In the Eye of the Storm –

Risk Perception and Perceived Adaptive Capacity among Civil Society Leaders in Tuvalu

Picture 1: Leaning palm trees as a result of coastal erosion along the Vaitupu coast, Tuvalu, where sand has been taken for housing projects

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Arrival

It is the 16th of March 2013. Winter has been left behind and I am sitting in a plane. My destination is Tuvalu, one of the smallest sovereign and least accessible states on planet Earth, found in the middle of the South Pacific Ocean.

The plane makes a turn and I look out of the window. I see it for the first time, the snake-like landmass of Funafuti, the main island of Tuvalu.

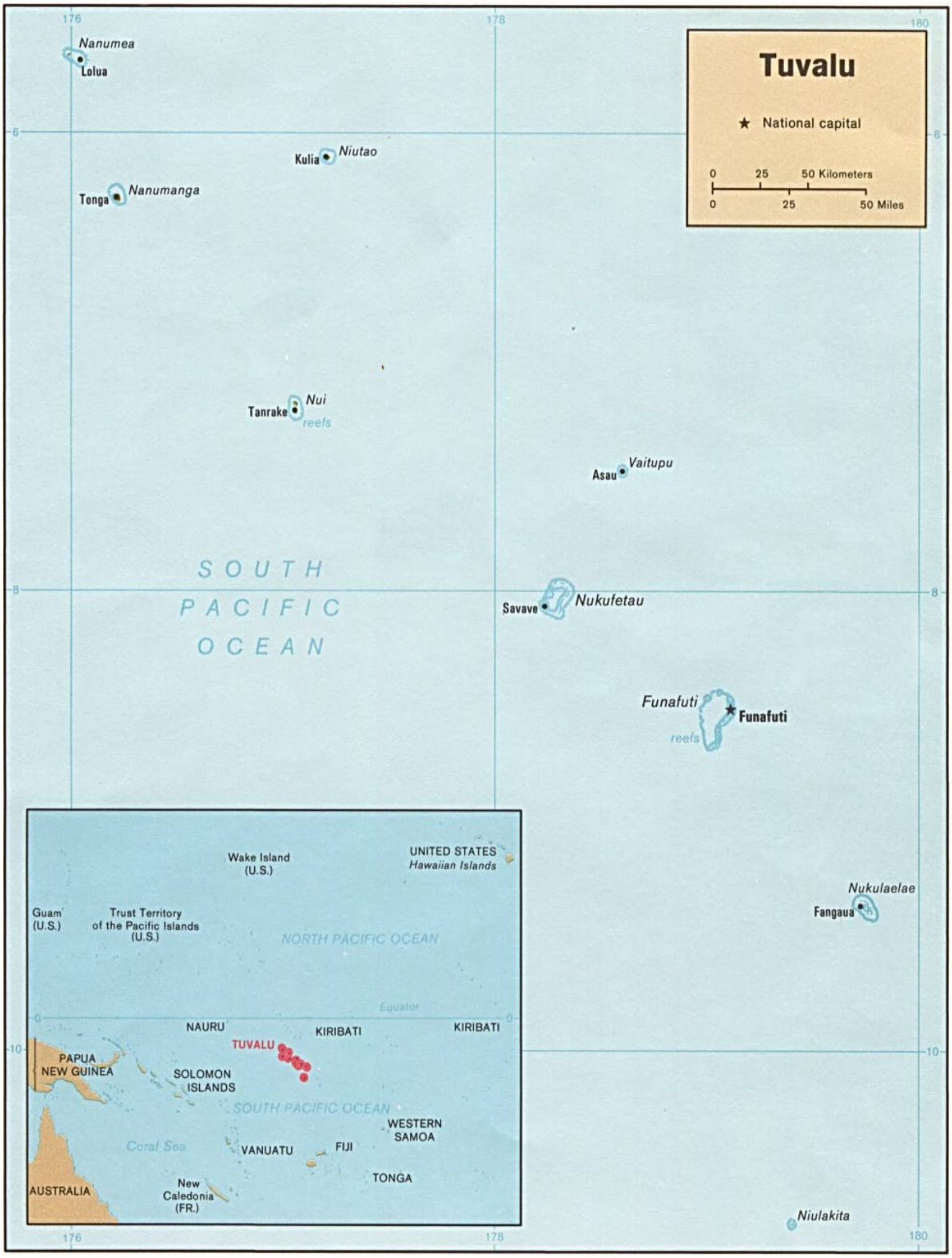
Picture 2: the capital Funafuti.

The woman next to me looks at me with curious eyes because I am pressing my face on the window. I believe she might be thinking the same thing as you. “Tuvalu? What am I about to do here?”

Let’s back up a little. During my undergraduate studies four years earlier, I realized that climatic themes truly interested me. When reading about the reckless environmental destruction were benefiting a few and leaving millions of others behind, I was often sad and wondered about the state of things. At some point I read an investigative article about Tuvalu, a place described as “doomed,” the first island to “disappear.” Where would its people, within a very short time, be forced to migrate? At the time I did not know if everything I read was true, but I wondered, “What are their lives like?”

Time passed and I forgot about the article. In 2012, one year into my masters, it was time for me to select a subject for the final step before graduation: my thesis. Somehow that topic again crossed my mind. When I received notice of an internship in neighboring Fiji at the UNDP Pacific Centre—an office working toward regional policy building for the 15 Pacific nations, including Tuvalu, I made up my mind.

The captain has just informed us that it is time to prepare for landing. The past, present, and future are becoming one; the adventure is about to begin. I ask myself, “What will happen next?” I hope you will come along and find out.



Picture 3: Map of Tuvalu (Retrieved from: http://www.vidiani.com/?p=14047 2013-10-19).

ABSTRACT

Tuvalu is a nation highly exposed to climatic changes, such as rising sea levels. It is so threatened that some studies suggest it will be uninhabitable within a few decades. Because it is understood that Tuvalu can do nothing to avoid this destiny, no focus has been placed on explaining the way social and ecological systems can actually avoid or adapt to environmental impacts. This scientific conceptualization foresees that environmental impacts on local ecologies cannot be completely attributed to global warming, but are also the fruit of human-led, unsustainable practices. Today unsustainability is a reality in Tuvalu, where natural protections against climate change are being explored. Previous studies have asserted that the people's behavior influences the capacity of the Tuvaluan islands to adapt to climate changes. Therefore, in order to respond to this research gap, this study employs the Protection Motivation Theory (PMT), to examine the risk perception and perceived adaptive capacity among Tuvaluan civil society leaders. By doing so, this theory could suggest insights into whether maladaptive or adaptive outcomes are likely. The focus on civil society leaders is motivated by their strong capacity to make decisions on behalf of their communities due to the hierarchical Tuvaluan society. The result of this study shows that one reason why maladaptations occur is that no leaders had *adaptive intentions* in the first place, either because they were more worried about other perceived threats related to modernization or because of the disbelief that local actions could be effective in resisting climate changes. Modernization priorities, religious views, and threat experience appraisal were the factors found to greatly influence how leaders perceived climate changes.

Keywords: Adaptive Capacity, Climate Change, Perceived Adaptive Capacity, Risk Perception, Tuvalu.

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1. INTRODUCTION

In the middle of the vast South Pacific Ocean, we find Tuvalu. With its highest point reaching no more than four meters above the sea level, this tiny nation has become highly exposed to climatic changes, such as rising sea levels.[1] This has placed the spotlight on Tuvalu and it is no surprise that even a backpacking website such as *Lonely Planet* writes: "Barely higher than the surrounding ocean, and capped with a fringe of coconut palms, it's easy to understand why rising sea level due to global warming is a major concern here."[2] But is it really a major concern? We will come back to that.

Although there are other places that are severely threatened by climatic changes as the sea level rises (for instance other Pacific islands and Arctic settlements), Tuvalu is unique because of the amount of attention it is receiving.[3] Due to the lack of within-borders relocation zones, this island nation has often been made to speak on behalf of the whole planet and has been used as a tool in international negotiations to sway migration and environmental policies.[4] The portrait created by the international media and environmental NGOs has often been sensationalistic and culturally insensitive, describing a nation that will doubtless disappear and a population that will remain passive until it has to flee as refugees.[5] The 2050s have been repeatedly stressed as the approximate time that Tuvalu will be submerged.[6]

What is seldom mentioned in the "sinking Tuvalu" story is the fact that the South Pacific region is one of world's least examined areas in terms of local impacts from climatic changes.[7] The only existing research about Tuvalu focuses on the vulnerability of its ecosystems, built on local inaccurate calculations of sea level changes.[8] However, because it is understood that Tuvalu can do nothing to avoid its destiny, no focus has been placed on explaining the way in which social and ecological systems can actually avoid or adapt to

[1] Dickinson, 1999 and Shen & Gemenne, 2011: 226, among others.
[2] Lonely Planet, http://www.lonelyplanet.com/tuvalu#ixzz2KYKmbPzl, 2013-02-11.
[3] Welzer, 2008 and Pearce et al., 2009.
[4] McAdam, 2010; Farbotko & Lazrus, 2012: 382; and Mortreux & Barnett, 2009: 106.
[5] Barnett & Campbell, 2010: 2, 176-177 and McNamara & Gibson, 2011: 478-479.
[6] Iati Iati 2008: 22, exemplified by for instance: Roberts, 2007 and Allen, 2004. This statement is mysterious, as it is unclear when, by who, and what data (if any) it is originally based upon.
[7] Australian Bureau of Meteorology and CSIRO, 2011.
[8] Mortreux & Barnett, 2009; Shen & Gemenne, 2011: 227; and the Australian Bureau of Meteorology and CSIRO, 2011.

environmental impacts.[9] This scientific limitation underestimates the detail that global warming rarely places stress single-handedly on local ecologies.[10] In fact, particularly in small island states, it is relevant to encompass and consider local behavior and how local resources are used when projecting the future. For instance, local pollution can destroy the coral reefs, which are crucial natural protection against erosion in atoll environments.

Today unsustainability is a reality in Tuvalu; it can be easily identified on the shores of its capital, Funafuti, where dying corals and eroded beaches are part of the scenery. This development is a result of changing lifestyles, where new demands have led people to abandon sustainable ways of using their few but essential natural resources.[11] Local unsustainable behavior is a serious issue on small island states, because it degrades existing natural defenses to climatic changes. This suggests that when making predictions about how climate change impacts Tuvalu, it is highly relevant to first examine how the local people understand the changes, and second, to look at what they are doing to deal with them.[12] This study will focus on the former.

A few previous studies have discussed how the local people perceive climate change; none have, however, asserted that people's behavior influences the capacity of the Tuvaluan islands to adapt to climate changes.[13] This highlights a serious research gap as, for instance, Grothmann and Patt (2003) argue "how local people perceive and react to climatic change might be a greater determinant than global warming in deciding the adaptive capacity at exposed locations".[14] If we are to see how Tuvalu is going to adapt to the future challenges posed by climate change, research has to be conducted to ascertain how its people perceive and act on such threats.

1.1 Purpose

This study will provide new insights into what local perceptions actually are with regard to climate change in Tuvalu, which becomes relevant concerning the nation's fragile ecosystem

[9] Mortreux & Barnett, 2009: 105.
[10] Barnett & Campbell, 2010: 22, 26, 48.
[11] Barnett & Campbell, 2010: 3 and Pelling & Uitto, 2001: 59.
[12] Barnett & Campbell, 2010:45-46
[13] See: Barnett & Campbell, 2010: 170; Farbotko & Lazrus, 2012: 284; and Mortreux & Barnett, 2009: 106.
[14] Grothmann & Patt, 2003: 5. The concept of adaptive capacity is central in this study; it is further developed and explained in Chapter 3.1. Grothmann & Patt (2003) define it as "the potential or ability of a system, region, or community to adapt to the effects or impacts of climate change."

and its ongoing unsustainable practices.[15] In order to respond to the existing research gap and to make future analyses available about the occurring maladaptations in Tuvalu, this study will employ the Protection Motivation Theory (PMT). The PMT is a model that was updated by Grothmann and Patt (2003) to examine how psychological factors influence the adaptive capacity of a specific location.[16] According to PMT, when assessing how people might react to climate changes, two components should be explained: the *risk perceptions of climate change* and the *perceived adaptive capacity*. This theory suggests that adaptive intentions come before maladaptations only when those two components are simultaneously "high," which refers to a state when people understand that the potential consequences of a threat exist and yet believe that they can solve it.

This study focuses on civil society leaders from local non-governmental organizations, churches, and traditional institutions from the two Tuvaluan islands Funafuti and Vaitupu. This narrowed approach (rather than a focus on "the public") is motivated by the fact that local leaders, due to the hierarchic societal structure in Tuvalu, have great capacity to make decisions on behalf of their communities. In the Pacific region, civil society plays a major role in planting norms, organizing community work, and connecting local communities with the government, international organizations, and aid donors.[17] Hence, this group is of particular interest when trying to assess the adaptive capacity of the Tuvaluan society (the selection process and more information on the different leaders is developed in Chapter 4.3).

Thus, the purpose of this study is to examine whether civil society leaders have maladaptive or adaptive intentions.[18] To prove this, two PMT connecting empirical research questions need answers (given by the two PMT components *risk perception* and *perceived adaptive capacity – further* explained and defined by the PMT model, p. 17).

- *How do leaders perceive the risks of climate change related hazards?*
- *How do leaders perceive their adaptive capacity to respond to those risks?*

[15] Farbotko & Lazrus, 2012: 282.
[16] Grothmann & Patt, 2003.
[17] Adger, 2003: 400 and Iati Iati, 2008: 30.
[18] According to PMT, maladaptations refer to states of no ambition or carelessness in engaging in environmental matters, while adaptive intentions refer to a mental stage potentially leading to initiatives that could strengthen the natural defense toward climate changes.

In the literature there are many suggested approaches from different schools on how to measure adaptive capacity. This study looks at the perceived adaptive capacity among civil society leaders and can draw no conclusions on the actual explanatory power of PMT itself or in comparison to other social natural and/or scientific models of adaptive capacity. The reason for choosing PMT before other approaches and how the theory is used in this study is developed in Chapter 3.1. Furthermore, this study bases its results on Tuvaluan society leaders from two of the nine Tuvaluan islands (which when relevant will be compared). To what extent those leaders and islands are generalizable to other Tuvaluan or Pacific communities can only be supported theoretically. It should thereby be clear that this study looks primarily at those two islands as an end and not as a mean to extract lessons to other locations or contexts. These limitations will, during the progression of this report, be further discussed.

1.2 Outline of the Study

The impact of climate and social changes in Tuvalu will be discussed in Chapter 2. Chapter 3 explains why the PMT is used as a theoretic tool in this study and presents relevant previous research. Methodological considerations will be discussed in Chapter 4, which includes the selection of interviewees and locations, ethics and interviewing. The empirical results will, in a logical order defined by the main concepts of the theoretical approach (PMT), be presented in Chapter 5. The results, thereafter, are analyzed in Chapter 6 and concluded upon in Chapter 7.

2. THE PRESSURES ON TUVALU

The following two subchapters present an overview of what we know about environmental impacts in Tuvalu. Natural scientific and social scientific aspects of climate change walk hand in hand, although a separation has been made to simplify matters for the reader. Chapter 2.1 (natural science aspects) is briefer than 2.2 (social science aspects). One motivation is that natural scientific literature is most frequently used for predictions about Tuvalu while social scientific impacts are unknown or undiscussed (because the doomsday approach toward Tuvalu has led to a debate that has foreseen locally caused environmental impacts). Even more of a reason, however, is the fact that Tuvaluans alone cannot easily adapt to globally caused impacts such as sea level rise. Social aspects, on the other hand, such as pollution control and the protection of beaches, are practical adaptations, which if implemented, would strengthen natural protection against global threats as sea levels rise. Therefore, as this study looks at the perceived adaptive capacity among the Tuvaluan leaders, the social aspects of climate changes have been given special attention.

2.1 Climate Change – the External caused Impacts

The expressions "sinking" and "disappearing" are commonly used in reference to the islands in the Pacific region. This refers to the fact that many Pacific islands are low-lying and will experience a decreasing amount of land because of sea level rise.[19] It is often stressed that low-lying and reef-dependent atolls are at risk from sea level rise because of their size and unprotected, remote locations.[20] Since 1993 the sea level has been rising approximately five millimeters per year in the greater Tuvalu region.[21] Calculated on expected future global emission trends, the Intergovernmental Panel on Climate Change (IPCC) concludes that the sea will continually rise between 5-15 cm until 2030; by 2090, the sea level will rise by 20-60 cm a year.[22] Current warming trends are higher than at any other point in the last 10,000 years and 11 of the 12 years between 1995 and 2006 were the warmest known so far in the

[19] Australian Bureau of Meteorology and CSIRO, 2011: 241.
[20] Dickinson, 1999: 124.
[21] Australian Bureau of Meteorology and CSIRO, 2011: 241.
[22] Australian Bureau of Meteorology and CSIRO, 2011: 233, 243 and IPCC, 2007. The most recent data for climate change projections for Tuvalu are discussed in detail in *Climate Change in the Pacific: Scientific Assessment and New Research.*

region.[23] This is the type of data referred to in predictions concerning the environmental impacts and migration patterns in Tuvalu.

Yet, as discussed, how local environments will react to global emissions cannot sufficiently be measured without giving consideration to their local adaptive capacity. Concerning the natural science aspects of adaptive capacity, it is still unclear how the Tuvaluan islands will react to the rising sea level.[24] For instance, atolls are not steady landforms and in response to climate change, they might reorganize their sediments and move leeward rather than decrease in size.[25]

Climate change also encompasses much more than mere sea level rise. Tuvalu's weather is thoroughly impacted by various cycles (e.g. El Niño, La Niña, and "neutral" years), which due to global warming, will increase in both frequency and intensity in the future.[26] Because of atmospheric and oceanic circulation, El Niño periods are synonymous with extreme weather such as cyclones, spring tides, heavy rainfall, and droughts that then lead to agricultural and financial losses and damage to roads and buildings.[27] There has been an increased amount of these extreme weather events in recent Tuvaluan history. In 1997, Hurricane Keli eroded an islet in the Funafuti lagoon (Tepuka Savilivili) whereby large quantities of land disappeared overnight. Another concern is the higher frequency and intensity of king tides, causing erosion and loss of soil on the Tuvaluan islands.[28]

2.2 Social Change – the Internal caused Impacts

Environmental change in Tuvalu is not only caused by global weather trends.[29] Tuvaluan life styles increasingly affect the environment, whereby factors such as land tenure, kinship, and culture are similarly critical to examine when considering the risks that climate change poses for Tuvalu.[30] Climate change always occurs, man-made or not, and the reason why Tuvaluans have been able to inhabit Tuvalu for thousands of years is not a result of unchanged weather

[23] IPCC, 2007.
[24] Webb and Kench, 1999: 17.
[25] Webb and Kench, 1999: 2, 7-9.
[26] Dickinson 1999: 1.
[27] Australian Bureau of Meteorology and CSIRO, 2011: 230-234. Pelling & Uitto, 2001: 65 and Jones et al., 1999. There is an interannual tidal variability of 26 centimeters in the Tuvaluan waters.
[28] Shen & Gemenne, 2011: 227-228.
[29] Shen & Gemenne, 2011: 228.
[30] Barnett & Campbell, 2010: 177-179.

patterns, but a social ability to adapt to various environmental fluctuations.[31] This adaptability, which has survived changes such as colonization and Christianization, is based on a communal lifestyle where their scarce natural resources have been sustainably used for the collective good.[32]

Since the 1970s Tuvalu has been changing. A modernization process has introduced public health care, improved health facilities, infrastructure, and access to products such as televisions, radios, motorbikes, electricity, flush toilets, and water tanks. World news has been made available through Internet access on all Tuvaluan islands.[33] Yet discarding traditional practices is seldom friction free and modernization has indeed brought costs. In Tuvalu's national report for sustainable development, Te Kakeega II (2005), it is written that:[34]

> "*The traditional structure of Tuvalu's subsistence economy has been built on the sustainable use of the nation's limited, but nevertheless valuable natural resources, and the conservation and careful exploitation of its fragile atoll ecosystem. These are now under threat from changing attitudes in society and from a continually growing cash economy."*

Particularly on small islands states, breakdowns of sustainable traditions can lead to serious environmental and social issues. In Tuvalu, social change have caused declines in pollution control, shortages of freshwater, declining rural agricultural production, less food security, youth unemployment, fewer inter-island cooperative efforts, and increased demand for imported material.[35] The resource decline has led to more pressure on people to be able to afford new products such as rice, oil, and flour. Changed diets, combination with better roads and other technical advancements, have led to less physical activity and more health issues. The import of plastic and metallic materials has contributed to overly filled garbage dumps, which are a threat to both the land and lagoon. Beaches, a crucial natural defense against erosion, have been dug out for road construction; meanwhile uncontrolled local pollution has caused land and coral reef degradation. Seemingly forgotten in the literature, these impacts are destroying the limited yet essential natural protections against extreme weather, sea level rise, and erosion.

[31] Te Kakeega II, 2005: 32 and Barnett & Campbell, 2010: 33.
[32] Barnett & Campbell, 2010: 34. As seen in the national motto, Christianity has a decided influence: *"Tuvalu mo te Atua*"; Tuvalu for God, God for Tuvalu.
[33] Simpson et al., 2012: 27.
[34] Te Kakeega II, 2005: 13, 16.
[35] Te Kakeega II, 2005: 15; Barnett & Campbell, 2010: 35-36, 44; and Shen & Gemmene, 2011: 239.

Tuvalu consists of nine different developing islands. The capital Funafuti has become the modernized center and the location for paid jobs, the government, and international relations. The population has been constantly growing as a result of migration from the outer islands, which in turn has resulted in growing unemployment rates.[36] The density has also been linked to the lack of fresh water and decreasing farming possibilities.[37] Trees have been cut down to make space for houses at the cost of protection against extreme weather.[38] Pollution has further heavily damaged the coral reefs, causing coastal erosion and depopulating the fish along the coastal areas.[39] The outer islands have similarly experienced environmental degradation, but because of smaller populations, more sustainable use of local resources, and less import of non-degradable materials, the effects have so far been less pronounced.

Tuvalu is currently impacted by multiple global influences. One example are their fisheries. Tuvalu might be small land-wise but it controls some of the world's best fishing waters. Japan, therefore, has paid large amounts to secure long-term fishing rights; today they correspond to approximately 40% of the revenue paid to the Tuvaluan government.[40] This might benefit short-term finances but over time, it is a major concern due to the Tuvaluans' dependency on stable fishing stocks.[41] Other governments, IGOs, and NGOs increasingly influence the local settings in Tuvalu indirectly through emissions and directly through activities such as workshops about how Tuvaluans should understand climatic changes.[42] The effects from outside engagement are multidimensional; in some cases they might improve education and present better knowledge about existing threats, while in others, they might decrease the potential for Tuvaluans to manage their own local resources and use more traditional methods of problem solving.

To sum up, because of modernization and globalization, social changes have contributed to unsustainable local practices and the loss of traditional ecological knowledge. The increasingly unsustainable situation has put new pressure on Tuvaluan communities to

[36] Te Kakeega II, 2005: 42.
[37] Te Kakeega II, 2005: 15, 42.
[38] Simpson et al., 2012: 29, 32.
[39] Simpson et al., 2012: 24.
[40] Barnett & Campbell, 2010: 7. Tuvalu's total GDP is $15 million.
[41] ADB, 2002.
[42] Simpson et al., 2012: 32.

adapt and they could contribute to Tuvalu becoming as threatened as the doomsday global predictions suggest.[43] Given this situation, local risk perceptions and perceived adaptive capacity can impact the Tuvaluans' potential to adapt to climatic changes. The changes in values and the unsustainable local behavior, highlight a need to increase the understanding of what these perceptions look like in Tuvalu, especially among influential civil society leaders.[44]

3. THEORETICAL FRAMEWORK

3.1 Adaptive Capacity

Why PMT was selected as the theoretical approach in this study will be explained here. A wide range of literature, including numerous schools of thought and variables, is available on how adaptive capacity can and should be measured. For instance, Marshall et al. (2009), in a literature review, summarized 24 different approaches across the fields of psychology, sociology, finance, geography, and human and natural sciences.[45] However, in many of those approaches, the logic suggests that local adaptations on small Pacific islands barely have any impact on the location's adaptive capacity (due to limited infrastructure and low technical and financial abilities).[46] For instance, Pelling and Uitto (2001) concluded that the most vulnerable states in the world are the Pacific nations because of their size, insularity, remoteness, limited disaster mitigation capacity, and/or weak demographic, economic, and technical structures.[47]

This reasoning ignores the fact that adaptations are also impacted by people's everyday behavior. Adger (2003) argues that adaptations are, especially in small Pacific states, equally dependent on the ability of individuals and their communities to act collectively when facing risks.[48] Iati Iati (2008) states that actions made by local people are essential to avoid

[43] Barnett & Campbell, 2010: 181
[44] Barnett & Campbell, 2010: 15. Local adaptations can be two-folded. Besides, increasing the local adaptive capacity, demonstrating sustainability might increase Tuvalu's international negotiation ability.
[45] Marshall et al. 2009 Attempts have also been made to include multiple approaches in one model to conclude on a locations "actual" or "objective" adaptive capacity (see for instance UNDP, 2008).
[46] Barnett & Campbell, 2010: 16; Mortreux & Barnett, 2009: 106; Shen & Gemmene, 2011: 226
[47] Pelling & Uitto, 2001: 49, 60
[48] Adger, 2003: 400.

disasters and to increase their social and environmental adaptability.[49] Thereby, as argued in the introduction, especially in small Pacific states, the psychological aspects of adaptive capacity are of importance to consider as human living directly influences the protection of the local landscape from climate changes. This study will follow the logic of PMT, a theory made to explain the effects of people's understandings and reactions toward environmental issues. Grothmann and Patt (2003) argue that "The major determinant of adaptation is the perceived adaptive capacity, since the objective adaptation options are not even tried by human actors."[50] The PMT is preferred over other approaches (made to measure adaptive capacity) because it explains the consequences of how people conceptualize dangerous social and natural changes, which is highly relevant to examine in Tuvalu, due to its decreasing sustainable practices.

3.1.1 The Protection Motivation Theory (PMT)

The Protection Motivation Theory model was originally developed by Rogers (1975) to examine the impact of risk perception and perceived adaptive capacity within the domain of health behavior. Since then it has travelled across fields and subjects, and over time it was adjusted to proactively examine adaptive capacity in regard to climate change by authors as Mulilis and Lippa (1990), Kroemker and Mosler (2002), and Grothmann and Patt (2003). More recently, a few studies have been conducted using this approach to examine local people's behavior. For instance Frank et al. (2011) studied adaptation to climate risks in the coffee sector of Chiapas. In this study, the presentation of the PMT follows Grothmann and Patt's (2003) work[51].

[49] Iati Iati., 2008: 25.
[50] Grothmann & Patt, 2003.
[51] This theory is presented in slightly different ways by different authors. Therefore, not to cause confusions, it was logical to choose one structured version and follow it.

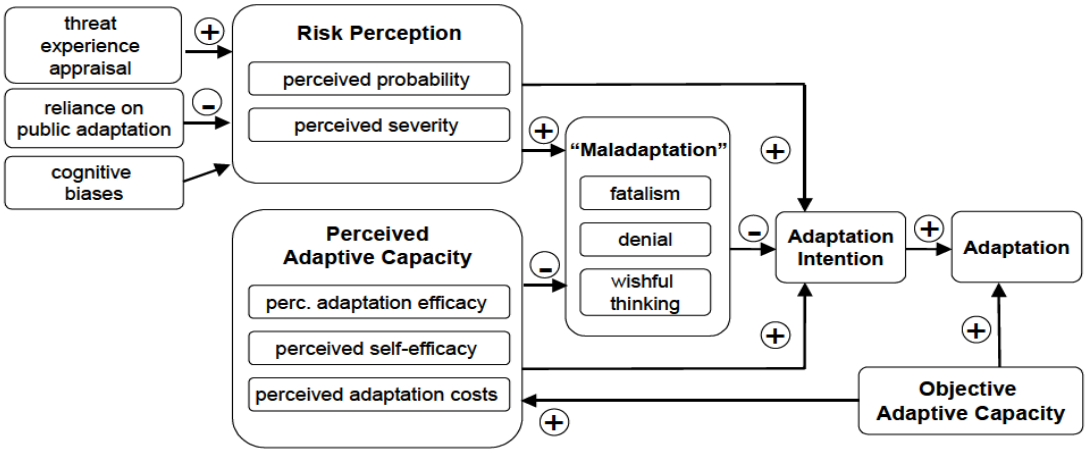

Table 1: Illustrated scheme of the PMT Theory. Grothmann & Patt, 2003: 7.

PMT is built on two main components: *risk perception* and *perceived adaptive capacity*. By examining those two elements among individuals, the PMT model can suggest whether maladaptations or adaptation intentions are the most likely outcome. Maladaptation in PMT logic refers to passivity, wishful thinking, denial, or other attitudes that will not contribute to the betterment of the local environment. Adaptation intention refers to environmental awareness and aims to increase the local sustainability. The pluses and minuses suggest that some psychological aspects can have negative or positive contributions to the outcome in other cells. In the table below, *risk perception* and *perceived adaptive capacity* are placed in boxes to simplify the logic and connection between them.

4 types of outcomes	**Low Perceived Capacity**	**High Perceived Capacity**
Low Risk Perception	**Outcome 1:** Low adaptive capacity Lack of both motivation and competence Maladaptive outcome	**Outcome 2:** Low adaptive capacity Lack of motivation Maladaptive outcome
High Risk Perception	**Outcome 3**: Low adaptive capacity Lack of competence "Avoiding" coping style is likely Maladaptive outcome	**Outcome 4**: High adaptive capacity Have both motivation and competence Adaptive intentions are likely Adaptive outcome

Table 2[52]: Illustrated sequence of the four potential outcomes in PMT that can be drawn when connecting the lessons learned from people's risk perceptions and perceived capacities.

The first component of PMT is risk perception and it refers to "whether a person perceives things he or she values as threatened or not." If a person has *low risk perception*,

[52] Freely developed from Kroemker & Mosler, 2002: 97.

exemplified by ignorance and wishful thinking, the theory suggests that nothing will be done to eliminate the risks (Table 2: Outcome 1). This might not damage the environment per se**,** but it might prevent people from engaging in collective actions. In this study, if influential individuals avoid participation, it can lead to fewer collective actions across the whole society.

According to PMT, if an individual perceives a threat, he or she will respond to it. However, to predict whether the response will be adaptive or maladaptive, the *perceived adaptive capacity* should be examined, "whether the person perceives his or her ability to cope with [or] avert being harmed by this threat." If a person perceives a *low capacity to cope with threats*, preventive actions are unlikely, with potential follow-up consequences such as fewer local investments and unsustainable uses of resources to maximize private short-term gain (Table 2: Outcome 3).

One possibility is that individuals have *low risk perception* and *high perceived adaptive capacity*. This is a likely outcome when the risks are perceived to be less serious in their consequences. When risk perception is low a likely consequence is that other threats will be perceived as more imperative, which would further decrease the likeliness of *adaptive intentions* (a cognitive bias). If individuals have no risk perception at all, they cannot logically have any perceived adaptive capacity (as they are not aware of the threat in the first place) (Table 2: Outcome 2).

Therefore, the only combination sufficient for adaptive responses is simultaneously having *high levels of perceived risk and adaptive capacity* (Table 2: Outcome 4).[53] Community members who perceive climate change as threatening to their livelihoods and perceive adaptations as being within their powers, are more likely to enhance their adaptive capacity by cooperating in collective adaptation actions.[54]

Furthermore, PMT stresses five subcomponents that should be considered when evaluating risk perception and perceived adaptive capacity (which are discussed in separate subchapters in the empirical part of this study to give a logical progression and ensure that

[53] The concepts of adaptation and maladaptation can be twisted. For example, the denial of a threat might be good for a person's mental status if he or she has few means to deal with it. Ye, risk denial cannot contribute to the collective good, which for adaptive outcomes in PMT is needed.
[54] Besides Grothmann & Patt, 2003 see also Adger, 2003: 401 and Patton et al., 2001: 47.

all relevant parts of the two key concepts are covered). Two subcomponents refer to *risk perception*:

- The *perceived probability* among individuals of being exposed to a threat.
- The *perceived severity* among individuals of how harmful this threat might become.

Three subcomponents refer to the *perceived adaptive capacity* (to adapt to perceived threats):

- The *perceived adaptation efficacy* among individuals concerning whether adaptations will be effective in protecting themselves and their communities from being harmed by a threat.
- The *perceived self-efficacy* among individuals concerning whether their own participation will be valuable in such an adaptation processes.
- *The perceived adaptation cost* among individuals for their participating in collective actions (e.g. monetary, personal, time, etc.).

Here it should be noted that the first, *perceived adaptation efficacy,* is the most important. If individuals doubt local actions are helpful in adapting to climate changes, they will be less likely to contribute even if they perceive *high self-efficacy* and/or can pay *high perceived adaptation costs* (have funds and time etc.).

Furthermore, in the PMT model, three potential biases should be accounted for when examining the component of *risk perception* (the cells to the left in Table 1). First, *cognitive biases* refer to people who underestimate large probabilities and overestimate small ones. More recent and/or clearly striking events (e.g. tsunami, car crash, etc.) tend to be perceived as more severe; in these situations, individuals can be aware of risks but not prioritize them because other risks are perceived as more imperative. The second bias, *threat experience appraisal*, explains that individuals tend to worry more about issues they have personally experienced. The last bias, having too high a *reliance on public institutions*, can lead to people who are less worried about risks than they rationally should be.[55]

Finally, in the empirical chapters of this study, what defines “high” and “low” risk perceptions and perceived adaptive capacity will follow the conceptualizations made by Grothmann and Patt (2003).

[55] Grothmann & Patt, 2003: 7.

PMT Subcomponents	Low Perception	High Perception
Probability	The person does not expect to be exposed to a climate related threat and/or other risks are seen as more harmful	The person expects to be exposed to a climate related threat; environmental changes are seen as being the most harmful
Severity	The person expresses uncertainty, denial or wishful thinking about the severity of environmental change	The person expresses certainty that environmental changes pose severe threats, to oneself and the community
Adaptation efficacy	The person doubts local protective actions will be helpful to protect oneself or others from a threat	The person believes local protective actions will be helpful to protect oneself or others from a threat
Self-efficacy	The person expresses doubt of its own and its community's ability to carry out adaptive responses	The person looks positively at its own and its community's ability to carry out adaptive responses
Adaptation costs	The person believes that there are some complicating costs involved in taking preventive responses (monetary, personal, time, effort etc.)	The person assumes there will be no or few personal costs in taking preventive responses (monetary, personal, time effort etc.)

Table 3: Guidelines for what "high" and "low" refer to among the PMT subcomponents.

3.1.2 Theoretical Delimitations

Risk perception, perceived adaptive capacity, and their subcomponents and potential biases are the practiced parts of the PMT model in this study. It should be pointed out, however, that the PMT model's (Table 1) final goal is to explain whether adaptations will actually occur. *Risk perception* and *perceived adaptive capacity* give answers to whether *maladaptations* or *adaptation intentions* are likely outcomes. However, if individuals have *adaptation intentions*, to find out whether those intentions can become actual adaptations, the *objective adaptive capacity* should also be examined (explained by the "objective adaptive capacity" symbol in the lower right corner of Table 1).[56] This refers to a comparison made with previous adaptive capacity research (such as financial and technical capacity, international relations, or level of education) that should address whether intentions can be practically carried out. Because this would require an unrealistic study size and because such research barely exists in Tuvalu, this final part of the PMT is not accounted for in the present study. Therefore, this study should instead be seen as a base for further research about whether adaptations and/or more sustainable lifestyles will take place in the future.[57].

[56] Grothmann & Patt, 2003: 7.
[57] Allen, 2006: 95 and Iati Iati, 2008: 24.

3.2 Risk Perceptions and Perceived Capacity – What is Known?

Overall, there has been very little previous research done in Tuvalu about risk perceptions and perceived adaptive capacity to climate changes, and no study explicitly discusses this in regard to civil society leaders. This chapter presents what is known about risk perceptions and the factors that made them. The focus here does not include previous studies using PMT. This theory is suitable for place-specific research and no studies were found on other locations in the Pacific region.

A recent hypothesis is that the discourse on a sinking Tuvalu can, if it causes psychological effects such as carelessness of resources, negatively affect how Tuvaluans perceive their adaptive capacity.[58] However, Mortreux and Barnett (2009) argue that the majority barely consider "the sinking Tuvalu prophesy" as likely, while other studies conclude that multiple other factors seem to influence risk perceptions and decision making.[59] Multiple factors influencing the perceived realities in various localities are no surprise in the broader literature. Slovic and Peters (2006) argue that how people perceive climate change can be subjective and driven by multiple place-specific characteristics, such as local and international media; what peers, leaders, or other authorities say; personal experiences; education; wealth and health factors; culture; religion and/or other world views.[60] It has also been stressed that perceptions of climate change will vary over time and sometimes be conflicting among local people.[61]

A few case-specific discussions of PMT's relevance exist. Shen and Gemenne (2011) claim to have found five general attitudes toward climate change.[62] Listed below, the first two correlate with what the PMT explains as low risk perception, while numbers three and four refer to high risk perception but low perceived adaptive capacity. Only the fifth option refers to equally high values of both factors (and is thereby the only adaptive outcome in PMT logic).

1. Denial perceptions: Climate change does not occur, or it occurs but is not a threat.
2. Climate change occurs but other issues are perceived as more worrying.

[58] Farbotko & Lazrus, 2012: 283-285; Gemenne & Shen, 2011: 240; Mortreux & Barnett, 2009: 106; and McNamara & Gibson, 2011.
[59] Mortreux & Barnett, 2009: 110-111 and Talia, 2009.
[60] Barnett & Campbell, 2010: 178-179; Mortreux & Barnett, 2009; and Slovic & Peters, 2006.
[61] Mortreux & Barnett, 2009: 107, 111 and Slovic & Weber, 2002.
[62] Shen & Gemenne, 2011: 233-234.

3. Negative perceptions: Tuvalu cannot adapt to climate change and people will leave.
4. Climate change occurs and can be solved. It is, however, dependent on assistance and leadership from the international community.
5. Optimistic attitudes: Changes occur and can be adapted to locally.

Neither these options nor other researchers have clarified who shares those attitudes. The existing Tuvalu literature, though, at least discusses the factors that influence risk perceptions. Mortreux and Barnett (2009) and McNamara and Gibson (2011) argue that family bonds and attitudes of "home" seem to affect perceptions.[63] Mortreux and Barnett (2009) and Talia (2009) argue that religion is influential and discuss how due to God's promise in the Bible to never again flood the world, the common view is held that Tuvalu will not become uninhabitable (from here on referred to as "the Noah Narrative").[64] Talia (2009) stated that a survey in the Congregational Christian Church of Tuvalu (EKT[65]) showed that 20% of the churchgoing population fully denied climate change, which included a majority of the EKT pastors; this belief was most common among people aged 40 and older.[66] Mortreux and Barnett (2009) and Simpson et al. (2012) discussed how elderly citizens might better understand climatic changes due to their personal experiences of changes occurring over time.[67]

In a paper about neighboring Kiribati, Loughry and McAdam (2008) discuss how even though people are aware of climate change, due to what the Bible says, they remain unsure about its severity.[68] They stress that some believe that the water shortage is a sign of God punishing wrongdoing while other refers to God as a reason not to worry.[69] Simpson et al. (2012) present a similar message about Tuvalu. They argue that due to the observed changes in fruit bearing seasons, cyclones, and other natural disasters, the Tuvaluans are becoming more aware of environmental issues and the need for adaptation strategies.[70] However,

[63] McNamara & Gibson, 2011: 482.
[64] Mortreux & Barnett, 2009: 109-110; Iati Iati., 2008: 22, 24; and Talia, 2009: 37.
[65] EKT is the largest church in Tuvalu, composed of approximately 92% of the population.
[66] Talia, 2009: 36-38.
[67] Mortreux & Barnett, 2009: 109-110 and Simpson et al., 2011: 33.
[68] Loughry & McAdam, 2008: 51. Kiribati is similar Tuvalu in that it is a religious-based and collective atoll-state facing a "sinking" approach. Tuvalu and Kiribati were one country until the 1978 Tuvaluan Declaration of Independence.
[69] Loughry & McAdam, 2008: 51.
[70] Simpson et al., 2012: 32.

even if environmental impacts are realized, they will not necessarily lead to expectations that Tuvalu will become uninhabitable or submerged.[71]

Climate change is commonly expressed by governmental spokespersons in international forums as a high threat situation, one that can only be solved by the global community (a maladaptive outcome in PMT).[72] For instance, Saufatu Sopoanga, a former Prime Minister of Tuvalu, reported before the United Nations General Assembly in 2003 that "the global-warming threat is no different from a slow and insidious form of terrorism against us."[73] Whether this is a negotiation technique, or based on a lower perceived adaptive capacity, is not concluded within the literature. However, few radical actions to adapt to climate change have been made in Tuvalu.[74] Talia (2009) argues that government and church officials in the island country have voiced people's concern at the international level, but due to doubts in their local solutions, they are less active at home.[75]

[71] McNamara & Gibson, 2011: 481.
[72] Te Kakeega II, 2005: 9; McNamara & Gibson, 2011: 480; Shen & Gemenne, 2011: 224; Shibuya, 1996; and Farbotko & Lazrus, 2012: 387.
[73] Allen, 2004.
[74] Talia, 2009: 16.
[75] Talia, 2009: 16.

4. METHODOLOGY

This chapter discusses the methodological decisions made concerning the PMT approach, the unique physical and social characteristics of Tuvalu, and the purpose of this study (to examine whether civil society leaders have maladaptive or adaptive intentions). This chapter follows funnel logic where, in turn, decisions about methodological considerations, the selection of locations and interviewees, and the conduction of the interviews are discussed.

4.1 Research Approach

This subchapter explains the selection of a methodological approach to obtain theoretically relevant empirical material in Tuvalu. First, when trying to understand perceived realities in unknown environments, one valuable tool is to be able to collect in-depth information. Therefore, as the researcher had never been to Tuvalu before the study, a qualitative approach was selected.[76] Secondly, there are different types of qualitative approaches. Because the researcher would not be able to understand or moderate in the local language, Tuvaluan, which would be needed for focus groups and more general observations, personal interviews were the preferred means of data collection.[77]

The third choice to be made dealt with the selection of an interview method.[78] Given that one expectation was to find similarities between the interviewees, the non-directive and unstructured approaches would be least helpful. Structured interviewing is useful when comparing responses but less helpful to follow up on new potential evidence, which was needed in this study. According to Bryman (2004), when a researcher begins an investigation with some place-specific knowledge, a semi-structured approach is preferable.[79] Therefore, as I had gained regional skills during the five months spent working for UNDP Pacific Centre in Fiji prior to the fieldwork, this approach was selected.

Thereafter, a theoretical approach was chosen for the semi-structured interviews: symbolic interactionism. This approach refers to the idea that the human world can be described by interactions within a socially constructed reality, where values, realities, and facts are constantly changing.[80] The most famous sentence states, “If men define situations [as] real,

[76] Leonard Brians et al., 2011 and Trost, 2011: 32.
[77] Bryman, 2004: 328 and Trost, 2011: 46, 129.
[78] Bryman, 2004: 314.
[79] Bryman, 2004: 315 and Kvale, 1997: 100.
[80] Trost, 2011: 33.

they are real in their consequences."[81] Because symbolic interactionism puts emphasis on perceptions and perceived realities, it provided useful guidance to obtain the type of information also seen as important in PMT. In this approach, the interviewer should strive to find answers to "how" before "why" and take the time to understand the interviewees' definitions, feelings, and methods of reasoning.[82]

Another aspect to be considered is the fact that the actual environment matters in people's attitudes and realities. Therefore, to build a basic understanding of everyday life and be better prepared for local expression, norms, and behavior, the researcher spent one month in Funafuti before conducting any interviews.[83] This pre-phase had benefits for upholding sensitivity to local traditions. In addition, Otsuka (2006) argues that in Pacific nations, it is particularly important to be culturally accepting, as interviewees otherwise might try to teach you lessons by giving wrong answers. Therefore, serious emphasis was placed on following the local advice concerning traditions, religion, dressing, interview locations and time, and personal behavior.[84]

4.2 Funafuti and Vaitupu – Why these Locations?

The data in this study has been collected from two Tuvaluan islands, Funafuti and Vaitupu, between March 8 and June 10, 2013. Funafuti, the name of both the capital and the island, is the main hub of Tuvalu (it has 5,500 inhabitants or in actuality 8,300 people/km^2).[85] Vaitupu is the largest island of the nation land-wise; it has 1,500 inhabitants and is mostly covered by bush. Funafuti has the only airport and international connections while the single transportation method to Vaitupu is a boat to/from Funafuti that makes the trip approximately once per month. Tuvalu consists of nine inhabited islands, unique in their settings and accessibility. Due to their irregular connections, all of these islands could not be visited during this study.[86] Because of Funafuti's proximity to the important actors in this study, my key contacts, and the entire formal civil society, the original idea was to conduct the entire research study here. But because a significant part of Funafuti's population comes

[81] William et al., 1928.
[82] Bryman, 2004: 321 and Trost, 2011: 39, 42, 53, 85, 97.
[83] Otsuka, 2006: 2.
[84] Trost, 2011: 77, 91.
[85] Webb & Kench, 2010: 1-3.
[86] Te Kakeega II, 2005: 44. The entire nation covers 26 km^2 of land and has approximately 11,000 inhabitants.

from the outer islands, it was thought that some knowledge about them should still be obtained.

As expected, the interviewees used the outer islands as reference points in explaining the development in Funafuti. However, less expected was the fact that they referred to them as better places. Did they romanticize the outer islands or did other factors influence their perceived reality? In order to find these answers, a three-week extension was added when the possibility occurred to board a ship transporting secondary school students to Vaitupu. The main reason for choosing Vaitupu was that accommodations could be organized beforehand. This additional fieldwork took part at a location where standardized (or thought through) responses would rarely occur (as people had rarely been exposed to climate change researchers). Less than 1,000 people visit Tuvalu in a year and few of those make it outside Funafuti due to the lack of modern conveniences and the difficulty in planning trips. At the time, I was the first Westerner that had visited Vaitupu for many months. The material collected in Vaitupu should be seen as additional information to improve the understanding of the perceived realities among Tuvaluan civil society leaders. In the empirical chapters, the lessons learned from the differences between Vaitupu and Funafuti interviewees are discussed with cautiousness. This notice stands in accordance to Adger who said that "the nature of adaptive capacity is such that it has culture and place specific characteristics that can be identified only through culture and place specific research."[87]

4.3 Selection Criteria and Interviewees

This chapter will develop how and why the Tuvaluan civil society leaders were chosen for this study. In broader the literature, a "civil society" is seen as important for organizing local people and connecting them with governments and NGOs.[88] Iati Iati (2008) concludes that civil society, as it positions itself at the intersection of major societal actors and the people, is vital in climate change adaptation processes in the Pacific nations.[89]

The Tuvaluan society is collective and hierarchy-based, and in decision-making processes emphasis is put on consensus style politics, in which local leaders are expected to make decisions on behalf of their communities. Iati Iati (2008) argues that neither the government

[87] Adger, 2003: 400.
[88] Allen, 2006: 85, 95 and Reid et al., 2012.
[89] Iati Iati, 2008: 27-28.

nor national and international NGOs can successfully implement any decisions or projects without approval from the local leaders.[90] Despite how local people actually understand risks, their local leaders might be able to compel families and communities to support or deny specific climate change adaptation strategies.[91] Therefore, when examining adaptive capacity in Tuvalu, it is extremely relevant to study these leaders and their risk perceptions and perceived adaptive capacities.

Duckworth (2001) defines civil society in Tuvalu as encompassing "all organizations that are not part of the government. It includes the private sector, non-governmental organizations, most churches and the Falekaupule."[92] However, there are still some influential traditional bodies that are not covered in this or any other definitions of either the state or civil society in Tuvalu. Therefore, as some influential leaders would be left out, Duckworth's (2001) definition has been used as a guide rather than a strictly followed checklist, to find *different influential leaders on the local level*. The goal of this study has been to understand what Trost (2011) describes as a heterogeneous selection within the homogeneity, which, when used here, means common perceptions among different influential Tuvaluan leaders.[93] The motivation to include different types of influential leaders is, as Iati Iati (2008) argues, the combination of churches, formal civil society, and traditional institutions that can together be highly effective in engaging the people to take adaptive actions, even though on their own they might not have enough influence.[94] With assistance from the UNDP Pacific Centre and reconfirmed during the pre-phrase of this study, three broader categories of influential leaders were chosen.[95]

First, faith-based leaders, especially from the EKT church, are highly influential in local decision-making processes.[96] Churches in the Pacific are not only influential in religious matters, but many other community decisions as well, since they are newer and less tradition-based; they can be progressive forces for change in multiple societal discussions.

[90] Iati Iati, 2008: 26, 28.
[91] Iati Iati, 2008: 28.
[92] Duckworth, 2001: 1.
[93] Trost, 2011: 137.
[94] Iati Iati., 2008: 29.
[95] Iati Iati, 2008.
[96] Simpson et al., 2011: 42.

One example is the "Otin Taai declaration (2004)," where representatives of the Christian churches of several Pacific Island States issued a statement on climate change.

The second category of influential leaders comes from traditional institutions: the Falekaupule, Kaupule, and other island leaders. The Falekaupule are an influential cultural and tradition-based assembly of elders (predominantly made up of influential older men, such as community chiefs and pastors) functioning as a local government on each Tuvaluan island. Equally, for every Falekaupule there is one Kaupule, which is a linking body between the state and the Falekaupule that executes most community-level initiatives (the representatives are elected by the Falekaupule but paid by the government).[97] On some of the Tuvaluan islands, including Vaitupu, there are particular island leaders who make decisions concerning social matters, such as events and preferred norms. Even though they lack political power, they are influential in people prioritize in their daily lives.

The last category of leaders come from the more recent formal civil society organizations, engaging in activities such as family planning and women's, youth's, and disabled rights, among others. All formal organizations are located in Funafuti and their leaders have, in comparison to faith-based and traditional leaders, less influence. However, they are gateways for new influences, have access to policy-makers, and potentially over time, they will equalize the power balance in the society.

4.3.1 Selection of Interviewees

A snowballing approach was used to find interviewees. By contacting the national umbrella organization TANGO, contact information to all registered NGO´s in Tuvalu was provided. Hence, the first interviews were conducted with leaders from formal organizations in Funafuti. Concerning the Falekaupule/Kaupule and the Church, the researcher was unavoidably impacted by what others explained as "suitable" interviewees. Farbotko and Lazrus (2012) argue that one issue when doing climate research in Tuvalu is that Funafuti has developed individuals who have rehearsed for interviews regarding climate change research.[98] However, the aim in this study was to talk with different influential leaders regardless of their expertise on the subject. Therefore, to avoid a biased selection process, during the interviews, the researcher asked about influential societal participants before

[97] Simpson et al., 2011: 14-15.
[98] Farbotko & Lazrus, 2012: 387.

climate change was brought up as a topic (seen in the layout of the question guide in Appendix I).

	Formal civil society leaders	Traditional leaders*	Faith-based leaders
Funafuti	7	3	2
Vaitupu	1	2	3

Table 4: The spread of interviewees.*Falekaupule, Island leaders, and Kaupule representatives.

The spread of the interviewees in this study is shown Table 4. Seven formal leaders, two Falekaupule elders, one Kaupule representative, and two faith-based leaders were interviewed in Funafuti. One formal leader, one youth leader, one Kaupule elder, one Island chief, and three faith-based leaders were interviewed in Vaitupu. There were few formal organizations in Vaitupu, although women, clan, and youth groups existed, from which one such leader was included. The large variation among the formal civil society leaders thereby depends on that most formal organizations are based in Funafuti, while only a few local youth and women groups can be found on the outer islands.

Lastly, due to the gender-based and hierarchical society, a majority of the interviewees were unavoidably men. The traditional and faith-based position holders are exclusively males in Tuvalu, whereas the only women incorporated into the study came from formal civil society organizations in Funafuti. Furthermore, because a private sector barely exists in Tuvalu and the government engages less on the community-level, this study does not include any leaders from the government or the private sector. Climate change is a key responsibility of the state, however, the government, due to financial, cultural, and geographical reasons, leaves most of the local initiatives up to the Falekaupules. This is explained in the Falekaupule Act (1997), which was set up by the government to decentralize decision making by formalizing the role of the already existing traditional decision-making bodies, the Falekaupules (in functioning as local governments). This act was written as no matter what; the Tuvaluan government can never act locally without the agreement of the local councils (due to strong local traditions concerning decision-making).

4.4 Interviews

4.4.1 Tools and Preparations

A guide was created to support the gathering of empirical data (Appendix I) and to find respondents.[99] The questions were developed to capture answers to each one of the PMT subcomponents by using symbolic interactionism and assistance from a key contact. One pre-interview was conducted to see if there were any questions or topics too difficult to understand in the guide, but it was not used in this study. A voice recorder was used to capture the data, with the advantage that I could focus on the interviewees instead of note taking.[100] The possible downside was that the interviewees might avoid conveying their true perceptions (a common suggested risk with recording).[101] However, in this instance, none of the participants were overly concerned about being recorded.

All of the interviews in this study were fully transcribed and conducted by the researcher, giving the advantage that some early conclusions and ideas could be drawn upon in other interviews.[102] After transcription, key parts of the material were put into a scheme of analysis, which was made by using the PMT subcomponents and their definitions (see Table 5 on the next page). This scheme was created to first function as a tool for extracting information and, second, to guarantee that all subcomponents of the PMT were correctly discussed in the empirical chapters.

All of the interviews were conducted in English, whereby both interviewees and the researcher used a second language. An interpreter had to be used in one interview while all other interviewees spoke English fluently. The influence of language on the results of the study is difficult to estimate. One risk is that the interviewees expressed themselves differently than they would have in their native Tuvaluan and/or with someone they were more familiar with. However, due to the researcher being an outsider, there is also the possibility that the responses were more descriptive and frank. The interviews lasted between 45 and 75 minutes and were also used to gather general information about Tuvalu.

[99] Bryman, 2004: 317.
[100] Trost, 2011: 74-76.
[101] Trost, 2011: 75.
[102] Trost, 2011: 76 and Bryman, 2004: 318, 322.

Scheme of Analysis

Interviewee: xx

Threat experience	*Citations above line* *Own comments below line*
Cognitive biases	
Role of institutions	
Perceived probability	
Perceived severity	
Perceived adaptation efficacy	
Perceived self-efficacy	
Perceived adaptation costs	
Other comments	

Table 5: Scheme of Analysis

Definitions (according to Grothmann & Patt, 2003)

Biases to Risk Perception

A. **Threat Experience Appraisal** - A threat experienced in the past has a somewhat positive impact on risk perception—positive bias
B. **Cognitive Biases** (Memory and Priority Biases)—negative biases
   - Underestimate large probabilities, overestimate small ones
   - Memorable events are perceived as more likely to happen again
   - Events more recently experienced are perceived as more likely to happen again
C. **Role of Institutions** - If people rely too much on the efficacy of public or administrative led adaptations they will likely to some extent take less precautionary actions—negative bias

Risk Perception - A person's risk perception assesses a threat probability and damage potential according to things he or she values under the condition of no changes in his or her own behavior.

A. **Perceived probability** – The person's expectancy of being exposed to a threat (relative to the appraisal of how harmful other challenges in society are)
B. **Perceived severity** – How harmful the consequences of the threat would be to things he or she values if the threat where to occur

Perceived Adaptive Capacity - A person evaluates his or her ability to cope with and avert being harmed by a threat along with the costs of taking such actions

A. **Perceived adaptation efficacy** – The belief that protective actions or responses will be effective in protecting oneself or others from being harmed by a threat
B. **Perceived Self-efficacy –** Refers to the person's perceived ability to actually perform or carry out these adaptive responses
C. **Perceived adaptation costs** – The assumed costs of taking the preventive responses (e.g. monetary, personal, time, or effort)

4.4.2 Conducting Interviews

The same basic structure was used throughout the interviews in accordance with symbolic interactionism. In order they were: presentation of the researcher and the purpose, ask warm up questions to relax the interviewee, logical progression of the key topics laid out by the PMT, and show appreciation.[103] Before the interviews started, the interviewees were informed of the purpose of the study, that participation was voluntary, and that their responses would be treated with anonymity.[104] Anonymity was given here with the hope of obtaining more explanatory answers and capture personal definitions and values. To avoid any steering within the early phase o the interview, the concept of climate change was avoided (the researcher expressed that he was trying to understand the existing risks in the society).[105] Hence, if climate change had directly been raised as a topic, it would have been harder to understand if other matters were perceived as more threatening (important to control for in the PMT concerning the subcomponent *perceived probability,* see Chapter 3.1.1, and notice the order of the questions in the guide, Appendix I). Furthermore, as humans have different definitions for the same issues, the researcher had to be careful when using value-laden or place-specific expressions, such as "climate change", "vulnerability," and "civil society." Therefore, a non-scientific language, with open questions and minimal interruptions, was used in accordance with symbolic interactionism to gather the interviewees' definitions (rather than standardized responses).[106]

If climate change had been fully denied by the interviewee, it would not have been possible to ask questions about the second PMT component, "perceived adaptive capacity" (it would be pointless to ask if something could be solved that was not perceived as a threat in the first place). However, since all of the interviewees showed at least minimal risk awareness of climatic changes, this potential problem did not arise as a complication. A few times interviewees would counter with questions about the researcher's own opinion. This was solved by informing the participants that this information would be shared after the

[103] Farbotko & Lazrus, 2012: 387 and West Lothian council of psychological services (2013-03-30).
[104] Safety Diagnosis, 2009.
[105] Farbotko & Lazrus: 387.
[106] Trost, 2011: 13, 52 and Bryman, 2004: 317.

interview.[107] This step was important step in order to avoid interviewees just agreeing with conclusions they had not necessarily had in mind before the interview began.[108]

5. ANALYSIS

5.1 Layout of the Empirical Chapters

This study employs the PMT to examine the risk perception of climate changes and perceived adaptive capacity in Tuvalu. The analysis attempts to gather shared understandings among interviewees so that general lessons can be drawn. It should be understood that the leaders are of interest as a study group where the differences between different categories of leaders (or their numbers) are of lesser importance. A cautious comparison between the two islands will occur, however, only when specific conclusions can be drawn from this research. What defines "high" and "low" is explained in Table 3, Chapter 3.1.1, as the distinction cannot naturally be made with precision in this type of study, and the researcher's own interpretation of these concepts leads the discussion forward. This chapter will follow the subcomponents of PMT, where each component has been given its own chapter. In each subchapter, the field data is selected and arranged through the "scheme of analysis" (see Table 5, Chapter 4.4.1).

Chapter 5.2 presents material relevant to the PMT subcomponents of risk perception: *the perceived probability* and *the perceived severity*. In 5.3, the subcomponents of perceived adaptive capacity: *the perceived adaptation efficacy*, *the perceived self-efficacy*, and *the perceived adaptation costs* lead the discussion forward. Those two chapters will present the results from this study in a neutral fashion, while Chapters 5.4 and 5.5 will analyze the presented results by applying PMT. By using "the outcome model" (see Table 2, Chapter 3.1.1), the key lessons from the two main PMT components combined are analyzed in Chapter 6. The potential biases: *threat experience appraisal, too high a trust in public institutions*, and *cognitive biases* are not presented in separate subchapters, but are mentioned when relevant.

[107] Trost, 2011: 106.
[108] Mitchell & Slim, 1991: 1.

5.2 Risk Perception

5.2.1 The perceived probability of being exposed to climate change

This subchapter covers the perceived probability of being negatively exposed to climatic changes. This specific part of risk perception in PMT is connected to cognitive biases (see Chapter 3.1.1) and suggests that if other issues are perceived to be more serious than climatic changes, the perceived importance to carry out adaptive actions is decreased.

Among the twelve interviewees in Funafuti, only four (all formal civil society leaders) expressed that their biggest concern was environmental impacts. Among the Vaitupu interviewees, all but one discussed environmental impacts as being the major concern.

The eight Funafuti interviewees, who did not refer to climatic impacts, worried more about modernization related issues. They reasoned that because of the dependency on the outside world they had lost control of their societal development and experienced financial constraints. Some discussed how Tuvalu was losing its culture and participating less often in social events. Other topics brought up addressed how people were having difficulties affording food and making the children follow traditional behavior, high unemployment, gender inequality, diseases, and the high costs of various services. In many interviews, discussions were held on whether the interviewees were aware of any ongoing environmental initiatives. Many interviewees were not sure about any current initiatives and only a few concluded that environmental initiatives rarely occur. The uncertainty here strengthens the understanding that these interviewees often had their focuses elsewhere rather than on environmental initiatives.

Furthermore, PMT suggests that an individual's highest perceived threat is what that individual will focus on, even if he or she have also expressed concerns about other perceived threats. Regarding this factor, during the fieldwork it was explained to me that neither the Funafuti nor the Vaitupu Kaupule offices used their annual project budgets for climate change related activities.[109] In Vaitupu, I was told that their budget is used to install flush toilets all over the island. This example is notable as all the Vaitupu interviewees expressed how due to frequent droughts they were concerned about the local water supply (all Tuvaluan islands are dependent on rainwater storage). Yet such worries had not stopped

[109] One Kaupule is given $150,000 Australian dollars every year to invest in relevant local projects.

the Falekaupule from instructing the Kaupule to invest in a project that had no environmental contribution and also required valuable water reserves in order to function. This observation had no bearing on the perceptions among the respondents in this study. However, it gives an important example of how climate change problems can be foreseen from other issues (modernization), even if such focus decreases the amount of a vital natural resource.

Most interviewees, independent of whether they thought climate change was the most serious issue or not, could refer to personally experienced environmental impacts (no interviewees denied climate change completely). There was, nevertheless, a difference between how this was explained among the Funafuti and Vaitupu interviewees. The experiences among the latter related to impacts on plants, fisheries, and other daily activities associated with collecting food and materials.

> *"Climate change on our island means many changes…bad weather as rains, storms, king tides...The high tides are causing really high erosion. Some parts of the island [are] starting to get yellow. Maybe it is no balance on water...There have been some droughts really affecting the trees and ground water. Before it was very sweet [and] now it is starting to turn salt[y]." – Traditional leader, Vaitupu*

The Funafuti interviewees related experiences that dealt with impacts on personal belongings more than the physical environment.

> *"If you go along the sea side, it is coming up at high tide, the salt water…people are becoming consciousness [sic] because their motorbikes are destroyed. Before no one noticed but now when it is affecting us…I don't drive that way anymore." – Formal leader, Funafuti*

One Funafuti formal civil society leader explained this difference between the Tuvaluan islands:

> *"On the outer islands they have seen that the sea level rise has impacted the root crops, erosion of the sea shores and thereby become more aware…People in Funafuti, no they don't see that." – Formal leader, Funafuti*

The key insight here is that Vaitupu interviewees were more accurate in identifying climatic changes. As previously presented, one of the differences between the two islands is that Funafuti is fully dependent on imports while life in Vaitupu is still based on local farming. The everyday use of local plants in Vaitupu was the reason given as to why the remote and less formally educated outer island has a population that is more aware of environmental changes.

Some interviewees discussed that people's understanding of climate change as a serious constraint to environmental initiatives being implemented (a highly relevant topic in this study). The message was that people have heard about the severity of climate change since birth, but because the land degradation takes place slowly over time, they have not noticed the changes. This in turn leads to ignorance and doubts about climate change. The interviewees also discussed how religion was a limitation, because it made people worry less and only act reactively after the occurrence of extreme events. A common message among the younger leaders in the study was that the elder citizens are the people most influenced by religion and care the least about environmental matters.

> *"They all believe that God will save us, but the fact is…[i]t is obvious we have to do something otherwise we will all die…people don't think proactively. They are not used to being threatened you know. We don´t even have an evacuation plan." – Formal leader, Funafuti*

Most interviewees expressed that climatic impacts will affect them similarly or worse in the future. Two faith-based leaders had different views on the subject but argued that climate change will over time disappear.

> *"We understand that climate change is affecting Tuvalu…but I think it is only a circulation of water. The sun depends on our universe…the earth is moving and the water is affected. Climate change [happens] only because earth is in that position…so for me…No. Noah has already experienced the flood." – Faith-based leader, Funafuti*

The key insights in this subchapter were that half of the interviewees were worried more about climate changes, while the other half did not consider it the most serious threat since perceived modernization issues were seen as the priority. All interviewees to some extent thought climate changes were real and had an idea of what it was (they had at least minimal risk perception of climate change). Three factors accentuated the risk perceptions among the leaders in Tuvalu: modernization, threat experience appraisal, and religion.[110]

5.2.2 The perceived severity of how harmful climate change might become

The way interviewees perceived the severity of climate change varied. The interviewees who raised other topics before environmental change were either less certain about the actual severity or convinced that God had assured Tuvalu would endure these threats. They still connected climate change to actual impacts on land, especially with topics like fisheries, the

[110] As will be seen in the upcoming subchapters, the potential bias of *too high a reliance on public adaptation* did not contribute to the foreseen threats, which can be said considering that most leaders expressed doubts about local institutions.

heat, the amount of rainwater, and other resources valuable to their everyday life. The belief in God, therefore, was mostly connected to the fact that the actual land would not disappear.

> *"I have no idea of the future, no idea at all. Things that happen will happen. But we are not sure. If it will happen at all, or in a short time or in a long time, we cannot tell." – Traditional leader, Funafuti*

The most climate change aware interviewees (the four civil society leaders from Funafuti and some Vaitupu interviewees) had more negative feelings about the future and expressed that climate change is so severe that it threatens the very existence of the Tuvaluan islands.

> *"If it is true the island is not safe for living in the next 50 years then we need to do something [for] it [to] remain safe. Migration is not an option, but of course we can be forced to leave…what else can we do if we will not get assistance[?] You have to understand, to maintain culture and identity, we have to live here to be able to do that." – Traditional leader, Vaitupu*

This last quote captures what has often been expressed in this study—Tuvalu has to exist for the Tuvaluans to maintain their culture and identity. The interviewees highlighted this as one specifically important reason to make people more aware of climate change. The younger interviewees were overall more certain that Tuvalu faced serious environmental risks. It was explained that a common message in Tuvaluan schools is that Tuvalu, in 50 years' time, might become uninhabitable.

Among the faith-based leaders, there was no consensus on how to interpret climate change. Three people expressed that Tuvalu is threatened to its very existence, while two leaders referred to the Bible, stating that this was not true. One interesting discussion that came up from these leaders revolved around the Noah narrative. The leaders who denied it argued that work should be done to make Tuvaluans interpret the Bible differently in order to increase their risk awareness. This was less popular among the other two leaders who believed that such reasoning was a violation of the Bible.

> *"If you ask the people they will answer that God has promised that there will never be another flood again. We have to re-read the story, and put it in another context to climate change. We have to tell them that it is not God who causes this flood, it is us humans, and that is a big difference." – Faith-based leader, Funafuti*

The key insights in this subchapter are that, at first, the leaders who in the first subchapter referred to other issues as more threatening than climate change here expressed uncertainty about how climate change would affect Tuvalu. The other leaders, who in the

first chapter picked climate change as the most serious threat, expressed here that the severity of climate change threatened the existence of Tuvalu. One key difference between the two groups was that the former were more influenced by the promise God made in the Bible to never again flood the world. This is a single, decisive interpretation, which directly impacted the way they understood climate change.

5.3 Perceived Adaptive Capacity

5.3.1 The perceived adaptation efficacy of protective responses

Two broader responses were given on whether and how Tuvalu could adapt to the impacts from climate change. The leaders who expressed uncertainty about the severity of climate change were overall more positive about the fact that climate change could be adapted to. Their common message was that even if Tuvalu is not very well equipped and lacks technical possibilities, people will come together to solve any issue when they need to. They barely discussed global environmental impacts related to sea level rise and did not consider these items threats. Instead, they associated environmental impacts to things like shortages in the amount of food and water.

Contrary to the former group, the interviewees who expressed that climate change was the most serious issue were more negative about Tuvalu's capacity to resist it. They express how local solutions alone would not make much difference. They voiced that the Tuvaluan government lacked the funds and therefore could neither lead nor finance solutions on an appropriate scale. Their common reasoning was that, as Tuvalu had not caused the environmental impacts, wealthier nations had and should make substantial contributions for Tuvalu to remain inhabitable. Concerning whether this external assistance would be given, some expressed that international participants did not care about Tuvalu and would barely mitigate their emissions, while others were somewhat hopeful about international support.

> *"Tuvalu only produces a little bit of carbon dioxides…why don´t those big countries…Is It anything we can do to make them stop? Because they contribute more to global warming…it does not matter what we do, they give us some money but they don't cut their own emissions. They will make Tuvalu sink."*
> *– Formal leader, Funafuti*

It is relevant to highlight that the more aware interviewees, in opposition to the less aware, put less emphasis on the potential of local adaptations and more on what global actors should do. This is an attitude that seems to be the same as the one presented in previous

research about governmental officials. Even if they were highly concerned about climate change, very few of those individuals had developed ideas for local contributions, which could be helpful in a much more tangible way. For instance, one formal civil society leader expressed that:

> *"Tuvalu can maintain but it depends on the international community, if they can assist, because [there] is no way Tuvalu can raise that amount of money itself…if they don´t want Tuvalu to go beneath the sea they will help, if they don't care, Tuvalu will disappear." – Formal leader, Funafuti*

Many leaders argued that modernization had put pressure on people to use their resources elsewhere rather than on adaptive initiatives, whereby awareness raising was crucial to make people change their way of living. However, one Vaitupu leader discussed how more awareness of climatic impacts would not necessarily lead to more initiatives in Tuvalu. A relevant point as will be seen further on in this analysis.

> *"I think people are getting more aware at last. I have seen some, they use their local canoe again instead of using their boat and petrol. But I have seen other people too. They are using up their land so they can sell and make money and move to relatives in New Zealand. I think they have given up." – Traditional leader, Vaitupu*

The key insights in this subchapter were that leaders who believed in the Noah narrative thought climate change could be adapted to, since they were less worried about its severity. The leaders who were more worried about the severity of climate change expressed that Tuvalu could only remain inhabitable with assistance from international participants. Considering this conceptualization, they had developed few ideas for local initiatives to strengthen the local adaptive capacity (seen in chapter 5.2.1).

5.3.2 The perceived self-efficacy to carry out adaptive responses

In the previous section, it was asserted that many leaders doubted the potential of local initiatives to make an impact on climate change. This was reflected in their perceived self-efficacy. The leaders who held the most negative opinions about their own potential to carry out initiatives were the only female leaders in this study, four female formal civil society leaders from Funafuti. They said that they had little influence on the men and were trained

to stay silent in public meetings[111]. One female leader shared her view of community meetings:

> *"There are very clear hierarchies here you know. Those on the top, the men, they talk. The youth and the women just sit on the side saying nothing…It is like a different society compared to the working society. We have to respect the culture…so here they can be the prime minister or whatever…Here your identity matters…not really your function or skills." – Formal leader, Funafuti*

The main constraint discussed, however, was expressed among all categories of leaders and revolved around Tuvalu's financial limitations. The message was that neither they nor their institutions had the funds to put out for any major changes in the society. Commonly discussed as well, was the fact that the state system was slow, lacked funds, and made it difficult to build direct relationships with donors. The Vaitupu leaders argued that Funafuti was given too much money, while the Funafuti leaders argued that more money was given to the outer islands from the national funds.

> *"It is difficult many times. If we need something we go to Kaupule…mostly they reply they don't have money. Then we ask the government and they give the same answer. You know if we have the chance to find projects directly to donors it would be a lot easier…we can do cleaning [sic] ups, control water usage and some planting, but that's it." – Formal leader, Vaitupu*

> *"We are the heads of the island and people listen to us. We try to do waste management and make people dump garbage at one place. But that is it. It depends on the finances, the government only provide us 150,000 dollar a year...what can we do for that?" – Traditional leader, Vaitupu*

The key insight in this subchapter was that all of the leaders referred to financial issues as the major constraint to making any far-reaching contributions (through their institutions) to the local environment.

5.3.3 The perceived adaptation costs of preventive responses

Many interviewees stressed that initiatives were easier to carry out on the outer islands. They reasoned that because the people have more communal lifestyles, have fewer demands for getting paid, and are not bound to working hours, they can easily come together at any point to engage in collective actions. Concerning Funafuti, it was discussed how collective actions are difficult to carry out due to the dependency on a cash economy, people wanting to get paid for their labor, and the fact that many individuals have office hours that limit their free time. One faith-based leader stated:

[111] The detailed differences among female and male leaders are outside of this study's scope. The topic is brought up in this section to be highlighted for future research.

> *"It is very hard. I am working for a company and I have my family too. Whenever someone asks me I cannot just leave my job…Here in Funafuti people are dependent on the shops, they are working, have no time to plant or cook traditional crops, they depend on rice that takes less time, but it is expensive and makes them fat, and they have no time to help their communities." – Faith-based leader, Funafuti*

Another topic brought up was modernization and how it is a limiting factor for local initiatives. It was commonly discussed that norms have changed in the society leading to people preferring technical and expensive solutions instead of more traditional methods of problem solving. Funafuti leaders stated that this was particularly true in the capital. One traditional leader concluded:

> *"Some of the islands have these traditional ways of building sea-walls where they plant multiple trees along the beachside and fill it with rubbish. They not only stop erosion but also extend the side of the island. That has stopped. Why? Because they say it is better to build modern sea walls. But for the old ones we had the tools we needed but with the modern ones you have to cut down big trees…the old only cost labor, but with the new we have to spend all our money." – Traditional leader, Vaitupu*

The key insights in this (and the previous) subchapter were that the leaders thought it would be easier to carry out initiatives in the less developed Vaitupu than the more modernized Funafuti. Collective actions were not really seen as something that led to personal costs in Vaitupu. In Funafuti, collective actions were believed to cause both time and financial costs to individuals. The differences in values were suggested to exist due to modernization, which has contributed to new societal preferences with regard to what has to be developed.

5.4 PMT Applied to Risk Perception

In subchapter 5.2.1, it was noted that half of the interviewees did not acknowledge climate change impacts as the worst threat they were exposed to and believed that modernization issues were the larger threat. We can now discuss whether "adaptations" to modernization issues are different from adaptations to environmental changes. For instance, the decreased use of motorized vehicles would decrease financial costs and health problems in Tuvalu, but also provide environmental benefits. Nevertheless, perceived modernization issues can also make leaders focus on such things as dress codes, road construction, or financial policies. These items, which do not necessarily cause environmental impacts per se, do lead people's engagement, time, and finances away from adaptive initiatives. An example of a non-adaptive outcome is the flush toilets being installed on Vaitupu, exacerbating environmental issues and seen as threatening to the limited water supply. Therefore, according to PMT, when individuals do not acknowledge climate change as the most serious threat, they should

be categorized as having a *low perceived probability*. The interviewees in this study who were more worried about modernization issues fit this label.

Most interviewees could relate to some personal threat experience appraisals from environmental impacts, whose effects were thought to remain over time. This shows that the interviewees possessed at least a minimal risk perception. In PMT, as people are more likely to conceptualize threats they have experienced themselves, the bias "*threat experience appraisal*" is discussed as having a positive effect on their risk perceptions. From this point on, the difference between the two islands becomes significant. It was clear that Vaitupu interviewees could explain local impacts with ease, which seemed to originate from their dependency and everyday use of the local ecology, such as fish stocks and plants. This fact seemed to guide Vaitupu interviewees to state that climatic impacts are the most serious threat they are exposed to. Because they did so, in accordance to PMT, the Vaitupu interviewees should therefore be seen as having a *high perceived probability* of being exposed to a threat (in comparison to their Funafuti counterparts).

In subchapter 5.2.2, concerning the *perceived severity*, a key insight is that the same interviewees who most often did not worry about climate change, regularly expressed uncertainty or denial about the severity of climate change impacts. The denial seemed to be based on the Noah narrative that Tuvalu might be impacted by climate change but cannot "sink." Throughout the analysis, it can be seen that religious aspects have marked influence on how the *probability* and *severity* of climate change is perceived among Tuvaluan leaders. The interviewees who shared this belief in the Noah narrative worried less about the severity of climate change, which contributed to the Funafuti interviewees being more worried about modernization related issues. In PMT, when individuals express uncertainty about the severity of climate change, they should be defined as having a *low perceived severity*. The leaders who thought Tuvalu was threatened to its very existence, should for this reason, in opposition, be seen as having a *high perceived severity*. An interesting notation here, as was suggested in previous research and discussed by some interviewees is that younger people seem to be less bound by religious explanations. This suggests that the role of religion might over time decrease, possibly leading to increasingly higher risk perceptions among Tuvaluans.

Finally, the main lessons from Chapter 5.2 are that *threat experience appraisal* had a positive impact on risk perception. This was seen among the Vaitupu leaders whose reality is based on local farming. Religion was another influential factor. The interviewees who shared a belief in the Noah narrative perceived both *low probability* and *low severity* of climate change, because they did not believe Tuvalu would become uninhabitable. According to PMT logic, the fact that Vaitupu leaders were particularly worried about climate change and its severity suggests that they should be defined as having *high risk perception*. Funafuti leaders were in general more worried about modernization issues, seemingly because of their lesser threat experience appraisal (because of their lack of everyday engagement with plants and farming) and new material demands. In PMT, when individuals are more worried about other issues than climate changes and express uncertainty about its severity, they should be seen as having *low risk perception*.

5.5 PMT Applied to Perceived Adaptive Capacity

In subchapter 5.3.1, it was observed that the interviewees who were uncertain or denying the severity of climate change were more confident that environmental impacts could be adapted to. In PMT, *high perceived adaptation efficacy* refers to when individuals believe they can solve threats. Therefore, the fact that this group of interviewees expressed that environmental impacts could be solved locally suggests that they can be categorized as having *high perceived adaptation efficacy*.

The interviewees who did not share a belief in the Noah narrative exhibited a different focus (the leaders who *perceived high severity* of climate change, like the Vaitupu leaders). They discussed how international support and global mitigation were the only way to handle environmental changes because they doubted local institutions and local actions could make any major contributions to ensure that Tuvalu remains inhabitable. Concerning PMT, if individuals doubt their society's capacity to adapt itself to posed threats, this refers to *low perceived adaptation efficacy*. Therefore, the fact that these interviewees expressed doubts in the ability of local adaptations to solve problems and had not developed ideas for specific adaptive initiatives suggests that these leaders should be categorized as having *low perceived adaptation efficacy*.

In subchapter 5.3.2, it was shown that all the leaders to some extent doubted their own institutions' capacity to carry out any major adaptive initiatives. The difference that existed among the leaders concerned collective actions. Vaitupu leaders expressed that they could engage the people in collective initiatives due to their strong societal ties. The Funafuti leaders also argued that people could be put to work yet they expressed that this has become more difficult due to new material and financial demands. However, in PMT, high perceived self-efficacy refers to individuals that perceive that their engagement truly matters. Therefore, the fact that leaders expressed financial and local institutional limitations suggests that the leaders' perceptions were closer to what PMT defines as having *low perceived self-efficacy*.

Concerning the last subcomponent of perceived adaptive capacity, *perceived adaptation costs*, the difference between the two islands becomes even more apparent. The Funafuti interviewees discussed how it was hard for them to engage in their community, due to such restrictions as working hours in formal jobs, new material demands, rents, and the peoples' demands to be paid for their labor. The Vaitupu leaders, in opposition, perceived less personal costs to engaging in preventive actions; for instance, they explained that they were less bound to time-based activities. Although, discussed by all leaders, one perceived cost to carry out initiatives is that the money that is needed to carry out the new types of projects afforded by modernization. However, among the Vaitupu leaders there were overall few discussed *perceived adaptation costs* to engage in collective actions. This view seemed to be based on their lower dependency on a cash-economy and a more collective living style. Therefore, because few adaptations costs were perceived, the Vaitupu leaders can be seen as having what PMT defines as *high perceived adaptation costs*. The Funafuti leaders perceived their reality as being in complete opposition, which conforms to what PMT defines as having *low perceived adaptation costs*. This conclusion can be drawn due to their expressed difficulties in finding the time and the finances to participate in collective actions (Here it is important to note that *high* refer to no or few perceived costs while *low* refer to more serious and influential perceived adaptations costs).

To sum up, in Chapter 5.3, a key insight is that the leaders who were less certain about the severity of climate changes were more positive about the possibility to adapt to such changes. In contrast, the leaders who were most worried about the severity of climate

change were overly negative about the purposefulness of local initiatives in Tuvalu. Religion was found to be a major influential factor in the way interviewees thought they could adapt to these changes. This is seen in the perception that Tuvalu could not disappear (the Noah Narrative), which was made some interviewees express themselves positively with regard to the future. Modernization was another influential factor, which seemed to have a negative effect on the leaders' *perceived adaptive capacity*. This was seen in their doubts about their abilities to engage people and carry out initiatives (mostly seen among Funafuti leaders).

No clear cases were found of interviewees having what PMT defines as *high perceived adaptive capacity*. The conclusion can be drawn because, first, that the Vaitupu interviewees expressed uncertainty about the purposefulness of local initiatives. The fact that they expressed doubts in local actions (correlating to *low adaptation efficacy)* suggests that they should be defined as having *low perceived adaptive capacity (*even if they did not perceive any major *adaptation costs*).[112] Second, the Funafuti interviewees influenced by the Noah narrative were the leaders closest to having what PMT defines as *high perceived adaptive capacity*. This is seen in their belief that environmental impacts can be solved locally. However, they did express doubts in their own self-efficacy and perceived adaptation costs, seen in how they discussed financial limitations and the general populace's lack of time. Taking these factors into consideration, they stand somewhere in between *high* and *low perceived adaptive capacity*.[113]

6. DISCUSSION

6.1 Adaptive or Maladaptive Responses, What is Likely?

In this chapter, the lessons from Chapters 5.4 and 5.5 will be discussed and connected. At first, some interviewees perceived that environmental issues could be adapted to, but due to their abundant worries about modernization issues, they were barely prioritizing adaptation initiatives. This way of conceptualizing their reality was most common among the Funafuti interviewees. In PMT it is explained that when an issue is not highly prioritized, the

[112] The subcomponent *perceived adaptation efficacy* (whether local initiatives can be purposeful) is the most influential aspect of percieved adaptive capacity, because self-efficacy and adaptations costs will matter less if the capacity of the whole society is denied.

[113] Maladaptive outcomes in the PMT model will be achieved due to their *low risk perception,* regardless of this group's stance on *perceived adaptive capacity*, as it will be discussed in the following chapter.

likely consequence is that few attempts will occur to solve it. The remaining leaders *perceived high severity* with regard to environmental impacts. Yet they believed that the effects in Tuvalu were mainly caused elsewhere, and thought that local actions would be less helpful for Tuvalu than global initiatives. This perceived reality seemingly decreased their ambition to lead local efforts. In PMT, when a threat is not believed to be capable of being resolved locally, it is connected to *low perceived adaptive capacity* and suggests that few adaptations will occur.

Being aware of these two broader perceived realities, the interviewees with *low risk perception* and *high perceived adaptive capacity* (the ones influenced by the Noah narrative and modernization), should in Table 2 (provided below again for convenience) be connected to maladaptive Outcome 2. This can be said because they lacked obvious motivation to deal with the environmental issues. The remaining interviewees, who had *high risk perception* but *low perceived adaptive capacity* (the Vaitupu leaders and four formal leaders from Funafuti), should also be connected to the maladaptive Outcome 3. In PMT logic, even if they expressed motivation to solve environmental issues, they lacked "competence" as to how local actions could possibly be helpful. The fact that they had not developed new ideas for local actions to strengthen their adaptive capacity confirms that they should be connected to a maladaptive outcome. It should be noted here that no leaders could be connected to adaptive Outcome 4.

4 types of outcomes	**Low Perceived Capacity**	**High Perceived Capacity**
Low Risk Perception	**Outcome 1:** Low adaptive capacity Maladaptive outcome	**Outcome 2:** Low adaptive capacity Maladaptive outcome
High Risk Perception	**Outcome 3**: Low adaptive capacity Maladaptive outcome	**Outcome 4**: High adaptive capacity Adaptive outcome

Table 2: Same table as the one presented in Chapter 3.1.1, suggesting whether maladaptive or adaptive outcomes are likely

There were also differences between the two islands in how their leaders approached climate changes. The Vaitupu leaders were more certain about their influence in organizing people in collective actions. Most of all they were better able to understand the ongoing climatic changes. However, due to their *low perceived adaptation efficacy* (that local actions could be purposeful), they remained passive about environmental issues. Nonetheless, their

awareness about how humans affected the local environment made them more concerned about upholding sustainable living; this awareness was based on their *threat experience appraisal*.

It is noteworthy that the way the interviewees conceptualized the Noah narrative (that the world would not again be flooded) was crucial in both the way they perceived risks and how they perceived the adaptive capacity to deal with those risks. Therefore, the single interpretation of this biblical message led interviewees either toward high risk perception or high perceived adaptive capacity. However, it did not make it possible for both components to be perceived as "high" at the same time (which is required by PMT for *adaptive intentions* - Outcome 4). When interviewees denied the Noah narrative, the same knowledge also seemed to decrease their belief in the potential to adapt to environmental changes. One interesting point here is that some interviewees discussed how it is important to increase people's awareness of climate changes to in turn make them live more sustainably. This study shows that more awareness among the leaders did not increase their focus to engage with and lead adaptive initiatives. This is a fact represented by one formal leader from Funafuti:

> *"A few people in Funafuti are aware and have the means…other[s] have the means but not the beliefs while others have the beliefs but not the means…few people do what is best for the community."*

6.2 The Modernization Paradox

Here, at the end of the study, modernization is worth its own discussion due to the fact that it is a barely mentioned topic in any literature about climate change in Tuvalu. It has been shown in this study that because modernization issues decidedly influenced the way leaders prioritized their engagements (in turn important for the local adaptive capacity on small Tuvaluan islands), there is a serious limitation in the current Tuvalu literature. First, modernization in Tuvalu is connected to activities that have negative environmental impacts, for instance, through import or non-degradable materials. It also seems to cause lower health standards, cultural degradation, and increased monetary dependency among the people.

Second, in relation to PMT, among the Tuvaluan civil society leaders modernization decreased the *perceived probability* of climate change (as being the most important issue to

solve), which in turn, contributed to less focus on adaptive capacity strengthening activities (see subchapter 5.2.1). Similarly, as it contributed to *low perceived (and actual) adaptation costs* to the leaders, it also decreased their *perceived adaptive capacity* to deal with any potential threats in a tangible way. This is seen in the Funafuti leaders' perceptions about having more to lose than the people on the outer islands when participating in collective actions (see subchapter 5.3.3).

The negative impacts from modernization become more obvious when looking at the differences between the Vaitupu and Funafuti interviewees. Funafuti has a better infrastructure, more access to the global market, and more possibilities to earn money. Yet concerning the interviewees' answers, in comparison to the outer islands, it is harder for them to organize and participate in local actions, especially those concerning environmental initiatives. Here, it can be discussed that the collective good in Vaitupu was similar to the personal good on the island, while in the capital this was no longer the case, due to modernization leading to new material demands and cash-economy based lifestyles. Therefore, one important realization was that the isolated Vaitupu seemed better off than the modernized Funafuti, because of the decreased knowledge in the capital about the way local actions and lifestyles affect ecosystems (see subchapter 5.2.1). Furthermore, although in the financial and technical driven literature, isolation is often seen as a reason for vulnerability, the results of this study suggest that this should not be a standardized assumption. On small financially and geographically remote Tuvaluan islands, isolation, traditional living, and little involvement from the outside world are strengthening factors in their local adaptive capacity. In many demand driven regions of the world, where fewer insights occur among people regarding how local ecosystems function, this insight teaches an important lesson.

Tuvalu is an important example of a situation where economic growth should *not* be defined as development. Increasing material and financial circulations on Funafuti have given people new possibilities to travel and import flat-screen TVs, but these trends have also knocked out the few but vital natural resources protecting the people from sea level rise and extreme weather. Environmental factors, therefore, are of more importance than economic factors when looking at the potential of small islands states to not only develop but also remain on the world map.

7. CONCLUSIONS

During the introduction of this study, it was presented that Tuvalu is exposed to environmental changes originating from global emissions, such as rising sea level. It was further discussed that local sustainable practices also affect how serious those external threats will be on the Pacific island countries. By continuing unsustainable practices, Tuvaluans are exacerbating the risks their island nation is being exposed to. The literature on climate change prevention and adaptation does not encompass nor explain the role of local sustainable practices in Tuvalu as a way to prevent environmental disasters. Concerning this serious research gap, by examine *how civil society leaders perceive the risks associated with environmental change* and *their adaptive capacity to respond to those risks*, the purpose of this study was to find answers to whether civil society leaders have maladaptive or adaptive intentions.

The interviews conducted with 18 Tuvaluan leaders suggest that few locally led adaptations will occur in Tuvalu due to some of the society's most influential participants not perceiving any need to create adaptive initiatives, while others doubted local protective actions would be helpful in coping with environmental threats.

First, for leaders that were less aware of the risks posed by climate change, focus was placed on issues related to socio-economic modernization. This focus not only steered them away from environmental awareness, but it also encouraged practices that degraded the local environment (even if they had a basic awareness of the negative environmental impacts that could follow from it). For instance, sand from the beaches was dug out for road construction and flush toilets were being built despite constant water shortages.

Second, if the leaders were more aware of the severity of climatic impacts, this understanding did not translate into *adaptive intentions*. Under the condition that they did not share a belief in the Noah narrative, climate change was seen as too complicated to solve, followed by perceptions that local initiatives and their own *self-efficacy* would barely be helpful in adaptation processes. Due to the strong influence of the leaders on the people, this gives us some insight as to why few noticeable attempts have occurred to prevent maladaptations in Tuvalu. Furthermore, in future policy building and environmental workshops in Tuvalu the lessons here suggest that the Noah narrative issue has to be solved

because it will increase people's risk perception. However, this study has shown that risk awareness alone will not lead to initiatives. Therefore, equal focus should be given to convince leaders that local initiatives and sustainable living will make important contributions to the future of life on Tuvalu.

It is relevant to discuss here PMT's appropriateness in this study. First, there are as many approaches as there are arguments on how to measure adaptive capacity, so PMT alone cannot concretely remark upon the way Tuvalu will be impacted by climate change. Second, the PMT itself mentions that values are constantly changing, which raises the question of how quickly attitudes can actually change among the interviewees. Theoretical limitations like these make it difficult to discuss the future of the Tuvaluan islands. Nonetheless, since it cannot be expected that values will change any time soon by themselves, and concerning the serious situation that Tuvalu faces, this suggests that the psychological factors allowing maladaptations to occur have to be better explored before they can be remedied.

Considering that the results did not theoretically lead to the *adaptive intentions* cell in the PMT model (see the PMT model, Chapter 3.1.1), we are from here on motivated to focus on the factors that influenced leaders' *not* to have *adaptive intentions*. In this study, three such key factors were found. The first was religion, seen when interviewees believed that God ensured Tuvalu would remain; this made leaders worry less about climate related issues. The Noah narrative suggests that religion is a limitation to reaching adaptive behavior in Tuvalu, because it decreased people's risk perception concerning the severity of climate change. However, for studies outside Tuvalu, religion might not necessarily be associated with positive or negative outcomes; the key lesson here is that religion and other cultural aspects should be accounted for in environmental studies in the Pacific region.

The second factor was the interviewees' *threat experience appraisal*, a factor that had a positive impact on the interviewees risk perceptions. In technical and financial driven approaches to adaptive capacity, it is often suggested that isolation increases a location's exposure. However, due to unsustainable practices connected to attempts to maintain higher levels of prosperity, the more socio-economic center Funafuti is actually more threatened than the financially and geographically isolated Vaitupu. This finding is based on the Vaitupu leaders' closeness to the physical landscape, making them more aware of the

environmental impacts and their lifestyles and in turn leading to less destructive behaviors. Furthermore, as small Pacific states will never become influential economies, they will not be able to implement costly and technical solutions, contributing to unsustainable practices (artificial extensions of the land, etc.). The literature using the financial and technical approaches of adaptive capacity is correct in that Tuvalu lacks these types of resources. However, this literature foresees that if the Tuvaluan islands had upheld sustainable practices in the first place, costly and technical solutions would not be equally important.

Besides religion and threat experience appraisal, a third influential factor in the continuation of maladaptations was *modernization*. Modernization seemed to be negatively associated with sustainability, as it decreased both the risk perception and the perceived adaptive capacity among leaders. The former because it made leaders engage in alternative activities rather than environmental issues (in combination with religious beliefs that decreased such worries), and the latter because it made leaders express more concern about their self-efficacy and the costs associated with collective actions. The lesson here is that the simultaneously ongoing processes of modernization and human-posed climate change have increased the vulnerability of Tuvalu. This is especially true with regard to Funafuti.

Finally, when discussing climate change adaptations and adaptive capacity in Tuvalu or other threatened locations, future research should be guided by the local human practices and how they influence the natural landscape. To make predictions more accurate and trustworthy about how Tuvalu or other Pacific nations will be impacted by climate change and to develop locally helpful solutions, natural and social scientists should make joint contributions. This study has shown the importance of including psychological aspects in the climate change adaptation discourse. Modernization and religion are seldom discussed in adaptation literature, especially in the case of Tuvalu, which is an obvious limitation when considering that those aspects are highly influential in the way Tuvaluans understand climate change.

Developing an understanding of psychological insights into adaptive capacity is also relevant outside of Tuvalu. The entire Pacific region is experiencing modernization trends, where the old collective and sustainable living is being challenged by new demands that seek resources for financial short-term gain. How modernization affects sustainability within this corner of

the world is a topic yet to be uncovered. In the near future it will become increasingly relevant to further explore this decisive theme; a good start would be to include the psychological factors discussed in this study.

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Departure

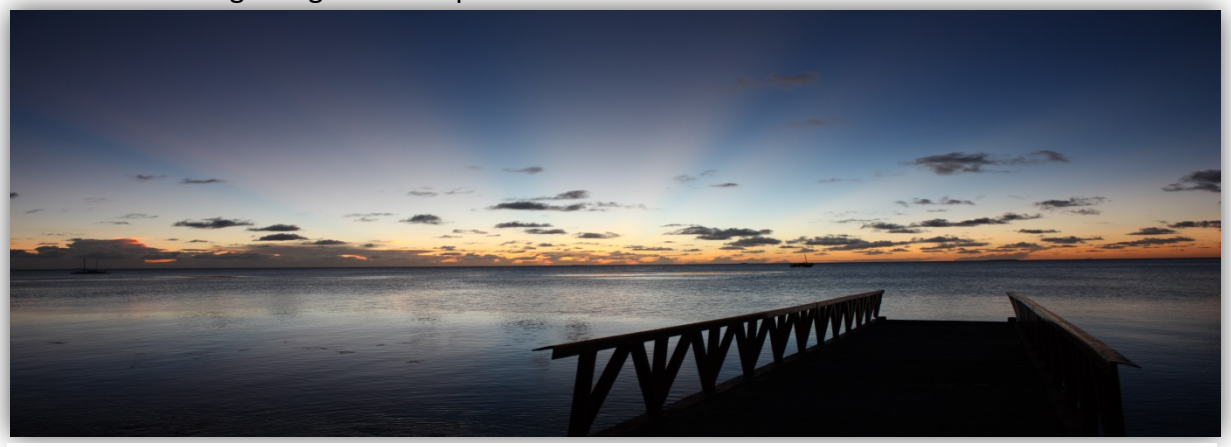
Three months is not a long time but if these months are different from anything else you previously experienced, they can forever change you. Tuvalu is a nation struggling to be recognized, with a people being forced to answer questions about a future they cannot predict. Nonetheless, more than anywhere else, they are open to foreigners. They will help you, take care of you, and let you become a part of their families.

I take the last few steps to enter the aircraft. I wave goodbye to the people I was fortunate enough to get to know. It might take a long time before I again can set a foot on Tuvaluan ground; maybe it'll never happen again. Regarding distance and time, nevertheless, I do know—I know—that these memories of Tuvalu and its beautiful people will always remain close to my heart.

Tuvalu is in many ways an unlikely place of living—scarce of resources, where people's survival, over generations, is based on many extraordinary understandings of how resources can be used and their functions in local ecosystems. I sincerely hope these stories will be recognized and remembered, not only for the Tuvaluans themselves and their worries about losing their identity, but for people all over the world to understand that for the potential of future life on planet Earth, sustainable living is decisive.

I do believe this story, about a place far away, where people are happy, smiling, and live for the moment, in harmony and peace, is a story worth telling. Please help me do so, hence, the reality we predict is the reality we will shape.

Thanks for coming along on this trip– Jonas



Picture 4: My favorite location in Funafuti. Many days at sunset, I used to bring a cold drink, lie down on this pier, and enjoy the sky shifting colors…After all, the small things in life are what make it truly enjoyable.

APPENDIX

Appendix I: Interview Guide

Responses to get further explanations:

- Can you expand a little on this?
- Can you give some examples?
- What do you think personally?
- Mmm
- Can you tell me anything else?

Introduction

- Introduce myself – (name, where I come from, University)
- Purpose of thesis – ("To understand which threats Tuvalu potentially is exposed for"[114])
- Confidentiality – (no names will be used, end or pause interview at any time, only for private use, no right to share material, ask for allowance to record)

Warm up questions

- Who are you x?
- Where are you from originally? (What island?)
- If any: Can you present your organization/institution?
- If any: How long time have you had your post? Which are your main functions within your organization/institution?
- Is it on voluntary basis?

Find important actors and trust in institutions

Which actor(s), do you believe, should take the lead in community development? Who have the most influence on people? "*Try to get suggestions of people I should talk to*"

- How would you explain the work of the government/organizations/institutions? Do you think other actors in society do enough in environment work*? (Reliance on public institutions)*

Risk perceptions and climate change specifically

Would you say there are any serious issues in society? Which are the main reasons these challenges exist? (*Priority bias*)

- Will these, or other challenges, also occur in the upcoming future? How?

Climate change is an often discussed phenomenon. Which effects do you believe climate change might have? Will it occur in the future?

- Does it affect you personally? How? (*Probability to be exposed for a threat*)

[114] Note that this is a broader purpose than the one stated in the introduction. This version had to be used to avoid mentioning climate change and thereby affect the respondents to state this as a key issue even if they had other matters in mind.

- How serious can it become? (*perceived severity*)

Perceived Capacity to adapt to climate change (if they believe climate change occur)

How would you explain the society's potential to adapt to threats related to climate change? (*Perceived adaptive efficacy – make sure they understand the concepts here*)

- About the issues you mentioned, what can be done to deal with them?
- Are there any difficulties in carrying out environment work in society?
- Are the any difficulties in the community to agree on common solutions?
  Are there any solutions needed? Will it be easier or harder to deal with issues in the future? How?

How do you experience your responsibility as an individual? Is it easy or hard for you to carry out ideas or projects concerning adaptations? *(Perceived self-efficacy)*

- Do you experience you have access to the assistance you need in community work? Why/Why not?

Do you experience it is burdening or trouble-free to take part in environmental community work? How? Are there any reasons not to participate in initiatives? Why? (*Perceived adaptive costs)*

- Are there any difficulties in coordinating between family and community engagements?
- Are you ready to put in own resources in climate change adaptation initiatives?

Are you aware of any major projects or activities in society today related to environment and/ or sustainable living?

- Do you find those activities purposeful? Why/why not?
- Do you take part personally?

In your own household, have you made any changes lately? Any changes needed? How?

- Have others done so? How?
- Are you involved in any specific activities today related to climatic issues? Which?
- What would you (your institution) ideally like to work with (in community work)?

Cool off questions/ end of interview/ bonus questions

- How will life be like in Tuvalu a few decades from now?
- Is it anything you would like to add to the discussion we have had?
- Are there any questions you think I should have asked you?

Be clear that no further questions will be asked and that the recorder is turned off. Thank the interviewee for the time and his/her answers. Be conscious of last second confessions!

Appendix II: Pictures

Picture 5: With the lack of ongoing, large-scale projects, some people try to protect themselves and their properties by constructing private sea-walls.

Picture 6: Eroded beach in Vaitupu.

Picture 7: Wedding in Funafuti.

Picture 8: Me together with the Governor General of Tuvalu, his wife, and my favorite everyday playmate, their grandchild, Talia.