteristics as outlined above:

- The voices of people affected by climate change and induced or forced to move are the primary source of information in this study.
- It is exploratory. The village of Lotofaga on the south coast of Upolu was selected to undertake the study. Lotofaga can be considered a representative rural village in Samoa.
- It is interdisciplinary. It combines two knowledge systems: a modern Western-based one and a traditional Samoan one.
- It is qualitative. The modern knowledge system includes selected disciplinary insights to contextualise the research topic. A comprehensive document review and interviews with key informants helped prepare the characterisation of Samoa

and the selected village (Chapter 2). The traditional knowledge of environmental migration is expressed throughout the people's voices. Perceptions, experiences and expectations are presented in a qualitative village study. *Talanoa*, a Pacific research method, was used to interview participants. The results are presented in Chapters 5 and 6.

- Considering the holistic Samoan worldview, the integration of different knowledge systems has occurred during the whole research process. The interdisciplinary understanding is presented in Chapters 5 and 6 (Results) and Chapters 7 and 8 (Discussion of Results).

Western-based modern technical knowledge to contextualise the village study

Context

Patterns and dynamics of migration are context specific. Context here refers to various interacting economic, social, cultural, environmental and political factors. Thus, understanding the patterns and migration dynamics in specific contexts can be improved by exploring the interaction of local-level factors immediately influencing people's migration decisions with interacting political, economic and social factors and processes at different levels (Collinson, 2009).

Research methods for data collection

In order to contextualise the research topic, two qualitative methods, namely a comprehensive document review and semi-structured interviews with key informants, were selected to prepare the socio-economic and environmental characterisation of Samoa and the selected village of Lotofaga (Chapter 2). In addition, the results of this exercise helped contextualise the findings of the village study (Chapters 5 and 6 Results).

Comprehensive document review

This method is a systematic procedure for reviewing and evaluating documents both printed and electronic. Document analysis requires that data be examined and interpreted to elicit meaning, gain understanding and develop empirical knowledge (Bowen, 2009). In this study, the comprehensive document review was an on-going process that included collecting published records (i.e. statistics and annual institutional reports), and unpublished records (i.e. minutes of meetings and inventory records). A

30-year (1985 – 2015) period of analysis was considered. Six dimensions were identified: economic, social, cultural, demographic, environmental and political. In some cases, disciplinary insights were used to address thematic areas, such as rural development, natural resources management, land tenure and gender issues.

Semi-structured interviews with key informants

The voices of key informants, collected using semi-structured interviews, were a rich source of information for this study. Kvale (2007) points out that with qualitative semi-structured interviews, the researcher tries to understand something from each respondent's point of view and to uncover the meaning of his/her experiences. The researcher prepares a list of questions and topics to be covered, usually in a particular order. However, there is flexibility to include new issues.

Sampling and recruitment

Key informants were interviewed in Samoa and New Zealand. Participants were selected purposively, in view of their knowledge of and expertise in climate change and population movements. It was hoped that key informants could offer specific insights about the overall situation on climate change and migration, policies promoted at a national level and the realities in the villages. Information about the research was given personally, by phone or email and via a participant information sheet (Appendix F). The informants were interviewed between November 2012 and November 2013. All participants signed a consent form (Appendix G), and their identities remain anonymous in the research.

Key informants

Twelve semi-structured interviews were conducted face to face with key informants (Table 8). The only consideration when selecting the participants was their knowledge of the research topic.

Table 8: Key Informants Profile

Key Informants in Samoa (n = 7)	Affiliation
IS1	Research centre
IS2	NGO
IS3	Government
IS4	Government
IS5	Government
IS6	International organisation
IS7	International organisation
Key Informants in Auckland (n = 5)	**Affiliation**
INZ1	Research centre
INZ2	Samoan community leader
INZ3	Youth community leader
INZ4	NZ Government
INZ5	NGO
TOTAL = 12 key informants (7 Samoa, 5 New Zealand)	

Interview schedule and pre-testing

Guiding questions and a list of topics to be covered during the semi-structured interviews with key informants were prepared (Appendix H). The guiding questions were tested with a PhD colleague (with experience on development issues) to assure suitability in terms of relevance and length.

Semi-structured interviews

All the key informants were interviewed in English by the researcher. Seven interviews took place in Samoa and five in Auckland. Respondents in Samoa included government staff, representatives from international organisations and research centres. In Auckland, respondents included representatives of New Zealand governmental and non-governmental organisations, and local leaders. The interviews ranged in length between 40 and 50 minutes. The questions were adapted according to the background of the interviewee. For example, if the key informant was an expert on gender issues, the questions were more focused on the differentiated effects of climate change on men and women.

Semi-structured interviews proved to be adequate with key informants. It was useful to get insights into the research topic from different stakeholders' perspectives. One advantage of semi-structured interviews in exploratory research is that the use of open-ended questions and probing gives participants the opportunity to respond in their own words. This method was useful because open-ended questions have the ability to elicit

responses that are meaningful, unanticipated by the researcher, and rich and explanatory in nature. Another advantage of semi-structured interviews is that they allow the researcher the flexibility to probe initial participant responses, for instance, asking them to elaborate on their answers. Each semi-structured interview was audiotaped and then transcribed by the researcher.

The findings linked to the semi-structured interviews were used to support the preparation of Chapter 2 of this study, and provided context to the village study. A number of interviewees supported their responses with official documents produced by their institutions, such as policy and technical reports and statistics.

People's knowledge

In this study, the voices and experiences on climate-induced mobility of the people of Lotofaga have been crucial. Although the study is family and village-based, it was necessary also to include the extended Lotofaga community, namely family members who have migrated to Apia and Auckland. Therefore, the aims of the village study were two-fold:

- Origin of migration. To understand the impact of climate change on people's lives and livelihoods, their migration patterns within the village and their thoughts about possible future migration decisions to other places, other than within the village.
- Destination of migration. To learn whether climate change had affected families' or individuals' decisions to move to Apia or Auckland. Returning plans and involvement in the solution of climate change-related problems in their communities of origin would also be studied.

Talanoa - Research method for data collection

One of the characteristics of *talanoa* is that it is a research methodology and also a research method (McFall-McCaffery, 2010). As a qualitative data-gathering interviewing method, *talanoa* can be used in one-on-one interviews or focus group discussions, and is also a useful method to use across disciplines (McFall-McCaffery, 2010). In this study, *talanoa,* as a conversational method, was used for data collection with individuals and groups in Samoa and New Zealand. Using *talanoa* meant that conversations with the participants were more meaningful when Samoan protocols were followed and when Samoan language was used.

Getting started

In Pacific-based research, the process of gathering information is as important as establishing good relationships with the participants; relationships are the basis of all ethical conduct. During my first trip to Samoa (November - December 2012), I contacted the village High Chief Fiame Naomi Mata'afa to discuss the extent of the study and request support for the field work. She kindly agreed to provide advice for the study and hosted me during my stay in Lotofaga. Thanks to her support, I was able to make all the logistical arrangements. She also assisted me in recruiting two local research assistants (Appendix I) who not only helped me carry out the interviews but also introduced me to some of the finer points of daily life in Lotofaga. Having the support of a man and a woman as research assistants also brought a deeper appreciation of the differential impact of climate change by gender. The second visit to Lotofaga took place in November 2013 and the support of the village High Chief was also critical for the data collection.

Interview schedule

When using *talanoa*, an open technique can be used. In some cases, the precise nature of questions is not determined in advance. In other instances, guiding questions can be helpful. The researcher's decision will depend on the way in which the *talanoa* develops (Vaioleti, 2006). For the purpose of this study, I prepared a number of guiding questions and a list of topics to be covered during the *talanoa* with participants in Samoa and Auckland, bearing in mind that there was room for flexibility and inclusion of new issues (Appendix J).

Pilot interviews / *talanoa*

In Lotofaga, the guiding questions were discussed with the village High Chief and the research assistants before the field research, to make sure of their relevance and suitability in terms of content, length, and applicability in the particular Samoan cultural context. Then they were tested with a male villager to make adjustments. Following the testing, the indicative questions were translated into Samoan. The guiding questions for migrants living in Apia and Auckland were also tested in Apia with a female migrant, and Auckland, with a male migrant.

Sampling

The study used non-probability sampling. Two complementary sampling techniques were used to identify and select the research participants, namely purposive and snowball sampling. Both proved to be appropriate to the Samoan context. The main goal of purposive sampling is to focus on particular characteristics of a population that are of interest (Denscombe, 2007; Guest, Bounce, & Johnson, 2006). In snowball sampling, the researcher begins by identifying someone who meets the criteria for inclusion in the study. The researcher then asks that person to recommend others they may know who also meet the criteria (Trochim, 2006).

Patton (2002) points out that small sample sizes are selected purposively for exploratory studies. The use of small samples enables the researcher to be immersed in the research field and to establish fruitful relationships with the community. Likewise, Crouch and McKenzie (2006) argue that a small number of cases will facilitate the researcher's close association with the respondents, and enhance the validity of fine-grained analysis. Whether to interview family members jointly or disaggregated by gender and age is a choice the researcher must consider in the field (Sarmento, Ferreira, & Hurtado, 2009).

When designing the field study, the possibility of interviewing people from the same extended family was considered, both in the origin of migration and in the destination areas. In some cases, it was possible but in other cases the researcher explored different options equally relevant to the study. The final selection of participants in Lotofaga, Apia and Auckland was based on a set of criteria (i.e. gender, age, *matai* title) with the aim of ensuring a range of voices and experiences.

Recruitment of participants

Recruitment of village participants

The data collection was undertaken in two different periods totalling five weeks. On the first visit, I spent three weeks in Samoa from November to December 2012. The second visit was for two weeks in November 2013; it was organised with the purpose of consolidating and gaining a more in-depth understanding of the data gathered during the first trip. It was also an opportunity to share the preliminary results with key stakeholders. On this second trip, I also conducted a number of interviews with male elders in the village – voices which had not been prominent during the first visit.

Village participants were recruited using both purposive and snowball techniques. They were identified with the help of the village High Chief Fiame Naomi Mata'afa and the research assistants, using the purposive technique. Then we approached potential participants to explain orally the purpose of the research in detail. My research assistants explained the study in Samoan and often a mixture of Samoan and English. Using the snowball technique, we also asked participants to provide contact details of other potential participants as well as the contact details of migrant family members living in Apia and Auckland. Once potential participants were identified, they were invited to take part in the individual or group interviews. Each one was provided with the participant information sheet and the consent form (both of them in Samoan) (Appendix K and L).

Recruitment of migrant participants living in Apia

Participants were interviewed in two different periods (November-December 2012 and November 2013). In all cases, they were members of the extended families interviewed in Lotofaga and contact details were provided by Lotofaga families. The same invitation process was followed, namely a verbal explanation of the purpose of the research, a sharing of the participant information sheet and consent form (available in Samoan and English) (Appendix K and L) and an invitation to participate. Both purposive and snowball recruitment techniques were used.

Recruitment of migrant participants living in Auckland

Auckland participants were selected with the support of my research supervisors. Both purposive and snowball recruitment techniques were used to invite participants to take part in the study. The timing was flexible (between November 2012 and November 2013) as it depended on the preliminary results of the field work in Samoa. Four out of the five participants were from Lotofaga. The fifth, although not born in Lotofaga, had close links with the village.

Participant profile

Twenty-nine people participated in the village study; they were either presently living in Lotofaga, migrants living in Apia and Auckland. Gender, age and *matai* title were taken into consideration to select the sample.

Villagers

In Lotofaga, 19 participants took part in the study (Table 9). Two group *talanoa* were conducted, one with the Women's Committee (six participants, with no *matai* title) and another group *talanoa* with elder men (three participants, all with *matai* title). In addition, ten individual *talanoa* were conducted with villagers to discuss their experience of environmental migration (two males and eight females). Only one man had a *matai* title.

Table 9: Lotofaga - Participant Profile

Participant	Gender	Age	*Matai* title
Group *talanoa*			
Women's Group (n = 6)			
WG1	F	40s	No
WG2	F	60s	No
WG3	F	50s	No
WG4	F	60s	No
WG5	F	40s	No
WG6	F	20s	No
Men's Group (n = 3)			
MG1	M	70s	Yes
MG2	M	70s	Yes
MG3	M	60s	Yes
Individual *talanoa* n = 10 (8 females, 2 males)			
LO1	F	60s	No
LO2	F	70s	No
LO3	F	60s	No
LO4	F	50s	No
LO5	F	50s	No
LO6	M	50s	Yes
LO7	F	30s	No
LO8	F	30s	No
LO9	F	20s	No
LO10	M	30s	No
TOTAL	= 19 participants (9 participants in group *talanoa* + 10 individual *talanoa*)		
	= 14 females, 5 males		
	= 4 with *matai* title, 15 without *matai* title		

The relatively large proportion of adult female respondents in the study area aligns with the characteristics of the village population at the time of the study.

Migrants (Apia and Auckland)

Ten migrant participants took part in the study (Table 10). Five individual *talanoa* were conducted with migrants in Apia (one male and four females, four of them with *matai* title) and five individual *talanoa* with migrants living in Auckland (four males, two with *matai* title and two without, and one female *matai*). Respondents were migrants informed about the impacts of climate change in the village, and in some cases, they were members of the extended families interviewed in Lotofaga.

Table 10: Migrants (Apia and Auckland) - Participant Profile

Participant	Gender	Age	*Matai* title
Apia – (individual *talanoa*) n = 5 (4 females, 1 male)			
AP1	F	40s	Yes
AP2	F	40s	Yes
AP3	F	50s	Yes
AP4	M	60s	Yes
AP5	F	60s	No
Auckland – (individual *talanoa*) n = 5 (1 female, 4 males)			
NZ1	F	60s	Yes
NZ2	M	50s	Yes
NZ3	M	60s	Yes
NZ4	M	50s	No
NZ5	M	60s	No
TOTAL = 10 participants (individual *talanoa*)			
= 5 females, 5 males			
= 7 with *matai* title, 3 without *matai* title			

Process of *talanoa*

In Lotofaga, individual and group *talanoa* were conducted in the Samoan language, with the support of the research assistants. There was lively interaction among the participants, research assistants and researcher. In general, the researcher or research assistants started the *talanoa*, explaining clearly the purpose of the visit: *I/we have come so that we can discuss/talk about ...* (Vaioleti, 2006). In some cases, the conversation began and/or ended with a prayer, asking God for guidance in the *talanoa*. In the Samoan context, prayers are part of life, and they are a culturally appropriate way to begin any Samoan meeting, function, talk, *talanoa* or gathering of any kind (Wilson, S., 2010).

During individual or group *talanoa*, participants had time to elaborate on their comments, based on their knowledge, lived experiences, values and beliefs. They asked

questions, requested clarification and asked for the researcher's opinions on the topic under discussion. The *talanoa* ended when the issues were exhausted and when it lost its *malie* (a Tongan word that means connection) (Valioleti, 2006). Most *talanoa* in this study, both with individuals and groups, lasted around an hour. Some of them lasted for over 90 minutes; this is an example of the flexibility that characterises the method. Silence and other forms of non-verbal cues have meaning in *talanoa;* this is why being aware of cultural issues is of key importance.

Since all the individual *talanoa* were conducted in the participants' houses, other family members were present. In some cases, family members were just observers, and they simply listened to the conversation. In other cases, they participated actively in the discussions; they added information, corroborated statements or gave their own opinion on the subject under discussion. Participation of other family members or friends during *talanoa* was not, in any case, an element of distraction. *Talanoa* with focus groups was held in familiar places such as the *malae* and a church premises. *Talanoa* with migrants living in Apia and Auckland also followed cultural protocols and were conducted in English by the researcher.

Following Samoan protocols, at the end of *talanoa*, a small *koha* (Maori word for gift) or *meaalofa* (Samoan word for gift) was offered to each participant in Samoa and New Zealand as a way to reciprocate and thank them sincerely for sharing their time, knowledge and emotions. In *talanoa*, researchers and participants share not only one other's time, interest and information, but also emotions (Otsuka, 2006). This fact was particularly relevant in the study because the issues discussed were very sensitive. The discussions brought back memories of family separation and problems associated with climate change. Memories of destruction, and feelings of fear and anxiety about the uncertainty of natural disasters, were shared.

As a data-gathering method, *talanoa* proved to be appropriate for the group of participants in Samoa and New Zealand as well as the purpose of the study. Participants were not merely knowledge providers, as their role was to bring to light and reinforce traditional knowledge about environmental migration in Samoa. *Talanoa* as other indigenous conversational methods are a means of gathering knowledge. As Kovach (2010) pointed out:

> These [conversational] methods are strategies that help to gather knowledge based on oral story-telling tradition, congruent with an indigenous paradigm

and that involves a dialogic participation that holds a deep purpose of sharing story as a means to assist others. (p. 1)

Data analysis

Understanding the theoretical underpinnings of the research is a crucial stage before starting any thematic analysis involving Pacific data collection. As Farrelly and Nabobo-Baba (2012) said:

> If we want to understand our participants' hopes and struggles, we need to holistically contextualise the words they share with us as we move with them through the course of their daily lives. But this movement is not only physical. When our participants talk, they carry us on a cognitive journey, imaginatively moving us from past to present to future so that we can better understand how they live and feel their world. (p. 4)

In the data analysis phase, I was aware of the need to ensure integrity and validity of the data. This was achieved through discussions with the research assistants in the village (always talking through things), the village High Chief and my supervisors. It was a sort of triangulation where I requested clarification of relevant concepts, metaphors and descriptions that allowed me to understand the profound meaning of the narratives and its nuances. I had plenty of three-way discussions aimed at ensuring that the voices of participants were heard, and truly reflected in the research findings. This is in line with the Pacific Health Research Guidelines, a document prepared by the Health Research Council of New Zealand (HRC) in 2014.

> Researchers undertaking Pacific research need to be well prepared to conduct data analysis and they need to be aware of any knowledge and cultural gaps. In fact, the use of metaphors and genealogical narratives is common among Pacific oral responses and researchers should be aware of these characteristics. The literal interpretation of words and narratives could be misleading, may distort the research findings and undermine the integrity of the research. Consultation with cultural advisors is important to understand unique expressions of culture and to determine what the community needs are. (p. 21-22)

The same considerations were taken when analysing the semi-structured interviews with key informants. In addition, the disciplinary insights collected, in parallel with the village study, were used to contextualise the participants' voices.

Thematic analysis

In this study, a thematic analysis was used as a method for identifying, analysing and reporting patterns (themes) within the data. According to Braun and Clarke (2006), one

of the advantages of thematic analysis is flexibility, as it can be used across different theoretical frameworks and epistemologies to answer different types of research questions. However, researchers cannot free themselves of their theoretical and epistemological commitments because data cannot be coded in an epistemological vacuum. This aspect is crucial in cases where data collection is done with indigenous methods because its theoretical frameworks take into account a number of assumptions about the nature of the data, and what it represents in terms of worldviews, realities, and perceptions. Therefore, a worthwhile thematic analysis must make sure that the interpretations of the data are consistent with the theoretical framework.

Braun and Clark (2006) identified five ways to approach thematic analysis: (a) Deductive. Coding and theme development are directed by existing concepts or ideas. (b) Semantic. Coding and theme development reflect the explicit content of the data. (c) Latent. Coding and theme development report concepts and assumptions underpinning the data. (d) Realist or essentialist. Focuses on reporting an assumed reality evident in the data. (e) Constructionist. Focuses on looking at how a certain reality is created by the data.

In this research, latent coding was used, as it was considered more appropriate for the data analysis stage. As Braun and Clark (2006) said:

> A latent data analysis goes beyond the semantic content of the data, and starts to identify or examine the underlying ideas, assumptions, and conceptualisations – and ideologies – that are theorised as shaping or informing the semantic content of the data. (p. 13)

My research approach to thematic analysis

The thematic data analysis involved an iterative and flexible process. Data analysis began informally during data collection. This process enabled me to determine and improve subsequent data collection activities, collect missing information and fill gaps (Ayres, 2008). A thematic analysis in a Pacific-based research is not a linear process of simply moving from one phase to the next. It is, rather, an iterative process where movement is back and forth as needed, throughout the phases. Based on Braun and Clark (2006), I elaborated a seven-phase thematic analysis that fits well with the exploratory interdisciplinary research (Figure 9).
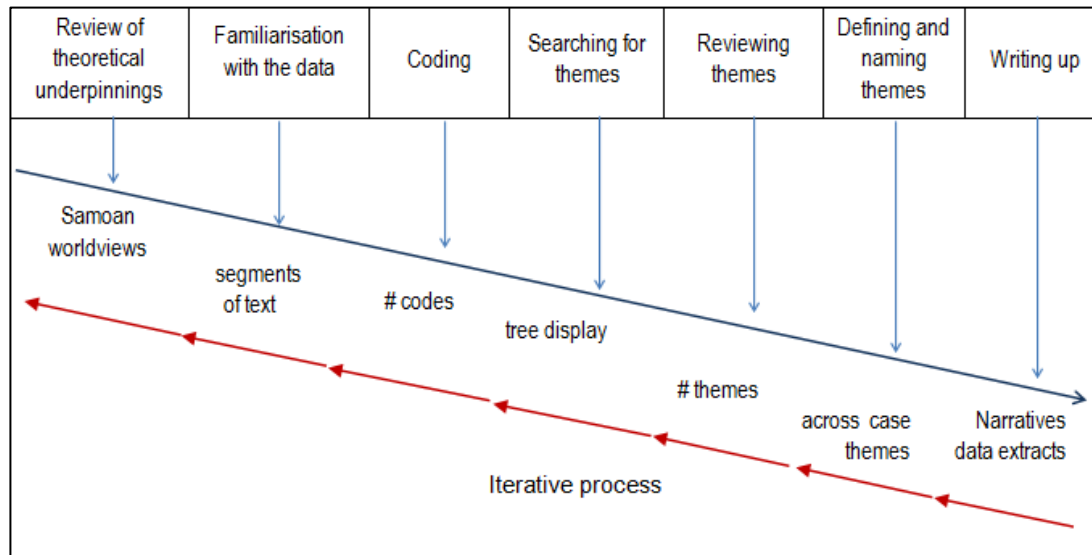
Figure 9: Visual Model of the Qualitative Thematic Analysis
Source: Adapted from Braun and Clark (2006).

Phase 1: Review of the research's theoretical underpinnings

This research is underpinned by Samoan holistic worldviews, grounded upon Samoan knowledge and cultural values and beliefs as illustrated by the *fonofale* model (Pulotu-Endemann, 2001). This holistic worldview reflects the way Samoan communities frame their world, practices and behaviours. It is a worldview that revolves around a balanced and integrated relationship between the spiritual, social and physical spheres. This balance contributes to an integrated and holistic life that helps Samoan communities adapt in a rapidly changing environment (HRC, 2014). These spheres are crucial to understanding the impacts of climate change on people's lives and livelihoods. Imbalances such as those associated with climate change can undermine people's sense of wellbeing.

Phase 2: Familiarisation with the data

To become immersed in and intimately familiar with the data content, this stage involved transcription, translation and reading and re-reading the data. In my study, individual and group *talanoa* and semi-structured interviews were audio recorded in agreement with the participants. A number of *talanoa* were conducted in Samoan (with villagers), and others were conducted in English (migrants). All the semi-structured interviews with key informants were conducted in English. Therefore, before the analysis, it was necessary to translate and transcribe all the gathered information (Appendix M).

Transcription and translation into English of the *talanoa* (conducted in Samoan) were done by experienced Samoan translators and then reviewed carefully by my supervisors to ensure fidelity to what was said. Each *talanoa* and semi-structured interview was transcribed verbatim to reflect the original wording and grammar used by the participants. Time spent in translation and transcription was not, in any way, misused as it informed the early stages of analysis. Time devoted to these activities allowed a more thorough understanding of the data because it was an opportunity to familiarise myself with the information and also to check the transcripts against the original audio recordings for accuracy.

In addition, I took numerous notes during *talanoa* (individual and groups) and also during the semi-structured interviews. These notes were useful support for the data analysis. Data collected in Lotofaga was discussed with the village High Chief and the two Samoan research assistants. At the end of each day, we summarised our notes and analysed our findings. I asked for clarification of concepts and received information and feedback. In order to understand how participants perceive the effects of climate change on their lives and livelihoods, and how this situation is influencing people's decision to move, I was required to engage in an in-depth analysis of the transcripts. To do this, I read and re-read the transcripts, looking for themes, connecting the themes, and applying potential themes to the other cases. Then I discussed the narratives with my research supervisors to understand the meanings and nuances of what had been said.

Phase 3: Coding

This phase involved dividing the text into segments of information and labelling these segments with codes, in order to identify important features of the data that might be relevant to answering the research questions. It entailed coding the entire dataset and, after that, collating all the codes and all relevant data extracts together, for later stages of analysis. Coding can be performed either manually or through a software programme. In this research, I coded manually, and I also used the NVivo 10 software (Lavery & Butler, 2012). I was specifically looking for themes related to vulnerability and resilience to the impacts of climate change and migration patterns associated with climate change.

As I collected data from three different populations (villagers, migrants in Auckland and Apia, and key informants), I conducted "within-case" and "cross-case analyses" of the data as a means of identifying themes within and across groups. I also included in my

analysis an exploration of the context and circumstances in which the participants' experiences took place. This contextual data was integrated into the themes identified through other forms of data collection (document review and information provided by key informants) and used them to inform the data analysis.

Phase 4: Searching for themes

This phase entails examining the codes and collated data to identify significant broader patterns of meaning (potential themes). It then involves collating data relevant to each candidate theme to work with the data and review the viability of each emerging theme. Here, researcher judgement is necessary to determine what a theme is. Bryman (2012) says that:

> A theme is a category identified by the researcher through his/her data, that relates to his/her research focus (and quite possibly to research questions), that builds on codes identified in transcripts and/or field notes, and that provides the researcher with the basis for a theoretical understanding of his/her data that can make a theoretical contribution. (p. 580)

Phase 5: Reviewing themes

This phase involves examining the emerging themes against the dataset to determine that they tell a convincing story. The themes have to contribute to answering the research questions. In this phase, themes are typically refined, which sometimes involves them being split, combined or discarded. During this process, some themes emerged as stand-alone themes, while other clusters of interrelated themes emerged through the process of analysis.

Phase 6: Defining and naming themes

This phase involved refining and developing a detailed analysis of each theme, working out the scope and focus of each theme, and determining the story of each. It also involved deciding on an informative name for each theme.

Phase 7: Writing up

After weaving together, the analytic narratives and data extracts, they were contextualised with the help of the disciplinary insights.

Integration of different knowledge systems and new interdisciplinary understanding

Integration of different knowledge systems

In interdisciplinary research, the act of borrowing disciplinary insights is necessarily selective. Boix Mansilla (2004) says that "it involves not only deciding which disciplines might best inform the research question but also what specific aspect of each discipline might prove most useful (e.g., particular content, methods, purposes or forms of communication)" (p. 11). Although it is clear that integrating or combining different disciplinary insights helps to better understand a research problem, how to integrate different forms of data is a difficult challenge. It is even more challenging when the integration involves different knowledge systems, as in the case of this study. Both traditional knowledge (as expressed by the participants) and disciplinary insights (mainly Western-based) were integrated to respond to the research questions.

In this study, the integration of different knowledge layers was undertaken by evaluating ways in which these materials were in agreement or conflict. The purpose was to discover or identify common ground concepts, theory, or assumptions by which the insights can be reconciled. The interdisciplinary approach provided a means for understanding various sources of information, while situating the village in the broader Samoan context. In so doing, two primary implications of the research design emerged. First, the approach validated the importance of traditional knowledge as expressed by participants in the village study. Second, the secondary information and results of the interviews with key informants reinforced the village-level study.

Interdisciplinary understanding

Interdisciplinary understanding means that eventually a new knowledge is generated, and new methods may become available to different knowledge cultures (Tress, B., Tress, G., & Fry, 2005). In this study, an understanding of the environmental migration dynamics in Lotofaga has been generated. Although the new interdisciplinary understanding is limited in time and to a particular context, it can be used as lenses to identify relevant issues at the national level. The village-level findings were not extrapolated to explain the situation at the national level. The field outcomes were just used as lenses to identify critical issues at the national level and to provide the basis for future studies and policies on environmental migration. The integration of both

knowledge systems is presented in the research findings (Chapters 5 and 6) and discussion of results (Chapters 7 and 8).

From the previous discussion, it can be seen that a Samoan-based exploratory, interdisciplinary and qualitative research can help understand how climate change is affecting people's lives and livelihoods in Lotofaga, and how it influences their decisions to move internally or overseas. The combination of traditional and Western-based modern technical knowledge in interdisciplinary research and practices is not new in the area of natural resources management, climate change and sustainable development. A number of research centres, governments, and aid development agencies have been promoting the incorporation of traditional knowledge to address climate change-related problems in combination with scientific knowledge (Tuafuti, 2011; UNESCO & ICHCAP, 2013).

Of course, the implementation of these proposals is not straightforward in both the research and policy spheres. In most cases, the inputs provided by indigenous people, in the form of traditional knowledge, have been interpreted, validated and incorporated in research and policies using Western codes. In those cases, the voices of people affected by environment and climate change problems have faded in Western-based solutions. However, it is fair to say that there are genuine attempts to listen to the voices of the most affected. For instance, a number of national and international organisations are promoting different forms of community-based adaptation initiatives with encouraging results.

Ethical considerations

Taking into account that the research involved interaction with Samoan communities, ethical considerations and specific research protocols have remained central to the research inquiry throughout the entire process. The application for ethics approval for this research was granted in August 2012 (Appendix A).

The following principles guided the research journey in both Samoa and Auckland:

Social and cultural sensitivity

Working in a new cultural context does raise challenges and opportunities. As a non-Samoan researcher, I was aware of the need to devote enough time to a serious learning process, not only of the research topic but also of the Samoan culture. At the same time,

I was also aware that my own cultural background, cultural sensitivity and work experience in different countries and cultural contexts were relevant to frame the knowledge base for the research topic. To ensure I was taking the necessary steps to fulfil the requirements of this kind of research, I first visited the country with my family in 2011. It was a worthwhile starting point to learn about the *fa'a Samoa* and the cultural practices. I also started to investigate and read widely with respect to villages' cultural and entry protocols for carrying out research in Samoa. I knew that village agreement to the research would be fundamental as well.

Once a study site had been decided, the following steps were taken:

(a) I met with the village High Chief Fiame Naomi Mata'afa and discussed the research aims, theoretical framework and methodologies. She became my adviser and agreed to take this information back to the village. Agreement was reached and she facilitated my entry into the village. The fact that I was introduced to the village by the High Chief facilitated enormously my stay in Lotofaga because I could observe how life in the community was organised. I also had the opportunity to get to know the participants better in their own context.

(b) During my stays in Samoa, I had frequent discussions with my adviser, the village High Chief. She is a well-known politician and an expert in rural development, land, gender issues and education. These helped me further understand ideas about the research topic, methodologies and findings. Her knowledge and support were an invaluable contribution to this research.

(c) I also knew research assistance would be needed to facilitate *talanoa.* Thus, with the support of the High Chief I hired two research assistants (a man and a woman) who worked with me and helped me overcome the language barrier. They proved to be an important source of information about Lotofaga. They walked with me everywhere and helped me familiarise myself with village protocols and routines.

(d) The guidance of my two Samoan supervisors has been exceptional along the whole research journey. They have provided me with constant advice and have encouraged me to think outside the box.

Since my first visit to Samoa in 20011, I have been back to the country three more times. Those visits were crucial periods for consultations with different stakeholders

and also for collecting information from research centres, government departments, NGOS and international organisations. Consultations were a fundamental characteristic of my research journey. The purpose of the consultations was to ensure that research practices were appropriate in the Samoan context. Consultations were held with cultural advisers, such as village authorities, Samoan governmental officials and Samoan leaders. Most importantly, to undertake this research, I relied upon the advice of my two Samoan supervisors. The support of these advisers was essential for the organisation and implementation of the field work in both Samoa and New Zealand, and then in the analysis stage.

Partnership

Partnership was addressed by engaging with participants in a process of mutual respect. The participants were informed about the extent of the research and what was expected from them. Participant information sheets were prepared in both English and Samoan. My role in this research has been of a partner in a learning process on issues relating to climate change and migration in Samoa.

Participation

Participation was addressed through inclusive sampling. The research aim and design took into account the involvement of people affected by climate change. Their differentiated voices were crucial to understanding how climate change induces population movements. Participants were asked to share information about these issues.

Protection

Prevention of deceit and harm was addressed through transparency in the aim, design and implementation of the research. Privacy was a key issue. Participants were given the option of being named in resulting publications or for their identity to remain confidential; in the latter case, they were identified only by their designation (i.e. villager, migrant or key informant). Cultural aspects were respected throughout the whole research project.

Anonymity

Considering that the research sample was relatively small, anonymity was an issue I discussed with villagers, migrants and key informants. Most of them requested to remain anonymous throughout the study. Therefore, data that may have identified the

participants has not been used or it has only been used to provide general references about specific topics. A code was given to each participant.

Voluntary consent

Consent forms in English and Samoan were prepared for villagers, migrants and key informants. Only individuals over the age of 18 were invited to participate. They were advised of their right to withdraw themselves and their data at any time during the research. All participants signed the AUT consent forms.

Reflections on the research process

In this section I present some reflections on the research process. As Chilisa (2012) pointed out:

> Whatever the paradigm assumptions that guide the research process, the resulting studies should be convincing enough that research participants can see themselves in the descriptions. In addition, all stakeholders, practitioners and policy makers should feel confident to act on the findings and implication of the studies. (p. 164)

Acceptability

There is a growing recognition and appreciation of the advantages of using Pacific methods to understand Pacific issues (Fairbairn-Dunlop, 2014). In this study, both the data collection and data analysis proved to be appropriate in the Samoan context, as they helped to capture insights about the ways people have perceived, experienced and evaluated the effects of climate change on any decision to move.

In my study, information collected using Samoan methods underpinned by Samoan worldviews, values, beliefs and experiences have proved to be an effective approach. *Talanoa* conversations helped collect valid, meaningful and reliable information about what has been happening in the village, in terms of environmental migration. I strongly believe that *talanoa* enabled participants to identify issues and discuss ways to address them in a very honest authentic way. As a result, the findings shared here are trustworthy and relevant because participants supported the whole process of collecting and analysing the information. The findings were convincing for them because they could see themselves in the descriptions. I can say that in the *talanoa* with participants, we co-created knowledge and shared emotions.

Reliability and validity of data

Cohen, Manion, and Morrison (2007) explained that reliability in qualitative methodologies may be achieved through "fidelity to real life, context and situation specific, authenticity, comprehensiveness, detail, honesty, depth of response and meaningfulness to the respondents" (p. 149). In research involving Samoan people, the notion of being faithful to real life may be achieved if protocols and cultural practices are adopted. Similarly, authentic responses can only be obtained when participants perceive that their thoughts are relevant and when they perceive that their contributions to the research will be seriously taken into consideration (HRC, 2014).

Vailoleti (2006) notes that some issues regarding reliability and validity arise if *talanoa* is examined using conventional interpretations. He says that:

> *Talanoa* affects the learning of both researchers and participants. Therefore, viewpoints and reactions will change. Reliability is concerned with consistency. *Talanoa* research methodology is unlikely to yield similar results over time. Learning from *tanaloa* and normal life processes means that people's reasons and ideas about an issue or topic will change. This is also true for other types of qualitative research; reliability as it is understood in experimental research is not appropriate. The participants involved will be the most suitable and knowledgeable for that particular time. If they are not, it is likely that they will direct the researchers to the most appropriate people, as dictated by a Pacific natural and cultural order of things. This is the strength of *talanoa*, rather than a weakness. (p. 32)

Lincoln and Guba, 1985, as cited in Cohen et al., 2007) suggest that it would be more appropriate to "replace validity and reliability with trustworthiness" (p. 138). Kalavite (2014), referring to the concept of trustworthiness in her research with Tongan communities, says it is crucial that the researcher demonstrates professionalism and integrity during the study. In addition, cultural protocols should be followed to build trust with the participants. Dissemination of information is crucial to validate the research findings.

Summary of the chapter

For this enquiry, I considered it necessary to develop a culturally sensitive research design to understand the linkages between climate change and population movements. Therefore, a combination of two worldviews and knowledge systems, a Western-based one and a Samoan one, was crucial to understanding the research topic. While it was necessary to combine different knowledge systems, the voices of the people were at the

centre of the research design. Special consideration was given to Samoan traditional knowledge, worldviews, values and beliefs to understand how climate change is altering people's lives, and how it is influencing people's behaviours and practices (e.g. adaptation to climate change, including human mobility). The interaction between climate change and population movements is multifaceted. Therefore, isolating environmental aspects from other migration drivers is very challenging. Considering this limitation, an exploratory interdisciplinary approach helped frame the knowledge base to examine the research topic which is context specific in time and place.

Two sources of information were considered. First, Western-based methods, namely semi-structured interviews (twelve interviews with key informants) and a comprehensive document review to contextualise the research. Second, the Pacific method called *talanoa* was employed. Twenty-nine *talanoa* with groups and individuals were conducted. Participants were villagers and migrants living in Apia and Auckland. With *talanoa,* it was possible to capture the essence of the holistic Samoan worldviews, intrinsically attached to ancestral lands. Subsequently, a thematic analysis for organising data was employed. This method was selected because it can be used within different theoretical frameworks and epistemologies to answer different types of research questions. Thus, the results of the village-level study provided the basis for identifying critical issues related to environmental migration that can be considered at the national level.

Chapter 5 - Findings: Climate Change in Lotofaga

Lotofaga, like many rural villages in Samoa, is particularly vulnerable to the effects of climate change and natural disasters due to its coastal location and families' reliance on natural resource-based livelihoods. The first question this study sought to determine is how people perceive and manage the impacts of climate change. As seen in the participants' profile presented in Chapter 4, participants represented the extended Lotofaga community: those living in the village, those who live most of their daily life in Apia (but still call Lotofaga home), and those who have migrated to Auckland. While their views are grouped together, their coding denotes their positioning.

Notably, all participants, and elderly especially viewed climate change against their remembrances of past times – even the younger participants. There was a mixing of memories between what should be attributed to natural disasters – as in the 2009 tsunami and Cyclone Evan in 2012, and changing weather patterns. Thus, participants made some distinction between slow- and sudden-onset or catastrophic events. There were also differences in the perceptions of local, Apia and overseas participants on the impacts of climate change on their lives and livelihoods, and how a combination of traditional and Western-based modern technical information was helping them adapt to these challenges.

The chapter is in five parts. First, a brief outline of the village and a description of the land and sea resources set the study context. This is followed by the participants' knowledge about climate change and their observations of the climate change effects. Then, participants' views about the impacts of climate change on family health and livelihood security are presented, concluding with a focus on equity and hardship challenges. Drawing on these, and in line with the thesis focus, the chapter concludes with a review of the participants' knowledge base on climate change, a mix of traditional and Western-based modern technical knowledge.

Land and sea resources

Lotofaga has the appearance of a traditional Samoan village. The *fono o matai* (village council) is the main institution in the village, and the chief (*matai*) of every family sits on this village decision-making forum. The women's *komiti* (committee) is the other main village institution. Findings were that it is still the expectation that every woman and girl over the age of 15 years is a member of the *komiti*.

The village *malae* and meeting place for the *fono o matai* sits prominently by the sea shore, and today it is the home of the High Chief and MP, the Honourable Fiame Naomi Mata'afa. In earlier years, other family homes were dotted around the *malae* with members walking inland daily to work on their plantation sites and then returning to their homes at the central village site in the evening.

Two churches, the school, the women's *komiti* house and the small health centre run by *komiti* members are located close to the village hub. The village *malae* has retained its importance as the centre for the village *fono* and ceremonies. However, in recent times, the village has spread out as more and more families have built permanent homes on their inland plantation sites or along the main road to Apia, coming down to the main *malae* for the gatherings of the village. A female *matai,* now living in Auckland, described the communal village decision-making systems and she highlighted the importance of keeping these alive:

> In our young days, we shared knowledge in our village. Every Monday we had what we called *aso gafua*. It was a special day of the week to air out the village programmes. Families would have a representative joining the whole village, doing chores to feed the whole village. For example, Wednesday was village fishing day. So, every family had a representative in the village meeting house that day. Early in the morning they would hear the conch shell being blown, to remind people to gather in front of the meeting house so that they all went together to the sea for fishing. Any catch they brought back was divided and shared amongst the whole village. We need to preserve our ways of life. (NZ1)

As in many rural areas, semi-subsistence agriculture and fishing are the major economic activities in Lotofaga (See Chapter 2). At the time of the study, there was a small number of family-owned businesses: bus and taxi owners, retail shops selling imported foods such as sugar, salt, rice, flour, *pisupo* (corned beef) and cigarettes, and some families were selling produce (fresh and cooked goods) at small stalls along the road. Some family members worked formally or informally in Apia. Most participants in Lotofaga said they receive remittances from family members living abroad.

Families are the main production units. They grow crops, fish, rear animals for food security, sale and exchange, and produce goods used in ceremonial exchanges. AP3 explained the norms governing production and behaviours, and the importance of land. She also highlighted people's strong social, cultural and spiritual connections to their lands:

Today farming is still the same in our village. In the past, it was a normal process that families must work the land because we are all brought up to understand how important having land as a great gift from God is. Because of that, we must work and respect the land, as a source of wealth, and we must make good use of it. (AP3)

Land in Lotofaga is still held in customary tenure under the stewardship of the family *matai* who has the duty of ensuring family members have equitable access to land so as to meet their basic needs. Access to family land did not seem to be an issue for most participants as explained by AP1, a female *matai* now living in Apia:

There is no distribution in terms of who gets what part of the land. We just equally use it and, like I said, we've got a lot of land. My cousins just farm each side of it, and we still have a lot that is unused because they can't utilise the whole piece of land. But we don't have any problem with land distribution like other families and other villages [do]. (AP1)

Her words were echoed by an elderly male *matai* who sits on the *fono*:

We don't have any problem [with] our land. We've got plenty of land. At the moment, we've got some houses for our family… we are six brothers, two sisters and my mother's sister, and five children, so they are all my responsibility. You see, this is our family. Each one of us has a right to our land. I never say no to anybody of my family, never. (MG1)

Despite the spread-out nature of land holdings, it is notable that every participant was keenly aware of their lands. LO1 an elderly widow and LO10 a young farmer pointed out their land plots to me:

We've got lots of land. There is some on the coastal side of the road, where we used to live; that piece of land stretches [out] and ends next to our neighbours, [so] there is plenty of land to do whatever we want to do. (LO1)

This is our land [showing a piece of land]. There is another [bit of] land of ours over there [showing the bush]. That land is located at the back, in the bush, and also our land over there [showing another piece of land] is being used; it's leased by the Telephone Office, Samoa Tel. (LO10)

LO7, a young married woman, talked about her appreciation that her family *matai* had allowed her family to work on a plantation site not far from their house in the village, and had also allocated them a plot further inland.

The old man, the *matai* of the family, allowed us to have our plantation over there and he says it's okay for us to grow crops because no one [else] is using it. Now we need money to start. (LO7)

A small number of participants said they would have liked more land and attributed their difficulties in achieving it to the traditional systems. This was because they were not born in the village and had no land rights. A male participant from another village said that while his wife was from Lotofaga and they were living in there, they had no enough land.

> [This is] my wife's family land. Not enough, not enough [land]". (LO6)

In another example, a widow who was a second wife (but from another village) said:

> This is the only land the old man [*matai*] gave for us to live [on] with my children, these young ones here. But the old man had plenty of land. All of the kids [from the man's previous marriage] have been allocated a piece of land, each of the older children have their own land to live in, so this land is ours, for my young children, but it's not enough. (LO4)

Increased cash cropping was highlighted by one male *matai* as a factor that is having impact on unequal access to land:

> According to our customary land tenure, each *matai* allocates and distributes land to the family members. He makes sure every member of the family has a piece of land for subsistence [purposes], to grow crops. But now we are moving [to] commercial [agriculture] and that is causing some problems. Start commercialising your plantations, that's moving away from subsistence to land use for commercial purposes, and you'll have problems. There are also certain cases [in which there is] no equitable [land] distribution. Large [plots are given] to some people, very small [ones] to others. Not all members of the family are hardworking; the other ones are just in possession [of it], and they're not making full use [of it] for cultivation. Those kinds of issues mean the start of fractures, problems. But these kinds of things happen. I recall very few disputes in Lotofaga. I guess an explanation for some friction is because some people are selfish; they want more land for themselves. (AP4)

During the field work, there was no evidence of conflict associated with land tenure and land use. Therefore, at this time it is not possible to say that the steady movement of families into the inland planting sites is causing friction. No reference was made to government proposals on the leasing of customary lands for economic purposes either. At the time of the study, ADB was providing technical assistance to the government of Samoa to consider options of permitting leases of customary land to be mortgaged and recommendations to implement such arrangements (ADB, 2009, 2015c).

As regards to sea resources, Samoa has a system of property rights on reef and lagoon areas. This system is characterised by legal ownership by the state, combined with

customary ownership of fishing rights by community village groups (Fairbairn-Dunlop, 1991). One participant explained the village rules:

> In Lotofaga, village rules and bylaws guide the use of sea resources. For instance, the use of dynamite, *ava niukini [Paraderris Montana]*, and other harmful methods for fishing are prohibited in the village. (IS3)

Knowledge about climate change

Access to information

Every participant I talked to had heard the term "climate change" on the radio and television, during information campaigns organised by government officials, and also in consultations for development initiatives in Lotofaga. One participant commented that even the churches were spearheading activities relating to climate-change awareness:

> During the SIDS conference [in 2014], representatives of churches stood together in the sea in Apia, praying for those people vulnerable to rising sea levels and extreme weather events. These activities are often conducted by churches to raise awareness of the impact of climate change. (INZ5)

All participants were aware of the Samoan term for climate change as *"fesui'aiga o le tau"*. However, while familiar with the term, there were different understandings of what climate change meant or how the technical information about climate change they received applied to their daily lives. An NGO representative said:

> We hear all these very technological terminologies from government and others, and on the radio, but we really need to make sure that we understand what climate change is. Many of these concepts are driven in terms of global processes. It's very important for rural people to better align what they are doing at the village-level towards climate change globally, and what we can do in our own villages. (IS2)

The youth I talked to had an understanding of specific aspects of climate change largely, they said, due to school educational campaigns and information through social media:

> Nowadays people keep burning [fossil fuels], and that affects the ozone [layer]. The ozone thing can be broken because people are burning something. So maybe it can create a tsunami and a cyclone. (LO9)

> These days, just from what I've seen, there are lots of changes in the climate. I know because it's caused by lots of air pollution in the urban areas; the use of cars. Things like that have affected the ozone layer. These days, when the sun shines, we feel it, especially in Apia town. It's extremely hot; the sunlight beams through; the rays of the sun… when they touch the body it's extremely hot. The

hot weather has greatly increased. The ozone is not preventing the sun from beaming through. (LO10)

Apia participants were especially aware of how climate change had impacted not only Lotofaga but the urban area as well. AP1 said:

[In Lotofaga] the sea has moved inland a bit more than [where] it used to be. It's slowly coming in. I remember when I was younger; we used to have a wider beach. I think it has been affected by climate change… Apia is congested. I guess like anywhere else, with urbanisation and climate change, these are the common problems around the Pacific region, around the world. (AP1)

Auckland participants were highly aware of the impacts of climate change in Samoa and other Pacific Islands, largely drawn from television news reports and photos. However, those who did not return home often maintained almost an idyllic vision of Lotofaga. In our conversations, they did not associate climate change with specific problems. In fact, catastrophic scenarios were not part of our discussions.

Climate change, in my own opinion, is happening everywhere. But [the impacts of climate change] in Samoa are not the same as in low atolls; we have high lands close to most of our coasts. (NZ5)

Memories of natural disasters

The memories of natural disasters, such as the 2009 tsunami and the 2012 cyclone, weaved into and influenced participants' perceptions of climate change. The 2009 tsunami wiped out large stretches of the south and south-east coasts of Upolu, including villages neighbouring Lotofaga. While participants outlined the effects of the tsunami on their livelihoods and infrastructure, they were keenly aware that Lotofaga had not been as severely affected as the neighbouring villages. They noted, however, fear about these events and how they were vulnerable to forces which they said were beyond their control. In addition, male and female participants, young and old, drew on their memories to analyse and interpret the recent natural disasters, many saying "this didn't happen before":

Lots of changes nowadays. Our family was not badly affected by the tsunami, only our road because the waves went up that way. Did you both come from below? [A question put to the researcher and research assistant]. For us, a contentious matter we are facing here is the road, our road. These days, cars cannot travel along it because it was damaged. Well, see for yourselves how big a problem our road is for us. (LO2)

Nowadays there are tsunamis that come. There was never any of that when I was growing up. It's a new occurrence in these times; life has changed. (WG4)

I know there are lots of changes nowadays. Earthquakes and tsunamis are happening, and especially things like cyclones are happening more these days in our lifetime, but in the old days there was never any, or rarely any, occurrences in Samoa. (WG3)

[Because of the tsunami] people are traumatised; they are scared. It's hard to work; people think about this thing happening again. They feel it's not right because that was the first time the new and the old generations saw the tsunami. That was the first tsunami in Samoa. I know this is a big problem for all the people. We are afraid this thing happens again. (LO6)

Most of the people now remember the tsunami and the memory will carry [on] for a long time, and I think because of that people are now making some decisions not to live near the sea. (AP2)

Just as families had started to get things back to normal, the 2009 tsunami had been followed in 2012 by Cyclone Evan which damaged homes and village infrastructure, including the primary school. The plantation access roads were also wrecked, so influencing the patterns of daily life events:

Nowadays, strong, strong cyclones, [and much] destruction. The big problem now is the access road... the way we walk; you jump from one side to the other side. That is the way cos no one can drive there. It's a problem for the kids; they have to wake up early in the morning, at four o'clock or five o'clock, to go to school and church. That's why we need help. (LO6)

Climate justice

One interesting finding was the number of participants who framed their responses in terms of issues of climate justice and political concerns. They emphasised that climate change is caused or originates elsewhere, and vulnerable areas like Lotofaga are disproportionally affected. A male participant said:

Before that [climate change] was the time when the sun's harmful rays couldn't get through, the ozone was good, and we were happy; there was no much pollution. But now there is lots of pollution, there is lots of manufacturing and things like that. Something that I know is happening now... I think the reason for climate change these days is because the sun's rays are stronger. When it rains now, it really pours down. Suddenly, cyclones happen at other times, and we don't know why. (LO10)

A male *matai* said:

It's quite unfair to start talking about climate change, how you adapt to climate change or how much contribution you have to make towards a global responsibility, when we have contributed negligible or even nothing to the problem. (IS2)

A female *matai,* who lives in Auckland, was more incisive when she said:

Climate change is created by scientists, the wealthy and politically influential individuals because they see doubt as their product. They use tactics of fear, uncertainty and doubt; it's a pattern created to justify the lack of insight and understanding of the makeup of individuals, and their cultural and traditional values. (NZ1)

She added that climate change is a common responsibility:

Climate change is about all the happenings and the challenges surrounding people's lives. It needs demonstration of leadership, policies to be set at national, regional and global levels to benefit people. (NZ1)

Observations of climate change effects

While the technical underpinnings of the term "climate change" might be unclear, participants were very aware of the changes in their environment, and the effects these have had on their lives and livelihoods. A number of participants associated climate change with changes in temperature and precipitation: that weather patterns have become unpredictable and extreme all the year round.

Changes in temperature

There was a consensus amongst all participants that temperatures have increased over the past years. All stated very firmly that hot weather is an issue throughout the whole year:

Our weather has drastically changed from those days; it's extremely hot these days and there's never a brief moment of breeze. Most of the time it's really hot. (WG4)

It's much hotter, not like the old days. The old days, true, it was hot, but not as dry and extreme. It has changed. These days the hot sun dominates. (LO2)

Sometimes the weather is very hot; you don't feel the cold but just very, very hot. And even at night, it's the same thing, the hot weather hasn't changed. (LO1)

Even when it rains, it is still hot, the weather is getting really hot… hot weather has greatly increased. (LO4)

LO8 referred to the changing weather patterns as 'strange':

> Before it was not too hot, but now it's very hot. We see the changing weather during day time [hot], when it goes to the night time it's very hot, but during day time it's the same thing. So, we can compare the olden days, the weather was all good, but nowadays it's so strange, the changing of the weather. (LO8)

In WG5's view, thunder and lightning had not been so frequent in the past as today:

> For me, and what I've seen, the striking of thunder and lightning is very new. This is a new experience for me, in my entire life. From October to this month [November] I have been startled by thunder and lightning. The lightning flashes are strong; that's when I knew for certain that there were changes in weather patterns that have affected us and our progress forward. (WG5)

LO7, a young mother, said the heat made them feel sick:

> Before it was very nice and right now it's really hot. It makes us feel sick because when you go out [during the day], you can feel your body burning inside. The heat is really bad. (LO7)

The impact of climate change on health is discussed further below.

Changes in rainfall patterns

Participants noted changes in rainfall patterns compared with the past:

> These days the rainfall is different. It rains and [then] it's sunny, it rains, it's sunny. That what is like now, and there are huge changes these days, changes in the climate. (WG3)

More particularly, however, there was a deep concern that, with the decreases in rainfall in recent years, rivers and streams were drying up. Today there is inadequate water for family use or farming. WG4 and WG2 highlighted the link between lack of water and changes in temperature in this way:

> Now the sun is hotter, and there's hardly any rain. Those days [in the past] people, particularly people of our village, never experienced any shortage like these days. They would have never guessed there would not be enough fresh water for our people. The sun is stronger and hotter which has dried the soil and especially the plants which provide shade for the place where fresh water springs [come] from... I know the change today is because there is not enough fresh water these days, because of the pinch of the sun and the dry soil. There is not enough fresh water. (WG4)

> In the past, it was better, but these days… there are huge differences. When the sun is beaming hot, down there, there's no water. We have water shortages, and

> people are left guessing when there will be [more] water. Unless there is rain, that's the only time we get fresh water. (WG2)

All participants said that while Lotofaga had often had problems with water shortages in the past, this had increased significantly. LO2 explained how they had traditionally dealt with water shortages in the village:

> There is not enough water for the family. Sometimes you have to wait for the rain… the water over here, sometimes it comes in drops… In the past it was difficult to access clean, fresh water. It had to be sourced from wells or the ocean; then it was boiled to remove the salt. (LO2)

The families who did not have water tanks knew they could always rely on other families. However, this was not ideal:

> We have problems with water. Sometimes we run out of our water; it takes a week to wait for [more] water. So, we go up and ask for some water from another family because they have a water tank; then we wait for the water to come back. [If] there's no rain, the plantations start to die away. So, it's good if it rains… some families have got [tanks]... after the tsunami. I asked the Red Cross to bring a tank down here, in my place, but right now I am still waiting [for the tank]. (LO7)

The relationship between water shortage and good health is discussed further below.

Changes in marine and terrestrial environment

Most comments about changes in the marine environment due to climate change focused on the decline of and changes in fish species in the reefs and lagoon, coral bleaching, sea-level rise, high waves and changes in the currents. A number of people noted that today there are less fish and far less shellfish, and fishing is more difficult:

> These days, almost no fish. If there are any, you get small ones, not like in the past, when the fish were big. I also noted that after the tsunami our coral is bleaching rapidly (WG2)

> The sea is ruined from the starfish. There are lots of starfish during our poor season, when fish are scarce. It's not good, especially when there's a crown-of-thorns starfish. (WG1)

Participants living in New Zealand also showed great awareness of larger scale impacts of changes:

> The change of the weather is huge. Cyclones. I think when I was young I never saw anything like that… I can see the sea-level rise. If you go there, you can

see the difference [between] when you were young and now. When you go back there is a big difference, like you've seen before on the coast. (NZ2)

In terms of climate change, because I go back frequently, and I visit Lotofaga, I see a lot more erosion… sea erosion of the beaches and the shores; there's a lot more of that. When I was young, the beach was much further into the lagoon; now it's much further inland. Our family land, as part of the lower part of Lotofaga, has been eroded gradually. (NZ3)

Less was said about the impact of climate change on terrestrial ecosystems. Lotofaga's natural forests are highly vulnerable to climate change and also to unsustainable land use practices. A key informant, representing an NGO in Samoa explained these issues with these words:

In Samoa, climate change is affecting our forests. There are forest fires as result of droughts. There's clear interference in the normal cycles of rainfall patterns. Then, the cyclones have caused serious damages in our forests. (IS2)

He also highlighted the man-made causes of forest degradation:

Sometimes poverty forces people to cut their forest for cash. What is worse is that business operators force village leaders to accept their short term and large cash offers in return to the communities as compensation for them to harvest their forest resources. Villages do not have the capacity to monitor or assess the selection process on the trees being cut. Another problem is that the village plantation roads provide easy access so loggers can cut the forests. This situation has affected our rich biodiversity, water resources, soil, and ecosystems negatively. (IS2)

Impacts of climate change and natural disasters on the quality of life

Impacts on people's health

All participants saw a direct link between changing weather patterns, water availability and health and disease:

[That] people's health, these days is different. There are lots of diseases these days. It's not like life in Samoa in the past. (WG4)

There are lots of diseases within our country because of the changes in the weather, rapid changes… it's hot. These days, lots of diseases have arisen due to the differences in the weather. (WG1)

The weather sometimes gives people the flu; other weather gives strength. That's my feeling about the differences in weather these days. (WG2)

The vital importance of water to good health was also emphasised:

The other thing is our drinking water. If there is no rain, [there's] no water in our tap. We have now only diseases that come from this, and it's due to the changes in the weather. We don't understand the reason why this is happening. (WG5)

Towards the end of last year [2012] we got rainfall which provided fresh water, [so] now we have some [water]. This restored people's health and wellbeing. (WG2)

Participants said elders and children were most at risk. A young farmer put it this way:

There are lots of effects such as diseases because of the changes in climate. New diseases have arisen that affect not only children but also old people. The extreme hot weather has caused the fast attack of cancer. There are lots of people suffering from cancer these days. The other disease is the fever I've heard [about]. Lots of kids are being affected; the flu [happens] because of the weather. (LO10)

His view was supported by a young mother:

The change of climate these days is huge. Have you seen our children's bodies? Lots are suffering from different types of diseases. Lots of diseases have arisen from the dirt, because of the change we see now. When the sun beats down hard, you burn. When it's fiercely hot, it's similar to the red-hot heat of a fire. That's how I know there are huge changes. (WG3)

An elderly woman said:

Well, don't you think that maybe I'm the one affected by the change in the weather? For three months I have been unwell. Do you know what's happening to my body?... I'm extremely hot, even at night. I can't use a sheet to cover up as I sleep. (LO1)

A young mother commented:

Sometimes it's really hot, and it makes us feel sick. The weather is really hot and people feel tired and get sick. Big change now. (LO7)

It was also said that high temperatures affected work and productivity:

The weather has put some people down; they feel tired; they feel sick sometimes. That's why people stay in their houses; nobody likes to go to [work] the *maumaga* [taro-patch] because they feel… it's like burning inside. Before you worked hard, but now only small things [make] you feel tired. (LO6)

In the past, I was very strong and could collect up to a hundred coconuts, but now I wouldn't be able to get half of that; my strength is not the same anymore. (WG4)

> I'm tired because of the weather. It's really hot these days for me. As a consequence of the hot weather, there is an increase in diseases. Our bodies feel weak; we don't know who will do the [work] when weakness and laziness set upon us, when you can't be bothered because of the rapid changes in weather. (WG3)

> When the sun comes out, that 'can't be bothered' feeling looms over us. It's laziness; we refuse to do any more chores. (WG2)

These reflections on the linkages between variable weather patterns and human health are in line with external documentary evidence. According to WHO (2015c), a lack of safe water compromises hygiene and increases the risk of diarrhoeal and other infectious diseases. Flooding contaminates freshwater supplies, increases the risk of water-borne diseases and creates breeding grounds for disease-carrying insects such as mosquitoes. In 2014, some Lotofaga families were affected by the national outbreak of the mosquito-borne chikungunya virus.

Impact on livelihood security

Food security

Discussions backed by my observations confirmed that families in Lotofaga produce a range of agricultural, livestock and marine goods necessary to food security. The most common items of family diet were home produced. These were taro, breadfruit, green bananas and *palusami* (a Samoan dish made with coconut cream and taro leaves) with fish or shellfish (once or twice a week) and the addition of chicken, octopus, pork (on special occasions) and vegetables. Purchased food items included sugar, rice, flour and salt and *pisupo* (corned beef), canned fish and imported chicken.

In general, it can be said that families in Lotofaga are achieving the FAO definition of food security: "When all members, at all times, have physical and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 2008, p. 1). Participants said that most families in Lotofaga achieve food security through a combination of factors of food availability and accessibility, cash income (informal sales) and, support from family members living in Apia and abroad. Few families face periods of food insecurity derived from the lack of labour force or low income. However, for all families, climate change and natural disasters represent a threat to the achievement of food security because of their primary livelihoods, such as semi-subsistence agriculture and fishing, are based on their natural resources, sensitive to climate-related impacts.

Participants' views on food security differed. A young mother commented:

> I have so much food on my land because I grow crops and some veggies. So we depend on those and we have something to eat. If we don't have money, we can have a pig or chicken to make a soup or something, and taro. [My family] produces more than enough. It's the same for other families because all the families in the village grow some crops and [have] some pigs and some chicken. Some families have lots of cows. (LO7)

Another woman said food security was not a problem because they had fewer family members living in Lotofaga:

> Yes, there is more than enough [produce], because there aren't many of us at home. However, just because we have more than enough doesn't mean we should take this for granted. It doesn't mean we have to stop working. We still continue to plant more crops. We have paw-paw, taro, yams and banana. (LO4)

Other comments referred to selling and exchange of family produced goods:

> If people want a bunch of bananas, then we sell them a bunch of bananas. Some people come wanting pumpkins, or fruit or things like eggplant, so those are the things we sell to get money here. (LO1)

> From what I know, it's almost the same [for other families]. Produce is taken and sold for money, and in return, the shopping is done to sustain the family. It's just like the sea. The boat goes out and catches fish which we sell to sustain the family. (WG2)

> We just sustain ourselves with catches from fishing and growing crops. But if we get some surplus money, we buy some products to improve our fishing tools, to obtain a surplus of fish and for our plantations. Or we sometimes like to buy things like pieces of fish from the shops. Just a change in the diet from domesticated chicken and other food stuffs. (LO10)

> My older brother has a big plantation. My second brother, who is looking after the shop, has pigs and chicken. That's more than enough for our family [in Lotofaga]. (AP2)

A female participant noted that some fishing skills have been lost or are missing:

> I myself am certain that we have enough crops but some families don't have anybody who can go out and fish. In the past, lots of people fished but these days… people have moved away from going to sea. (WG1)

Farming

Research findings showed agriculture as practised in Lotofaga to be labour intensive and characterised by the use of traditional farming techniques. There was no mechanisation or irrigation noted. The methods of clearing, planting and weeding were based on simple technology and hand labour. Most farmers said that a bush knife and hand weeding were their primary means of tending their plantations and gardens. Participants' list of the crops they grow highlighted the diversified nature of their farming systems as well as families' fine attention to seasonal factors. Taro was the dominant crop, along with other subsistence crops such as breadfruit, banana and coconut. A variety of vegetables were also grown such as eggplant, pumpkin, and cucumber, and fruit including paw-paw, star fruit and pineapple were grown in small patches largely for family consumption. Some families said they grew medicinal plants and the *noni* fruit (*Morinda citrifolia L)* which are used as a dietary supplement and medicine. Kava (*Piper methysticum*) for ceremonies, leisure and sale purposes was also cultivated on the plantations and village household plots. The nature of the family production system was described in this way:

> We have a plantation; we work together with my son and his wife, and my wife too. We have coconut, cucumber, tomatoes, banana and taro. However, it was better in the past. (LO6)

A major change, however, was the use of agrochemicals. Almost half of the participants highlighted what they described as unsustainable agricultural practices associated with the use of agrochemicals, but also in their view associated with ameliorating the impacts of climate change. Participants in the women's group *talanoa* were particularly vocal on this issue. They said:

> In the past, there weren't any chemicals used like these days. In the past, people used machetes to clear the land before planting. Now chemicals are used to spray the bush before planting the taro root, whereas in the past chemicals were never used. People used their hands in the past. (WG4)

> Nowadays, chemical sprays are used on bushes for taro roots to be planted. But in the past, clearing of land was done using machetes and weeding by hand. Chemicals were never used, but now they [farmers] use chemicals on everything. (WG3)

> When people went to cultivate taro gardens, everything was done by hand. Chemicals were not used, only just now. There is a great change. Chemicals help to clear the land to get taro; it helps to clean the taro gardens. (WG1)

One elderly woman linked the overuse of chemicals with poor crops:

> Changes from back in the old days… the plants such as taro and bananas would grow in excess. However, these days not good, less good crops, maybe it's the weed spray that's caused the drop in growth. (LO2)

Male participants supported these women's views:

> They use chemicals, unlike [in] the old days [when] there weren't many chemicals. So they didn't use any chemicals in those days; people used to weed the bush [by hand], but these days people rely heavily on the use of chemicals to remove the weeds, to prepare [for] cultivation of the crops and plantations…The other thing is there are lots of methods that people use these days to cultivate the crops and plantations. They spray the soil with fertilizer. But in the past it was natural, normal, how land was maintained. (LO10)

> It's a bit different now… Now people use [herbicide name] to kill the grass, but before they used the hand and the knife to clean the grass and everything… I don't know, the government… we've heard they're trying to stop the [herbicide name]. They want to go back to the previous life. (LO6)

> Sometimes we use it [the pesticide] … my husband has a big plantation, but he can't work right now because now [there are] so many pests in the plantation... we need money to buy [pesticide name]. (LO7)

Some women participants had joined an agricultural initiative that promoted organic agriculture. An elderly woman said:

> In our land here, we don't use weed spray. The land is left natural. Our land here is under Women and Business [referring to an NGO], so we don't use weed spray. (LO1)

Women were also involved in the manufacturing of bark cloth (*siapo*), fine mats (*i'e toga*), sleeping mats and floor mats. Other goods produced using coconut palm fronds included food trays (*laulau*), house blinds (*pola*) and food baskets (*ato*).

Livestock

Livestock in the village is largely semi-subsistence in nature, except for very small segments of medium-scale cattle production. The main livestock animals (poultry, pigs and cows) are raised for domestic consumption and *fa'alavelave,* and horses are still used for transportation in the village. Notably, families that have cattle are those who receive economic support from family members living in Apia or receive remittances from kin members living overseas. Participants saw having cattle as being for the wealthy. For example:

> I've got only domesticated pigs and chicken. We don't have any cows; they are very expensive. (LO3)

> All the families around the village have some pigs and some chicken. Some families have lots of cows; the wealthy ones [do]. (LO7)

> We have only chicken and a few pigs, [but] no cows; [they are] expensive. (LO8)

A male farmer explained how pigs and cows are important items used as a contribution for *fa'alavelave* or consumed on special occasions:

> I have few cows; I tend the cows because [they are] only [for] *fa'alavelave*. Some Samoans have cows, pigs, and they save them for the Samoan custom, the *fa'alavelave*. Sometimes people eat chicken. Not all the time [though]. (LO6)

A woman now living in Apia, whose family in the village has cattle, commented on her family's need for more land:

> We've actually got more [cattle] now than we had twenty years ago. The only problem is the limitation of land for the number of cattle that we have. We are trying to ask our neighbours if we could utilise some of the grass to feed the cattle. (AP1)

Interestingly, a participant mentioned that climate change is affecting animal health. A female participant reported:

> I've heard there are lots of climate change problems such as the weather where animals get sick. (WG1)

Fishing

Next to agriculture, fishing is the most important activity in Lotofaga and is carried out by villagers operating in shallow lagoon waters adjacent to their lands. A female *matai* summarised the importance of fishing with these words:

> Fishing is still strong, back home, as a means for food and a healthy diet. When I last visited, last year, villagers still fish in the reefs: spear fishing, netting and other sorts of fishing. People still love fishing; fishing using canoes and fishing boats continues to be strong. People are still doing all sorts of traditional fishing, night and day. (NZ1)

Most fishing occurs from canoes or by walking along the edge of the water and is mainly for subsistence and for sale when there is a surplus. The most common fishing practices combine traditional and modern fishing techniques, including: dive fishing

(with masks, fins and snorkel), net fishing (in shallow water), spear fishing (in both the fringe reef for fish and shellfish, and in deep water beyond the reef), trap fishing (on the reef and also in deep water), line fishing (fishing with hand lines and baited metal hooks), knife fishing (an activity that both men and women can perform), hand fishing (inserting a thin stick into holes in the reef coral in order to find the hiding fish), and night spearing (using underwater torches).

Two male participants enthusiastically described the modern fishing tools used today:

> Nowadays, there are lots of nice tools. Fishing tools are well-developed in how they are made. They are good, like flapping shoes, things like boats are good, but in the past the old men used *lulu popo,* sprinkle coconut crumbs to summon and lure the fishes so they could catch them. That's a difference these days. (LO10)

> Today there are more tools to catch the fish like poles and nets, but before [there was] only the spear. (LO6)

Fishing, as in the case of agriculture, is a family affair. Women had much to say about fishing, and this highlighted very compellingly their role and their knowledge from past times. These views are presented fully to highlight women's traditional knowledge:

> There are lots of changes from the old days to now. In the old days, the first thing is the *vaa o lepa*, a fishing technique they used to catch sharks. The old men would go and remain motionless in the water to catch sharks. Women and men together collected the fish. The men collected squid. The boats trawled (with a baited line) and caught squid and various other types of fish. The old people dug up the sand to get fish called *sugale* that hid in the sand. The women knew when the fish came to the surface because the sand flew up and all they had to do was poke it and pull it out, and there was a *sugale* fish. Other old people would catch *alili* – small fish/mollusc under rocks and get *aliao*. Some mothers used to collect crabs along the rocks; in those days there were various ways of fishing but these days people only [get] *laga*. There is no more collecting of fish or crab or *vaalepa* like the old days. These days the only method is *lama* – fishing by torchlight. Other fishing techniques are no longer used like in the old days. (WG4)

> In the past, the old men would go with their boats and catch fish using the *kosokoso* (pulling method). They brought back snapper. Also, the old women sometimes went with baskets *(ola)* to fish, and they collected large quantities of the different types of fish. But these days you will never see this type of fishing. Instead, fishing rods are used. Fishing boats are used and people dive. There are hardly any fishing techniques that were [once] used, especially the canoe they used to build [in] those days. They would go fishing with oil lamps, but these days it's battery-run torches. That's my own understanding of the differences between the past and the present day. (WG3)

I remember in the old days, the old men would lure octopus using a rock (shaped like an octopus) to attract the octopus. The men would shake this rock and the octopus would attach itself to it, and then it was captured. And men also made a fishing rod to capture fish. Nowadays, most people dive and use a spear to catch fish. (LO1)

In the past, they used a *seuseu* (lure), a long-handed hoop net, used for grey mullet, attached to a long bamboo pole. It was used by old men back in the old days. And we used the *makakao* or spear-prong. We didn't use techniques such as *ava niukini* [*Paraderris montana*]. These days, only the fishing net is used. It is cast into the sea, and you get fish. (LO4)

A male villager also explained some of the differences in fishing techniques:

Now they use a flashlight and catch more fish at night time. But before they used the Samoan basket they call *ola*. They put the coconut rubbish inside and the small fish came and ate it. The fish were picked up and put in the boat. But now they don't want to do that. They've changed; now they go and use the boat and flashlight. Everything is easy now. (LO6)

While participants reflected on the old ways of fishing, they also emphasised the challenges they face today. One participant recalled:

The sea used to be like a garden from which we could feed our families. Nowadays, everything is different; coral fish are dying off, and we have to row far out to sea to fill our nets and it is difficult to continue our fishing routines. (WG1)

While most participants could not explain what was happening, many believed changes were linked to climate change and natural disasters, such as the 2009 tsunami and cyclones:

Lots of changes. In the old days, the fishing trips were always successful, but these days it's not the same. There aren't many, and you don't get as many fish as [in] the old days. It's not good. The sea is very rough; there are strong winds and high tides, and also the occurrence of cyclones and the tsunami have had negative effects on fishing. (LO2)

Something happened with the tsunami; that's why this problem is happening and because over here it's rougher... wave and wind… the tsunami, the heavy breakers on us. (LO1)

Before, it was easy to find the big fish but now [just] small ones after the tsunami. That's why there are no crabs on the seabed now. (LO6)

My husband likes to go fishing, but [now] no good fish after the tsunami. (LO8)

> I like fishing, but it's hard to find fish today. It was better in the past, and it's getting quite expensive. It's changing. I think it's because of the weather, storms. Before cyclones occurred every five years, but now they're more frequent. (NZ5)

Despite the fact that fishing is an important activity in the village, and fish is one of the main components of people's diet, not all the families can practise fishing. Cost of equipment was one factor:

> I am not used to going fishing; nor is my husband… some people go out fishing and get a very good catch. Nets are expensive and some families cannot afford them. (LO7)

Furthermore, participants were well aware of the fishing regulations that the Ministry of Agriculture and Fisheries in Samoa establishes and the limits on fish size:

> Now the government makes the rules… don't bring in the small ones… if they find out that you are bringing the small ones to the market, they ticket you. (LO6)

> The government is quick to encourage fishing trips because there is now the fish market to supply in Apia. However, they have set a size limit on the various types of fish that can be caught, and there are other types that are not to be caught at all. If the fish are small, you get fined by the government. (LO10)

Interestingly, participants said they still relied on their traditional management practices. They were informed about the life cycles of fish species, and prescribed specific times for catching different types of fish. INZ2 noted the Samoan worldview that all things are connected to each other:

> According to the villagers, breaking the [fishing] rules can have serious consequences such as a poor catch, illness or even cyclones and flooding. Take only what you need. (INZ2)

That said, many comments reaffirmed a relationship between people and the sea, as well as a great respect:

> We have great respect for the sea. Overfishing would anger the sea; we just take what we need and we adhere to a code of conduct. According to our ancient tales, the sea has the power to change and take any form. The sea can capsize canoes and fishing boats. (IS1)

Hardship

Several factors influence livelihood security and quality of life, such as socio-economic status, gender and age. An elderly woman explained different families' experiences in her own words:

> Families are not all the same. Some families don't have taro gardens; they buy their taro. Some families don't fish. So, if they have to buy taro to prepare a meal and also buy some fish, it's a wonder where they get the money to do so… Some families with lots of taro and food take it to the market. Some families have boys who grow crops, and some people fish. Whereas [in] some families, like our family, no one fishes. (WG4)

From my observations and discussions with participants, the vulnerable families were those who had an insufficient labour force, did not receive remittances (goods or cash) and those who did not 'belong' to the village and hence had challenges accessing land. It was difficult to separate the impact of these factors. For example, LO4 who is in this situation said:

> My late husband's children from his first family had gone away to America, New Zealand and Australia in search of fortune and success and to help and support the family. But no one supports me and my children. (LO4)

A number of participants said they were selling produce to cover other family needs such as school fees:

> Not enough money. We need money to pay school fees, to buy food. (LO5)

> In the past, we consumed our produce but these days they are mostly taken to be sold for money to help sustain and look after the family. (LO4)

For most families, the injection of remittances usually helped address present basic needs and also enabled families to generate further livelihood options such as purchasing livestock, agricultural inputs and fishing equipment:

> Some families have no plantation so they depend on family overseas; they really need the remittances. So, as you have seen here in Samoa, we depend on crops and fish so we can go to the market and sell it. (WG5)

> We are okay; we have crops and plantations to sustain our family and we receive remittances from family living in New Zealand. They went there to help our family. (LO3)

A farmer who also works in Apia to diversify family income said:

> The only thing is money that's sort of [got us] stuck us now. In Apia we are trying to sell sausages and other things, so we can get money for us back here [in Lotofaga]… I sell fish and sausages, coke [cans] and lots of Samoan products like *keke puaa* [pork buns]. (LO10)

Clearly migration and, in turn, migrant remittances now play a key role in diversifying families' income generation so enabling them to meet their needs, contribute to the church and fulfil the cultural obligation of *fa'alavelave*. A female *matai*, who lives in Apia and supports her family and the village, said:

> I strongly support our village and my family. On the first Sunday of the month I always go back to the village, I donate money to the church in the village. I always support the village. I am a *matai* there. (AP2)

As well reported, under the framework of the *fa'a Samoa,* customary systems provide the coping mechanisms or safety nets for families. This was evident in Lotofaga. For instance, in times of water shortage families shared tank water. However, one participant also mentioned that Samoan customs and traditions can place a burden on families. LO6 said:

> I love *fa'a Samoa*, but [when money is] not enough to take care of the family, we are worried. We need money to make the Samoan *fa'alavelave*, money to pay the debts; it's a Samoan custom. When somebody dies, it's over ten thousand [tala]. The family [has to] spend, because all the people come in the village, the *matai*, the women and all the people in the church. If I die, and I'm a *matai* and I'm related, all the people in the church come too. (LO6)

Knowledge base to adapt to climate change

Anecdotal evidence indicates that families in Lotofaga have adapted to different climatic conditions over generations. Families' capacity to adapt to environmental change has been based on an in-depth understanding of their land and natural resources. However, as climate change is increasingly affecting the village, people are responding and adapting in unique ways. They are combining their own traditional knowledge with Western-based technical knowledge that they receive mainly from development projects supported by the government, NGOs and international organisations.

Traditional knowledge

There is evidence that Lotofaga families' traditional knowledge, values and beliefs continue to guide their interactions with their land, sea and natural resources and that

their responses to climate change are framed around the *fa'a Samoa.* Participants showed a great pride, as seen in these comments:

> We have learnt to adapt for generations. People in Samoa can actually survive so well with very limited resources because that's their nature, that's how they live. This may be limited in the concept of how Westerners see it but it's rich. There are rich resources in the rivers, in the sea, in the land, and the people have lived very happily. And a lot of the practices they have actually adapted to, [like] issues of climate change, when they conserve their mangroves, when they harvest their marine resources or even harvest agricultural produce and some of their crops. Actually, crops are a measure of adaptation. (IS2)

> We've learned [to adapt to climate change] from our ancestors. We just think of our ancestors; we believe [in] their guidance. The stars and the wind, they knew what happened at each time. We just think about all that. (MG2)

Others noted the ways their traditional social structures have adapted to climate change; a male *matai* made reference to the *fa'a matai* system and *fa'a Samoa*:

> We know how to live with [climate change]. In our village, we have different duties. Here a chief is a chief. We have community meetings, assemblies. We teach our children, adults do what they need to do, so [we] just do it. It's our custom, our *fa'a Samoa.* Just respect everybody, not just their parents but the village, our land [too]. (MG3)

Although a number of participants described their traditional knowledge as alive, others were a little pessimistic. For example:

> We rely on the knowledge of our ancestors, our parents, grandparents, but sometimes we don't understand changes anymore; maybe our ancestors can no longer help us. (LO3)

Participants in Apia and Auckland considered that their traditional knowledge was being challenged by climate change:

> When we really come to think of climate change, Samoa is not the only one who is suffering from climate change. We have always lived with changes; we have constantly been adapting ourselves. Maybe it's more difficult now. It's a global problem now. (AP5)

In general, all adults, and particularly elderly participants, believed that they had a responsibility to pass on their traditional knowledge and wisdom to the young:

> Traditional knowledge is so important because that's the knowledge that has kept people alive for generations. And we need, for Samoa, to be very careful that we are not telling them to do something different which they are not accustomed to.

[Like being] driven by foreign concepts that will end up being detrimental in terms of their whole livelihoods. (NZ2)

Spirituality was a recurrent theme among participants as they talked about *fa'a Samoa*. Some associated climate change with God's will. A number of participants said that God created the world and entrusted its care to all of us. Therefore, we should be grateful for God's creation and we should protect that creation and also protect the people most affected by climate change. These included:

> I don't know the reason for these changes… only God the Almighty does because He rules over everything and controls the changes in climate. (LO1)

> I would leave this place only if and when it is God's will. But I can't go away [yet]. (LO4)

> In the past everything was blessed because the weather was blessed. (WG2)

> There is nothing we as people can do for the life of the Earth; the only thing is to give it to God's grace. He is the greatest help there is, but there are extreme changes in the climate these days. Just as many of us, the mothers gathered here, have declared, there are changes in the climate in Samoa today. (WG4)

An elderly man made reference to the man-made causes of climate change, in his view:

> Climate change is happening because of nuclear activities, something like that, and the mixture of gases. I think that's the reason for the changing climate. We just think of God's creation; only God can help. (MG2)

NZ5 was very worried about the impacts of climate change in Samoa and globally:

> I am a person of the church. God created the world for us, everything is there. But nowadays people are destroying [the environment], so flooding, earthquakes, cyclones are happening. How can we stop them? What is happening nowadays? We are creating damage. (NZ5)

Access to Western-based modern technical knowledge

Lotofaga families relied not only on their traditional knowledge to adapt to climate change, but they also had some access to modern technical information. As noted in Chapter 2, several information campaigns on disaster risk reduction and climate change have been organised in the village, and there have also been consultations for development initiatives that include climate change components. However, participant responses indicated that these activities had been sporadic with no follow-up.

As mentioned in Chapter 2, Lotofaga does not have a comprehensive development plan or a framework for adaptation to climate change. Therefore, the initiatives that have been implemented in the village could be termed as *ad-hoc* and not connected to one another. AP4, who lives in Apia, commented:

> We don't have a village plan, I think. There's no written plan, but they [the government] have calendars for development initiatives, like agricultural competitions, where farmers show their crops, cows, pigs. That's a good thing. I'm sure they [the government] have that [village plan]. For instance, in terms of tourism, there is a ministry; there is cohesion between government and the villages. (AP4)

In the absence of a concerted plan, it was apparent that families continually tested and combined their own traditional knowledge with technical knowledge and ideas gained from development projects and from other family members. LO10 was very positive about combining traditional and modern knowledge to address climate change challenges adding:

> If we can get help now from researchers, then we can work together to help the climate. (LO10)

NZ1 supported this view:

> I think those who are academics should be doing [research], they should rally together to pass on what is important for us when it comes to those changes. For example, we just had the tsunami. Nobody knew it was coming, but it killed [almost] everybody. (NZ1)

Many participants knew there had been climate change initiatives in the village but some had not been involved themselves. There was an impression that 'gender' was a factor here:

> My husband is the one who participates in this kind of training. They [government officials] help; they gave us the fertiliser for the plantation. They come and talk to people [about] how to grow their crops. Only my husband [attends these trainings] because he works on the plantation. (LO7)

By way of contrast, LO1 shared what she had learnt about the *fetau* tree (*Calophyllum*) in a Women in Business Development (WIB) project. She appreciated that this NGO had asked participants what they wanted and needed. However, she had no information about the marketing of the final product, the oil, and how and where it could be sold:

> When they [representatives of the NGO] come to conduct their inspections, they ask us to tell them things we want, like to develop [products] that can be sold [income-generating projects]. For example, cutting down a *fetau* tree*, a large coastal tree which we sell. We can get $27 a kilo, that's how much the Women in Business pay. I did it last year, but we haven't been told a time to cut [down] a *fetau* this year… I don't know [what happens after we grow, harvest and prepare the fruit], they [WIB] just come and take it, and then we get the money. (LO1)

Other participants said they had attended some consultations for new initiatives in the area, but there had been little time to fully understand the purpose of the initiatives because they were short and very technical. The participants thought those consultations were neither fully inclusive nor participatory.

Moreover, there have been some initiatives in the village regarding natural disasters. For instance, after the 2009 tsunami, some families received support to repair and rebuild their houses, while others were still waiting (at the time of my first visit to Lotofaga in November 2012).

LO4, who lives in the coastal area, explained her housing situation, saying that after the tsunami she went to a governmental department in Apia to request support for house reconstruction and cleaning debris and rubbish. Unfortunately, she has not yet received any help:

> Well, you see, it was only us [who helped each other]. You only receive gifts from the government if your family's house is destroyed. So, we didn't get anything from the government. (LO4)

A male villager, who faced the same situation, confirmed this:

> Probably the government prioritised touristic villages. Another reason would be the fact that officials provide assistance to their friends first, and they did not follow the rules of the job. We tell you the truth. Before I made that request I told some guys about all the rubbish down there but the officials never helped us. (LO6)

In 2012, Cyclone Evan also damaged houses, plantations and infrastructure, including the school. Repair work for the school was funded by villagers and kin members living in Apia and abroad. This showed the strength of communal ties.

Apart from talking about past events, participants also had the opportunity to talk about the future, including whether or not they felt they were better prepared for a natural

disaster should this occur. Despite the fact that they felt vulnerable to natural disasters, tremendous optimism was shown by all participants. There was solidarity within the village; they had their traditional knowledge to anticipate the occurrence of these kinds of events and, more importantly, they had the *fa'a matai*, their social structure and governance system. MG1 proudly stated:

> We had the tsunami in 2009 and all that [referring to climate-change-associated problems]. We are still here where we were since the old times, where our parents lived. Lotofaga is the best place in our life. The weather? We accept it. The weather is nothing at all for us. We accept it because we've lived with it. We were raised here. We have always just lived with this weather: hot, cold sometimes when the rain comes. (MG1)

After the 2009 tsunami, national and international organisations have been supporting education and infrastructure initiatives to reduce the damage and destruction of any type of disaster. In the case of an emergency due to natural disasters, participants said that they know what to do to stay safe:

> The government gave us some information about [natural disasters] … if something happens again, like cyclone, we are ready. If they say the tsunami is going to happen again, and they think that it will, we walk away. We have to go to a safe place for my children and me. (LO3)

> If something happens again, I know what to do. If they announce it on the radio, then it's good to move to a safe place. (LO6)

One issue that people mentioned repeatedly was the need for more coordinated support by external agents. They said that after the tsunami, families received clothing and food. However, they did not know which organisation was providing support as the items were channelled through the church. An elderly woman made the following statement:

> I don't know where they [the items] came from, except the things handed out from our church were distributed from the Josephs' house. They gave us clothes, *lava lava* [single rectangular cloth worn as a skirt] and bags of rice. Those were things gifted to us by our church. Clothes were distributed from the minister's house. (LO1)

In general, participants shared tremendous confidence in their village organisations such as the *fono matai*, the women's *komiti* and the churches because they can contribute to disseminating information on disaster preparedness among villagers and, most importantly, they can help in aid coordination:

In our community, there's a whole range [of organisations] and we have our men, our *fono* and a women's group, like the committee and even the church. The women have their own group and the younger generation also help, the boys who are not the chiefs yet. (MG1)

Chapter summary

Climate change is a growing concern in Lotofaga. It is now increasingly affecting people's lives and livelihoods. Semi-subsistence agriculture, livestock, fishing and other income-generating activities that are the main sources of families' livelihoods are significantly compromised. These effects add other pressures to their resources and traditional ways of life, threatening not only the viability of their livelihoods but also challenging their traditional knowledge and culture.

Although climate change is real, families in Lotofaga have shown tremendous resilience. Over generations, families have adopted different strategies to respond to climate change and natural disasters. Supported by strong social systems, families have been using their traditional knowledge in their production systems and the conservation of their natural resources.

They have also incorporated Western-based modern technical knowledge to assist them to deal with different challenges.

Climate change has differentiated effects as it tends to exacerbate differences among the various groups. While most families in the village appeared to be resilient to the impacts of climate change, a group of vulnerable families is emerging due to labour shortages, poor access to remittances and insufficient support. There are also gender-differentiated impacts as a result of gender inequalities that limit access to information and resources for women.

As regards the knowledge base on climate change, the participants said that there are some information gaps. Traditional knowledge plays a critical role in families' resilience as seen in families' fishing and farming systems, management and conservation of natural resources, adaptation to climate change and disasters risk reduction practices. While access to Western-based modern technical information presents some challenges, it is necessary that this information is made accessible to the people in the village as it is a major factor determining their ability to adapt to environmental changes. Interestingly, families also frame their knowledge base on climate change around climate justice.

Chapter 6 - Findings: Linking Climate Change and Population Movements in Lotofaga

The second question this study sought to determine is whether and how climate change has a role in people's decision to move internally in Samoa or abroad. Human mobility is not a new phenomenon in Lotofaga and, as in the rest of the country, people have always moved internally and abroad.

As discussed in Chapter 3, the extremely challenging task of disentangling climate change from other migration drivers reinforces the urgent need to contextualise migration drivers from the point of view of the people and within their own social and geographical contexts, as in this research. As noted by Samoan researcher Lilomaiava-Doktor (2009): "Local contexts merit serious consideration to better understand Pacific Islander movements. A more balanced approach must include people's indigenous knowledge and understanding of their movements, as well as the structural, economic, and political environments in which they are enmeshed" (p. 1).

A number of related findings overarch this chapter. The first refers to general mobility patterns. Three patterns of mobility were identified: (a) Movements within the village, mainly to inland family lands. (b) Migration to Apia, with individuals or families spending all or some of their time in Apia. (c) Migration overseas. Families might be engaged in all or some of these types of movements at any point in time. Circular movement was present within each of the three patterns of mobility – a coming and going both actual but also in the mind.

A second finding was that climate change-related factors have become prominent in discussions about mobility. While economic, social and cultural drivers were undeniably the priority concern such as the desire for more land for cash cropping, the benefits of education and employment associated with a move to Apia or overseas, climate change-related challenges are being factored into and have a place in family decision-making.

Third, and overarching all, was that participants stressed very compellingly that no matter how far they went or for how long, Lotofaga was their home, their place of identity and belonging.

This finding aligns with Lilomaiava-Doktor (2009) use of the Samoan concept of *malaga* to explain peoples' *vā* or relationship with the land. Connectedness to land is so strong that migration does not signal a severance of ties or being uprooted but 'in the eyes of those involved' migration is a continual 'going back and forth' (p. 1). Lilomaiava-Doktor (2009) writes:

> From the *fa'a Samoa* perspective, Samoan migrants do not live between two places with no single place to call home; rather, they remain firmly rooted in their identification with their place of origin. These blood and body links are internally related and functionally interdependent. (p. 7)

In line with Lilomaiava-Doktor's meaning of migration, it is not wise to explain mobility in Lotofaga by using rigid categories. However, for the purpose of this study, I will use a conventional typology to explore the various forms of internal and external mobility while contextualising these to the particular cultural context of Lotofaga village.

This chapter is in three parts. First, a general overview of the village population movements is presented, highlighting how people's mobility has a profound impact on the *'aiga* as a whole. In sum, mobility is not only an individual affair but also a family effort. In part two, climate-induced mobility is analysed within the village's broader socio-economic and cultural context. Third is a discussion of mobility as a risk-management strategy in the face of the impacts of climate change and natural disasters. The chapter concludes with a summary.

Overview of population movements

Three patterns of population movements were identified in Lotofaga: mobility within the village, migration to Apia and migration overseas.

Mobility within the village

A significant amount of movement from the former village's central coastal site has already taken place in the last decades. Today much of the village of Lotofaga is located along the main road to Apia and up in the family plantation hill sites. These movements are a response to improved infrastructure and other services as well as the expansion of cash cropping. Most importantly, findings were that these movements have also been a

response to climate-change-related factors. Notably, sea-level rise and natural disasters are reasons given for relocating to higher inland grounds.

AP3, who lives in Apia, explained the process of relocation inland with these words:

> A lot of new inland roads have been built in the country. And this is something that is necessary in terms of reacting to what is happening on the coastline. The most dangerous things, and the most concerning for us, are sea-level rise and natural disasters. Many villages have been actually moving where the road has been placed and people move inland where the road is. (AP3)

One participant highlighted the increase in cash cropping as a factor in the movement into the plantation lands:

> Since family members moved up [inland], they are cultivating more crops so they can sell [the produce] in the market. (NZ5)

There had been some movement into and between other villages largely through marriage. This point was signalled in discussions about rights to land. As is the custom, those from outside Lotofaga had some difficulties accessing land as seen in these comments:

> According to Samoan custom, when the girl gets a husband, they leave; when the boy gets a wife, they stay. (LO2)

> When I married my husband, I moved to Lotofaga. I was born in another village. (LO1)

> You don't have to move to another village when you get married. You are allowed to stay in your village, but you are not allowed to marry a man from your own village. It's good because [otherwise] if a disagreement arises between this girl of the village and this man of the village the two families will fight each other within the same village. And besides that, there is a saying in Samoa that "the people have more roots than the roots of the trees". Maybe you are not connected here, but you are connected to the man. Maybe you are not connected to the woman from a village but you are connected to the man from the same village. (AP5)

Migration to Apia

A number of families had moved to Apia either temporarily or permanently. An idea of the range of factors influencing these decisions is seen in these responses:

> I think a common reason why people move to Apia is for education and employment. But if the government provided the same quality of education and

employment accessible in rural areas, I don't see why people should be living in town. It's more peaceful there [in Lotofaga]. (AP4)

Lots of people have moved into town because of school and jobs. [Commuting] is expensive when you work in town and then have to go back to the village every day. I preferred to buy freehold land in town. It was easy for us to get a good shop [small business] there, and also it's much cheaper than going back to the village. (AP2)

My parents wanted a better future for us, so we moved to Apia for better schooling. I am thankful; we've been so lucky to have parents like them. They made good decisions for us; they pushed us to look for a better future. We're settled now. Some siblings in Apia and others have moved overseas. We have our own families, and we're happy. (AP1)

Talking about her children's future, a young mother affirmed:

Many people in the village go to Apia. Lotofaga is far away from town. Some families want to send their children to college and university. I want my kids to go to school in Apia, so I'll take them to my older sister's place there. Yes, this is why some people move to Apia. (LO7)

As in the concept of *malaga* (circular mobility), while they might live in Apia, families also maintained robust and firm networks with the village:

Many family members have moved to Apia. They live in Vaivase because my parents had their own piece of land there. But they go to Lotofaga frequently for family *fa'alavelave* and family get-togethers. [Our family] moved to town for education and work, and it's worth it. (NZ3)

AP2 explained that transport between Lotofaga and Apia was costly, so family members often opted to stay in Apia for varying lengths of time:

Lotofaga is not so far from Apia. I think it's 40 to 50 minutes' drive. So, it takes one hour and it's very expensive. When you have your own car, it's 50 tala or 40 tala per day for petrol. So, that is very expensive. You can't afford to do that, especially when you only get 200 tala for a week. So, it's not worth it. That's why you may want to stay in town. (AP2)

A significant amount of daily return travel from Lotofaga to Apia for purposes such as study, health or to sell agricultural goods was also found.

Another significant finding was that some people had no choice but to stay in the village. Moving to Apia was not within the reach of all families today. AP1 said:

> Many people are moving to town, especially young people, but people with low incomes always stay in the village. So, when they get a job in town, they always catch a bus and after work they go back by bus. (AP1)

This point is discussed later in the section 'Population movements as risk-management strategies'.

Migration overseas

All the families I talked to said they had family members living overseas, particularly in New Zealand, Australia and the United States. They classified some as more long-term migrants and others as short-term ones who had migrated mainly for work, studies, and family matters. Interestingly, and a main research finding, was that participants talked about migration as a strategy to diversify the family income, and they highlighted the reciprocal bonds maintained between family members which they said overrode the challenges of time and place:

> I have five children; two went to New Zealand and three went to Australia. They moved away just to seek a better future for the family; to see how it goes, and assist with family affairs. As you are well aware, my family is very poor. (LO1)

> There are a lot of family members living abroad. Some of them started their families and moved on, but they help family here. (LO2)

> Families who move overseas help their families here. They move overseas to help their families with their needs and wants. When they get jobs, they have to send money to help the families. (LO7)

An elderly male *matai* now living in Apia explained the migration process in this way:

> I'm sure there are a lot of our people in New Zealand, mainly in Auckland but also in Christchurch, and other communities in New Zealand. And I think we are now either in the third or fourth generation of New Zealand-born Samoans. So, people are still moving from Lotofaga because of the connection with those families that went to New Zealand many years back. My own children live in New Zealand; two of them were born in New Zealand because I was sent there by the government for educational purposes. (AP4)

When I asked participants living in New Zealand to reflect on their own experiences, they automatically referred to how migration impacted the family back home:

> Migration certainly has affected my immediate family. If I have a look at the people who are left in Samoa, roughly speaking, there is a 30-70 ratio, but 70 per cent are overseas. So, 30 per cent of the family are left back in Samoa, and even less are in Lotofaga. The main *matai* of our family had several children,

and, at the moment, there are only three left in Samoa and only one is living in Lotofaga. We are not different from many other families. A lot of my father's family are in the United States; they went through American Samoa because we had family [there] and then from American Samoa to Hawai'i and then to the United States in the 1960s, 1970s and 1980s. (NZ3)

In my case, I moved [to New Zealand] together with my family. In other cases, some parents send some of their kids for better education, good jobs, to support their families in Samoa. If there's any chance to bring family members here, others can come. But it depends on the New Zealand government; it's up to them, like other Pacific Islanders. If you have a quota, you can come and you have to find a job. (NZ5)

Most of the Lotofaga-based participants said they regularly receive money or goods from their families living overseas. MG3's words captured the spirit underpinning remittances, while MG1 referred to how remittances had been instrumental in helping families to meet basic family needs:

Our people have created their future [overseas]; they went to America, Australia, New Zealand, wherever. I am very proud of them because they never forget where they come from. (MG3)

If you look at our village, you seldom see the real Samoan house, only the *palagi* [Western-type] house. Most of the families have a house like this [showing his Western-type house], not because we don't need it [a traditional house], but because we've got money to build it. That money comes from our children in New Zealand, and from our people in America. That's why our people go away to help our family. (MG1)

He also saw migrant remittances as transforming the whole country:

Nowadays, our country has exactly the same life as in New Zealand. In the old days, we brought different things from New Zealand because we didn't have those [items] in Samoa. Nowadays we can buy the same things in Apia, exactly the same stuff as in New Zealand. If you have money, you can buy anything, and you can store it at your place in Lotofaga, the same as the family in Apia. That's why we are so proud of our people [migrants' remittances]. (MG1)

In addition, there are also cases of circular or temporary migration, such as seasonal migrants, labourers on temporary working visas, and pride in students gaining study awards who are expected to return home:

There are people like [name of his brother's daughter] who got a scholarship to go to Japan. Others are in New Zealand and another group of people is in Australia. (LO10)

Importantly, a number of migrants had the intention and hope of returning to Lotofaga. MG1 described his return to Lotofaga with these words:

> I lived in New Zealand for almost 44 years but I came back to Samoa in 2008. I am very pleased I came back. When I first went there in 1964 we expected to come back home to retire. (MG1)

Another participant talked about his return migration prospects:

> I think I'd like to return home [to Lotofaga]. Some people have moved back, especially old people, because in the islands there are no seasons, no winter. When people become old, yes, they prefer to live in Samoa... What I miss the most from Samoa? Freedom. In Samoa, you have a free life. As for myself, I really want to go back to Samoa when I get old. (NZ5)

Key factors relating to population movements

Mobility in Lotofaga has a meaning that transcends economic factors. There are intrinsic social and cultural aspects around the migration process (Suaali'i-Sauni, 2007). Population movements are, in general, focused on the wellbeing of the *'aiga* that extends from the village to families living in Apia and overseas. The population movements that have been taking place in Lotofaga have reinforced and enhanced connections between individuals, families and communities across borders, and brought changes in economic, social, cultural, political and also environmental spheres, both in the origin and destination areas of migration.

Disregarding, for the moment, the influence of climate-related issues in migration patterns, five broad themes have emerged from my review of the different typologies of mobility in Lotofaga. All of them warrant further research.

First, movements inland have responded to improvements in infrastructure and expansion of agriculture. Notably, these movements have also responded to climate-related impacts. Second, migration to urban areas and abroad is a strategy to diversify family income, look for a better future in terms of better access to education and employment, expand social networks, and fulfil cultural obligations. Third, migration is associated with support back to the village (remittances and other) from both Apia and overseas. Thus, mobility and remittances have generated fundamental economic, social and cultural changes in the extended families. The extent, direction and composition of those changes are determined through family connections and the relationships among the *'aiga* members. However, not all families are in receipt of remittances. An important

finding was that moving to Apia or migrating overseas was not within the reach of all families today:

> The old man's older children have gone away to America, New Zealand and Australia. But we have just stayed here… The old man's older children, those who lived together with his mother, have gone abroad. It's only us now, living in this house built by the old man… [It feels like] nobody loves us. (LO4)

Fourth, young individuals and families are moving away from the village, and apparently, more females than males decide to move. According to the latest 2011 census, in the 15-to-24-year age range, there were more males than females living in Lotofaga (although at the time of the field work more women were residing in the village). The same pattern was also observed in the 25-to-44-year age group (Samoa Bureau of Statistics, 2011). LO7 said:

> Young families are migrating with their kids; young people. But no older people because older people can't work in New Zealand. Also, they have so many kids staying in New Zealand. If I had a sister overseas, I would send my kids to grow up in New Zealand; I would make the arrangement for the boys. (LO7)

The movement of young people has and will have an impact on the labour force of the village.

Finally, findings suggest that migration to urban areas does not necessarily precede international migration. Migration from Lotofaga to Apia and overseas are continuum parallel processes that follow national patterns.

Climate-induced mobility

While economic, social and cultural factors were the main drivers of mobility, as outlined in the previous section, climate change is starting to emerge as a contributing factor. This discussion is in three parts: (a) movements inland, (b) migration to Apia, and (c) migration to Auckland.

Climate-induced movements inland

The movements within the village have responded not only to improvements in infrastructure and expansion of agriculture but also to climate-related factors which have influenced people' decisions to move inland to their customary lands. These climate-related factors include slow-onset events such as sea-level rise and sudden-onset events such as cyclones.

Slow-onset events

AP1 and AP4, who are now living in Apia, reflected on how sea-level rise had been a consideration in their own family patterns of movement:

> Our family have land [in the coastal area], and my great-grandparents used to live on the beach before they moved [inland]. They moved even when my father was young, and he is about 60 plus now. It was a sort of relocation inland. If you've been to Lotofaga you can see that the sea has moved inland a bit more. It's slowly coming in. I remember when I was younger we used to have a wider beach from where our land is, but now our land is here and the sea is right about there [showing how the beach has shrunk]. So, I think it's been affected by climate change. We don't have any sea walls or anything to prevent the erosion of the sand, so in the next ten years it will be very different. We'll keep moving inland. (AP1)

> There have been internal movements, maybe because of climate change. Thirty, forty years ago, Lotofaga had a beautiful beach, a long, wide, sandy beach. It used to be the most beautiful village. As I'm recalling the olden days, ten, fifteen years ago, maybe more, the *malae* was close to the beach, close to the High Chief's residencies. It was a nice village. Climate change can be a reason for movements, with strong waves and high tides that hit the village. The village is different now; no more houses in the coastal area; people have moved inland. (AP4)

On similar vein, NZ3 noted:

> When we go back to the 1940s and 1950s, part of our family was mostly down in the lower part of the village. Then they moved up to high land. Now they are safe. The beach was much wider, out into the lagoon. Now it seems it's gone. You can tell that the sea has moved inland; it's much closer now than it was before. (NZ3)

Sudden-onset events (natural disasters)

Natural disasters such as recurrent cyclones and the tsunami that hit the country in 2009 have also acted as push factors in internal mobility. Some participants said they had moved voluntarily to higher ground after assessing the risks associated with living in the coastal areas. Some other participants said they had been temporarily displaced and had sought refuge on higher ground within their customary lands. Participants explained:

> You can see that many families moved inland a long time ago, and others after the [2009] tsunami … you can see where aunty [name of the High Chief] lives, so only in that place people still live there [coastal area]. But other families moved up here, to high land. (WG2)

> In the old days, our people lived close to the sea shore. We moved up because of sea-level rise, climate and then the tsunami [in 2009] came and affected our

families and the waves came right through to our places. So, that's why most of our village has moved up to the top place. (MG2)

Some families have gone uphill, to highland areas because of the cyclones and tsunami. They no longer live down there… they have gone to high places, way further inland, away from the sea. Other families have gone to live behind the road; they're frightened by the tsunami. (WG3)

Four participants who are now living inland commented:

Those families that lived down near the sea moved up to higher ground. They were very frightened and scared of the tsunami that affected Samoa. (WG6)

Those families that lived down there, beside the sea, have come up uphill… Lots of people have gone inland, to the valley, to build their homes… This type of thing [the tsunami] isn't easy. (WG1)

Do you remember when the tsunami came in 2009? That was the same year we moved inland, back here. When the tsunami finished on that Tuesday, that very same week on the Friday, we cleared up this place and built this *fale* (traditional Samoan house), and we have lived here since then. (LO1)

As far as we know, there are some villages like our village; they are too close to the sea shore. So, families moved up to the top; that's why they moved up, after the tsunami. (MG2)

A woman who lives in Apia but also spends time in Lotofaga, said:

I think fewer people live in the coastal area now; less than before. We were affected by the tsunami. After that you can hardly see any village members staying next to the sea road; it's because of what happened with the tsunami. [Almost] everyone moved up. (AP5)

The decision to relocate inland

Today, few families are living in the Lotofaga coastal area. Participants said those who want to stay are aware of the risks associated with their decision to stay. As mentioned by LO6 and WG4:

Not so many families are living down there [in the coastal area]; maybe four families and the High Chief too. They haven't relocated inland yet, but they can move up here when they are ready. (LO6)

Some families remain down there [in the coastal area]; they don't want to relocate, but they know they have to move to higher ground. (WG4)

Some families who can afford the costs of relocation said they had intentionally made the decision not to move yet:

> Before some people used to live down here [in the coastal area], but then they moved up. As for me and my family, I don't want to move away from here yet. I am used to living here; here we have everything. (LO7)

Other families had no option but to stay in the coastal area. They did not have the resources or access to resources which would enable them to move inland. Two examples illustrate that although relocation inland has become a strategy for addressing climate change, this option is not available to all the families. LO5, a widow, very concerned about her situation, commented:

> I am trying to move up there [inland], but I have nothing... I don't have support... if I could move up there, I'd take these [her belongings] up, and I'd build a small house up there… How can I afford to do that? I don't know what to do. (LO5)

A female participant who also wanted to move inland provided details on her situation:

> We would like to move up but there's no support. Other families have already moved. We are worried because we haven't received any help. It is too low over here but over there it's high, so we would be safe. (LO8)

Voluntary relocation is likely to continue in the future, and this is mainly associated with climate-related problems. A common view is that population movements inland are inevitable because they are triggered by climate change and natural disasters.

AP3 commented:

> I think movements inland will continue. The people remember the impacts of the 2009 tsunami, and the memory will carry on for a long time. I think, because of that, people are now making some decisions not to live near the sea. And it's not just Lotofaga; I think Lotofaga [villagers] made an earlier decision to move inland. But going towards the Lalomanu area, people have all moved inland because of the recent tsunami. They made the decision, and you can still make out that they were settled pretty close to the sea before they moved. So, I think that [the tsunami] is one of the reasons why people continue to move inland and [they will] for generations to come as long as they remember that tsunami and its impacts. (AP3)

Planned relocation

In the case of Lotofaga, the relocation inland cannot be considered "planned relocation". Instead, I see this as a voluntary process that has also been induced by public policies.

Even though families have voluntarily decided to move inland, a process that started at least three decades ago, the Government has also been encouraging relocation to higher grounds. For instance, the Coastal Infrastructure Management Plan (CIM Plan) for Lotofaga identified coastal erosion and flash flooding along the river as the main factors that have pushed families to relocate inland. The CIM plan recommended continuing to relocate houses beyond the coastal area (MNRE, 2007b, 2007c).

Some participants commented on how the government is warning families to relocate inland:

> I know the government warns the people who live close to the sea to move up. So, some families of this village have moved up. Some other people have moved to Apia, far away from the sea. (LO6)

> After the tsunami, they [the government] warned people to move away from the sea and specially to prepare a place, up on higher ground, to go to. (WG2)

> We would all get frightened if [another] tsunami was to suddenly hit. There are instructions [from the government] for everyone who lives down near the sea to move away. (WG4)

One participant made reference to the financial support provided by the government:

> Previously, so many people lived here in the village [on the coast]. When they had more money, they moved up. But other families moved up because of the tsunami; they moved up and government helped them to build new houses and everything. (LO10)

A number of participants said they knew the village was exposed to climate change and natural disasters, and that there was no other option than to move:

> I think that climate change is one of the reasons [for relocating inland] and another reason is that Samoa is quite prone to these cyclones and tsunamis. And I think people have decided to go and cultivate inland and live [there] for safety reasons. We have had more intense cyclones. When I was young we sort of put on an alert during the tropical cyclone period. I think people have become [more] alert and have decided to move inland. I mean there is a lot of land there to be utilised. And it is really not quite safe now to live close to the sea, especially after the last tsunami in 2009. (AP1)

> Now we remember the tsunami and the memory will carry [on] for many generations. This is why many people don't want to live near the sea. (NZ2)

> Well, why do people have to evacuate from lowland [coastal] areas? It is because when a tsunami strikes, people living there can be the first affected… There are

people in our village that [still] live in lowland areas. They have to move up to the highland areas, the mountains, far away from the coastal areas. (WG3)

WG1 noted the importance of research on decisions to move:

Currently, research on climate is being conducted. So now families are preparing [to move] their homes far away from the sea. After natural disasters like the tsunami, people are preparing… these days families are taking it easy. (WG1)

It is important to highlight that in the case of Lotofaga, the intra-village movements have not exacerbated problems related to land allocation for family members, and have not caused conflicts over land use for different activities. Families have been adapting to their new surroundings while trying to preserve traditional practices for their livelihoods.

Preparation for future climate-related events

Participants talked about how they prepare in the event of an emergency or disaster. A number of them said that government agencies and other organisations conduct information campaigns or consult about new initiatives associated with natural disasters:

The people from the government came and explained to us how to prepare for something that happens, like a tsunami. If something happens, we have to move up. If it's really rainy and there's flooding, we have to go to another place, away from the flooding. I think I am prepared [for natural disasters] … There is also an alarm. I can also listen to the radio or the weather reports, so I know what to do. (LO7)

I am not afraid to live here [in Lotofaga] with climate change and the waves. If something happens, you are supposed to quickly prepare your place of residence [inland]. (LO2)

[After the tsunami] the government gave some support. They had drills to teach the people what to watch out for and to do when you see this [natural disaster]. They even gave sirens to the village mayors so that could alert everybody to evacuate. So, that's help from the government. (AP5)

While a number of participants said they knew how to prepare for emergencies associated with natural disasters, it was clear that they need to have better access to information and resources. Some participants said they did not have good information about what the government and other organisations are doing to respond to climate

change and natural disasters, apart from information campaigns on disaster risk reduction.

LO10 and others described the government information campaigns with these words:

> These days, people have training [in Apia]. I'm not sure about here [in the village]. Maybe in the schools. But after the tsunami they [the government] offered training, practice drills in Apia. For example, the sirens would sound and there were also direct pathways for people to safely move along. The timing must be quick ... I don't know if they taught it to all the villagers, but there [in Apia] are allocated places for people to move to. They suggest moving to higher ground, that's all I know. (LO10)

> They [the government] gave us some information about natural disasters. I think, maybe, they do something else because they interviewed people, I don't know. (LO4)

Many comments were made about the purpose and value of the government interventions, such as the sea walls:

> The government is building sea walls. They built them after the tsunami; they built the sea walls to protect us. People say that down here, they built the sea walls to stop the waves coming in. Maybe the sea wall can stop doing that. Some people came and built the sea wall; I think they explained [the situation] to the *matai*. (L07)

> I have heard that sea walls can be dangerous because the rocks can come in with the waves at high tide. It's dangerous. (LO8)

A number of participants stated very firmly that village families had not been considered enough in the discussions on climate change and disaster risk reduction. However, they said they are ready to engage in adaptation initiatives that take into account their traditional knowledge, their local organisations and their social structures.

> We want [to participate in] sincere consultations. We don't want just to respond to their questions, so they [government and non-government agencies] just tick the boxes and then they say yes we have consulted. We need to understand what they are proposing, sit down with village members, plan the activities, and actually ask them [villagers]: What do you know about this problem? What do you feel we should be addressing? Things like that. (IS2)

Climate-induced migration to Apia

Most participants viewed rural-urban migration as mostly related to social and economic factors. AP3 explained:

People will basically move for better jobs and education, especially those with good education. Also, those families that have got freehold land in town. I think climate change is not yet a reason to move. (AP3)

Although climate change was not yet considered to be a significant driver of migration, the externalities of climate change might become push factors for both temporary and permanent movements. Our discussions showed an acute awareness that families' livelihoods have been affected by cyclones, flash floods, high rainfall, high temperatures and dry periods. The effects on agriculture, for instance, are linked to the loss of quality and quantity in production. Moreover, unstable and inconsistent food production caused by climate change has affected farmers' capacity for self-sufficiency and also their capacity to generate income from their crops (UN-Habitat, 2014).

An issue that has emerged from the study is the migration of young people to Apia. In Samoa, youngsters are increasingly abandoning agriculture and rural areas in search of better livelihoods in urban areas. Understanding the effects of loss of labour, skills and knowledge of the youth in the village is necessary. AP2 explained with her own words:

I think the main reason many young people from our village move into town is because of better schools; it's easy for us to get a good job here in town. But when you stay in the village, you have nothing to do. The only solution is to do farming, which is not good at the moment. (AP2)

L010, a young male villager, referred to the challenges of agricultural adaptation to climate change. He said that he was forced to move to Apia when food security became an issue:

I work in Apia for short periods of time. Farming is not very good now [in Lotofaga], so [there's] not enough food. The plan, so far, is for me to live back here [in Lotofaga], and go to Apia for work and then come back. (LO10)

Other participants linked the move to Apia with fear and also a loss of land due to sea-level rise and natural disasters:

Sea-level rise and coastal erosion are affecting us. Families cannot cultivate their crops because of these problems. That's why people want to live in Apia. (LO3)

There are lots of families that have gone to Apia. They've gone to look for land to live on in Apia because they are very frightened about staying here. As time passes, and if it [a natural disaster] suddenly happens again they would be extremely frightened. So, they've all gone away. (WG5)

> There are some [families] who have gone to Apia in search of land to live on with their families and their children. That's the situation. We all get afraid when we mention the tsunami. (WG3)

A woman who had moved to Apia noted that even in Apia, families were moving inland up to the hills:

> Here in town, people have started to move up by Vailima and around there, going inland. They've moved away from the coast, all because of that [climate change and natural disasters]. You'll see some new settlements around, down by Vaitele. A lot of people, even those from Lotofaga, want to move to higher places because they don't want to be vulnerable to all of these disasters and impacts of climate change. (AP1)

Findings suggest that climate change and natural disasters will increasingly become push factors in the move to Apia in search of protection, food and shelter. The extent of any climatic event will determine the duration and the type of migration.

Climate-induced migration abroad

Although the majority of the Auckland-based participants said climate change had not been the main reason for migrating overseas, they agreed that this an issue that is starting to be considered as a cause of migration and warrants further study. Views were:

> I know a lot of Lotofaga people have migrated overseas, mainly to New Zealand, some to the United States, some also to the territory of American Samoa… and some to Australia. This is something that has been happening since my youth. Quite a number of villagers have migrated. I don't think climate change has anything to do with migration. I think it's to seek a new life for the family, to look for wealth. A lot of families overseas send remittances. (AP4)

> People moving away because of climate change? I'm not sure about Samoa, but I know the situation in other Pacific countries, like Tuvalu, yes. That's why they are moving away. As for myself, we moved for a good future, better education and healthcare because we cannot have that [in Samoa], like in New Zealand. But for me it was not climate change. I have a Tuvaluan friend and he told me their land is going to disappear. They're trying to buy land elsewhere. But it's not the case in Samoa; that's not going to happen in Samoa. (NZ5)

AP3 noted some links between climate change and overseas migration:

> People have migrated overseas, mainly to New Zealand and Australia. It might not be to do with climate change but it's a lot to do with economics. But economics rests on environment and natural resources. And if people find that their natural resources are not supplying them adequately for the church needs

and for their cultural needs, and for family needs, that might be one reason why they move. (AP3)

Interestingly, some participants saw a closer association between migration and the effects of natural disasters as seen in these comments:

What worries us are the natural disasters because many people lost their lives in the tsunami. Others have gone to New Zealand with their children; they've gone because they no longer want to stay in Samoa. (WG6)

Some people are lucky with the [New Zealand migration] quotas; they can go to New Zealand… Some people say that it's hard to work on plantations; they don't get any money from that. And then [there are the] disasters. They need to work, so they decide to have a new life. Some [people] move to New Zealand to make a better living. (LO7)

A lack of resources to move was again raised as a factor influencing migration:

Family members have gone far away in search of fortune and success, and also because of climate change, and to look for work to help and support family… but no one cares. (LO4)

As seen in the previous comments, climate change is increasingly being taken account of in discussions about migration abroad. However, in the short term, migration overseas is, and will continue to be, conditioned by different natural and financial barriers as well as immigration regulations, quotas and other factors that set limits on the number of people entering a country.

If other migration opportunities arise, it is likely that there will be significant increases in out-migration. Presently, people who can cross borders may be relatively well off, compared with those who do not have the means to move overseas, especially young people (individuals and families) for whom migration overseas is not out of discussion.

People's decision to leave or stay in Lotofaga

Explaining the reasons why individuals or families decide to stay in the village or move to Apia or overseas, NZ4 said:

People who are left back in Lotofaga live off the land. For others, those who decide to move, the choice of moving is much more for work, [so the decision is] whether to be in Apia or overseas. There's a lot more people in my family who are choosing to live overseas. The few people who choose to live off the land, who still live in the village, it's because they are earning from fishing, from the land, from selling produce. They are looking after the family property in that

way because they're the only people left [there] from our family. Most of us, we are away. It's not an easy life in the village; sometimes agriculture is not good, and then there are the cyclones. (NZ4)

Although a number of people may want to move to Apia or overseas, others want to stay in Lotofaga, particularly the elders. A common view among elder participants was their desire to stay in their own village and in their own country, regardless of climate-change-associated problems. They said that they are prepared for future climate-related events, adding that they have been adapting to environmental changes for generations:

> We know how to live with [climate change] and adapt [to it]. As I said, I know this climate, we have no winter whatsoever … like this wind, [it's] cold enough to feel in our body and the weather [is] still good. So, since we were young till now; we know what to do [adapt]. (MG1)

Clearly, it is difficult for people of Lotofaga, especially the elderly, to imagine leaving or abandoning their family lands because of climate change or other factors. Participants associated their land with culture, identity and traditions. The sense of belonging is so strong that it embraces the extended Lotofaga community, those who live in the village and those widespread communities in Apia and abroad. For all of them, the village represents home. Responses here were so strongly put that they are listed in full:

> Our village is the best place we've ever had. I think the weather is not going to change our home where we live, because Lotofaga is our home, our home town, our land, our homeland. (MG3)

> Climate change? No. We will never go away from Lotofaga for that reason. We never think about it; we never have a second thought whatsoever about moving away. We were born and raised in Lotofaga. So why should we leave if we have a beautiful place? We are so lucky. We love each other; we help each other; that is what [it is] all about. That is what the *fa'a Samoa* is all about, respecting one another. That's right from the top, from the *matai* of the *'aiga* to the younger generation, to the youngest person of our family; we help each other. (MG2)

> Nothing [referring to climate change and natural disasters], even the tsunami, the cyclones that came two or three times, changed our minds to run away to Apia or abroad. The only reason why our people went abroad is to help their families, and to create whatever they want. (WG2)

> For me, I don't want to go far away from my country. Climate change is not a reason to move away. I just want to stay here in Samoa. It's enough for me that [some of] my children have gone overseas, but I want to stay here in Samoa with

my family and my [other] children. However, there are lots of people who have gone overseas. (WG4)

In my opinion, it's just like what [name of the previous speaker] said about [migration]. I do not want to leave either. The only thing is, I would like to go overseas for a holiday. But if you asked me if I would stay there, my answer is no. For me, Samoa is the best place to live. I have enough things here, and I like where I live here, and caring [for] my parents and my family land. But going abroad because of climate change, no, there are no plans. Samoa right here is where I want to live now. I'm used to it, and I like [being a] servant to the church; that's the situation. (WG3)

There was a tsunami in Samoa but you've seen Lotofaga now. We have a bit of higher land away from the sea, where we can evacuate [to]. We'll go and settle there. Because of the tsunami we lost our house, and my dad's house. But that doesn't make us leave, because I am Samoan; it [the land] is so precious to me. (AP5)

Others, those who had been overseas and returned, made reference to short-term movements or *malaga:*

I lived in New Zealand for over 40 years. I don't want to go back to New Zealand; it's too cold. I go there to visit my children; all my children are overseas, two of them in Australia, three of them in New Zealand. That's why my wife and I go there. For a month, six weeks, then we come back [here] where we like [to be]. (MG1)

I am not afraid of the ocean. No, not really. If I travel [overseas], hopefully, I would go only to visit my children. (LO1)

If I could go overseas, I would visit my relatives, maybe, only for two months. And then I'd come back. Go and visit. Then come back here to sustain the family. (LO2)

As mentioned previously, migration prospects appeared to be more uncertain for youth. They need viable opportunities to remain in the village, otherwise migration is considered one of the best options. Climate change in this context can act as an additional push factor. Some young people may contemplate the possibility of moving to Apia or migrating overseas if the opportunity arises. Apart from the economic benefits, migration overseas entails a social and cultural element of prestige, and it can be linked with the desire of many men to acquire *matai* titles; the money earned overseas may contribute to acquiring a title in Samoa.

A number of youth participants stated directly that village life has become more difficult because of climate change and the lack of opportunities this engenders. LO9, who had just finished secondary school in Apia, said:

> Nowadays [it] is different for young people. I'm preparing to go overseas, to Australia. Life in the village is getting difficult for me. I want to go overseas, to learn more and search for a new life. Because overseas is better than Samoa; there are more opportunities. (LO9)

LO7 explained:

> Some young people want to work on the plantations. Agriculture is important to the village, but it's not easy, so people prefer to live in Apia. Others, those who were raised in Apia, whose families have shops… for them it's different. Most of them have their own plantations, but they prefer to stay in town. (LO7)

While some young participants expressed their desire to migrate, others said they had decided to stay in the village despite the fact that they recognise that farming is becoming more difficult, and there are limited opportunities for income diversification:

> In the future, I would think about that [migration], but I like it here. It's a very simple life [but] sometimes not good for agriculture. For my children, I want them to go to school in Apia to extend their knowledge… As for me, we have everything here. My husband grows crops; we have the plantation. So, I don't want to move away. I don't know if I want to move away from here. (LO7)

> We want to stay [in the village]. Like my husband, for example. I told him to find a job in Apia and he says that he gets more money from the plantations. And to find a job in town is really hard. But here in the village, he can grow crops. He says it's easy for him and then when he sells them he can get some money. (LO8)

Elders were aware of the difficulties youth are facing today; however, they showed tremendous optimism. An elderly male *matai*, talking about young people's challenges, emphatically commented:

> Our young people will fight for their future. For instance, we have our schools, our university. We never had them twenty or thirty years ago. Now we have our own medical school and our own technical school. That's our country catching up. But now we are down; still a poor country. But our people are very clever; they work hard to create everything, our future. So, what I said, on behalf of our village, we never thought to move away from Lotofaga. What we need to do is prepare to make our village better, to create better opportunities, to solve problems, including climate change. (MG1)

Migrant communities in Apia and abroad

As regards migrants, the role of Samoan communities in Apia and abroad is crucial in supporting new migrants, and also helping families back home. In periods of climate stress and natural disasters, families in Lotofaga receive remittances very quickly. These are often more timely than assistance received from the government and other organisations.

Apia participants said they provide immediate support in times of need which is doable given the closeness of Apia to Lotofaga. Participants living in Auckland stated that they send remittances, organise events to raise money and travel back to the village to help when disaster strikes. A number of Lotofaga-based participants strongly believe that kin members living in Apia and abroad will continue to support families back home, using their family networks to provide immediate assistance in times of stress and disaster. AP2 who lives in Apia said:

> Returning to the village in the future? No, I don't think so. I am still, and I will be, contributing to the village, but not staying there. I prefer living here and then I can go back to the village and support them, but not to live [there]. I think living in town is much easier than staying in the village. When you stay there you have to commit to village commitments and church commitments. Too many *fa'alavelave*; I don't like staying in the village. I prefer to live here. I am used to my own lifestyle here; I go to work and after work look after my small business; so I am used to it. But, yes, definitely, I will always support my family and the village. (AP2)

NZ3 who lives in Auckland said:

> After the tsunami, we organised fundraising activities [in Auckland], collected clothing, food and other household items to help not only our families in Lotofaga but our churches and the whole village. Some people even travelled to the village to help in reconstruction work and the restoration of plantations. (NZ3)

An issue that was not particularly prominent in the fieldwork, and that deserves further research, refers to the role of second, third and future generations of migrants and New Zealand-born Samoans. The costs of adaptation to climate in the village and the costs of migration may increase financial pressure on migrants already settled in both Apia and New Zealand. Families back home have been relying on remittances to recover from the effects of climate change and natural disasters; this situation will continue in the future.

An elderly male villager, explaining the involvement of his children in village affairs, recognised that although they are attached to Lotofaga and the Samoan culture they have their own lives overseas:

> As for my children, they want to live there [overseas] because they have young children, our grandchildren. I told them, this is the best place [referring to Australia and New Zealand] for your children, for my grandchildren, for my great-grandchildren. All my children have good jobs there, they have their own families and their children have a better school. They don't need to come back here [to Samoa]. They know about this climate change [in Lotofaga], but they have never experienced the impacts. (MG1)

Population movements as risk-management strategies

The findings indicate that climate-related events do affect migration decisions along with economic, social and cultural factors. Moreover, the degree to which migration improves families' adaptive capacity depends on factors, such as household size and composition, asset base, degree of livelihood diversity, and existing family networks in Apia and overseas. Thus, there are instances where mobility can be considered a risk-management strategy to face the impacts of climate change and natural disasters.

The research findings have shown that families with more resources are better able to migrate and to improve their resilience to economic downturns and climate change, such as investing in education, health, climate-resilient livelihood opportunities and income diversification. These families have already moved inland. In addition, migration of family members to urban areas and abroad has helped build resilience to a range of climate-related impacts. Remittances have contributed to improving families' livelihoods and adapt to climate change.

At the same time, those families that do not receive remittances or any other kind of support, are most vulnerable to the impacts of climate change. Also, it became evident that the most vulnerable families in Lotofaga are those who have no resources for migration. Although many of the families in this category have moved inland and have family members living in Apia and abroad, they can be classified as vulnerable because they face difficulties in diversifying income and maintaining food security, and have fewer adaptation options to climate change. In this case, mobility has partially contributed to improving families' livelihoods and adapt to climate change.

When studying people's migration patterns and their relation to the adaptive capacity to climate change, Warner et al. (2012) makes a distinction between resilience and

vulnerability. In the most vulnerable group, the author identifies two subgroups. The first one refers to those families with fewer adaptation options. These people use migration to survive but not to flourish, or use migration as a matter of human security. The second group is known as "trapped populations" (Climate Science and Policy, 2015; Warner et al., 2012).

In the case of Lotofaga, very few families use migration as a means to survive, as they usually have a range of other options and land security for basic family needs. Also, there are no "trapped populations", as defined by Warren et al. (2012), people who struggle to survive in their areas of origin and cannot easily use migration to adapt to the adverse impacts of climate change. Extended families' systems and the village community play an important role in buffering socio-economic and environmental risks. As established by *fa'a Samoa*, the safety nets provided by the extended families and village community are very strong as they are underpinned by traditional beliefs and practices of solidarity and obligation.

Chapter summary

While population movements in Lotofaga have had an underlying economic, social and cultural rationale, other factors have started to influence significantly the extent, direction and composition of movements, such as those associated with climate change and natural disasters.

Having discussed the different typologies of human mobility in the context of climate change, it is possible to say that migration has occurred predominantly within national borders. The most common forms of mobility are the movements inland that have mainly responded to climate stressors. The findings of the village study suggest that migration to Apia and abroad are two parallel processes that follow national migration patterns. Although this type of migration has been driven by economic, social and cultural factors, climate-related aspects are also starting to play a significant role.

The fact that, regardless of the impacts of climate change, people, particularly the elders, want to stay on their land, in their village, and in their homeland, has emerged strongly. Climate change may increasingly become a push factor, but people of Lotofaga want to stay.

The prospects for young people are more uncertain because there are few economic opportunities in the village. As a consequence, there has been an increase in the

migration of young people to urban areas. This fact has affected the labour force in the village with fewer people dedicated to their farming systems. On the other hand, income from farming activities has decreased significantly because of climate change, natural disasters and fluctuating markets. Engaging youth in agriculture is a challenge, not only in the village but also in other rural areas of Samoa.

As regards the role of traditional organisations when dealing with new challenges such as climate change and natural disasters, elderly men and women agreed that their traditional social structure and the governance system were strong enough to deal with future challenges. Moreover, the findings suggest that the extended community of Lotofaga, which includes kin members living in Apia and overseas, will continue to support the village and will fight to preserve their original lands. However, despite the fact that social structures in Lotofaga are strong and can become instruments to deal with the impacts of climate change, it is evident that these new challenges need strong support from the government and the international community.

Although kin members living in Apia and abroad will continue supporting families back home, climate change is likely to impose an additional financial pressure on migrants. The role of second and third generations of migrants living abroad and New Zealand-born Samoans remains unclear. This is an issue that requires further investigation. In the long-term land, customs and tradition may be under threat when the generation of parents and grandparents living in the village pass away, and the fourth and fifth generation (overseas born) ties with the village may become weakened. These factors should be factored into long-term government planning.

Chapter 7 - Discussion of Results: Village Study

The daily life and the traditional social structure of Lotofaga are underpinned by *fa'a Samoa* which is composed of customary land tenure, traditional production practices and natural resources management. Livelihood strategies include semi-subsistence agriculture, livestock and fishing, although linked to a fragile environment, and a few other income-generating activities.

Lotofaga, like many rural villages in Samoa, is particularly vulnerable to the effects of climate change and natural disasters due to their coastal location and reliance on natural resource-based livelihoods. However, in this predominantly semi-subsistence economy, the family-based social support systems are critical mechanisms for resilience as they are supported by cooperation, reciprocity and service values (Fairbairn-Dunlop, 1991; Meleisea, 1987).

Village families have been adapting to climate change by relying on their strong social support systems, drawing on their traditional knowledge, and combining this with Western-based modern technical information. Moreover, the findings confirmed that mobility, in some cases, has contributed to building resilience as families have been using population movements as risk-management strategies to respond to climate change-related impacts.

This chapter discusses the findings presented in Chapter 5: Climate Change in Lotofaga and Chapter 6: Impacts of Climate Change and Natural Disasters on Population Movements in Lotofaga, and highlights their significance in relation to existing literature about environmental migration. Although outside the village study, the voices of key informants (Samoan leaders, representatives from national and international development agencies, and research centres) have also been included in this discussion.

The first two questions this study sought to answer were:

- How do people perceive and manage the impacts of climate change?
- How have climate change impacts played a role in people's decisions to move internally and internationally?

The chapter is divided into three parts: (a) Families' resilience in the context of climate-induced mobility. (b) Human mobility as a risk-management strategy. (c) Reflections on

the implications of climate-induced mobility. The chapter concludes with a summary of the main topics covered.

Families' resilience in the context of climate-induced mobility

In the literature, the term vulnerability is frequently used to describe Pacific peoples' situation in the face of climate change (Adelman et al, 2015; Rowling, 2014). However, this was not the case for Lotofaga; far from portraying themselves as helpless victims of climate change, Lotofaga families have shown tremendous resilience.

Resilience in the context of climate change is defined as the "capacity of social, economic, and environmental systems to cope with hazardous events or trends or disturbance, responding or reorganising in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning and transformation" (IPCC, 2014c, p. 5). Based on this definition, resilience in Lotofaga can be seen when families can anticipate, absorb the shocks and recover from the effects of climate change and natural disasters without compromising their long-term prospects. Resilience cannot be seen as a fixed end state but as a dynamic set of conditions and processes (Turnbull, Sterrett, & Hilleboe, 2013).

This study confirmed compellingly that village families have lived semi-subsistence lifestyles for a long time, and that, for them, there is nothing new about living and dealing with a variable and changing climate. What is new, however, is the extent of the changes, i.e. the speed, the scale, and the effect these changes are having on an increasing number of people. Even though families have had generations of experience in creating mechanisms to cope with such variability, participants noted that the impacts of these global problems are affecting them disproportionally today, and threatening the heart of their culturally grounded social support systems.

Despite the fact that climate change is posing a major threat to lives and livelihoods, people are drawing on the resources available to them. Thus, Lotofaga families are using different strategies to build resilience to climate-related impacts:

- They rely on their customary land tenure.
- They rely on their strong social systems.
- They draw on their traditional knowledge of the natural resource-base.

- They combine their traditional knowledge with other modern technologies to adapt and find solutions.
- They use population movements as an adaptation mechanism.

Each one of these strategies is discussed further below.

Customary land tenure

Land in Samoa has a significance that transcends its economic value. The village study findings confirm people's strong social, cultural and spiritual connection with the land. For these families, land represents life and the main source of sustenance. Notably, all the participants living in Lotofaga, Apia and overseas spoke about land as a means of food and livelihood security, and, most importantly, they talked about land in terms of identity and a sense of belonging.

Samoan culture and customary land tenure influence the traditional production systems present in the village. The family is the main production unit, and every man and woman in the family is responsible for a share of agricultural work on family lands. The importance of the semi-subsistence economy in Lotofaga is evident as families' farming systems contribute to food security and provide some cash income. As highlighted in Chapter 2, at least 81 per cent of land in Samoa is held under customary tenure (Samoa Bureau of Statistics, 2011). Typically, customary sections of land are rectangular tracts running from the coast inland towards the mountains in the centre of the islands. Thus, each family has access to both coastal areas and interior lands (OHCHR, 2010).

The endurance of the customary land tenure system provides the platform for families' responses to the impacts of climate change and natural disasters. Whilst the use of this resource – customary land – is feasible in Lotofaga, it would likely be different in other contexts. In any case, the importance of customary land as a buffer against climate change cannot be underestimated. As noted, families can move inland if low-lying coastal areas are threatened or severely affected by climate-related impacts. For instance, a study conducted by OHCHR (2010) to monitor the situation of persons internally displaced by the 2009 tsunami found that in the southern coastal region of Upolu, directly affected by the tsunami, 90 per cent or more of people were living on customary land. The study found that "[customary land] was a considerable asset after the tsunami, as most families had unimpeded access to areas inland for temporary safety

from the affected coastal areas, and later had the viable option of settling inland as a permanent solution" (OHCHR, 2010, p. 22).

Since the early days of colonisation, the Samoan customary land system has been questioned. The early missionaries claimed that the Samoan communal system inhibited industry and saw this as a constraint to individual and national progress (Meleisea, 1987). Nowadays, this view is emphasised by many external researchers and aid agencies that regard the customary land tenure system as impeding productive land-use practices and development (IMF, 2015). For instance, the Climate Investment Funds [CIF], (2011), a multi-donor initiative, stated in an official document:

> Customary and traditional rights, particularly regarding land tenure, persist as a major constraint to development; however work is in progress to determine ways by which customary-owned land, much of which lies idle, could be accessed for development purposes while at the same time ensuring that ownership is not compromised. (p. 10)

The Asian Development Bank (ADB) is currently providing technical assistance to Samoa to support the government's objectives to promote the "economic use" of customary land. This technical assistance is in its third phase, and aims to build the institutions and legal mechanisms that would permit land leases to be used as collateral by commercial banks (ADB, 2009, 2015c).

However, ADB and the Samoan government have been criticised for not taking account of the people's voices and failing to engage communities in meaningful consultations on the plans to promote the economic use of customary land. In August 2014, a group of *matai* complained about the lack of meaningful consultation on these projects. The *matai* also raised fears that the people of Samoa would become alienated from their own land, and that the economic benefits would not reach local communities. The ADB's Independent Office of the Special Project Facilitator sent a team to Samoa to investigate the complaint and has since recommended that the Samoa government undergo meaningful consultations with the community and stakeholders (Keni Lesa, 2015; "Chiefs not satisfied, complaint elevated," 2016). Any dismantling or alteration of customary land rights is likely to reduce the coping mechanisms that families have against climate change. The fact that lands stretch from the coast to inland areas clearly shows the value of such land tenure system as a long-term guarantee against future environmental changes.

Strong social system

The cohesive and well-organised nature of Lotofaga's family-based institutions is undoubtedly a major factor in family resilience. The study confirmed that *fa'a Samoa* has remained strong in the village, despite the constant exposure to Western influences. In *fa'a Samoa*, the *'aiga* (extended family) and the *nu'u* (village) are at the core of Samoan culture. The underlying traditional belief is that the wellbeing of the *'aiga* and the village will ensure the welfare of the individual.

As often reported, *fa'a Samoa* guides the social, cultural, economic and political aspects of life that relate to land and the environment (Va'a, 2007; Meleisea, 1987). Spirituality also plays a major role in village life, signifying an on-going faith in the work of God the creator and providing hope and assurance to deal with climate change-related challenges. Moreover, a sense of community is clearly visible in the village as extended families care for one other, assume responsibility for one other, and extend hospitality in times of need. These relationships extend out into the migrant communities in Apia and overseas as well seen in remittances and other resource supports.

Referring to the importance of family support after the 2009 tsunami, the Head of State of Samoa, Tui Atua Tupua Tamasese Efi said:

> In Samoa, the tsunami of September 29th was potent not only for the death and destruction it caused, but also, as has been the case throughout history, for the invitation to reassess, cleanse and make anew. Samoans will remember for some time the power of this tsunami. We will remember this one not just for the paradoxes of its rage, but more poignantly for its rallying, reaffirming and cleansing of the ideals of family. The essence of family I believe is its ability to come together in times of need. (Tui Atua, 2009, p. 12)

It was found that kin members living in Apia and Auckland are always in the picture. Despite the fact that they do not directly experience the impacts of climate change, they always support extended families after natural disasters, and in times of water scarcity, drought and other events associated with climate change. Participants in Apia provide immediate support, which is easier considering that the village is not far from the capital. In the case of family members living in Auckland, participants send remittances, organise fundraising events and even travel back to Lotofaga to help in the reconstruction of houses and village infrastructure, and contribute to the recovery of crops and plantations.

Traditional knowledge

Traditional knowledge – knowledge passed on from generation to generation – is another major factor in families' resilience in dealing with climate change, all the while adapting to changing times and conditions. An overwhelming finding was that (as in the past), villagers and particularly elders draw on what could be called centuries of traditional knowledge and oral history, as a base by which they observe, monitor changes, make predictions and act accordingly. The knowledge and practices are generated, stored, accumulated and shared amongst *'aiga* family members who live in the village, in urban Apia and also abroad. Elders especially are well-respected for their knowledge and wisdom (Tui Atua, 2003, 2005).

The Samoan seasonal calendar is still used as a valuable early-warning system, particularly in the case of extreme events (Lefale, 2003). Traditional knowledge associated with climate change and natural disasters is applied in different facets of life, such as farming, fishing practices, forestry, housing, and traditional social support systems. For instance, semi-subsistence livelihood activities have been adapted to the natural variability of the climate and other external shocks. A number of safety mechanisms established for sustainable agriculture are evident, such as the production of surpluses, crop diversification, produce storage and control of food consumption. As in the past, these methods have enabled families to mitigate the risks and effects of climate change, and to ensure food security.

In fishing, traditional practices have been put in place, such as limiting access to certain areas, establishing no-catch zones, enacting species-specific prohibition during certain seasons, and prohibition of the use of dynamite and *ava niu kini*. These traditional fishing management practices not only contribute to sustainable resource management and ecosystem protection; they help guarantee food reserves for the village in times of necessity. In forestry, traditional practices are still in use, and are valued not only for their part in the conservation of natural resources but also in activities associated with cultural identity. People know the ecological, economic and socio-cultural significance of different plants used for food, fuel, medicine, clothing, ornaments and ceremonies.

Another area of knowledge found in this study relates to traditional housing. While Western-style home construction has been gradually replacing the traditional *fale* in Lotofaga, some families are keenly aware of the importance of preserving their traditional architectural knowledge to mitigate the impacts of climate change and

natural disasters. The *fale* is an example of a disaster-resilient house, as its open structure allows strong winds to pass straight through, and the complex system of lashing offers flexible movement and strength to confront the changing winds (Wilson, C., 2014). While navigation practices were not discussed in the field work, Samoan navigators are well-known for their extensive traditional knowledge and techniques related to weather patterns and signs to guide their voyages (UNESCO & ICHCAP, 2013).

Some elders raised concerns about the erosion of traditional knowledge among the younger generation, especially as a result of an increase in the cash economy, changes in consumption, migration and the lack of recognition of traditional knowledge in formal education (Fa'asau, 2011). In their view, these influences have made village youth less resilient. This finding is consistent with other research that indicates erosion of traditional knowledge and skills may increase vulnerability and risk for younger generations (Nakashima et al., 2012; UNESCO & ICHCAP, 2013).

Western-based modern technical knowledge

A well-reported characteristic of *fa'a Samoa,* and as a finding of this study, is its fluidity (Siauane, 2004). Many ideas and innovations from other parts of the world have been incorporated into day-to-day life but *fa'a Samoa*, the Samoan way, absorbs these changes, so providing an environment which ensures cultural continuity (Lay et al., 2000; Macpherson, C. & Macpherson, L., 2009).

Not surprisingly, Lotofaga families have been receptive to the introduction of Western-based technical knowledge. They have been continuously incorporating ideas, approaches and practices introduced by a host of technical assistance programmes and organised by Government and aid organisations, such as multi-lateral, bi-lateral, and national and international NGOs. These ideas, approaches and practices have the aim of improving the families' livelihoods. For example, agricultural technologies have included improved crop varieties, chemical fertilisers and pesticides. Other activities have included diversification of traditional livelihood strategies. Combining these with other strategies in non-traditional sectors has resulted in skills improvement and entrepreneurship. As regards the so-called "hard technologies" to adapt to climate change, they have included sea walls, enhancement of drainage systems, and improvements in water supply and storage facilities.

While families have had access to modern technical knowledge, significant information gaps about climate change were found. Some villagers stated that technical knowledge was not accessible. They gave examples where technical concepts related to climate change, and the implications, were not communicated in a way that engaged local families or took account of traditional knowledge. This, and other similar views pointed to the need to coordinate actions among the different stakeholders operating in the area, such as government agencies, international organisations and national and international NGOs, with the village families. Villagers found that having to deal with various organisations was difficult and prevented synergies between the different types of support offered.

This finding is linked to another major issue identified in the study: the tendency of the government and aid agencies to focus on *ad hoc* interventions by small projects, as opposed to comprehensive and long-term planning and a programmatic approach. These findings further support the position that village-level initiatives should not be a series of isolated actions, but systematically mainstreamed into government structures, policies and planning processes (Reid, Ampomah, Olazábal Prera, Rabbani, & Zvigadza, 2012; Reid & Schipper, 2014). In addition, the challenges that both traditional and modern technical solutions face are, in many cases, not directly related to the technical solutions per se, but also to the economic, social and political context in which they are being implemented.

A national NGO spokesperson stated emphatically:

> We have to be very careful when we talk to villagers about climate change. The best approach is to raise awareness. When we talk about greenhouse gas emissions or carbon dioxide, what are you talking about? Those are very difficult concepts to understand. How do you measure carbon? Because they look at a tree as a tree, they don't look at a carbon stick. It would be very useful for them to have a broader understanding about climate change. For example, when they are cutting down grass, they normally burn it and that has been the practice for generations. But they need to know that there are better alternatives, like composting the grass rather than burning it. So instead of telling them don't burn, tell them why, so they then learn what options they could take. (IS2)

For a New Zealand-based key informant, communities should be encouraged by the use of more relevant and practical examples:

> It is necessary to encourage communities to explore how their activities are having an impact on a local and global scale. So, whatever little activity they

[villagers] are doing in the village they can easily relate how their activity is actually linked to the global problem. So, they can have a sense of local responsibility to make sure that they are playing their little part in addressing climate change locally and cumulatively, hopefully, it will have some regional impact and, automatically, global impact. (INZ2)

These views are consistent with those of McNaught (2015): "Scientifically derived climate change information must be communicated in a way that resonates with local ways of perceiving the world, and must be delivered in a way that empowers local groups to apply their abilities" (McNaught, 2015 as cited in Volunteer Service Abroad [VSA], 2015).

With regard to people's access to information on disaster risk reduction, it was found that government agencies periodically organise disaster- preparedness workshops and drills in the village where the participation of village groups has been crucial. For instance, agencies use the Women's Committee as the delivery channel for community disaster-awareness programmes. In turn, Women's Committee members carry out safety and sanitation inspections and lead discussions on disaster-related topics (MWCSD, 2015).

From the previous discussion about the importance of both traditional and Western-based modern technical knowledge, it can be seen that the blending of both knowledge systems has been an important step forward towards climate change adaptation in Lotofaga. However, there appear to be mixed results. For instance, community-based activities driven by the communities themselves have shown more sustainable results. In those cases, families have addressed their own priorities such as the revitalisation of traditional agricultural practices, conservation of traditional ecosystems and promotion of culture-related activities. Those initiatives have been in response to the aspirations, priorities and needs of the community, and have been led by local leaders and organisations.

On the other hand, donor-driven initiatives implemented in the village appear to have responded more to donors' agendas and priorities. As reported, adaptation activities have usually started with sensitisation and information campaigns conducted by government officials and external agencies. In general, these activities have been attached to projects to be implemented in the area, and in many cases, they have not considered genuine traditional participatory processes.

Two issues have emerged from these findings: first, there is a need to better coordinate adaptation to climate change-related initiatives. Second, there are opportunities for local people's participation and engagement of their local organisations. They can guarantee that the initiatives respond to the needs of local families.

Population movements

As outlined in Chapter 3, identifying and defining different types of human mobility associated with climate change is not an easy task because there are several overlapping concepts, terms and categories (Ferris, 2015; MECLEP, 2015a; Morrissey, 2012). The findings of this study are in agreement with those by Hugo (1996) and IOM (2008) that propose that mobility in the context of climate change must be examined along a continuum, ranging from totally voluntary migration to totally forced migration. Very few decisions are entirely forced or voluntary, as seen in the case of Lotofaga. Mobility has not occurred in the extremes (totally voluntary movement and forced migration) but along a continuum, and it has been linked to the extent of slow- and rapid-onset events related to climate change.

Three main mobility patterns were found in Lotofaga: movement inland and migration to Apia and overseas. Moreover, displacement has occurred in the village following natural disasters.

Relocation inland

The most common form of mobility in Lotofaga is the movement inland to the families' customary lands. These movements can be considered as "voluntary relocation" and in some cases "voluntary relocation induced by national policies". Like other villages, the customary allocation of land in Lotofaga has seen families allotted plots close to the sea through to larger inland plots reaching into the mountains. These plots are the plantation sites. As a result, every family has access to both coastal areas and the interior lands (Fairbairn-Dunlop, 1991). While responses show that some movements inland have mainly been a response to climate-related impacts, it must be highlighted that some families have also moved to higher grounds to expand their agricultural practices, and when better access roads and other services were provided. Notably, government strategies in infrastructure relocation and construction of new roads have also been a response to climate-change drivers.

In the case of "planned relocation", there has been no government-planned measure to relocate the families of Lotofaga; it has not been deemed necessary. The Coastal Management Plan 2007 (CIM Plan) provided non-statutory guidance for future planning in the village, including recommendations to continue to relocate public infrastructure and houses outside the coastal hazard area where practicable (MNRE, 2007b, 2007c).

As regards displacement, this has occurred after natural disasters. These movements have largely been temporary, as families moved to their customary land holdings inland and then returned home. However, it is important to highlight that displacement events may trigger permanent relocation. This has happened in the case of Lotofaga. For instance, following the 2009 tsunami, many families opted to reside inland permanently. In contrast, there is no evidence that families from Lotofaga were displaced to urban areas after the occurrence of the recent natural disasters.

Rural – urban migration

It was found that voluntary temporary or permanent migration from Lotofaga to Apia has occurred for several reasons. Families have moved towards the capital in search of employment, to diversify income, and to have better access to education and health care. In the context of climate change, the study's findings suggest that families and individuals have also migrated temporarily or permanently after natural disasters or, as found, after evaluating the risks associated with slow-onset events such as sea-level rise.

Although climate change has not been considered the most significant driver of migration yet, the externalities of climate change might become push factors for both temporary and permanent movements. Climate change has direct effects on the people's wellbeing and health. There is evidence that the families' livelihoods have been affected by cyclones, flash floods, high rainfall, high temperatures and dry periods. The effects on agriculture are linked to the loss of quality and quantity in production. Additionally, unstable and inconsistent food production caused by climate change has affected families' food security and their capacity to generate income from their crops (UN-Habitat, 2014). Health impacts of climate change include trauma from extreme weather events, heat-related illnesses, compromised safety and security of water and food, vector-borne diseases, respiratory illnesses, and psychosocial ill health (McIver et al., 2016).

Migration abroad

In the short and medium term, it is likely that migration abroad will continue to be motivated more by economic, social and cultural factors. Furthermore, as seen in the case of Lotofaga, migration abroad would likely be by individuals, as entire families moving together is not common. I was unable to find evidence of Lotofaga families who have moved to New Zealand exclusively because of climate change. However, given that climate change-related impacts may increase substantially in the coming years (MNRE et al., 2011), it is likely that the increased scale, severity and pace of those impacts may trigger overseas movements in the future.

When analysing migration abroad, it is necessary to consider the role of migrant communities in supporting climate change adaptation in Lotofaga. As noted, kin members living in Apia and Auckland provide support to families in the village. Clearly, migration and, in turn, migrant remittances now play a fundamental role in diversifying income generation, hence enabling families to meet their needs, contribute to the church, fulfil the cultural obligation of *fa'alavelave* and adapt to climate change. The study found that considerable amounts of remittances have been sent directly to address climate-related impacts in the village.

Having discussed the three forms of climate-induced mobility in Lotofaga, namely, inland, Apia and abroad, it is possible to confirm that climate change has become an important driver of mobility along with other economic, social and cultural factors. In the context of climate change, mobility may be triggered by slow- and sudden-onset events. However, as noted, disentangling climate change from other migration drivers is not a useful exercise because of the interplay of economic, social, cultural and environmental factors. This finding confirms my research rationale that environmental migration must be studied within a broader context and in an interdisciplinary way (Dun & Gemmene, 2008; Ferris, 2015). As also noted, in the case of Samoa and other PICTs, intrinsic cultural aspects such as the social systems and the endurance of customary land tenure must be considered.

Human mobility as a risk-management strategy

As discussed in the previous section, under the framework of *fa'a Samoa,* resilience in Lotofaga is underpinned by customary land tenure, strong social systems, a combination of traditional and modern technical knowledge systems, and population movements. These factors provide the coping mechanisms or safety nets for families to address

climate-related impacts and build resilience. In addition, adaptation initiatives funded by government and non-governmental organisations have benefited these families.

Focusing now on mobility, one significant finding was that the families of Lotofaga have been using population movements not only to face the impacts of climate change but also to preserve their livelihoods and guarantee food security. In the case of movement inland, customary lands enable villagers to continue access to their traditional livelihoods. The different types of mobility that have been occurring in the village could be considered risk-management strategies aimed to respond to climate change and, in some cases, they may even help build resilience. However, when analysing mobility against the differentiated impacts of climate change, the distinction between resilient and vulnerable households becomes crucial.

In order to distinguish the degree of families' resilience, it is necessary to look at the family characteristics such as family size and composition, asset base, livelihood diversification options, and the level of support provided by family members living in Apia and abroad. Within the families, it is also useful to consider age, gender, and access to and control over resources. In line with previous studies that have distinguished between resilient and vulnerable households, it was found that the greater the resilience of the households and the more alternative livelihoods they have *in situ* (in the village), the less vulnerable they are against climate change (Warner & Afifi, 2013a, p. 21). This fact is crucial to understanding mobility patterns in the context of climate change. Although the practices of cooperation, reciprocity and service have prevailed in Lotofaga, climate change has had a differential impact on families' livelihoods. Two types of households can be distinguished in Lotofaga: (a) More resilient households. (b) Less resilient households.

More resilient households

The more resilient households in Lotofaga were those who had already moved inland where they built more climate-resilient livelihoods on their customary lands. In general, families achieved food security and were able to diversify their income. They also used mobility through temporary or permanent migration. The family members who moved to Apia or overseas had access to better education, gained better skills and found better jobs. They now send money back home. Families in the village can invest that money in food, education, health and livelihood diversification, and they can fulfil their cultural and church obligations, while being able to cope better with climate change impacts. In

these more resilient households, mobility has had beneficial outcomes because the extended families have been able to diversify and use different types of mobility, thus helping one another build resilience.

Less resilient households

Very few families are in this category. However, it is possible to distinguish: (a) families that had already moved inland but are struggling to build resilience, and (b) families that had not yet moved inland because they had no access to the resources to do so.

In the first case, families were already settled inland, and some have kin members in Apia or abroad. However, these families were not receiving the support they may have needed to develop their livelihoods. In this case, migration could be worsening their situation because of the loss of labour and knowledge, and the lack of support, such as remittances.

Other families would have liked to move inland but were unable to do so because they had no financial resources or enough family support. In the case of Lotofaga, this group cannot be considered as "trapped populations unable to move" because extended families and the village provided a safety net. Families that did not relocate inland were mainly woman-headed households and those who received less support from family members living in Apia and abroad, such as those born outside the village.

The less resilient families, both those that had already moved inland and those that remain in the coastal area, experienced periods of hardship with insufficient income to cover their basic needs. Sometimes they failed to achieve food security. They also lacked labour for their semi-subsistence livelihoods and, in some cases, they had to sell their produce to cover basic needs, such as paying school fees.

Drawing on these findings, both the more resilient and less resilient households may use population movements as risk-management strategies. In the case of the more resilient households, mobility enhances resilience. In the case of the less resilient households, mobility, in some cases, may contribute to increased vulnerability to climate change. It is important to note that families considered less resilient are doing their best to use their available resources to respond to climate-related impacts.

When looking at families' resilience in the medium and longer term, the prospects remain unclear. The capacity of families across generations to sustain their livelihood opportunities and wellbeing, despite environmental and economic disturbances, will depend on the responses of the extended families, communities, government and international community (Tanner el al., 2015). Therefore, policies must focus on household profiles and the degree of resilience or vulnerability to design adaptation mechanisms and investments. Prioritisation is needed to improve the adaptive capacity of vulnerable households to ensure that mobility is a choice.

Implications of climate-induced mobility

For this study, an interdisciplinary approach was selected to understand the linkages between climate change and population movements. In this section, the socio-cultural, economic and environmental implications of environmental migration will be discussed.

Socio-cultural implications

This study found that the human face of environmental migration has often been overlooked in both research and policy. The socio-cultural implications of mobility, highlighted in this study, have not been given prominence in debates such as the loss of culture, community cohesion, identity and livelihoods, even in cases of internal migration. In order to discuss these implications, it is necessary to distinguish between: (a) the families living in Lotofaga, including those that have moved to higher ground, and those that still live in the coastal area, and (b) the families that have migrated to Apia and abroad.

Village families

When families move inland, they continue to preserve the village communal customary practices and traditions, despite the time and resources that this might take. However, the findings also highlighted that internal population movements have modified traditional social and cultural structures. When families move inland, they leave their traditional village setting, a central place in their lives where they used to live, socialise and interact on a daily basis.

Every single piece of land has a history and significance that embodies cultural heritage. In some cases, movements involve a rupture of the family-community-land connection, difficult to recover afterwards. Furthermore, people's social and cultural connectedness to their lands and ancestral places may suffer serious distress. A representative of a

Samoan NGO pointed out the ways movements inland have affected people's identity, customary practices and culture:

> A lot of our oratory language is based on what happens in our villages and what is happening inland, what is happening with our fishing, and everything in the sea. When all is affected by climate change, you have to re-organise your whole being to see how you can align to this new exposure [new settlements inland]. That affects our oratory language when people don't find the indicators and the benchmarks by which you could measure what you are saying, and you basically try and recite them, recite the oratory language without having linkages on what you are actually talking about. Every oratory word has a whole story behind [it]. (IS2)

Recognising the challenges of maintaining people's cultural practices, another key informant brought to focus the strengths of traditional village organisations, the social structures and the governance systems in dealing with new challenges such as climate change-related issues. INZ2 said:

> Our culture is very strong, and I think that's the only thing that's keeping Samoa very good and peaceful. It's the culture, because of *fa'a Samoa*, our Samoan culture. That's why we can solve our problems, and we can discuss how to deal with it [climate change] in our village *fono*. [Our governance system] is still very strict. (INZ2)

Another important issue is the psychological impacts as a result of climate change, and particularly those related to natural disasters. A number of participants who are now living inland said that moving to higher ground had caused them distress and some missed the old settlement. Others pointed out that it had been difficult to adapt to new routines. A number of participants spoke about their traumatic experiences as they had been directly affected by the tsunami and the recent cyclones that hit the country. In fact, survivors and witnesses of natural disasters, where family members and friends have been killed, and where homes and property have been lost, can have a devastating impact on the psychological and social wellbeing of adults and children (OHCHR, 2010).

As regards the implications of climate change on culturally significant sites, some participants said that families also suffer distress as a consequence of the destruction of grave sites that have intangible value for the community. For instance, when the 2009 tsunami hit the country, waves came ashore and washed away many of the graves. A key informant, explaining the impacts of that event, said:

> Since the whole coastline has been affected [by climate change], people have lost the burial grounds of their ancestors. We still believe that with your people dead, you still live with them. A lot of our people still bury their fathers and mothers right around their own places. So, their children can go and play on their graves, and they still talk to them because it's a spiritual connectivity to the dead. Because we still believe that our ancestors are speaking to us, their lives have formed a lot of our lessons that continue to direct our lives. So that strength, our traditional and cultural connectivity to our past is totally destroyed. And then when people leave, when they are forced to relocate inland because of climate change, there are psychological and cultural impacts. (IS1)

Very little was found in the literature about the impacts of population movements on archaeological sites. This is particularly important in the case of Lotofaga where there is evidence of a prehistoric settlement inland in an area marked as Tafagamanu Sand (Davidson, 1965; Meleisea & Schoeffel Meleisea, 1987).

Migrants

Land for the extended Samoan community in Apia and abroad is highly significant as a source of identity and sense of belonging. No matter how long people have been living in Apia or abroad, the attachment to their 'aiga land is very strong. Thus, in the context of climate change, despite the fact that migrants do not experience the impacts of climate change and natural disasters directly, they assist families left behind. In times of adversity, the strong connections between the village and extended families in Apia and abroad become more evident. This finding further supports the fact that the extended family system and kinship ties provide critical support in times of disaster and need (Le De et al., 2016; Tupuola-Plunkett, 2014).

Economic implications

Government

As discussed in Chapter 2, a major concern in Samoa is that between 70 and 80 per cent of the population (rural and urban) lives in low-lying areas that are vulnerable to inundation due to the combined effects of sea-level rise, more severe storm surges, and flooding caused by heavier rainfall (UN-Habitat, 2014). For instance, the 2009 tsunami and the 2012 cyclone caused considerable damage to houses, infrastructure, crops and natural forests. The government has invested in rebuilding and relocating homes, and rehabilitating infrastructure inland, including access to water, sanitation, power and roads, while families had to rebuild their livelihoods. As seen in this case, the impacts

of climate change and natural disasters are disastrous for social and economic development.

Considering the physical vulnerability of the coastal villages, one of the government responses has been to relocate homes and infrastructure inland, a measure that incurs considerable costs (MNRE, 2007b, 2007c). A study funded by the World Bank found that extreme weather variability in the coastal zone would involve significant costs for either investment in coastal protection or the relocation of assets. The study proposed that in the longer term, the relocation of assets – or even whole villages – may be the best option as it would shift economic activity such as tourism, crops, and other businesses away from the coast (World Bank, 2013).

Although the government, with the support of the international cooperation, has contributed by relocating and constructing infrastructure on higher grounds, and providing social services, the villagers interviewed said that their extended families also covered the costs of relocation. They have diversified their income, including different types of population movements.

Families

Over the last decades, relocation inland has been occurring in Lotofaga. This has posed many challenges, not only for those who move but also for the extended families in urban areas and abroad. Those who decide to move inland have to put in place adaptation mechanisms to respond to climate change and natural disasters. Adaptation *in situ,* which includes relocation inland, includes measures implemented locally to enable the continued use of the village space. In some cases, that means reframing land-use patterns and redefining livelihood strategies in the villages. These actions demand significant financial resources.

The economic costs of families' movements from high-risk areas to less vulnerable areas inland, has not only fallen on the villagers but also on the extended Lotofaga community in Apia and abroad. The study found that a significant amount of resources provided by kin members living abroad helped the relocation inland. In situations of climatic stress, migrants support not only family members but also the village as a whole. Furthermore, the costs of migration to urban areas and overseas of family members are also covered by the extended families.

Auckland families, apart from sending remittances, also cover the settlement process of new migrants. Thus, they can send money back home, and families in the village can invest that money in livelihood security, and fulfil their social and church obligations while being better able to cope with externalities related to climate change and natural disasters. This is an example of a socially nurturing environment.

On this point, much of the literature alludes to migrant families in the diaspora coming under stress with the increasing demands placed upon them by new arrivals and requests from people left behind in the villages. For example, a study on the impacts of climate change-induced migration on Pacific families living in New Zealand found that receiving families often face an additional financial burden when relatives join them from the Pacific islands (McLeod, 2010). However, this was not the case in this particular study. The migrant participants living in Auckland talked of their love, responsibility and commitment to their families at home, as carried out in the spirit of *fa'a Samoa* because the *'aiga* and the village were their sources of identity. However, this does not mean there are no stresses.

Overall, these findings are consistent with other research that has found that the existence of strong community networks is one of the most important factors for community resilience to climate change (International Fund for Agricultural Development [IFAD], 2008; Vella, Dale, Cottrell, & Gooch, 2012). A strong social structure and governance system in the village, and well-established communities in both Apia and overseas have been crucial in strengthening risk-management strategies for adapting to climate change.

Remittances

One issue that requires special attention is remittances. This study confirms that in the context of climate change and natural disasters, remittances have provided immediate relief for households during slow- and sudden-onset events (Meldau, 2012; World Bank, 2010b). For instance, remittances from Samoans living in Apia and abroad increase significantly after natural disasters (World Bank, 2014d). Money sent home has been used to rebuild livelihoods, houses and household assets. It has also helped with various collective activities, such as repairing village assets and church repairing or construction (Connell & Brown, 2004, 2005). Moreover, remittances have also contributed to disaster preparedness as families can equip themselves better to protect not only their own assets but also the village ones.

Two factors can be highlighted when considering the importance of remittances in the context of climate change. First, the perception that remittances can potentially support climate change adaptation should not ignore the fact that remittances are personal flows of money from diaspora communities to their *'aiga* and villages. Therefore, remittances cannot be a substitute for public funding. Furthermore, it is necessary to consider that today not all families receive remittances regularly. Second, uncertainty remains about the inflow of future remittances, although in the case of Samoa there is no strong evidence to support the hypothesis that remittances will decline in the future (Connell & Brown, 2004). Another point to note is that remittances flows depend on the economic circumnstances in host countries and global economic stability.

Environment implications

The study found that relocation inland might entail a redefinition of land use in the future. In the case of Lotofaga, there is no empirical evidence of significant disruption, conflicts over land use or land degradation associated with the new settlement. However, as noted by a representative of the MNRE:

> Degraded land areas are visible in Samoa, due to the frequent occurrence of natural disasters, impacts of climate change, and infrastructural development. There is a need to protect our land through the promotion of sustainable land management practices such as sustainable agriculture and watershed management, to name a few, as well as through rehabilitation and conservation measures. (IS3)

Degradation is also the result of inadequate agricultural and fishing practices, and misuse or depletion of other natural resources. For instance, Samoan mangrove areas show signs of damage due to human activities, such as harvesting for firewood, land reclamation and waste disposal (Boon, 2001; MNRE, 2013b; UNDP, 2013). The degradation of natural resources has started to become evident in the country and could be aggravated by conflict over land use associated with relocation inland.

Plant genetic resources was an issue not discussed in the fieldwork. Research is needed on the impacts of relocation inland and the potential conflict over land use regarding the so-called secondary or neglected species, which are those cultivated or semi-cultivated species that play an important role in traditional agriculture and in the supply of food for local communities such as taro, sweet potato and yam (FAO, 2004). Further research is also necessary on the impacts of environmental migration and the under-utilisation of traditional resources. Cultivated land may be lost because the shortage of labour means

there are not enough people to undertake farming. An under-utilisation of native crops, and the consequent loss of diversity have resulted in the concentration of a reduced number of crops. This issue is becoming a growing concern in the PICTs. Genetic resources represent the most important raw material for farmers, and serve as a repository of genetic adaptability and resilience and thus act as a safety net in the event of environmental changes (Flores-Palacios, 1997; FAO, 2004; Khoury et al., 2016).

Chapter summary

Traditional livelihood strategies in Lotofaga are being affected by an increase in the severity of sudden-onset events and slow-onset events, such as coastal erosion and sea-level rise and changes in weather patterns. However, families are responding and adapting in unique ways. They are combining their own traditional knowledge with a Western-based modern technical one that they receive via development projects funded by the government, NGOs and international organisations. Families' capacity to adapt to climate change is based on an in-depth understanding of their natural resources and availability of land. Customary land tenure and strong social systems are also factors that contribute to building resilience.

Population movements are also being used as a response to climate change and natural disasters. The study found that in Lotofaga, as in the rest of the country, decisions to move both internally or abroad are usually made within the *'aiga* rather than by individuals, and are made with a view to the wellbeing of the whole extended family. At this point in time, mobility, in the context of climate change, is almost entirely within national borders. Climate mobility is mainly occurring within the village and through the utilisation of families' customary lands. In some cases, natural disasters have acted as a push factor in internal mobility; families have been temporarily displaced and have sought refuge on higher ground within their customary lands. In other cases, some families have voluntarily moved to higher ground after assessing the risk associated with living in the coastal areas. Even though mobility to Apia and abroad still appears to be driven by livelihood-related needs, aspirations for higher education and a desire for what is seen to be a better standard of living, climate-related issues may become critical push factors for migration to urban areas and abroad in the coming years.

Different types of mobility are common risk-management strategies for households and communities facing climatic stressors. However, my study points to the need to distinguish between resilient and vulnerable households. In the case of Lotofaga, the

more resilient households use mobility as a risk-management strategy to build resilience. In the less resilient households, mobility can increase vulnerability if households do not receive support from their extended families. The lack of labour in the village to deal with climate-related risks also increases vulnerability. Although mobility has different outcomes for both types of households, traditional coping mechanisms and safety nets remain strong in the village.

As regards the economic, social and environmental implications of climate-induced mobility, the study found that in both research and policies they are usually overlooked. The social implications include the loss of culture, community cohesion, identity and livelihoods, even in cases of internal migration (Campbell & Warrick, 2014). It was also found that different types of mobility incur significant costs for the extended families, although the government is financing replacement infrastructure and the rehabilitation of assets damaged or destroyed by climate change and natural disasters. The environmental implications refer to a redefinition of land use that may aggravate conflicts over land use, or degradation associated with the new settlements inland. In the case of Lotofaga, these problems were not identified, but they must be considered at the national level.

Chapter 8 - Policy Discussion

Although Samoa is making progress towards sustainable development, the impacts of climate change and natural disasters remain serious problems. The government, non-governmental organisations and civil society have demonstrated a deep concern about climate change-related issues, and they are promoting measures to deal with them (MOF, 2008, 2012; Poissonnier-Lescuras, Brücker, & Gemenne, 2013).

The political commitment is evident in the high priority placed on initiatives that respond to climate change. Addressing the opening ceremony of the 16th Parliament of Samoa in March 2016, the Head of State Tui Atua Tupua Tamasese Efi said:

> The phenomenon of climate change is a real part of our lives today. It is encouraging to note the budgetary commitment made by the last government to addressing the challenges of climate change. This shows prudence and acknowledges the seriousness of the issue. (Tui Atua, 2016, para. 13)

In the same way, after winning the general election in March 2016, the re-elected Samoan Prime Minister, Tuilaepa Sailele Malielegaoi identified climate change as a leading issue that his country is grappling with. He said: "The biggest challenge for the government would be to put in place adaptation projects that would assist the country to cope with climate change, and that means it cuts right across all sectors of the economy" ("Tuilaepa identifies climate change as Samoa's main challenge," 2016, para. 4).

Furthermore, non-governmental and community-based organisations, churches and other groups representing civil society have been advocating for climate justice and promoting initiatives at the local level to address the impacts of climate change in order to protect their lives and livelihoods.

Samoa's commitment to addressing climate change is also reflected in the leading role played by the country in climate change debates and negotiations in the Pacific region and at the international level.

The third question in this study sought to answer:

> Based on the findings of the village study, what key issues associated with environmental migration should be addressed at the national level?

This chapter puts the village findings into the national context; they are a lens for reviewing the topic of environmental migration at the national level. The findings are not extrapolated to explain the country situation, but to identify critical issues.

This chapter is in two parts:

- First, based on the village findings, climate-induced mobility is examined within the national Samoan context. The purpose is to understand whether or not the mobility patterns identified at the village-level are found at the national level and to understand how they are reflected in national policies and practices.
- Second, the policy recommendations are presented to address climate-induced mobility at the village, national, regional and international level.

Climate-induced mobility in the Samoan context

A major finding that has emerged from the study is that mobility in Samoa continues to be a central element of social, economic, cultural and political life. Furthermore, mobility is a family affair, as Samoans rely on their kin members for moral support and mutual aid. These findings are in agreement with Lilomaiava-Niko (1993) and Macpherson, C. and Macpherson, L. (2009), indicating that unique cultural factors must be taken into account in order to understand Samoan mobility. Therefore, any study of environmental migration has to take into account not only environmental factors but also critical social, cultural, political and economic ones.

As illustrated in Chapters 6 and 7, three typologies of mobility associated with climate change and natural disasters were identified in Lotofaga: relocation inland, migration to Apia, and migration abroad. The patterns identified at the village-level have also been observed at the national level. People can be involved in one or more typology of movement during their lifetime and also in both short- and long-term movements.

In this section, I will add displacement as a separate category to emphasise the extent of the impacts natural disasters have had in Samoa. Hence, the analysis of climate-induced migration patterns at the national level, presented in this section, are in line with the categories proposed by UNFCCC (2010), namely, displacement, planned relocation, and migration (internal and external).

Displacement

Overview

National and international reports highlight that Samoa is exposed to a number of natural hazards. Some of these are seasonal, such as tropical cyclones, floods and droughts. Others are an ever-present threat, such as earthquakes, volcanic eruption and tsunamis (MNRE, 2005, 2011). The occurrence of these events leads thousands of Samoans to leave their homes.

In recent decades, natural disasters have caused relatively major displacement. The 2009 tsunami that hit the country killed 143 people and displaced 2.5 per cent of the country's population. Communities in 23 coastal villages, mainly along the south coast of Upolu Island, fled their homes and were displaced to higher ground on customary lands. Villagers did not have to flee far inland to be safe; some less than 1 km, others up to 5 km inland. In the immediate aftermath of the tsunami, temporary shelters and camps were set up inland (OHCHR, 2011).

Cyclone Evan hit the country in December 2012 and was considered one of the most damaging natural disasters in recent years. It caused extensive destruction, particularly along the south coast of Upolu. Power cuts, uprooted trees and flash floods claimed lives and left homes, farms and businesses ravaged. Twelve people were killed and at least 7,500 people were displaced, seeking shelter in evacuation centres that were put in place by government agencies, humanitarian organisations and churches. These official shelters were located in urban areas while people in rural communities sheltered in church halls and with other families (Bradshaw, 2015; Meldau, 2012).

After the occurrence of these two natural disasters, some families that were displaced returned to their coastal villages to rebuild their homes and livelihoods, while others opted to relocate the entire village to rebuild and resettle further inland (OHCHR, 2010). In both events, displacement was short term and happened mainly within families' customary lands. Families could recover relatively quickly because *fa'a Samoa* enables them to address a variety of challenges more effectively. A strong social structure and a customary land system were crucial elements of resilience. The families helped one another in the disaster zones. Rural-urban kinship ties also helped displaced families recover. Family members living in Apia hosted relatives and friends during the aftermath of both events. Moreover, Samoan families abroad provided financial and practical assistance, with many family members returning to Samoa to assist in the

rebuild. These findings align with previous studies which have found that social cohesion is a crucial element in the recovery phase (Bird, Chague-Goff, & Gero, 2011; Murphy, 2013).

Policy response

In terms of policy response, the Disaster Management Office (DMO) of the MNRE has a mandate to coordinate risk-reduction activities in Samoa, working alongside a multi-agency Disaster Advisory Committee that reports to a high-level National Disaster Council. Thus, after the occurrence of any natural disaster, immediate humanitarian relief is provided under the overall coordination of the government's DMO and with support from international aid agencies. Over the last decade, the Government of Samoa has strengthened its disaster risk-management arrangements and has updated the *National Disaster Management Plan (NDMP)* (MNRE, 2005, 2011, 2013b, 2015, 2016).

In order to promote community participation, the Government of Samoa is implementing the *Community Disaster and Climate Risk Management Programme (CDCRM)*. It has been developed to facilitate the delivery of the disaster and climate risk-management programme for all villages in Samoa (MNRE, 2016). Although national policies are aimed at strengthening the disaster risk-management capacities at the village-level, local capacities are still weak due to limited resources and skill base (MNRE, 2013b).

The need to recognise the importance of community participation in policy design and practice is evident. Communities must be engaged in the identification, implementation, monitoring and evaluation of disaster management activities to reduce their vulnerabilities and enhance their capacities. Moreover, the involvement of most vulnerable social groups is crucial in this process (Abarquez & Murshed, 2004, as cited in Kafle & Murshed, 2006, p. 17). Where local partnership, knowledge generation and application are continuous processes, meaningful and inclusive disaster-related efforts are more targeted, cost-effective, efficient and timely (Asian Disaster Preparedness Centre [ADPC], 2015; IOM, 2009b; UNISDR & UNOCHA, 2008).

Relocation inland

Overview

The Lotofaga study found that relocation inland has been a voluntary process but has also been induced by national policies. This type of movement has also been observed at the national level. Over the last decades, relocation inland to families' customary lands has been occurring in Samoa due to improvements in infrastructure on higher grounds and the expansion of agriculture. Relocation inland has also been happening as a response to the impacts of climate change and natural disasters. As seen in the case of Lotofaga, relocation can become a permanent movement when it is triggered by displacement.

Based on the analys of the relocation process that has been taking place in Samoa, it is possible to identify two types: reactive and preventive (Schade et al., 2015):

Examples of reactive relocation include the villages of Safa'i, Saleapaga and Lalomanu. Safa'i, located on the northernmost point of the island of Savai'i, was totally destroyed by the cyclones of 1990 and 1991. Over 80 per cent of the houses located on the coast were destroyed by strong winds and surging waves. The majority of families relocated to customary lands further inland (UNDP, 2009). Another example of reactive relocation is the case of Saleapaga and Lalomanu on the east coast of Upolu Island. Both villages were relocated inland after the 2009 tsunami destroyed houses, transport, water and energy infrastructure across large areas, and wrought havoc on tourism facilities (World Bank, 2010a).

Preventive relocation has been shown in Solosolo village on the northeast coast of Upolu island. The village has initiated a relocation process inland as a response to sea-level rise and sand mining (Keresoma, 2016). After the 2009 tsunami, the villagers of Solosolo started to discuss shifting to higher ground. They felt vulnerable to natural disasters, rising sea levels, and flooding caused by two rivers at both ends of the village. To'omata Nora Leota (2016), a village *matai*, said:

> We experienced that danger during the 2009 tsunami, where many of us ran to high grounds and that's when most of the families decided to make the move permanently… We are very lucky that we have land on higher grounds for us to move to, and I hope that families who remain on the coastal area will also consider moving for their safety (To'omata, 2016, as cited in Mulitalo Ale, 2016, p. 1).

Villagers recognised that man-made causes have also contributed to aggravating the situation in the coastal area. To'omata went on to say:

> A new sea wall that was built years ago to stop the erosion is sinking slowly… and mining is the main cause of the problem. We have seen big companies getting sand from their village. Also, sea water would form a pond in the village *malae*, especially when it was high tide. In the next ten years, the sea will take over the village *malae*. (To'omata, 2016, as cited in Mulitalo Ale, 2016, p. 1)

Policy response

Over the last decade, relocation to higher ground has been encouraged by Samoan authorities. For instance, after the occurrence of Cyclone Evan in 2012, the Prime Minister of Samoa stated:

> The valuable lesson following this cyclone is that we need to warn people that are living close to rivers that they ought to shift, as well as those who live very close to the coastal areas, that they need to shift (Hill, 2013, para. 15).

In terms of policy response, the relocation inland was identified as a priority in the *2005 Samoan National Adaptation to Climate Change Programme of Action (NAPA)*. One of the recommendations refers to the implementation of the *Coastal Infrastructure Management Strategy and Coastal Infrastructure Management Plans (CIM Plans)* for highly vulnerable districts (MNRE, 2005). In the period 2000 to 2007, the World Bank funded the preparation of the CIM Plans covering all 41 political districts of Samoa (Beca International Consultants Ltd., 2001; Yeoman Ward International, 2000). These plans proposed the relocation of community and public assets outside the coastal hazard zones. These plans have been partially implemented, especially the relocation of public infrastructure.

New initiatives funded by the Climate Investment Funds (CIF), the World Bank and UNDP will update the CIM Plans, now called *Infrastructure Management Plans* promoting the so-called "ridge-to-reef approach". The planned relocation of communities is also included in these proposed initiatives as well as infrastructure such as road work upgrades, drainage channel improvements, culvert replacing, repairs or maintenance of existing sea walls and water supply improvements. In addition, "soft measures" are also envisaged such as the rehabilitation of mangroves (CIF, 2011; World Bank, 2012, 2013, 2015b). Despite the increasing importance of the relocation inland process, very little was found in the literature on the economic, social, cultural and

environmental implications of this type of mobility. Moreover, there are currently no statistics available to determine the extent of these movements at the village, district or national level.

An issue that deserves particular attention refers to the importance of customary lands in relocation processes (OHCHR, 2010). A study conducted by Tamasese, Parsons, Waldegrave, and Thompson, (2014) on the 2009 post-tsunami responses highlighted:

> The customary land tenure arrangements in Samoa proved to be a saving grace for many families whose livelihoods and homes were destroyed by the tsunami. Their ability to move inland and replant crops enabled a speedy resumption of their lives when compared with the disturbing survival processes of such disasters in other countries. (p. 11)

Relocation is an extreme risk reduction measure. In some circumstances, particularly for coastal villages highly vulnerable to extreme climate events, there is no other choice than to move to higher ground. Therefore, the success or failure of communities and government efforts to reduce vulnerability to natural risks, by establishing resettlement areas, depend on whether the basic services could be provided quickly and sustainably to relocated people, and most importantly the land arrangements that are put in place (Government of Samoa, 2010b). In the case of Samoa, it is critical that maintaining customary land tenure systems becomes intrinsic to policies and approaches related to relocation.

Migration to Apia

Overview

Apia is the location of the Central Business District and also a central location for government departments and social services. Industrial activities, commerce, restaurants, tourism ventures and other small business are also located in the capital. Agriculture and forestry activities are scattered in the highlands (UN-Habitat, 2014).

Apia is considered to be the only urban area in the country and, consequently, it has been attracting families and individuals from rural areas. Likewise, the availability of freehold land in the North West of Upolu, mainly in Vaitele, and the industrial zone located in that area have also been attracting families from the rest of the country. The fact that freehold land is only available in certain areas has influenced the spatial distribution of the population in Samoa, particularly in the North West of Upolu (Fairbairn-Dunlop, 2000a).

Only 29 per cent of the households in the capital live on customary land, and by way of contrast, the rest of the households are freehold land owners. Residence on freehold land is not subject to the authority of the *matai* system of a village, even if it is located in a village. In Apia, there is a range of urban land uses in each village area, as families are granted the right to start businesses on their land.

Rural-urban mobility is characterised by an array of different types of movements. There are temporary movements of farmers who move to town to sell their produce and then return to their villages. There are individuals who work or study in Apia for short periods of time; some people commute to town on a daily basis. There are also permanent movements to Apia. Families and individuals move into town for employment, education, health services and more social oportunities.

Thus, the main drivers of urban growth can be associated with greater social and economic opportunities in Apia and the surrounding region of North West Upolu. However, rural-urban migration's response to economic and social factors is also associated with climate-related factors. Considering that climate change and natural disasters may be pushing rural families to Apia and the North West of Upolu, it is necessary to look at the particular vulnerabilities of the urban areas.

Apia is characterised by a narrow, low-lying coastal plain with Mount Vaea and the highlands bordering the city in the south from east to west. The lowland is relatively flat and its elevation is not more than ten metres above the mean sea level. The location of Apia in a floodplain exposes the urban population and infrastructure to frequent flooding. In addition, Apia is vulnerable to a range of impacts as a result of climate change, and it is exposed to risks associated with tropical cyclone, storm surge, sea-level rise and intense rainfall (UN-Habitat, 2014).

There is a relationship between increasing population densities in urban coastal areas and the pressures put on urban services and resources (MNRE, 2013c). Informal settlements are emerging on customary and freehold lands in the middle of Apia and on its fringes. A report prepared by Habitat for Humanity (2009) highlighted that development within these settlements was unregulated, and the government was providing few services.

Policy response

In terms of policy response, to date, no proper land-use planning has been developed for Apia. However, the *National Urban Policy for Samoa*, a document prepared by the Samoan government in 2013, sets the framework for a long-term *National City Strategic Framework* to guide urban development and growth. The *National Urban Policy* provides a framework to address urban planning, emphasising the need to revert the adverse impacts of urban growth and development and land-use settlement patterns (MNRE, 2013c).

Various initiatives have been put in place to enhance the adaptive capacity of Apia. For instance, sea walls already exist at the most built-up coastal area of the capital. These provide a level of protection from climate-related events to inland property and infrastructure. In 2007, the *Samoa Power Sector Expansion Plan* developed climate-proofing actions for the production and delivery of electricity to the public. These include the relocation of the Tanugamanono Power Station further inland to Fiaga, the undergrounding of electricity lines, the establishment of sub-stations for better connectivity during power failures, and the upgrading of hydro power stations. The Land Transport Authority is using the *Apia Master Plan* to upgrade the drainage systems and river protection to reduce flooding and overflow during heavy rainfall in Apia. The Samoa Water Authority and the MNRE, as part of the *Samoa Water Sector Plan*, are collaborating to improve the adaptive capacity of Apia to climate change. Initiatives include securing the watershed area for protection, widening and deepening waterways, and extending protected areas around river banks (MNRE, 2013c).

As regards housing development, it is possible to build homes in some coastal areas but it is considered a transition option with raised floor levels to allow for more frequent and higher flood levels. For instance, residents in the villages of Sogi, Fugalei, Vaimoso and Vaitoloa have built homes with elevated floor levels (UN-Habitat, 2014).

In the case of relocation, national authorities have been reinforcing calls for Apia families who are vulnerable to the impacts of climate-related events to consider moving inland voluntarily (Hill, 2013). Conversely, there are no initiatives related to planned relocation. This type of measure would require an urban planning framework. For now, the *Planning and Urban Management Act (2004)* is undergoing a review to identify appropriate zones for regulating and limiting various activities related to housing (UN-Habitat, 2014).

Although an existing policy framework guides urban development, there is recognition that adaptation to climate change and responses to natural disasters require greater community participation. Community-based organisations have a vital role to play. Therefore, it is necessary to build capacity and awareness about climate change, in particular about its impacts on livelihoods, and disaster risk management (UN-Habitat, 2014). Moreover, people need to be part of any initiatives that affect their lives.

Migration abroad

Overview

Push and pull factors are forces that can either induce or force families to move to a new location. Work opportunities, education and family reunification are some of the reasons Samoan families choose to leave their country and start a new life elsewhere (Macpherson, C., 2000). Climate change-associated problems and natural disasters are also factors that have begun to be mentioned in the discussions about moving away from the villages.

The village study confirms that any study of international migration has to consider the peculiar Samoan characteristics of mobility such as the socio-cultural, political and economic elements that are embedded in the decisions to move (Macpherson, C. & Macpherson, L., 2009). Therefore, climate change-associated factors have to be incorporated within that context. This aspect is crucial when considering that the effects of climate change are projected to intensify in the coming decades. The combination and interaction of geographic, economic, environmental and social factors are expected to make the country particularly sensitive to climate change (ADB, 2013).

The findings of the study highlight two crucial aspects that may shape migration associated with climate change in the future. First, while the precise nature and extent of climate change in Samoa cannot be predicted with certainty, it is likely that it may become an increasingly important driver of intra-national migration (rural-rural and rural-urban) and also international migration. Second, it is remarkable that Samoan communities abroad maintain strong ties with their *'aiga* and villages. This has enabled Samoan development to be sustained and their culture to be kept alive, both in the country and abroad.

Emigration has provided a safety net for high fertility rates in Samoa, limited resources and lack of employment opportunities (Samoa Bureau of Statistics, 2011). Moreover,

remittances have significantly helped to improve the lives and livelihoods of families who stay in the country, boosting the economy as a whole, and responding to the impacts of climate change and natural disasters.

In a study of remittances after the 2009 tsunami and cyclone Evan in 2012, it was found that remittances quickly reached those families affected, and they continued in the following months, helping the families to cope with and recover from the disasters (Gibson, 2010). Families receiving remittances were able to recover more quickly than those with no or limited access to these funds. Moreover, remittances also benefited the wider community (Le De, Gaillard, Friesen, & Matautia Smith, 2015).

Another study pointed out the migrants' perspectives on remittances when disasters struck. It was found that "migrants remitted because of a sense of obligation/responsibility to assist their family, a consciousness of the economic struggles experienced in Samoa, and religious ethics" (Le De et al., 2016). The study found that while remitting in the disaster context could imply severe economic impacts on migrant communities; it also reinforced the social ties they had with the affected community.

Mobility in the future will continue to be necessary to fulfil cultural, social and economic functions within the '*aiga* (Macpherson, C., 2000). However, although the strong connectedness of Samoan communities abroad with their *'aiga* in their home country, it remains uncertain the long-term response of diaspora communities. The adherence to *fa'a Samoa* of future generations of migrants and Samoans born overseas may change. While many migrants retain an attachment to their homeland, it is unclear how new generations of migrants, migrants' children and overseas-born Samoans are going to shape migration in the future and how culture is going to affect these movements.

Policy response

Regarding the policy response to migration abroad that is associated with climate change, the Samoan Government has not taken any specific measures. In the case of migration to New Zealand, which is the focus of this research project, families and individuals who want to emigrate must meet the pre-established requirements of the New Zealand government. Thus, people may apply under the following categories: (a) Skilled migrant category. (b) Business and investment. (c) Family reunification. (d)

Samoan quota scheme. (e) Study. (f) Recognised seasonal employer scheme (Immigration New Zealand, n.d.).

Policy recommendations to address climate-induced mobility

This study suggests that climate-induced mobility has to be studied within specific contexts (place and time), so that tailored interventions can be put in place to address different types of mobility. Policy design demands an interdisciplinary approach that must be underpinned by traditional and technical knowledge systems. Within this context, the voices of people affected by climate change should be the core of any initiative.

In this section, some policy recommendations that are expected to take action at the village, national, regional and international level are presented (Nansen Initiative, 2013a, 2013b, 2013c, 2013d).

Village level

Samoan communities have demonstrated great strength and resilience in the context of slow- and sudden-onset events associated with climate change. In times of distress, people not only prioritise their own safety and needs but also *their 'aiga*'s and the village's wellbeing. Samoa's communal systems – including the semi-subsistence sector, customary land tenure, strong cultural identity and traditional values, a stable social system based on the extended family and village community, and traditional knowledge and practices – can be considered the foundations of families' resilience (Fairbairn-Dunlop, 2000b).

At the village-level, policies related to adaptation to climate change and responses to natural disasters have to consider the whole Lotofaga community, families that are living in the coastal areas, those living along the road and those who have relocated inland. It is necessary to highlight that although relocation inland can contribute to diminishing the risk of climate change impacts, families' livelihoods and local ecosystems remain vulnerable due to the geographical location of most of the coastal villages.

Based on the findings of the village study, two aspects were identified as critical to ensuring that policies about climate change and mobility support people's resilience while considering their social and cultural characteristics.

- First, the voices of people affected by climate change have to be heard. Affected communities have their traditional knowledge and centuries of experience adapting to changing environmental conditions.

- Second, a key policy priority should be to strengthen villages' resilience to make mobility an informed choice rather than a forced movement.

Listening to the people's voices

One of the most significant findings of this study is that while the voices of scientists, academics, politicians and development practitioners dominate the climate change debate, the voices of people affected by it are often neglected in both research and policy. Not only are they the ones affected directly by climate change; their knowledge, experiences and aspirations should have a central place in order to understand and address these challenges, including human mobility.

The findings of the study have helped identify strategies to integrate the voices of people affected by climate change in both research and policies. They include: (a) Using Samoan and Pacific research methodologies. (b) Promoting synergy between different knowledge systems. (c) Recognising traditional ways of participation. (d) Recognising that participation is not only local but global. (e) Considering the differentiated voices, particularly the voices of elders, women and youth in both research and policies.

Using Samoan and Pacific research methodologies

The use of Samoan and Pacific research methodologies can contribute to the amplification of the voices of people affected by climate change and natural disasters. They can help bring to light Samoan knowledge systems. This finding is in line with those of previous studies that have suggested that indigenous approaches to research represent alternative ways of thinking about research processes that consider the epistemic perspectives, cosmologies, and insights of indigenous people (Battiste, 2000; Chilisa, 2012; Mignolo, 2009; Smith, 1999; Thaman, 2003).

Revitalising and decolonising indigenous research is not an easy process. However, it is important to recognise that today there are opportunities to promote alternative ways of knowing. de Sousa Santos et al. (2007) refers to the epistemologies of the south. These epistemologies, far from refusing science, recognise the diversity of knowledge existing in contemporary societies. Mignolo (2009) made reference to "decolonial thinking" and

calls for an epistemic disobedience, independent thought and decolonial freedom for imagining and building democratic, just, and non-colonial societies.

Gegeo and Watson-Gegeo (2001) said:

> Around the world today indigenous ethnic groups are asserting the validity of their own ways of knowing and being, in resistance to the intensifying hegemony of mainstream epistemology from the metropolitan powers. This assertion is not happening only among third-world scholars familiar with the challenges to Anglo-European cosmology and epistemology from postmodernists over the past several decades. It is also happening among rural villagers with little or no schooling or awareness of the debates going on internationally in philosophy and the social sciences. (p. 1)

The debate about decolonisation and revitalisation of indigenous research is moving forward. In fact, many researchers across the world are calling for engagement in proactive initiatives, rather than resorting to reactive models. They say that indigenous peoples must set the agenda for change themselves, not simply react to an agenda that has been laid out for them by others (Smith, 1999; Thaman, 2007). The findings of this study indicate that indigenous approaches to research are not meant to compete with Western research paradigms; rather they contribute to the body of knowledge of indigenous peoples for their own agendas, rather than as objects of mere investigation.

Promoting synergy between different knowledge systems

Samoan knowledge systems can be combined with Western-based technical knowledge to inform research and policies on environmental migration. This study has brought to light traditional knowledge, critical for responding to climate change-related impacts. Samoan people have maintained, nurtured and refined knowledge in diverse domains. These knowledge systems not only represent approaches of the acquisition and construction of knowledge but they are also expressions of strong relationships between people and their environment (Fa'asau, 2011; UNESCO & ICHCAP, 2013). The study emphasises people's strong connection to their lands and sensitivity to their environment and natural resources endowment. Participants talked about the social, cultural and physical features of their village and a strong emphasis was placed on the importance of maintaining traditional knowledge, worldviews, values, beliefs and practices, in order to deal with new challenges.

Although traditional knowledge is alive, the extent of the impacts of climate change is challenging people's traditional knowledge and practices in some ways. In the past,

traditional knowledge associated with climate change and natural disasters was passed on from generation to generation. This practice has diminished in recent years due to the increase in the cash economy, changes in consumption, urbanisation, migration abroad, the passing away of elders, and also a declining interest in traditional knowledge by many young people.

These findings are in line with recent studies indicating that a combination of factors is causing the erosion of traditional knowledge, such as the rapid pace at which social, economic and ecological changes are occurring (Mazzocchi, 2006; Nakashima et al., 2012; Nunn, 2009; Raygorodetsky, 2011; UNESCO & ICHCAP, 2013). This study found that the erosion of traditional knowledge has two leading causes in the context of mobility associated with climate change. First, when families move to higher ground, although within their customary lands, some cultural practices may change or be lost. A key informant in Samoa said:

> If you start shifting inland because of climate change, how can you measure the value of our cultural intricacies, all these complexities that have become part of our lives for generations? When you move, you just try and do the best you can do. You've lost the connectivity with your ancient places, and with your parents; they're still lying there. In our oral language, we have stories and then people think about those stories, but they have references to what we are discussing. It is very powerful, very integrated, very deep and meaningful. If you lose the references, if you are an orator, you just recite these things, and [the words] become meaningless to many people, like empty shelves. So, you find that orators of today are just speaking words without understanding the meaning of them. (IS1)

Although there is evidence of erosion of traditional knowledge, the results of this study also indicate that when families move inland, they strive to keep their traditional knowledge and practices alive to deal with the new challenges.

The second cause is specialised traditional knowledge, critical to climate change adaptation, travels with migrants, particularly those who live abroad. A number of participants stated that their traditional knowledge, in some cases, has been moving away with migrants. In other cases, it has been "contaminated" with new practices and experiences that migrants and others are taking back home. There is evidence of the loss of traditional agricultural and fishing practices, traditional food production and coping strategies to deal with climate change and natural disasters. Allusions and metaphors linked to people's environment are at risk of being lost. There is also a loss of maritime skills and traditional arts and crafts (Fa'asau, 2011).

Kin members living in Apia and overseas are trying to preserve and pass on their knowledge, although recognising that practical skills are difficult to teach, while principles, values, and beliefs keep the communities alive. There are examples of Samoan families living in Auckland that try to keep their traditional knowledge and skills alive by recreating a piece of Samoan life in their host country, such as communal gardens where they can demonstrate and pass on their knowledge.

One issue that requires further investigation refers to the need to combine traditional and Western-based modern technical knowledge in effective ways. In some cases, successful past adaptation is not the same as adaptive capacity to deal with new challenges such as those associated with climate change and natural disasters. Fundamental components of adaptive capacity include the ability to learn and experiment. This is why it is so important for Samoan people to have access to modern technical knowledge so that they can incorporate it into their own knowledge systems.

New technical solutions cannot be imposed; they must be integrated, and adapted to specific cultural settings. Even the most reliable scientific finding and its resulting climate change policies have to be translated into actions, and locally contextualised in order to become a part, as coherent as possible, of the traditional knowledge. Any external piece of Western-based knowledge and technology has to be perceived as an integral part of Samoan knowledge, and has to be balanced with the various elements that support *fa'a Samoa*. Otherwise, it will be rejected as an intruder or it will disrupt the equilibrium of the other vital elements.

Recognising traditional ways of participation

As discussed in Chapter 3, Samoan culture is based on a hierarchical structure upon which Samoan life is governed. In Samoa, a parliamentarian democracy and a traditional chiefly system or *fa'a matai* coexist (Fa'amatala, 2007). This is the key socio-political system of governance in the country. The *fa'a matai* provides a framework that allows participation within the *'aiga* and the village. There is a division of the village in which members of the community have roles and responsibilities. Even though *fa'a matai* revolves around the *matai*, it nevertheless provides the focal point that brings together all the members of families, villages, the nation and communities abroad. About 90 per cent of Samoans live under the *fa'a matai*, which has a real and strong influence on the everyday lives of Samoans, both within the country and overseas (So'o, 2007; Va'a, 2007).

The findings of the study village show that traditional participatory processes continue to play an important role in the village. However, the villagers interviewed felt that although well-established village organisations and effective traditional participatory processes exist, their voices are not heard in policy-making and practices. These villagers also indicated that there is a lack of access to information about government programmes and activities associated with climate change and natural disasters. The information that is available is sometimes difficult to obtain and interpret. There is a desire to learn about and access information about policies, projects and other initiatives that can be understood and are timely.

Participation requires that local women and men speak for themselves. People's voices must be included since the inception of new initiatives. The study found that consultation and information are not enough to engage local people. Therefore, policies and actions related to climate change adaptation and disaster risk reduction should promote genuine participatory processes. Village organisations should be engaged to promote, coordinate and implement new activities in their localities. The knowledge and practices of local people need to be recognised by development agents and built upon in climate change-related activities.

This finding is consistent with other studies that highlight a lack of effective community involvement in planning and decision-making regarding climate change adaptation and disaster risk reduction initiatives. For instance, the *Progress Review of Hyogo Framework for Action on Disasters Risk Reduction for Asia and Pacific 2011-2013* pointed out that there was a lack of effective involvement of communities in planning and decision-making in disaster risk management. The report cites the case of Samoa and highlights the fact that gender issues do not feature strongly as an organising principle for disaster risk management activities in the country (United Nations Office for Disaster Risk Reduction [UNISDR], 2013). It is evident that participation by all those impacted by climate change adaptation initiatives and natural disaster responses is an essential requisite to forge ownership and ensure sustainability.

Acknowledging differentiated voices, particularly elders, women and youth

The findings highlighted the critical role that village-based organisations such as the village councils and women's committees play in climate change adaptation initiatives, coordinating disaster, mitigation and preparedness programmes, and other development

activities at community level. Therefore, village resilience needs the effective and meaningful participation of different groups, particularly elders, women and youth.

The study also found that elders, the traditional knowledge holders, have an important role to play in climate change adaptation. As Percival (2008) recalls, "traditional knowledge is conveyed from one generation to the next through family guilds or groups of experts localised in a particular area, often close to a special environmental feature or a component needed when using or expressing the knowledge" (p. 12). Elders in the study village recognised the importance of teaching young people the skills they will need in a changing environment. This finding reflects the strong cultural values. As the Head of State of Samoa Tui Atua Tupua Tamasese Efi (2003) said: "The role of the elders is to nurture the young so that the young will inherit from them the stories of their struggles and survival, their values, their *alofa* and their vision for the future" (Tui Atua, 2003, as cited in Percival, 2008, p. 12).

Regarding women's roles in the village, they participate actively in the semi-subsistence village economy, in agriculture, fishing, livestock and small income-generating activities. Their traditional knowledge about production systems, natural resources management, climate change adaptation and disaster risk reduction is critical. Moreover, they are open to incorporating modern techniques in their knowledge systems.

As mentioned in the literature review, climate change is not gender neutral. Vulnerabilities of men and women to climate change tend to differ, reflecting men's and women's socially and culturally defined roles and responsibilities (UN Women, 2015). In Samoa, the division of labour has been traditionally based on rank, gender and age. However, migration, and economic and social needs have contributed to the modification of those patterns. This change in roles has also affected the ways men and women respond to the impacts of climate change and natural disasters. During the field work women were observed performing some farming and fishing activities that were once considered male responsibilities.

The study found that in the context of climate change, women are more vulnerable than men because they tend to have less access to or control over assets, including the resources necessary to respond to slow- and sudden-onset events. These include access to information, education, technical assistance and financial resources. Moreover, they

have reduced mobility in situations of environmental stress because of their childcare and eldercare responsibilities (Boncour & Burson , 2009; Lane & McNaught, 2009; UN Women, 2016). In the case of Samoa, testimonies from survivors of the 2009 tsunami said that women helped to evacuate old, young and disabled members of the villages (Nemerever, 2012). With regard to the impacts of natural disasters, empirical studies indicate that women and children are more likely to die or to be injured in a disaster than men (Neumayer & Plümper, 2007). In the 2009 tsunami, 70 per cent of the adults that died from tropical cyclones in both Samoa and Tonga were females (UN Women, 2015).

Although women are more exposed and vulnerable to climate change, the study found that Samoan women are also agents of change. Female community leaders actively participate in developing strategies to cope with climate-related risks. Furthermore, the Women's Committees along with representatives of the Ministry of Women, Community and Social Development (MWCSD) work to implement the *Healthy Families, Healthy Villages Programme* that include specific measures to deal with climate change issues (MOH, 2008).

Regarding youth, the findings were that their voices must be heard on matters that affect them, such as climate change and population movements, not just because they will have to live with the impact of the political decisions of today, but also because they need to discuss their future and be part of the solution. Youth need to harness their traditional knowledge in order to maintain connections to their land, cultural values and beliefs. Moreover, it is necessary to reinforce the educational systems that support youth learning and traditional knowledge transmission.

One clear issue that emerged in the study refers to the high rates of youth unemployment. It is necessary to use climate change adaptation funds to engage youth in climate change initiatives, including education, awareness-raising and targeted initiatives. For instance, a partnership between ILO and MNRE is exploring youth employment opportunities within the climate change and environment sector. The purpose of the agreement is to promote "green works" aim to restore and protect the productive capacity of lands, to build resilient infrastructure capable of adapting to climate change, and to create livelihood and income security for the most vulnerable (ILO, 2015b). This is an example that could be replicated.

Recognising that participation is not only local but global

As discussed in the previous section, there is a need to listen to the differentiated voices of Samoan people – men, women, elders and youth – at the national and international level. Climate change is a global challenge; therefore, people's priorities and aspirations need to be included not only in national public policies but also in international frameworks.

As in other PICTs, a growing number of organised youth groups in Samoa are highlighting the fact that Pacific people are at the forefront of living with the reality of the injustices caused by climate change originated elsewhere (350 pacific, n.d.; SPREP, 2015b). Thus, Pacific youth are highlighting the vulnerabilities of their islands to climate change while showcasing their strength and resilience (350 pacific, n.d.). They are calling for climate justice; a term used to frame climate change as an ethical and political issue, rather than one that is purely environmental or physical in nature (Elisara, 2008, 2011; Mary Robinson Foundation. Climate Justice, 2016; Tiumalu, 2013).

It is evident that younger generations can play a vital role as agents of change within their communities. Brianna Fruean, a young Samoan environmental activist, reflecting on her participation at the Paris Climate Conference in 2015, said:

> [At day 2 of COP 21] speakers spoke about indigenous people in the forefront of climate change and our ability as people who have a spiritual understanding of the land to lead change. This opened my eyes to the fact that one of the smartest ways forward for adaptation and mitigation of climate change for traditional societies is marrying technology, science and traditional knowledge together. Going back to our roots to find solutions. (SPREP, 2015b, para. 1-2)

Strengthening villages' resilience to make mobility an informed choice

The integration of environmental migration into local planning processes can provide a channel for ensuring that village priorities are considered. Mobility is not an issue to be addressed in isolation, as part of specific demographic policies, but it must be interpreted and dealt with inside the mainstream planning process and sustainable development strategies.

Given the localised nature of climate impacts, policy responses must start at the village-level to ensure relevant and effective practices. A key policy priority should be to strengthen resilience of coastal communities to reduce the risk of people succumbing to

economic and environmental shocks. The inclusion of vulnerable groups and a gender-sensitive approach are essential elements to ensure that policies respond to different vulnerabilities and priorities.

Thus, building resilience requires risk assessments, disaster preparedness, disaster risk-reduction measures, adaptation to climate change initiatives, and development interventions. In parallel, social-protection measures would enhance the possibility of people remaining in their villages.

In some cases, mobility can act as a coping mechanism to deal with climate change and natural disasters, and can contribute to building resilience. In Samoa, one response to climate-related impacts has been the relocation inland to customary lands. In cases of village relocation away from areas of high vulnerability, there is a need for community participation, with communities guiding the process from the beginning. Additionally, adequate mechanisms and safeguards on land tenure need to be put in place, considering the importance of customary land in the country. If people migrate to urban areas, basic services, adequate housing, and access to livelihoods for relocated people in the receiving community are required.

If individuals or families choose or are forced to move, they need to have access to information. Critical elements to consider are: awareness raising, education and genuine discussion and consultation with at-risk communities and potential host communities for the prospect of population movements, and what this entails (Nansen Initiative, 2013e).

National level

Population movements driven by climate change and natural disasters are emerging as a serious concern in the country. Policy actions taken today can prevent the emergence of crises in years to come by promoting resilience in affected communities and well-managed population movements. Based on the findings of the village study, two main recommendations can be made:

- First, there is a need to improve information on different types of climate-induced mobility.
- Second, climate-induced mobility has to be included in both development and sectoral policies.

Improving information and research methodologies on climate-induced mobility

Despite the importance of the topic of mobility linked to climate change, there is still a lack of reliable data and policy-oriented research. Migration decisions are complex and reflect the linkages between environmental factors with economic, social, cultural and political ones. Moreover, migration flows are heterogeneous in Samoa, requiring the development of better tools to capture their diversity. Therefore, there is a need to improve the knowledge base on population movements associated with climate change by strengthening data collection methods and analysis, specifically:

a) Improving data collection related to the location, timing, patterns, duration and distance of different types of mobility to understand families' resilience and vulnerabilities.

b) Improving data collection related to climate stressors, the likely impacts and the likelihood they act as a trigger of mobility.

c) Improving collection of data disaggregated by gender, age, and socio-economic status.

d) Using qualitative and quantitative methods, and modelling to collect information. Longitudinal data is needed on how migration and relocation can strengthen adaptive strategies; particularly by identifying the risks they mitigate (Swing, 2015).

e) Using Pacific methodologies to capture the voices of people affected by climate change and natural disasters and who are induced or forced to move.

f) Improving research capacities at the national level, by increasing collaboration among local researchers and researchers from across the Pacific region.

Including climate-induced mobility in policy and planning processes

Policy options related to population movements in the context of climate change and natural disasters have yet to be addressed by the Samoan Government. To date, mobility has not been given prominence in climate change adaptation and disaster risk-management policies. In addition, climate change has yet to be addressed more comprehensively in social and economic policies, and more broadly in development policies.

Sectoral policies

As discussed in Chapters 2 and 6, it is fair to recognise that Samoa has made enormous efforts to put in place sectoral policies to respond to climate change, natural disasters and environmental protection. These include the *National Climate Policy (NCP)*, the

National Adaptation Programme of Action for Climate Change (NAPA), and the *National Green House Gas Abatement Scheme (NGHGAS)* that provide guidelines for climate change adaptation and mitigation (MNRE, 2005, 2011, 2013b, 2015, 2016). The sectoral policies for energy, water and forestry are climate sensitive, and the agriculture and environment policies also make reference to climate change issues. Additionally, there are in place a *Tourism Sector Plan*, and the *Coastal Infrastructure Management Plans (CIM Plans)* (Overseas Development Institute [ODI], KVA Consult Ltd, & Pacific Environment Consultants Ltd., 2012).

In relation to disaster risk reduction (DRR), the main policy document in Samoa is the *National Disaster Management Plan 2011-2016*. In addition, the *National Action Plan for Combating Desertification* relates to DRR actions in the context of sustainable land management. The *Disaster and Emergency Management Act 2007* represents a significant achievement for Samoa as the Act clearly indicates a shift from the former relief-oriented approach to a more comprehensive risk-management approach (ODI et al., 2012).

Although Samoa has produced an important policy framework to respond to climate change and natural disasters, there are overlaps between climate change adaptation and mitigation, and disaster risk management. Some PICTs have started to integrate both types of policies under a broader framework (SPREP, South Pacific Applied Geoscience Commission [SOPAC], & SPC, 2013). In the case of Samoa, a number of initiatives integrate climate change and disaster risk management at a programme level but not yet at the policy level (UNISDR, UNDP, Global Facility for Disaster Reduction and Recovery [GFDRR], & Global Environmental Facility [GEF], 2012).

References to human mobility in the context of climate change and natural disasters are only mentioned in the CIM Plans (2001, 2007) and the NAPA 2005. The CIM plans address the role of the planned relocation of individuals and infrastructure outside the coastal hazard zones as an adaptive strategy, particularly in the context of rising sea levels. Human mobility emerged as a theme in the NAPA 2005; however, the document provides little detail on strategies to prevent population movements or facilitate them when needed.

Development policies

From the previous discussion, it is seen that Samoa has taken the first steps towards the consideration of climate-induced mobility in development policies. It is evident that climate-related mobility cannot only be addressed by sectors. It needs to be considered in an interdisciplinary way, and be integrated into national development planning and sustainable development initiatives. Moreover, there is a need to enhance participation of people affected by climate change in policy and planning processes.

The re-elected Samoan government has recognised the need to promote effective policy measures to accelerate the reduction of disasters and climate-related risks. The Deputy Prime Minister of Samoa, Fiame Naomi Mata'afa, during the World Humanitarian Summit in May 2016, said that Samoa is committed to reinforcing national and local leadership and capacities in managing disasters and climate-related risks by strengthening their existent local mechanisms and policies on disaster preparedness, response and recovery (World Humanitarian Summit, 2016).

The Government of Samoa produced the *National Development Strategy for the period 2012 to 2016*, a document that highlighted climate change as a priority issue. The government is now preparing a new development strategy for the period 2016-2020 called *Accelerating Sustainable Development and Creating Opportunities for All*. The document will include recommendations from the main global agreements and frameworks, such as the Samoan Pathway (2014), the Sendai Framework for Disaster Risk Reduction (2015), the UN 2030 Agenda (2015), and the Paris Agreement on Climate Change (2015) (World Humanitarian Summit, 2016). Within this new strategic framework, there are opportunities to address the issue of mobility in the context of climate change.

In both sectoral and development policies, the three typologies of mobility – displacement, relocation and migration – must be comprehensively included to design tailored measures as forms of adaptation and risk-management strategies. It is also necessary to address vulnerability and resilience in the origin of mobility and in the destination areas. This is particularly clear in the case of displacement and relocation within the villages. In the case of rural-urban migration, it is necessary to include urban areas in policy design to understand how this type of mobility shapes opportunities for families to respond to slow- and sudden-onset events.

Finally, other policy measures to be considered at the national level, that were discussed at the Consultation of the Nansen Initiative on *Disaster-Induced Cross-Border Displacement in the Pacific* held in the Cook Islands in 2013, include**:**

a) Continue to strengthen and deepen education, training and upskilling through qualification and accreditation alignment, so that people can migrate with dignity if they choose to do so.
b) Strengthen national capacities to identify and address the assistance and protection needs of particularly vulnerable persons among those affected by natural disasters and climate change.
c) Take measures such as land audits, demarcation of uncontested boundaries and community land mapping to facilitate the identification of land when people need to be temporarily or permanently moved.
d) Encourage the review of existing citizenship laws to ensure that they allow for dual nationality as a measure to help safeguard the cultural identity of those who move abroad. This helps to sustain ties to countries of origin and allows for the possibility of circular migration where appropriate. (Nansen Initiative, 2013e, p. 2)

Regional level

Adaptation to climate change has been gaining attention in the PICTs and has been receiving support from the international community, with a growing number of initiatives (World Bank, 2012; SIDS, 2014). Most PICTs now have established policies, strategies and planning tools to guide national adaptation activities, such as national adaptation plans of action or joint national action plans for adaptation and disaster risk reduction or equivalent instruments. In recognition of adaptation as a cross-sectoral development priority, some of these mechanisms are increasingly being linked to national sustainable development strategies (SPREP et al., 2013).

At the regional level, the issue of mobility in the context of climate change has been discussed in different fora. Undoubtedly, the issue of cross-border migration is very sensitive, particularly when the prospect of permanent movement of whole communities is contemplated (Burson & Bedford, 2015; Flores-Palacios, 2015). At the regional consultation of the *Nansen Initiative on Disaster-Induced Cross-Border Displacement in the Pacific* in 2013, a key message was that Pacific people wish to remain in their homes for as long as possible. However, there was recognition that some forms of displacement, relocation and migration are inevitable (Nansen Initiative, 2013e).

Based on the Nansen Initiative consultation in the Pacific, some recommendations in terms of policy design can be made:

a) Continue the regional dialogue on voluntary migration, forced displacement and planned relocation. Promote regional agencies and national governments to continue to identify gaps in knowledge, and collect relevant information using Western-based methodologies and Pacific ones.

b) Integrate issues of voluntary migration, forced displacement, and planned relocation within ongoing regional processes, such as the *Pacific Plan Review* and the revision of other relevant regional frameworks.

c) While discussion on cross-border mobility has been focused on migration from PICTs to the Pacific Rim, less attention has been given to migration options among the PICTs themselves. Therefore, it is necessary to encourage a review, as part of regional processes, of existing admission and immigration policies. There are examples of solidarity among the PICTs. The government of Fiji has offered permanent refuge to the people of Kiribati and Tuvalu, should they be displaced in the face of rising seas and global warming (Bainimarama, 2016).

d) Improve coordination among regional organisations dealing with climate change and natural disasters to better respond to the countries' needs. Referring to the ratification of the Paris agreement in April 2016, Dame Meg Taylor, Secretary General of the Pacific Islands Forum Secretariat said:

> Only by working together can we address the most serious issues brought upon us by the effects of climate change. The CROP [Council of Regional Organisations in the Pacific] agencies will continue to work together, the Pacific will continue to work together, and the world must continue to work together, to save our vulnerable brothers and sisters, and future generations. (SPREP, 2016a, para. 7)

Aware of the need to coordinate activities, regional organisations in the Pacific have promoted the creation of a *Pacific Climate Change Centre (PCCC).* The government of Samoa is committed to a partnership with the government of Japan, SPREP, and other Pacific countries to establish the PCCC to be hosted at SPREP headquarters in Samoa. The PCCC will encourage partnerships throughout the region and internationally as a key element of building resilience to climate change in PICTs. Construction of the PCCC will begin in 2017 and is expected to be completed by July 2018 (SPREP, 2016b).

Another initiative refers to a *Pacific Climate Treaty*. The Pacific Islands Climate Action Network (PICAN) is exploring with the Pacific government officials, communities and development partners the concept of a *Pacific Climate Treaty* that could potentially

become a regional framework for climate change action to implement all the key areas of the Paris Agreement among the PICTs. These areas include mitigation, finance, climate-induced migration, loss and damage, gender, human rights and adaptation needs of the region (PICAN, 2016).

International level

For most of the PICTs, climate change represents a threat to their survival. There is recognition among governments, civil society and regional organisations that a united voice on climate change is necessary to strengthen global leadership. Pacific leaders have made it clear that the PICTs make a negligible contribution to global warming. Nonetheless, they are aware of their collective responsibility and are committed to reducing their own carbon emissions by increasing the use of renewable energy sources. For countries with low carbon footprints such as PICTs, climate change adaptation is a more urgent issue than mitigation (SIDS, 2014).

In 2015, Samoa's Prime Minister Tuilaepa Sailele Malielegaoi in his address to the UN Climate Change Conference COP21 said:

> We are in Paris with only one goal. We want a legally binding and universal agreement that will keep global warming preferably below 1.5 degrees Celsius. Without that, the continuing existence of some of the low-lying islands in our Pacific region and elsewhere, which is an ideal and moral goal to save Planet Earth, will be in grave doubt … Like other SIDS, our contribution to the causes of climate change is negligible. Yet we are the frontline vulnerable countries to the impacts of climate change. These are the facts. (UNFCCC, 2015d, p. 1-2)

Leaders from the PICTs and other development island states are requesting urgent action to respond to the impacts of climate change. Thoriq Ibrahim, Minister of Energy and Environment for the Maldives and Chair of the Alliance of Small Island States (AOSIS) during the Paris Climate Change Agreement signing ceremony in April 2016 said:

> It is no accident that [the] islands [Fiji, Nauru, Palau, Republic of the Marshall Islands, Samoa and Tuvalu] were the first countries to ratify the Paris Agreement. As some of the countries most vulnerable to climate change impacts, we are acutely aware of the need to move urgently to implement its objectives, and that starts by bringing the agreement into force... Our mantra moving forward must be: more, faster, better. (AOSIS, 2016, para. 3)

Climate-induced mobility is a very sensitive issue in the PICTs. This topic has been discussed in regional and international fora. For instance, in the *Consultation of the*

Nansen Initiative on Disaster-Induced Cross-Border Displacement in 2013, a number of policy recommendations were made for the Pacific region:

a) Ensure that the Pacific region maintains a strong voice in international fora, while also respecting and reflecting the diversity in the region.
b) Ensure that donor priorities are better aligned with regional and national priorities.
c) Encourage discussions regarding resources being made available within the framework of existing or new international financial mechanisms to cover costs and investments related to displacement and planned relocation, and to compensate for loss of community ties, land, and cultural assets.
d) Encourage Pacific states and relevant international organisations to develop appropriate normative frameworks to address the protection needs of displaced or relocated populations.

Climate change is reshaping mobility patterns across the world. For this reason, displacement, planned relocation and migration have been part of the international climate change negotiations for a number of years. Recently, global policy debates on climate-induced migration have focused on humanitarian assistance and legal protection. However, it is necessary that human mobility, in the context of climate change, be addressed in the broader context of development agendas (Climate and Migration Coalition, 2016).

The Paris agreement recognises the need to address climate-related displacement by calling for the establishment of a "Climate Displacement Task Force" to draw up recommendations on measures "to avert, minimize and address displacement related to the adverse effects of climate change" (UNFCCC, 2016, p. 7). While the creation of the task force is an important step forward, it is not clear yet how it will operate. Although international climate negotiations have created various mechanism and task forces in the past, this is the first time a task force has been created out of such a comprehensive international agreement (Climate and Migration Coalition, 2016).

Summary of the chapter

Samoa has made enormous efforts to respond to climate change from the perspective of sustainable development and a robust policy architecture has been put in place. Climate change has been integrated into sectoral and development programmes, and there are

also specific policies on climate change and disaster risk reduction. However, mobility within the climate change policy framework has yet to be included comprehensibly.

Population movements in Samoa have peculiar characteristics that must be considered in any study of migration. Contemporary mobility in the country reflects traditional mobility patterns that respond to economic, social and cultural factors. In this study, although I have used conventional typologies of movements, I have recognised the special characteristics of the Samoan mobility.

In the Lotofaga study, it was found that families have been using population movements to respond to climate change, and three typologies were identified – relocation inland, migration to Apia and migration overseas. These typologies have also been observed at the national level. Additionally, displacement in the national context appears as a stand-alone category to highlight the extent of the impacts of sudden-onset events in the country.

The most common form of climate-induced mobility are the voluntary movements inland. Although the government has been warning families in the coastal villages to move to higher ground, the decisions to move are basically voluntary. Displacement has occurred after natural disasters, and these movements have largely been temporary. Families have moved to their customary lands in the interior or on higher ground and then returned home. However, in some cases, displacement has triggered permanent movements inland as families opted to rebuild their livelihoods there after assessing the risk of living in the coastal areas. Migration to Apia and overseas has mainly responded to economic, social and cultural factors. However, climate change has started to be mentioned as a reason to leave the villages.

Even though climate-induced mobility is gaining some attention at national and international level, these movements remain undocumented most of the time. Hence, in terms of policy responses, while the need to strengthen adaptation to climate change efforts and responses to natural disasters has been recognised, it is also crucial to include environmental migration into sectoral and development policies, distinguishing the different types of mobility. Understanding and predicting mobility is critical for evaluating the population's vulnerability and resilience, and developing policy responses. Moreover, listening to people's knowledge and experiences is fundamental to understanding the dynamics, impacts of and responses to climate-induced mobility.

While a well-designed policy framework is necessary to address climate-induced mobility, it is important to recognise that families in Samoa bear not only the brunt of climate change impacts but also have to pay the social and economic costs that this global problem is causing. Climate change is having impacts on mobility patterns; therefore, simultaneous policy responses and actions at the village, national, regional and international levels are necessary. Most importantly, it is crucial to hear people's voices and experiences when designing climate change-related policies. Warner et al. (2013) referring to climate-induced mobility policies made the following recommendation:

> [These policies] should ensure that migration remains a matter of choice to improve resilience, and that displacement and planned relocation, where necessary, can be undertaken in safe, dignified conditions with durable long-term solutions. Climate policy will influence the extent to which the mobility of future generations improves welfare or accelerates a downward spiral of deteriorating human security in the long term. (Warner et al., 2013, p. 44)

Chapter 9 - Conclusions

It is now well-recognised that climate change and natural disasters are major drivers in both voluntary and forced mobility. Like other PICTs, Samoa is particularly vulnerable due to high exposure to frequent and damaging natural disasters and climate change, and there is evidence that these phenomena are causing population movements. This trend is set to continue and increase substantially in scale in the coming years.

In the village study, participants' responses to questions of whether and how climate change has been stimulating internal and international populations in Samoa over a period of 30 years (1985 – 2015) indicated that families have demonstrated great strength and resilience in the context of slow- and sudden-onset events. Furthermore, participants' responses showed three patterns of movements linked to climate-related impacts, namely relocation inland, migration to Apia and migration overseas. Even though there is evidence of various types of climate-induced movements, they have not yet been addressed comprehensively in both research and policy design.

Climate-induced mobility is a relatively new field of research, and as a cross-cutting issue, it touches on key policy areas such as sustainable development, poverty alleviation, humanitarian action, sovereignty and security. As discussed in this study, the extremely challenging task of disentangling climate change from other migration drivers reinforces the need to contextualise and understand migration drivers from the point of view of the people in their own social and geographical contexts. An interdisciplinary approach can help include people's knowledge and understanding of their movements, as well as the social, cultural, economic and political contexts. Furthermore, appropriate policy responses demand interdisciplinary research and cross-sectoral approaches to address various forms of human mobility.

In this chapter, I present the study's contribution to knowledge, significant findings and limitations of this study, suggested areas of further research, and my reflections on the theoretical framework used in this inquiry.

Contribution to knowledge

The research topic is challenging, and the attempt to tease out climate change as a factor among economic, social and cultural influences in Samoan migration is a significant

contribution to knowledge. Furthermore, this study is not just about climate change but the reality on the ground in terms of the human aspect of environmental migration.

Another significant contribution is the focus on middle-sized island nations. While most research on climate change for PICTs has focused on the low-lying atolls almost at the exclusion of others, this study demonstrates the need to critically examine the potential impact on larger island nations such as Samoa. It would be useful for other researchers to use a similar framework for developing this approach in studying other Pacific island nations to help build the knowledge base for policy in the sub-region.

In terms of theories of development, a significant original contribution is pointing out the importance of local social and cultural context in framing theoretical understanding about places and peoples. In this regard, the study interdisciplinary approach emphasises the importance of traditional knowledge and local voices. The careful weaving of the Western and Samoan worldviews on climate change constitutes one of the major contributions to knowledge-theory. The study merges climate science and social sciences and embraces Samoan traditional knowledge with social science and scientific knowledge.

The innovative research design provides a theoretical framework to understand the linkages between climate and population movements which are underpinned by both a Samoan perspective and a Western-based one. The Samoan perspective recognises and acknowledges the importance of traditional knowledge, values, beliefs, practices and the ways these cultural factors affect people's lives. The Western-based perspective provides the disciplinary insights to framing the knowledge base on climate-induced mobility.

The findings of this study will inform emerging theories on environmental migration and provide a framework for policy design that considers the voices of those people affected by climate change who have been induced or forced to move as central. Moreover, the findings may resonate with the challenges of other PICTs.

Significant findings of the study

The most significant findings were: (a) climate change is affecting people's lives and livelihoods in Samoa; (b) families are resilient; (c) climate change and natural disasters are drivers of population movements; (d) mobility can be considered a risk-management strategy; and (e) climate-induced mobility must be included in policy design and

planning. These findings of the village study have been used as lenses to identify critical issues at the national level.

Climate change is affecting people's lives and livelihoods in Samoa

Despite the fact that Pacific people have done little to contribute to the causes of climate change – with less than 0.03 per cent of current global greenhouse gas emissions – they are among the first to be affected (SPREP, 2015a). Communities in Samoa and other PICTs have begun to iterate the injustice of this situation in their countries and in compelling regional statements as well. As in other PICTs, climate change in Samoa is increasingly seen as an urgent issue; it affects all aspects of people's lives from families' livelihood security through health, traditional knowledge, social structures, and culture. Furthermore, sudden-onset events, such as cyclones, storm surges and floods, and slow-onset events associated with climate change, such as sea-level rise, are affecting terrestrial and marine ecosystems, infrastructure and water supply.

The findings confirm that climate change and natural disasters are drivers in both forced and voluntary population movements in Samoa, and this trend is likely to continue in the medium and longer term. Indeed, research findings indicate that climate-related impacts are and will affect mobility in different ways. For instance, the effects of warming and drying will affect livelihoods based on natural resources, and will undermine ecosystem services such as clean water and fertile soils. The increase and intensification of extreme weather events – in particular, storm surges, tropical cyclones and resulting flooding (flash, river and coastal) – will affect more people. Sea-level rise will increase coastal erosion and destroy extensive low-lying coastal areas that are home to at least 70 per cent of Samoa's population and where 70 per cent of Samoa's infrastructure is located. If climate-induced mobility is not addressed now, the dislocation of the coastal settlements could be exacerbated.

Families are resilient

Lotofaga participants highlighted responses to climate change as largely family-based, as opposed to individuals, and also the extreme resilience of families. For instance, participants emphasised their capacity to anticipate climatic events, absorb external changes and stresses, and recover from the effects of climate change and natural disasters without compromising their long-term prospects. It is clear that resilience in Lotofaga cannot be seen as a fixed end state but as a dynamic set of conditions and processes (Adger, 2000; IPCC, 2014c).

Furthermore, this group of families, far from regarding climate change in a fatalistic way, as reported in much of the climate change literature (Farbotko, 2005, 2010a), have continuously been seeking solutions aimed at adapting to climate change. Moreover, they have applied holistic solutions to increase their family and community resilience to a wide range of challenges. In times of distress, people prioritise not only their own safety and needs but also their *'aiga'*s and the village's wellbeing.

Lotofaga families use a mix of at least five strategies to develop resilience to climate change. As shown in Figure 10, people are engaging in internally-driven responses by using their traditional knowledge and combining it with Western-based modern technical information, drawing on and nurturing strong family and village social support systems, utilising their customary land tenure entitlements, and using population movements. These village-based efforts have been backed by government initiatives funded by external aid, such as adaptation to climate change projects and education campaigns on disaster risk reduction. Notably, not all the families had access to all of these strategies; therefore, vulnerability factors need to be further researched.
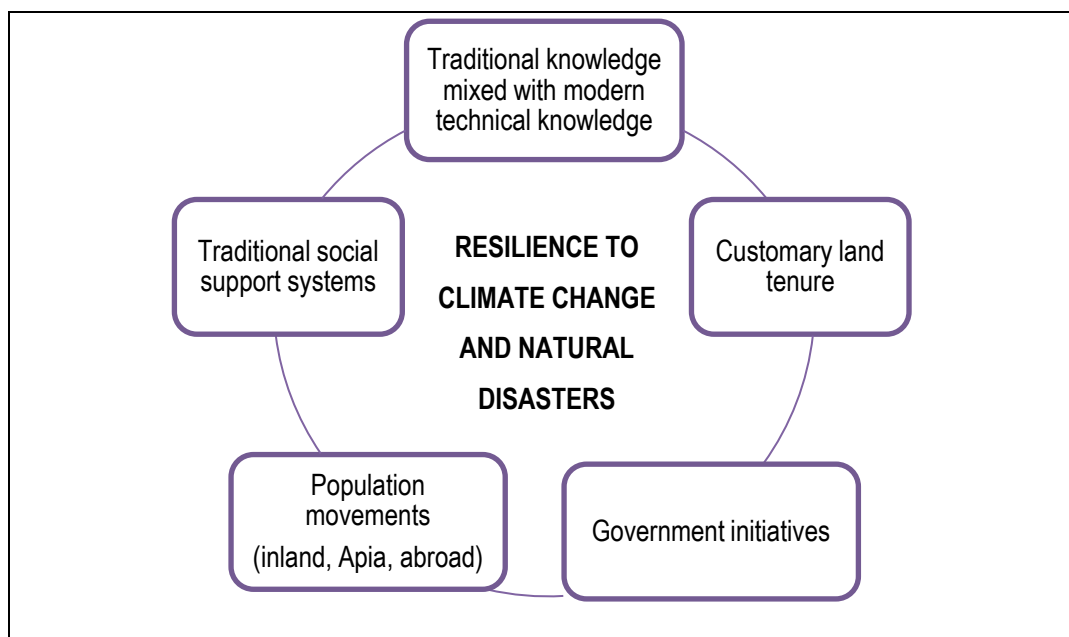
Figure 10: Strategies for Building Resilience in the Context of Climate Change

The strategies that people in Lotofaga are using to building resilience to climate change are discussed separately; they are not prioritised.

Synergy of different knowledge systems

As seen in the case of Lotofaga, a vast body of traditional knowledge has enabled Samoan people to successfully live and thrive in their own environment. Their natural resources have supplied food, housing, clothing, medicines, material for cultural and ceremonial purposes, and means of transportation. In addition, traditional knowledge has enabled people to adapt traditional livelihoods in the face of uncertainty, and deal with the persistent threat of climate change and natural disasters. This body of knowledge, experiences and ways of doing things has accumulated and has been selected over generations. Although today these knowledge systems are a contributing factor in building resilience, they are also threatened. The erosion of traditional knowledge is a serious concern; Thaman, Meleisea and Makasiale (1979) wrote: "the loss of traditional knowledge would be a cultural disaster" (p. 83).

While it is crucial to consider traditional knowledge systems in both research and policy, this study has also emphasised the need to combine them with Western-based modern technical knowledge. The calls for consideration of traditional knowledge in both research and policies linked to climate change are not new in Samoa and other PICTs. For instance, almost four decades ago, Thaman et al. (1979) recommended including relevant aspects of traditional knowledge into national policy and planning related to natural disasters. Although some progress has been made in including traditional knowledge aspects into national development planning and decision-making processes, much more needs to be done.

A synergy between the two knowledge systems can be achieved by promoting the effective participation of communities in climate change discussions and improving people's access to modern technical knowledge, technologies and financial resources. Climate change adaptation and responses to natural disasters must take into account Samoan values, traditions, culture and practices (Women in Business, 2015). While short-term initiatives are in place, and some of these consider the important role that culture plays in enabling effective adaptation to climate change, it is unlikely that the implementation of long-term strategies will be achieved without international collaboration and the provision of financial resources and technology (UNFCCC, 2015a).

Traditional social support systems

As seen in the case of Lotofaga, traditional Samoan support systems, comprising a strong social structure and governance systems in the village and established communities in both Apia and overseas, are serving as a safety net to address the impacts of climate change. Remittances in cash and kind from family members in Apia and overseas have also played a significant role in building resilience. The inflow of these resources has contributed to the diversification of income generation, so enabling families to meet their basic needs, fulfil their cultural obligations, and adapt to climate change and natural disasters.

Customary land tenure

Samoa's customary land tenure system allows land owning groups access to land from the coastal plains to elevated inland areas. Moving from coastal localities to upland areas that belong to the same group is less disruptive compared to situations where movement may entail settlement in some other group's land. The endurance of customary land tenure under the stewardship of the family chiefs has proven to be a critical factor in family resilience. For instance, the families' ability to relocate inland, as a response to climate-related effects, has enabled them to resume and sustain their livelihoods. Although a number of changes have occurred in the Samoan land systems, leading to new forms of more individual tenure (O'Meara, 1987; Meleisea & Schoeffel, 2015), land policies and legislation must consider the strong links between customary land and displacements and relocation processes due to climate change.

Government initiatives

With the support of foreign aid, the government of Samoa has put in place a number of policies to address climate change and natural disasters, and numerous initiatives that draw on these policies have been implemented. However, traditional Samoan coping mechanisms, based on historical experience and observations, have not been included in most of these projects.

Of just as equal importance is that even though external aid-funded initiatives have made an enormous contribution to building family and community resilience, there is a widely held perception that foreign aid agencies are setting the agenda for climate change adaptation and sustainable development. Given that the predicted impacts of climate change have the potential to further increase existing vulnerabilities, the

country's financial and technical capacity to implement costly adaptation measures is, and will continue to be, seriously challenged. Indeed, the extent of climate-related impacts has rendered the country critically dependent on external aid. Clearly, there is an urgent need to negotiate national and donors' priorities to place the needs and aspirations of the people affected by climate change at the centre of each initiative.

Human mobility

A highly significant finding of this study was the way human mobility is being used as a factor in building family resilience to climate change. This aspect is discussed in more detail in the next section.

Climate change and natural disasters are drivers of population movements

The study confirmed that the nature of Samoan internal and international mobility has particular intrinsic social and cultural characteristics that must be taken account of in both research and policy. More particularly, population movements have been influenced by people's ability and desire to fulfil the social, cultural and economic functions necessary to sustain and enhance connections between individuals, families and communities within the country and across borders. As noted, decisions to move are usually shaped within the family context, and the movements have been directed at improving both the wellbeing of those who remain at home and those who move to Apia and abroad (Connell & Brown, 2004).

Even though I have used conventional typologies to explain climate-induced mobility – i.e. displacement, relocation and migration to urban areas and abroad – I have taken into account the cultural underpinnings of these movements. In Lotofaga, mobility has usually been induced by a wide variety of drivers, amongst which climate-related factors now play an increasingly important role. Even so, factors cannot be disentangled from their socio-economic and cultural context. Climate-induced mobility must be studied in an interdisciplinary way and, as the findings confirm, climate-induced mobility cannot be considered as a separate category of mobility.

While there are some estimates about the possible numbers of people in PICTs who might be internally displaced by sudden-onset events, it is far more challenging to predict the number of individuals who will be induced or forced to move due to slow-onset events. In Samoa, although there are no reliable estimates of the number of people on the move today or in the future, as a result of climate-related factors, this research

found significant evidence of three major types of population movements which can be attributed to the impacts of slow- and sudden-onset events linked to climate change. These are: (a) displacement and relocation from coastal areas to inland customary lands; (b) temporary and permanent migration to Apia; and (c) while climate change as a driver of overseas migration has not emerged clearly in this study, there are indications that this will become prominent in future migration.

In Samoa, movements inland to families' customary lands have evidently responded to slow-onset events such as sea-level rise, and also to sudden-onset events such as the recent cyclones and the 2009 tsunami that hit the country. While there is a clear connection between natural disasters and displacement, other factors also shape the kinds of movement that happen when a disaster strikes. The country's capacity to respond to a disaster may have a bigger impact on how, when and for how long people move than the severity of the disaster itself. Although relocation to customary lands may be successful in reducing the physical vulnerability of families to the impacts of climate change and natural disasters in the coastal areas, this usually implies also a disruption of families' livelihoods and social support systems. However, at this time and in the case of Samoa, the families' strategies to building resilience have proved to be effective.

With respect to migration to Apia and abroad, it can be said that people's perceptions of people's vulnerability to climate-related factors and people's adaptive capacity are influencing the decisions to move. Migration to Apia has been mainly driven by economic and social factors; however, climate change and natural disasters are now inducing families to shift. In sum, deteriorating environmental conditions are triggering elements for migration. If semi-subsistence livelihoods are disrupted, families need to diversify their sources of income and employment. In this type of migration, isolating climate-related factors from other socio-economic and environmental ones is not straightforward, because it is the accumulation of different factors that often prompts migration decisions. While migration to Apia may reduce the pressure caused by climate change in coastal villages, increased urbanisation may exacerbate existing social and economic problems. Urban growth places considerable pressure on land, social services, infrastructure, and employment opportunities. Notably, the Apia urban area is itself a coastal location and is likely to be exposed to the effects of sea-level rise and floods as well as other climate-change effects.

As noted, cases related to migration abroad due to climate change have not emerged clearly. However, if conditions deteriorate in the villages, the influence of climate change may appear as a clear migration driver. Thus, if opportunities to migrate abroad arise, it is likely that there will be an increase in out-migration. At present, people who migrate overseas are mainly those who have the resources to do so and have strong family support systems.

Although climate change effects may encourage many of those living in the coastal areas to move to Apia or overseas, other people, particularly the elders, stated very clearly that they want to stay in their villages. A common view expressed by older participants in Lotofaga was their desire to stay in their own village and in their own country, regardless of any climate change-associated problems.

Mobility can be considered a risk-management strategy

This study highlighted compellingly the differentiated impacts of climate change and the way climate change tends to exacerbate differences among groups. Families' adaptive capacity depends on underlying factors, such as household size and composition, asset base, degree of livelihood diversity, and the nature and extent of family networks in urban areas and overseas.

Clearly, families that are better off can benefit by using different types of mobility to improve their responses and resilience to economic downturns and climate change. On the other hand, families that already experience difficulties in diversifying income and maintaining basic needs, and which do not receive remittances or other support, are less able to use mobility as an adaptive mechanism. These families have fewer adaptation options and are more vulnerable to the impacts of climate change.

The Lotofaga study revealed a group of families that had inadequate financial resources for voluntary relocation inland or migration to Apia or overseas. However, I propose that these families cannot be classified as "trapped populations" (Warner et al., 2012), because the *fa'a Samoa* and the extended families and the village support system play a major role in buffering socio-economic and environmental risks with practices of solidarity and obligations.

The gender-differentiated impacts of climate change warrant more in-depth study. Findings indicated that women had limited access to information about climate change, their access to family land was insecure and that in situations of environmental stress,

women had reduced mobility because they were the ones who cared for children and the elderly. Nevertheless, women play a critical role in response to climate change due to their traditional knowledge and leadership in sustainable practices at the household and village level. This situation has also been observed in other PICTs and developing countries.

Climate-induced mobility must be included in policy design

In view of the projected increase of slow- and sudden-onset events associated with climate change, it is anticipated that the number of people induced or forced to move will rise. Among the urgent issues that must be addressed at the policy level are the need for adaptation to the effects of climate change *in situ*, the relocation of at-risk families, the need to provide support to those who migrate to urban areas and abroad, and tackle the legal challenges around people displaced by climate-related threats. Furthermore, both scientific technical information and traditional knowledge have to inform and influence policy design and practices.

In order to address climate-induced mobility, this study has identified a dual approach that must be integrated at the village level by targeting climate-induced mobility priorities and at the policy level by mainstreaming climate-induced mobility in sectoral and development policies.

Targeted climate-induced mobility priorities at the village level

At the village level, the targeted climate-induced mobility priorities must seek to address the specific needs of people who are induced or forced to move due to climate change, distinguishing between the more resilient and the less resilient households. These initiatives should include specific measures to support different types of families: those who are induced or forced to relocate inland, those who are unable to relocate inland because they lack the resources, and those who move temporarily or permanently to Apia. It is also critical to promote dialogue with diaspora communities about the prospects of migration abroad due to climate change. It is also important that these initiatives be community-based and led by the village community. They should aim at improving the adaptive capacity of families, focusing on land tenure issues, strengthening community groups, and facilitating people's access to information, financial resources and technology. In sum, given the localised nature of climate change impacts, decision-making should take place at the village level to ensure effective responses.

Mainstreaming climate-induced mobility in sectoral and development policies

Addressing climate-induced mobility at the policy level requires mainstreaming this issue in both sectoral and development policies. As outlined, Samoa has made considerable efforts to build effective institutional and policy frameworks to respond to climate change and natural disasters, yet mobility has not been given prominence. However, there is considerable room to ensure that relocation, displacement and migration are taken into consideration. Understanding and predicting mobility is critical for assessing the families' and villages' vulnerabilities and resilience, and developing policy responses.

Furthermore, policy design must consider the social and economic implications of climate-induced mobility. Social implications may include the erosion of culture, community cohesion, identity and livelihoods. As regards the economic implications, this study has highlighted the fact that families incur significant economic costs in voluntary and forced movements associated with climate change. As also noted, remittances play a fundamental role in alleviating the impacts of climate change. However, the assumption that remittances will continue to be considered critical in supporting climate change adaptation (including population movements) should not ignore the fact that remittances are personal flows of money from migrants to families and villages. Therefore, remittances cannot be a substitute for public funding.

In terms of financing, climate-induced mobility is a cross-sectoral issue that demands significant financial resources in order to put in place measures to prevent "unwanted" movements and displacement as well as facilitating movements that enable better adaptation to the impacts of climate change. Climate-induced mobility cannot be addressed in isolation by a single country; it requires international political commitment and financial resources. As set out in the Cancun Agreements at the 2010 United Nations Climate Change Conference (UNFCCC, 2010), it is necessary to undertake "measures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at national, regional and international levels" (p. 5).

Regarding the destination of migration, in the case of migration to New Zealand families and individuals who want to emigrate must meet the pre-established requirements of the New Zealand government. However, it is important that both sending and receiving countries explore other avenues to address the demand of

migration linked to climate change. This demand for migration overseas is not only increasing in the atoll nations, but also in other PICTs. As stated by the Head of States of the Coalition of Low Lying Atoll Nations on Climate Change (CANCC) in the *High-Level Dialogue on Climate-Induced Migration* held in October, 2015 at Tarawa in Kiribati:

> We draw attention to the fact that climate change-related impacts are increasing the demand for migration and will continue to do so, and that this is already resulting in rural to urban migration and a demand for increasing opportunities for international labour migration. (Government of Tokelau, 2015, para. 6)

Limitations of the study

This research provides insights into environmental migration in Samoa, a topic that poses challenges and opportunities for both research and policy design and practices. However, the study has some limitations that are explained below.

The selection of one study village

Lotofaga, on the south coast of Upolu, was selected as the study village. While most of the findings of the study can be extrapolated to explain the situation in other coastal villages in Samoa, the findings associated with temporary and circular migration to Apia could be biased due to the relative proximity of Lotofaga to the capital, so enabling greater temporary, circular migration and even commuting on a daily basis. For families living in other villages, such as those on Savai'i Island, these types of mobility can be more challenging. Therefore, any study about Savai'i' or other rural villages must take into consideration the special characteristics of temporary and permanent migration to Apia, and the role of kin members living in the capital in facilitating and supporting these kinds of movements.

The sample size

The sample size of 29 participants, including villagers and migrants living in Apia and Auckland, is small considering that the study covered a cross-section of people. However, the purposive sampling used in this study combined with the snowball sampling was particularly well-suited to creating an exploratory sample for the inclusion of a wide cross-section of people – by gender, age and rank – (Descombe, 2007). Although limited, this sample can be considered representative of the village population. While the sample size may inhibit the generalisation of the research

findings, they have provided critical insights about the linkages between climate change and mobility in Samoa.

Limited research

As noted, most climate change research has been focused on science-based underpinnings with less attention to the people's voices and their daily life experiences. Thus, this study was limited by the dearth of previous research that puts people at the centre of the analysis and combines multiple knowledge systems to investigate the linkages between climate change and population movements. Nonetheless, this limitation created an opportunity to use an exploratory design, identify gaps in the literature and define further areas of research. Therefore, the findings of this research can be generalised subject to certain limitations, for instance, the applicability of the research design to other PICTs.

Areas of further research

In Samoa, as in other PICTs, there is a lack of data and research on the projected effects of climate change on families' lives, livelihoods and population movements. Data on different types of mobility are not systematically collected in a form that would enable researchers, communities and policymakers to analyse the real spectrum of mobility associated with climate change. This study has identified distinct typologies of mobility and the peculiarities involved; however, it has also shown that more research and data on this topic are necessary. The suggested areas of further research are explained below.

Theoretical frameworks that combine Pacific and Western-based modern technical knowledge systems

Building synergies between traditional and Western-based knowledge remains a challenge. In the context of climate change, there is a range of initiatives starting from Western-based approaches that need to "verify, select and validate" certain areas of traditional knowledge to be incorporated into "technical knowledge", to initiatives that recognise that traditional knowledge is valid, and therefore initiatives are built upon it (UNESCO & ICHCAP, 2013). More research is required to determine the potential and effectiveness of combining different knowledge systems in both research and policy, to better understand climate-induced migration. I have presented some insights into the interplay between a Samoan knowledge system and a Western-based one where the Samoan worldviews, values, beliefs, knowledge and experiences have prominence. The

rationale for adopting this approach is that culture plays an important role in enabling families' adaptation to climate change.

Interdisciplinary inquiry

There is a need for more interdisciplinary research on climate-induced migration as there is still a tendency to work in disciplinary silos. This topic should be considered as a development issue that requires insights from different disciplines. In the case of environmental migration, the voices of the people who stay are as important as the voices of those who move away.

Methodologies

As regards methodologies, while there has been some progress in research projects that consider qualitative, quantitative and mixed methods, there is a need to systematise experiences to build a robust knowledge base. In addition, research on climate-induced migration should draw on Pacific research methodologies as they have the advantage to recognise and acknowledge the importance of people's knowledge, worldviews, values and beliefs, ethics and protocols as well as their historical, political, environmental and socio-economic contexts. In this research, the use of Pacific methodologies has shown enormous potential for amplifying Samoan voices and experiences. Furthermore, participatory methodologies provide insights into the multifaceted dimensions of climate-induced mobility.

Methods of data collection

Apart from conventional qualitative and quantitative methods, technology offers enormous possibilities for data collection. Some examples are listed below:

- Modelling scenarios. To make projections using demographic, socio-economic and climate change-related variables.
- Longitudinal versus snapshot studies. They are not necessarily opposed but can be complementary.
- Mobile data collection. This method has been used to gather aggregated and anonymised location data from mobile operators to develop large-scale population movement models. They can provide precise and reliable data for understanding mobility related to natural disasters and other types of climate-related events (Wrathall & Lu, 2016).

- Participatory methods. A number of climate-related projects in Samoa have used participatory three-dimensional mapping with good results (UNDP, 2014b).
- Geographic information systems (GIS). They offer opportunities to combine mobility data with climate change-related events (McLeman, 2013). They can also interact with participatory three-dimensional mapping.

Thematic areas

In this research, I have argued the need to contextualise any study on climate-induced migration. Human mobility is better understood within the context in which it occurs. Based on the findings of this study, I have identified a number of thematic areas where it is necessary to improve data collection and analysis:

Economic, social and cultural aspects of climate-induced mobility

- The economic and social costs of different types of movements.
- The role of remittances in climate change adaptation and climate-induced mobility.
- The role of customary land tenure in relocation and displacement processes.
- Linkages between relocation and displacement due to climate change and land use, including archaeological and sacred sites.
- Environmental, cultural and psychological implications of climate-induced mobility.
- Human rights approaches in displacement situations (OHCHR, 2011).

Linkages between specific climate stressors and specific types of mobility

- The likely impact of climate stressors and the likelihood that they act as a trigger for different types of mobility, including extreme events, changes in rainfall conditions, sea-level rise.
- Environmental degradation as a driver of population movements, including depletion of resources such as water and soil, destruction of ecosystems and loss of biodiversity.

Location, timing, patterns, duration and distance of the various types of mobility

- Likely hotspots. In Samoa, some areas are more vulnerable than others to the impacts of climate change such as coastal, delta and riverine villages,

communities prone to drought, and urban areas. Population movements in these areas are likely to increase (Campbell & Warrick, 2014).

- Potential receiving areas. Economic, social and environmental effects of migration in national receiving urban areas and potential receiving countries. The role of migrant communities in urban areas and abroad in facilitating integration in new communities.

Data disaggregated by gender, age and socio-economic status

- Village level. It is necessary to take into account the fact that communities are not homogenous. Disaggregated data is critical for listening to the voices of women, youth and the elderly, and their socio-economic status.
- Migrants. Data disaggregated by type of migrant (internal or international), also considering gender, age and socio-economic status.

Final reflections

Research into human mobility associated with environmental and climate change has been gaining increasing attention as an issue that requires an interdisciplinary approach. Furthermore, it is recognised that research should be linked to policy design. However, both research and policy design need to make efforts to listen to the experiences and challenges of people affected by climate change and induced or forced to move.

When I started my research journey, I asked myself how to represent the voices of participants who would share with me their knowledge and wisdom on the research topic, and how to make this work relevant to them. By reflecting on these issues, I have explored Pacific worldviews, adopted Pacific and Western-based methodologies, and reflected on my position as a researcher. In turn, this has informed my choice of a combined methodological design to this research that includes three complementary approaches, namely exploratory, qualitative and interdisciplinary. Furthermore, the use of *talanoa* as a conversational method helped to highlight the knowledge and experiences of people affected by climate change who were induced or forced to move.

As seen in the *fonofale* model, the Samoan worldview that underlies my research encompasses three interconnected spheres, namely spiritual, social and physical. This worldview emphasises the interconnectedness of all things and encompasses a holistic integration of people, their spirituality, and their land and natural resources endowment. The Samoan worldviews were clearly articulated in the participants' responses on how

climate change was affecting their lives and livelihoods. Thus, in order to understand families' resilience and vulnerabilities to climate change, it was crucial to give special consideration to Samoan traditional knowledge, worldviews, values and beliefs to understand how climate change is influencing people's behaviours and practices (e.g. adaptation to climate change, including human mobility). While traditional knowledge was critical to understanding people's perspectives, Western-based disciplinary insights provided the basis for contextualising the study, and to understanding how village communities have access to modern technical knowledge, technology and resources to adapt to climate change, including population movements.

The use of a research design that combined three complementary approaches – exploratory, qualitative and interdisciplinary – opened up many new and previous understated areas for study. The exploratory approach enabled an understanding of the multifaceted interactions between climate change and population movements on a small scale. The qualitative approach allowed me to listen to the people's voices and to understand that the individuals' and families' holistic wellbeing is rooted in worldviews, values, beliefs, knowledge and experiences. Mobility within this context has to be understood in a holistic way as it involves extended families, those living in the villages and those who have moved to Apia and abroad. The interdisciplinary approach, grounded in Samoan worldviews, drew on both the voices of people affected by climate change and forced to move and selected insights of modern technical knowledge. Both sources of knowledge were integrated to create an interdisciplinary understanding. Although this new understanding is limited in time, and to a particular context, it was used as a lens to identify critical issues at the national level.

Two clear implications for policy design have been identified. First, the voices of people affected by climate change must be incorporated in both research and policy. Not only are they the ones affected by changes; their knowledge and aspirations have a central place in understanding and addressing climate change challenges. Second, climate-induced mobility has to be studied within specific contexts (place and time) so that tailored interventions can be put in place. Therefore, the design of any initiative must be conducted with affected communities to ensure that their priorities are taken into account. While the voices of people affected are critical, climate change has differentiated effects within the communities. It underlines the need to pay special attention to those more vulnerable households and groups more at risk and less able to

adapt. It is necessary to give greater attention to the specific needs of women, elders, youth, and other vulnerable groups.

In this study, gaps were found in the existing channels for the dissemination of technical information, technological transfer and financing. Top-down approaches are still adopted, and the priorities of the funding agencies prevail over the communities' interests and needs. Samoan families must have access to technical information, environmentally sound technologies, know-how and resources for adaptation to climate change (including population movements) in order to make decisions about whether to stay in their villages or move elsewhere.

Finally, engaging in Pacific theoretical frameworks and methodologies presents challenges and opportunities. The research praxis requires a reflective and contextual framework to better inform the Pacific research agendas. Researchers must consider certain premises before conducting studies using Pacific methodologies. First, any researcher who studies Pacific issues must understand Pacific cultures, worldviews, values and beliefs (Tupuola, 2007). Second, the use of Pacific methodologies requires mentoring, and social and cultural sensitivity, when designing and implementing a research project. Researchers interested in engaging with Pacific communities are called upon to recognise that, in addition to methodological choices, there are ethical dimensions in their choice of research topic and dissemination of results (AUTEC, 2016; HRC, 2014).

References

Adelman, M. A., Ivaschenko, O., Packard, T. G., & Suri, V. (2015). *Hardship and vulnerability in the Pacific island countries*: World Bank. Retrieved from http://documents.worldbank.org/curated/en/649891468098658407/pdf/85557-REVISED-WP-P144446-PUBLIC-Box391432B-1502066-Pacific-Hardship-Web-PUBLIC.pdf

Adger, W. N. (2000). Social and ecological resilience: Are they related? *Progress in Human Geography, 24*(3), 347-364. doi: 10.1191/030913200701540465

Afifi, T., Govil, R., Sakdapolrak, P., & Warner, K. (2012). *Climate change, vulnerability and human mobility: Perspectives of refugees from the east and horn of Africa* (UNU-EHS Report No. 1). Retrieved from UNU website: http://collections.unu.edu/view/UNU:1839

Aguilar, L., Granat, M., & Owren (2015). *Roots for the future: The landscape and way forward on gender and climate change*: IUCN & GGCA. Retrieved from https://portals.iucn.org/library/sites/library/files/documents/2015-039.pdf

Albó, X., & Suvelza, F. X. B. (2007). *Por una Bolivia plurinacional e intercultural con autonomías*: PNUD & IDH. Retrieved from http://www.ops.org.bo/textocompleto/ley31745.pdf

Alliance of Small Island States. (2016). *Small islands lead world in climate treaty ratification*. Retrieved from http://aosis.org/small-islands-lead-world-in-climate-treaty-ratification/

Anae, M., Coxon, E., Mara, D., Wendt-Samu, T., & Finau, C. (2001). *Pasifika education research guidelines*: Ministry of Education of New Zealand. Retrieved from https://www.educationcounts.govt.nz/__data/assets/pdf_file/0010/7669/pacrsrch--guide.pdf

Asian Development Bank. (2009). *Independent state of Samoa: Promoting economic use of customary land, phase II*. Retrieved from https://www.adb.org/sites/default/files/project-document/64634/41173-sam-tar.pdf

Asian Development Bank. (2010a). *Responding to climate change in the Pacific: Moving from strategy to action*. Retrieved from https://www.adb.org/sites/default/files/publication/28008/responding-climate-change.pdf

Asian Development Bank. (2010b). *Climate change in the Pacific. Stepping up responses in the face of rising impacts*. Retrieved from https://www.adb.org/sites/default/files/publication/27476/climate-change-pac.pdf

Asian Development Bank. (2011). *Food security and climate change in the Pacific. Rethinking the options*. Retrieved from http://www.adb.org/sites/default/files/publication/29078/climate-change-food-security.pdf

Asian Development Bank. (2012a). *The state of Pacific towns and cities: Urbanization in ADB's Pacific developing member countries*. Retrieved from http://www.adb.org/sites/default/files/publication/29765/state-pacific-towns-cities.pdf

Asian Development Bank. (2012b). *Addressing climate change and migration in Asia and the Pacific*. Retrieved from https://www.adb.org/sites/default/files/publication/29662/addressing-climate-change-migration.pdf

Asian Development Bank. (2013). *The economics of climate change in the Pacific*. Retrieved from http://www.adb.org/sites/default/files/publication/31136/economics-climate-change-pacific.pdf

Asian Development Bank. (2015a). *Asian Development Bank member fact sheet: Samoa*. Retrieved from http://www.adb.org/sites/default/files/publication/27793/sam-2015.pdf

Asian Development Bank. (2015b). *Reform renewed: A private sector assessment for Samoa*. Retrieved from http://www.adb.org/sites/default/files/institutional-document/167330/reform-renewed-psa-samoa.pdf

Asian Development Bank. (2015c). *Promoting economic use of customary land, phase II: Technical assistance completion report*. Retrieved from https://www.adb.org/sites/default/files/project-document/172538/41173-012-tcr.pdf

Asian Disaster Preparedness Center. (2015). *ADPC's approach to supporting the post-2015 framework for DRR*. Retrieved from http://www.adpc.net/igo/category/ID839/doc/2015-hlc5FS-ADPC-ADPC_-_Supporting_the_post-2015_framework_for_DRR.pdf

Auckland University of Technology (AUT). (2016). *Ethical principles @ AUT* [PowerPoint slides]. Retrieved from http://www.aut.ac.nz/researchethics/resources/ethical-principles

Ayres, L. (2008). Thematic coding and analysis. In L. M. Given (Ed.), *The SAGE encyclopedia of qualitative research methods* (pp. 867-868). Thousand Oaks, California: SAGE Publications.

Baba, T., Mahina, O., Williams, N., & Nabobo - Baba, U. (2004). *Researching the Pacific and indigenous peoples: Issues and perspectives*. Auckland, New Zealand: Centre for Pacific Studies, University of Auckland.

Bainimarama, V. (2016, May 24). Urgent plea from the Pacific. *The Huffington Post*. Retrieved from http://www.huffingtonpost.com

Baker, L., & Bonnett, G. (2015, September 17). Climate refugee claim: Deportation due. *Radio New Zealand*. Retrieved from http://www.radionz.co.nz

Barker, A. (2008). *Climate change migrants: A case study analysis* (Internship project report). Retrieved from http://www.adb.org

Barnett, J. (2001). Adapting to climate change in Pacific island countries: The problem of uncertainty. *World Development, 29*(6), 977-993. doi:10.1016/S0305-750X(01)00022-5

Barnett, J., & Campbell, J. (2010). *Climate change and small island states: Power, knowledge, and the South Pacific.* London, England: Earthscan.

Barnett, J., & O'Neill, S. (2010). Maladaptation. *Global Environmental Change, 20*(2), 211-213. doi:10.1016/j.gloenvcha.2009.11.004

Barnett, J., & O'Neill, S. (2012). Islands, resettlement and adaptation. *Nature Climate Change, 2*(1), 8-10. doi:10.1038/nclimate1334

Barnett, J., & Webber, M. (2010). *Accommodating migration to promote adaptation to climate change* (Policy Research Working Paper 5270). Retrieved from World Bank website: http://documents.worldbank.org/curated/en/765111468326385012/pdf/WPS5270.pdf

Bates, D. C. (2002). Environmental refugees? Classifying human migrations caused by environmental change. *Population and Environment, 23*(5), 465-477. doi:10.1023/A:1015186001919

Battiste, M. (2000). Introduction: Unfolding the lessons of colonization. In M. Battiste (Ed.), *Reclaiming indigenous voice and vision (pp. 1-2)*. Vancouver, Canada: University of British Columbia Press.

Beca International Consultants Ltd. (2001). *Coastal infrastructure management project: CIM strategy*: MNRE. Retrieved from http://www.mnre.gov.ws/images/stories/MNRE/siam2/CIM-Strategy-Jan01-Report.pdf

Bedford, R. (2007). *Pasifika mobility: Pathways, circuits and challenges in the 21st century* [PowerPoint slides]. Retrieved from http://igps.victoria.ac.nz/events/completed-activities/Pasifika%20project/TLD%20Richard%20Bedford.pdf

Bedford, R., & Hugo, G. (2008). *International migration in a sea of islands: Challenges and opportunities for insular Pacific spaces* (Populations Studies Centre. Discussions Paper 69). Retrieved from http://www.waikato.ac.nz/__data/assets/pdf_file/0005/74174/dp-69.pdf

Bedford, R., & Hugo, G. (2012). *Population movement in the Pacific: A perspective on future prospects*: Department of Labour. Ministry of Business Innovation and Employment of New Zealand. Retrieved from http://www.mbie.govt.nz/publications-research/publications?ID=393

Bell, N., Conroy, E., Wheatley, K., Michaud, B., Maracle, C., Pelletier, J., Johnson, B. (2010). *The ways of knowing guide*. Retrieved from http://www.torontozoo.com/pdfs/tic/Stewardship_Guide.pdf

Bertram, G. (1999). The MIRAB model twelve years on. *The contemporary Pacific, 11*(1),105-138. Retrieved from http://www.jstor.org/stable/23717414

Bertram, G., & Watters, R. F. (1985). The MIRAB economy in South Pacific microstates. *Pacific Viewpoint, 26*(3), 497-519.

Bhaskar, R., Frank, C., Høyer, K. G., Næss, P., & Parker, J. (2010). *Interdisciplinarity and climate change. Transforming knowledge and practice for our global future*. New York, NY: Routledge.

Biermann, F., & Boas, I. (2008). Protecting climate refugees: The case for a global protocol. *Environment 50*(6), 8-17. Retrieved from http://www.environmentmagazine.org/Archives/Back%20Issues/November-December%202008/Biermann-Boas-full.html

Bird, D. K., Chagué-Goff, C., & Gero, A. (2011). Human response to extreme events: A review of three post-tsunami disaster case studies. *Australian Geographer, 42*(3), 225-239. doi:10.1080/00049182.2011.595670

Bishop, R. (1998). Freeing ourselves from neo-colonial domination in research: A Maori approach to creating knowledge. *International Journal of Qualitative Studies in Education, 11*(22), 199-219. doi:10.1080/095183998236674

Black, R. (2001). *Environmental refugees: Myth or reality?* (Working Paper No. 34). Retrieved from UNHCR website: http://www.unhcr.org/research/RESEARCH/3ae6a0d00.pdf

Boix Mansilla, V. (2004). *Assessing student work at disciplinary crossroads* (GoodWork® Project Report Series 33). Retrieved from The Good Project website: http://thegoodproject.org/pdf/33-Assessing-Student-Wo.pdf

Boncour, P., & Burson, B. (2009). Climate change and migration in the South Pacific region: Policy perspectives. *Policy Quarterly, 5*(4), 13-20. Retrieved from http://ips.ac.nz/publications/files/b91c4a65af6.pdf

Boon, J. M. (2001). A socio-economic analysis of margrove degradation in Samoa. *Geographical Review of Japan (Ser. B), 74*(2), 159-186. doi:10.4157/grj1984b.74.159

Bowen, G. (2009). Document Analysis as a qualitative research method. *Qualitative Research, 9*(2), 27-40. doi:10.3316/QRJ0902027

Bradshaw, S. (2015). *Sharing lessons from cyclone Pam in Samoa*. Retrieved from https://www.oxfam.org.au/2015/05/sharing-lessons-from-cyclone-pam-in-samoa/

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. doi:10.1191/1478088706qp063oa

Brookings. (2011). *Bern project on internal displacement: IASC operational guidelines on the protection of persons in situations of natural disasters*. Retrieved from http://www.ohchr.org/Documents/Issues/IDPersons/OperationalGuidelines_IDP.pdf

Brookings. (2014). *LSE Project on internal displacement: Climate change and internal displacement*. Retrieved from http://www.brookings.edu/~/media/research/files/papers/2014/10/un-idps-climate-change/climate-change-and-internal-displacement-october-10-2014.pdf

Brown, O. (2008). *Migration and climate change* (IOM Migration Research Series No. 31). Retrieved from IOM website: http://www.iisd.org/pdf/2008/migration_climate.pdf

Bryman, A. (2012). *Social research methods* (4th ed.). Oxford, England: Oxford University Press.

Burns, N., & Groove, S. K. (2001). *The practice of nursing research. Conduct, critique and utilisation* (4th ed.). Philadelphia, PA: W. B. Saunders.

Burson, B. (2010). Protecting the rights of people displaced by climate change: Global issues and regional perspectives. In B. Burson (Ed.), *Climate change and migration. South Pacific perspectives* (pp. 159-180). Wellington, New Zealand: Victoria University.

Burson, B., & Bedford, R. (2013). *Clusters and hubs: Toward a regional architecture for voluntary adaptive migration in the Pacific*: Nansen Initiative. Retrieved from https://www.nanseninitiative.org/pacific-consultations-intergovernmental/#tab-1422527382474-3-8

Burson, B., & Bedford, R. (2015). Facilitating voluntary adaptive migration in the Pacific. *Forced Migration Review,* (49), 54-55. Retrieved from http://www.fmreview.org

Campbell, J. (2010a). Climate change and population movement in Pacific island countries. In B. Burson (Ed.), *Climate change and migration. South Pacific perspectives* (pp. 29-50). Wellington, New Zealand: Victoria University.

Campbell, J. (2010b). Climate-induced community relocation in the Pacific: The meaning and importance of land. In J. McAdam (Ed.), *Climate change and displacement: Multidisciplinary perspectives* (pp. 57-79). Oxford, England, Hart Publishing

Campbell, J., & Barnett, J. (2010). *Climate change and small islands states: Power, knowledge and the South Pacific*. Washington, DC: Earthscan.

Campbell, J., & Bedford, R. (2014). Migration and climate change in Oceania. In E. Piguet & F. Laczko (Eds.), *People on the move in a changing climate* (Vol. 2, pp. 177-204). doi:10.1007/978-94-007-6985-4_8

Campbell, J., & Warrick, O. (2014). *Climate change and migration issues in the Pacific*: UNESCAP. Retrieved from http://www.unescap.org/sites/default/files/Climate-Change-and-Migration-Issues-in-the-Pacific.pdf

Caritas Aotearoa New Zealand. (2014). *Small yet strong. Voices from oceania on the environment*. Retrieved from http://www.caritas.org.nz/sites/default/files/Small%20yet%20strong_WEB.pdf

Castles, S. (2002). *Environmental change and forced migration. Making sense of the debate. New Issues in Refugee Research* (Working Paper No. 70). Retrieved from UNHCR website: http://www.unhcr.org/research/RESEARCH/3de344fd9.pdf

Chiefs not satisfied, complaint elevated. (2016, April 17). *Samoa Observer*. Retrieved from http://www.sobserver.ws

Chilisa, B. (2012). *Indigenous research methodologies*. Thousand Oaks, CA: SAGE Publications.

Clark, S., Rutherford, M., Auer, M., Cherney, D., Wallace, R., Mattson, D., . . . Steelman, T. (2011). College and university environmental programs as a policy problem (part 2): Strategies for improvement. *Environmental Management, 47*(5), 716-726. doi:10.1007/s00267-011-9635-2

Climate and Development Knowledge Network. (2014). *The IPCC's fifth assessment report. What's in it for small island developing states?* Retrieved from http://cdkn.org/wp-content/uploads/2014/08/CDKN_IPCC_Whats_in_it_for_SIDS.pdf

Climate and Migration Coalition. (2016). *Briefing: After the Paris climate talks – What next for migration and displacement?* Retrieved from http://climatemigration.org.uk/paris-climate-migration-displacement/

Climate Investment Funds. (2011). *Pilot programme for climate resilience (PPCR). Samoa. Strategic programme for climate resilience (SPCR)*. Retrieved from https://www.climateinvestmentfunds.org/cifnet/sites/default/files/Samoa%20PPCR%20Strategic%20Program%20-%20Endorsed.pdf

Climate Science and Policy. (2015). *People on the move: Migration in the face of climate change. A conversation with Koko Warner*. Retrieved from http://www.climatescienceandpolicy.eu/2015/03/people-on-the-move-migration-in-the-face-of-climate-change/

Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education*. New York, NY: Routledge.

Collinson, S. (2009). *The political economy of migration processes: An agenda for migration research and analysis* (Working Paper, 12). Retrieved from IMI website: http://www.imi.ox.ac.uk/publications/wp-12-09

Connell, J. (2011). *Small island states and islands: Economies, ecosystems, change and migration*: UK Government Office for Science. Retrieved from http://www.bis.gov.uk/assets/foresight/docs/migration/drivers/11-1186-dr16-drivers-of-migration-in-islands.pdf

Connell, J., & Brown, R. (2004). The remittances of migrant Tongan and Samoan nurses from Australia. *Human Resources for Health, 2*(1), 2. doi: 10.1186/1478-4491-2-2

Connell, J., & Brown, R. (2005). *Remittances in the Pacific. An overview*: ADB. Retrieved from http://www.adb.org/sites/default/files/publication/28799/remittances-pacific.pdf

Corendea, C., Bello, V., & Bryar, T. (2015). *Promoting human security and minimizing conflict associated with forced migration in the Pacific region*: PIFS, UNU-GCM, & UNU-EHS. Retrieved from http://i.unu.edu/media/migration.unu.edu/publication/3891/EXTENDIDAS-BAJA-PACIFIC-REPORT.pdf

Cornell, S. (2010). Brokering interdisciplinarity across the physical and social sciences. In R. Bhaskar, C. Frank, K. G. Høyer, P. Næss, & J. Parker (Eds.), *Interdisciplinarity and climate change: Transforming knowledge and practice for our global future* (pp. 116-135). New York, NY: Routledge.

Corrin, J. (2008). Resolving land disputes in Samoa. In T. Levantis, M. Sullivan, P. O'Connor, J. Munro, & S. Wawrzonek (Eds.), *Making land work* (Vol. 2, pp. 199-221). Retrieved from http://dfat.gov.au/about-us/publications/Documents/MLW_VolumeTwo_CaseStudy_10.pdf

Cousteau, J. M. (2014). *Canaries of climate change: The plight of Pacific island nations*. Retrieved from http://www.oceanfutures.org/news/blog/canaries-climate-change-plight-pacific-island-nations

Creswell, J. W. (2002). *Educational research: Planning, conducting, and evaluating quantitative*. New Jersey, NJ: Prentice Hall.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

Crocombe, R. (1995). Overview. In R. Crocombe (Ed.), *Customary land and sustainable development: Complementarity or conflict?* Suva, Fiji: South Pacific Commision and Institute of Pacific Studies, University of South Pacific.

Crocombe, R. (2001). *The South Pacific*. Suva, Fiji: University of the South Pacific.

Crouch, M., & McKenzie, H. (2006). The logic of small samples in interview-based qualitative research. *Social Science Information, 45*(4), 483-499. doi:10.1177/0539018406069584

Davidson, J. M. (1965). Archaeology in Samoa and Tonga. *New Zealand Archaeological Association Newsletter, 8*(2), 59-57l.

de Sherbinin, A., Castro, M., & Gemenne, F. (2010, November). *Preparing for population displacement and resettlement associated with large climate change adaptation and mitigation projects*. Paper presented at the meeting of the Bellagio workshop on climate change, population, displacement and resettlement, Bellagio, Italy. Retrieved from http://www.ciesin.columbia.edu/confluence/download/attachments/92799210/Background_Paper_final.pdf

de Sousa Santos, B., Nunes, J. A., & Meneses, M. P. (2007). Introduction: Opening up the canon of knowledge and recognition of difference. In B. de Sousa Santos (Ed.), *Another knowledge is possible: Beyond northern pistemologies* (pp. xix-lxii). Retrieved from http://www.boaventuradesousasantos.pt/pages/pt/livros/another-knowledge-is-possible-beyond-northern-epistemologies.php

Descombe, M. (2007). *The good research guide for small-scale social research projects*. Philadelphia, PA: Open University Press.

Du Plessis, R., & Fairbairn-Dunlop, P. (2009). The ethics of knowledge production–Pacific challenges. *International Social Science Journal, 60*(195), 109-114. doi: 10.1111/j.1468-2451.2009.01704.x

Dun, O., & Gemenne, F. (2008). Defining 'environmental migration'. *Forced Migration Review,* (31), 10-11. Retrieved from http://www.fmreview.org

EACH- FOR Project. (2009). *Final activity report*. Retrieved from http://cordis.europa.eu/documents/documentlibrary/126792421EN6.pdf

Economist Intelligence Unit. (2014). *Country report Samoa: 4th quarter 2014*. Retrieved from http://www.eiu.com/

Elliott, M., & Fagan, D. (2010). From community to Copenhagen: Civil society action on climate change in the Pacific. In B. Burson (Ed.), *Climate change and migration south Pacific perspectives* (pp. 61-88). Wellington, New Zealand: Victoria University.

Elisara, F. M. (2008, April). *Effects of climate change on indigenous peoples. A Pacific presentation*. Contribution at the International Expert Group Meeting on Indigenous Peoples and Climate Change, Darwin, Australia. Retrieved from www.un.org/esa/socdev/unpfii/documents/EGM_cs08_Elisara.doc

Elisara, F. M. (2011). Climate Justice: The false solution to climate change. *Measina a Samoa. National University of Samoa, 5*, 33-44.

Environmental Justice Foundation. (2008). *No place like home. Where next for climate refugees?* Retrieved from http://ejfoundation.org/sites/default/files/public/no%20place%20like%20home.pdf

Fa'amatala, A. (2007). A changing fa'amatai and implications for governance. In A. So'o (Ed.), *Changes in the matai system* (pp. 207-228). Apia, Samoa: Centre for Samoan Studies. National University of Samoa.

Fa'asau, H. (2011). The protection of Samoa's traditional knowledge and expressions of culture. *Measina a Samoa. University of Samoa, 5*, 71-95.

Fairbairn-Dunlop, P. (1991). *E Au Le Inailau a Tamaitai: Women, education and development, Western Samoa*. (Unpublished doctoral thesis). Macquarie University, Sydney, Australia.

Fairbairn-Dunlop, P. (1998). *Tamaitai Samoa: Their stories*. Suva, Fiji: Institute of Pacific Studies. University of the South Pacific.

Fairbairn-Dunlop, P. (2000a). Changing perception of land: Samoa. Proceedings of the 2000 National Environment Forum. Ministry of Natural Resources and Environment 2. Retrieved from http://www1.mnre.gov.ws/documents/forum/2001/10-Dunlop.pdf

Fairbairn-Dunlop, P. (2000b). Gender, culture and sustainable development - The Pacific way. In A. Hooper (Ed.), *Culture and sustainable development in the Pacific* (pp. 62-75). Canberra, Australia: Asia Pacific Press.

Fairbairn-Dunlop, P. (2014). Where we can ask the questions we don't ask in class? In P. Fairbairn-Dunlop & E. Coxon (Eds.), *Talanoa. Building a Pasifika research culture* (pp. 15-31). Wellington, New Zealand: Dunmore.

Fairbairn-Dunlop, P., & Makisi, G. S. (2003). *Making our place: Growing up PI in New Zealand*. Palmerston North, New Zeland: Dunmore Press.

Fairbairn-Dunlop, P., Nanai, J., & Ahio, L. (2014). Pacific research. In V. Wright St-Clair, D. Reid, S. Shaw, & J. Ramsbotham (Eds.), *Evidence-based health practice*. Melbourne, Australia: Oxford University Press.

Farbotko, C. (2005). Tuvalu and climate change: Constructions of environmental displacement in the Sydney Morning Herald. *Geografiska Annaler: Series B, Human Geography, 87*(4), 279-293. doi:10.1111/j.0435-3684.2005.00199.x

Farbotko, C. (2010a). Wishful sinking: Disappearing islands, climate refugees and cosmopolitan experimentation. *Asia Pacific Viewpoint, 51*(1), 47-60. doi:10.1111/j.1467-8373.2010.001413.x

Farbotko, C. (2010b). The global warming clock is ticking so see these places while you can: Voyeuristic tourism and model environmental citizens on Tuvalu's disappearing islands. *Singapore Journal of Tropical Geography, 31*(2), 224-238. doi:10.1111/j.1467-9493.2010.00392.x

Farbotko, C., & Lazrus, H. (2012). The first climate refugees? Contesting global narratives of climate change in Tuvalu. *Global Environmental Change, 22*(2), 382-390. doi:http://dx.doi.org/10.1016/j.gloenvcha.2011.11.014

Farrelly, T., & Nabobo-Baba, U. (2012, December). *Talanoa as empathic research*. Paper presented at the Meeting of the International Development Conference, Auckland, New Zealand. Retrieved from http://www.devnet.org.nz/sites/default/files/Farrelly,%20Trisia%20&%20Nabobo-baba,%20Unaisi%20Talanoa%20as%20Empathic%20Research%20[paper]_0.pdf

Felli, R. (2015). *Environment and migration*. Retrieved from
https://www.academia.edu/12517294/Environment_and_migration

Ferris, E. (2014). *Planned relocations, disasters and climate change: Consolidating good practices and preparing for the future* (Background document. San Remo consultation, 12-14 March 2014): Brookings-LSE Project on Internal Displacement. Retrieved from http://www.unhcr.org/53c4d6f99.pdf

Ferris, E. (2015, July). *Climate change, migration and the incredibly complicated task of influencing policy*. Keynote address at the meeting of the Human migration and the Environment: Futures, politics, invention. Durham University, Durham, UK. Retrieved from http://cmsny.org/climate-change-migration-policy/

Flores-Palacios, X. (1997). *Contribution to the estimation of countries' inter-dependence in the area of plant genetic resources*: FAO. Retrieved from ftp://ftp.fao.org/docrep/fao/meeting/015/j0747e.pdf

Flores-Palacios, X. (2015). Samoa: Local knowledge, climate change and population movements. *Forced Migration Review,* (49), 59-61. Retrieved from http://www.fmreview.org

Food and Agriculture Organization of the United Nations. (2004). *FAO and SIDS: Challenges and emerging issues in agriculture, forestry and fisheries*. Retrieved from ftp://ftp.fao.org/docrep/fao/006/y5203E/y5203E00.pdf

Food and Agriculture Organization of the United Nations. (2008). *An introduction to the basic concepts of food security*. Retrieved from http://www.fao.org/docrep/013/al936e/al936e00.pdf

Foresight. (2011). *Migration and global environmental change. Future challenges and opportunities. Final project report*: The Government Office for Science. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/287717/11-1116-migration-and-global-environmental-change.pdf

Foundation for Development Cooperation. (2007). *Leveraging remittances with microfinance: Samoa country report*. Retrieved from http://www.microfinancegateway.org/sites/default/files/mfg-en-paper-leveraging-remittances-with-microfinance-samoa-country-report-dec-2007.pdf

Freire, P. (2003). *Pedagogía del oprimido*. Madrid, Spain: Siglo XXI.

Galloway McLean, K. (2010). *Advance guard: Climate change impacts, adaptation, mitigation and indigenous peoples – A compendium of case studies*: UNU – Traditional Knowledge Initiative. Retrieved from UNU website: http://www.unutki.org/news.php?doc_id=101&news_id=92

Gegeo, D. W. (1998). Indigenous knowledge and empowerment: Rural development examined from within. *The Contemporary Pacific, 10*(2), 289-315. Retrieved from http://www.jstor.org/stable/23706891

Gegeo, D. W., & Watson-Gegeo, K. A. (2001). " How we know": Kwara'ae rural villagers doing indigenous epistemology. *The Contemporary Pacific*, *13*(1), 55-88. doi: 10.1353/cp.2001.0004

Gemenne, F. (2008). *Environmental migration* (Version 11. Knol). Retrieved from http://knol.google.com/k/environmental-migration#

Gemenne, F. (2015). One good reason to speak of 'climate refugees'. *Forced Migration Review,* (49), 70-71. Retrieved from http://www.fmreview.org

Gibson, J. (2010). Recent shocks and long-term change in the Samoan economy. *Pacific Economic Bulletin. The Australian National University, 25*(3), 7-23. Retrieved from http://researchcommons.waikato.ac.nz/bitstream/handle/10289/5171/Recent%20shocks.pdf?sequence=1

Ginnetti, J. (2015). *Disaster-related displacement risk: Measuring the risk and addressing its drivers*: IDMC. Retrieved from http://www.internal-displacement.org/assets/publications/2015/20150312-global-disaster-related-displacement-risk-en.pdf

Government of Australia. Department of Climate Change and Energy Efficiency. (2009). *Engaging our Pacific neighbours on climate change: Australia's approach*. Retrieved from https://www.environment.gov.au/system/files/resources/a93976f1-4705-4323-a64d-f709ebc7e192/files/engaging-pacific-neighbours.pdf

Government of Samoa. (1999). *First national communication to the UNFCCC*. Retrieved from http://www.sprep.org/att/IRC/eCOPIES/Countries/Samoa/41.pdf

Government of Samoa. (2009). *Samoa's 4th national report to the convention on biological diversity (CBD)*. Retrieved from https://www.cbd.int/doc/world/ws/ws-nr-04-en.pdf

Government of Samoa. (2010a). *Samoa's second national communication to the United Nations Framework Convention on Climate Change (UNFCCC)*. Retrieved from http://unfccc.int/resource/docs/natc/samnc2.pdf

Government of Samoa. (2010b). *Tsunami: Samoa, 29 September 2009*. Retrieved from http://www.mof.gov.ws/Portals/195/tsunami_publication2_wf_blanks.pdf

Government of Samoa. (2014a). *Samoa's smooth transition strategy report*. Retrieved from http://www.un.org/en/development/desa/policy/cdp/ldc_documents/2015-cdp-samoa-transition.pdf

Government of Samoa. (2014b). *Statement by the Deputy Prime Minister Hon. Fonotoe Nuafesili Pierre Lauofo for the high-level panel discussion on small island developing states on the issue of graduation from least developed country status*. Retrieved from http://www.samoagovt.ws/wp-content/uploads/2014/09/DPM-Fonotoe-Statement-at-High-Level-Panel-Discussion-on-SIDS-on-the-graduation-from-LDC-status-2-September-2014.pdf

Government of Samoa. (2014c). *Samoa's 5th national report 2014. A report prepared for the convention on biological diversity (CBD)*. Retrieved from https://www.cbd.int/doc/world/ws/ws-nr-05-en.pdf

Government of Samoa. (2015). *Samoa's intended nationally determined contribution*. Retrieved from http://www4.unfccc.int/ndcregistry/PublishedDocuments/Samoa%20First/Samoa%20INDC_Submission%20to%20UNFCCC.pdf

Government of Tokelau. (2015). *High-level dialogue on climate induced migration outcomes document. Coalition of low lying atoll nations on climate change (CANCC)* (Bulletin October 2015). Retrieved from http://www.tokelau.org.nz/Bulletin/October+2015/Climate+induced+migration+outcomes+document.html

Guba, E. G. (1990). The alternative paradigm dialog. In E. G. Guba (Ed.), *The paradigm dialog* (pp. 17-30). London, United Kingdom: SAGE Publications.

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods, 18*(1), 59-82. doi: 10.1177/1525822X05279903

Haberkorn, G. (2008). Pacific islands' population and development: Facts, fictions and follies. *New Zealand Population Review, 33/34*, 95-127. Retrieved from http://www.population.org.nz/wp-content/uploads/2010/01/nzpr-vol-33-and-34_gerald-haberkorn.pdf

Habitat for Humanity. (2009). *Poverty housing in the developing nations of the Pacific islands*. Retrieved from http://www.habitat.org/sites/default/files/ap_HFHAP_Pacific_Report.pdf

Halapua, S. (2000). *Talanoa process: The case of Fiji*. Retrieved from http://unpan1.un.org/intradoc/groups/public/documents/un/unpan022610.pdf

Hau'ofa, E. (1994). Our sea of islands. *The Contemporary Pacific*, *6*(1), 148-161. Retrieved from http://www.jstor.org/stable/23701593

Hau'ofa, E. (1998). The ocean in us. *The Contemporary Pacific, 10*(2), 392-410. Retrieved from http://www.jstor.org/stable/23706895

Hay, J. E., Mimura, N., Campbell, J. R., Fifita, S., Koshy, K., Mclean, R. F., . . . De Wet, N. A. (2003). *Climate variability and change and sea-level rise in the Pacific Islands Region: A resource book for policy and decision makers, educators and other stakeholders*. Retrieved from http://www.sprep.org

Health Research Council of New Zealand. (2014). *Pacific health research guidelines*. Retrieved from http://www.hrc.govt.nz/sites/default/files/Pacific%20Health%20Research%20Guidelines%202014.pdf

Hill, B. (2013, January 11). Samoans urged to move away from coast and riverbanks. *Radio Australia*. Retrieved from http://www.radioaustralia.net.au

Hirsch-Hadorn, G., Hoffmann-Riem, H., Biber-Klemm, S., Grossenbacher-Mansuy, W., Joye, D., Pohl, C., . . . Zemp, E. (2008). *Handbook of transdisciplinary research*. Bern, Switzerland: Springer.

Hugo, G. (1996). Environmental concerns and international migration. *International migration review, 30*(1), 105-131. doi:10.2307/2547462

Hugo, G. (2008). *Migration, development and environment*: IOM. Retrieved from http://publications.iom.int/system/files/pdf/mrs_35.pdf

Human Rights Protection Party. (n.d.). *Vision and values*. Retrieved February 20, 2016, from http://hrpp.org.ws/about-hrpp/vision-and-values

Hviding, E. (2003). Between knowledges: Pacific studies and academic disciplines. *The Contemporary Pacific, 15*, 43-73. Retrieved from https://scholarspace.manoa.hawaii.edu/bitstream/handle/10125/13692/v15n1-43-73.pdf?sequence=1

Immigration New Zealand. (n.d.). *Explore options*. Retrieved January 15, 2015, from https://www.immigration.govt.nz/new-zealand-visas

Intergovernmental Panel on Climate Change. (2000). *Methodological and technological issues in technology transfer. Summary for policymakers*. Retrieved from https://www.ipcc.ch/pdf/special-reports/spm/srtt-en.pdf

Intergovernmental Panel on Climate Change. (2007). *Fourth assessment report: Climate change 2007*. Retrieved from http://www.ipcc.ch/index.htm

Intergovernmental Panel on Climate Change. (2010). *IPCC workshop on sea level rise and ice sheet instabilities*. Retrieved from https://www.ipcc.ch/pdf/supporting-material/SLW_WorkshopReport_kuala_lumpur.pdf

Intergovernmental Panel on Climate Change. (2012). Glossary of terms. In C. B. Field, V. Barros, T. F. Stocker, D. Qin, D. J. Dokken, K. L. Ebi, ..., & P. M. Midgley (Eds.), *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC).* (pp. 555-564). Retrieved from https://www.ipcc.ch/pdf/special-reports/srex/SREX_Full_Report.pdf

Intergovernmental Panel on Climate Change. (2014a). *Climate change 2014: Synthesis report. Contribution of working groups I, II and III to the fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC)*. Retrieved from https://www.ipcc.ch/report/ar5/syr/

Intergovernmental Panel on Climate Change. (2014b). *Climate Change 2014: Impacts, adaptation, and vulnerability. Summaries, frequently asked questions, and cross-chapter boxes. A contribution of working group II to the fifth assessment report of the IPCC*. Retrieved from https://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-IntegrationBrochure_FINAL.pdf

Intergovernmental Panel on Climate Change. (2014c). Summary for policymakers. In C. B. Field, V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, L.L.White (Ed.), *Climate change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Retrieved from http://ipcc-wg2.gov/AR5/images/uploads/WG2AR5_SPM_FINAL.pdf

Internal Displacement Monitoring Centre. (2016). *Internal displacement by country in 2015 - IDMC official figures.* Retrieved March 25, 2016, from http://www.internal-displacement.org/database/

Internal Displacement Monitoring Centre, & Norwegian Refugee Council. (2015). *Global estimates 2015. People displaced by disasters*. Retrieved from http://www.internal-displacement.org/assets/library/Media/201507-globalEstimates-2015/20150713-global-estimates-2015-en-v1.pdf

International Council for Science & United Nations Educational, Scientific and Cultural Organization. (2002). *Science, traditional knowledge and sustainable development* (ICSU Series on Science for Sustainable Development No. 4). Retrieved from UNESCO website: http://unesdoc.unesco.org/images/0015/001505/150501eo.pdf

International Federation of Red Cross and Red Crescent Societies. (2016). *One month on from tropical cyclone Winston needs remain huge*. Retrieved from http://www.ifrc.org/en/news-and-media/news-stories/asia-pacific/fiji/one-month-on-from-tropical-cyclone-winston-needs-remain-huge-72036/

International Fund for Agricultural Development. (2008). *Climate change: Building the resilience of poor rural communities*. Retrieved from http://www.ifad.org/climate/factsheet/e.pdf

International Labour Organization. (2015a). *Launch of ILO project signals Samoa's commitment to youth employment*. Retrieved from http://www.ilo.org/suva/public-information/WCMS_369988/lang--en/index.htm

International Labour Organization. (2015b). *ILO partner to advance youth employment through green jobs in green works*. Retrieved from http://www.ilo.org/suva/public-information/WCMS_396963/lang--en/index.htm

International Migration Institute. University of Oxford, & National Institute of Demographic and Economic Analysis. University of Waikato. (2013). *Global migration futures. Pacific region: Drivers, processes and future scenarios of migration*. Retrieved from http://www.imi.ox.ac.uk/publications/global-migration-futures-using-scenarios-to-explore-future-migration-in-the-pacific

International Monetary Fund. (2009). *Balance of payments and international investment. Position manual* (Sixth edition BPM6). Retrieved from https://www.imf.org/external/pubs/ft/bop/2007/pdf/bpm6.pdf

International Monetary Fund. (2015). *2015 Article IV consultation: Staff report, and statement by the executive director for Samoa* (IMF Country Report No. 15/191). Retrieved from https://www.imf.org/external/pubs/ft/scr/2015/cr15191.pdf

International Organization for Migration. (2007). *Discussion note: Migration and the environment*. Retrieved from https://www.iom.int/jahia/webdav/shared/shared/mainsite/about_iom/en/council/94/MC_INF_288.pdf

International Organization for Migration. (2008). *Migration, development and environment*. Retrieved from http://publications.iom.int/system/files/pdf/mrs_35.pdf

International Organization for Migration. (2009a). *Compendium of IOM's activities in migration, climate change and the environment*. Retrieved from https://www.iom.int/jahia/webdav/shared/shared/mainsite/activities/env_degradation/compendium_climate_change.pdf

International Organization for Migration. (2009b). *Disaster risk reduction, climate change adaptation and environmental migration. A police perspective*. Retrieved from https://www.iom.int/jahia/webdav/shared/shared/mainsite/activities/env_degradation/DRR-CCA-Policy-Paper-Final.pdf

International Organization for Migration. (2011a). *Medioambiente, cambio climático y migración: Perspectiva y actividades de la OIM.* Retrieved from http://publications.iom.int/system/files/pdf/climatechangesp_final.pdf

International Organization for Migration. (2011b). *Glossary on migration*. Geneva, Switzerland: IOM.

International Organization for Migration. (2012). *Climate change, environmental degradation and migration*. Retrieved from http://publications.iom.int/bookstore/free/RB18_ENG_web.pdf

International Organization for Migration. (2015a). *Migration, climate change and the environment. A complex nexus*. Retrieved from https://www.iom.int/complex-nexus

International Organization for Migration. (2015b). *Migration, climate change and the environment. Definitional issues*. Retrieved from https://www.iom.int/definitional-issues

International Organization for Migration. (2015c). *Facts and figures. Samoa*. Retrieved July 30, 2015, from http://mac.iom.int/cms/en/sites/iom/home/where-we-work/asia-and-the-pacific/samoa.html

International Organization for Migration. (2016). *Migration and climate change*. Retrieved 5 January 2016, from https://www.iom.int/migration-and-climate-change

Jäger, J., Frühmann, J., Günberger, S., & Vag, A. (2009). *Environmental change and forced migration scenarios. Project synthesis report*: CCEMA. Retrieved from http://www.ccema-portal.org/article/read/each-for-project-publications

Kafle, S. K., & Murshed, Z. (2006). *Participant's workbook. Community-based disaster risk management for local authorities*: ADPC. Retrieved from http://www.unisdr.org/files/3366_3366CBDRMShesh.pdf

Kalavite, T. (2014). Exploring Pacific - Tongan research approaches. In P. Fairbairn-Dunlop & E. Coxon (Eds.), *Talanoa. Building a Pasifika research culture* (pp. 159-177). Auckland, New Zealand: Dunmore.

Kelkar, G. (2009). *Adivasi women. Engaging with climate change*: UNIFEM, IFAD, & Christensen Fund. Retrieved from https://www.ifad.org/documents/10180/0346a74e-5515-4ec5-836c-89d60bff97f9

Keni Lesa, M. (2015, July 19). If land is lost, so will the matai system and culture of Samoa. *Samoa Observer*. Retrieved from http://www.samoaobserver.ws/other/village/13978-if-land-is-lost-so-will-the-matai-system-and-culture-of-samoa

Kenny, G. (2012). *Climate resilience in Samoa. Capacity assessment and enhancement consultancy*: Earthwise Consulting Limited. Retrieved from http://www.mof.gov.ws/Portals/195/CRIC/Capacity%20Assessment%20and%20Enhancement%20final%20report.pdf

Keresoma, L. (2016, May 10). Solosolo village relocating due to risks from climate change and sand mining. *Talamua Online News*. Retrieved from http://www.talamua.com

Khoury, C. K., Achicanoy, H. A., Bjorkman, A. D., Navarro-Racines, C., Guarino, L., Flores-Palacios, X., . . . Struik, P. C. (2016). Origins of food crops connect countries worldwide. *Proceedings of the Royal Society B: Biological Sciences, 283*(1832), 1-9. doi:10.1098/rspb.2016.0792

Ki-Moon, B. (2011). *Remarks to Auckland University*. Retrieved from http://www.un.org/apps/news/infocus/sgspeeches/statments_full.asp?statID=1280#.Vgxqhvmqqko

Klein, J. (2004). Prospects for transdisciplinarity. *Futures, 36*(4), 515-526. doi:10.1016/j.futures.2003.10.007

Knierim, A., Siart, S., Toussaint, V., Müller, K., & Wiggering, H. (2010, July). *Development of climate change adaptation strategies within the transdisciplinary network INKA BB*. Paper presented at the meeting of the 9th European International Farming Systems Association (IFSA), Vienna, Austria. Retrieved from http://ifsa.boku.ac.at/cms/index.php?id=107

Kolmannskog, V. O. (2008). *Future floods of refugees. A comment on climate change, conflict and forced migration*: Norwegian Refugee Council. Retrieved from http://www.migrationdrc.org/publications/resource_guides/Migration_and_Climate_Change/Future_floods_of_refugees.pdf

Kovach, M. E. (2010). *Indigenous methodologies: Characteristics, conversations, and contexts.* Toronto, Canada: University of Toronto Press.

Kreft, S., & Eckstein, D. (2014). *Global climate risk index 2014. Who suffers most from extreme weather events? Weather-related loss events in 2012 and 1993 to 2012*. Retrieved from https://germanwatch.org/en/download/8551.pdf

Kvale, S. (2007). *Doing interviews*. London, England: SAGE Publications.

Laczko, F., & Aghazarm, C. (2009). Introduction and overview: Enhancing the knowledge base. In F. Laczko & C. Aghazarm (Eds.), *Migration, environment and climate change: Assessing the evidence* (pp. 7-40): IOM. Retrieved from http://publications.iom.int/system/files/pdf/migration_and_environment.pdf

Laczko, F., & Piguet, E. (2014). Regional perspectives on migration, the environment and climate change. In E. Piguet & F. Laczko (Eds.), *People on the move in a changing climate. The regional impact of environmental change on migration*. doi: 10.1007/978-94-007-6985-4

Lane, R., & McNaught, R. (2009). Building gendered approaches to adaptation in the Pacific. *Gender & Development, 17*(1), 67-80. doi:10.1080/13552070802696920

Lavell, C., & Ginnetti, J. (2014). *Technical paper: The risk of disaster-induced displacement*: IDMC & Norwegian Refugee Council. Retrieved from http://internal-displacement.org/assets/publications/2014/201401-technical-paper-the-risk-of-disaster-induced-displacement-report-en.pdf

Lavery, L., & Butler, R. (2012). *Introduction to NVIVO 10: Working with data.* Retrieved from http://www.academic-consulting.co.nz/

Lay, G., Tamua, E., Murrow, T., & Meleisea, M. (2000). *Samoa*. Auckland, New Zealand: Pasifika Press.

Le De, L., Gaillard, J. C., Friesen, W., & Matautia Smith, F. (2015). Remittances in the face of disasters: A case study of rural Samoa. *Environment, Development & Sustainability, 17*(3), 653-672. doi:10.1007/s10668-014-9559-0

Le De, L., Gaillard, J. C., Friesen, W., Pupualii, M., Brown, C., & Aupito, A. (2016). Our family comes first: Migrants' perspectives on remittances in disaster. *Migration and Development, 5*(1), 130-148. doi:10.1080/21632324.2015.1017971

Lee, H. (2009). Introduction. In H. Lee & S.T. Francis (Eds.), *Migration and transnationalism: Pacific perspectives* (pp. 1). Camberra, Australia: ANU E Press.

Lefale, P. (2003). Seasons in Samoa. *Water and atmosphere, 11*(2), 10-11. Retrieved from https://www.niwa.co.nz/sites/niwa.co.nz/files/import/attachments/samoa.pdf

Lehman, J. (2009). *Environmental refugees: The construction of a crisis*: UHU-EHS. Retrieved from http://www.bonn-dialogues.com/file/get/4145

Levine, A., & Sauafea-Leau, F. (2013). Traditional knowledge, use, and management of living marine resources in American Samoa: Documenting changes over time through interviews with elder fishers. *Pacific Science, 67*(3). Retrieved from https://pacificscience.files.wordpress.com/2013/02/pac-sci-early-view-67-3-7.pdf

Lew, K. P. (2015, 5 September). Fiji report: Suva Declaration pushes losses, damages issue for COP21 in Paris. *Pacific.Scoop*. Retrieved from http://pacific.scoop.co.nz

Lilomaiava-Doktor, S. I. (2009). Beyond "migration": Samoan population movement (malaga) and the geography of social space (vā). *Contemporary Pacific, 21*(1), 1-32. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.469.4495&rep=rep1&type=pdf

Lilomaiava-Niko, S. (1993). *An analysis of approaches to migration: The western Samoan case* (Master's thesis, University of Hawaii - Manoa). Retrieved from http://scholarspace.manoa.hawaii.edu/bitstream/handle/10125/21182/Lilomaiava-Niko_1993.pdf?sequence=1

Loughry, M., & McAdam, J. (2008). Kiribati – relocation and adaptation. *Forced Migration Review,* (31), 51-52. Retrieved from http://www.fmreview.org

Lyall, C., & Fletcher, I. (2013). Experiments in interdisciplinary capacity-building: The successes and challenges of large-scale interdisciplinary investments. *Science and Public Policy, 40*(1), 1-7. doi:10.1093/scipol/scs113

Maas, A. (2014, August 3). Tuvalu climate change family win NZ residency appeal. *New Zealand Herald*. Retrieved from http://www.nzherald.co.nz

Macklin, A. (2005). Disappearing refugees: Reflections on the Canada-U.S. safe third country agreement. *Columbia Human Rights Law Review, 36*(2), 365-426. Retrieved from http://ssrn.com/abstract=871226

Macpherson, C. (1999). Changing contours of kinship: The impacts of social and economic development on kinship organization in the South Pacific. *Pacific Studies, 22*, 71-95. Retrieved from https://ojs.lib.byu.edu/spc/index.php/PacificStudies/article/viewFile/10162/9810

Macpherson, C. (2000). *Some social and economic consequences of migration. A curriculum paper for Samoa*: UNESCO. Retrieved from http://www.unesco.org/fileadmin/MULTIMEDIA/HQ/SHS/pdf/Migration-in-Samoa.pdf

Macpherson, C., & Macpherson, L. (2009). *The warm winds of change: Globalisation and contemporary Samoa*. Auckland, New Zealand: Auckland University Press.

Martin, S. (2010a). Climate change and international migration. In K. Koser & F. Laczko (Eds.), *World migration report 2010*. Geneva, Switzerland: IOM.

Martin, S. (2010b). Climate change, migration and governance. *Global Governance, 16*(3), 397-414. doi:10.5555/ggov.2010.16.3.397

Martin, S. (2015). The state of the evidence. *Forced Migration Review,* (49), 12-13. Retrieved from http://www.fmreview.org

Mary Robinson Foundation. Climate Justice. (2016). *Principles of climate justice*. Retrieved January15, 2016, from http://www.mrfcj.org/principles-of-climate-justice/

Mawby, B. (2015). *Longitudinal research on environmental change and migration. A workshop on objectives, methods, and applicability to policy and practice*: KNOMAD. Retrieved from http://www.knomad.org/docs/environmental_change/KNOMAD%20Workshop_Report_Final_TWG11,%20March%2019-20,%202015%20(final%20version).pdf

Mazzocchi, F. (2006). Western science and traditional knowledge: Despite their variations, different forms of knowledge can learn from each other. *EMBO Reports, 7*(5), 463-466. doi:10.1038/sj.embor.7400693

McAdam, J. (2011). *Climate change displacement and international law: Complementary protection standards*:UNHCR. Retrieved from http://www.unhcr.org/4dff16e99.pdf

McAdam, J., & Limon, M. (2015). *Human rights, climate change and cross-border displacement: The role of the international human rights community in contributing to effective and just solutions*. Retrieved from http://www.universal-rights.org/wp-content/uploads/2015/12/CC_HR_Displacement_pge.pdf

McAdoo, B. G., Ah-Leong, J. S., Bell, L., Ifopo, P., Ward, J., Lovell, E., & Skelton, P. (2011). Coral reefs as buffers during the 2009 south Pacific tsunami, Upolu island, Samoa. *Earth-Science Reviews, 107*(1–2), 147-155. doi:10.1016/j.earscirev.2010.11.005

McFall-McCaffery, J. (2010). Getting started with Pacific research: Finding resources and information on Pacific research models and methodologies. *MAI Review, 1,* 1-5. Retrieved from http://www.review.mai.ac.nz/index.php/MR/article/viewFile/332/367

McLeod, D. (2010). Potential impacts of climate change migration on Pacific families living in New Zealand. In B. Burson (Ed.), *Climate change and migration: South Pacific perspectives* (pp. 135-158). Wellington, New Zealand: Victoria University.

McIver, L., Kim, R., Woodward, A., Hales, S., Spickett, J., Katscherian, D., ... & Naicker, J. (2016). Health impacts of climate change in Pacific island countries: A regional assessment of vulnerabilities and adaptation priorities. *Environmental health perspectives*, 124(11), 1707-1714. doi:10.1289/ehp.1509756

McLeman, R. (2013). Developments in modelling of climate change-related migration. *Climatic Change, 117*(3), 599-611. doi:10.1007/s10584-012-0578-2

McNamara, K. E. (2008). Pragmatic discourses and alternative resistance: Responses to climate change in the Pacific. *Graduate Journal of Asia-Pacific Studies, 6*(2), 33-54. Retrieved from http://espace.library.uq.edu.au/view/UQ:301898/UQ301898_OA.pdf

McNamara, K. E., & Gibson, C. (2009). 'We do not want to leave our land': Pacific ambassadors at the United Nations resist the category of 'climate refugees'. *Geoforum, 40*(3), 475-483. doi: 10.1016/j.geoforum.2009.03.006

McNamara, K. E., & Jacot Des Combes, H. (2015). Planning for community relocations due to climate change in Fiji. *Int J Disaster Risk Sci.* doi:10.1007/s13753-015-0065-2

Meldau, A. (2012). Cyclone Evan in Samoa. In F. Gemenne, P. Brücker, & D. Ionesco (Eds.), *The state of environmental migration 2013* (pp. 49-62): IDDRI & IOM. Retrieved from http://publications.iom.int/system/files/pdf/state_environmental_migration_2013.pdf

Meleisea, M. (1987). *The making of modern Samoa:Traditional authority and colonial administration in the history of Western Samoa.* Suva, Fiji: Institute of Pacific Studies of the University of the South Pacific.

Meleisea, M., Schoeffel Meleisea. (1987). *Lagaga: A short history of Western Samoa.* Suva, Fiji: University of South Pacific.

Meleisea, M., & Schoeffel, P. (2015). Land, custom and history in Samoa. *Journal of Samoan Studies, 5*, 22-34. Retrieved from http://journal.samoanstudies.ws/wp-content/uploads/2015/12/Vol5_2.-Land-Custom-and-History-in-Samoa.pdf

Mertens, D. M. (2010). *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods* (3rd ed.). Thousand Oaks, CA: Sage.

Mignolo, W. (2007a). The de-colonial option and the meaning of identity in politics. *Anales Nueva Epoca,* (9-10), 43-72. Retrieved from https://gupea.ub.gu.se/bitstream/2077/4500/2/anales_9-10_mignolo.pdf

Mignolo, W. (2007b). Delinking: The rhetoric of modernity, the logic of coloniality and the grammar of de-coloniality. *Cultural Studies, 21*(2-3), 449-514. doi: 10.1080/09502380601162647

Mignolo, W. (2009). Epistemic disobedience, independent thought and decolonial freedom. *Theory, Culture & Society, 26*(7/8), 159-181. doi: 10.1177/0263276409349275

Migration, Environment and Climate Change: Evidence for Policy. (2014). *Glossary.* Retrieved from http://publications.iom.int/bookstore/free/MECLEP%20Glossary_EN.pdf

Migration, Environment and Climate Change: Evidence for Policy. (2015a). *Migration, environment and climate change: Policy briefs series*. Retrieved http://www.environmentalmigration.iom.int/sites/default/files/policy%20briefs/Policy%20Brief%20Series%20Leaflet%2015Dec%20FINAL%20Version.pdf

Migration, Environment and Climate Change: Evidence for Policy. (2015b). *Migration, environment, climate change: Capacity building training workshop in Papua New Guinea*. Retrieved from http://environmentalmigration.iom.int/sites/default/files/Flyer_PNG%20FINAL.pdf

Mimura, N., Nurse, L., McLean, R. F., Agard, J., Briguglio, L., Lefale, P., . . . Sem, G. (2007). *Small islands. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. In O. F. C. M.L. Parry, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds (Ed.), *Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Retrieved from https://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch16.html

Ministry of Education of New Zealand. (1996). *Samoan in the New Zealand curriculum. Taʻiala mo le Gagana Sāmoa i Niu Sila*. Wellington, New Zealand: Learning Media.

Ministry of Finance of Samoa. (2008). *National strategy for the development of Samoa 2008 – 2012. Ensuring sustainable economic and social progress*. Retrieved from http://www.mof.gov.ws/portals/195/sds_2008_-_2012_-_english.pdf

Ministry of Finance of Samoa. (2012). *Strategy for the development of Samoa (SDS) 2012-2016. Boosting productivity for sustainable development*. Retrieved from http://www.mof.gov.ws/Portals/195/Services/Economy/SDS%202012%20-%202016%20ENGLISH%20VERSION.pdf

Ministry of Foreign Affairs and Trade of New Zealand. (2015). *New Zealand aid programme. Strategic plan 2015-2019*. Retrieved from https://www.mfat.govt.nz/assets/_securedfiles/Aid-Prog-docs/New-Zealand-Aid-Programme-Strategic-Plan-2015-19.pdf

Ministry of Health of Samoa. (2008). *Health sector plan 2008 – 2018.* Retrieved from http://www.health.gov.ws/images/MOH/Publications/HealthPlans/HEALTHSECTORPLAN-08-18.pdf

Ministry of Natural Resources and Environment of Samoa. (2005). *Samoa. National adaptation programme of action (NAPA)*. Retrieved from http://unfccc.int/resource/docs/napa/sam01.pdf

Ministry of Natural Resources and Environment of Samoa. (2007a). *National policy of combating climate change*. Retrieved from http://www.mnre.gov.ws/images/stories/MNRE/policies/national%20policy%20on%20combating%20climate%20change%202007.pdf

Ministry of Natural Resources and Environment of Samoa. (2007b). *Coastal infrastructure management plan. Lotofaga District. Plan development*. Retrieved from http://www.mnre.gov.ws/images/stories/MNRE/siam2/CIM%20Plans/LotofagaPD-FE.pdf

Ministry of Natural Resources and Environment of Samoa. (2007c). *Coastal infrastructure management plan. Lotofaga District. Implementation guidelines*. Retrieved from http://www.mnre.gov.ws/images/stories/MNRE/siam2/CIM%20Plans/LotofagaIG-FE.pdf

Ministry of Natural Resources and Environment of Samoa. (2011). *Samoa's national disaster management plan 2011 – 2014*. Retrieved from http://www.preventionweb.net/files/27077_ndmpfinal20111215endoresedbydac.pdf

Ministry of Natural Resources and Environment of Samoa. (2013a). *State of environment report*. Retrieved from http://www.mnre.gov.ws/images/stories/MNRE/corporateDocs/file____C__Users_Sony_Desktop_New%20folder%203_Binder1_soe.pdf

Ministry of Natural Resources and Environment of Samoa. (2013b). *Samoa. National progress report on the implementation of the Hyogo Framework for Action (2011-2013) - interim*. Retrieved from http://www.preventionweb.net/files/28739_wsm_NationalHFAprogress_2011-13.pdf

Ministry of Natural Resources and Environment of Samoa. (2013c). *The Samoa national urban policy: Sustainable, resilient and inclusive city*. Retrieved from http://www.urbangateway.org/system/files/documents/urbangateway/mnre_2013_national_urban_policy.pdf

Ministry of Natural Resources and Environment of Samoa. (2015). *Samoa 's risk profile*. Retrieved from http://www.mnre.gov.ws/index.php/riskreductiondmo/understanding-risk-management2/82-disaster-management

Ministry of Natural Resources and Environment of Samoa. (2016). *Community disaster and climate risk management programme (CDCRM)*. Retrieved January 7, 2016, from http://www.mnre.gov.ws/index.php/cdcrm-dmo

Ministry of Natural Resources and Environment of Samoa, Australian Bureau of Meteorology, & Commonwealth Scientific and Industrial Research Organisation. (2011). *Current and future climate of Samoa*. Retrieved from http://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/3_PCCSP_Samoa_8pp.pdf

Ministry of Women Community and Social Development of Samoa. (2013). *Village profile: Lotofaga.* Manuscript in preparation.

Ministry of Women Community and Social Development of Samoa. (2015). *Annual report for the MWCSD 2013 - 2014*. Retrieved from http://www.mwcsd.gov.ws/images/stories/PUBLICATIONS%20WEBSITE/2015/Annual%20Report20132014/English%20latest%20-%20AR13-14.pdf

Ministry of Works Transport and Infrastructure of Samoa. (2014). *Transport sector plan 2014 – 2019* (Vol. 1). Retrieved from http://www.mwti.gov.ws/downloads/TSP/Volume%20I.pdf

Morrissey, J. (2012). Rethinking the 'debate on environmental refugees': From 'maximalists and minimalists' to 'proponents and critics'. *Journal of Political Ecology*(19), 36-49. Retrieved from http://jpe.library.arizona.edu/volume_19/Morrissey.pdf

Morton, A., Boncour, P., & Laczko, F. (2008). Human security policy challenges. *Forced Migration Review,* (31), 5-7. Retrieved from http://www.fmreview.org

Mortreux, C., & Barnett, J. (2009). Climate change, migration and adaptation in Funafuti, Tuvalu. *Global Environmental Change, 19*(1), 105-112. doi:10.1016/j.gloenvcha.2008.09.006

Mulitalo Ale, P. (2016, May 16). Rising sea, sand mining see Solosolo village relocate. *Samoa Observer*. Retrieved from http://www.samoaobserver

Murphy, S. J. (2013). *Fa'a Samoa: An aid to livelihood recovery following the Samoan tsunami?* (Master'a thesis, Massey University, Auckland, New Zealand). Retrieved from http://mro.massey.ac.nz/bitstream/handle/10179/4320/02_whole.pdf?sequence=1

Nabobo-Baba, U. (2008). Decolonising framings in Pacific research: Indigenous Fijian Vanua research framework as an organic response. *Alternative: An International Journal of Indigenous Peoples, 4*(2), 140-154. Retrieved from http://www.content.alternative.ac.nz/index.php/alternative/article/view/50

Nakashima, D. J., Galloway McLean, K., Thulstrup, H. D., Ramos Castillo, A., & Rubis, J. T. (2012). *Weathering uncertainty: Traditional knowledge for climate change assessment and adaptation*: UNESCO-UNU. Retrieved from http://www.ipmpcc.org/wp-content/uploads/2012/06/Weathering-Uncertainty_FINAL_12-6-2012.pdf

Nansen Initiative. (2013a). *Human mobility, natural disasters and climate change in the Pacific. Background paper*. Retrieved from https://www.nanseninitiative.org/pacific-consultations-intergovernmental/#

Nansen Initiative. (2013b). *Human mobility, natural disasters and climate change in the Pacific. Outcome report*. Retrieved from https://www.nanseninitiative.org/pacific-consultations-intergovernmental/#tab-1422527366643-2-10

Nansen Initiative. (2013c). Human mobility, natural disasters and climate change in the Pacific. Summary of conclusions. Retrieved from https://www.nanseninitiative.org/pacific-consultations-intergovernmental/#tab-1422467069-2-74

Nansen Initiative. (2013d). *Nansen initiative Pacific Regional consultation – Chair's summary*. Retrieved from https://www.nanseninitiative.org/global-consultations/

Nansen Initiative. (2013e). *Conclusions: Nansen initiative Pacific regional consultation*. Retrieved from https://www2.nanseninitiative.org/wp-content/uploads/2015/02/Conclusion-Document-Nansen-Initiative-Pacific-Consultation.pdf

Nansen Initiative. (2015). *Nansen Initiative and Chatham House Expert Meeting on the Draft Protection Agenda*. Retrieved from https://www.nanseninitiative.org/nansen-initiative-and-chatham-house-expert-meeting-on-the-draft-protection-agenda/

Naser, M. M. (2015). *Assessing the evidence: Migration, environment and climate change in Papua New Guinea*: MECLEP. Retrieved from http://publications.iom.int/system/files/pdf/meclep_assessment_png.pdf

Natanielu, S. (2011). The tanoa: An indigenous approach to holistic health. *Measina a Samoa. University of Samoa, 5*, 5-22.

Nemerever, Z. (2012). *Preparing for the worst: Disaster preparedness education in Samoa*. Retrieved from http://digitalcollections.sit.edu/isp_collection/1281

Neumayer, E., & Plümper, T. (2007). The gendered nature of natural disasters: The impact of catastrophic events on the gender gap in life expectancy, 1981–2002. *Annals of the Association of American Geographers, 97*(3), 551-566. doi:10.1111/j.1467-8306.2007.00563.x

Nunn, P. D. (1994). *Oceanic islands*. Oxford, England: Blackwell.

Nunn, P. D. (2009). Responding to the challenges of climate change in the Pacific islands: Management and technological imperatives. *Climate Research, 40*(2-3), 211-231. doi:10.3354/cr00806

Obokata, R., Veronis, L., & McLeman, R. (2014). Empirical research on international environmental migration: A systematic review. *Population and Environment, 36*(1), 111-135. doi:10.1007/s11111-014-0210-7

Office of the Head of State of Samoa. (2014). *Disaster preparedness and 'the indigenous' in the Pacific.* Opening Remarks, Parallel Event of the Massey University of Aotearoa, New Zealand, Pacific Research and Policy Centre and the Joint Centre for Disaster Research "Indigenous Responses to Disaster Risk Reduction", UN Conference on Small Island Developing States, Apia, Samoa, 2 September 2014. Retrieved from http://www.headofstate.ws/?page_id=717

Office of the High Commissioner for Human Rights. Co-lead Agency - Pacific Humanitarian Protection Cluster. (2010). *Human rights monitoring of persons internally displaced by the 2009 tsunami in Samoa*. Retrieved from http://pacific.ohchr.org/docs/Samoa_displacement-reportJuly%202011.doc

Office of the High Commissioner for Human Rights. Regional Office for the Pacific. (2011). *Protecting the human rights of internally displaced persons in natural disasters. Challenges in the Pacific*. Retrieved from http://pacific.ohchr.org/docs/IDP_report.pdf

Office of the President of the Republic of Kiribati. (2015). *Relocation*. Retrieved from http://www.climate.gov.ki/category/action/relocation/

Olsen, D. S., Borlaug, S. B., Klitkou, A., Lyall, C., & Yearley, S. (2013). *A better understanding of interdisciplinary research in climate change* (Working Paper 15/2013). Retrieved from Nordic Institute for Studies in Innovation, Research and Education website: http://meopar.ca/uploads/NIFUworking-paper2013-15.pdf

O'Meara, J. T. (1987). Samoa: Customary individualism. In R. G. Crocombe (Ed.), *Land tenure in the Pacific* (pp. 74-113). Suva, Fiji: University of the South Pacific.

Opeskin, B., & MacDermott, T. (2010). *Enhancing opportunities for regional migration in the Pacific* (Briefing 13). Retrieved from Pacific Institute of Public Policy website: http://pacificpolicy.org/wp-content/blogs.dir/2/files/2015/02/DP13.pdf

Otsuka, S. (2006). Talanoa research: Culturally appropriate research design in Fiji. *Proceedings of the Australian Association for Research in Education (AARE). 2005 International Education Research Conference: Creative Dissent-Constructive Solutions.* Retrieved from http://www.aare.edu.au/data/publications/2005/ots05506.pdf

Our entire survival is at stake: Kiribati president Anote Tong calls for international community to deliver on climate funding pledge. (2014, July 11). *ABC News Online*. Retrieved from http://www.abc.net.au

Overseas Development Institute, KVA Consult Ltd, & Pacific Environment Consultants Ltd. (2012). *Samoa climate public expenditure and institutional review*. Retrieved from https://www.cbd.int/financial/climatechange/samoa-cpeir.pdf

OXFAM New Zealand. (2015). *Poverty in the Pacific*. Retrieved September 15, 2015 from http://www.oxfam.org.nz/what-we-do/where-we-work/poverty-in-the-pacific

Pacific Climate Warriors. (n.d.). *Frontline truths*. Retrieved November 12, 2015, from https://350.org/frontline-truths/

Pacific Islands Climate Action Network. (2016). *Pacific must continue to lead climate action* [Press release]. Retrieved from http://pacific.scoop.co.nz/2016/04/pacific-must-continue-to-lead-climate-action/

Pacific Islands Development Forum. (2015). *Suva declaration on climate change*. Retrieved from http://pacificidf.org/wp-content/uploads/2013/06/PACIFIC-ISLAND-DEVELOPMENT-FORUM-SUVA-DECLARATION-ON-CLIMATE-CHANGE.v2.pdf

Pacific Islands Forum Secretariat. (2008). *39th Pacific islands forum communique*. Retrieved from http://www.forumsec.org/resources/uploads/attachments/documents/2008%20Forum%20Communique,%20Alofi,%20Niue,%2019-20%20Aug.pdf

Pacific Islands Forum Secretariat. (2015). *2015 Pacific regional MDGs tracking report*. Retrieved from http://www.forumsec.org/resources/uploads/attachments/documents/2015%20Pacific%20Regional%20MDGs%20Tracking%20Report1.pdf

Paton, K., & Fairbairn-Dunlop, P. (2010). Listening to local voices: Tuvaluans respond to climate change. *Local Environment, 15*(7), 687-698. doi:10.1080/13549839.2010.498809

Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: SAGE Publications.

Percival, G. S. (2008). *An assessment of indigenous environmental knowledge (IEK) in the Pacific region to improve resilience environmental change*. Retrieved from https://independent.academia.edu/PercivalSteven

Piguet, E. (2008). *Climate change and forced migration* (Research Paper No. 153). Retrieved from UNHCR website: http://www.unhcr.org/47a316182.pdf

Poissonnier-Lescuras, M., Brücker, P., & Gemenne, F. (2013). *Samoa. Case-study in the framework of the project ClimMig: Climate-related migration and the need for new normative and institutional frameworks*. Retrieved from http://www.humanrights.at/climmig/wp-content/uploads/Samoa-ClimMig.pdf

Porsanger, J. (2004). An essay about indigenous methodology. *Nordlit, 8*(1), 105-120. Retrieved from http://septentrio.uit.no/index.php/nordlit/article/view/1910/1776

Pulotu-Endemann, F. K. (2001). *Fonofale model of health*. Retrieved from http://whanauoraresearch.co.nz/files/formidable/Fonofalemodelexplanation1-Copy.pdf

Tuilaepa identifies climate change as Samoa's main challenge. (2016, March 7). *Radio New Zealand*. Retrieved from http://www.radionz.co.nz

Raygorodetsky, G. (2011). *Why traditional kowledge holds the key to climate change*. Retrieved from http://unu.edu/publications/articles/why-traditional-knowledge-holds-the-key-to-climate-change.html

Reid, H., & Schipper, E. L. F. (2014). Upscaling community-based adaptation. An introduction to the edited volume In E. L. F. Schipper, J. Ayers, H. Reid, S. Huq, & A. Rahman (Eds.), *Community-based adaptation to climate change: Scaling it up* (pp. 3-21). New York, NY: Routledge.

Reid, H., Ampomah, G., Olazábal Prera, M. I., Rabbani, G., & Zvigadza, S. (2012). *Southern voices on climate policy choices. Analysis of and lessons learned from civil society advocacy on climate change*: IIED. Retrieved from http://careclimatechange.org/wp-content/uploads/2015/05/SV_Policy_Choices_2012.pdf

Repko, A. F. (2007). Integrating interdisciplinarity: How the theories of common ground and cognitive interdisciplinarity are informing the debate on interdisciplinary integration. *Issues in integrative studies,* (25), 1-31. Retrieved from http://wwwp.oakland.edu/Assets/upload/docs/AIS/Issues-in-Interdisciplinary-Studies/2007-Volume-25/03_Vol_25_Integrating_Interdisciplinarity_How_the_Theories_of_Common_Ground_and_Cognitive_Interdisciplinarity_Are_Informing_the_Debate_on_Interdisciplinary_Integration.pdf

Rivera Cusicanqui, S. (2012). Ch'ixinakax utxiwa: A reflection on the practices and discourses of decolonization. *South Atlantic Quarterly, 111*(1), 95-109. doi:10.1215/00382876-1472612

Rowling, M. (2014, 12 December). Vulnerable nations urged to craft climate migration policy. *Reuters*. Retrieved from http://www.reuters.com

Russell, L. (2009). *Poverty, climate change and health in Pacific island countries. Issues to consider in discussion, debate and policy development*. Retrieved from http://ussc.edu.au/ussc/assets/media/docs/publications/0904_pacificislandspaper_russell.pdf

Samoa Bureau of Statistics. (2006). *Population and housing census 2006*. Retrieved from http://www.sbs.gov.ws

Samoa Bureau of Statistics. (2011). *Population and housing census 2011*. Retrieved from http://www.sbs.gov.ws

Samoa Bureau of Statistics. (2014). *Statistical abstract 2014*. Retrieved from http://www.sbs.gov.ws

Samoa Bureau of Statistics. (2015a). *Population and demography indicator summary*. Retrieved http://www.sbs.gov.ws

Samoa Bureau of Statistics. (2015b). *Samoa. Socio-economic atlas 2011*. Retrieved from http://www.sbs.gov.ws

Samoa Bureau of Statistics. (2015c). *Samoa. Demographic and health survey 2014*. Retrieved from http://www.sbs.gov.ws

Sarmento, F., Ferreira, J., & Hurtado, A. (2009). *Territorial diagnosis handbook project idea and supervision*: FAO & ActionAid. Retrieved from http://www.ieham.org/html/docs/TDGuid_low.pdf

Schade, J., McDowell, C., Ferris, E., Schmidt, K., Bettini, G., Felgentreff, C., . . --. Wright, A. (2015). Climate change and climate policy induced relocations: A challenge for social justice. *Migration, Environment and Climate Change: Policy Brief Series, 1*(10), 1-9. Retrieved from https://publications.iom.int/system/files/pdf/policy_brief_series_issue10_0.pdf

Schmelz, A., von Oswald, A., & Hillmann, F. (2011). *Rethinking migration: Climate, resource conflicts and migration in Europe*. [PowerPoint slides]. Retrieved from http://www.network-migration.org/rethinking-migration-2011/2/papers/HillmannOswaldSchmelz.pdf

Secretariat of the Pacific Community. (2010a). *Annual Report 2010. Part 1 - Annual Overview*. Retrieved from http://www.spc.int/crga/sites/default/files/pdf/en-spc-annual-report-2010-part-1.pdf

Secretariat of the Pacific Community. (2010b). *Beijing + 15: Review of progress in implementing the Beijing platform for action in Pacific island countries and territories*. Retrieved from http://www.ipp.aut.ac.nz/__data/assets/pdf_file/0017/161054/beijing_15_review _report.pdf

Secretariat of the Pacific Community. (2013). *Pacific island populations 2013*. Retrieved from http://www.spc.int/prism/images/downloads/Pacific_Population_Poster_Statistic sFINAL.pdf

Secretariat of the Pacific Community, Secretariat of the Pacific Regional Environment Programme, United Nations Development Programme, UN Women, & Deutsche Gesellschaft fur Internationale Zusammenarbeit. (2013). *Pacific gender and climate change toolkit. Tools for practitioners*. Retrieved from http://reliefweb.int/sites/reliefweb.int/files/resources/Tools_ALL.pdf

Secretariat of the Pacific Community, Secretariat of the Pacific Environment Programme, United Nations Office of Disaster Risk Reduction, United Nations Development Programme, Pacific Island Forum Secretariat, & University of the South Pacific. (2015). *Strategy for climate and disaster resilient development in the Pacific (SRDP)*. Retrieved from http://reliefweb.int/sites/reliefweb.int/files/resources/SRDP_Executive_summar y.pdf

Secretariat of the Pacific Regional Environment Programme. (2015a). *Climate change overview*. Retrieved October15, 2015, from https://www.sprep.org/Climate-Change/climate-change-overview

Secretariat of the Pacific Regional Environment Programme. (2015b). *Reflections by SPREP youth ambassador miss Brianna Fruean*. Retrieved from https://www.sprep.org/climate-change/reflections-by-sprep-youth-ambassador-miss-brianna-fruean

Secretariat of the Pacific Regional Environment Programme. (2016a). *Six Pacific islands ratify the Paris climate accord*. Retrieved from https://www.sprep.org/climate-change/six-pacific-islands-ratify-the-paris-climate-accord

Secretariat of the Pacific Regional Environment Programme. (2016b). *The Pacific climate change centre in Samoa to belong to all Pacific islands*. Retrieved from https://www.sprep.org/climate-change/the-pacific-climate-change-centre-in-samoa-to-belong-to-all-pacific-islands

Secretariat of the Pacific Regional Environment Programme, South Pacific Applied Geoscience Commission, & Secretariat of the Pacific Community. (2013). *Roadmap towards a post 2015 integrated regional strategy for disaster risk management and climate change in the Pacific (Revised March 2013)*. Retrieved from http://www.pacificdisaster.net/pdnadmin/data/original/SOPAC_SPREP_2013_D RM_CC_Revised180413.pdf

Secretariat of the Pacific Regional Environment Programme & United Nations Development Programme. (2013). *Adapting to climate change in the Pacific: The PACC programme*. Retrieved from https://www.sprep.org/attachments/Publications/CC/PACC_Programme.pdf

Should international refugee law accommodate climate change? (2014). *UN News Service.* Retrieved from https://www.un.org/apps/news/story.asp?NewsID=48201#.U7YPm_mSz50

Siauane, L. (2004). *Fa'a Samoa: A look at the evolution of the fa'a Samoa in Christchurch* (Master's thesis University of Canterbury, Christchurch, New Zealand). Retrieved from http://ir.canterbury.ac.nz/bitstream/10092/899/1/thesis_fulltext.pdf

Small Island Developing States. (2014). *SIDS accelerated modalities of action [S.A.M.O.A.] pathway*. Retrieved from http://www.sids2014.org/index.php?menu=1537

Smith, A., & Jones, K. L. (2007). *Cultural landscapes of the Pacific islands*: ICOMOS. Retrieved from http://www.icomos.org/studies/cultural-landscapes-pacific/cultural-landscapes-pacific.pdf

Smith, L. T. (1999). *Decolonizing methodologies: Research and indigenous people.* Dunedin, New Zealand: University of Otago.

Statistics New Zealand. (2006). *Pacific profiles. Samoan people in New Zealand: 2006* Retrieved from http://www.stats.govt.nz

Statistics New Zealand. (2013). *2013 census QuickStats about culture and identity*. Retrieved from http://www.stats.govt.nz

Stebbins, R. A. (2001). *Exploratory research in the social sciences*. Thousand Oaks, CA: SAGE Publications.

Stephenson, J., Newman, K., & Mayhew, S. (2010). Population dynamics and climate change: What are the links? *Public Health, 32*(2), 150-156. doi: 10.1093/pubmed/fdq038

So'o, A. (2007). Introduction. In A. So'o (Ed.), *Changes in the matai system. O Suiga i le fa'amatai* (pp. 7-11). Apia, Samoa: Centre for Samoan Studies. National University of Samoa.

Stern, N. (2007). *The economics of climate change: The Stern review*. Cambridge, United Kingdom: Cambridge University press.

Stern, N., & Calderon, P. (2014). *Better growth, better climate: The new climate economy report*. Retrieved from http://2014.newclimateeconomy.report/

Su, Y. (2016). Should we bring back 'climate refugees'? *Oxford Monitor of Forced Migration, 6*(1), 22-33. Retrieved from http://oxmofm.com/past-issues/vol-6-no-1-june-2016/

Suaali'i-Sauni, T. (2007). E Faigata le Alofa: The Samoan fa'amatai - Reflections from afar. In A. So'o (Ed.), *Changes in the matai system: O Suiga i le Fa'amatai* (pp. 33-60). Apia, Samoa: Centre for Samoan Studies. National University of Samoa.

Sutton, V. (2005). Custom, tradition and science in the South Pacific: Fiji's new environmental management act and vanua. *Journal of South Pacific Law (JSPL), 9*(2). Retrieved from http://www.usp.ac.fj/index.php?id=13307

Swing, W. L. (2015). An integrated focus. *Forced Migration Review*(49), 15-17. Retrieved from http://www.fmreview.org

Tabe, T. (211). *Sapon Riki Ba Kain Toromon: A study of the I-Kiribati community in Solomon Islands* (Master's thesis, University of Hawaii at Manoa). Retrieved from https://scholarspace.manoa.hawaii.edu/handle/10125/24272?mode=full

Tamasese, T. K., Parsons, T. L., Waldegrave, C., & Thompson, A. (2014). *Trauma, livelihoods and resilience in post-tsunami Samoa*. Retrieved from http://familycentre.org.nz/Publications/PDF's/Tsunami_Review_Trauma_livelihoods_and_resilience_in_Samoa.pdf

Tanner, T., Lewis, D., Wrathall, D., Bronen, R., Cradock-Henry, N., Huq, S., . . . Rahman, M. A. (2015). Livelihood resilience in the face of climate change. *Nature Climate Change, 5*(1), 23-26. doi:10.1038/nclimate2431

Tapaleao, V. (2016, 19 March). Samoa swears in first female deputy PM. *New Zealand Herald*. Retrieved from http://m.nzherald.co.nz

Tauli Corpuz, V. (2015). *Human rights and climate change. Indigenous peoples' rights must be respected in global climate change agreement* (Oral statement of the special rapporteur on the rights of indigenous peoples. Human Rights Council, Twenty Eighth session). Retrieved from http://unsr.vtaulicorpuz.org/site/index.php/statements/63-panel-hrc-cc

Tertiary Education Commission. (2012). *Performance-based research fund. Pacific research expert advisory group. Criteria for the 2012 quality evaluation*. Retrieved from https://www.tec.govt.nz/Documents/Forms%20Templates%20and%20Guides/Pacific-Research-EAG-criteria.pdf

Thaman, K. H. (1993). Beyond hula, hotels, and handicrafts: A Pacific islander's perspective of tourism development. *The Contemporary Pacific*, *5*(1), 104-111. Retrieved from http://www.jstor.org/stable/23699872

Thaman, K. H. (2003). Decolonizing Pacific studies: Indigenous perspectives, knowledge, and wisdom in higher education. *The Contemporary Pacific, 15*(1), 1-17. Retrieved from http://www.jstor.org/stable/23722020

Thaman, K. H. (2007, December). *Re-thinking and re-searching Pacific education: Further observations*. Paper presented at the meeting of the Keynote address, NZARE Conference, Christchurch, New Zealand.

Thaman, R. R., Meleisea, M., & Makasiale, J. (1979). Agricultural diversity and traditional knowledge as insurance against natural disasters. *Pacific health dialog, 9*(1), 76-85. Retrieved http://pacifichealthdialog.org.fj/Volume209/No20120_20Emergency20Health20 In20The20Pacific/Reprint20Review20of20drug_related20legislation20in20the2 0Republic20of20Fiji20Islands.pdf

Tisdell, C. (2014). *The MIRAB model of small island economies in the Pacific and their security issues. Revised version*: University of Queensland, School of Economics. Retrieved from http://econpapers.repec.org/paper/agsuqsese/165087.htm

Tiumalu, K. (2013). *Let's rise: The Pacific climate warriors!* Retrieved from http://350pacific.org/lets-rise-the-pacific-climate-warriors/

Tress, B., Tress, G., & Fry, G. (2005). Defining concepts and the process of knowledge production in integrative research. In B. Tress, G. Tres, G. Fry, & P. Opdam (Eds.), *From landscape research to landscape planning: Aspects of integration, education and application* (pp. 13-26). Retrieved from https://library.wur.nl/ojs/index.php/frontis/issue/view/210

Trochim, W. (2006). *The research methods knowledge base*. Retrieved from http://www.socialresearchmethods.net/kb/

Tuafuti, P. (2011). Multiple challenges in research within the fa'asamoa context. *Pacific-Asian Education, 23*(2), 33-42. Retrieved from http://pacificcircleconsortium.org/uploads/PAE_23__2__final_11.pdf

Tui Atua, T. E. (2003). In search of meaning, nuance and metaphor in social policy. *Social Policy Journal of New Zealand, 20*, 49-63. Retrieved from https://www.msd.govt.nz/about-msd-and-our-work/publications-resources/journals-and-magazines/social-policy-journal/spj20/nuance-and-metaphor-in-social-policy-20-pages49-63.html

Tui Atua, T. E. (2005). Clutter in indigenous knowledge, research and history: A Samoan perspective. *Social Policy Journal of New Zealand,* (25), 61-68. Retrieved from https://www.msd.govt.nz/documents/about-msd-and-our-work/publications-resources/journals-and-magazines/social-policy-journal/spj25/25-pages61-69.pdf

Tui Atua, T. E. (2009). *O le e lave i tiga, ole ivi, le toto, ma le aano. He who rallies in my hour of need is my kin*. Retrieved from http://www.head-of-state-samoa.ws/speeches_pdf/Tupua%20Family%20Commission%20FINAL4%20(2) .pdf

Tui Atua, T. E. (2014). *Address to World Summit 2014. Universal Peace Federation.* Retrieved from http://www.upf.org/resources/speeches-and-articles/6017-tt-evi-speech-at-world-summi-2014

Tui Atua, T. E. (2016, March 20). A calm will most certainly follow a storm. *Samoa Observer*. Retrieved from http://www.samoaobserver.ws

Tulele Peisa. (n.d.). *History of Tulele Peisa*. Retrieved March 15, 2015, from http://www.tulele-peisa.org/

Tupuola, A. (2007). Raising consciousness: the Fa'a Samoa way. *New Zealand Annual Review of Education 3*, 175-189.

Tupuola-Plunkett, A. M. (2014). Home is transient and fluid [Web log post]. Retrieved from http://www-new.amnh.org/our-research/anthropology/projects/rethinking-home/blog/home-is-transient-and-fluid-by-dr.-anne-marie-tupuola-plunkett/

Turnbull, M., Sterrett, C., & Hilleboe, A. (2013). *Towards resilience*: Emergency Capacity Building (ECB) Project. Retrieved from http://www.crs.org/sites/default/files/tools-research/toward-resilience-disaster-risk-reduction-climate-change.pdf

UN chief and Kiribati leader warn over climate change threat to Pacific islands. (2011). Retrieved from *UN News Centre*. http://www.un.org/apps/news/

UN Women. (2015). *Gender, climate change and disaster risk reduction and recovery strategy. Asia Pacific. 2015-2018*. Retrieved from http://www2.unwomen.org/~/media/headquarters/attachments/sections/news/stories/2015/gender-cc-drr%20asiapacific%20strategy-final%20unw%20(002).pdf?v=1&d=20150911T140953

UN Women. (2016). *Moving forward together* (Special issue: Tropical cyclone Winston). Retrieved from http://www2.unwomen.org/~/media/field%20office%20eseasia/docs/publications/2016/05/unwp_newslettertcwinstons.pdf?v=1&d=20160506T072056

United Nations Development Programme. (2009). *Safa'i village community–based adaptation project. Full project proposal*. Retrieved from http://www.adaptation-undp.org/sites/default/files/downloads/safai_cba_full_proposal_final.pdf

United Nations Development Programme. (2013). *Strengthening multi sectoral management of critical landscape*. Retrieved from http://www.ws.undp.org/content/samoa/en/home/operations/projects/environment_and_energy/SMSMCL/

United Nations Development Programme. (2014a). *The millennium development goals. Eight goals for 2015. Samoa*. Retrieved from http://www.ws.undp.org/content/samoa/en/home/mdgoverview/

United Nations Development Programme. (2014b). *Building on communities' sense of ownership*. Retrieved from http://www.ws.undp.org/content/samoa/en/home/presscenter/articles/2014/03/03/iccrifs-participatory-three-dimensional-handover.html

United Nations Development Programme. (2015a). *2030 Agenda for sustainable development*. Retrieved from http://www.undp.org/content/undp/en/home/mdgoverview/post-2015-development-agenda.html#

United Nations Development Programme. (2015b). *Human development reports. Samoa. Expenditure on education, (% of GDP)*. Retrieved June 10, 2015, from http://hdr.undp.org/en/content/expenditure-education-public-gdp

United Nations Economic and Social Commission for Asia and the Pacific. (2015). *Pacific climate change and migration project*. Retrieved from http://www.unescap.org/subregional-office/pacific/pacific-climate-change-and-migration-project

United Nations Educational, Scientific and Cultural Organization. (1978). *Recommendation concerning the international standardization of statistics on science and technology*. Retrieved from http://portal.unesco.org/en/ev.php-URL_ID=13135&URL_DO=DO_TOPIC&URL_SECTION=201.html

United Nations Organization for Education, Science and Culture. (2015). *COP21. Resilience in a time of uncertainty: Indigenous peoples and climate change*. Retrieved from http://www.unesco.org/new/en/unesco/events/cop21/?tx_browser_pi1%5BshowUid%5D=30813&cHash=6537a47cb8

United Nations Educational, Scientific and Cultural Organization & International Information and Networking Centre for Intangible Cultural Heritage in the Asia-Pacific Region. (2013). *Traditional knowledge for adapting to climate change. Safeguarding intangible cultural heritage in the Pacific*. Retrieved from http://unesdoc.unesco.org/images/0022/002253/225313E.pdf

United Nations Environment Programme. (2012). *21 Issues for the 21st century: Result of the UNEP foresight process on emerging environmental issues*. Retrieved from http://www.unep.org/pdf/Foresight_Report-21_Issues_for_the_21st_Century.pdf

United Nations Framework Convention on Climate Change. (1992). *United Nations framework convention on climate change*. Retrieved from https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf

United Nations Framework Convention on Climate Change. (2010). *Cancun adaptation framework. Report of the conference of the parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010*. Retrieved from http://unfccc.int/adaptation/items/5852.php

United Nations Framework Convention on Climate Change. (2014). *Glossary of climate change acronyms*. Retrieved from http://unfccc.int/essential_background/glossary/items/3666.php

United Nations Framework Convention on Climate Change. (2015a). *Adoption of the Paris agreement. Proposal by the president*. Retrieved from https://unfccc.int/documentation/documents/advanced_search/items/6911.php?priref=600008831

United Nations Framework Convention on Climate Change. (2015b). *Statements by the Prime Minister of Tuvalu, the Honourable Enele S. Sopoaga at the Leaders Event at the Paris Climate Change Conference - COP 21*. Retrieved from http://unfccc.int/files/meetings/paris_nov_2015/application/pdf/cop21cmp11_leaders_event_tuvalu.pdf

United Nations Framework Convention on Climate Change. (2015c). *Statements by H.E. Christopher J. Loeak President of the Republic of the Marshall Islands at the Leaders Event at the Paris Climate Change Conference - COP 21*. Retrieved from http://unfccc.int/files/meetings/paris_nov_2015/application/pdf/cop21cmp11_leaders_event_marshall_islands.pdf

United Nations Framework Convention on Climate Change. (2015d). *Statements by Honourable Tuilaepa Lupesoliai Sailele Malielegaoi, Prime Minister of Samoa at the Leaders Event at the Paris Climate Change Conference - COP 21*. Retrieved from http://unfccc.int/meetings/paris_nov_2015/items/9331.php

United Nations Framework Convention on Climate Change. (2016). *New data brings new answers on climate migration. Experts set out latest advances in Bonn*. Retrieved May16, 2016, from http://newsroom.unfccc.int/unfccc-newsroom/human-mobility-and-the-paris-agreement/

United Nations High Commissioner for Refugees. (2015). *Human mobility in the context of climate change. Elements for the UNFCCC Paris agreement*. Retrieved from http://www.unhcr.org/5550ab359.pdf

United Nations High Commissioner for Refugees. (2016). *Information on UNHCR Resettlement.* Retrieved May 18, 2016, from http://www.unhcr.org/information-on-unhcr-resettlement.html

United Nations Human Settlements Programme. (2014). *Abridged report. Apia, Samoa. Climate change vulnerability assessment.* Retrieved from http://unhabitat.org/books/apia-samoa-climate-change-vulnerability-assessment/

United Nations International Strategy for Disaster Reduction, United Nations Development Programme, Global Facility for Disaster Reduction and Recovery, & Global Environment Facility. (2012). *Disaster risk reduction and climate change adaptation in the Pacific: An institutional and policy analysis*. Retrieved from http://www.unisdr.org/files/26725_26725drrandccainthepacificaninstitu.pdf

United Nations Office for Disaster Risk Reduction. (2009). *2OO9 UNISDR. Terminology on disater risk reduction*. Retrieved from http://www.unisdr.org/we/inform/publications/7817

United Nations Office for Disaster Risk Reduction. (2013). *The Hyogo framework for action in Asia and the Pacific: Regional synthesis report 2011-2013*. Retrieved from https://www.unisdr.org/we/inform/publications/32851

United Nations Office for Disaster Risk Reduction, & United Nations Office for Coordination of Humanitarian Affairs. (2008). *Disaster preparedness for effective response. Guidance and indicator package for implementing priority five of the Hyogo framework*. Retrieved from http://www.unisdr.org/files/2909_Disasterpreparednessforeffectiveresponse.pdf

United Nations. Population Division of the Department of Economic and Social Affairs. (2016). *2015 Revision of world population prospects*. Retrieved 5 January, from http://esa.un.org/unpd/wpp/DataQuery/

United Nations Population Fund. (2013). *Pacific regional review of the implementation of the international conference on population and development programme of action in the Pacific beyond 2014*. Retrieved from https://www.unfpa.org/sites/default/files/jahia-news/documents/news/2013/Pacific%20ICPD%20report%20final%20with%20pics.pdf

United Nations Population Fund. Pacific Sub-Regional Office. (2014). *Population and development profiles: Pacific island countries*. Retrieved from http://countryoffice.unfpa.org/pacific/drive/web__140414_UNFPAPopulationandDevelopmentProfiles-PacificSub-RegionExtendedv1LRv2.pdf

United Nations University. Institute for Environment and Human Security, & United Nations Economic and Social Commission for Asia and the Pacific. (2015). *Climate change and migration in the Pacific: Links, attitudes, and future scenarios in Nauru, Tuvalu, and Kiribati*. Retrieved from http://i.unu.edu/media/ehs.unu.edu/news/11747/RZ_Pacific_EHS_ESCAP_151201.pdf

University of Otago. (2011). *Pacific research protocols*. Retrieved from http://www.otago.ac.nz/research/otago085503.pdf

Va'a, U. F. (2007). The fa'amatai in transition in a mission village. In A. So'o (Ed.), *Changes in the matai system* (pp. 185-206). Apia, Samoa: Centre for Samoan Studies, National University of Samoa.

Va'a, U. F. (2011). Indigenous Samoan perception of themselves and the natural environment. *Measina a Samoa. National University of Samoa, 5*, 45-56.

Vaioleti, T. (2006). Talanoa research methodology: A developing position on Pacific research. *Waikato Journal of Education, 12*, 21-34. Retrieved from http://researchcommons.waikato.ac.nz/handle/10289/6199

Vella, K., Dale, A., Cottrell, A., & Gooch, M. (2012). Assessing community resilience to climate change. Proceedings of the 12th International Coral Reef Symposium, Cairns, Australia, 9-13 July 2012. 19A Human impacts on coral reefs: general session. Retrieved from http://www.icrs2012.com/proceedings/manuscripts/ICRS2012_19A_5.pdf

Volunteer Service Abroad. (2015). *What does climate change mean in the Pacific?* Retrieved from http://www.vsa.org.nz/blog/news/what-does-climate-change-mean-in-the-pacific/

Wagstaff, K. (2014, September 22). What do activists want from the U.N climate summit? *NBCNEWS*. Retrieved from http://www.nbcnews.com

Warner, K., & Afifi, T. (2013a). Where the rain falls: Evidence from 8 countries on how vulnerable households use migration to manage the risk of rainfall variability and food insecurity. *Climate and Development, 6*(1), 1-17. doi:10.1080/17565529.2013.835707

Warner, K., & Afifi, T. (2013b). *Human migration: Patterns and emerging understanding* (UNU-EHS Policy Brief No. 8). Retrieved from UNU website: http://collections.unu.edu/eserv/UNU:1837/pdf11213.pdf

Warner, K., Afifi, T., Henry, K., Rawe, T., Smith, C., & de Sherbinin, A. (2012). *Where the rain falls: Climate change, food and livelihood security, and migration*: CARE France and UNU-EHS. Retrieved from http://wheretherainfalls.org/wp-content/uploads/2014/01/2755WTRF_report_lowres.pdf

Warner, K., Afifi, T., Kälin, W., Leckie, S., Ferris, B., Martin, S. F., & Wrathall, D. (2013). *Changing climates, moving people: Framing migration, displacement and planned relocation* (UNU-EHS Policy Brief No. 8). Retrieved from http://collections.unu.edu/eserv/UNU:1837/pdf11213.pdf

Warner, K., Ehrhart, C., Sherbinin, A. d., Adamo, S., & Chai-Onn, T. (2009). *In search of shelter: Mapping the effects of climate change on human migration and displacement*: CARE, CIESIN, UNHCR, UNU-EHS and World Bank. Retrieved from http://ciesin.columbia.edu/documents/clim-migr-report-june09_media.pdf

Wiesmann, U., Biber-Klemm, S., Grossenbacher-Mansuy, W., Hadorn, G. H., Hoffmann-Riem, H., Joye, D., . . . Zemp, E. (2008). Enhancing transdisciplinary research: A synthesis in fifteen propositions. In *Handbook of transdisciplinary research* (pp. 433-441). doi: 10.1007/978-1-4020-6699-3

Wilson, C. (2014, October 2). Samoa's architects look to the past to boost climate resilience. *Thomson Reuters Foundation News*. Retrieved from http://news.trust.org/

Wilson, S. L. M. (2010). *Le tofi ne'i vale tuulima. Perceptions of Samoan students, teachers and parents on the place of the Samoan language in New Zealand today* (Master's thesis, Victoria University of Wellington, New Zealand). Retrieved from http://researcharchive.vuw.ac.nz/xmlui/bitstream/handle/10063/1452/thesis.pdf?sequence=1

Wiseman, D. (2014, May 28). Kiribati completes Fiji land purchase. *Radio New Zealand*. Retrieved from http://www.radionz.co.nz

Women in Business Development Inc. (2015). *Transforming lives: Creating opportunities*. Retrieved May 18, 2015, from http://www.womeninbusiness.ws/

World Bank. (2010a). *Samoa post tsunami reconstruction*. Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2010/06/09/000262044_20100610100429/Rendered/PDF/Project0Inform1nami0Reconstruction.pdf

World Bank. (2010b). *Economics of adaptation to climate change: Synthesis report*. Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2012/06/27/000425970_20120627163039/Rendered/PDF/702670ESW0P10800EACCSynthesisReport.pdf

World Bank. (2012). *Country partnership strategy for the independent state of Samoa. 2012 - 2016*. Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2012/03/09/000386194_20120309010647/Rendered/PDF/671940CAS0P1300Official0Use0Only090.pdf

World Bank. (2013). *Enhancing the climate resilience of coastal resources and communities project*. Retrieved from http://documents.worldbank.org/curated/en/361421468335703425/pdf/PAD6860PAD0P12010Box379877B00OUO090.pdf

World Bank. (2014a). *Samoa. First fiscal and economic reform operation program* Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/09/03/000442464_20140903105740/Rendered/PDF/901210PGD0P149010Box385310B00OUO090.pdf

World Bank. (2014b). *Remittance market outlook*. Retrieved from http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTFINANCIALSECTOR/EXTPAYMENTREMMITTANCE/0,,contentMDK:22117153~menuPK:2554287~pagePK:210058~piPK:210062~theSitePK:1943138,00.html

World Bank. (2014c). *World Bank, Government of Samoa launch climate resilience program*. Retrieved from Retrieved from http://www.worldbank.org/en/news/press-release/2014/02/07/world-bank-government-of-samoa-launch-climate-resilience-program

World Bank. (2014d). *Hardship and vulnerability in the Pacific island countries*. Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/04/23/090224b082dff8c6/2_0/Rendered/PDF/Hardship0and0v0fic0island0countries.pdf

World Bank. (2015a). *World development indicators. Samoa*. Retrieved from http://data.worldbank.org/country/samoa

World Bank. (2015b). *Underwater cable to bring high-speed internet to Samoa*. Retrieved from http://www.worldbank.org/en/news/press-release/2015/06/19/underwater-cable-to-bring-high-speed-internet-to-samoa

World Bank. (2015c). *Pacific resilience programme*. Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/06/04/090224b082ef288f/1_0/Rendered/PDF/Samoa000Pacifi0ence0Program0Project.pdf

World's first climate change refugee fights to stay in NZ. (2013, October 17). *New Zealand Herald*. Retrieved from http://www.nzherald.co.nz

World Health Organization. (2012). *WHO. Country cooperation strategy for Samoa 2013-2017*. Retrieved from http://www.who.int/countryfocus/cooperation_strategy/ccs_wsm_en.pdf

World Health Organization. (2015a). *Samoa: WHO statistical profile*. Retrieved from http://www.who.int/gho/countries/wsm.pdf?ua=1

World Health Organization. (2015b). *Samoa. Statistics*. Retrieved July 25, 2015, from http://www.who.int/countries/wsm/en/

World Health Organization. (2015c). *Climate change and health*. Retrieved July 29, 2015, from http://www.who.int/mediacentre/factsheets/fs266/en/

World Humanitarian Summit. (2016). *Statement by Hon. Fiame Naomi Mata'afa, Deputy Prime Minister of Samoa: Natural disasters and climate change: Managing risks and crisis differently*. Retrieved from https://www.worldhumanitariansummit.org/roundtable-statements

Wrathall, D. J., & Lu, X. (2016). *Mobile phone data helps identify displaced people faster, cheaper, more accurately*. Retrieved 18 August 2016, from https://www.newsecuritybeat.org/2016/08/mobile-phone-data-helps-identify-displaced-people-faster-cheaper-accurately/

Yeoman Ward International. (2000). *Infrastructure asset management project: Coastal, environmental and institutional services*: MNRE. Retrieved from http://www.mnre.gov.ws/images/stories/MNRE/siam2/DLSE%20Restructuring%20Report/DLSE%20IAMP%20Inst%20Strengthening%20Phase%201FINAL%20REPORT.pdf

350 pacific (n.d.). *About 350 pacific*. Retrieved January 4, 2016, from http://350pacific.org/about/

Appendix A: Ethics Approval

M E M O R A N D U M
Auckland University of Technology Ethics Committee (AUTEC)

To: Peggy Fairbairn-Dunlop
From: Rosemary Godbold, Executive Secretary, AUTEC
Date: 31 August 2012
Subject: Ethics Application Number **12/207 "Samoa. Linking climate change, migration and resettlements".**

Dear Peggy

I am pleased to advise that the Auckland University of Technology Ethics Committee (AUTEC) approved your ethics application at their meeting on 27 August 2012. Your application is now approved for a period of three years until 27 August 2015.

AUTEC wishes to commend the researcher and yourself on the overall quality of this application.

I advise that as part of the ethics approval process, you are required to submit to AUTEC the following:

- A brief annual progress report using form EA2, which is available online through http://www.aut.ac.nz/research/research-ethics/ethics. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on ;

- A brief report on the status of the project using form EA3, which is available online through http://www.aut.ac.nz/research/research-ethics/ethics. This report is to be submitted either when the approval expires on or on completion of the project, whichever comes sooner;

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are reminded that, as applicant, you are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

Please note that AUTEC grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to make the arrangements necessary to obtain this. Also, if your research is undertaken within a jurisdiction outside New Zealand, you will need to make the arrangements necessary to meet the legal and ethical requirements that apply within that jurisdiction.

To enable us to provide you with efficient service, we ask that you use the application number and study title in all written and verbal correspondence with us. Should you have any further enquiries regarding this matter, you are welcome to contact me by email at ethics@aut.ac.nz or by telephone on 921 9999 at extension 6902. Alternatively you may contact your AUTEC Faculty Representative (a list with contact details may be found in the Ethics Knowledge Base at http://www.aut.ac.nz/research/research-ethics/ethics).

On behalf of the AUTEC and myself, I wish you success with your research and look forward to reading about it in your reports.

Yours sincerely

Dr Rosemary Godbold
Executive Secretary
Auckland University of Technology Ethics Committee

Cc: Ximena Flores-Palacios ximena@libero.it

Appendix B: PICTs Population

Pacific Island Countries and Territories (PICTs): Key Population Indicators

Country	Last Census	Estimated Population	Land area km²	Population Density Persons km²	Urbanization	Populationannual growth rate %
Melanesia		8,892,397	540,030	16		
Fiji	2007	837,271	18,333	47	51	0.5
New Caledonia	2009	245,580	18,576	14	67	1.3
PNG	2011	7,059,653	462,840	16	13	2.3
Solomon Islands	2009	515,870	28,000	22	20	2.5
Vanuatu	2009	234,023	12,281	22	24	2.5
Micronesia		499,829	3156	223		
FSM	2010	102,843	701	147	22	0.0
Guam	2010	159,358	541	323	94	2.6
Kiribati	2010	103,058	811	134	54	2.1
Marshall Islands	2011	53,158	181	299	74	0.8
Nauru	2011	10,084	21	499	100	1.7
CNMI	2010	53,883	457	122	90	1.1
Palau	2012	17,445	444	40	77	0.5
Polynesia		656,717	8126	123		
American Samoa	2010	55,519	199	284	50	0.6
Cook Islands	2011	14,974	237	64	74	0.5
French Polynesia	2012	268,270	3,521	74	51	0.2
Niue	2011	1,611	259	6	na	-2.4
Pitcairn Islands	2012	57	47	na	na	na
Samoa	2011	187,820	2,934	64	20	0.0
Tokelau	2011	1,205	12	98	0	-0.9
Tonga	2011	103,252	749	138	23	0.1
Tuvalu	2011	10,564	26	420	47	1.6
Wallis & Futuna	2008	13,445	142	85	0	-0.4
Total		**10,566,30**	**551,312**			

Source: Secretariat of the Pacific Community (SPC) - PRISM, 2013.

na: not applicable. PNG: Papua New Guinea. FSM: Federated States of Micronesia. CNMI:
Commonwealth of the Northern Mariana Islands

Appendix C: Samoa Population

Samoa: Total population by 5-year age groups, sex and regions for the census, 2011

Age group	Total					Male					Female				
			Region[1]					Region					Region		
	Samoa	AUA	NWU	ROU	SAVAII	Samoa	AUA	NWU	ROU	SAVAII	Samoa	AUA	NWU	ROU	SAVAII
	187,820	**36,735**	**62,390**	**44,293**	**44,402**	**96,990**	**18,485**	**32,198**	**23,251**	**23,056**	**90,830**	**18,250**	**30,192**	**21,042**	**21,346**
0-4	**26,829**	4,921	9,082	6,537	6,289	**13,953**	2,574	4,788	3,335	3,256	**12,876**	2,347	4,294	3,202	3,033
5-9	**23,044**	4,140	7,505	5,639	5,760	**11,899**	2,078	3,868	2,941	3,012	**11,145**	2,062	3,637	2,698	2,748
10-14	**22,017**	4,066	7,095	5,196	5,660	**11,497**	2,080	3,655	2,759	3,003	**10,520**	1,986	3,440	2,437	2,657
15-19	**19,814**	4,028	6,722	4,435	4,629	**10,391**	2,011	3,476	2,445	2,459	**9,423**	2,017	3,246	1,990	2,170
20-24	**14,833**	3,244	5,297	3,457	2,835	**7,700**	1,621	2,740	1,852	1,487	**7,133**	1,623	2,557	1,605	1,348
25-29	**12,767**	2,812	4,437	2,949	2,569	**6,601**	1,432	2,260	1,552	1,357	**6,166**	1,380	2,177	1,397	1,212
30-34	**11,543**	2,408	3,978	2,672	2,485	**5,945**	1,229	2,049	1,414	1,253	**5,598**	1,179	1,929	1,258	1,232
35-39	**10,877**	2,108	3,743	2,489	2,537	**5,735**	1,073	2,008	1,325	1,329	**5,142**	1,035	1,735	1,164	1,208
40-44	**10,436**	2,002	3,599	2,437	2,398	**5,602**	1,022	1,967	1,361	1,252	**4,834**	980	1,632	1,076	1,146
45-49	**8,887**	1,777	2,832	2,107	2,171	**4,574**	907	1,450	1,083	1,134	**4,313**	870	1,382	1,024	1,037
50-54	**7,576**	1,501	2,417	1,771	1,887	**3,966**	759	1,280	934	993	**3,610**	742	1,137	837	894
55-59	**5,904**	1,193	1,815	1,380	1,516	**3,007**	572	924	722	789	**2,897**	621	891	658	727
60-64	**3,978**	782	1,208	926	1,062	**2,002**	381	620	471	530	**1,976**	401	588	455	532
65-69	**3,374**	648	990	833	903	**1,605**	305	428	414	458	**1,769**	343	562	419	445
70-74	**2,557**	494	745	613	705	**1,187**	232	337	280	338	**1,370**	262	408	333	367
75+	**3,354**	605	907	848	994	**1,302**	204	333	361	404	**2,052**	401	574	487	590
ns[2]	**30**	6	18	4	2	**24**	5	15	2	2	**6**	1	3	2	-

Source: Samoa Bureau of Statistics, 2011.
AUA: Apia Urban Area. NWU: North West Upolu. ROU: Rest of Upolu

Appendix D: Samoa. Millennium Development Goals (MDGs) for 2015

MDG		Progress
MDG 1	Eradicate extreme hunger and poverty	Mixed
MDG 2	Achieve universal primary education	On track
MDG 3	Promote gender equality and empower women	Mixed
MDG 4	Reduce child mortality	On track
MDG 5	Improve maternal health	Mixed
MDG 6	Combat HIV/AIDS, malaria and other diseases	Mixed
MDG 7	Ensure environmental sustainability	On track
MDG 8	Develop a global partnership for development	Mixed

Source: UNDP, 2014a.

Appendix E: Lotofaga Population 2004 – 2011
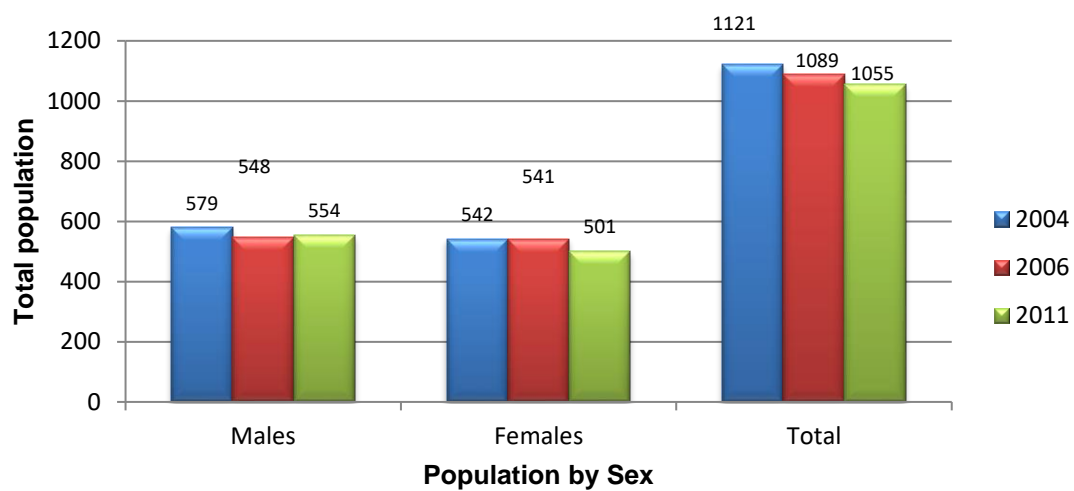
Source: Samoa Bureau of Statistics, Population and Housing Census 2011

Appendix F: Participant Information Sheet (Key informants)

Participant
Information Sheet

AUT
UNIVERSITY
TE WĀNANGA ARONUI O TAMAKI MAKAU RAU

Key Informants

Date Information Sheet Produced: 23 July 2012

Project Title: Samoa. Exploring the Linkages between Climate Change and Population Movements

Researcher: Ximena Flores-Palacios
Institute of Public Policy. Faculty of Culture and Society.
Auckland University of Technology (AUT).

An Invitation

Hello, my name is Ximena Flores and I would like to invite you to participate in a study I am conducting as part of my PhD qualification at the Auckland University of Technology (AUT) in New Zealand. My supervisor for this research is Prof. Peggy Fairbairn-Dunlop who is Professor of Pacific Studies at AUT.

You are invited to share your knowledge and expertise about how climate change is inducing population movements in Samoa. If you agree to participate the interview will take up to one hour of your time and will be held at a place and time that is convenient to you. Should you feel the need to withdraw from the research, you may do so without question at any time. If you agree to participate, the interview will be audio-taped to complement the interview notes.

What is the purpose of this research?

The aim of the research is to understand whether climate change is stimulating internal and international population movements in Samoa by linking climate change, migration and resettlements.

What will happen in this research?

In this research I will be interviewing different actors: (a) village residents, (b) migrants (living in Apia and Auckland), and (c) key informants (Samoa and New Zealand). Key informants will represent Samoan government; international and non-governmental organizations operating in Samoa, research community (Samoa and New Zealand), and Samoan leaders (in Samoa and New Zealand).

How was I identified and why am I being invited to participate in this research?

You have been selected to take part in the study because your knowledge and experience is highly valued and will make a remarkable contribution to the research.

What are the discomforts and risks?

No discomfort or risk is anticipated for you. However, should you experience any uneasiness, during the interview then we can stop it immediately. This will include turning the audio tape off.

How will these discomforts and risks be alleviated?

During the interview, I will ask if you are feeling alright and see that you are comfortable at all times. If you are feeling distressed, you may decide not to continue at any time.

What are the benefits?

The research is an opportunity for you to share your knowledge and to know other points of view about the topic under study.

How will my privacy be protected?

Your information will be used exclusively for the research purposes. All care will be taken to protect your identity. If you don't want to be named, that is fine. To take part in the study you need to sign a Consent Form that says that you agree to take part in the study.

What are the costs of participating in this research?

If you accept to participate in this study, you will be asked to dedicate up to one hour for an interview.

What opportunity do I have to consider this invitation?

The interview will take place at a location that will be suitable to you. This will be discussed with you prior to the interview starting and all the documentation is confirmed and signed. This is a voluntary participation and you have the right not to take part or withdraw your information up until the analysis stage of the study.

How do I agree to participate in this research?

If you would like to participate in this discussion, then please let me know. I can be contacted at:

Apia: Fiame Naomi Mata'afa (Government House)
Auckland: Ximena Flores (ximena@libero.it; Mob. +64 21 030 3728)

I have included a Consent Form for you to read and sign before we can proceed with

the interview.

Will I receive feedback on the results of this research?

A 3-page summary of the findings will be prepared to be circulated among the participants for feedback and comments. In addition, any publications arising from this study will be circulated among all participants for information. At the end of the study, the complete thesis will be made available by AUT (online repository).

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Prof. Peggy Fairnbairn-Dunlop, peggy.fairbairn-dunlop@aut.ac.nz, +64 921 9999 ext 6206

Concerns regarding the conduct of the research should be notified to the Executive

Secretary, AUTEC, Dr Rosemary Godbold, rosemary.godbold@aut.ac.nz, +64 921

9999 ext 6902.

Whom do I contact for further information about this research?

Researcher Contact Details:	*Project Supervisor Contact Details:*
Ximena Flores-Palacios Email: ximena@libero.it Mob. +64 21 030 3728	Prof. Peggy Fairnbairn-Dunlop peggy.fairbairn-dunlop@aut.ac.nz Tel. +64 921 9999 ext 6206

Approved by the Auckland University of Technology Ethics Committee on type the date final ethics approval was granted, AUTEC Reference number type the **12/207**.

Appendix G: Consent Form (Key informants)

Consent Form

Interviews with Key Informants (Apia and Auckland)

Project title: **Samoa. Exploring the Linkages between Climate Change and Population Movements**

Project Supervisor: **Prof. Peggy Fairbairn-Dunlop**

Researcher: **Ximena Flores-Palacios**

○ I have read and understood the information provided about this research project in the Information Sheet dated **dd mmmm yyyy**.

○ I have had an opportunity to ask questions and to have them answered.

○ I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.

○ I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.

○ If I withdraw, I understand that all relevant information including tapes and transcripts, or parts thereof, will be destroyed.

○ I agree to take part in this research.

○ I wish to receive a summary of the report from the research (please tick one):

  Yes O   No O

Participant's signature: --

Participant's name: --

Participant's Contact Details (if appropriate): ---

Date: ---

Approved by the Auckland University of Technology Ethics Committee on 31 August 2012 *AUTEC Reference number* **12/207**

Note: The Participant should retain a copy of this form.

Appendix H: Guiding Questions – Semi-structured Interviews (Key informants)

Project title: **Samoa. Exploring the Linkages between Climate Change and Population Movements**

Project Supervisor: Prof. Peggy Fairnbairn-Dunlop

Researcher: Ximena Flores-Palacios

Date:

<div align="center">

Indicative Questions for Key Informants

</div>

I.   INTERVIEWEE CHARACTERISTICS

A.   Name   _____

B.   Occupation   _____

C.   Gender

        Male _____   Female _____

D.   Current place of residence

Indicative Questions

1. What is the extent of climate change in Samoa, particularly in rural areas?

2. What patterns of migration have been observed in Samoa (5, 10, 15 years)? <u>Internal migration</u> (within the village, to other villages, to urban areas)? <u>International migration</u> (other countries)?

3. Why are people migrating these days? Where are they going? <u>Internal migration</u> (within the village, to other villages, to urban areas)? <u>International migration</u> (other countries)?

4. Is climate change affecting migration? **If yes:** In what ways is climate change affecting migration? Migration is an adaptation strategy to climate change in Samoa?

5. How do environmental factors mingle with other migration drivers in the case of Samoa? How has this situation evolved over the last ten years?

6. What are the effects of this migration in the villages and in the country as a whole (e.g. economic, social, cultural, and environmental)?

7. Has the government promoted resettlement plans in the village?

8. What have been the impacts (e.g. economic, social, cultural, political and environmental) and results of resettlements plans associated with climate change in the case of Samoa?

9. What is the situation of land tenure in the country? How climate change is affecting land tenure in the country?

10. What are the responses of different stakeholders (at local, national, regional and global level) to population movements associated with climate change occurring in Samoa?

11. What can governments and the international community do to address environmental migration in Samoa?

Appendix I: Confidentiality Agreement for Research Assistant

Confidentiality Agreement

For a research assistant.

Project title: Samoa. Exploring the Linkages between Climate Change and Population Movements Project

Supervisor: Prof. Peggy Fairbairn-Dunlop

Researcher: Ximena Flores-Palacios

○ I understand that all the material I will be asked to record is confidential.

○ I understand that the contents of the Consent Forms, tapes, or interview notes can only be discussed with the researchers.

○ I will not keep any copies of the information nor allow third parties access to them.

Research Assistant's signature:

....…………………………………………………

Research Assistant's name:
....…………………………………………………………………

Research Assistant's Contact Details (if appropriate):

………………………………………………………………………………………..

………………………………………………………………………………………..

Date:

Project Supervisor's Contact Details (if appropriate):

………………………………………………………………………………………..

Approved by the Auckland University of Technology Ethics Committee on 31 August 2012

AUTEC Reference number **12/207**

Note: The Research Assistant should retain a copy of this form.

Appendix J: Guiding Questions – *Talanoa* (Villagers and Migrants in Apia and
          Auckland)

Project title: **Samoa. Exploring the Linkages between Climate Change**

                and Population Movements

Project Supervisor: *Prof. Peggy Fairnbairn-Dunlop*

Researcher: *Ximena Flores*

Date:

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Indicative Questions for Interviews (Village Residents)

</div>

I.   INTERVIEWEE CHARACTERISTICS

A.   Gender

        Male _____   Female _____

B.   Age (exact or approximate age)? _____

C.   Current place you live

        Area/Village: _____

        District: _____

D.   How long have you lived here? _____

E.   Civil status _____

F.   Your highest educational level (Primary school, Secondary school, High school,
No schooling, Other)

_____

G. Members of your family who live with you now

Relationship with the interviewee	Age	Education	Occupation
	0-10 years; 11-20 years		
	21-30 years; 31-40 years		
	41-50 years; 50 years-above		

II.   PERCEPTIONS OF CLIMATE CHANGE AND MIGRATION

1. How would you describe the environment in your place of residence?

   Supporting question. Has the environmental quality improved or worsened during the past years?

2. How many people have migrated from this village to another village, to Apia or abroad over the past years (5, 10, or more)?

   Support question. Were most of them leaving temporary or permanently? Where are they going? Were they men or women? Were they young people or adults?

3. What were according to you the main reasons why people have decided or were forced to move away (temporarily or permanently)?

   Supporting examples. Some issues to provide examples (if needed): (a) Social (limited access to education, health); (b) Political/Conflicts (violence, conflict over natural resources); (c) Economics (unemployment or not enough income; no land available for farming; not satisfied with their livelihood; environmental degradation made it impossible to earn a decent living); (d) Environment (poor water quality, poor soil quality, water shortage; sudden natural disaster - flood, storms, cyclones-; slow environmental degradation - sea level rise, erosion-); other issues.

4. Has the government promoted resettlement plans in the village?

   Supporting question. Please explain

5. What are the effects of out-migration for the village?

   Recommendation. Allow interviewee to tell his/her story

6. What has the government done to improve the situation with respect to climate change related problems or related to conflicts over natural resources? Other institutions? Community groups?

   Supporting question. Please specify (development projects, subsidies, other measures?)

III.   THINGS THAT MAY AFFECT A DECISION TO MIGRATE

7. Have any members of your family migrated or resettled?

    Supporting questions. *Where have they migrated or who has/have been resettled? (a) Near your current residence, (b) Apia, (c) Abroad in another country (Where exactly?)*

8. Why did the person or people from your family move away?

    Supporting questions. *Better jobs?   Better schools or other educational institution? Starting their own families? Other reasons? Please specify*

9. Does the person who has moved away help your family in any way, such as sending money or other kinds of help?

    Supporting question. *Please explain in which way.*

10. At any time in your own life, did any climate change problem (like sea level rise, floods, problems with the soil, disasters, etc.) affect your decision to move?

    10a Or: at any time in your own life, were you resettled because of your living area was destroyed as a consequence of a natural disaster?

    Supporting question. If yes: *When climate change related problems have affected you?*

11. Are you planning to move away from your village?

    Supporting question. If yes*: Could you please explain why you plan to move away? Do you have friends or family to help you? How <u>climate change</u> would influence your decision to move to a different place in the future?* ***If not****: Could you please explain why you do not plan to move away?*

12. Have any of the local organizations (a committee, Church, farmers organization, other) helped you, or would you trust them to help you if you had a climate change related problem in the future?

    Supporting questions. If yes*: In what way one or more of these organizations would help you if you needed help? Or in what way did they help you in the past? Could you expect financial help? Shelter, food, help getting a job? Why would you not rely on these organizations to help you?*

IV.   LIVELIHOODS, ENVIRONMENT, AND MIGRATION

13. What do you do for a living/ to support yourself?

Supporting question/examples. Agriculture (farming, etc.), Services (tourism, etc.), Public sector (working for the government, teacher, etc.) , Unemployed, Not in the labour market (such as students, women or men who take care of the household and family but do not earn an income, those who cannot work because of illness) , Other job/business (self-employed)?

14. How do environmental problems affect how you support yourself and your family?

Supporting question. Please explain

15. Do (or did) you grow crops?

Supporting questions. If yes: Do you own the land on which you farm (landowner), or do you work on someone else's land)? Do you grow crops mostly for your family use or mostly for your family to sell? In the last few years did your crop yields decline? What are the reasons for the declining yields (poor soil quality, not enough fertilizer available or not allowed, fertilizer too expensive, not enough seeds available, seeds too expensive, not enough water available, too much water (flooding), erosion, pests or other diseases, not enough workers available, changing climate and temperatures (i.e. too hot, too rainy), other kinds of natural disasters?

If not: Does (did) this cause problems for you? If you cannot not grow enough crops, what do you do?

16. Do you keep animals/livestock?

Supporting questions. If yes: Do (or did) you have problems feeding your animals? If you have (or had) problems feeding your animals, what do you usually do to solve the problem? How dependent are you on your animals to live? In the last few years did the number of your animals/livestock decline? What were the reasons for the declining animals/livestock (price of animals rose, sold animals, poor quality of grazing land, overgrazing, shortage of water, no fodder/animal food available, problems with diseases,   used for own consumption, sold for receiving money)?

V.   ACCESS TO SERVICES THAT MAY AFFECT MIGRATION DECISION

17. Are any of the following public services available to you? _Energy_ (oil, fuel wood, electricity, etc.)? <u>Water</u> (consumption, irrigation)? <u>Transport</u> (indicate type of transport)? <u>Health service</u> (indicate distance to service)? <u>School</u> (indicate distance to school)? <u>Market</u> (indicate distance to market)? Other (specify)?

18. Do you have access to any kind of financial services?

   Supporting questions: *Informal borrowing (money lender, family members)? Micro credit? Formal financial services (loans)? Remittances? Other*

19. Does access to money affect whether you will migrate or not migrate in the future? Or Access to money (like loans) reduces the pressure on your family to migrate?

   Supporting question. *Please explain*

Project title: **Samoa. Exploring the Linkages between Climate Change and Population Movements**

Project Supervisor: *Prof. Peggy Fairnbairn-Dunlop*

Researcher: *Ximena Flores-Palacios*

Date:

Indicative Questions for Focus Groups

1. How would you describe the environmental situation in your place of residence? Has the environmental quality improved or worsened during the past years?

2. Have many villagers migrated from this village during the past year? Men, women? Young, adults?

3. What were according to you the main reasons why villagers have decided or were forced to move away (temporarily or permanently)?

4. What are the effects for the village of this out-migration?

Project title: **Samoa. Exploring the Linkages between Climate Change and Population Movements**

Project Supervisor: *Prof. Peggy Fairnbairn-Dunlop*

Researcher: *Ximena Flores-Palacios*

Indicative Questions for Migrants (living in Apia or Auckland)

I. INTERVIEWEE CHARACTERISTICS

A. Gender

Male _____   Female _____

B. Age (exact or approximate age)?

_____

C. Current place you live

Area/Village: _____

District: _____

D. How long have you lived here?

_____

E. Are you married?

_____

F. Your highest educational level (Primary school, Secondary school, High school, No schooling, Other)

_____

G. Members of your family who live with you now

Relationship with the interviewee	Age	Education	Occupation
	0-10 years; 11-20 years		
	21-30 years; 31-40 years		
	41-50 years; 50 years-above		

II.   PERCEPTIONS OF CLIMATE CHANGE AND MIGRATION

1. Please tell us about all the places from which you moved. Which of these places had climate change related problems (including like weather, sea level rise, floods, problems with the soil, disasters, etc.)?

   Supporting question. Please explain

2. At any time in your own life, did any climate change related problem (like sea level rise, floods, problems with the soil, disasters, etc.) affect your decision to move? *Or your resettlement by the government*?

   Supporting question: If yes: Tell us about the reasons that caused you to move away from the place with climate change problems.

3. Do you expect climate change would influence your decision to migrate to a different place in the future?

   Supporting question. Please explain

4. Have any members of your family migrated or resettled?

   Supporting question. If yes: Where have they migrated or who has/have been resettled?

5. Why did the person or people from your family move away?

   Supporting question. Please explain

III.   THINGS THAT AFFECT THAT MAY DECISION TO MIGRATE OR THAT AFFECT THE FORCED MOVEMENT AWAY

6. Can you tell me about how important certain things were in your original decision to migrate from your first home or you forced movement from your first home?

    Supporting questions. <u>Social</u> (no school for my children available , insufficient health care services, no relatives and friends, no community life, family reasons, other; <u>Political/Conflicts</u> (conflict in the village/crime, conflict over natural resources (please specify) , other (please describe); <u>Economics</u> (not enough income, unemployment, no <u>land</u> available for farming, no land available for grazing, not satisfied with my livelihood, my neighbours were better off than me, work/livelihood related to my skills was not available, environmental degradation made it impossible to earn a decent living, other (please describe); <u>Environment</u> (poor water quality, poor soil quality, water shortage, development plans (infrastructure, development projects), sudden natural disaster like flood, earthquake, storms, cyclones (please specify),slow environmental degradation, unreliable harvest, unhealthy environment for me and my family, other (please describe)

7. *<u>If the interviewee indicated that climate change was a reason in their decision to migrate</u>:* You identified climate change related problems as one of the reasons that affected your decision to move. If the environmental situation in your former residence area changed (improved), do you think you would return? **If yes:** Could you please explain why you would return to your village? **If not:** Could you please explain why you would not return to your village?

8. Do you have relatives and /or friends still living in your former area of residence?

    Supporting question. If you have family and friends still living in your home region, do they face climate change related problems?

9. Did your relatives or friends also migrate or were they resettled in part because of climate change related problems?

    Supporting question. If yes: Please explain

10. How do you maintain your ties with your village?

    Supporting question. Family? Local organizations? Migrant community?

IV.   LIVELIHOODS, ENVIRONMENT, AND MIGRATION

11. What did you do to support yourself in your former area of residence / in your village?

   Supporting question. . Services (tourism, etc.)? Agriculture (farming, etc.)? Public sector (working for the government, teacher, etc.)? Unemployed? Not in the labour market (such as students, women or men who take care of the household and family but do not earn an income, those who cannot work because of illness)? Other job/business (self-employed), please describe

12. How did problems with climate change (like too much or too little rain, poor soil, etc.) affected your livelihood? How did climate change related problems affect how you supported yourself and your family?

   Supporting question. Please explain

13. Did you grow crops?

   Supporting questions. If yes: Did you own the land on which you farm (landowner), or did you work on someone else's land)? Did you grow crops mostly for your family use or mostly for your family to sell? In the last few years did your crop yields decline? What were the reasons for the declining yields (poor soil quality, not enough fertilizer available or not allowed, fertilizer too expensive, not enough seeds available, seeds too expensive, not enough water available, too much water (flooding), erosion, pests or other diseases, not enough workers available, changing climate and temperatures (i.e. too hot, too rainy), other kinds of natural disasters?

   If not: Did this cause problems for you? If you could not grow enough crops, what did you do?

14. Did you keep animals/livestock?

   Supporting questions. If yes: Did you have problems feeding your animals? If you had problems feeding your animals, what did you usually do to solve the problem? How dependent were you on your animals to live? In the last few years did the number of your animals/livestock decline? What were the reasons for the declining animals/livestock (price of animals rose, sold animals, poor quality of grazing land, overgrazing, shortage of water, no fodder/animal food available, problems with diseases, used for own consumption, sold for receiving money)?

V.   ACCESS TO SERVICES THAT MAY AFFECT MIGRATION DECISION

15. Were any of the following services available to you in your village? *Energy* (oil, fuel wood, electricity, etc.)? Water (consumption, irrigation)? Transport (indicate type of transport)? Health service (indicate distance to service)? School (indicate distance to school)? Market (indicate distance to market)? Other (specify)?

16. Did you have access to any kind of financial services?

    Supporting questions: *Informal borrowing (money lender, family members)? Micro credit? Formal financial services (loans)? Remittances? Other*

17. Does access to money affect whether you will migrate or not migrate in the future? Or Access to money (like loans) reduces the pressure on your family to migrate?

    Supporting question. *Please explain*

Appendix K: Participant Information Sheet (Villagers and Migrants)

Participant Information Sheet

Village (Individual Interviews)

Date Information Sheet Produced: 23 July 2012

Project Title: Samoa. Exploring the Linkages between Climate Change and Population Movements

Supervisor: Prof. Peggy Fairbairn-Dunlop

Researcher: Ximena Flores-Palacios

Institute of Public Policy. Faculty of Culture and Society.

Auckland University of Technology (AUT).

An Invitation

Hello, my name is Ximena Flores and I would like to invite you to participate in a study I am conducting at the Auckland University of Technology (AUT) in New Zealand. My supervisor for this research is Prof. Peggy Fairbairn-Dunlop who is Professor of Pacific Studies at AUT.

You are invited to share your experiences about how climate change may have affected you or your family's lives. If you agree to participate the interviews will take up to one hour of your time and will be held at a place and time that is convenient to you. Should you feel the need to withdraw from the research, you may do so without question at any time. If you agree, I would like to audio-tape our discussions. However, you may choose to have the audio-recorder turned off at anytime you wish.

What is the purpose of this research?

The purpose of the research is to learn about whether climate change may have influenced you or your family's lives, as for example, decisions about where to plant your crops or to move to another village, to Apia or to Auckland (New Zealand).

What will happen in this research?

In this research I will be interviewing (a) groups of village residents, including those who have moved to another village, to Apia or to Auckland, (b) people working in Apia for the Ministry of Natural Resources and Environment (MNRE), and (c) others working in climate change projects, both in Samoa and New Zealand.

The village research involves three group meetings and up to five individual in-depth interviews to gain a fuller understanding of how climate change has and is impacting at individual family level.

How was I identified and why am I being invited to participate in this research?

Your village was identified for this research with the help of the Ministry of Natural Resources and Environment of Samoa (MNRE) and the Small Grants Programme (SGP). After the village Introductory Meeting for this study, group meetings were held with community groups (the women's *komiti*, youth and teachers). At these meetings you were identified as someone it would be valuable to interview given your in-depth experience and knowledge of climate change issues and how this problem has influenced families in this village.

What are the discomforts and risks?

No discomfort or risk is anticipated for you. However, should you experience any uneasiness, during the interview then we can stop it immediately. This will include turning the audio tape off.

How will these discomforts and risks be alleviated?

During the interview, I will try to ensure that you are comfortable at all times. If in our discussions you find that there are topics that you prefer not to talk about, that is fine. If you are feeling distressed due to the sensitive nature of this topic, you may decide not to continue at any time. We can then discuss how best support can be provided for you should you need this. A Samoan research assistant will be working with me, so interviews may be carried out in English or the Samoan language.

What are the benefits?

The research is an opportunity to express your views about how climate change has influenced you and your family's lives, and in doing so make your voice heard to a wider community. The results of this study will also contribute to increase the knowledge at the national level.

How will my privacy be protected?

Your information will be used exclusively for the research purposes. All care will be taken to protect your identity. If you don't want to be named, that is fine. To take part in the study you need to sign a Consent Form that says that you agree to participate.

What are the costs of participating in this research?

If you accept to participate in this study, you will be asked to dedicate up to one hour for an interview.

What opportunity do I have to consider this invitation?

I will be in the village for one week. The interview will take place at a location that will be suitable to you. This will be discussed with you prior to the interview starting and all the documentation is confirmed and signed. This is a voluntary participation and you have the right not to take part or withdraw your information at any stage of the study.

How do I agree to participate in this research?

If you would like to participate in this discussion, then please let us know. We can be contacted at:

- *Address in the village: Residence of Fiame Naomi Mata'afa.*

We have included a Consent Form for you to read and sign before we can proceed with the interview.

Will I receive feedback on the results of this research?

A 3-page summary of the research findings will be sent to you for feedback and comments. In addition, any publications arising from this study will be circulated among all participants for information. At the end of the study, the complete thesis will be made available by AUT (online repository).

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Prof. Peggy Fairbairn-Dunlop, peggy.fairbairn-dunlop@aut.ac.nz, +64 921 9999 ext 6206.

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTEC, Dr Rosemary Godbold, rosemary.godbold@aut.ac.nz, +64 921 9999 ext 6902.

Whom do I contact for further information about this research?

Researcher Contact Details:	*Project Supervisor Contact Details:*
Ximena Flores-Palacios	*Prof. Peggy Fairbairn-Dunlop*
Email: ximena@libero.it	*Email: peggy.fairbairn-dunlop@aut.ac.nz*
Mob. +64 21 030 3728	*Tel. +64 921 9999 ext 6206*

Approved by the Auckland University of Technology Ethics Committee on type the date final ethics approval was granted, AUTEC Reference number **12/207**

Participant Information Sheet

Village (Focus Groups)

Date Information Sheet Produced: 23 July 2012

Project Title: Samoa. Exploring the Linkages between Climate Change and Population Movements

Supervisor: Prof. Peggy Fairbairn-Dunlop

Researcher: Ximena Flores-Palacios
Institute of Public Policy. Faculty of Culture and Society.
Auckland University of Technology (AUT).

An Invitation

Hello, my name is Ximena Flores and I would like to invite you to participate in a study I am conducting at the Auckland University of Technology (AUT) in New Zealand. My supervisor for this research is Prof. Peggy Fairbairn-Dunlop who is Professor of Pacific Studies at AUT.

You are invited to share your experiences about how climate change may have affected you or your family's lives. If you agree to participate, the group discussion will take up to one hour of your time and will be held at a place and time that is convenient to you. Should you feel the need to withdraw from the research, you may do so without question at any time. I would like to audio-tape the group discussion. However, if you feel uncomfortable with this, you can leave the focus group at any stage.

What is the purpose of this research?

The purpose of the research is to learn about whether climate change may have influenced you or your family's lives, as for example, decisions about where to plant your crops or to move to another village, to Apia or to Auckland (New Zealand).

What will happen in this research?

In this research I will be interviewing (a) groups of village residents, including those who have moved to another village, to Apia or to Auckland, (b) people working in Apia for the Ministry of Natural Resources and Environment (MNRE), and (c) others working in climate change projects, both in Samoa and New Zealand.

The village research involves three group meetings and up to five individual in-depth interviews. For the group meetings I am inviting members of the women's *komiti*, youth group or teachers' group. Up to ten people will be invited to participate in each group.

How was I identified and why am I being invited to participate in this research?

Your village was identified for this research with the help of the Ministry of Natural Resources and Environment of Samoa (MNRE) and the Small Grants Programme (SGP). Some of you were identified in the Information Meeting because you are member of one of these groups: women's *komiti*, youth group or teachers' group and also because you have experience on climate change issues in the village. Others were identified by members of one of these groups to complete the required number of participants for these meetings.

What are the discomforts and risks?

No discomfort or risk is anticipated for you. However, should you experience any uneasiness during the group discussion, then you can leave the meeting at any stage.

How will these discomforts and risks be alleviated?

During the discussion, I will try to ensure that you are comfortable at all times. If in our discussions you find that there are topics that you prefer not to talk about, that is fine. If you are feeling distressed due to the sensitive nature of this topic, you may decide not to continue at any time. We can then discuss how best support can be provided for you should you need this. A Samoan research assistant will be working with me, so the group discussion may be carried out in English or the Samoan language.

What are the benefits?

The research is an opportunity to express your views about how climate change has influenced you and your family's lives, and in doing so make your voice heard to a wider community. The results of this study will also contribute to increase the knowledge at the national level.

How will my privacy be protected?

Your information will be used exclusively for the research purposes. All care will be taken to protect your identity. If you don't want to be named, that is fine. To take part in the study *you need to sign a Consent Form that says that you agree to participate.* Participants at the group discussion will unavoidably know the identity of the other participants. You are encouraged to maintain confidentiality for others and to use your own discretion in what you share with the group if you have concerns.

What are the costs of participating in this research?

If you accept to participate in this study, you will be asked to dedicate up to one hour for a group discussion. There will be a 10 minute break with morning or afternoon tea provided.

What opportunity do I have to consider this invitation?

I will be in the village for one week. The group discussion will take place at a location that will be suitable to you. This will be discussed with you prior to the meeting starting

and all the documentation is confirmed and signed. This is a voluntary participation and you have the right not to take part or withdraw your information at any stage of the study.

How do I agree to participate in this research?

If you would like to participate in this discussion, then please let us know. We can be contacted at:

- *Address in the village: Residence of Fiame Naomi Mata'afa.*

We have included a Consent Form for you to read and sign before we can proceed with the meeting.

Will I receive feedback on the results of this research?

A 3-page summary of the research findings will be sent to you for feedback and comments. In addition, any publications arising from this study will be circulated among all participants for information. At the end of the study, the complete thesis will be made available by AUT (online repository).

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Prof. Peggy Fairbairn-Dunlop, peggy.fairbairn-dunlop@aut.ac.nz, +64 921 9999 ext 6206

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTEC, Dr Rosemary Godbold, rosemary.godbold@aut.ac.nz, +64 921 9999 ext 6902.

Whom do I contact for further information about this research?

Researcher Contact Details:	*Project Supervisor Contact Details:*
Ximena Flores-Palacios Email: ximena@libero.it Mob. +64 21 030 3728	Prof. Peggy Fairbairn-Dunlop peggy.fairbairn-dunlop@aut.ac.nz Tel. +64 921 9999 ext 6206

Approved by the Auckland University of Technology Ethics Committee on type the date final ethics approval was granted, AUTEC Reference number **12/207**

Participant Information Sheet in Samoan

Faamatalaga mo le silafia o i latou o le a auai i lenei Suesuega

Alalafaga/nu'u (fa'atalanoaga ta'ito'atasi)

Aso:

Ulutala o le suesuega: "Fesootaiga o Fesuiaiga o le Tau, agai atu i fafo o le atunuu/alalafaga ma le toe taliu atu e nofoia le atunuu/alalafaga"

Tamaitai Suesue: Ximena Flores-Palacios
                          Institute of Public Policy
                          Iunivesite o Tekonolosi i Aukilani (AUT)

Talosaga
Talofa lava, o lou igoa o Ximena Flores ma ua ou talosagaina lau susuga e auai i lau suesuega o loo faia nei i le Iunivesite o Tekonolosi i Aukilani (AUT) Niu Sila. O lau faiaoga mo lenei suesuega o le tamaitai Polofesa Afioga ia Tagaloatele Peggy Fairbairn-Dunlop.

O loo talosagaina lau susuga e talanoa mai e uiga i fesuiaiga o le tau (i Samoa) ma pe faapefea ona aafia ai le olaga o lou aiga ona o nei fesuiaiga. Afai e te malie e auai i lenei suesuega, o nei talanoaga e tai itula le umi ma e mafai ona fai i soo se taimi ma nofoaga e talafeagai ma oe. Afai e te fia maamulu mai lenei suesuega, e ia te oe le loto faitalia e faamaamulu ai. Afai e te malie e auai, ou te manao e pue talanoaga uma i se la'au pueleo. E iai te oe le loto faitalia e tape lenei masini i soo se taimi e te finagalo ai.

O le a le uiga o lenei suesuega?
O le uiga o lenei suesuega o le fia malamalama atili pe faapefea ona aafia ai lou olaga ma lou aiga i fesuiaiga o le tau, mo se faataitaiga, o aafiaga i maumaga po o le siitia foi o lou aiga i se isi nuu, i Apia, po o Aukilani (Niu Sila).

O se a se mea e ona tupu i lenei suesuega?
Mo lenei suesuega, o le a ou faatalanoa ai (a) tagata o loo aumau i nuu e aofia ai i latou ua siitia i nisi nuu, i Apia, ma Aukilani (b) tagata o loo galulue i le Matagaluega o Punaoa Faanatura ma le Siosiomaga (MNRE), ma (c) i latou o loo galulue i Samoa ma Niu Sila i nisi suesuega e uiga i fesuiaiga o le tau.

O suesuega e fai i totonu o nuu e aofia ai ni faatalatalanoaga lautele e tolu, ma ni talanoaga faasamasamanoa ma tagata taitoatasi e toalima ina ia ou malamalama atili le aafiaga o fesuiaiga o le tau mo aiga taitoatasi.

Pe faapefea ona filifilia ma valaauina au ou te auai i lenei suesuega?
Na filifili e le Matagaluega o Punaoa Faanatura ma le Siosiomaga ma le Polokalame a le

UNDP Small Grants lou nuu e auai i lenei suesuega. Ina ua maea le feiloaiga muamua ma le nuu mo lenei suesuega, na fai nisi feiloaiga ma Komiti a Tina, tupulaga ma faiaoga. O i feiloaiga nei na faapena ona faailoa mai ai lau susuga o se tagata e aoga ona faatalanoaina mo lenei suesuega ona o lou tomai ma le tofa i mataupu tau fesuiaiga o le tau ma le aafiaga o nei fesuiaiga i aiga i totonu o lenei nuu.

E iai se mea e ono faapopoleina ai au i lenei suesuega?

E leai se mea e ono fa'apopoleina ai oe ona o lenei suesuega. Ae afai e te le fiafia pe e te popole i se mea e uiga i lenei faatalanoaga, e mafai lava ona faamuta le talanoaga i soo se taimi e aofia ai ma le tapeina ole laau pueleo.

O le a ou taumafai e fesoasoani ia faanofo filemuina ma faafaigofie lenei talanoaga mo oe. E le afaina pe afai e iai ni mataupu i lenei suesuega e te le fia talanoa iai. E mafai lava ona faamuta lenei talanoaga i so o se taimi pe afai foi e le logo lelei ia te oe ni mataupu o le talanoaga. E mafai ona faatalanoaina ni auala e ao ona maua ai se fesoasoani mo oe pe a manaomia. O le a ma galulue fa'atasi ma se suesue fesoasoani Samoa i lenei faatalanoaga ma e mafai ona faia lenei galuega i le gagana faaperetania po o le gagana Samoa.

O a aoga o lenei suesuega?

O se avanoa lenei e faasoa ai ni ou manatu ma lagona e uiga i fesuiaiga o le tau ma le aafiaga i lou aiga. O le a faapena foi ona faailoa atu ou manatu i le saofaiga o tagata lautele. O faaiuga o lenei suesuega o le a mafai ai ona faatuputeleina le agavaa i le atunuu lautele.

E faapefea ona puipuia lou tagata mai le silafia o le lautele?

O soo se faamaumauga e patino tonu i lau susuga faapea foi o ou manatu faaalia, e na o lenei suesuega o le a faaaogaina ai. Afai e te le finagalo e faaaoga lou suafa, o le a natia. Afai e te fia auai i lenei suesuega, o loo iai se pepa 'Feagaiga o Maliliega' e faapena ona e saini i ai ae lei amatalia le suesuega.

E iai se avanoa e tu'u mai ou te mafaufau ai i lenei valaulia?

Afai e te malie e auai i lenei suesuega, e talosagaina le faaavanoaina o se itula o lou taimi e fai ai se talatalanoaga.

Ou te asiasi mai i le nuu mo se vaiaso. O le a faia le talatalanoaga i se nofoaga e talafeagai ma oe. O le a faatalanoaina nei mataupu ae lei amatalia le faatalanoaga ma maea ona sainia uma pepa o "Maliliega e auai" ma le pepa "Faamatalaga mo le silafia o i latou o le a auai i lenei Suesuega". O lou auai i lenei suesuega e i luga o lou lava loto faitalia, ma e mafai ona e faamaamulu i soo se taimi.

E faapefea ona ou auai i lenei suesuega?

Afai e te fia auai i lenei suesuega, faamolemole faafesootai mai:

- *Nofoaga:*

- *Tuatusi:*

O loo faapipii atu se pepa o le "Feagaiga o maliliega" mo lou silafia. Faamolemole, saini lenei pepa ae lei amatalia le faatalanoaga.

Faamata ou te maua se tali mai i le faaiuga o lenei Suesuega?

O se otootoga o faaiuga mai lenei suesuega o le a lafo atu e te siakiina. O ni tusitusiga e afua mai lenei suesuega o le a faapena foi ona tufaina i e na auai i le suesuega. A maea le suesuega, o le a faaavanoaina e le Iunivesite o Tekonolosi i Aukilani.le tusitusiga atoa i luga o le upega tafailagi.

Se a se mea e ao ona ou faia pe afai e iai ni mea e tulai mai e faapopoleina ai au i lenei suesuega?

Afai e iai se mea e faapopoleina ai oe i lenei suesuega, fesootai muamua le faiaoga mo lenei suesuega, le tamaitai Polofesa, Afioga ia Tagaloatele Peggy Fairbairn-Dunlop, Imeli: peggy.fairbairn-dunlop@aut.ac.nz, Telefoni: +64 921 9999 ext 6203.

E mafai foi ona faafesootai le failautusi - Komiti o Tulafono (Ethics) a le Iunivesite o Tekonolosi i Aukilani, Dr. Rosemary Goldbold, imeli: rosemary.godbold@aut.ac.nz, telefoni: +64 921 9999 ext 6902.

Mo nisi faamatalaga, faafesootai:

Tama'tai Suesue:	Faiaoga:
Ximena Flores-Palacios Imeli: ximena@libero.it Telefoni: +64 21 030 3728	Tagaloatele Peggy Fairbairn-Dunlop Imeli: peggy.fairbairn-dunlop@aut.ac.nz Telefoni: +64 921 9999 ext 6206

Faamatalaga mo le silafia o i latou o le a auai i lenei Suesuega

Alalafaga/nu'u (Faatalatalanoaga ma se vaega faapitoa mo lenei suesuega)

Aso:

Ulutala o le suesuega: "Fesootaiga o Fesuiaiga o le Tau, agai atu i fafo o le atunuu/alalafaga, ma le toe taliu atu e nofoia le atunuu/alalafaga"

Tamaitai Suesue:　　Ximena Flores-Palacios
　　　　　　　　　　　　Institute of Public Policy
　　　　　　　　　　　　Iunivesite o Tekonolosi i Aukilani (AUT)

Talosaga
Talofa lava, o lou igoa o Ximena Flores ma ua ou talosagaina lau susuga e auai i lau suesuega o loo faia nei i le Iunivesite o Tekonolosi i Aukilani (AUT) Niu Sila. O lau faiaoga mo lenei suesuega o le tamaitai Polofesa Afioga ia Tagaloatele Peggy Fairbairn-Dunlop.

O loo talosagaina lau susuga e talanoa mai e uiga i fesuiaiga o le tau (i Samoa) ma pe faapefea ona aafia ai le olaga o lou aiga ona o nei fesuiaiga. Afai e te malie e auai i lenei suesuega, o nei talanoaga e tai itula le umi ma e mafai ona fai i soo se taimi ma nofoaga e talafeagai ma oe. Afai e te fia maamulu mai lenei suesuega, e ia te oe le loto faitalia e faamaamulu ai. Afai e te malie e auai, ou te manao e pue talanoaga uma i se la'au pueleo. E iai te oe le loto faitalia e tape lenei masini i soo se taimi e te finagalo ai.

O le a le uiga o lenei suesuega?
O le uiga o lenei suesuega o le fia malamalama atili pe faapefea ona aafia ai lou olaga ma lou aiga i fesuiaiga o le tau, mo se faataitaiga, o aafiaga i maumaga po o le siitia foi o lou aiga i se isi nuu, i Apia, po o Aukilani (Niu Sila).

O se a se mea e ona tupu i lenei suesuega?
Mo lenei suesuega, o le a ou faatalanoa ai (a) tagata o loo aumau i nuu e aofia ai i latou ua siitia i nisi nuu, i Apia, ma Aukilani (b) tagata o loo galulue i le Matagaluega o Punaoa Faanatura ma le Siosiomaga (MNRE), ma (c) i latou o loo galulue i Samoa ma Niu Sila i nisi suesuega e uiga i fesuiaiga o le tau.

O suesuega e fai i totonu o nuu e aofia ai ni faatalatalanoaga lautele e tolu, ma ni talanoaga faasamasamanoa ma tagata taitoatasi e toalima ina ia ou malamalama atili le aafiaga o fesuiaiga o le tau mo aiga taitoatasi.

O le a vaevaeina i ni fono se tolu suesuega mo le nuu ma e tusa ma le lima ni faatalanoaga auiliili mo i latou taitoatasi. O le a valaauina ni sui mai le Komiti a Tina, Tupulaga ma ni faiaoga foi e toasefulu (10) i latou mo se vaega e tasi.

Pe faapefea ona filifilia ma valaauina a'u ou te auai i lenei suesuega?

Na filifili e le Matagaluega o Punaoa Faanatura ma le Siosiomaga ma le Polokalame a le UNDP Small Grants lou nuu e auai i lenei suesuega. O nisi o outou na filifilia mai le uluai fono na faatalanoa ai mataupu o lenei suesuega ona o outou o nisi mai faalapotopotoga nei: Komiti a tina, Tupulaga po o autalavou, ma faiaoga, e le tainane i lea, o nisi ua iai le tomai po o le silafia i mea tau fesuiaiga o le tau i o outou alalafaga. O nisi na faailoa mai e nisi o faalapotopotoga pei ona taua i luga e faaatoa ai le aofai o tagata mo lenei suesuega.

E iai se mea e ono faapopoleina ai a'u i lenei suesuega?

E leai se mea e ono faapopoleina ai oe ona o lenei suesuega. Ae afai e te le fiafia pe e te popole i se mea e uiga i lenei faatalanoaga, e mafai lava ona faamuta le talanoaga i so'o se taimi e aofia ai ma le tapeina ole laau pueleo.

O le a ou taumafai ina ia faafaigofieina mea uma mo oe i taimi uma o lenei faatalanoaga. A iai se mataupu o talanoaina e te le fia talanoa iai ona o ni mafuaafa e te faaeteete iai, e ia te oe le aia e faamuta ai lenei faatalanoaga i soo se taimi lava.

O a aoga o lenei suesuega?

O se avanoa lenei e faasoa ai ni ou manatu ma lagona e uiga i fesuiaiga o le tau ma le aafiaga i lou aiga. O le a faapena foi ona faailoa atu ou manatu i le saofaiga o tagata lautele. O faaiuga o lenei suesuega o le a mafai ai ona faatuputeleina le agavaa i le atunuu lautele.

E faapefea ona puipuia lo'u tagata mai le silafia o le lautele?

O mea uma e uiga ia te oe ua faailoa mai mo lenei suesuega o le a faaaogaina lava lea mo na o lenei galuega. O le a matou taumafai ina ia malutia lou suafa ma lou tagata pe afai e te le fia manao e faailoa atu. E ao ina ia e faatumu le pepa o lou "Finagalo malie e auai i lenei suesuega". E faamalulu atu o le a le mafai ona natia lou suafa po o lou tagata mai isi o le a outou faatalanoaina faatasi mataupu i lenei suesuega, ae matou te talosaga atu ina ia outou faapena ona taofiofi mea patino i lenei faatalanoaga faapea foi ma ni mea e te faasoa mai ai pe a iai se mea e te popole ai.

E iai se avanoa e tu'u mai ou te mafaufau ai i lenei valaulia?

Afai e te malie e auai i lenei suesuega, e talosagaina le faaavanoaina o se itula o lou taimi e fai ai se talatalanoaga.

Ou te asiasi mai i le nuu mo se vaiaso. O le a faia le talatalanoaga i se nofoaga e talafeagai ma oe. O le a faatalanoaina nei mataupu ae lei amatalia le faatalanoaga ma maea ona sainia uma pepa o "Maliliega e auai" ma le pepa "Faamatalaga mo le silafia o i latou o le a auai i lenei Suesuega". O lou auai i lenei suesuega e i luga o lou lava loto faitalia, ma e mafai ona e faamaamulu i soo se taimi.

E faapefea ona ou auai i lenei suesuega?

Afai e te fia auai i lenei suesuega, faamolemole faafesootai mai:

- *Nofoaga:*

- *Tuatusi:*

O loo faapipii atu se pepa o le "Feagaiga o maliliega" mo lou silafia. Faamolemole, saini lenei pepa ae lei amatalia le faatalanoaga.

Faamata ou te maua se tali mai i le faaiuga o lenei Suesuega?

O se otootoga o faaiuga mai lenei suesuega o le a lafo atu e te siakiina. O ni tusitusiga e afua mai lenei suesuega o le a faapena foi ona tufaina i e na auai i le suesuega. A maea le suesuega, o le a faaavanoaina e le Iunivesite o Tekonolosi i Aukilani.le tusitusiga atoa i luga o le upega tafailagi.

Se a se mea e ao ona ou faia pe afai e iai ni mea e tulai mai e faapopoleina ai a'u i lenei suesuega?

Afai e iai se mea e faapopoleina ai oe i lenei suesuega, fesootai muamua le faiaoga mo lenei suesuega, le tamaitai Polofesa, Afioga ia Tagaloatele Peggy Fairbairn-Dunlop, Imeli: peggy.fairbairn-dunlop@aut.ac.nz, Telefoni: +64 921 9999 ext 6203.

E mafai foi ona faafesootai le failautusi - Komiti o Tulafono (Ethics) a le Iunivesite o Tekonolosi i Aukilani, Dr. Rosemary Goldbold, imeli: rosemary.godbold@aut.ac.nz, telefoni: +64 921 9999 ext 6902.

Mo nisi faamatalaga, faafesootai:

Tama'tai Suesue:	Faiaoga:
Ximena Flores-Palacios Imeli: ximena@libero.it Telefoni: +64 21 030 3728	Tagaloatele Peggy Fairbairn-Dunlop Imeli: peggy.fairbairn-dunlop@aut.ac.nz Telefoni: +64 921 9999 ext 6206

Participant Information Sheet

AUT
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TE WĀNANGA ARONUI O TAMAKI MAKAU RAU

Migrants (Apia and Auckland)

Date Information Sheet Produced: 23 July 2012

Project Title: Samoa. Exploring the Linkages between Climate Change and Population Movements

Supervisor: Prof. Peggy Fairbairn-Dunlop

Researcher: Ximena Flores-Palacios
      Institute of Public Policy. Faculty of Culture and Society. Auckland University of Technology (AUT).

An Invitation

Hello, my name is Ximena Flores and I would like to invite you to participate in a study I am conducting at the Auckland University of Technology (AUT) in New Zealand. My supervisor for this research is Prof. Peggy Fairbairn-Dunlop who is Professor of Pacific Studies at AUT.

You are invited to share your experiences about how climate change may have affected you or your family's lives. If you agree to participate the interviews will take up to one hour of your time and will be held at a place and time that is convenient to you. Should you feel the need to withdraw from the research, you may do so without question at any time. If you agree, I would like to audio-tape our discussions. However, you may choose to have the audio-recorder turned off at anytime you wish.

What is the purpose of this research?

The purpose of the research is to learn about whether climate change may have influenced you or your family's lives, as for example, decisions about where to plant your crops or to move to another village, to Apia or to Auckland (New Zealand).

What will happen in this research?

In this research I will be interviewing (a) groups of village residents, including those who have moved to another village, to Apia or to Auckland, (b) people working in Apia for the Ministry of Natural Resources and Environment (MNRE), and (c) others working in climate change projects, both in Samoa and New Zealand.

I already interviewed people in the villages and now I need to interview people who have moved to other villages, to Apia or to Auckland. The aim is to gain a fuller understanding of how climate change has and is impacting at individual family level and the village in general.

How was I identified and why am I being invited to participate in this research?

Your village was identified for this research with the help of the Ministry of Natural Resources and Environment of Samoa (MNRE) and the Small Grants Programme (SGP). In the villages I interviewed representatives from the women's komiti, youth and teachers, and also I conducted individual interviews. At these meetings you were identified as someone it would be valuable to interview given your in-depth experience and knowledge of climate change issues. Your contact details were provided by people I interviewed in the villages. Others were identified by migrants I already interviewed.

What are the discomforts and risks?

No discomfort or risk is anticipated for you. However, should you experience any uneasiness, during the interview then we can stop it immediately. This will include turning the audio tape off.

How will these discomforts and risks be alleviated?

During the interview, I will try to ensure that you are comfortable at all times. If in our discussions you find that there are topics that you prefer not to talk about, that is fine. If you are feeling distressed due to the sensitive nature of this topic, you may decide not to continue at any time. We can then discuss how best support can be provided for you should you need this. A Samoan research assistant will be working with me, so interviews may be carried out in English or the Samoan language.

What are the benefits?

The research is an opportunity to express your views about how climate change has influenced you and your family's lives and in doing so make your voice heard to a wider community. The results of this study will also contribute to increase the knowledge at the national level.

How will my privacy be protected?

Your information will be used exclusively for the research purposes. All care will be taken to protect your identity. If you don't want to be named, that is fine. To take part in the study you need to sign a Consent Form that says that you agree to participate.

What are the costs of participating in this research?

If you accept to participate in this study, you will be asked to dedicate up to one hour for an interview.

What opportunity do I have to consider this invitation?

The interview will take place at a location that will be suitable to you. This will be discussed with you prior to the interview starting and all the documentation is confirmed and signed. This is a voluntary participation and you have the right not to take part or withdraw your information at any stage of the study.

How do I agree to participate in this research?

If you would like to participate in this discussion, then please let me know. I can be contacted at:

Apia: Fiame Naomi Mata'afa.Government House

Auckland: Ximena Flores (ximena@libero.it; Mob. +64 21 030 3728)

I have included a Consent Form for you to read and sign before we can proceed with the interview.

Will I receive feedback on the results of this research?

A 3-page summary of the results will be prepared to be circulated among the participants for feedback and comments. In addition, any publications arising from this study will be circulated among all participants for information. At the end of the study, the complete thesis will be made available by AUT (online repository).

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Prof. Peggy Fairnbairn-Dunlop, peggy.fairbairn-dunlop@aut.ac.nz, +64 921 9999 ext 6206.

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTEC, Dr Rosemary Godbold, rosemary.godbold@aut.ac.nz, +64 921 9999 ext 6902.

Whom do I contact for further information about this research?

Researcher Contact Details:	*Project Supervisor Contact Details:*
Ximena Flores-Palacios Email: ximena@libero.it Mob. +64 21 030 3728	Prof. Peggy Fairnbairn-Dunlop peggy.fairbairn-dunlop@aut.ac.nz Tel. +64 921 9999 ext 6206

Approved by the Auckland University of Technology Ethics Committee on type the date final ethics approval was granted, AUTEC Reference number type the **12/207**

Appendix L: Consent Form (Villagers and Migrants in Apia and Auckland)

Consent Form

AUT
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TE WĀNANGA ARONUI O TAMAKI MAKAU RAU

Interviews with Participants (Villagers and Migrants in Apia and Auckland)

Project title: **Samoa. Exploring the Linkages between Climate Change and Population Movements**

Project Supervisor: *Prof. Peggy Fairbairn-Dunlop*

Researcher: *Ximena Flores-Palacios*

○ I have read and understood the information provided about this research project in the Information Sheet dated **dd mmmm yyyy**.

○ I have had an opportunity to ask questions and to have them answered.

○ I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.

○ I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.

○ If I withdraw, I understand that all relevant information including tapes and transcripts, or parts thereof, will be destroyed.

○ I agree to take part in this research.

○ I wish to receive a summary of the report from the research (please tick one):

   Yes O   No O

Participant's signature: --

Participant's name: --

Participant's Contact Details (if appropriate): ---

Date: --

Approved by the Auckland University of Technology Ethics Committee on 31 August 2012 *AUTEC Reference number* **12/207**

Note: The Participant should retain a copy of this form.

Consent forms in Samoan for Villagers (individual and group talanoa)

Feagaiga o Maliliega

Talanoaga ma tagata o le nu'u

Ulutala: Fesootaiga o Fesuiaiga o le Tau, Agai atu i fafo o le atunuu/alalafaga, ma le toe taliu atu e nofoia le atunu'u/alalafaga.

Faiaoga: Tamaitai Polofesa Afioga Tagaloatele Peggy Fairbairn-Dunlop

Tamaitai Suesue: Ximena Flores-Palacios

○ Ua ou faitauina ma ua ou malamalama i faamalamalamaga uma o lenei suesuega ua tuuina mai ia te au i le pepa o "Faamatalaga mo le silafia o i latou o le a auai i lenei suesuega" i le aso dd/mm/yyyy

○ Ua maea ona tuu mai ia te au le avanoa e mafai ai ona ou fesiligia lenei suesuega faapea foi ona taliaina fesili ma lou malie atoa iai

○ Ou te malamalama o le a faamaumau ma pu'eina nei talanoaga i se laau pueleo

○ Ou te malamalama e ia te au le loto faitalia e mafai ai ona ou faamaamulu mai i lenei suesuega i soo se taimi ae lei maea le suesuega

○ Afai ou te faamaamulu mai lenei suesuega, o faamaumauga uma o lenei suesuega o le a faaleaogaina (susunu)

○ Ou te manao ma malie atoa e auai i lenei suesuega

○ Ou te manao ina ia tuuina ma ia te a'u se kopi o le tauaofaiga o lenei suesuega pe a maea. Ioe ○   Leai ○

Sainia lou suafa: ....……………………………

Tusi lolomi lou suafa: ....……………………

Tuatusi (pe a talafeagai):

…………………………………………………………………………………………..

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Aso:

Taliaina e le Komiti o Tulafono (Ethics) a le Iunivesite o Tekonolosi i Aukilani I le aso on 31 August 2012 *AUTEC Reference number* **12/207**

Tautuana: ina ia taofia e le o lo o auai i lenei suesuega se kopi o lenei pepa 'faatagaina' o lona loto malie e auai.

Feagaiga o Maliliega

Faatalatalanoaga ma se vaega faapitoa mo lenei suesuega

Ulutala: Fesootaiga o Fesuiaiga o le Tau, Agai atu i fafo o le atunuu/alalafaga, ma le toe taliu atu e nofoia le atunu'u/alalafaga.

Faiaoga: Tamaitai Polofesa Afioga Tagaloatele Peggy Fairbairn-Dunlop

Tamaitai Suesue: Ximena Flores-Palacios

○   Ua ou faitauina ma ua ou malamalama i faamalamalamaga uma o lenei suesuega ua tuuina mai ia te au i le pepa o "Faamatalaga mo le silafia o i latou o le a auai i lenei suesuega" i le aso dd/mm/yyyy

○   Ua maea ona tuu mai ia te au le avanoa e mafai ai ona ou fesiligia lenei suesuega faapea foi ona taliaina fesili ma lou malie atoa iai

○   Ou te malamalama o le a natia suafa o i latou uma e auai i lenei suesuega

○   Ou te malamalama o le a faamaumau ma pueina nei talanoaga i se laau pueleo

○   Ou te malamalama e ia te au le loto faitalia e mafai ai ona ou faamaamulu mai i lenei suesuega i soo se taimi ae lei maea le suesuega

○   Afai ou te faamaamulu, e ia au le faamalamalamaaga e ui lava e le mafai on susunu uma faamaumauga mai le faatalatalanoaga na ou auai ai, ae o faamaumauga uma e patino ia te au o le a faaleaogaina

○   Ou te manao ma malie atoa e auai i lenei suesuega

○   Ou te manao ina ia tuuina ma ia te au se kopi o le tauaofaiga o lenei suesuega pe a maea. Ioe ○   Leai ○

Sainia lou suafa: ....……………………………

Tusi lolomi lou suafa: ....……………………

Tuatusi (pe a talafeagai):

………………………………………………………………………………………..

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Aso:

Taliaina e le Komiti o Tulafono (Ethics) a le Iunivesite o Tekonolosi i Aukilani I le aso on 31 August 2012 *AUTEC Reference number* **12/207**

Tautuana: ina ia taofia e le o lo o auai i lenei suesuega se kopi o lenei pepa 'fa'atagaina' o lona loto malie e auai.

Appendix M: Confidentiality Agreement for Interpreter and Transcribing Data

Confidentiality Agreement

For someone transcribing and translating data, e.g. audio-tapes of interviews and focus groups.

Project title: **"Samoa. Exploring the Linkages between Climate Change and Population Movements**

Project Supervisor: **Prof. Peggy Fairbairn-Dunlop**

Researcher: **Ximena Flores-Palacios**

○   I understand that all the material I will be asked to transcribe and translate is confidential.

○   I understand that the contents of the tapes or recordings can only be discussed with the researchers.

○   I will not keep any copies of the transcripts nor allow third parties access to them.

Transcriber's signature:
....…………………………………………………………

Transcriber's name:
....…………………………………….…………………………

Transcriber's Contact Details (if appropriate):

………………………………………………………………………………………..

………………………………………………………………………………………..

Date:

Project Supervisor's Contact Details (if appropriate):

………………………………………………………………………………………..

Approved by the Auckland University of Technology Ethics Committee on 31 August 2012
AUTEC Reference number **12/207**

Note: The Transcriber should retain a copy of this form.