Highlighting the importance of Health in Climate Change Adaption

A qualitative content analysis exploring inclusion of health in climate change policies of three pacific island countries

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Abstract

**Introduction and Aim:** Associations between climate change and health have consistently been shown in scientific literature. Despite this, knowledge regarding health adaption policies and inclusion of health implications in climate change policies remain scarce. This thesis aimed to fill the knowledge gap by exploring the extent to which health implications were included in climate change policies of Tonga, Niue and the Cook Islands.

**Methods:** The data used in this thesis consisted of National Climate Change Adaption plans for each country. The plans were analysed using qualitative content analysis.

**Findings:** Three themes were found. The first theme discovered was the exclusion of health sector from development of climate change policies. The second theme showed that health was not a top priority, instead sectors contributing more to the economy were addressed with higher concern. Lastly, it was found that health issues are still poorly included in climate change policies, and health implications were not always recognized by policymakers. The study found that the overall recognition of health impacts was quite low, although there were noteworthy differences between plans.

**Conclusion:** The overall recognition of health implications in the plans was low. However, one plan which included health representatives in the early planning stages had a considerably higher recognition of possible health impacts. This suggests that collaboration between all government sectors in climate change policies is important to ensure important aspects are not being missed. Further research is needed regarding climate change adaption and its links to health, to support policymakers in decision-making.

*Key Words:* Climate change, Health, Policy, Adaption, Pacific Islands, Tonga, Cook Islands, Niue, SIDS
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## Abbreviations and Glossary:

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<th>Description</th>
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<tbody>
<tr>
<td>ACP/EU</td>
<td>African Caribbean and Pacific/European Union</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GEF</td>
<td>Global Environment Facility</td>
</tr>
<tr>
<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
</tr>
<tr>
<td>JNAP</td>
<td>Joint National Action Plan</td>
</tr>
<tr>
<td>MAFFF</td>
<td>Ministry of Agriculture, Food, Fisheries and Forestry</td>
</tr>
<tr>
<td>MECC</td>
<td>Ministry of Environment and Climate Change</td>
</tr>
<tr>
<td>MLSNR</td>
<td>Ministry of Lands, Survey and Natural Resources</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>MOW</td>
<td>Ministry of Works</td>
</tr>
<tr>
<td>PACC</td>
<td>Pacific Adaption to Climate Change Project</td>
</tr>
<tr>
<td>PCCR</td>
<td>Pacific Climate Change Roundtable</td>
</tr>
<tr>
<td>PIC</td>
<td>Pacific Island Country</td>
</tr>
<tr>
<td>SNC</td>
<td>Second National Communications (on climate change)</td>
</tr>
<tr>
<td>SIDS</td>
<td>Small Island Developing States</td>
</tr>
<tr>
<td>SOPAC</td>
<td>Applied Geoscience &amp; Technology Division of the Secretariat of the Pacific Community</td>
</tr>
<tr>
<td>SPREP</td>
<td>Secretariat for the Pacific Regional Environment Programme</td>
</tr>
<tr>
<td>TMS</td>
<td>Tonga Meteorological Service</td>
</tr>
<tr>
<td>TWB</td>
<td>Tonga Water Board</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Adaption</td>
<td>A process involving the identification and implementation of measures or actions to help countries and their communities to reduce the risks posed by climate-hazards such as extreme weather events, sea level rise and prolonged droughts (1).</td>
</tr>
<tr>
<td>Annex-1 Country</td>
<td>One of three groups the UNFCCC divides countries into. Annex 1 Parties include industrialized countries that were OECD members, plus countries with economies in transition (including the Russian Federation, the Baltic states and several Central and Eastern European States (2).</td>
</tr>
<tr>
<td>Climate Change</td>
<td>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 (1).</td>
</tr>
<tr>
<td>Mitigation</td>
<td>Interventions to reduce the sources or enhance the sinks of greenhouse gases. Examples include using fossil fuels more efficiently for industrial processes or electricity generation, switching to renewable energy (solar energy or wind power), improving the insulation of buildings, and expanding forests and other &quot;sinks&quot; to remove greater amounts of carbon dioxide from the atmosphere (1).</td>
</tr>
<tr>
<td>National Communications</td>
<td>To meet their obligations under the UNFCCC, all Parties must report in national communications information on circumstances related to the achievements of the objective of the Convention and must detail their greenhouse gas (GHG) emissions as well as efforts to address climate change and report on their vulnerability and adaptation options (3).</td>
</tr>
</tbody>
</table>
Non-Annex 1 Country
UNFCCC grouping (See Annex-1 country). Mostly developing countries, many of which are recognized by the Convention as especially vulnerable (2).

Resilience
The ability of a system, community or society exposed to hazards to resist, absorb, accommodate and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions (1).

Ring of Fire
Major area in the basin of the Pacific Ocean where a large number of earthquakes and volcanic eruptions occur, in a 40 000 km horseshoe shape. About 90% of the world’s earthquakes occur along the ring of fire (4).

Small Island Developing States
Small Island Developing States (SIDS) are a distinct group of developing countries facing specific social, economic and environmental vulnerabilities. SIDS were recognized as a special case both for their environment and development at the United Nations Conference on Environment and Development (UNCED) (5).

South Pacific Convergence Zone
A reverse-oriented monsoon trough. It is a band of low-level convergence, cloudiness and precipitation extending from the Western Pacific Warm Pool at the maritime continent south-eastwards towards French Polynesia and as far as the Cook Islands (6).

Subduction Zone
Region where tectonic plates collide. Subduction zones have key characteristics which identifies them: mountain formations, volcanic activity and deep marine trenches (7).
Introduction:

The increasing threat of climate change

Climate change and health

Global climate change, or global warming, is well recognized as one of the most pressing challenges of our time and threatens development of both present and future human populations (8). Climate change is defined by The National Aeronautics and Space Administration as: “A change in the typical or average weather of a region or city. This could be a change in a region's average annual rainfall, for example. Or it could be a change in a city's average temperature for a given month or season.” (9). When we discuss climate change or global warming today, we refer to the warming of earth’s atmosphere caused by various greenhouse gases, such as carbon dioxide (10). For a long time, climate change has been thought of as a problem of the future, but we are now forced to face the fact that it has already arrived. The Intergovernmental Panel on Climate Change (IPCC), the international body for assessing the science related to climate change set up by the World Meteorological Organization and the United Nations Environmental Programme (11), has reported that both air and water temperatures have been steadily increasing for the past decades and are now at an all-time high (12). There has also been a change in precipitation patterns, changes in the frequency and intensity of numerous extreme weather events and a rise in sea levels. These changes in climate are predicted to both accelerate, and increase in severity (8,12).

The links between climate change and human health have been well recognized in the global scientific community (13–16). The Lancet Commission on Health and Climate Change have even gone so far as to call climate change the biggest threat to global health in the 21st century (13). Climate change will threaten public health through both direct and indirect pathways (17). A direct impact could for example be extreme weather events such as storms or floods, directly causing injuries and fatalities (13). Whereas the indirect effects of climate change on health have more complex pathways. Climatic conditions will alter stability, transmission and reproduction of disease pathogens. Changes in temperature, for example, can indirectly lead to an increased burden of infectious disease because higher temperatures are beneficial to many food and water-borne disease pathogens (13,14,16). Increased temperatures have also been shown to worsen asthma, due to increased ozone production (18), as well as increase the
incidence of heat strokes (8). Changes in temperature and precipitation are also expected to affect agriculture, impacting food security, reducing food availability, and posing a huge risk for dietary and weight-related death (19–23). Human exposure to agricultural contaminants is predicted to increase due to several factors such as changes in crop pest seasonality leading to more pesticide use or increased spread of contaminants through floods (18). Climate change has also been predicted to bring about social disruption, like conflicts and displacement of populations (13). A 2011 report from the Government Office for Science in London investigated the issue of climate change and migration (24), and found that people have already been forced to migrate because of climate change, a phenomenon which is expected to continue (24). This, along with damages and disruption caused by extreme weather events, is expected to have severe adverse effects on mental health (25).

By 2030, deaths related to climate change impacts on various infectious diseases, malnutrition and heat related illness is predicted to rise to as many as 250 000 per year (26). Disease burden will be unevenly distributed, mostly affecting already vulnerable populations like the old, young and poor (27). Climate change has the potential to halt and possibly reverse the improvement that has been made in public health during the past decades (16) and in order to adapt to the changing climate and continue the progress made in disease containment, clear policies and measures regarding climate change and health are needed (28).

The global response to Climate Change

Current political landscape

In the past years, several important commitments for environmental health have been signed, The Agenda 2030, The Sendai Framework and the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement (29–31). The Paris Agreement at UNFCCC (31), was the last global agreement signed regarding climate change in 2015 (31,32). Whereas both Agenda 2030 and the Sendai Framework are voluntary, the Paris Agreement provides a legally binding treaty (32). The agreement aims to bring nations together and strengthen the global response to climate change (31).

It can also be important to note, that although climate change has been widely accepted as a phenomenon, not everyone is convinced. Since the topic of climate change emerged,
discussions have been met by climate change deniers or sceptics. Opposition to climate change began with corporations negatively affected by decreased use of fossil fuels, who led aggressive attacks denying the existence of climate change (33). Modern climate change sceptics question the scientific evidence presented on climate change, and either question or deny the mainstream thought that climate change is caused by human activity (34). It is suggested that the evidence we have been presented up until now has been insufficient in proving that the changes in climate are outside the scope of natural variability, or that such changes are expected to take place (10).

Current incorporation of health in climate change policies

Research regarding climate change and health is still a relatively new area of research. The emergence of climate change adaption and its inclusion of health is recent in both public health literature and the policy discourse (35). Until now, research and action planning for climate change has focused mainly on the risks to economic productivity, tourism, infrastructure and valued species (36). However, climate change research focusing on health is growing rapidly (37). Although interest in the area is becoming increasingly recognized, there is still need for more research, as many articles today are reviews or editorials (37).

There appears to be a difference in opinion among researchers on whether health is typically included in climate change policies, or not. The Lancet Commission stated that very few national strategies bring climate change into public health decision making processes (28). Whereas a study looking at health adaption initiatives in Organisation for Economic Cooperation and Development (OECD) countries, stated that many countries have now started to recognize health impacts in their national plans (38). The study found, however, that although national plans recognize the threat to health they typically did not target specific health risks (38). A third study investigating UNFCCC Annex 1 countries found that although recognition for health impacts caused by climate change has increased, the issue was not being considered to a wide extent anywhere outside the health sector (39). A study by Semenza and Menne investigating climate change and infectious disease in Europe found that most public health strategies in place today were not designed to account for the expected changes in infectious disease spread resulting from the changing climate (16). Lastly, a study looking at climate change policies in Fiji found that health impacts were not accounted for in major climate change policies to a sufficient degree, and that there was no detailed
Lesnikowski et al. found in their study looking at UNFCCC Annex 1 countries, that major health vulnerabilities were not addressed in all countries, and no vulnerability was addressed by all (39). They found that the most recognized vulnerability was flooding, and the least recognized were health implications brought on by extreme cold (39). Contradictory, a study conducted by Austin et al. in OECD countries found flooding to be one of the less targeted risks, along with storms, air quality, UV-radiation, cold and mental health (38). They instead found the most targeted risks to be infectious disease and heat related risks (38).

The disagreements in literature concerning health inclusion in climate change policies could be explained by a significant research gap in this specific area. Several studies have raised the issue of the limited information on efforts being undertaken to prepare for the expected health implications brought on by climate change (35,39). Research regarding health adaption and climate change is scarce and the little research that exists has been conducted in high income countries (38,39). There is therefore a substantial gap in current research, significantly limiting our knowledge on how adaption is taking place and if health implications are being satisfactorily identified and included in national adaption strategies (39). More research tracking adaption is needed to clarify the extent to which health is being considered in adaption plans (35,38). This is especially true for Non-Annex 1 and non-OECD countries (35,37).

It has been suggested that health is not a priority sector when it comes to climate change. But since the research looking at health and climate change adaption is so limited, there is no clear answer as to why health adaption may not be as prioritized as other sectors. One hypothesis is that adaption activities should generally be based on vulnerability assessments, and uncertainties in future climate conditions makes planning adaption activities especially hard for sectors like health (35). Health impacts are also inadequately understood and presented to both the public and policymakers (28). Barriers to health inclusion in climate change plans include competing spending priorities, widespread poverty, lack of data to inform adaption policies, weak institutions and poor governance (28). Further, the health sector often needs to compete for funding with other sectors who are more adept to produce quick visible outcomes (35). Funding focusing on vulnerability assessments for health and climate change remain minimal (35), and research on climate change and especially its relation to health is seriously de-prioritized in today’s national and regional budgets (41).
Not only have climate change experts interest in health aspects not been a priority in climate change discussions, but the health sector has historically shown a mutual disinterest to climate change, as demonstrated by the following quote from the World Health Organization in 2015 (42):”The health sector’s response to climate change has historically been modest, perhaps because of health professionals’ typical requirement for proven causality between exposure and outcome, which is difficult for a long-term phenomenon such as climate change.” Despite this, there is consensus among researchers that public health initiative is needed in development of climate change actions. The Lancet commission on health and climate change has called for health professionals to take on a leadership role in the response to climate change related health threats (28). Another study, investigating how global health fits into the climate change agenda, found that it could play an integral role in developing policies and actions (35). And the WHO has also called for increased action to prepare for climate change impacts on health, and has urged national governments to put health at the centre of climate policy (38,39). Moving forward, The Lancet Commission on Health and Climate Change has recommended governments to implement mechanisms facilitating collaboration between Ministries of Health and other government departments (28). They also highlight the importance of empowering health professionals to help ensure health and climate considerations are included in government wide approaches, stating that siloed strategies without cross departmental collaboration will not work (28). Lesnikowski et al. study also found the need for policymakers to engage all parts of government in cross-sectoral collaboration (39). A paper by Tong et al. on managing and mitigating climate change health risks called for the need of cost-effective health-protective adaption, especially in vulnerable regions (36). They further stressed the importance for continued monitoring, evaluation and refinement of implemented policies (36). In their study looking at governance and how it could affect global health in a changing climate, Bowen et al. concluded that the health sector should be included in climate change policy making processes, as it has been shown that if actors from specific sectors are involved in the policy making process the odds of those sectors being included in the adaption policy will also increase considerably (43).
The special case of Small Island Developing States

Although climate change is a global issue, the effects of it are expected to be unevenly distributed both across regions and across populations. One group of nations who have been especially active in voicing their concern about climate change are the Small Island Developing States (SIDS), who were very vocal throughout the negotiations that lead to the United Nations Framework Convention on Climate Change (3). Even though these small nations are among the least responsible for climate change, they are expected to be extremely affected by it, and many risk becoming uninhabitable (3). Many SIDS have a limited amount of power and ability to act alone, this makes it important for their situation to get the help and attention from the international community (3). SIDS are not a homogenous group and have variations in all aspects ranging from geographical and economical to the political and cultural (3). There are, however, some characteristics shared which increases their vulnerability to climate change (3). For example, most of them are limited in physical size and relatively isolated from major markets. Most of them are also quite limited in natural resources, such as limited sources for freshwater supply which is threatened by sea level changes. The South Pacific Region is one of two regions (the other being the wider Caribbean region) where the majority of SIDS are located (3). This thesis will therefore focus on countries located within this region.

South Pacific

As mentioned above, the SIDS in the South Pacific are among the world’s most vulnerable countries to climate change impacts, and their unique characteristics are what make them so vulnerable (27,44). The South Pacific region encompasses three ethno-geographic groups: Melanesia, Polynesia and Micronesia and comprises small island nations spread across a region of the Pacific Ocean equivalent to 15% of the globe’s surface (45). Most Pacific Island Countries (PICs) are very small, and therefore quite limited in natural resources. They also have narrow economies and because of their geographical location and have very long distances to major markets. All these factors make them vulnerable to exogenous shocks and give them a high level of economic volatility (45).
PICs have been called the “canaries in the coalmine” of climate change (27)(44), referring to the fact that they will most likely be serving as cautionary tales to the possible impacts of climate change unless drastic changes are made. PICs are characterized by low lying nations, small populations and a lack of resources (42). During the sixth session of the UNFCCC, held in The Netherlands in 2000, the Prime Minister of Tuvalu Hon. Teleke P Lauti made the following statement, showing the unique vulnerability of small island nations (3):

“The sea is our very close neighbour. In fact, on the island where I live, Funafuti, it is possible to throw a stone from one side of the island to the other. Our islands are very low lying. When a cyclone hits us there is no place to escape. We cannot climb any mountains or move away to take refuge. It is hard to describe the effects of a cyclonic storm surge when it washes right across our islands. I would not want to wish this experience on anyone. The devastation is beyond description ... This concern is so serious for our people, that the Cabinet, in which I am a member, has been exploring the possibility of buying land in a nearby country, in case we become refugees to the impacts of climate change.”

Sea level rise is expected to severely affect many of the islands, especially the most low-lying islands such as Marshall islands, Tokelau, Tuvalu or Kiribati, all of whom have a highest
elevation of 10 metres or less above sea level (46). These small islands also become extra vulnerable since there are no higher areas for displaced people to flee to (46). Pacific islands are also vulnerable to a decrease in their already limited supply of drinking water (46). This contamination of water could result from either droughts, or floods, it is also expected that salt water will contaminate underground freshwater aquifers (46). A disruption in water sufficiency will most likely have dramatic consequences for many of the Pacific islands, since their small size and remoteness have already left them with a limited water supply. Furthermore, many of the small islands do not have a proper large scale water capture infrastructure, many times because there just is not enough room on the island for such large infrastructure (46). Pacific Islands can also expect climate change to leave them with a decrease in arable landmass (46).

Climate change is expected to affect numerous areas of public health in the PICs. One of the most talked about concerns is rising sea-levels. If sea-levels continue to rise they will be put at risk of becoming inhabitable. Other impacts PICs are likely to experience include impacts from increased extreme weather events, such as cyclones and typhoons, decreased water- and food security, increase in vector- and foodborne illnesses, and disruption of health services and heat-related illness (42).

**Rationale and Aim**

**Rationale**

Since human health is expected to be so detrimentally affected by climate change, but is often de-prioritized, it is important to investigate the extent to which public health is included in climate change adaption plans. It is also vital to highlight the importance of health to be included in adaptive measures to climate change. As can be seen in the current literature on health inclusion in climate change policies, there is a significant knowledge gap regarding adaptive strategies. Very little is known about how adaptive strategies are taking place and if and how health implications are included. The limited research available has mostly focused on high income countries, and countries in the European region have been overly represented. This means that the knowledge gap surrounding health inclusion in climate change adaption policies is even greater in lower income or “developing” countries. The region of the South Pacific is one that previously has largely been left out of climate and health policy research, despite Pacific Island Countries being some of the most vulnerable nations in the world to the
effects of global climate change. Being in a vulnerable state, the importance of having strong policies working towards improved health in a changing climate becomes even more important.

Aim and research question:

This thesis aims to fill the expressed need to investigate the extent to which health implications are included in climate change policies. Climate change policies of three small island nations in the South Pacific, Tonga, Niue and the Cook Islands, will be analysed using qualitative research methods. The thesis aims to explore the inclusion of health and help clarify the role of health in climate change adaption. The study aims to investigate if, and how, health issues are discussed and how they are included in adaption activities. The study will aim to answer the following question:

*Are health implications caused by climate change discussed, and planned for, in the climate change adaption plans of Tonga, Niue and the Cook Islands?*

Methods:

Data collection

The data analysed for this study consisted of three national action plans which were all publicly available government documents. A list of all climate change policies and plans for the Pacific region are available at the Pacific Climate Change Portal, which was created at the request of the Pacific Climate Change Roundtable and works as a platform to exchange information on all climate change activities in the region. All three national plans were found and downloaded through the portal, after each respective country’s government websites were checked for updated versions.

National plans considering climate change included in this study:

- The Kingdom of Tonga’s Joint National Action Plan on Climate Change Adaption and Disaster Risk Management 2010-2015 (47)
- The Cook Islands Joint National Action Plan for Disaster Risk Management and Climate Change Adoption (JNAP) 2011 – 2015 (1)
- Niue’s Joint National Action Plan for Disaster Risk Management and Climate Change, (48)

**Cases & Research Setting**

This thesis looked at national climate change policies of three neighbouring island nations in the South Pacific.

**Table 1. Characteristics of plans**

<table>
<thead>
<tr>
<th>Country</th>
<th>Tonga</th>
<th>Cook Islands</th>
<th>Niue</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Publication Year</strong></td>
<td>2010</td>
<td>2012</td>
<td>2012</td>
</tr>
<tr>
<td><strong>Responsible agency</strong></td>
<td>Minister for Environment and Climate Change</td>
<td>Climate Change Cook Islands, Emergency Management Cook Islands, Central Policy and Planning Unit</td>
<td>Disaster Reduction Programme, Department of Environment</td>
</tr>
<tr>
<td><strong>Supporting agencies</strong></td>
<td>GEF, SPREP, UNDP, ACP-EU, UNFCCC, SOPAC</td>
<td>SPREP, SOPAC, PDRMP, UNDP PC</td>
<td>SPREP, SOPAC, EU, PDRMP, Australian Government.</td>
</tr>
<tr>
<td><strong>Links to plan</strong></td>
<td><a href="#">Tonga JNAP</a></td>
<td><a href="#">Cook Island JNAP</a></td>
<td><a href="#">Niue JNAP</a></td>
</tr>
</tbody>
</table>
Regional collaboration

There is some regional collaborations and activities on climate change issues already active in the South Pacific region, which can be important to note. The Secretariat of the Pacific Regional Environmental Programme (SPREP) has been given responsibility by governments in the region to ensure the protection and sustainable development of the regions environment (49). SPREP has, among other things, come out with the Pacific Islands Framework for Action on Climate Change (50). SPREP also coordinates the Pacific Climate Change Roundtable, an event which has been held twice a year since its start in 2008, to discuss climate change issues of the region (51). Between 2010 and 2013, the WHO conducted a vulnerability assessment and adaption planning project in 13 Pacific Island Countries, including Niue, Tonga and the Cook Islands (42).

The Global Environment Facility (GEF) Trust Fund is one of the main channels of support for the PICs when it comes to climate change (3), which has enabled many countries and territories in the South Pacific to assume important climate change activities and uphold responsibilities they have to the UNFCCC, such as producing National Communications on ongoing climate change activities.

Tonga:

The Kingdom of Tonga is an archipelago and consists of 172 named islands, located in the Central South Pacific (47). Tonga has a combined land and sea area of 720 000 km\(^2\), where the total land mass only takes up 747 km\(^2\). Out of the 172 islands only 36 are inhabited, and most islands are very flat with an average altitude of less than 5 metres (52). Tonga is located in an area quite rich in weather variations, it is located both in the subduction zone of the Indian- Australian and Pacific tectonic plates and the Ring of fire. The low altitude of the islands, combined with its location makes it very vulnerable to weather impacts such as tsunamis and storm surges (47). According to Tonga’s sixth decennial census, which took place in 2006, the total population of the Kingdom was 101 991 (52). The population has been steadily increasing since the 1950s, which has resulted in an increased exploitation of natural resources and a decrease in sustainability to environmental and climate impacts. The
agricultural sector is the main contributor to Tonga’s Gross Domestic Product (GDP), followed by Public Administration and services (52).

**Figure 1.** Map of Kingdom of Tonga

*Tonga has a tropical climate and has a tropical cyclone season which lasts from November to April. Tonga faces constant threats from earthquakes, tsunamis, volcano eruptions, tropical cyclones and other climatic hazards (54). In the WHO health risk assessment the following health impacts were found to be of highest priority: extreme weather events, water security and safety including water-borne disease, food security and nutritional disease, vector borne disease and Non-communicable diseases (NCDs) (42).*
Cook Islands

The Cook Islands consist of 13 inhabited islands stretched over an Exclusive Economic Zone of as much as 1 800 000km$^2$ (55). The landmass of the islands, however, only amounts to about 236 km$^2$, and carries a population of approximately 14 974 (55). The northern islands are primarily low-lying atolls while the southern islands are mostly volcanic islands. This means that the environmental vulnerabilities differ between the islands groups (1). The northern islands are less suitable for agriculture whereas the southern islands issues are more related to increased population pressures and tourism (1). Despite bringing with it environmental issues, tourism is still the main driver of the Cook Island economy (55). The amount of Cook Islanders living in diaspora outnumber the resident population approximately nine times. The Cook Islands have experienced a prolonged depopulation, which seriously threatens the development of the nation (55). In 1965, the Cook Islands became self-governing after being a British procreate, although it remains in free association with New Zealand who gained administrative control from Britain in 1900 (55).

Figure 2. Building in Cook Islands destroyed by cyclone

The climate on the islands is sub-tropical and tropical oceanic. Although the northern islands generally have a lower altitude than the southern islands, the highest points on all islands are under 15 metres above sea level. The Cook Islands are located within the Cyclone belt and as
such, are vulnerable to cyclones and the floods and storm surges that accompany them (1). Accessing and retaining sufficient freshwater is a constant challenge, especially during dry season when droughts are common. The Cook Islands have experienced an increase in temperatures and rainfall as well as a rise in sea level and increased ocean acidification (1).

Tourism, fishing agriculture and financial services are the four biggest producers of income in the Cook Islands (55). Tourism is by far the largest contributor to the national GDP, and has contributed with approximately 80% of the GDP in recent years (55). The fisheries sector is the main exporting sector, and stands for around 60 to 80% of total exports (55). The agricultural sector is also very important for the people of the Cook Islands, as about 70% of all households have some kind of agricultural activity (55). The WHO risk assessment found the following climate sensitive health risks to be of highest priority for the Cook Islands: extreme weather events, heat related illness, water security and water borne disease, food security and nutritional disease, vector borne disease and respiratory illness (42).

Niue

Niue is a raised coral atoll, with an area of approximately 259 km², located between Tonga, Samoa and the Cook Islands (56). The island holds two world records; it is the world’s largest coral atoll and is the world’s least populated nation with its 1 190 inhabitants (56). The island has three levels of terrace which range from 20 to 70 metres above sea level. A rise in sea-level seriously threatens Niue’s underground freshwater supplies (57). Niue is located right on the border of the southern tropical cyclone belt and as such is vulnerable to increases in extreme weather events (57). Niue has two seasons, a wet season from November to April, and a dry season from May to October. The islands are located close to the South Pacific Convergence Zone, which causes high rainfalls in Niue (averages 2180mm per year). Since Niue is a coral atoll, most of the landmass is unsuitable for agriculture (48). The Food and Agriculture Organization has stated that only 11% of Niuean land is considered arable. Notwithstanding, Niue is considered a food exporting country and the agricultural sector accounts for 23% of the GDP (48).
Opposing the trend in most other countries, Niue has had a steady decline in population since the 1970s to great concern of the nation (58). The decline makes development for the nation hard, with a constant lack of human capital. Although Niue has been a self-governing state since 1974, it remains in free association with New Zealand and heavily dependent on their relationship (48). The support from New Zealand includes, among other things, support during disasters and aid which counts for about 70% of Niue’s national GDP. In 2009, Niue developed a National Climate Change Policy where health, water, energy, infrastructure, tourism, natural ecosystems, fisheries, forestry and agriculture were identifies as vulnerable sectors (42). The biggest contributor to the economy is the public sector, which employs over 400 people equal to 56% of formally employed people in the nation (48). Agriculture is also a main contributor to Niue’s GDP, contributing with about 23%. Agriculture for subsistence use is also important for cultural, economic and dietary reasons (48).

The WHO risk assessment found the following climate sensitive health risks to be of highest priority for Niue: extreme weather events, heat related illness, water security and water borne disease, food security and nutritional disease, vector borne disease and respiratory illness, disorders of eyes, ears and skin as well as NCDs (42).
Ethical consideration and Reflexivity

Typical ethical considerations normally include obtaining informed consent from participants, ensuring no harm is done and maintaining anonymity of data (59). However, since this study did not include and human participants and only analysed publicly available government plans, no ethical approval or special ethical consideration were required.

Reflexivity in qualitative research aims to decrease or address potential bias introduced by the researcher themselves. By having the researcher reflecting over their position in the research, hopes are that it could lessen bias or distortion of findings caused by unintentional influences of the researcher. Although this study is less interactive than many other forms of qualitative research, such as interviews or focus group discussions, research is never completely objective. I believe my interest in climate change is very much a product of the environment and time I have grown up in. Having grown up in Sweden and having attended some form of school since the millennial change, discussions on climate change news and breakthroughs have been ever-present throughout my education. Further, having family ties in the South Pacific has instilled a desire of and interest in the well-being of small island states. I believe that having roots in a region which is often forgotten or missed has made me feel the need to bring them into awareness through my work. I also believe my passion for health and development in the South Pacific region, and my deep interest in climate and sustainability issues feed of each other as climate activities are especially important in this region. As for how my personal interest and ties to the region could affect the research outcomes, I have found it most challenging when I have been faced with critiquing the policies. I found myself wanting to be more forgiving and understanding towards countries I have a personal connection to. This is something I have tried to maintain awareness of throughout the analysis of this study, to keep the research as objective as possible.

Data analysis

Qualitative research methods are often used to explore and understand government and social programmes; therefore, a qualitative approach was found fitting for this study (60). Qualitative content analysis (QCA) is a well-known method used to interpret the content of
documents (60), and as the aim of this study was to analyse the content of three national policy documents, QCA was decided to be the best suited method.

This study has followed the QCA procedure and terminology as suggested by Graneheim and Lundman (61). Each Joint National Action Plan (JNAP) was seen as a unit of analysis, and were all analysed individually. Before starting the analysis, each plan was read through in order for me to get familiarized with the data. The plans were also converted from their original PDF formats to Microsoft Word using Adobe Acrobat, to make it easier to highlight and comment the text. After getting to know my data, each plan was read through again to identify meaning units, which are words or sentences referring to the same central meaning (61). Each meaning unit was then shortened through a process of condensation (61), and put into a list with more manageable condensed meaning units. The meaning units and condensed meaning units for all plans were then extracted using a macro for Microsoft Word, and transferred to an excel spread sheet to gain a better overview. The condensed meaning units were used as codes, and grouped together with codes of similar content to create categories. In QCA, categories should be mutually exclusive and codes should not fit into more than one category (61), sub-categories were constructed were the codes were similar enough to be related to each other while still bringing different enough information to be separated. The grouping together of codes of categories under a higher order is referred to, by Graneheim and Lundman, as abstraction. In this study, I have used the process of abstraction first when creating categories from codes, and then to create themes out of the categories. All codes and categories were created using the manifest content of the text, which represents the obvious content of the unit of analysis (61). After creating categories for each plan separately, the categories were compared across plans to identify themes. Although the categories were created from the manifest content of the units of analysis, the themes represent the underlying, latent content of the text at a higher level of abstraction. Since the themes represent underlying meanings identified throughout the Joint National Action Plans at a higher level of abstraction than the categories, the themes do not have to be mutually exclusive (61).

When looking for how health was included in each plan, I was first looking for all meaning units where the word health was mentioned, or where explicitly health related words such as disease were used. In sections discussing issues which could be related to health, such as water contamination, they were only included if their relation to health was expressed. The term “health sector” is used for many different areas, it is used to describe governmental
departments, hospitals or other medical facilities or when talking about health care workers. In this study, the health sector refers to the governmental departments or ministries dedicated to working with health issues.
Table 2. Example of condensation and abstraction process

<table>
<thead>
<tr>
<th>Text with highlighted meaning unit</th>
<th>Condensed meaning unit</th>
<th>Code</th>
<th>Category</th>
<th>Sub-theme</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Droughts have potentially caused health and sanitation problems due to dusty roads and water shortages. Most of Tongan residents are heavily dependent on open rainwater catchments for drinking purposes and these are exposed to dust and contamination from all sorts of sources. This has caused diarrhoea, respiratory diseases and skin diseases.” - Tongan JNAP</td>
<td>Droughts potentially cause health problems due to dust and water shortages.</td>
<td>• Droughts potentially cause health problems</td>
<td>Recognized links between climate change and disease</td>
<td>Recognized links between climate change and disease</td>
<td>A varied recognition of health implications</td>
</tr>
<tr>
<td>“Climate change impacts on rainfall”</td>
<td>Drinking water from open rainwater catchments are exposed to contamination. This has caused diarrhoea, resp disease and skin disease.</td>
<td>• Contaminated drinking water causes illness</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


patterns are uncertain, with inconsistent climate model results. There is suggestion from models of a decrease in dry season rainfall and an increase in wet season rainfall. The rain that does fall in the dry season is expected to fall in fewer but more intense episodes, with implications for erosion and potential damage to agricultural crops.

- Niue JNAP

| Rain in dry season expected in few, but intense episodes, with implications for erosion and potential damage to agricultural crops. |
| Change in rainfall seen as agricultural problem |
| Failing to see health impacts |
Findings:

Qualitative content analysis was used to analyse the Joint National Action Plans (JNAP) for Disaster Risk Management and Climate Change Adaption of The Kingdom of Tonga, Niue and The Cook Islands. The process of analysis identified codes, which were then grouped into categories for each national plan. The categories for all national plans were then compared, and resulted in the identification of themes and subthemes representing underlying features across all plans. The analysis uncovered three themes and six sub themes demonstrating how the JNAPs of Tonga, Niue and the Cook Islands relate to health (see table 3). The themes were felt to best represent the findings in relation to the thesis aim, since the underlying issues behind why and how health was included was felt to be more relevant than the manifest content of the text. Therefore, the findings will be organized around the themes and sub themes, and will be presented in the section below.

Table 3. Overview of themes and sub-themes

<table>
<thead>
<tr>
<th>Themes</th>
<th>Exclusion of health sector from policy development</th>
<th>Health is not the priority</th>
<th>Poor recognition of health implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub themes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>It’s just an environmental problem</td>
<td>Sectors bringing in money are of most concern</td>
<td>Are infectious diseases the only threat?</td>
</tr>
<tr>
<td></td>
<td>Health sector’s limited responsibility</td>
<td>Health is missing in action</td>
<td>A varied recognition of health implications</td>
</tr>
</tbody>
</table>
Theme 1: The exclusion of health sector from policy development

The first theme which emerged through the analysis process was the fact that the health sector was predominantly excluded from the development of climate change policies. While there were some differences between the plans, the trend became clear when looking at what type of responsibility the different ministries and departments are given throughout the planning and implementation of the respective JNAPs. The environmental sectors of all countries carried primary responsibility, and were considerably more involved in the plan development compared to the health sectors.

It’s just an environmental problem

“Climate change first emerged primarily as an environmental issue, and was accordingly taken up by the National Environmental Service (NES) as lead agent”
– Cook Islands JNAP

All three JNAPs were heavily focused on the environmental implications of climate change, and the responsibility of planning climate change actions were placed largely on the environmental departments in each respective country. Further, all three JNAPs were produced in collaboration with the Secretariat of the Pacific Regional Environment Programme (SPREP) and Pacific Islands Applied Geoscience Commission (SOPAC), two regional organizations with a heavy environmental focus. For all three JNAPs, the Ministry of Environment or the Department of Environment had the main responsibility for implementing and coordinating the plans.

In Niue, the JNAP was monitored and coordinated by a JNAP unit established in the Department of Environment. The responsibility of the Department of Environment was vast both throughout planning and implementing the plan. Representatives from the department were for example included in the committee responsible for developing the JNAP, strengthening community preparedness and together with the Department of Meteorology they were responsible for distributing the Second National Communications Report and developing the Third National Communications Report. The Departments for Environment and Meteorology are also
responsible for building local capacity to access external funding and the developing of the JNAP was financed by the Global Environmental Facility, an organization predominantly focused on environmental issues. In the Cook Island JNAP, the environmental focus on climate change is very clear. In the foreword, it is even stated that climate change has traditionally been viewed as an environmental problem, and recently they have also realized the links it has with disaster management. Up till now, climate change activities have been led by the National Environmental Service (NES), who have had the responsibility of creating awareness and building institutional capacity for climate change. With the development of the Cook Island JNAP, a new institution within the Prime Minister’s Office was created to lead climate change activities, the Climate Change Cook Islands (CCCI). The Tongan JNAP follows the same environmentally heavy pattern as the other JNAPs. Tonga however, has taken the link between climate change and environment one step further with a joint department for the two, namely the Department of Climate Change and Environment. While developing the Tongan JNAP, the Minister for Climate Change and Environment was responsible for both composing and editing the plan. The development of the JNAP was financed by the Global Environmental Facility, SPREP and SOPAC, all organizations with a heavy focus on environment. Tonga instituted a task force responsible for overseeing the implementation of the JNAP, and is required to report the implementation progress to several national institutions. The environmental focus shines through when looking at the institutions the JNAP task force reports too: The National Environment Coordinating Committee (NECC), National Emergency Management Committee (NEMC), Project and Aid Coordinating Committee (PACC) and the environmental department.

Health sector's limited responsibility

Compared to the environmental sector, the health sectors of all three countries have been given a significantly lower amount of responsibility. Overall, the involvement of the health sectors has been mostly in the implementation stage of the plan. The exception to this is the Tongan JNAP, where the health sector was also included in the initial risk assessments and stakeholder consultations.
In the Niue JNAP, the health department was not involved in any planning or coordinating at a higher level. The responsibility of the health sector was instead only to help implement the JNAP, where they were given several responsibilities. The Department of Health was involved in community engagement activities, and ensuring climate change considerations in the national building codes. The Niue health sector was also involved in identifying and promoting tools needed to make risk assessments, a responsibility they shared with the environmental department. The health sector was also one of three sectors responsible for compiling and standardizing statistical information and data on climate and disaster risks, impacts and losses. The Niue was also included in strengthening and evolving emergency preparedness by for example establishing alternative communications systems providing redundancy during emergency events and strengthening the existing evacuation plans and strategies. In the Cook Islands, their Ministry of Health was also involved only at the execution phase of the plans, and had a quite limited responsibility for only strictly health related areas. The Cook Islands JNAP outlined the Ministry of Health responsibility as strengthening capacity for emergency health care and to strengthen systems for preventative health care and research, including research on climate change impact and adaption. The Tongan JNAP was the only of the three, where health sector representatives were included in the planning phase as well as the implementation phase of the plan. A Ministry of Health representative was included in the JNAP vulnerability and assessment team. The responsibilities of the health sector in the implementation phase were, for example, assessing and implementing institutional and policy strengthening needs to improve water governance in urban areas and the outer islands and developing a public awareness programme on climate change and related diseases. They were also included in conducting assessments and training on impacts climate change is expected to have on vector-, waterborne- and nutritional related diseases. Further the Ministry of Health was involved in strengthening community capacity to rainwater harvesting, and maintenance systems as well as developing waste management strategies to be used during post disaster situations. Tonga was also the only JNAP to include representatives from the health sector, representatives from the Tongan Ministry of Health, in the planning stages of the JNAP.
Theme 2: Health is not the priority

Sectors bringing in money are of most concern

“Niue is particularly vulnerable to the impacts of climate change and climate variability with the projected increased frequency and intensity of the storm events that may result from climate change proven to already have profound effect on the economy and environment.” – Niue JNAP

To understand the reasoning behind which sectors were included in the JNAP actions, it was important to understand which sectors the respective countries perceived as most threatened by climate change. All three JNAPs dedicated a section in which they discuss the expected impacts their respective islands will have to face because of climate change. There was a clear pattern across all three JNAPs, that sectors contributing most to their economies were the ones of most concern. Here, the Niue and Cook Island JNAP are similar in their discussions, the effects on agriculture, economy and tourism sectors are of greatest concern. There is however, a slight difference between the Tongan JNAP and the other two. The Tongan plan discusses impacts on health considerably more, and there is a more comprehensive discussion on how health could be affected by climate change.

The Niuean JNAP focused its discussion on extreme weather events and changes in rainfall. Although the discussion brings up several different areas, the agriculture sector can be seen as a red thread throughout the discussion, and is being linked to most other sectors, such as water and economy. Although the discussion on extreme weather mentions effects on other sectors as well, such as damage to infrastructure and possible fatalities, the effects on agriculture were of most concern. The agricultural sector is threatened by cyclones through for example water contamination, which will decrease existing water resources. Water contamination and destruction of arable land seem to be the major issues of concern for Niue. And damage to the agricultural sector will also mean a threat to food security, and decrease in food export. Niue ends its discussion on climate change risks with a table showing expected impacts in selected sectors. It is not stated, but implied, that these sectors are
the ones of most concern to Niue, and they are as follows: General aspect, Water Resources, Agriculture, Fishing and Tourism.

The Cook Island JNAP starts its discussion on climate change related risks by listing numerous areas of concern. The list includes warming temperatures, sea level rise, increasing intensity of cyclonic activity, changing precipitation patterns, ocean acidification and coral bleaching, accelerated coastal erosion, loss of agricultural productivity, health issues and quality and quantity of freshwater resources. Although the list is quite extensive, the focus in the actual body of discussion is more clear. Like agriculture in the Niue JNAP, economic impacts are the red thread in the Cook Island discussion, as the sectors discussed most were agriculture and fishing. The discussion centres mainly around four expected climatic changes: extreme weather events, changes in rainfall, rising sea levels and ocean acidification and coral bleaching. When discussing vulnerabilities to cyclones, huge infrastructural damages and fatalities are mentioned, but the greatness of impact was measured in monetary costs. Coastal settlements and infrastructure were also mentioned to be especially at risk during cyclones, where the small and low-lying atolls are completely exposed. Changes in precipitation are expected to affect agriculture and access to household water. The impact of most concern for the Cook Islanders was the progressive loss of land due to accelerated erosion of coastlines. The coastal erosion is expected to leave coastal settlements and infrastructure vulnerable to the sea, as well as cause loss of agricultural land. Lastly, coral bleaching is expected to negatively impact the fisheries sector, both commercial and recreational fishing. The Cook Islands JNAP also included a table with seven sectors they anticipated to be at risk (in order): Coastal Zones Infrastructure, Marine resources and Fisheries, Water Supply and Quality, Agriculture Food Security and Diet, Biodiversity, Human Health and Well-being, and Cross-cutting, Socio-Economic Considerations.

In the Tongan JNAP, the discussion on dreaded climate change impacts is a bit more extensive than those of the other two JNAPs. However, Tonga also had an extra focus on the effects on both the agriculture and the economic sector. Both extreme weather and changes in precipitation, for example, were according to the Tongan JNAP predicted to affect crop and food supply, and decrease yield for both land and sea
produce. This was in turn predicted to affect the national revenue and socio-economic development. Extreme weather like cyclones are also expected to damage infrastructure, tourist resorts and disrupt essential services, all of which will also result in massive costs. Rising sea levels also threaten both Tonga’s agriculture and economy. A rise in sea levels was anticipated to cause coastal erosion, a critical environmental issue for Tonga, which threatens coastal infrastructure and subsistence agriculture. Increasing temperatures, both in the air and in the sea, were also expressed as concerns in the Tongan JNAP. Rising sea temperatures were expected to negatively affect the fishing industry. A rise in air temperature will cause unfavourable conditions for crops, coral bleaching and is also expected to impact human health, through heat stress for example. Tonga expressed a special concern for the smaller islands, where the livestock, fisheries and health were felt to be extra vulnerable. The Tongan JNAP named eight critical sectors vulnerable to the effects of climate change: Coastal areas, agriculture and food security, water resources, human health, fisheries, natural disasters, tourism and infrastructures.

**Health is missing in action**

Health’s lack of priority also becomes apparent when looking at the actions planned in response to climate change. All plans discussed the possible health implications expected as a result of climate change, albeit to a varying degree. And although health implications are mentioned in discussions, they are quite absent in the actions planned. This was most clear in the Niuean JNAP. Although it had approximately 60 sub-actions, none of them specifically targeted health issues. The other two JNAPs had a few actions directed towards health issues. The Cook Islands JNAP had a few sub actions concerning human health, however they were mainly related to emergency health care during disaster events. But the Ministry of Health was also responsible for strengthening systems for preventative health care and conducting research including climate change impacts and adaptations. Compared to the other two JNAPs, the Tongan JNAP had considerably more actions which were directed towards responding to health issues. The ministry of health responsible for developing and implementing programmes to improve public awareness on climate change related diseases. They were also responsible for building capacity for trauma
counselling and training public health personnel in how to manage climate change health impacts. The health response in the Tongan JNAP is focused on nutritional, vector- and waterborne disease.

**Theme 3: Overall poor incorporation of health implications**

The third theme identified during analysis of the three JNAPs, was the overall poor incorporation of climate change health implications. Although some possible health impacts are included in all three JNAPs, the level and extent to which health was included varied considerably. The JNAP from Tonga had a more wide-ranging discussion on possible health issues which could be anticipated, when compared to the Niuean and Cook Island JNAPs. The third theme became apparent when looking at what sort of health implications were expected, and in which areas a proper health discussion was missing.

**Are infectious diseases the only threat?**

“*Climate change risks include [...] Health issues (disease outbreaks, transmission and distribution, especially of vector borne diseases)*” – Cook Islands JNAP

All three JNAPs discuss the anticipated increase in spread of infectious disease, especially vector borne diseases. In fact, the increased incidence of infectious disease was the most discussed health impact across all plans. In both the Niuean JNAP and the Cook Islands JNAP, infectious disease spread seem to be the only health threat of real concern. Again, the Tongan JNAP differs a bit from the other two, and expresses concern for a broader range of health impacts.

“*La Niña episodes are related to above average rainfall, which can result in yam disease outbreaks and heighten the prevalence of mosquito-borne diseases such as dengue*” – Niue JNAP

The discussion on possible climate change implications on human health was barely existent in the Niuean JNAP. The only health risk mentioned was the anticipation of
increased disease outbreaks for vector borne diseases. Both changes in temperature and precipitations were expected to alter proliferation patterns for disease carrying organisms, such as mosquitoes and medusas, and increase the incidence of vector borne diseases like dengue. The quote above shows one, out of only two, places in the plan which expresses concern for disease and explains its relation to climate change. Health impacts were mentioned when discussing expected increase in rainfall, which was expected to bring an increase in mosquito borne disease.

“Changes in climate are also anticipated to affect the distribution of pathogens, such as the dengue fever virus, which poses increased risks to public health.” – Cook Islands JNAP

The Cook Islands JNAP, like the Niuean, was most concerned with changed patterns for disease pathogens causing increased outbreaks of infectious disease. The plan had a table summarizing climate induced vulnerabilities to the human health sector listing expected impacts of four anticipated climate factors: temperature rise, rainfall variation, extreme weather events and sea level rise. Three out of four factors (all except sea level rise) were expected to increase risk for disease outbreaks. Rising temperatures were expected to bring an emergence of tropical disease, variations in precipitation were expected to bring favourable conditions for mosquito-breeding and extreme weather events was simply stated to increase risk for disease. A few other health impacts were included in the table, such as heat stress caused by increased temperature, or fatalities, stress and social disruption following extreme weather and impacts on housing from sea level rise. However, only infectious disease spread was discussed elsewhere in the plan. Heat stress and social disruption were only mentioned in the table, but were not further explained in the rest of the text. The Cook Island JNAP also raised concerns of increased outbreaks in cholera, as a result from water shortages brought by drought or extreme weather events.

“Increased rainfall will have a higher probable increased incidence of waterborne and vector borne diseases. Decrease in rainfall will lead to the exacerbation of problems with sanitation and hygiene, increase incidence of diarrhoeal diseases, asthma & other diseases due to drier atmospheric conditions. Sea level rise will contaminate underground water which is unsafe for drinking purposes and can
The Tongan JNAP differed a bit from the other two and had a more extensive discussion on health impacts, and the health sector was also included in a list of sectors vulnerable to climate change. An increase in rainfall was expected to bring an increase in incidence of waterborne disease whereas a decrease would exacerbate health and sanitation problems by increasing events of diarrhoeal-, respiratory- and skin diseases. Sea level rise was also expected to contaminate drinking water and cause diarrhoeal disease. While discussing possible health impacts, the plan also brought up that some health impacts caused by climate change had already been experienced in the kingdom. For example, Tonga has already experienced droughts causing health and sanitation problems due to dusty roads and water shortage. And Tongans suffering from asthma and heat stress had also already increased as a result from increased temperatures. Again, the health on smaller islands was particularly affected by drought due to dependence on rainwater and high salinity of ground water. The Tongan JNAP was also the only one to expressly mention an impact on psychological health, as a result from extreme weather events like earthquakes.

When making the Tongan JNAP, Tongan communities were consulted to gauge what they perceived and likely impacts of climate change. The communities expected an increase in water contamination and epidemics caused by droughts, and an increase in asthma, heat stress and epidemics from higher temperatures. They also expected sea level rise to damage housing as well as local diets. Consultations were also made with government ministries and non-governmental organisations to find adaption options for each sector. The following list is what was suggested for the health sector:

- Strengthen food and water hygiene
- Public Awareness/training on communicable/vector-borne/waterborne/foodborne and nutritional related diseases prevention
- Vector control unit established
- Better medical care and facilities
- Data management system in place
A varied recognition of health implications

The level to which health impacts were discussed differed in all plans, there were however areas in each plan where health issues could have been discussed more thoroughly.

The JNAP of Niue had the smallest inclusion of health impacts and there were several areas where a health discussion was left wanting. Firstly, health was not included in the table of sectors expected to be impacted by climate change. Second, the plan mentioned the importance of strengthening key infrastructure and key development sectors, neither of which included health. Third, when mentioning both changes in precipitation (increased rainfall, droughts and floods) and temperature, the discussion was focused on crop yields and agricultural sustainability. Increased disease spread was only mentioned in passing when talking about changes in rainfall. And last, although agricultural effects took up such a massive part of the discussion on climate change impacts, nutritional diseases were not mentioned once. Similarly, threat to groundwater sources was mentioned a few times, but health impacts of lacking access to water were not discussed instead the focus is on economic impacts. Health was not only missing in the discussion of possible climate change impacts in the Niuean JNAP, but when consulting stakeholders during the development of the plan no health sector representatives were present.

The Cook Islands JNAP also had a few areas where the discussion on health impacts could, or should, have been included. Cholera outbreaks were mentioned as a risk during water shortages, but no other health issues caused by lack of water were mentioned. For example, increased salinity in water was mentioned as a concern, but possible health implications such as high blood pressure or pregnancy complications were not mentioned. Further, in the table discussing factors which could impact human health, access to water was not included. Moreover, just as in the Niuean JNAP, the discussion on agricultural impacts was heavy, but there was no mention of its relation to health or nutrition.

In the Tongan JNAP, this study could not identify any obvious wholes were health issues were missing, although there were some minor instances where health factors
could have been included more thoroughly. Though health was not mentioned in the discussion of food security, nutritional diseases were mentioned as expected and something which needs to be brought to higher awareness in the community. There was also a discussion on coastal erosion causing a beach in front of a hospital to be eroded, leaving the hospital perimeter in the sea, but the possible health impacts on of it was not discussed. Further, although psychological effects were mentioned in a table of health impacts, it was not discussed in any other place in the plan.

Discussion

Research regarding climate change adaption, and especially its incorporation of health issues is still a relatively new area of research. Previous studies have highlighted a knowledge gap in this area, particularly for developing countries (38,39). This thesis set out to fill this gap by exploring the inclusion of climate change linked health issues in climate change adaption plans. To my knowledge, this is the first study to have used qualitative research methods to explore and compare climate change policies across countries in the South Pacific. This study brings important information on what climate change adaption strategies look like in practice in the South Pacific region. This thesis aimed to answer whether climate change related health issues were recognized and planned for in the Joins National Action Plans (JNAPs) for Disaster Risk Management and Climate Change Adaption of Tonga Niue, and the Cook Islands. It found that overall, the recognition of health implications was quite low but there were significant differences between the plans. Three themes were uncovered after using qualitative content analysis on the JNAPs of Tonga, Niue and the Cook Islands. The first theme discovered was the exclusion of health sectors from development of climate change policies, instead the majority of the responsibility was held by the environmental sectors of each country. The second theme showed that responding to health issues was not a main priority, instead sectors contributing more to the economy were addressed with higher concern. The last theme found was that health issues are still poorly included in climate change policies, and health implications are not always recognized by policymakers. The following section will further explore and highlight the most important findings, and their relation to the previous body of knowledge on climate change adaption and health.
Recognition of health effects

Previous studies have raised the question as to what extent health implications of climate change are included in climate change adaption policies (28,35,37–39). This study found that generally, incorporation of health issues in the climate change adaption plans were quite low. There has previously been some debate in literature as to whether health is typically included in climate change adaption actions, the findings from this study are in agreement with those who have reported an insufficient incorporation of health implications in climate change adaption actions (16,28,39,40). Although all policies considered in this thesis mentioned at least one possible health implication, compared to most other sectors health issues are not given much space.

The recognition of health issues was also quite limited in range, as many health issues were left out of the discussion almost entirely. The focus on health implications lie on changes in spread of various infectious diseases, primarily vector-borne diseases. This focus on just a few health impacts, especially infectious disease has also been picked up in previous studies (38). Infectious diseases, however, are only a small portion of the health impacts likely to affect the small pacific islands nations. Further, the comprehension of how other sectors, such as water supply or agriculture, are linked to and will affect health appeared poor. This was apparent, for example, where the Cook Islands discuss how water supply was expected to be increasingly contaminated, but neglects to discuss how water contamination could affect human health. Similarly, in both the Niuean and Cook Island JNAP agriculture is a sector of great concern, but neither plan mentions anything about nutritional diseases. Findings in this study can conclude that there are several areas where health issues are not recognized, and raises the question – why is the recognition of health effects so low?
Top priority sectors

First, health simply has not been a top priority sector when it comes to climate change adaptation. There are several other sectors which seem to be of higher priority than the health sector. Although it is not explicitly stated, one can assume that a continued mention of specific sectors suggest that these sectors in particular are of higher concern. Tonga, Niue and the Cook Islands all dedicated a segment of their plan to discuss anticipated vulnerabilities and impacts faced by their country. In these sections, sectors with large contributions to the respective GDPs of each country took up the majority of the discussion. The sectors which appeared to be of highest concern were for example sectors like agriculture, tourism, infrastructure or fisheries. It gives the appearance that these sectors are more important than the sectors which are not mentioned as frequently. However, as mentioned in other studies, previous vulnerability assessments and adaptations have been mainly centred around sectors that are important for the national economy (35). This could possibly explain the overrepresentation of these sectors in current adaptation plans, and other sectors are simply less included because adaptation plans historical focus elsewhere has led to current policymakers not having as much information and knowledge on other sectors.

A result of research priorities

It is also possible that the exclusion of health is a result of lack of knowledge among policymakers, as the plans expressed a desire to increase knowledge through for example more research or implementing methods of monitoring and assessing vulnerabilities. One of the main responsibilities the health sectors had in all three countries was to increase research on climate change and health, and develop and implement tools for vulnerability assessments, suggesting that policymakers want or need more information on the health effects of climate change. This need for more evidence and knowledge on health implications has also been touched upon by previous studies (37,41).
The fact that policymakers have expressed a need for more research is not surprising since research on climate change, and especially its links to health implications has not been a prioritized research topic when you look at research budgets. For example, the annual budget reported from the National Institutes of Health to the US Global Change Research programme on climate change has long been stagnant at 8 million US dollars (41). Although it may sound like a large budget, if you compare with other research areas such as antibiotic resistant bacteria, which received 774 million US dollars, you can clearly see a difference in priority (41). A similar lack of priority in funding can be seen in Europe where only 0.04% of the Horizon 2020 budget, EU’s biggest research and innovation programme, and 0.08% of the EU’s 7th Framework Programme for Research and Technical Development budgets are directed towards programmes focusing on climate and health (41). Allocations of research budgets need to be re-evaluated, and take the needs of policymakers into more consideration. If health implications are to be included and planned for to a higher degree than they are currently, more research on climate change and health is needed to base actions on.

Ever present scepticism

Another issue which may be important to keep in mind when trying to increase, or at least not decrease, budgets towards climate change and health research is climate change scepticism. Although climate change is well accepted by most people in the general population, it is important to recognize sceptics, and address concerns before they gain a wider spread of influence. Tranter and Booth, found in their 2015 study that climate change sceptics are increasing in many countries (62). In their study they looked at the level of environmental concern and proportion of climate change sceptics in 14 high income countries, and concluded that the largest percentage of sceptics were found in Australia at 17%, Norway (15%), New Zealand (13%) and the USA (12%) (62). This means that keeping track of scepticism can be of especial importance for many countries in the south pacific. Both Australia and New Zealand are important countries for collaboration and for aid, especially for Niue and Cook Islands who are still in free association with New Zealand and rely heavily on their aid.
Climate change sceptics have also had a recent upswing in support with the recent inauguration of the Trump Administration. The current US President, Donald J. Trump, is the only world leader openly dismissing the science of climate change (63). Since taking office, President Trump has also appointed a fellow climate change sceptic to be the head of the US Environmental Protection Agency (EPA) (64), one of the key institutions in climate change actions. Although most people today acknowledge climate change, this shift in leadership in such an influential nation as the US could mean a setback in climate change progress. It has already been seen to some extent with the change in management at the EPA, and severe budget cuts to many national climate change programmes in America (65).

The importance of cross-sectoral collaboration

All three plans had some discussion of possible implications on human health, due to climate change. The JNAPs from Niue and the Cook Islands were quite similar in their handling of health implications, but the Tongan JNAP differed considerably from the other two in its incorporation of health implications. The JNAP from Tonga had a significantly higher recognition of health issues related to climate change, and had more actions planned to respond to these health issues. Tonga was the only country to include health sector representatives in vulnerability assessment teams and stakeholder consultation. Whereas in Niue and the Cook Islands, the health sectors were just included when it came to implementing the plans. This suggests that inclusion of health sector representatives in climate change policy development will increase the recognition and incorporation of health aspects in climate change policies. This is in line with suggestions from previous studies (28,39), which have stated that climate change policies should to be developed with extensive collaboration across different government departments, including health. Findings from this thesis is also in agreement with the previous studies who have stated that it is important for the health sector to be involved in climate change adaption strategies, and health representatives could contribute greatly in the development of policies and actions (28,35,38,39).
Methodological considerations

To my knowledge, this is the first cross-country study exploring health in climate change policies of both this region, and in Non-Annex 1 countries. The strength in this study comes from the data used. Policies often present a more objective data set than those of interviews or focus group discussions, eliminating one possible source of bias. Further, national policies provide a good guideline and representation of what is actually prioritized by national governments. Using data in the form of government documents is very useful to avoid financial issues and time constraints for collecting data.

There are some limitations to this study which should be acknowledged. First, as it was a desk-based study, it relied solely on publicly available documents. This has drawbacks as it cannot provide information to the same depth as a study using interviews. Interviews with stakeholders could have provided this study with a deeper contextual knowledge and a greater understanding of dynamics within the different national governments, which I believe could have greatly contributed to this thesis. Further, I chose to look at only one plan for each country, knowing that this does not give a completely comprehensive view on national actions. It is common with some overlap between policies, meaning that issues left out in the policies considered here could be addressed elsewhere. Lastly, looking at three neighbouring countries in the same region greatly affects its generalizability. Although this was a conscious decision, as I felt that understanding this particular region was important and similar studies have been made in other regions, this means that the findings of this study may not be relevant outside the region.

Conclusion

This study found that recognition of climate change related health implications in the Joint National Actions Plans (JNAP) on Disaster Risk Management and Climate Change Adaption of Tonga, Niue and the Cook Islands was low. There were several important areas where a discussion on health issues was lacking, and other sectors were given considerably more space both in the discussions and in actions planned. The recognition of health implications varied between the plans, and the Tongan
JNAP showed a considerably higher degree of recognition when compared to the others. As the Tongan JNAP was also the only one to include health sector representatives in the planning stages of the JNAP, it suggests that inclusion of health sector representatives in plan development will lead to a higher recognition of health issues. This points towards the importance of increased collaboration between sectors when developing climate change policies. And the fact that the health sector needs to be included in the early stages of planning, not just during implementation.

Research on climate change adaption strategies remains a largely unexplored area. Although this thesis aimed to decrease the knowledge gap, there is still more research needed on how health adaption in relation to climate change is taking place. Policymakers have expressed a need for more research on the possible health outcomes of climate change and health adaption. More research is also needed to determine the pathways leading to disease and to provide successful adaptive measures, in order for policymakers and local leaders to make informed decisions during climate change adaption plans. Lastly, more research regarding actors involved in policymaking and their effect on plan outcome is suggested.
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**Annexure**

**List of categories**

**Table 2. Categories identified through qualitative content analysis**

<table>
<thead>
<tr>
<th>Niue categories</th>
<th>Cook Islands categories</th>
<th>Tonga categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental department has the primary responsibility</td>
<td>Climate change originated as environmental issue</td>
<td>Climate change is Ministry of Environment responsibility</td>
</tr>
<tr>
<td></td>
<td>Failing to see potential health impacts</td>
<td>Health sector included in planning of JNAP</td>
</tr>
<tr>
<td>The main risk to health – disease outbreak</td>
<td>Health sector only responsible for strengthening health care</td>
<td>Recognized links between climate change and disease</td>
</tr>
<tr>
<td>Health sector included in executing – not planning</td>
<td>Recognized health threats – infectious disease</td>
<td>Healthy is the goal</td>
</tr>
<tr>
<td>Missing health impacts</td>
<td></td>
<td>Recognized need for health sector to adapt to climate change</td>
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